Review of Railway Rehabilitation in Central Asia

for Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan

Tender Documents

on the rehabilitation measures for the Kungrad – Kazakh border railway section (Kazakhstan)

Lot 1.1 - Civil Works and Permanent Way

ITALFERR

A project implemented by Italferr S.p.A.

UZBEKISTAN

INVITATION FOR PREQUALIFICATION

[date]
[name of the Employer]
[ADB Loan number]

Rehabilitation measures for the Kungrad – Kazakh Border railway section

Lot 1.1 permanent way and civil works

This Invitation for Prequalification follows the General Procurement Notice for this project that appeared in the "ADB Business Opportunities", issue of [*issue date*].

[*name of Borrower*] has received a loan from the Asian Development Bank (the Bank) towards the cost of [*specify project*] and intends to apply part of the proceeds of the Loan to payments under the contract for the [*specify the contract].*

[*name of Employer]* (the Employer) intends prequalifying firms and joint ventures to tender for the following contract to be funded from part of the proceeds of the loan:

Contract for permanent way rehabilitation works along the line Kungrad – Kazakh Border (excluding the stations) and for bridges rehabilitation.

Main characteristics of the contract are the rehabilitation of 327km single track railway line including permanent way replacement works where necessary (about 177km including sub-ballast, ballast, sleepers, fastenings, rails, weldings for creating the continuous welded rail and joints) and tamping, levelling, re-aligning and ballast addition over 277km. Stations are excluded (rail yards, buildings and passenger facilities). Replacement works over 44 small bridges and other minor works are also envisaged.

The time schedule for realisation is 30 months (say thirty) from the date of the signature of the contract.

Prequalification and tendering for contracts to be financed with the proceeds of a loan from the Bank is open to firms and joint ventures of firms from eligible countries.

Interested eligible firms may obtain further information from [*insert name of Employer*] and inspect Prequalification Documents at the address given below, [*insert address at end of document*] from [*insert office hours*].

Prequalification documents in English language may be obtained from the address below upon payment of a non-refundable fee of [*state currency and value*] or equivalent in a convertible currency. [*Give instructions for payment by bank transfer or the like*].

If requested, the documents will be promptly despatched by courier, but no liability can be accepted for loss or late delivery.

The prequalification documents must be duly completed and delivered to the address below, on or before [*specify time and date of deadline for submission].*

Documents which are received late may be rejected and returned unopened.

Interested firms may obtain further information from, and inspect and acquire the prequalification documents at the following office:

[*Contact name*]

[*Executing agency*]

[*Address*]

[*Tel:*]

[*Fax:*]

Date: _____

STANDARD PROCUREMENT DOCUMENT

Prequalification of Bidders

Asian Development Bank
November 2004

Foreword

This Standard Procurement Document for the Prequalification of Bidders (SPQD) has been prepared by the Asian Development Bank (ADB) and is based on the Master Procurement Document entitled "Prequalification Documents for Procurement of Works", prepared by multilateral development banks and other public international financial institutions which reflects the majority view of these institutions. This document has the structure and the provisions of the Master Procurement Document, except where ADB-specific considerations have required a change.

This SPQD facilitates prequalification of bidders for large and complex civil works contracts, turnkey contracts, and contracts for the fabrication of expensive and technically complex plant and equipment. This is to ensure that only firms with appropriate experience, a proven track record, and necessary annual turnover, which are free of any major pending litigation, will be invited to submit bids.

This SPQD is to be used for the prequalification process for contracts financed in whole or in part by ADB and to be procured through International Competitive Bidding.

An important feature of this SPQD is that it can be used with minimum changes, as it does not contain explanations, footnotes or examples. The SPQD is only available in electronic format.

This SPQD is supported by a User's Guide. The User's Guide contains detailed explanations and recommendations to Employers on how to prepare specific Prequalification Documents and how to evaluate applications. The User's Guide is not a part of the Prequalification Document.

To obtain further information on procurement under ADB-assisted projects, contact

Project Coordination and Procurement Division
Central Operations Services Office
Asian Development Bank
P.O. Box 789, 0980 Manila, Philippines
Email: procurement@adb.org
Fax: (63-2) 636 2475

PROCUREMENT DOCUMENT

Prequalification of Bidders for the Procurement of

_____

_____

_____

_____

Issued on:

Invitation for Prequalification No.:

ICB No.:

Employer:

Country:

Preface

This Prequalification Document (PQD) has been prepared by . . . . . and is based on the Standard Procurement Document for the Prequalification of Bidders (SPQD) issued by the Asian Development Bank dated . . . . . .

ADB's SPQD has the structure and the provisions of the Master Procurement Document entitled "Prequalification Documents for Procurement of Works", prepared by multilateral development banks and other public international financial institutions except where ADB-specific considerations have required a change.

Summary Description

Page No.

PART 1. APPLICATION PROCEDURES

Section I. Instructions to Applicants (ITA) ---------- 1-1
This section specifies the procedures to be followed by Applicants in the preparation and submission of their Applications for Prequalification (AFP). Information is also provided on opening and evaluation of AFPs. **Section I. contains provisions that are to be used without modification**.

Section II. Application Data Sheet (ADS) ---------- 2-1
This section consists of provisions that are specific to each prequalification and supplement the information or requirements included in Section I. Instructions to Applicants.

Section III. Qualification Criteria (QLC) ---------- 3-1
This section contains the criteria and methods to be used to evaluate applications.

Section IV. Application Forms (APF) ---------- 4-1
This section contains the Application Submission Sheet and all the forms required to be submitted with the Application.

Section V. Eligible Countries (ELC) ---------- 5-1
This section contains a list of eligible countries.

PART 2. REQUIREMENTS

Section VI. Scope of Contract (SOC) ---------- 6-1
This section includes a summary description of the scope of contract and additional information on major contract components, major quantities, required construction methods, and the contract implementation period of the Contract subject of this prequalification exercise.

PART 1 – Prequalification Procedures

Section I. Instructions to Applicants

Table of Clauses

		Page
A.	**General**	**1-2**
1.	Scope of Application	1-2
2.	Source of Funds	1-2
3.	Corrupt Practices	1-2
4.	Eligible Applicants	1-2
5.	Eligible Materials, Equipment and Services	1-4
B.	**Contents of Prequalification Document**	**1-4**
6.	Sections of the Prequalification Document	1-4
7.	Clarification of Prequalification Document	1-5
8.	Amendment of Prequalification Document	1-5
C.	**Preparation of Applications**	**1-5**
9.	Cost of Applications	1-5
10.	Language of Application	1-5
11.	Documents Comprising the Application	1-5
12.	Application Submission Sheet	1-6
13.	Documents Establishing the Eligibility of the Applicant	1-6
14.	Documents Establishing the Qualifica-tions of the Applicant	1-6
15.	Signing of the Application and Number of Copies	1-6
D.	**Submission of Applications**	**1-6**
16.	Sealing and Marking of Applications	1-6
17.	Deadline for Submission of Applications	1-7
18.	Late Applications	1-7
19.	Opening of Applications	1-7
E.	**Evaluation of Applications**	**1-7**
20.	Confidentiality	1-7
21.	Clarification of Applications	1-7
22.	Responsive-ness of Applications	1-7
23.	Margin of Preference	1-7
24.	Subcontractors	1-8
F.	**Prequalification of Applicants**	**1-8**
25.	Evaluation of Applications	1-8
26.	Employer's Right to Accept or Reject Applications	1-8
27.	Prequalification of Applicants	1-8
28.	Notification of Prequalification	1-8
29.	Invitation to Bid	1-9
30.	Changes in Qualifications of Applicants	1-9

A. General

1. Scope of Application

1.1 In connection with the Invitation for Prequalification indicated in Section II, Application Data Sheet (ADS), the Employer, as defined in the ADS, issues this Prequalification Document to applicants interested in bidding for the works described in Section VI, Scope of Contract. The number of contracts and the name and identification of each contract as well as the International Competitive Bidding (ICB) number corresponding to this prequalification, are provided in the ADS.

2. Source of Funds

2.1 The Borrower or Recipient (hereinafter called "Borrower") indicated in the ADS has applied for or received financing (hereinafter called "funds") from the Asian Development Bank (hereinafter called "the ADB") towards the cost of the project named in the ADS. The Borrower intends to apply a portion of the funds to eligible payments under the contract resulting from the bidding for which this prequalification is conducted (hereinafter called "the Contract").

2.2 Payments by the ADB will be made only at the request of the Borrower and upon approval by the ADB in accordance with the terms and conditions of the financing agreement between the Borrower and the ADB (hereinafter called the Loan Agreement), and will be subject in all respects to the terms and conditions of that Loan Agreement. No party other than the Borrower shall derive any rights from the Loan Agreement or have any claim to the funds.

3. Corrupt Practices

3.1 ADB's Anticorruption Policy requires borrowers (including beneficiaries of ADB-financed activity), as well as bidders, suppliers, and contractors under ADB-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the ADB:

(a) defines, for the purposes of this provision, the terms set forth below as follows:

(i) "corrupt practice" means the offering, giving receiving, or soliciting, directly or indirectly, of any thing of value to influence the action of any party in the procurement process or the execution of a contract;

(ii) "fraudulent practice" means a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract;

(iii) "collusive practices" means a scheme or arrangement between two or more bidders, with or without the knowledge of the Borrower, designed to influence the action of any party in a procurement process or the execution of a contract;

(iv) "coercive practices" means harming or threatening to harm, directly or indirectly, persons, or their property to influence their participation in a procurement process, or affect the execution of a contract;

(b) will reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract; and

(c) will sanction a party or its successor, including declaring ineligible, either indefinitely or for a stated period of time, to participate in ADB-financed activities if it at any time determines that the firm has, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for, or in executing, an ADB-financed contract.

4. Eligible Applicants

4.1 An Applicant shall be a private or government-owned legal entity, subject to ITA Sub-Clause 4.6, or any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a Joint Venture (JV). In the case of a JV,

(a) all partners to the JV shall be jointly and severally liable; and

(b) a JV shall nominate a representative who shall have the authority to conduct all business for and on behalf of any and all the partners of the JV during the prequalification process and, in the event the JV is prequalified, during the bidding process, and in the event the JV is awarded the Contract, during contract execution.

4.2 An Applicant, and all partners constituting the Applicant, shall have the nationality of an eligible country, in accordance with Section V, Eligible Countries. An Applicant shall be deemed to have the nationality of a country if the Applicant is a national of that country; or is constituted, incorporated, or registered and operates in conformity with the provisions of the laws of that country.

4.3 The above requirement shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.

4.4 Applicants shall not have a conflict of interest. All Applicants found to have a conflict of interest with one or more parties in this prequalification process shall be disqualified. Applicants shall be considered to have a conflict of interest, if they

(a) have controlling shareholders in common; or

(b) receive or have received any direct or indirect subsidy from any of them; or

(c) have the same legal representative for purposes of their Application; or

(d) have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or to influence the application of another Applicant in the subsequent bidding process or influence the decisions of the Employer regarding this prequalification process; or

(e) participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of this prequalification. Where a firm, or a firm from the same economic or financial group, in addition to consulting, also has the capability to manufacture or supply goods or to construct works, that firm, or a firm from the same economic or financial group, may not normally be a supplier of goods or works, if it provided consulting services for the contract corresponding to this prequalification, unless it can be demonstrated that there is no significant degree of common ownership, influence or control.

4.5 A firm that is under a declaration of ineligibility by the ADB in accordance with ITA Clause 3, at the date of submission of the application or thereafter, shall not be considered.

4.6 Government-owned enterprises in the Employer's country shall be eligible only if they can establish that they are legally and financially autonomous, and operate under commercial law, and that they are not in any way dependent agencies of the Employer.

4.7 Applicants shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.

5. Eligible Materials, Equipment and Services

5.1 The materials, equipment and services to be supplied under the Contract and financed by ADB shall have as their country of origin an eligible country of ADB (see Section V, Eligible Countries).

B. Contents of Prequalification Document

6. Sections of the Prequalification Document

6.1 The Prequalification Document consists of Parts 1 and 2 which include all the sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITA Clause 8.

PART 1 Prequalification Procedures

- Section I. Instructions to Applicants (ITA)
- Section II. Application Data Sheet (ADS)
- Section III. Qualification Criteria
- Section IV. Application Forms
- Section V. Eligible Countries

PART 2 Requirements

- Section VI. Scope of Contract

6.2 The "Invitation for Prequalification" issued by the Employer is not part of the Prequalification Document.

6.3 The Employer accepts no responsibility for the completeness of the Prequalification Document and its addenda unless they were obtained directly from the Employer.

6.4 The Applicant is expected to examine all instructions, forms, and terms in the Prequalification Document and to furnish all information or documentation required by the Prequalification Document.

7. Clarification of Prequalification Document

7.1 A prospective Applicant requiring any clarification of the Prequalification Document shall contact the Employer in writing at the Employer's address indicated in the ADS. The Employer will respond in writing to any request for clarification provided that such request is received no later than fourteen (14) days prior to the deadline for submission of Applications. The Employer shall forward copies of its response to all Applicants who have acquired the Prequalification Document directly from the Employer including a description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Prequalification Document as a result of a request for clarification, it shall do so following the procedure under ITA Clause 8 and in accordance with the provisions of Sub-Clause 17.2.

8. Amendment of Prequalification Document

8.1 At any time prior to the deadline for submission of Applications, the Employer may amend the Prequalification Document by issuing addenda.

8.2 Any addendum issued shall be part of the Prequalification Document and shall be communicated in writing to all who have obtained the Prequalification Document directly from the Employer.

8.3 To give prospective Applicants reasonable time in which to take an addendum into account in preparing their Applications, the Employer may, at its discretion, extend the deadline for the submission of applications.

C. Preparation of Applications

9. Cost of Applications

9.1 The Applicant shall bear all costs associated with the preparation and submission of its application, and the Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the prequalification process.

10. Language of Application

10.1 The application, as well as all correspondence and documents relating to the prequalification exchanged by the Applicant and the Employer, shall be written in the English language. Supporting documents and printed literature that are part of the application may be in another language, provided they are accompanied by an accurate translation of the relevant passages into the English language, in which case, for purposes of interpretation of the application, the translation shall govern.

11. Documents Comprising the Application

11.1 The Application shall comprise the following:

(a) Application Submission Sheet, in accordance with ITA Clause 12;

(b) written confirmation authorizing the signatory of the application to commit the Applicant, in accordance with ITA Sub-Clause 15.3;

(c) documentary evidence establishing the Applicant's eligibility to prequalify, in accordance with ITA Clause 13;

(d) documentary evidence establishing the Applicant's qualifications, in accordance with ITA Clause 14; and

(e) any other document required as specified in the ADS.

12. Application Submission Sheet

12.1 The Applicant shall prepare an Application Submission Sheet using the form furnished in Section IV, Application Forms. This form must be completed without any alteration to its format.

13. Documents Establishing the Eligibility of the Applicant

13.1 To establish its eligibility in accordance with ITA Clause 4, the Applicant shall complete the eligibility declarations in the Application Submission Sheet and Forms ELI 1.1 and 1.2, included in Section IV, Application Forms.

14. Documents Establishing the Qualifications of the Applicant

14.1 To establish its qualifications to perform the contract in accordance with Section III, Qualification Criteria, the Applicant shall provide the information requested in the corresponding Information Sheets included in Section IV, Application Forms.

15. Signing of the Application and Number of Copies

15.1 The Applicant shall prepare one original of the documents comprising the application as described in ITA Clause 11 and clearly mark it "ORIGINAL". The original of the application shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Applicant.

15.2 The Applicant shall submit copies of the signed original application, in the number specified in the ADS, and clearly mark them "COPY". In the event of any discrepancy between the original and the copies, the original shall prevail.

15.3 The requirements regarding the legal instrument evidencing the authorization to represent and sign on behalf of the Applicant shall be as specified in the ADS. Applications submitted by an existing or intended JV shall include an undertaking signed by all partners

(a) stating that all partners shall be jointly and severally liable, and

(b) nominating a Representative who shall have the authority to conduct all business for and on behalf of any and all the partners of the JV during the prequalification process and, in the event the JV is prequalified, during the bidding process, and in the event the JV is awarded the Contract, during contract execution.

D. Submission of Applications

16. Sealing and Marking of Applications

16.1 The Applicant shall enclose the original and the copies of the application in a sealed envelope which shall

(a) bear the name and address of the Applicant;

(b) be addressed to the Employer, in accordance with ITA 17.1; and

(c) bear the specific identification of this prequalification process indicated in the ADS 1.1.

16.2 If the envelope is not sealed and marked as required, the Employer will assume no responsibility for the misplacement of the application.

17. Deadline for Submission of Applications

17.1 Applications shall be received by the Employer at the address and no later than the deadline indicated in the ADS.

17.2 The Employer may, at its discretion, extend the deadline for the submission of Applications by amending the Prequalification Document in accordance with ITA Clause 8, in which case all rights and obligations of the Employer and the Applicants subject to the previous deadline shall thereafter be subject to the deadline as extended.

18. Late Applications

18.1 The Employer reserves the right to accept or reject late Applications.

19. Opening of Applications

19.1 The Employer shall prepare a record of the opening of Applications that shall include, as a minimum, the name of the Applicant. A copy of the record shall be distributed to all Applicants.

E. Evaluation of Applications

20. Confidentiality

20.1 Information relating to the evaluation of Applications, and recommendation for prequalification, shall not be disclosed to Applicants or any other persons not officially concerned with such process until the notification of prequalification is made to all Applicants.

20.2 From the deadline for submission of Applications to the time of notification of the results of the prequalification in accordance with ITA Clause 28, if any Applicant wishes to contact the Employer on any matter related to the prequalification process, it may do so in writing.

21. Clarification of Applications

21.1 To assist in the evaluation of Applications, the Employer may, at its discretion, ask any Applicant for a clarification of its application which shall be submitted within a stated reasonable period of time. Any request for clarification and all clarifications shall be in writing.

21.2 If an Applicant does not provide clarifications of the information requested by the date and time set in the Employer's request for clarification, its Application may be rejected.

22. Responsiveness of Applications

22.1 The Employer may reject any Application which is not responsive to the requirements of the Prequalification Document.

23. Margin of Preference

23.1 If so indicated in the ADS, a margin of preference shall apply in the bidding process resulting from this prequalification.

24. Subcontractors

24.1 Applicants shall state in the Application Submission Sheet whether they intend to subcontract parts or elements of the Works.

24.2 If an Applicant intends to subcontract any of the key activities listed in Section III, Qualification Criteria, Criteria 4.2(b), then such key activities and the proposed subcontractors (Specialist Subcontractors) shall be clearly identified in Section IV, Application Forms, Forms ELI-1.2 and EXP-4.2(b). Such Specialist Subcontractor(s) shall meet the corresponding qualification requirements specified in Section III, Qualification Criteria. At the time of bidding, the Bidder shall use in its bid only Specialist Subcontractor(s) prequalified during the prequalification exercise.

24.3 Unless otherwise specified in the ADS, the Employer does not intend to execute certain specific parts of the Works by subcontractors selected in advance by the Employer (Nominated Subcontractors).

F. Prequalification of Applicants

25. Evaluation of Applications

25.1 The Employer shall use the criteria and methods defined in Section III, Qualification Criteria to evaluate the qualifications of the Applicants and proposed subcontractors.

25.2 Only the qualifications of proposed subcontractors that have been identified in the Application pursuant to ITA 24.2 will be considered in the evaluation of an Applicant. However, the general experience and financial resources of subcontractors may not be added to those of the Applicant for purposes of prequalification of the Applicant.

25.3 Unless otherwise indicated in the ADS, this prequalification shall be for a single contract.

26. Employer's Right to Accept or Reject Applications

26.1 The Employer reserves the right to accept or reject any Application, and to annul the prequalification process and reject all applications at any time, without thereby incurring any liability to Applicants

27. Prequalification of Applicants

27.1 All Applicants, including their proposed subcontractors, whose applications have been determined to be substantially responsive to the requirements of the Prequalification Document and who have met or exceeded the specified criteria shall be prequalified by the Employer.

28. Notification of Prequalification

28.1 Once the Employer has completed the evaluation of the Applications it shall notify all Applicants in writing of the names of those applicants who have been prequalified.

29. Invitation to Bid

29.1 Promptly after the notification of the results of the prequalification, the Employer shall invite bids from all the Applicants that have been prequalified.

29.2 Bidders may be required to provide bid security in the form of a demand guarantee or other security acceptable to the Employer for an amount as specified in the bidding document.

29.3 A qualified firm or a member of a qualified joint venture may participate in only one bid for the contract. If a firm submits more than one bid, singly or in joint venture, all bids including that firmrequest will be rejected. This rule will not apply in respect of bids that include specialist subcontractors that are used by more than one bidder.

30. Changes in Qualifications of Applicants

30.1 Any change in the qualification status of an Applicant after being prequalified in accordance with ITA Clause 27 shall be subject to the written approval of the Employer. Any such change shall be submitted to the Employer not later than fourteen (14) days after the date of the Invitation to Bid. Such approval shall be denied if as a consequence of any change,

(a) the prequalified Applicant, after the change, no longer substantially meets the qualification criteria set forth in Section III, Qualification Criteria; or

(b) a new partner that had not been prequalified as an Applicant or a Specialist Subcontractor as per ITA 24.2 is added to a prequalified Applicant.

Section II. Application Data Sheet

A. General

ITA 1.1	The identification of the Invitation for Prequalification is:
ITA 1.1	The name of the Employer is:
ITA 1.1	The names, identification and number of the contracts are:
ITA 1.1	The name and identification number of the ICB are:
ITA 2.1	The name of the Borrower is:
ITA 2.1	The name of the Project is: Rehabilitation measures for the Beyneu – Uzbek Border railway section – Lot 2.1 Telecommunications

B. Contents of the Prequalification Document

ITA 7.1	For **clarification purposes** only, the Employer's address is: Attention: Number and Street: Floor/Room Number: City: . ZIP Code: Country Telephone: Facsimile number: Electronic mail address:

C. Preparation of Applications

ITA 11.1 (e)	The Applicant shall submit with its application the following additional documents:
ITA 15.2	In addition to the original, the number of copies to be submitted with the application is:
ITA 15.3	The requirements regarding the legal instrument evidencing the authorization to represent and sign on behalf of the Applicant shall be:

D. Submission of Applications

ITA 17.1	For **application submission purposes** only, the Employer's address is: Attention: Number and Street: Floor/Room Number: City: ZIP Code: Country: Telephone: Facsimile number: Electronic mail address: **The deadline for application submission is:** Date: Time:

E. Evaluation of Applications

ITA 23.1	A margin of preference . . . . . apply in the bidding process corresponding to this prequalification. If a Margin of Preference applies, the procedure for evaluation will be specified in bidding document.
ITA 24.3	The Employer . . . . . to execute certain specific parts of the Works by subcontractors selected in advance (Nominated Subcontractors). The specific parts of the works and the respective subcontractors are:

F. Prequalification of Applicants

ITA 25.3	As stipulated in ITA 1.1, this prequalification exercise shall be for: . . . .

Section III. Qualification Criteria

Table of Contents

Page

1. Eligibility 3-2
1.1 Nationality 3-2
1.2 Conflict of Interest 3-2
1.3 ADB Eligibility 3-2
1.4 Government-owned Entity 3-2

2. Pending Litigation 3-3
2.1 Pending Litigation 3-3

3. Financial Situation 3-4
3.1 Historical Financial Performance 3-4
3.2 Average Annual Construction Turnover 3-5

4. Experience 3-6
4.1 General Construction Experience 3-6
4.2 Specific Construction Experience 3-7

1. Eligibility

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
1.1 Nationality					
Nationality in accordance with ITA Sub-Clause 4.2.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Forms ELI –1.1; ELI –1.2 with attachments
1.2 Conflict of Interest					
No conflicts of interest in accordance with ITA Sub-Clause 4.4.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Application Submission Sheet
1.3 ADB Eligibility					
Not having been declared ineligible by ADB, as described in ITA Sub-Clause 4.5.	must meet requirement	existing or intended JV must meet requirement	must meet requirement	not applicable	Application Submission Sheet
1.4 Government-owned Entity					
Applicant required to meet conditions of ITA Sub-Clause 4.6.	must meet requirement	must meet requirement	must meet requirement	not applicable	Forms ELI -1.1, ELI -1.2 with attachments

2. Pending Litigation

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
2.1 Pending Litigation					
All pending litigation shall be treated as resolved against the Applicant and so shall in total not represent more than . . . . . percent of the Applicant's net worth.	must meet requirement by itself or as partner to past or existing JV	not applicable	must meet requirement by itself or as partner to past or existing JV	not applicable	Form LIT - 2

3. Financial Situation

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

3.1 Historical Financial Performance

Submission of audited balance sheets or, if not required by the law of the applicant's country, other financial statements acceptable to the Employer, for the last . . . . . years to demonstrate the current soundness of the applicants financial position and its prospective long-term profitability.	must meet requirement	not applicable	must meet requirement	not applicable	Form FIN - 3.1 with attachments

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

3.2 Average Annual Construction Turnover

Minimum average annual construction turnover of US$ . . . . . calculated as total certified payments received for contracts in progress or completed, within the last . . . . . years.	must meet requirement	must meet requirement	must meet . . . . . of the requirement	must meet . . . . . of the requirement	Form FIN - 3.2

4. Experience

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

4.1 General Construction Experience

Experience under construction contracts in the role of contractor, subcontractor, or management contractor for at least the last . . . . . years prior to the applications submission deadline.	must meet requirement	not applicable	must meet requirement	not applicable	Form EXP-4.1

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

4.2 Specific Construction Experience

(a) Contracts of Similar Size and Nature

Participation as contractor, management contractor, or subcontractor, in at least . . . . . contracts within the last . . . . . years, each with a value of at least US$ . . . . . that have been successfully or are substantially completed and that are similar to the proposed works. The similarity shall be based on the physical size, complexity, methods, technology or other characteristics as described in Section VI, Scope of Contract.	must meet requirement	must meet requirement	not applicable	not applicable	Form EXP 4.2(a)

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

4.2 Specific Construction Experience

(b) Construction Experience in Key Activities

For the above or other contracts executed during the period stipulated in 4.2(a) above, a minimum construction experience in the following key activities:	must meet all requirements	must meet all requirements	not applicable	not applicable	Form EXP-4.2(b)

Section IV. Application Forms

Table of Forms

Page

Application Submission Sheet....4-2

Applicant Information Sheet....4-3

JV Information Sheet....4-4

Pending Litigation....4-5

Financial Situation....4-6

Average Annual Construction Turnover....4-7

General Construction Experience....4-8

Specific Construction Experience....4-9

Specific Construction Experience in Key Activities....4-10

Application Submission Sheet

Date: .....
IFP No.: .....
ICB No.: .....

To: .....

We, the undersigned, apply to be prequalified for the referenced ICB and declare the following.

(a) We have examined and have no reservations to the Prequalification Document, including Addenda No(s)....., issued in accordance with ITA Clause 8.

(b) We, including all subcontractors or suppliers for any part of the contract(s) resulting from this prequalification process, if any, have nationalities of eligible countries, in accordance with ITA Sub-Clause 4.2.

(c) We, including any subcontractors or suppliers for any part of the contract(s) resulting from this prequalification, do not have any conflict of interest in accordance with ITA Sub-Clause 4.4.

(d) We, including any subcontractors or suppliers for any part of the contract(s) resulting from this prequalification, have not been declared ineligible by the ADB.

(e) We are a not government-owned entity. (1)

(f) We, in accordance with ITA Sub-clause 24.1, plan to subcontract the following key activities or parts of the works: .....

(g) We declare that the following commissions, gratuities, or fees have been paid or are to be paid with respect to the prequalification process:

Name of Recipient	Address	Reason	Amount
.....	.....	.....	.....
.....	.....	.....	.....

(If none has been paid or is to be paid, indicate "none.")

(h) We understand that you may cancel the prequalification process at any time and that you are not bound either to accept any application that you may receive or to invite the prequalified applicants to bid for the contract(s) subject of this prequalification, without incurring any liability to the Applicants, in accordance with ITA Clause 26.

Name .....

In the capacity of .....

Signed .....
.....
.....

Duly authorized to sign the Application for and on behalf of .....

Date .....
.....

(1) Government-owned entites must replace para (e) with the following statement: "We are a government-owned entity but meet the requirements of ITA Sub-Clause 4.6."

Form ELI – 1.1

Applicant Information Sheet

Date: .....
IFP No.: .....
.....
.....
ICB No.: .....
.....
Page .....of .....pages

Applicant Information	
Applicant's legal name	
In case of JV, legal name of each partner	
Applicant's actual or intended country of constitution	
Applicant's actual or Intended year of constitution	
Applicant's legal address in country of constitution	
Applicant's authorized representative (name, address, telephone numbers, fax numbers, e-mail address)	

Attached are copies of the following original documents.

- ☐ 1. In case of single entity, articles of incorporation or constitution of the legal entity named above, in accordance with ITA Sub-Clauses 4.1 and 4.2.
- ☐ 2. Authorization to represent the firm or JV named in above, in accordance with ITA Sub-Clause 15.3.
- ☐ 3. In case of JV, letter of intent to form JV or JV agreement, in accordance with ITA Sub-Clause 4.1.
- ☐ 4. In case of a government-owned entity, any additional documents not covered under 1 above required to comply with ITA Sub-Clause 4.6.

Form ELI – 1.2

JV Information Sheet

for JV Partners and Specialist Subcontractors as per ITA 24.2

Date: .....
IFP No.: .....
.....
.....
ICB No.: .....
.....
Page .....of .....pages

Each member of a JV and Specialist Subcontractors as per ITA 24.2 must fill in this form

JV / Specialist Subcontractor Information	
Applicant's legal name	
JV Partner's or Subcontractor's legal name	
JV Partner's or Subcontractor's country of constitution	
JV Partner's or Subcontractor's year of constitution	
JV Partner's or Subcontractor's legal address in country of constitution	
JV Partner's or Subcontractor's authorized representative information (name, address, telephone numbers, fax numbers, e-mail address)	

Attached are copies of the following original documents.

❑ 1. Articles of incorporation or constitution of the legal entity named above, in accordance with ITA Sub-Clauses 4.1 and 4.2.

❑ 2. Authorization to represent the firm named above, in accordance with ITA Sub-Clause 15.3.

❑ 3. In the case of government-owned entity, documents establishing legal and financial autonomy and compliance with commercial law, in accordance with ITA Sub-Clause 4.6.

❑ 4. In case of Specialist Subcontractors as per ITA 24.2 a formal intent to enter into an agreement.

Form LIT – 1

Pending Litigation

Applicant's Legal Name: .....
.....
JV Partner Legal Name: .....
.....

Date: .....
IFP No.: .....
ICB No.: .....
.....
Page ..... of ..... pages

Each Applicant or member of a JV must fill in this form

Pending Litigation			
❑ **No pending litigation in accordance with Criteria 2.1 of Section III, Qualification Criteria**			
❑ **Pending litigation in accordance with Criteria 2.1 of Section III, Qualification Criteria, as indicated below**			
Year	**Matter in Dispute**	**Value of Pending Claim in US$ Equivalent**	**Value of Pending Claim as a Percentage of Net Worth**

Form FIN – 3.1

Financial Situation

Applicant's Legal Name: .....
.....
JV Partner's Legal Name: .....
.....

Date: .....
IFP No.: .....
ICB No.: .....
.....
Page .....of .....pages

Each Applicant or member of a JV must fill in this form

	Financial Data for Previous 3 Years [US$ Equivalent]		
	Year 1:	**Year 2:**	**Year 3:**
1. Total Assets			
2. Current Assets			
3. Total Liabilities			
4. Current Liabilities			
5. Profits Before Taxes			
6. Profits After Taxes			

7. Net Worth [= 1 – 3]			
8. Working Capital [= 2 – 4]			
9. Return on Equity [= 5 / 7 of prior year]			

❑ Attached are copies of the audited balance sheets, including all related notes, and income statements for the last three years, as indicated above, complying with the following conditions.

- All such documents reflect the financial situation of the Applicant or partner to a JV, and not sister or parent companies.
- Historic financial statements must be audited by a certified accountant.
- Historic financial statements must be complete, including all notes to the financial statements.
- Historic financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).

Form FIN – 3.2

Average Annual Construction Turnover

Applicant's Legal Name: .....
.....
JV Partner's Legal Name: .....
.....

Date: .....
IFP No.: .....
ICB No.: .....
.....
Page .....of .....pages

Each Applicant or member of a JV must fill in this form

Annual Turnover Data for the Last 3 Years (Construction only)			
Year	**Amount Currency**	**Exchange Rate**	**US$ Equivalent**
	Average Annual Construction Turnover		

The information supplied should be the Annual Turnover of the Applicant or each member of a JV in terms of the amounts billed to clients for each year for work in progress or completed, converted to US Dollars at the rate of exchange at the end of the period reported.

Form EXP – 4.1

General Construction Experience

Applicant's Legal Name: .....
.....
JV Partner's Legal Name: .....
.....

Date: .....
IFP No.: .....
ICB No.: .....
.....
Page .....of .....pages

Each Applicant or member of a JV must fill in this form

General Construction Experience				
Starting Month Year	Ending Month Year	Years	Contract Identification and Name Name and Address of Employer Brief Description of the Works Executed by the Applicant	Role of Applicant

Form EXP – 4.2 (a)

Specific Construction Experience

Applicant's Legal Name: .....
.....
JV Partner's Legal Name: .....
.....

Date: .....
IFP No.: .....
ICB No.: .....
.....
Page .....of .....pages

Fill up one (1) form per contract.

Contract of Similar Size and Nature		
Contract No ..... of	**Contract Identification**	
Award Date		**Completion Date**
Role in Contract	❑ **Contractor** ❑ **Management Contractor** ❑ **Subcontractor**	
Total Contract Amount		**US$**
If partner in a JV or subcontractor, specify participation of total contract amount	**Percent of Total**	**Amount**
Employer's Name **Address** **Telephone/Fax Number** **E-mail**		
Description of the similarity in accordance with Criteria 4.2(a) of Section III		

Form EXP – 4.2(b)

Specific Construction Experience in Key Activities

Applicant's Legal Name: ..... Date: .....

JV Partner's Legal Name: ..... IFP No.: .....

Subcontractor's Legal Name (as per ITA 24.2): ..... ICB No.: .....

..... Page : ..... of .....pages

Fill up one (1) form per contract

Contract with Similar Key Activities		
Contract No . . . . . of	**Contract Identification**	
Award Date		**Completion Date**
Role in Contract	❑ **Contractor** ❑ **Management Contractor** ❑ **Subcontractor**	
Total Contract Amount		**US$**
If partner in a JV or subcontractor, specify participation of total contract amount	**Percent of Total**	**Amount**
Employer's Name **Address** **Telephone Number** **Fax Number** **E-mail**		
Description of the key activities in accordance with Criteria 4.2(b) of Section III		

Section V. Eligible Countries

PART 2 – Requirements

Section VI. Scope of Contract

Table of Contents

A. Requirements 2
1. Brief Description of the Scope 2
2. Major Contract Components 7
3. Estimated Quantities of Major Components 7
4. Methods Required 7
5. Contract Implementation Period 8

B. Supplementary Information 9
1. Project Country 9
2. Contract Site 9

C. Facilities to be Provided by the Employer 10

A. Requirements

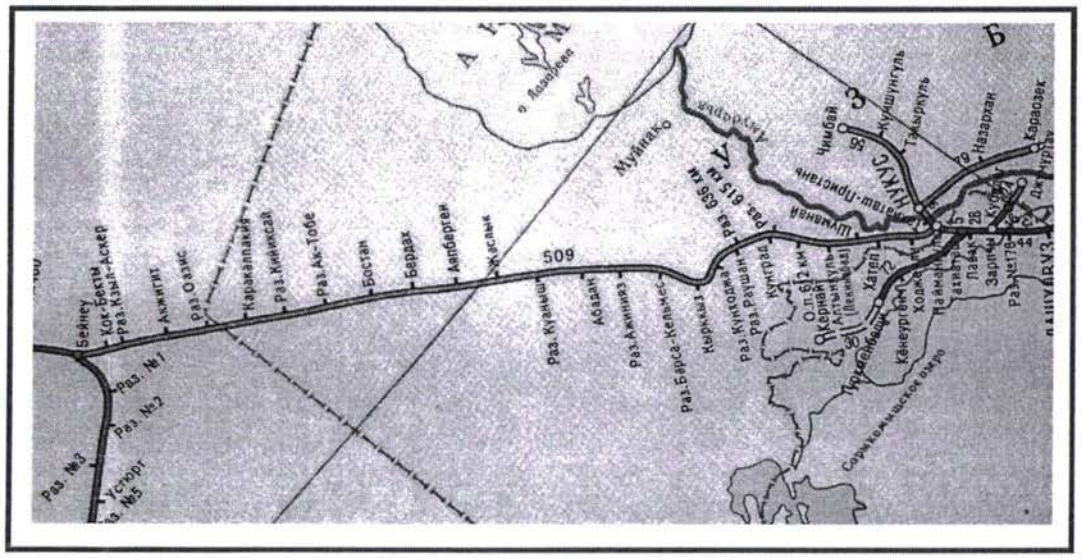
1. Brief Description of the Scope

The Scope of works refers to the conclusions of the feasibility study of the rehabilitation measures for the Kungrad - Kazakh border railway section in Uzbekistan.

Historically the section under study belongs to the line Kungrad - Beyneu (407 km) as it is shown in the following Figures A and B.

Figure A - The Kungrad – Beyneu railway line

Figure B - Details of Kungrad-Beyneu railway line



After the collapse of the former Soviet Union, the line has been split into two sections because of the introduction of the national border between Uzbekistan and Kazakhstan: the Kungrad – Border (327 km) and the Beyneu – Border (80 km).

Improvements along the main line have to be financed and managed by two different Railway Administrations. Consequently the study had to consider two different Feasibility Studies for rehabilitation measures concerning sections of the same line.

The Feasibility Study carried out for the Uzbek side of the line (from Kungrad to the Border) has outlined that improvements have been planned by the Uzbek Railways and that rehabilitation measures, due to the shortage of finance founds, could not be put in place in the last period. Therefore, the general maintenance conditions of the infrastructure in every element of its body, have been found to be focused at maintaining the minimum status, and to apply progressive speed restrictions for facing the safety problems deriving from such maintenance lack.

The line from Kungrad to the Kazakh border is 327 km long, single tracked, not electrified, mainly running on a low embankment (1-3m) and in a desert and flat territory. The line is operated in Uzbekistan by means of 15 stations, some of them only for train operations, some for passenger service. Traffic on the line is very low (about 4 pairs of trains per day) and maximum operating speed for passenger trains is today 50-70 km/h (in some short sections 80 km/h).

The Feasibility study focused on the minimum sustainable works to be implemented for increasing operation speeds both for passenger and freight trains, for increasing the maintenance status of the infrastructure and permanent way and for re-establishing the

original conditions of the line itself for PW, civil works and structures. In order the works to be sustainable, the feasibility study focused only on the sections comprised between two consecutive stations, without taking into consideration civil works or PW implementation into the stations. There in fact, the generalised lack of maintenance has not been proved to considerably affect the line operations and therefore the benefits of such measures into the stations would not have resulted in sufficient effects when compared with the measure's costs.

The objective of the interventions is not only to improve the original characteristics, but also to obtain higher levels of safety, speed and reliability of the infrastructure, that must be considered as a present and future transportation axis for all the area.

The specific technical aims are:
- increasing traffic speed both for passenger and freight trains;
- increasing traffic safety in terms of accident (or their probability) reduction;
- increasing general service level (S.L.) offered by the infrastructure to the running trains, in terms of travel quality, speed, vibration and noise;
- reducing environmental impact of the railway system, consequent to emissions reduction, and noise and vibration reduction;
- increasing line capacity in terms of trains per day (depending on the traffic flow directions, on signalling and telecommunication devices, on stations maximum distance).

In terms of costs, the proposed options have been focused on the following targets:
- reducing maintenance costs (for rolling stock and infrastructure);
- reducing operation costs (rolling stock and operation personnel) consequent to travel time reduction;
- reducing accidents costs;
- recycling residual material of the replaced permanent way, by using them on secondary lines of the network or on sidings and branches with low traffic.

The situation of the existing permanent way along the line and into the stations on the studied section, can be summarized as it follows.

Existing permanent way on line and stations

Rehabilitation of the Kungrad-Beyneu railway line - Permanent way type on the Kungrad - Border section												
Station		**Chainage**		**Type of rails**		**Type of sleepers**		**Traffic**	**Stations**			
	Name							**by 01.05**	**Siding 1**	**Turnouts**		
		start km	**end km**	**P-65**	**P-50**	**Wood**	**Concr.**	**(mln gross tn)**	**PW Type 1**	**Tot**	**P50**	**P65**
		Between turnouts		*km*	*km*	*km*	*km*					
1	*Kungrad*	*626.000*	*628.269*		*1.868*	*1.868*			*W+P50*	*12*	12	0
		628.269	645.254		16.985	16.985						
2	*Raushan*	*645.254*	*647.583*	*2.229*			*2.229*		*C+P65*	3	3	0

Rehabilitation of the Kungrad-Beyneu railway line - Permanent way type on the Kungrad - Border section

Station		Chainage		Type of rails		Type of sleepers		Traffic	Stations			
	Name							by 01.05	Siding 1	Turnouts		
		start km	end km	P-65	P-50	Wood	Concr.	(mln gross tn)	PW Type 1	Tot	P50	P65
		Between turnouts		km	km	km	km					
		647.583	657.200	9.617			9.617					
		657.200	659.200		2.000	2.000						
		659.200	670.249	11.049			11.049					
3	Kunkhodja	670.249	672.660	1.057	1.254	1.254	1.057		C+P65	3	3	0
		672.660	686.615	10.000	4.000	4.100	9.900	325.800				
4	Kyrk-Kyz	686.615	688.715		1.966	1.966			W+P50	4	4	0
		688.715	711.182	6.000	16.500	22.500	-	800.200				
5	B.-Kelmes	711.182	713.540		2.258	2.258			C+P65	3	3	0
		713.540	732.799	2.400	19.600	19.600	2.400	800.200				
6	Ajiniyaz	732.799	735.140		2.241	2.241			W+P50	3	3	0
		735.140	756.506	-	21.400	21.400	-	800.200				
7	Abadan	756.506	757.845		1.205	1.205			W+P50	4	4	0
		757.845	777.348		19.503	19.503		800.200				
8	Kuanysh	777.348	779.701		2.253	2.253			C+P65	3	3	0
		779.701	796.146		16.445	16.445		800.200				
9	Jaslyk	796.146	797.890		1.577	1.577			W+P50	5	5	0
		797.890	820.770		22.880	22.880		789.300				
10	Ayapb.	820.770	823.136		2.266	2.266			C+P65	3	3	0
		823.136	845.185	22.049			22.049	359.000				
11	Berdakh	845.185	847.532		2.247	2.247		789.300	W+P50	3	3	0
		847.532	870.220	22.688			22.688					
12	Bostan	870.220	871.579	1.192			1.192		W+P50	5	1	4
		871.579	891.477	19.898			19.898	188.700				
13	Ak-Tobe	891.477	893.800		2.223	2.223			W+P50	3	3	0
		893.800	912.309		18.509	18.509		789.300				
14	Kiyiksay	912.309	914.651		2.242	2.242			C+P65	3	3	0
		914.651	927.900		13.249	13.249		789.300				
		927.900	932.741	4.841			4.841	441.500				

Rehabilitation of the Kungrad-Beyneu railway line - Permanent way type on the Kungrad - Border section												
Station		Chainage		Type of rails		Type of sleepers		Traffic	Stations			
	Name							by 01.05	Siding 1	Turnouts		
		start km	end km	P-65	P-50	Wood	Concr.	(mln gross tn)	PW Type 1	Tot	P50	P65
		Between turnouts		*km*	*km*	*km*	*km*					
15	*Karak.*	*932.741*	*934.186*		*1.245*	*1.245*			*W+P50*	*6*	5	1
		934.186	953.000	*18.814*			*18.814*	230.600				
	BORDER	953.000								**63**	**58**	**5**

Some sections of the line are also equipped with continuous welded rails (CWR), as described by the following table.

Rehabilitation of the Kungrad-Beyneu railway line – PW with CWR on the Kungrad – Border section			
Chainages	**Rail type**	**Type of sleeper**	**Notes**
km 647 – km 658	P65	reinforced concrete	Continuous welded rails
km 658 – km 660	P65	wooden	Continuous welded rails
km 660 – km 677	P65	r. concrete	Continuous welded rails

The following tables resume the PW characteristics along the Kungrad-Border line.

PW type Uzbekistan (327 km) (turnouts excluded)		
	Km of line	**Km in stations main tracks**
W+P50	177.071	22.976
C+P65	121.356	4.478

The line Kungrad-Border is provided with 15 stations with an average distance of 20 km. The following table resumes the stations position and distances on the Kungrad-Beyneu line.

Stations of the Kungrad-Beyneu line					
Station name	Chainage km	Distance km	Station name	Chainage km	Distance km
Kungrad	626.917		Berdakh	846.503	
		19.651			24.497
Raushan	646.568		Bostan	871.000	
		25.034			21.788
Kunkhodja	671.602		Ak-Tobe	892.788	
		16.582			20.797
Kyrk-Kyz	688.184		Kiyiksay	913.585	
		24.298			19.583
Barsa-Kelmes	712.482		Karakalpakia	933.168	
		21.610			20.332
Ajiniyaz	734.092		BORDER	953.500	
		23.050			1.470
Abadan	757.142		Oazis	954.970	
		21.540			21.551

Kuanysh	778.682		Akjigit	976.521	
		18.698			27.117
Jaslyk	797.380		Kzyl-Asker	1003.638	
		24.700			19.523
Ayapbergen	822.080		Kok-Bekty	1023.161	
		24.423			10.418
			Beyneu	1033.579	

Under the operation point of view, from the original speed of 100-120 km/h for passenger trains and 80 km/h speed for freight trains, the maximum allowed speeds are, for the time being, the following:

Current speed restriction on the Kungrad-Border line		
Stretches between stations	**Length** (km)	**Maximum speed allowed** (km/h)
Kungrad – Raushan	21	50
Raushan – Kyrkis	41.6	70
Kyrk -Kyz – Berdakh	158.4	50
Berdakh – Aktobe	46.3	80
Aktobe – Kaiksay	20.8	50
Kaiksay – Kazak border	39.9	60

2. Major Contract Components

Major Contract components are:
1. topographic survey of the existing line and correction of the existing alignment and profile,
2. permanent way replacement (works and materials), including welding and regulation,
3. final tamping, levelling, aligning,
4. excavation of ditches,
5. re-paving of level crossings,
6. renewal of 44 small bridges (substitution of beams and overall maintenance of the piers and abutments).

3. Estimated Quantities of Major Components

Estimated quantities of major components are:
1. topographic survey of the existing line and correction of the existing alignment and profile: 327 km
2. permanent way replacement (works and materials), including welding and regulation: 177 km
3. final tamping, levelling, aligning: 277 km
4. excavation of ditches: 100 km
5. re-paving of level crossings: 15 l.c.,

6. renewal of 44 small bridges (substitution of 176 beams and overall maintenance of 110 piers and abutments).

4. Methods Required

No specific methods are required.

5. Contract Implementation Period

The contract implementation period will be of 30 months. The time schedule for implementation should avoid the interferences with the implementation of other Lots.

B. Supplementary Information

1. Project Country

The project country is Uzbekistan.

2. Contract Site

The contract site is along the railway line between Kungrad and the border with Kazakhstan.

C. Facilities to be Provided by the Employer

[...].

Asian Development Bank

Design-Build and Turnkey Contracts

Standard Bidding Document
Single Stage – One Envelope

Table of Contents

Instructions

Invitation for Bids, (Single Stage Bidding Procedure)
Notes on the Invitation for Bids
Invitation for Bids, Sample Clauses

Section 1 Instruction to Bidders,
Notes on the Instructions to Bidders
Table of Clauses
A. General
B. Bid Documents
C. Preparation of Bids
D. Submission of Bids
E. Bid Opening and Evaluation
F. Award of Contract

Section 2 Part I – General Conditions,
Notes on the Conditions of Contract
FIDIC Conditions of Contract for Design-Build and Turnkey,
First Edition 1995

Section 3 Part II – Conditions of Particular Application
Notes on the Preparation of the Conditions of Particular Application
Part II – Conditions of Particular Application, sample clauses

Section 4 Employer's Requirements

Section 5 Form of Bid and Appendix to Bid
Notes on Preparing Forms of Bid and Appendix to Bid
Form of Bid
Appendix to Bid

Section 6 Sample Forms
Notes on Sample Forms
Form of Bid Security
Form of Contract Agreement
Form of Performance Security
Form of Advance Payment
Form of Domestic Preference Guarantee

Section 7 Schedules
Notes on Schedules
Schedules of Prices
Schedule of Payment
Schedule of Coefficient and Indices for Price Adjustment
Schedule of Major items of Constructional Plant
Schedule of Key Personnel
Schedule of Subcontractors

Section 8 List of Eligible Member Countries of the Asian Development Bank,

Notes on List of Eligible Member Countries of the ADB

Section 9 Drawings
Notes on Drawings

Section 10 Notes on Selected Clauses of the Conditions of Contract, Preamble

Invitation for Bids

Single Stage Bidding Procedure

INVITATION FOR BIDS
(SINGLE STAGE BIDDING PROCEDURE)

Notes on the Invitation for Bids

The Invitation for Bids should be issued to all contractors who were determined by the Borrower to be qualified in accordance with the Borrower's prequalification procedure.

Its purpose is to supply information to enable prequalified bidders to decide on their participation.

INVITATION FOR BIDS

Date: *[of issue of invitation]*
Loan No.: _____
Contract No. _____

1. The _____ *[name of borrower]* has received[1] a loan from the Asian Development Bank (ADB) towards the cost of _____ *[name of project]* and it is intended that part of the proceeds of this loan will be applied to eligible payments under the contract for _____ *[name of Contract].* Bidding is open to all prequalified bidders from eligible source countries of the Asian Development Bank.

2. The _____ *[name of Employer]* ("the Employer") invites sealed bids from prequalified eligible bidders for design-build and completion of Civil works and Permanent Way (Lot 1.1) for the rehabilitation of the Kungrad – Kazakh Border railway section ("the Works").

3. Bidders may obtain further information from, and inspect and acquire the bidding documents, at _____ *[mailing address, street address, and cable/telex/facsimile numbers].*[2]

4. A complete set of bidding documents may be purchased by interested eligible bidders on submission of a written application to the above office, and upon payment of a nonrefundable fee of _____ *[insert amount and currency].*[3]

5. All bids must be accompanied by a bid security of _____ *[indicate amount]*[4] or an equivalent amount in a freely convertible currency, and must be delivered to _____ *[indicate address and exact location]* at or before _____ *[hours]* on _____ *[date].*[5] Bids will be opened immediately thereafter in the presence of bidders' representatives who choose to attend.[6]

Include para. 6 only if Domestic Preference has been expressly provided in the

---

1 Substitute "has applied for" if appropriate.

2 The Borrower and the Employer may be the same or different entities. The text of the Invitation for Bids and the texts of the other documents herein must indicate which agency will act as the Employer.

3 The fee chargeable should only be nominal to cover reproduction and mailing costs and to ensure that only bona fide bidders will apply for bidding documents. An amount of between US$50 and US$500 equivalent is considered appropriate, depending on the size and complexity of the Contract.

4 Insert the amount indicated in Sub-Clause 18.1 of Section 1, Instructions to Bidders, Bid Security.

5 Coordinate with sub-Clause 23.1 of Section 1, Instructions to Bidders, Deadline for Submission of Bids.

6 Coordinate with sub-Clause 26, 1, Instructions to Bidders, Bid Opening.

Loan Agreement and is included in the Instructions to Bidders.

6. In the comparison of bids, the Employer will grant a margin of preference to

[Alternative A] [7] eligible goods manufactured in

[Alternative B] [7] eligible domestic contractors (including eligible joint ventures of foreign contractors and domestic contractors) from

the Employer's country in accordance with the procedures outlines in the bidding documents.

[7] Select only one of the two alternatives, See Instructions to Bidders, Clause 33, Alternative A and Alternative B.

Section 1

Instructions to Bidders

Single Stage Bidding Procedure

SECTION 1
INSTRUCTIONS TO BIDDERS
(SINGLE STAGE BIDDING PROCEDURE)

Section 1 - Instruction to Bidders

TABLE OF CLAUSES

A. General

1. Scope of Bid
2. Source of Funds
3. Eligible Bidders
4. Eligible Materials, Equipment and Services
5. Qualification of the Bidder
6. One Bid per Bidder
7. Cost of Bidding
8. Site Visit

B. Bidding Documents

9. Content of Bidding Documents
10. Clarification of Bidding Documents
11. Amendment of Bidding Documents

C. Preparation of Bids

12. Language of Bid
13. Documents Comprising the Bid
14. Bid Form and Price Schedules
15. Bid Prices
16. Currencies of Bid and Payment
17. Bid Validity
18. Bid Security
19. Alternative Proposals by Bidders
20. Pre-Bid Meeting
21. Format and Signing of Bid

D. Submission of Bids

22. Sealing and Marking of Bids
23. Deadline for Submission of Bids
24. Late Bids
25. Modification and Withdrawal of Bids

E. Bid Opening and Evaluation

26. Bid Opening
27. Process to be Confidential
28. Clarification of Bids
29. Preliminary Examination of Bids and Determination of Responsiveness
30. Correction of Errors
31. Conversion to Single Currency
32. Evaluation and Comparison of Bids
33. Domestic Preference

F. Award of Contract

34. Award
35. Employer's Right to Accept any Bid and to Reject any of all Bids
36. Notification of Award
37. Signing of Contract Agreement
38. Performance Security
39. Corrupt or Fraudulent Practices

Section 1. Instructions to Bidders

A. General

1. Scope of Bid

1.1 The _____ *[name of Employer]*[8] (hereinafter referred to as "the Employer"), wishes to receive bids for design-build and completion of Civil works and Permanent Way (Lot 1.1) for the Rehabilitation of the Kungrad – Kazakh Border railway section, as defined in these bidding documents (hereinafter referred to as "the Works").

1.2 The successful bidder will be expected to complete the Works within 36 (thirtysix) months[9] from the date of commencement of the Works.

2. Source of Funds

2.1 The _____ *[name of Borrower]* has received[10] a loan from Asian Development Bank (hereinafter referred to as "the ADB"), towards the cost of _____ *[name of project]* and intends to apply part of the proceeds of this loan to eligible payments under the contract (hereinafter referred to as "the Contract") for which this Invitation to Bid is issued. Payment by the ADB will be made only at the request of the *[name of Borrower]* and upon approval by the ADB in accordance with the Loan Agreement, and will be subject in all respects to the terms and conditions of that Agreement. Except as the ADB may specifically otherwise agree, no party other than the *(name of Borrower)* shall derive any rights from the Loan Agreement or have any rights to the loan proceeds.

3. Eligible Bidders

3.1 This Invitation to Bid is open to prequalified bidders only. Each bidder (including all members of a joint venture and all subcontractors of a bidder) shall be from an eligible source country as listed in Section 8.

3.2 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer as the Employer shall reasonably request.

3.3 Bidders shall not be under a declaration of ineligibility for corrupt or fraudulent practices issued by the ADB in accordance with Sub-Clause 39.1(c).

4. Eligible Materials, Equipment and

4.1 The materials, equipment, and services to be supplied under the Contract shall have their origin in eligible source countries as defined in Sub-Clause 3.1 above and all expenditures

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8 See definitions of the terms used in these (Instructions to Bidders in Sub-Clause 1.1 of Section 2: Part 1- General Conditions.

9 For contracts of less than one year duration, use weeks. The figure indicated here should be the same as shown in the Appendix to Bid. (Section 5)

10 Substitute "has applied for" if appropriate.

Services

made under the Contract will be limited to such materials, equipment, and services. At the Employer's request, bidders may be required to provide evidence of the origin of materials, equipment, and services.

4.2 For purposes of Sub-Clause 4.1 above, "services" means the works and all project-related services including design services.

4.3 For purposes of Sub-Clause 4.1 above, "origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing or substantial or major assembling of components, a commercial recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

5. Qualification of the Bidder

5.1 To be qualified for award of Contract, bidders shall:

(a) submit a written power of attorney authorizing the signatory of the bid to commit the bidder; and

(b) have adequate financial capacity and technical capability to undertake the Contract. This will include the updating and reassessment of information which may previously have been considered during prequalification and an assessment of bidder's proposals regarding work methods, scheduling and resourcing which shall be provided in sufficient detail to confirm the bidder's capability to complete the works in accordance with the Employer's Requirements and the time for completion.[11]

5.2 Bids submitted by a joint venture of two or more firms as partners shall comply with the following requirements:

(a) the bid, and in case of a successful bid, the Form of Contract Agreement, shall be signed so as to be legally binding on all partners;

(b) one of the partners shall be authorized to be in charge; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners;

(c) the partner in charge shall be authorized to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the joint venture and the entire execution of the Contract;

(d) all partners of the joint venture shall be jointly and severalty liable for the execution of the Contract in accordance with the Contract terms, and a relevant

[11] If considered necessary, reference may also be made to work in hand, future commitments, and current litigation.

statement to this effect shall be included in the authorization mentioned under (b) above as well as in the Bid Form and the Form of Contract Agreement (in case of a successful bid); and

(e) a copy of the agreement entered into by the joint venture partners shall be submitted with the bid.

5.3 Bidders shall also submit proposals of work methods and schedule in sufficient detail to demonstrate the adequacy of the bidder's proposals to meet the Employer's Requirements and the completion time referred to in Sub-Clause 1.2 above.

6. One Bid per Bidder

6.1 Each bidder shall submit only one bid either by itself, or as a partner in a joint venture. A bidder who submits or participates in more than one bid will cause all those bids to be rejected.

7. Cost of Bidding

7.1 The bidder shall bear all costs associated with the preparation and submission of its bid and the Employer will in no case be responsible or liable for those costs.

8. Site Visit

8.1 The bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for the design-build and completion of the Works. The costs of visiting the Site shall be at the bidder's own expense.

8.2 The bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such inspection, but only upon the express condition that the bidder, its personnel and agents, will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof and will be responsible for death or personal injury, loss of or damage to property and any other loss, damage, costs and expenses incurred as a result of the inspection.

8.3 The Employer may conduct a Site visit concurrently with the Pre-Bid Meeting referred to in Clause 20.

B. Bidding Documents

9. Content of Bidding Documents

9.1 The bidding documents are those stated below, and should be read in conjunction with any Addenda issued in accordance with Clause 11:

	Invitation for Bids
Section 1	Instructions to Bidders
2	Part I - General Conditions
3	Part II - Conditions of Particular Application
4	Employer's Requirements
5	Form of Bid and Appendix to Bid
6	Sample Forms
7	Schedules

8 List of Eligible Member Countries
9 Drawings

9.2 The bidder is expected to examine carefully the contents of the bidding documents. Failure to comply with the requirements of bid submission will be at the bidder's own risk. Pursuant to Clause 29, bids which are not substantially responsive to the requirements of the bidding documents will be rejected.

10. Clarification of Bidding Documents

10.1 A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or by fax (hereinafter the term "fax" is deemed to include electronic transmission such as facsimile, cable and telex) at the Employer's address indicated in the Invitation for Bids. The Employer will respond to any request for clarification which it receives earlier than _____ *[insert numbers]*[12] days prior to the deadline for submission of bids. Copies of the Employer's response, including a description of the inquiry, will be forwarded to all purchasers of the bidding documents.

11. Amendment of Bidding Documents

11.1 At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the bidding documents by issuing addenda.

11.2 Any addendum thus issued shall be part of the bidding documents pursuant to Sub-Clause 9.1, and shall be communicated in writing or by fax to all purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum by fax to the Employer.

11.3 To afford prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may extend the deadline for submission of bids, in accordance with Clause 23.

C. Preparation of Bids

12. Language of Bid

12.1 The bid, and all correspondence and documents related to the bid, exchanged between the bidder and the Employer shall be written in the English language. Supporting documents and printed literature furnished by the bidder may be in another language provided they are accompanied by an accurate translation of the relevant passages in the English language, in which case, for purposes of interpretation of the bid the English translation shall prevail.

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12 Adequate time should be allowed for potential bidders to take the Employer's response into account in bid preparation. Thirty days are usually sufficient, but for large and complex works with long bid preparation periods, a minimum period of 42 to 56 days may be necessary, depending on the circumstance. It may be necessary to extend the deadline for submission of bids (see Sub-Clause 23.2).

13. Documents Comprising the Bid

13.1 The bid submitted by the bidder shall comprise the following:

(i) Bid Form and Appendix to Bid;
(ii) Form of Bid Security;
(iii) Power of Attorney;
(iv) Information on Qualification;
(v) Confirmation of Eligibility;
(vi) Schedules of Prices:

I. Design, Drawings and Documentation
II. Plant and Equipment, including Mandatory Spare Parts Supplied from outside the Employer's Country;
III. Plant and Equipment, including Mandatory Spare Parts supplied from within the Employer's Country;
IV. Civil Works, Installation and Other Services;
V. Grand Summary; and
VI. Recommended Spare Parts.

(vii) Schedule of Payment;
(viii) Schedule of Coefficients and Indices for Price Adjustment;
(ix) Schedule of Major Items of Equipment;
(x) Schedule of Major Items of Constructional Plant;
(xi) Schedule of Key Personnel;
(xii) Schedule of Subcontractors;
(xiii) Schedule of Recommended. Spare Parts; and
(xiv) Schedule of Compliance with the Bidding Document; and
(xv) Any other materials required to be completed and submitted by bidders in accordance with these Instructions to Bidders.

14. Bid Form and Price Schedules

14.1 The Bidder shall complete the Bid Form and the appropriate Price Schedules furnished in the bidding documents in the manner and detail indicated therein, following the requirements of Clauses 15 and 16;

15. Bid Prices

15.1 Unless specified otherwise in Employer's Requirements, Bidders shall quote for the entire facilities on a "single responsibility" basis such that the total bid price covers all the Contractor's obligations mentioned in or to be reasonably inferred from the bidding documents in respect of the design, manufacture, including procurement and subcontracting (if any), delivery, construction, installation and completion of the facilities. This includes all requirements under the Contractor's responsibilities for testing, precommissioning and commissioning of the facilities and, where so required by the bidding documents, the acquisition of all permits, approvals and licenses, etc, operation maintenance and training services and such other items and services as may be specified in the bidding documents, all in accordance with the requirements of the Conditions of Contract.

15.2 Bidders shall give a breakdown of the prices in the manner and detail called for in the Schedules of Prices.

15.3 In the Schedules, Bidders shall give the required details and a breakdown of their prices, including all taxes, duties, levies, and charges payable in the Employer's country as of twenty eight (28) days prior to the deadline for submission of bids, as follows:

(a) Design including all necessary drawings and documentation for the Work.

(b) Plant and equipment to be supplied from outside the Employer's country (Schedules of Prices: II) shall be quoted on a CIF port-of entry. In addition, the FOB price and import duties and taxes shall also be indicated separately.

(c) Plant and equipment, manufactured or fabricated within the Employer's country (Schedules of Prices: III) shall be quoted on an EXW (ex-factory, ex-works, ex-warehouse or off-the-shelf, as applicable) basis and shall be inclusive of all costs as well as duties and taxes paid or payable on components and raw materials incorporated or to be incorporated in the facilities. In addition value added taxes and sales taxes shall be indicated separately.

(d) Civil Works, Installation and Other Services shall be quoted separately (Schedules of Prices: IV) and shall include rates or prices for all labor, contractor's equipment, temporary works, materials, consumables and all matters and things of whatsoever nature, including local transportation, operations and maintenance services, the provision of operations and maintenance manuals, training, etc. where identified In the bidding documents, as necessary for the proper execution of the Civil Works, Installation and Other Services.

(e) Recommended spare parts shall be quoted separately (Schedules of Prices: VI) as specified in either subparagraph (b) or (c) above in accordance with the origin of the spare parts.

15.4 The terms EXW, CIF, and FOB shall be governed by the rules prescribed in the current edition of Incoterms, published by the International Chamber of Commerce, Paris.

15.5 Prices quoted by the bidder shall be subject to adjustment during performance of the contract to reflect changes in the cost of labor, fuel, material, equipment and transport components in accordance with the procedures specified in Sub Clause 13.17 of the Conditions of Particular Application. The price adjustment provision will not be taken into consideration in bid evaluation. Bidders are required to

indicate the source of labor, equipment and material indices in the Schedule of Coefficients and Indices for Price Adjustment.

16. Bid Currencies

16.1 Prices shall be quoted in the following currencies:

(a) the prices shall be quoted either in the currency of the bidder's home country, or in United States Dollars:

(b) a bidder expecting to incur a portion of its expenditures in the performance of the Contract in more than one currency, and wishing to be paid accordingly, shall so indicate in its Bid; and

(c) if some of the contract expenditures related to Civil Works, Installation and Other Services pursuant to Clause 15.3(d) are to be incurred in the borrowing country, such expenditures shall be quoted in either foreign and/or local currency, depending upon the currency in which the costs are to be incurred.

16.2 Bidders shall indicate their expected foreign currency requirements in the Appendix to Bid.

16.3 Bidders may be required by the Employer to clarify their local and foreign currency requirements, and to substantiate that the amounts included in the Schedule of Prices and shown in the Appendix to Bid are reasonable and responsive to Sub-Clause 15.1 in which case a detailed breakdown of its foreign currency requirements shall be provided by the bidder.

16.4 During the progress of the Works, the foreign currency portions of the outstanding balance of the Contract Price may be adjusted by agreement between the Employer and the Contractor to reflect any changes in foreign currency requirements for the contract, in accordance with Clause 13.15 of the Conditions of Particular Application. Any such adjustment shall be effected by comparing the amounts quoted in the bid with the amounts already used in the Works and the Contractor's future needs for imported items.

17. Bid Validity

17.1 Bids shall remain valid for a period of _____ *[specify number]*[13] days after the date of bid opening specified in Sub-Clause 26.1.

17.2 In exceptional circumstances, prior to expiry of the original bid validity period, the Employer may request that the bidders extend the period of validity for a specified additional period. The request and the responses thereto shall be made in writing or by fax. A bidder may refuse the request without

[13] This period should be realistic, allowing sufficient time to evaluate the bids, bearing in mind the complexity of the Works, and the time required for obtaining references, clarifications, clearances and approvals and for notification of the award. Normally the validity period should not exceed 180 days.

forfeiting its bid security. A bidder agreeing to the request will not be required or permitted to modify its bid, but will be required to extend the validity of its bid security for the period of the extension, and in compliance with Clause 18 in all respects.

18. Bid Security

18.1 The Bidder shall furnish, as part of its bid, a bid security in the amount of _____ *[indicate amount currency of Employer's country]*[14] or an equivalent amount in a freely convertible currency.

18.2 The bid security shall, at the bidder's option, be in the form of a certified check, bank draft, standby letter of credit or guarantee from a reputable bank.[15] The format of the bank guarantee shall be in accordance with the sample form of bid security included in Section 6; other formats may be permitted, subject to the prior approval of the Employer. The bid security shall remain valid for 28 days beyond the original validity period for the bid, and beyond any period of extension subsequently requested under Sub-Clause 17.2.

18.3 Any bid not accompanied by an acceptable bid security shall be rejected by the Employer as nonresponsive.

18.4 The bid securities of unsuccessful bidders will be returned as promptly as possible, but not later than 28 days after the expiration of the period of bid validity.

18.5 The bid security of the successful bidder will be returned when the bidder has signed the Contract Agreement and furnished the required performance security.

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[14] This amount should be the same as quoted in the Invitation for Bids. To avoid leakage of bidder's prices originating in the financial Institution issuing the security, a fixed sum shou1d be specified, in preference to a percentage of the bid price. The sum should not exceed two percent of the estimated cost of the Works. Alternatively, if the Employer wishes to specify a percentage of the bid price, it should be indicated as a "minimum of ____ percent" to enable bidders to provide in excess of the minimum and thus mask their prices.

[15] The Bank does not allow restrictions with respect to the provision of the bid security such as requiring (i) the issue of the bid security by a bank in the Employer's country: {ii) endorsement by a bank in the Employer's country: or (iii) a foreign bank determined by the bidder to be acceptable to the Employer.

18.6 The bid security may be forfeited

(a) if the bidder withdraws its bid, except as provided in Sub-Clause 25.1 ;

(b) if the bidder does not accept the correction of its bid price, pursuant to Sub-Clause 30.2; or

(c) in the case of a successful bidder, if it falls within the specified time limit to

(i) sign the Contract Agreement,

(ii) furnish the required performance security, or

(iii) furnish the required domestic preference security.[16]

Alternative Proposals by Bidders

Alternative A: To be used when alternative proposals are not permitted.

19. Alternative Proposals by Bidders

19.1 Bidders shall submit offers which comply with the documents, including the basic Employer's Requirements as indicated in the bidding documents. Alternatives will not be considered. The attention of bidders is drawn to the provisions of Clause 29 regarding the rejection of bids which are not substantially responsive to the requirements of the bidding documents.

Alternative Proposals by Bidders

Alternative B: Technical alternative accepted, but only that of the lowest evaluated substantially responsive bidder considers.

19.1 Bidders wishing to offer technical alternatives to the Employer's Requirements must first price the Employer's Requirements as described in the bidding documents and shall further provide all information necessary for a complete evaluation of the alternative by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methods. Only the technical alternatives, if any, of the lowest evaluated bidder conforming to the basic technical requirements shall be considered by the Employer.

[16] Delete where domestic preference is not applicable or where domestic preference security is not required.

20. Pre-Bid Meeting

20.1 The bidder or its official representative is invited to attend a pre-bid meeting which will take place at _____ _____ *[address of venue]* on _____ *[time and date].*[17]

20.2 The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

20.3 The bidder is requested to submit any questions in writing or by fax, to reach the Employer not later than one week before the meeting.

20.4 Minutes of the meeting, including the text of the questions raised and the responses given, will be transmitted without delay to all purchasers of the bidding documents. Any modification of the bidding documents listed in Sub-Clause 9.1 which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 11 and not through the minutes of the pre-bid meeting.

20.5 Nonattendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

21. Format and Signing of Bid

21.1 The bidder shall prepare one original and _____ *[insert number]*[18] copies of the bid documents comprising the bid as described in Clause 13 of these Instructions to Bidders, bound with the volume containing the Form of Bid, and clearly marked "ORIGINAL" and "COPY" as appropriate. In the event of discrepancy between them, the original shall prevail.

21.2 The original and all copies of the bid shall be typed or written in indelible ink (in the case of copies, photostats are also acceptable) and shall be signed by a person or persons duly authorized to sign on behalf of the bidder, pursuant to Sub-Clauses 5.1 (a) or 5.2 (b), as the case may be. All pages of the bid where entries or amendments have been made shall be initialled by the person or persons signing the bid.

21.3 The bid shall contain no alterations, omissions or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the bidder, in which case such corrections shall be initialed by the person or persons signing the bid.

21.4 The bidder shall furnish information as described in the Form of Bid on commission or gratuities, if any, paid or to be paid relating to this Bid, and to contract execution if the bidder is awarded the contract.

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17 Not later than 28 days before the deadline for bid submission. It should take place concurrently with the Site visit; if any (see Sub Clause 8.3).

18 Usually two, more if essential.

D. Submission of Bids

22. Sealing and Marking of Bids

22.1 The bidder shall seal the original and each copy of the bid in an inner and an outer envelope, duly marking the envelopes as "ORIGINAL" and "COPY".

22.2 The inner and outer envelopes shall

(a) be addressed to the Employer at the following address: _____ *[insert address of office for bid submission]*; and

(b) bear the following identification:

- Bid for _____ *[name of Contract]*
- Bid Reference Number: _____ *[insert loan and contract number]*
- DO NOT OPEN BEFORE _____ *[time and date for bid opening, per Sub-Clause 26.1]*

22.3 In addition to the identification required in Sub-Clause 22.2, the inner envelope shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared "late" pursuant to Clause 24.

22.4 If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the bid.

23. Deadline of Submission of Bid

23.1 Bids must be received by the Employer at the address specified above no later than _____ _____ *[insert time and date, they should be the same as those given in the Invitation for Bids]*.

23.2 The Employer may, at its discretion, extend the deadline for submission of bids by issuing an addendum in accordance with Clause 11, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will thereafter be subject to the deadlines extended.

24. Late Bids

24.1 Any bid received by the Employer after the deadline for submission of bids prescribed in Clause 23 will be rejected and returned unopened to the bidder.

25. Modification and Withdrawal of Bid

25.1 The bidder may modify or withdraw its bid after bid submission, provided that written notice of the modification or withdrawal is received by the Employer prior to the deadline for submission of bids.

25.2 The bidder's modification or withdrawal notice shall be

prepared, sealed, marked and delivered in accordance with the provisions of Clause 22, with the outer and inner envelopes additionally marked "MODIFICATION" or "WITHDRAWAL", as appropriate. A withdrawal notice may also be sent by fax but must be followed by a signed confirmation copy.

25.3 No bid may be modified by the bidder after the deadline for submission of bids, except in accordance with Sub-Clauses 25.2 and 30.2.

25.4 Withdrawal of a bid during the interval between the deadline for submission of bids and the expiration of the period of bid validity specified In Sub-Clause 17.1 may result in the forfeiture of the bid security pursuant to Sub-Clause 18.6.

E. Bid Opening and Evaluation

26. Bid Opening

26.1 The Employer will open the bids, including modifications made pursuant to Clause 25, in the presence of bidders representatives who choose to attend, at _____ *[insert time and date]*[19] at the following location: _____ _____ *[insert Address].* The bidders' representatives who are present shall sign a register evidencing their attendance.

26.2 Envelopes marked "'WITHDRAWAL" shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause 25 shall not be opened.

26.3 The bidders' names, the Bid Prices, including any alternative Bid Price, any discounts, bid modifications and withdrawals, the presence or absence of bid security, and such other details as the Employer may consider appropriate, will be announced and recorded by the Employer' at the opening. The bidders' representatives will be required to sign this record.

26.4 The Employer shall prepare minutes of the bid opening, including the information disclosed to those present in accordance with Sub-Clause 26.3.

27. Process to Be Confidential

27.1 Information relating to the examination, clarification, evaluation and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process. Any effort by a bidder to influence the Employer's processing of bids or award decisions may result In the rejection of the bidder's bid.

28. Clarification of

28.1 To assist in the examination, evaluation and comparison of

[19] Time and date should be as close as possible to those given for the deadline of submission of bids (Sub-Clause 23.1).

Bids and Contacting the Employer

bids, the Employer may, at its discretion, ask any bidder for clarification of its bid. The request for clarification and the response shall be in writing or by fax, but no change in the price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the bids in, accordance with Clause 30.

28.2 Subject to Sub-clause 28.1, no bidder shall contact the Employer on any matter relating too its bid from the time of the bid opening to the time the contract is awarded. If the bidder wishes to bring additional information to the notice of the Employer, it should do so in writing.

28.3 Any effort by the bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decisions may result in the rejection of the bidder's bid.

29. Preliminary Examination of Bids and Determination of Responsiveness

29.1 Prior to the detailed evaluation of bids, the Employer will determine whether each bid (i) meets the eligibility criteria of the ADB; (ii) has been properly signed; (iii) is accompanied by the required securities; (iv) is substantially responsive to the requirements of the bidding documents; and (v) provides any clarification and/or substantiation that the Employer may require pursuant to Clause 28.

29.2 A substantially responsive bid is one which conforms to all the terms, conditions and requirements of the bidding documents, without material deviation or reservation. A material deviation of reservation is one (i) which affects in any substantial way the scope, quality or performance of the Works; (ii) which limits in any substantial way, inconsistent with the bidding documents, the Employer's rights or the bidder's obligations under the Contract; or (iii) whose rectification would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

29.3 If a bid is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal. of the nonconforming deviation or reservation.

30. Correction of Errors

30.1 Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Arithmetic errors will be rectified on the following basis. If there is a discrepancy between the unit rate and the total cost that is obtained by multiplying the unit rate and quantity, the unit rate shall prevail and the total cost will be corrected unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit rate, in which case the total cost as quoted will govern and the unit rate corrected. If there is a discrepancy between the total bid amount and the sum of total costs, the sum of the total costs shall prevail and the total bid amount will be corrected.

30.2 The amount stated In the Form of Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount of bid, its bid will be rejected, and the bid security may be forfeited in accordance with Sub-Clause 18.6 (b).

31. Conversion to Single Currency

31.1 The Employer will convert the amounts in various currencies in which the Bid Price is payable to the currency of the Employer's country at the selling exchange rates officially prescribed for similar transactions as established by

_____

_____

[name of central bank in Employer's country or other authoritative source for similar transactions] on

[Alternative A][20] the date of opening of bids.

[Alternative B][13] the earlier of the dates: (i) the date of the decision to award the Contract; or (ii) the date of expiry of the initial period of bid validity specified in Sub-Clause 17.1.

32. Evaluation and Comparison of Bid

32.1 The Employer will evaluate and compare only the bids determined to be substantially responsive in accordance with Clause 29.

32.2 For plant and equipment, the comparison shall be of the ex-factory price of plant and equipment offered from within the Employer's country, (such price to include all costs as well as duties and taxes paid or payable on components .and raw material or to be incorporated in the plant and equipment) and the CIF-named port of destination price offered from outside the Employer's country; plus the cost of local transportation, civil works, installation and other services required under the contract. The Employer's comparison will also include the costs resulting from application of the evaluation procedures described in Sub-Clause 32.4.

32.3 The employer will carry out a detailed evaluation of the bids in order to determine whether the bidders confirm to meet the prequalification requirements and whether the bids are substantially responsive to the requirements set forth in the bidding documents. In order to reach such a determination, the Employer will examine the information supplied by the Bidders and other requirements in the bidding documents, taking into account the following factors.

(a) Qualification

(i) the determination will take into account the Bidder's updated financial technical and

[20] Select only one of the two alternatives.

production capabilities and past performance; it will be based upon an examination of the documentary evidence submitted by the Bidder, pursuant to Sub-Clause 5.1(b), as well as such other information as the Employer deems necessary and appropriate; and

(ii) an affirmative determination will be a prerequisite for the Employer to continue with the evaluation of the bid; a negative determination will result in rejection of the Bidder's bid.

(b) Technical

(i) overall completeness and compliance with the Employer's Requirements; the technical merits of plant and equipment offered and deviations from the Employer's Requirements; suitability of the facilities offered in relation to the environmental and climatic conditions prevailing at the site; quality, function and operation of any process control concept included in the bid;

(ii) achievement of specified performance criteria by the facilities;

(iii) type, quantity and long-term availability of spare parts and maintenance services;

(iv) _____
_____
_____

Include any other specific additional criteria that the Employer deems necessary or prudent to be taken into consideration. Note that the method of application must be included in Sub-Clause 32.4(f).

(c) Commercial

(i) the cost of all quantifiable deviation and omissions from the contractual and commercial conditions and the Employer's Requirements as identified in the bid, and other deviations and omissions not so identified;

(ii) compliance with the time schedule called for

in Appendix to Bid and evidenced as needed milestone schedule provided in the bid;

(iii) the projected operating costs during the life of the facilities;

(iv) the functional guarantees of the facilities offered; and

(v) the extra cost of work, services, facilities etc., required to be provided by the Employer or their parties.

32.4 Pursuant to Sub-Clause 32.3, the following evaluation methods will be followed:

(a) **Contractual and commercial deviations:** The evaluation shall be based on the evaluated cost for fulfilling the contract in compliance with all commercial, contractual and technical obligations under this bidding document. The Employer will make its own assessment of the cost of any deviations for the purpose of ensuring fair comparison of bids.

(b) **Time Schedule:** The plant and equipment covered by this bidding are required to be shipped, installed and the facilities completed within the period specified in Sub-Clause 1.2 and the Appendix to the Bid.

Alternative A: To be used when alternative time schedules are not permitted.

Bidders submitting bids which deviate from the time schedule specified will be rejected.

Alternative B: To be used when alternative time schedules are permitted.

No credit will be given to earlier completion. However, Bidders offering a completion date beyond the period specified shall be adjusted In the evaluation by adding *(indicate factor)*[21] to the bid price. Bids offering a completion date beyond

[21] The rate may be a fixed amount per, month or prorata per week, of delay related to the loss of benefits to the Employer.

(indicate maximum period)[22] shall be rejected.

(c) **Operating costs**: Since the operating costs of the facilities being procured form a major part of the life cycle cost of the facilities, these costs will be evaluated and based on prices furnished by the Bidder in Schedules of Prices: II and III as well as on past experience of the Employer or other employers similarly placed, Such costs shall be added to the bid price for evaluation.

Alternative A: ***To be used when the factors are specified in this clause.***

The operating cost factors for calculation are:

(i) number of years for initial period of operation [*it is recommended that the initial period of operation not exceed the usual period before a major overhaul of the facilities. Usually between five to ten years.*]

(ii) operating costs [*e.g. fuel and/or other input, unit cost, annual and total operational requirements.*]

(iii) rate, in percent, to be used to discount to present value all annual future costs calculated under (ii) above for the period specified in (i).

Alternative B: ***To be used when the methodology of calculation is specified elsewhere in the bidding documents.***

The methodology of calculation is specified in _____[23].

The price of recommended spare parts quoted in Schedule of Prices: VI shall not be considered for evaluation.

(d) **Functional Guarantee of the facilities:**

(i) Bidders shall state the functional guarantees (e.g. performance, efficiency, consumption) of the proposed facilities in response to the

22 The accepted period between the minimum and maximum time 'for completion should be such that the percentage or amount corresponding to the maximum period for completion should be less than or equal to 1he percentage or amount of liquidated damages stated in The Appendix to Bid.

23 Insert relevant section and clause no.

Employer's Requirements. Plant and equipment offered shall have a minimum (or a maximum, as the case may be) level of functional guarantees specified in the Employer's Requirements to be considered responsive. Bids offering plant and equipment with functional guarantees less (or more) than the minimum (or maximum) specified shall be rejected.

(ii) For the purposes of evaluation, an adjustment of *(indicate factor)*[24] will be added to the bid price for each drop (or excess) in the responsive functional guarantees: offered by the Bidder below (or above) the value specified in the Employer's Requirements.

(e) **Work, services, facilities etc., to be provided by the Employer:** Where bids include for the undertaking of work or the provision of services or facilities by the Employer in excess of the provisions allowed for in the bidding documents, the Employer shall assess the costs of such additional work, services and/or facilities during the duration of the contract. Such costs shall be added to the bid price for evaluation; and

(f) _____
_____
_____

32.5 (a) Any adjustments in price which result from the above procedures shall be added, for purposes of Comparative evaluation only, to arrive at an "Evaluated Bid Price" Bid prices quoted by Bidders shall remain unaltered.

(b) The Employer reserves the right to accept or reject any variation, deviation or alternative offer. Variations, deviations, and other factors which are in excess of the requirements of the bidding documents or otherwise result in the accrual of unsolicited benefits to the Employer shall not be taken into account in bid evaluation.

(c) The estimated effect of the price adjustment provisions of the Conditions of Particular Application,

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[24] Adjustment factors used for bid evaluation will be *[amount in the currency of bid evaluation]* for each one percent (1%)- or prorate for less than one percent - *(drop or excess)* of the nor specified in the Employer's Requirements *[reference]*
or
the value committed in the responsive bid with the most performing functional guarantees. *[Delete the inapplicable option.]*

applied over the period or execution of the Contract, shall not be taken bid evaluation.

(d) If the bid of the successful bidder is substantially below the Employer's estimate for the contract, the Employer may require the bidder to produce detailed price analyses to demonstrate the internal consistency of those prices. After evaluation of the price analysis, the Employer may require that the amount of the performance security set forth in Clause 38 be increased at the expense of the successful bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful bidder under the Contract.

Domestic Preference Scheme

Domestic preference may be accorded only if it is expressly permitted by the Loan Agreement and at the request of the Borrower.

Alternative A: ***Where the CIF cost of equipment to be used on the permanent works is less than 60 per cent of the total value of works then the contract can be classified as civil works and preference will be granted to eligible domestic contractors in accordance with the following provisions:***

33. Domestic Preference: Preference for Domestic Bidders

33.1 In comparing domestic bids with foreign bids, a margin of preference will be granted to eligible domestic contractors, as defined below, in accordance with the following provisions.

(a) For application of domestic preference, all responsive bids will first be classified into the following two categories:

(i) Category I: bids offered by domestic contractors and joint ventures eligible for the preference in accordance with the criteria set forth in Sub-Clause 33.2 below; and

(ii) Category II: bids offered by other contractors.

The Employer will review each bid to confirm the appropriateness of, or to modify as necessary, the Category to which the bid was assigned by the bidder in preparing it.

(b) The lowest evaluated bid of each Category will then be determined by comparing all evaluated bids in each Category among themselves.

(c) Such lowest evaluated bids will next be compared with each other and if, as a result of this comparison, a bid from Category I is found to be the lowest, it will be selected for the award of Contract.

(d) If however, as a result of the comparison under (c) above, the lowest bid is found to be from Category II, it will be further compared with the lowest evaluated bid from Category I. For the purpose of this further comparison only, an upward adjustment will be made to the lowest evaluated bid price of Category II by adding an amount equal to seven and one-half per cent (71/2%) of the bid price. If, after such comparison, the Category I bid is determined to be the lowest, it will be selected for the award of contract; if not, the lowest evaluated bid from Category II will be selected.

33.2 Domestic contractors and joint ventures between a domestic contractor(s) and its foreign partner(s) shall meet the following minimum criteria for eligibility of the Domestic Preference Scheme:

(a) Domestic contractor(s):

(i) firms are incorporated in (*Name of the Borrowing Country*); and

(ii) firms will not subcontract to foreign contractors more than fifty per cent (50%) of the total value of their work.

(b) A joint venture between a domestic contractor(s) and its foreign partner(s) will be eligible for the preference only if:

(i) the domestic partner(s) are individually eligible for the preference according to the criteria stated above;

(ii) the domestic partner(s) would not qualify for the Works on technical or financial grounds without the foreign participation; and

(iii) the domestic partner(s) will, under the arrangements proposed, carry out at least

fifty per cent (50%) of the Works measured in terms of value.

33.3 Bidders applying for the preference shall provide all evidence, including details of ownership, necessary to prove that they are qualified for the preference according to the criteria set forth in Sub-Clause 33.2.

33.4 If the Contract is awarded to a bidder who has received the preference pursuant to the foregoing provisions, such contractor shall not subcontract to foreign contractors more than fifty per cent (50%) of the total value of their work.

33.5 A joint venture which is awarded the Contract as a result of the application of the above domestic preference provisions, shall furnish the Employer, together with the Performance Security a "Domestic Preference Security" to guarantee that the profit and loss distribution and work-sharing arrangements with which the joint venture satisfied the criteria of Sub-Clause 33.2 (b) above will not be modified throughout the execution of the Contract. The Domestic Preference Security shall be issued in accordance with the requirements of Sub-Clause 4.25 of the Conditions of Particular Application, for an amount equivalent to the difference between the joint venture's bid price and the bid price of the lowest foreign bid.

Alternative B: ***In large and complex packages for Design-Build and Turnkey Contracts where the CIF cost of equipment to be used in the permanent works equals or exceeds 60 per cent of the total value of works, then the preference cannot be granted to the contractor but to domestically manufactured equipment in accordance with the following provisions:***

33. Domestic Preference: Preference for Domestic Goods

33.1 A margin of preference shall be applied to domestically manufactured equipment in accordance with the following provisions:

(a) The preference margin shall not be applied to the whole package but only to the domestically manufactured equipment within the package.

(b) Equipment offered from abroad shall be quoted CIF and equipment offered locally shall be offered EXW (free of sales and similar taxes).

(c) All other cost components, such as design, works installation and supervision shall be quoted separately.

(d) In the comparison of bids, only the CIF price in each bid of the equipment offered from outside the Employer's country shall be increased by the applicable duty and other taxes payable by a non-exempt importer, or by 15 per cent whichever is less.

(e) If duties vary from item to item within a package, the appropriate tariff for each item shall apply.

(f) No preference shall be applied for any associated services or works included in the package.

(g) Bidders should not be permitted or required to modify the mix of local and foreign equipment after bid opening.

F. AWARD OF CONTRACT

34. Award

34.1 Subject to Clause 35, the Employer will award the Contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents and who has offered the lowest Evaluated Bid Price, provided that such bidder has been determined to be (i) eligible in accordance with the provisions of Clause 3; and (ii) qualified in accordance with the provisions of Clause 5.

35. Employer's Right to Accept any Bid and to Reject any or all Bids

35.1 Notwithstanding Clause 34, the Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of Contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the grounds for the Employer's action.

36. Notification of Award

36.1 Prior to expiration of the period of bid validity prescribed by the Employer, the Employer will notify the successful bidder by fax, confirmed by registered letter, that its bid has been accepted. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") shall name the sum which the Employer will pay the Contractor in consideration of the execution, completion and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called "the Contract Price").

36.2 The notification of award will constitute the formation of the Contract.

36.3 Upon the furnishing by the successful bidder of a performance security (and domestic preference security where required) the Employer will promptly notify the other bidders that their bids have been unsuccessful.

37. Signing of Contract Agreement

37.1 At the same time that he notifies the successful bidder that its bid has been accepted, the Employer will send the bidder the Form of Contract Agreement provided in the bidding documents, incorporating all agreements between the parties.

37.2 Within _____ *[insert number]*[25] days of receipt of the Form of Agreement, the successful bidder shall sign the Form and return it to the Employer.

38. Performance Security

38.1 Within _____ *[insert number]*[26] days of receipt of the notification of award from the Employer, the successful bidder shall furnish to the Employer a performance security in an amount of _____ *[insert figure]*[27] percent of the Contract Price in accordance with the Conditions of Contract. The form of performance security provided in Section 6 of the bidding documents may be used or some other form acceptable to the Employer.

38.2 Failure of the successful bidder to comply with the requirements of Clauses 37 or 38 shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security.

38.3 The above provisions shall also apply to the furnishing of a domestic preference security; where required, and in the terms specified in Clause.33.[28]

39. Corrupt or Fraudulent Practices

39.1 The ADB requires that Borrowers (including beneficiaries of ADB loans), as well as bidders/suppliers/contractors under ADB-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In Pursuance of this policy, the ADB:

(a) defines, for the purposes of this provision, the terms ser forth below as follows:

(i) "corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and

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25 Normally 28 days is sufficient.

26 Same period as allowed under Sub-Clause 37.2.

27 An amount of 10 percent of the Contract Price is commonly acceptable.

28 Delete this sub-clause if domestic preference is not included or if domestic preference security is not required. Note that domestic preference security is only used in respect to preference for domestic bidders and not for preference of domestic goods.

(ii) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition;

(b) will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

(c) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded an ADB-financed contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, an ADB-financed contract.

39.2 Furthermore, bidders shall be aware of the provision stated in Sub-Clause 1.16 and Sub-Clause 15.5 of the Conditions of Contract, Part II - Conditions of Particular Application.

Section 2

Part I – General Conditions of Contract

Section 2. Part I – General Conditions

Notes on the Conditions of Contract

The Conditions of Contract comprise two parts: Part I – General Conditions (Section 2 of this document), and Part II – Conditions of Particular Application (Section 3 of this document).

The International Federation of Consulting Engineers (FIDIC), has recently prepared the First Edition (1995) of Conditions of Contract for Design-Build and Turnkey Contracts. FIDIC Part I – General Conditions is included herein, complete and without any changes as Section 2 of these documents.

Any other standard national or international Conditions of Contract acceptable to the ADB may be used for works procured by international competitive bidding. When another form is used, the "Table of Contents" of the FIDIC Conditions of Contract should be used as a checklist of the completeness of the provisions of that other form, and be revised accordingly.

The standard text of the FIDIC General Conditions of contract should be retained intact to facilitate its reading and interpretation by bidders and its review by the ADB. Any amendments and additions to the General Conditions, specific to the contract in hand, should be introduced in the "Particular Conditions of Contract". Sample Particular Conditions, applicable to the above FIDIC Conditions of Contract, are included under Section 3, and are recommended for use for Bank financed contracts instead of the Particular Conditions published by FIDIC. This is to ensure that ADB Guidelines for procurement and requirements are complied with.

The use of standard conditions of contract throughout a country will ensure comprehensiveness of coverage, general acceptability of its provisions, savings in time and cost for bid preparation and review.

Copies of the FIDIC Condition s of Contract can be obtained from:

FIDIC Secretariat
P.O. Box 86
1000 Lausanne 12
Switzerland
Facsimile: 41 21 653 5432
Telephone: 41 21 653 5003

Section 3. Part II – Conditions of Particular Application

Sub-Clause 1.1 Definitions	(ADB-R)	Amend subpara 1.1.1.3 of Sub-Clause 1.1 by adding the following words at the end: "The word 'tender' is synonymous with bid'." Add the following subparagraph to Sub-Clause 1.1: "1.1.2.7 "ADB" means the Asian Development Bank."
Sub-Clause 1.4 Law and Language	(ADB-R)	Replace the text of Sub-Clause 1.4 and add the following: "The law of the Contract is the law of _____.[29] The language is the English language."
Sub-Clause 1.5 Contract Agreement	(ADB-R) (*)	Substitute the wordings in Part I with the following: "A Contract Agreement in the form annexed, with such modifications as may be necessary to record the agreement reached shall be executed. The costs of stamp duties and similar charges imposed by the law shall be borne by the Employer."
Sub-Clause 1.6 Priority of Documents	(ADB-R)	Replace the list of documents listed under (a) to (h) and add the following: "(a) the Contract Agreement; (b) the Letter of Acceptance; (c) the Employer's Requirements; (d) the Bid; (e) the Conditions of Contract, Part II; (f) the Conditions of Contract, Part I; (g) the Schedules; (h) the Drawings; and (i) the Contractor's Proposal."
Sub-Clause 1.15 Confidentiality	(F-O)	Additional sub-clause: "The Contractor shall treat the details of the contract as private and confidential, except to the extent necessary to carry out its obligations under it. The Contractor shall not publish, permit to be published or disclose any particulars of the Contract in any trade or technical paper or elsewhere without the prior consent in writing of the Employer."
Sub-Clause 1.16	(ADB-R)	Add the following sub-clause:

[29] Insert the name of country where the Contract will be carried out.

Inspections and Audit by the ADB

"The Contractor shall permit the ADB to inspect the Contractor's accounts and records relating to the performance of the Contract and to have them audited by auditors appointed by the ADB, if so required by the ADB."

Sub-Clause 3.1 Employer Representative's Duties and Authority (ADB-R) Add the following clause as required:

"The Employer's Representative shall obtain the specific approval of the Employer before taking action under the following clauses[30] of the Conditions of Contract Part I.

(a) approving sub-contracting of any part of the Works under Sub-Clause 4.5.

(b) certifying additional cost to the Contract Price except if such a certification would adjust the Contract Price by more than *[insert figure]*[31] percent.

(c) granting an extension of time for completion under Sub-Clause 8.3.

(d) suspending progress of part or all of the Works under Sub-Clause 8.8.

(e) issuing a variation under Clause 14, except if such a variation would increase the Contract Price by no more than *[insert figure]* percent.

(f) issuing Taking-Over Certificate for the whole of the Works under Sub-Clause 10.1.

(g) issuing Performance Certificate for the Works under Sub-Clause 12.9.

Notwithstanding the obligation to obtain approval as set out above, if in the opinion of the Employer's Representative, an emergency occurs affecting the safety of life or of the Works or of adjoining property, it may, without relieving the Contractor of any of its duties and responsibilities under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Employer's Representative be necessary to abate or reduce the risk. The Contractor shall forthwith comply with the instructions of the Employer's Representative despite the absence of approval of the Employer. The Employer's Representative shall determine the extra cost to the Contractor for carrying out of such instruction and obtain the Employer's approval for an addition to the Contract Price."

Sub-Clause 4.1 (ADB-R) Add the following sentence to proceed the existing text

30 The list should be extended or reduced as necessary.

31 Usually 10 percent is an acceptable limit.

General Obligations	(*)	under Sub-Clause 4.1: "The Contractor is required to check the design criteria and calculations (if any) included in the Employer's Requirements, to confirm their correctness, in its bid and to assume full responsibility for them."
Sub-Clause 4.2 Performance Security	(ADB-R) (*)	Replace the text of Sub-Clause 4.2 with the following: "The Contractor Shall provide security for its proper performance of the Contract to the Employer within 28 days after the receipt of the Letter of Acceptance. The performance security shall be in the form of a bank guarantee, issued either (a) by a bank located in the country of the Employer or a foreign bank through a correspondent bank located in the country of the Employer, or (b) directly by a foreign bank acceptable to the Employer. The performance security shall be denominated in the types and proportions of currencies in which the Contract Price is payable. When providing such security to the Employer, the Contractor shall notify the Employer's Representative of so doing. Without limitation to the provision of the preceding paragraph, whenever the Employer's Representative determines an addition to the Contract Price as a result of a change in cost and/or legislation or as a result of a variation amounting to more than 25 percent of the portion of the Contract Price payable in a specific currency, the Contractor at the written request of the Employer's Representative shall promptly increase the value of the performance security in that currency by an equal percentage".
Sub-Clause 4.3 Contractor's Representative	(F-O)	At the end of Sub-Clause 4.3 add: "If the Contractor's Representative is not fluent in the English language, the Contractor shall make a competent interpreter available during all working hours."
Sub-Clause 4.4 Co-ordination of the Works	(ADB-R) (*)	Modify the first sentence of Sub-Clause 4.4 to read: "The Contractor shall be responsible for the co-ordination and proper execution of the Works, including co-ordination with other contractors and organizations to the extent specified in the Employer's Requirements."
Sub-Clause 4.9 Site Data	(F-R) (*)	Modify the last sentence of paragraph 1 of Sub-Clause 4.9 to read: "The Contractor shall be responsible for interpreting all data including data listed elsewhere in the Contract as open for inspection at _____ [insert particulars of the office or offices where such data is stored]".

Sub-Clause 4.14 Program

(ADB-R) (*)

Delete the third sentence of Sub-Clause 4.14 indicated below:

"Unless otherwise stated ..... and late finish dates".

When the Loan Agreement permits and the Instructions to bidders provide for Domestic Preference include additional Sub-Clause 4.25.

Sub-Clause 4.25 Domestic Preference Security

(ADB-R) (*)

"If the Contractor consists of a joint venture which is awarded the contract through the application of the domestic preference, the Contractor, (i) throughout the execution of the Contract, shall not modify the work-sharing characteristics of the joint venture with which it satisfied the criteria of eligibility for being awarded the contract in application of the domestic preference; and (ii) concurrently with the above performance security, shall provide security ("the domestic preference security") to guarantee that such characteristics of the joint venture will not be so modified. The domestic performance security shall be in the form of an "on demand" bank guarantee or standby letter of credit acceptable to the Employer, for an amount in a convertible currency equivalent to the difference between the joint venture's bid price and the bid price of the lowest foreign bid. The domestic preference security shall be issued either (a) by a bank located in the country of the Employer, or (b) directly by a foreign bank acceptable to the Employer.

The domestic preference security shall be valid until the Contractor has substantially completed the Works and a Taking-Over Certificate has been issued by the Employer's Representative in accordance with the provisions of Clause 10.1 and such security shall be returned to the Contractor together with the Taking-Over Certificate.

The cost of providing the security shall be borne by the Contractor."

Sub-Clause 5.2 Construction Documents

(ADB-R) (*)

In Sub-Clause 5.2 delete sub-paragraph (a) and substitute:

"(a) Construction shall not commence until the Contractor receives from the Employer's Representative approval of the Construction Documents relevant to the design and construction of such parts; provided always that if the Employer's Representative fails to give his ruling at the end of 28 days, despite the Contractor's written reminder at the end of the 21 days "review period", then the Contractor may proceed with the construction as though approval had been given".

Sub-Clause 5.4 Technical Standards & Regulations

(ADB-R) (*)

Add the following sentence to the end of the Sub-Clause 5.4:

"In respect of technical specifications and standards, any

national or international standards which promise to confer equal or better quality than the standards specified will also be acceptable."

If the Works involve the use by the Contractor of a design previously provided to the Employer by others add the following additional Sub-clause 5.10.

Sub-Clause 5.10 Employer's Warranty for Patent Rights

(F-O)

"If any matter, for which the Contractor is not liable to indemnity the Employer under Sub-Clause 5.9, causes the infringements (or allegation of infringement) by the Contractor of any patent, registered design, copyright, trademark or other intellectual property right, the Employer shall indemnify the Contractor against all claims, damages, charges and costs which the Contractor may incur.

The Contractor shall promptly notify the Employer of any claim under this Sub-Clause. The Employer may at his own cost, conduct negotiations for the settlements of such claims, and any litigation or arbitration that may arise from it. The Contractor shall not make any admission which might be prejudicial to the Employer, unless the Employer has failed to take over the conduct of the negotiations or litigation within a reasonable time after having been so requested. The Contractor shall, at the request and cost of the Employer, assist it in contesting any such claim or action and shall be repaid all reasonable cost incurred."

Sub-Clause 6.8 Contractor's Superintendence

(F-R) (*)

At the end of Sub-Clause 6.8 add:

"A reasonable proportion of the Contractor's superintending staff shall have a working knowledge of the English language, or the Contractor shall have sufficient competent interpreters available on site during all working hours."

Other Sub-Clauses may be added to take account of the circumstances and locality of the site. A few examples, to be numbered as appropriate, are provided hereunder:

Sub-Clause 6.__ Foreign staff and Labour

(F-O)

"The Contractor may import such staff, and labourers as are required in order to execute the Works. The Contractor must ensure that all such staff and labour are provided with the required visas and work permits. The Contractor shall be responsible for the return to the place where they were recruited or to their domicile of all persons whom the Contractor recruited and employed for the purpose of or in connection with the Contract. The Contractor shall be responsible for such persons as are to be returned until they shall have left the Site or, in the case of foreign nationals who have been recruited outside the Country, shall have left it."

Sub-Clause 6.__ Measures against Insect & Pest Nuisance	(F-O)	"The Contractor shall at all times take the necessary precautions to protect all staff and labour employed on the Site from insect and pest nuisance, and to reduce the dangers to health and the general nuisance occasioned by the same. The Contractor shall provide its staff and labour with suitable prophylactics for the prevention of malaria and take steps to prevent the formation of stagnant pools of water. The Contractor shall comply with all the regulations of the local health authorities and shall arrange to spray thoroughly with approved insecticide all buildings erected on the Site. Such treatment shall be carried out at least once a year or as instructed by such authorities."
Sub-Clause 6.__ Epidemics	(F-O)	"In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or sanitary authorities, for the purpose of dealing and overcoming the same."
Sub-Clause 6.__ Alcoholic Liquors or Drug	(F-O)	"The Contractor shall not, otherwise than in accordance with the statutes, ordinances and government regulations or orders for the time being in force, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or suffer any such importation, sale, gift, barter or disposal by his Subcontractors, agents staff or labour."
Sub-Clause 6.__ Arms and Ammunition	(F-O)	"The contractor shall not give, barter or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer to the same as aforesaid."
Sub-Clause 6.__ Festivals and Religious Customs	(F-O)	"The Contractor shall in all dealings with his staff and labour have due regard to all recognized festivals, days of rest and religious or other customs."

Include the following eligibility requirements.

Sub-Clause 7.7 Restriction on Eligibility	(ADB-R) (*)	(a)	Any materials, equipment, services or design services which will be incorporated in or required for the Contract, as well as the Contractor's Equipment and other supplies, shall have their origin in eligible source countries as listed in Section 8.
		(b)	For the purpose of this clause, "services" means the works and all project-related services including design services.
		(c)	For the purposes of this clause, "origin" means the place where the materials and equipment were mined, grown, produced, or manufactured, or from which the services are provided.
		(d)	The origin of Goods and Services is distinct from

the nationality of the Supplier."

If a bonus for early completion is deemed desirable, add the following Sub-Clause 8.12.

Sub-Clause 8.12 Bonus for early Completion

(F-O) If the Contractor achieves completion of the Works, or Section (if any) prior to the Time for Completion, the Employer shall pay to the Contractor the relevant sum stated in the Appendix to Tender (as bonus for early completion) for every calendar day which shall elapse between the date stated in the relevant Taking-Over Certificate and the relevant time prescribed in Sub-Clause 8.2.

Sub-Clause 13.1 The Contract Price

(ADB-R) (*) Amend sub-paragraphs (a) and (b) to read as follows:

" (a) Payment for the Works shall be made on a lump sum basis.

(b) The Contract Price shall be adjusted for changes in the cost of Labour, materials and other matters."

Delete "Sub-Clause 13.16" at the end of Sub-paragraph (c) and replace with "Sub-Clauses 13.16 and 13.17."

If Sub-Clause 13.1(a) is not to apply, the method of determining the Contract Price should be defined in additional Sub-Clauses, as envisaged in the last sentence of Sub-Clause 13.1. If the requirements involve measurements, the following working might be appropriate for one of such additional Sub-Clauses.

Sub-Clause 13._ Remeasurement

(F-O) "The Employer's Representative shall ascertain and determine by measurement the value of those parts of the Works which are to be remeasured in accordance with the Contract (note: the parts must be defined, here or elsewhere). Such parts of the Works shall be measured net, notwithstanding any general or local custom, except where otherwise provided for in the Contract. The Employer's Representative shall, when he requires any such part of the Works to be measured, give reasonable notice to the Contractor's Representative, who shall promptly:

(a) attend or sent a qualified representative to assist the Employer's Representative in making such measurement, and

(b) supply all particulars required by the Employer's

Representative.

Should the Contractor not attend, or neglect or omit to send such representative, then the measurement made by the Employer's Representative or approved by him shall be taken to be the correct measurement of such part of the Works."

Sub-Clause 13.2 Advance Payment (ADB-R) (*)

Modify the third sentence of this Sub-Clause to read:

"The Employer's Representative shall issue an Interim Payment Certificate for the first installment after (i) execution of the Form of Agreement by the parties hereto (ii) provision by the Contract of the Performance Security in accordance with Sub-Clause 4.2 and (iii) provision by the Contractor of an unconditional bank guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment."

Sub-Clause 13.3 Interim Payment Certificate (ADB-R)

Amend the text of items (a) and (b) to read:

" (a) the estimated contract value, at base rates and prices, of the Construction Documents produced and the Works (including variations) executed up the end of the month.

(b) any amount to be added and deducted for changes in cost and legislation in accordance with Sub-Clauses 13.16 and 13.17."

If the interim payments are not based on a Schedule of Payments an alternative method of interim Valuation may be adopted as described in the following sub-clause which will be used to replace the original sub-clause 13.4.

Sub-Clause 13.4 Interim Valuation (F-O)

"Prior to commencing construction of the Permanent Works, the Contractor shall submit a bill of principal quantities of the Permanent Works (referred to in this Sub-Clause as "the BPQPW") together with such supporting information and calculations as the Employer's Representative may reasonably require. The BPQPW shall include the anticipated final quantities of the principal items of Permanent Works, which shall have been priced using all-in rates such that the total amount equals the Contract Price. The BPQPW shall not contain priced items for design or for Temporary Works; the value of each element of such work, and of any other work elements not described in the BPQPW, shall each be included in the rates for Permanent Works to be constructed after such element is carried out. The BPQPW shall be subject to the approval of the Employer's Representative which may at any time be withdrawn, and shall be without prejudice to the final amount due under the Contract. The BPQPW shall

be revised and reissued if it appears at any time before Taking-Over that it will not fully represent the Permanent Works when complete.

During the Time for Completion, the contract value for the purpose of sub-paragraph (a) of Sub-Clause 13.3 shall not exceed the amount calculated from the current BPQPW, based on the quantities of Permanent Works which have been constructed in accordance with the Contract. The Contractor's interim statement shall be in the same form as that of the current BPQPW and shall be accompanied by the Contractor's signed statement that the current BPQPW attached hereto (including anticipated final quantities) and the as-constructed quantities are all correct: each such statement shall also be accompanied by a Construction Certificate, signed by the Contractor's Representative, certifying that the part of the Works constructed to date complies with the Contract. However, the Contractor may propose such lesser amount as seems reasonable, supported with appropriate calculations on a similar basis to the procedure described in this Sub-Clause."

Sub-Clause 13.5 Plant and Materials for Permanent Works

(ADB-R) Item (a) (v) is amended to read as follows:

"(v) the Plant and Materials and the currencies of payment therefore are those shown in the Appendix to Bid."

If payment for Plants and Materials for the Permanent Works is to be made prior to their arrival at site a new sub-clause as shown below may be used in place of the original Sub-Clause 13.5.

(F-O) "Interim Payment Certificates shall include (i) and additional amount of Plant and Materials which have been shipped to the Site for incorporation in the Permanent Works, and (ii) a deduction when payment is due under Sub-Clause 13.5. The Employer's Representative shall determine each addition and deduction in accordance with the following provisions:

(a) no addition shall be included in the Interim Payment Certificate unless, in the opinion of the Employer's Representative.

(i) Plant and Materials have been shipped to the Country, enroute to the Site, in accordance with the Contract;

(ii) the contractor has submitted a clean shipped bill of lading or other evidence of shipment, evidence of payment of freight and insurance, and other documents as the Employer's Representative may reasonably require, together with an

unconditional bank guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the amount due under sub-paragraph (b) of this Sub-Clause: such guarantee shall be valid until the Plant and Materials are properly stored on Site and protected against loss, damage or deterioration;

(iii) the Contractor's records of the requirements, orders receipts and use of Plant Materials are kept in a form approved by the Employer's Representative, and such records are available for inspection by the Employer's Representative;

(iv) the Contractor has submitted a statement of the Cost of acquiring and shipping the Plant and Materials to the port (or other place) of entry into the Country, together with such documents as may be required for the purpose of evidencing such Cost; and

(v) the Plant and Materials are those listed for this Sub-Clause in the Appendix to Bid;

(b) the additional amount to be certified shall be the equivalent of seventy percent of the cost of the Plant and Materials delivered to the port (or other place) of entry into the Country, as determined by the Employer's Representative after review of the documents mentioned in sub-paragraph (a) above, taking account of the contract value of such Plant and Materials as determined and considered appropriate by the Employer's Representative;

(c) the amount of the deduction for any Plant and Materials for which payment is due under Sub-Clause 13.5 shall be equivalent to the addition previously certified by the Employer's Representative for such Plant and Materials under sub-paragraph (b) above;

(d) the currencies for such additions and deductions shall be determined by the Employer's Representative for such Plant and Materials under sub-paragraph (b) above; and

(e) the currencies for such additions and deductions shall be determined by the Employers Representative as described in Sub-Clause 13.5."

Sub-Clause 13.9 (ADB-R) Add the following para. to Sub-Clause 13.9:

Payment of Retention Money

"At the request on the Contractor, the second half of the Retention Money may also be released at the issue of the Taking-Over Certificate provided a bank guarantee is provided by the Contractor for an amount equal to half the Retention Money for the period from the issue of the Taking-Over Certificate to the expiry of the Contract Period."

Sub-Clause 13.15 Calculation of Payments in Foreign Currency

(ADB-R) Delete Clause 13.15 and add the following:

"The Contract shall be paid in the currencies stated in the Appendix to Bid.

The foreign and local currency portions of the balance of the Contract Price shall be amended by agreement between the Employer and the Contractor to reflect any substantial changes in the expected foreign and local currency requirements of the Contractor during the execution of the Works, provided that:

(a) the Contractor shall inform the Employer and the Employer's Representative whenever any such substantial change may occur; or

(b) the Employer's Representative may recommend a review of such expected requirements if in its judgment there is evidence of a change in the country of origin of equipment, materials, plants, or services to be provided under the Contract which should result in any substantial change of such expected requirements.

Any such amendment shall be affected by comparing the amounts quoted in the bid with the amounts already used in the Works and the Contractor's future needs for imported items."

When price adjustment provisions are to be included add the following Sub-Clause 13.17.

Sub-Clause 13.17 Adjustment for Changes in Cost

(ADB-R) (*) "The amount payable to the Contractor and valued at base prices in accordance with the payment Schedule shall be adjusted for rises or falls in the cost of Labour, Contractor's Equipment, Plant, Materials and other inputs to the Works, by the addition or deduction of the amounts determined by the formulae prescribed in this Sub-Clause. To the extent that full compensation for any rise or fall in costs to the Contractor is not covered by the provisions of this or other clauses in the Contract, the Contract Price shall be determined to include amounts to cover the contingency of such other rise or fall in costs.

The amount to be added to or deducted from the Interim

Payment Certificates for changes in cost and legislation shall be determined from formulae for each of the currencies in which the Contract Price is payable and for each of the sections of work priced in the said Schedule. The formulae will be of the following general type:

$$Pn = a + b\frac{Ln}{Lo} + c\frac{Mn}{Mo} + d\frac{En}{Eo} + etc$$

where:

"Pn" is the adjustment factor to be applied to the estimated value of the work carried out in month "n".

"**a**" is a fixed coeffficient, specified in the Appendix to Tender, representing the non-adjustment portion in contractual payments;

"**b**", "**c**", "**d**", etc are coefficients representing the estimated proportion of each cost element (labour, materials, etc) in the Works, as specified in the Appendix to Bid;

"**Ln**", "**Mn**", "**En**", etc are the current cost indices or reference prices for the month "n", determined in the relevant currency of payment, applicable to each cost element on the date 49 days prior to the last day of period to which the particular Interim Payment Certificate is related; and

"**Lo**", "**Mo**", "**Eo**", are base cost indices or reference prices corresponding to the above cost elements, in the relevant currency of payment, on the Base Date.

The cost indices or reference prices specified in the Appendix to Tender shall be used. In cases where the Currency of Index is not the relevant currency of payment, the index shall be converted into the relevant currency of payment at the selling rate established by the Central Bank of the Country. If at any time a current index (for the date 49 days prior to the last day of the period to which the particular Interim Payment Certificate is related) is unavailable, a provisional index as determined by the Employer's representative shall be used, subject to subsequent correction of the amounts certified when the current index is available.

If the Contractor fails to complete the Works within the Time for Completion, adjustments of prices thereafter shall be made using either each index or price applicable on the date 49 days prior to the expiry of the Time for Completion, or the current index or price, whichever is more favourable to the Employer; provided that, if an extension of time is granted in accordance with Sub-Clause 8.3, the above provision shall apply to the extended time for completion.

The weightings (coefficients) for each of the factors of cost

given in the Appendix to Bid shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable, as a result of Variations."

In order to clarify the taxation responsibilities of the Contractor include the following Sub-Clause 13.18.

Sub-Clause 13.18 Taxation

(ADB-R) (*)

"(i) The prices bid by the Contractor shall include all taxes, duties and other changes imposed outside the Employer's country on the production, manufacture, sale and transport of the Contractor's equipment, Plant, materials and supplies to be used on or furnished under the Contract, and on the services performance under the Contract.

(ii) The prices bid by the Contractor shall include all customs duties, import duties, business taxes, income and other taxes that may be levied in accordance to the laws and regulations in being as of the date 28 days prior to the closing date for submission of bids in the Employer's country on the Contractor's Equipment, Plant, materials and supplies (permanent, temporary and consumable) acquired for the purpose of the Contract and on the services performed under the Contract. Nothing in the Contract shall relieve the Contractor from its responsibility to pay any tax that may be levied in the Employer's country on profits made by it in respect of the Contract."

Sub-Clause 15.5 Corrupt or Fraudulent Practices

(ADB-R) Delete the existing Sub-Clause 15.5 and substitute the following:

"If in the judgment of the Employer the Contractor has engaged in corrupt or fraudulent practices, in competing for or in executing the Contract, then the Employer may, after having given 14 days notice to the Contractor, terminate the Contractor's employment under the Contract and expel the Contractor from the Site, and the provisions of Clause 15 shall apply as if such expulsion had been made under Sub-Clause 15.2."

Sub-Clause 17.3 Employer's Risks

(ADB-R) (*) This sub-clause is amended to read as follows:

"The Employer's risks are:

(a) insofar as they directly affect the execution of the Works in the country where the Permanent Works are to be executed:

(i) war and hostilities (whether war be declared or not), invasion, act of foreign

enemies;

(ii) rebellion, revolution, insurrection, or military or usurped power, or civil war;

(iii) ionizing radiations, or contamination by radioactivity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radioactive toxic explosive or hazardous properties of any explosive nuclear assembly or nuclear component thereof;

(iv) pressure waves caused by aircraft or other aerial devised travelling at sonic or supersonic speeds;

(v) riot, commotion or disorder, unless solely restricted to the employees of the Contractor or of its Subcontractors and arising from the conduct of the Works;

(b) loss or damage due to the use or occupation by the Employer of any Section or part of the Permanent Works, except as may be provided for in the Contract;

(c) any operation of the forces of nature (insofar as it occurs on the Site) which an experience contractor:

(i) could not have reasonably foreseen, or

(ii) could reasonably have foreseen, but against which he could not reasonably have taken appropriate measures to prevent loss or damage to physical property occurring."

If the Contractor is to occupy the Employer's facilities temporarily add the following Sub-Clause 17.7.

Sub-Clause 17.7 Occupation and Care of Employer's Facilities

(F-O) "The Contractor occupying the Employer's facilities temporarily for the purpose of the Contract shall take full responsibility, from the dates of use or occupation to the dates of hand-over or cessation of occupation, of the items detailed below:

(insert details)

If any loss or damage happens to any of the above items while the Contractor is responsible for their care, arising from any cause whatsoever other than the Employer's Risks listed in Sub-clause 17.3, the Contractor shall at its own cost, rectify such loss or damage to the satisfaction of the Employer's representative."

Sub-Clause 18.2 Insurance for Works and Contractor's Equipment

(ADB-R) (*)

(i) Amend the second sentence of the first and second paragraphs to read:

"This insurance shall cover loss or damage from any cause other than the Employer's risks listed in amended Sub-Clause 17.3 paras. (a)(i) to (iv) in Part II of the Conditions of Contracts".

(ii) Amend the fourth sentence of the first paragraph to read:

"Such insurance shall cover the Employer and the Contractor from the first working day after the Commencement Date until the date of issue of the Taking-Over Certificate for the Works."

In certain circumstances, the Employer may decide not to insist on insurance for design under Sub-Clause 18.1 and/or to arrange insurance in respect of the Works and Third Party liability itself. In such a case Sub-Clause 18.2, 18.3 and 18.5 shall be modified as shown below.

Sub-Clause 18.2 Works Insurance by the Employer

(F-R) Delete the original text of Sub-Clause 18.2 and substitute:

"The Employer shall insure the Construction Documents, Plant, Materials and Works in the joint names of the Employer, the Contractor and the Subcontractors, against all loss or damage arising from any insurable cause other than the Employer's Risks listed in the amended Sub-Clause 17.3 paras (a)(i) to (iv) in Part II of the Conditions of Contract. Such insurance shall be for a limit of not less than the full replacement cost (including profit) and shall also cover the costs of demolition and removal of debris. Such insurance shall be in such a manner that the Employer and the Contractor are covered from the first working day after the Commencement Date until the date of issue of the Taking-Over Certificate for the Works. The Employer shall extend such insurance to provide cover until the date of issue of the Performance Certificate, for loss or damage for which the Contractor is liable arising from a cause occurring prior to the issue of the Taking-Over Certificate and for loss or damage occasioned by the Contractor or Subcontractors in the course of any other operation

(including those under Clauses 11 and 12).

The Contractor shall insure the Contractor's Equipment in the joint names of the Employer, the Contractor and Subcontractors, against all loss or damage arising from any insurable cause other than the Employer's risk listed in the amended Sub-Clause 17.3 paras. (a)(i) to (iv) in Part II of the Conditions of Contract. Such insurance shall be for a limit of not less than the full replacement value (including delivery to Site). Such insurance shall be in such a manner that each item of equipment is insured while it is being transported to the Site and throughout the period it is on or near the Site."

Sub-Clause 18.3 Third party Insurance by Employer (F-O)

Delete the original text of Sub-Clause 18.3 and substitute:

"The Employer shall insure against liability to third parties, in the joint names of the Employer, the Contractor and Subcontractors, for any, loss, damage, death or bodily injury which may occur to any physical property (except things insured under Sub-Clause 18.2) or to any person (except persons insured under Sub-Clause 18.4), which may arise out of the performance of the Contract and occurring before the issue of the Performance Certificate".

Sub-Clause 18.5 General Requirements for Insurance (F-O)

Delete the original text of Sub-Clause 18.5 and substitute:

"Each insurance policy shall be consistent with the general terms agreed in writing prior to the Effective Date, and such agreement shall take precedence over the provisions of this Clause.

The Contractor shall, within the period stated in the Appendix to Bid or the Appendix to Technical Proposal in the case of two-envelope bidding procedure (calculated from the Commencement Date), submit to the Employer appropriate evidence that the insurances for which the Contractor is responsible have been effected. When each premium has been paid, the Contractor shall submit copy receipts to the Employer. The Contractor shall effect all insurances for which the Contractor is responsible with insurers and in terms approved by the Employer. Each policy insuring against loss or damaged shall provide for payments to be made in the currencies required to rectify such loss or damage. Payments received from insurers shall be used for the rectification of the loss or damage. The Contractor (and, if appropriate, the Employer) shall comply with the conditions stipulated in each of the insurance policies.

The Employer shall, within 14 days, after receiving the performance security described in Sub-Clause 4.2, submit to the Contractor evidence that the insurances for which the Employer is responsible, have been effected, and copies for the relevant policies of insurance. When each premium has been paid, the Employer shall submit copy

receipts to the Contractor.

The Employer shall effect all insurances for which the Employer is responsible with insurers, and in the terms, approved solely by the Employer. All such insurances shall be in accordance with the details of insurance annexed unless otherwise agreed with the Contractor. The Contractor shall be deemed to have fully understood such details, and to have satisfied itself before submitting its Tender as to the extent of the cover provided under such insurances (taking account of the conditions, limits, exceptions and deductibles) and as to the correctness and sufficiency of the Contract Price, which shall be deemed to include the cost of any further insurances which the Contractor wishes to effect. The Contractor and Subcontractors shall accept the insurances effected by the Employer, as if they had effected such insurance; they and the Employer shall comply with the terms and conditions stipulated in each such policy. Payment received under a policy insuring against loss or damage shall be used for the rectification of the loss or damage.

Each party shall make no material alteration to the terms of any insurance for which it is responsible, without the prior agreement of the other party. If an insurer makes (or purports to make) any such alteration, the party notified by such insurer shall notify the other party immediately.

If either party fails to effect and keep in force any of the insurances which it is required to effect under the Contract, or falls to provide satisfactory evidence, policies and receipts in accordance with this Sub-Clause, the other party may; without prejudice to any other right or remedy, effect insurance for the coverage relevant to such default, and pay the premiums due. Such payment shall be recoverable from the party responsible for effecting such insurance.

Nothing in this Clause limits the obligations, liabilities or responsibilities of the Contractor or the Employer, under the other terms of the Contract or otherwise. Any amounts not insured or not recovered from the insurers (including the cost of preparing insurance claims) shall be borne by the Contractor and/or the Employer accordingly."

Section 4

Employer's Requirements

Section 4. Employer's Requirements

A. General

Object of the tender are the works for the rehabilitation of the existing railway line between Kungrad and Kazakh border (327km), excluding the rehabilitation of the stations (permanent way, buildings and passenger services).

The line will be rehabilitated along the sections between two consecutive stations, till the station first turnout, while the stations will be left in the current conditions as for the earthworks, permanent way and turnouts, and facilities (platforms, buildings, etc.).

In particular, selected works envisage the complete replacement of the permanent way, till the sub-ballast layer, along the sections with current P50 rails and worn out wooden sleepers, and the re-alignment and welding of the whole line, including the sections currently already replaced with P65 rails and concrete pre-stressed sleepers.

In detail, the following works will be carried out:

For the preliminary works, the following is requested:

- For all the line a detailed topographic survey will be carried out with the aim of producing 3D cartography on the base of which the corrections of the alignment and the profiles of the existing line will be carried out. The strip to be surveyed must be long as the railway line length (327 km) including the stations, and large at least 50+50 m around the centre line of the existing track. The scale of representation of the cartography must be 1:1,000. Particular attention will be given to the survey (plan and profile) of the existing track.
- For all the line corrections of the existing surveyed conditions of the track will be carried out for producing the design plan and profile of the track after the rehabilitation works. In the final drawings, to be submitted as plan-profile drawings in scale 1:1,000 for plan and 1:100 for profile, minimum the following elements must be shown:
    - Cartography as surveyed with indications of contour lines or quoted points (in case of flat environment), break lines of the ground (rivers, edges, roads, centre lines, etc.), existing interfering elements (electric, telephone, or other cable network, pipes and pipelines, buildings, walls, fencings, and all other elements necessary to be taken into consideration during the development of the necessary corrections) .
    - Geometric elements of the existing alignment according to the survey.

- Geometric elements of the designed alignment (horizontal and vertical curves, transition curves start and end, etc.).
- Location and dimensions (in scale) of the major structures.
- Location and representation of the minor structures (drainage culverts, pipe and small box culverts, etc.).
- Location and representation of stations (with indication of the position of the main line turnouts and signals).

The list of main civil and permanent way works to be executed and relevant approximate quantities are here below reported (see also Volume 4 – location of the works to be carried out and schematic drawings).
The bidder is requested to carry out his own evaluation of the exact quantities of works to be executed.

A) Stretches with P50 or P65/P50 rails on wooden sleepers:

1. demolition of 177 km of old track,
2. excavation of a layer 0,6 m thick of material (521.600 m3) on the top formation,
3. laying down a layer of 0,2 m thick of sandy gravel material (218.000 m3),
4. laying down a layer 0,3 m thick of compressed sandy gravel material,
5. substitution of the existing wooden sleepers with 326.000 concrete sleepers,
6. installing new P65 rails on the main line for a total length of 177 km (22240 tons),
7. installation of a layer of ballast 0.3 m thick under sleepers (317.000 m3),
8. regulation of mechanical tensions of long welded bars (243 km),
9. formation of continuous welded rail, about 16,500 weldings (243 km),
10. demolition of level crossing pavements,
11. rebuilding of definitive level crossing pavements (15 L.C. with the replacement of 24 concrete blocks each),
12. final tamping, levelling, aligning.

B) Stretches with P65 rails on wooden sleepers:

As before; P65 rails are recovered and used in other part of the line.

C) Stretches with P65 rails on concrete sleepers and cwr (continuous welded rails):

1. Tamping, levelling, aligning, addition of ballast (and ballast cleaning) if necessary,
2. The stretches rehabilitated in the last 4 years do not need any intervention.

D) Stretches with P65 rails on concrete sleepers, without cwr:

1. regulation of mechanical tensions of long welded bars,

2. formation of cwr,
3. as point C).

E) Stretches with P65 rails on mixed wooden/concrete sleepers:

As point B).

Earthworks:

Partial lateral rebuilding of embankment section for 100 km, placing and compacting the removed top material for widening the top surface of about 1,0 m on both sides. This work is requested for re-establishing the original cross section width in some sections where it has been reduced by the natural effects of raining waters and wind.

Drainages and structures:

Excavation of drainage ditches on embankment foot for 100 km on both sides of the embankment.

Civil works (structures):

Replacement of the beams of 44 double span small bridges for drainage purposes. Each bridge count 4 beams (two per span), therefore the substitution concerns 176 beams, simply leaned in reinforced concrete. Shape and specifications are according to the annexes specifications and drawings.

Capital maintenance for 110 elevations (abutments and piers).

Moreover it is requested that the line is kept in operation during the rehabilitation works, and therefore the Contractor should plan in detail the replacement works in order to work in time windows not longer than 6 hours per day. Work machines must be hosted in the intermediate stations of the line during the non working periods.

All goods and materials to be used in the works must be new, unused, of most recent or current models and incorporate recent improvements in design and materials.

The following table contains the proposed list of works with a short description.

INFRASTRUCTURE WORKS FOR LINE REHABILITATION		
	A. WORKS	DESCRIPTION

INFRASTRUCTURE WORKS FOR LINE REHABILITATION		
	A. WORKS	DESCRIPTION
1A	Topographic survey of the line and corrections of the existing alignment and profile.	Topographic survey to be carried out along the line, for a strip of 50+50m around the existing railway axis, production of the current status cartografy, and detailed correction of the alignment and profile of the line. New plan profile in scale 1:1,000 and current cross sections of the line in scale 1:200-1:100 step 50 m will be produced, indicating the existing and future geometrical parameters of the line.
2A	Demolition of line.	It consists in dismantling the existing worn out permanent way (rails, junctions, sleepers and fastenings), transportation of the materials to the deposit sites, dividing them into old and re-usable materials (residual value). This operation will be presumably carried out according to the methodology developed in this area: after having manually eliminated the fish-plated junctions of the rails, the dismantling train will pass over the free track panels, and its tail equipped with a dismantling crane will dismantle the track panels and automatically transport them into the front platform wagons.
3A	Excavation.	After having dismantled the permanent way, excavation of about 50-60 cm of topping material of the embankment by means of machine (bulldozer with front shovel). Generally, during this process, old polluted ballast and old polluted sub-ballast (sandy gravel) are discharged on embankment side for their future re-use. In case this work takes place into stations, the removed top material will be transported to dump. This item also include the further compaction of the top layer of the embankment for increasing hits bearing capacity and for re-shaping the embankment roof.
4A	Partial lateral rebuilding embankment section, placing and compacting the removed top material for widening the top surface of about 1,0 m on both sides.	This item will be applied only on those sections where the existing embankment is found to be eroded and not compliant with the typical cross section. In many cases in fact, ballast is falling on the embankment side for the embankment is reduced in transversal dimensions due to the water and wind erosion of hits slopes, not protected by means of grassing. For this item, material will be taken from the side material demolished in Item 3A for those sections where 3A took place, while for the other sections material will be transported or taken from the surrounding environment after tests. In order to widen the embankment side, the existing eroded side will be shaped in steps, and the additional earth will be added in layers of max 20-30cm in order to compact it by means of manual vibro-compacting machine.
5A	Implementation of a layer of sandy gravel material, 0,2 m thick under sleepers (sub-ballast).	After the item 4A, on the compacted top layer of the embankment the new layer of sandy gravel (sub-ballast) will be laid and compacted in the correct shape, according to typical cross section.

INFRASTRUCTURE WORKS FOR LINE REHABILITATION		
	A. WORKS	DESCRIPTION
6A	Construction of line.	After the item 5A, the new track will be built (sleepers, fastenings and rails), by laying it on the sub-ballast layer. This procedure will be presumably carried out with the system used in this area, described in detail in the Figure on the next page. This system is based on the use of construction train, similar to the dismantling train, with opposed operations. Tail locomotive of this train will push the front laying crane against the section to be built, and the crane will lay track panels, casted outside of the field, on the sub-ballast layer. Provisional junctions will be installed and the construction train will run on the just installed panels. Construction of the line can also be carried out with other methods, as for example that envisaging the use of long welded rail to be laid on the two sides of the existing permanent way and the transportation of the sleepers only on the construction train. This second method allows to avoid the big number of weldings to be done on field and allows to transport on field sleepers and long rails separately. The first train transporting long rails would also run during line operation, laying the new rails on the two sides, the second train would dismantle the existing permanent way, cleaning and re-laying the sub-ballast, laying the sleepers (transported by its wagons) at the correct distance and it would finally install the lateral new rails on the sleepers, with fastenings. The item 6A also includes first layers ballast spreading, tamping and lifting of rails up to 3 cm to final level.
7A	Flash-butt or thermic weld of P65 rail.	Welding of the panels by means of flash-butt or thermic system. Welding of the rails will have to be done according to strict technical specifications, that will be detailed in the next phase of the study.
8A	Regulation of mechanical tension of long welded rails (l.w.r.).	After the rail welding, mechanical tensions will be regulated, according to strict technical specifications, that will be detailed in the next phase of the study.
9A	Final tamping and levelling of new line.	The permanent way, so welded and regulated, will be in this phase taken to its final level and alignment by means of final tamping and levelling.
10A	Ballast cleaning on the other existing sections.	On some of the sections where existing permanent way is preserved, ballast cleaning will be carried out. Ballast cleaning concerns the existing section ballast cleaning and re-shaping, with some addition of new ballast where necessary. It can be carried out by means of automatic machines or by handwork.
11A	Tamping, levelling and aligning the other existing sections with l.w.r.	All over the sections where existing permanent way is preserved, tamping, levelling and aligning will be carried out for reaching the final alignment.
13A	Excavation of ditches.	Hydraulic drainages must be cleaned and embankment side ditches must be excavated when absent, in order to protect the embankment side from water infiltration and foot erosion. In general, no concrete cover is requested for the ditches. Trapezoid ditch 0.5-0.5-0.5 has a volume of 0,5m3/m.

INFRASTRUCTURE WORKS FOR LINE REHABILITATION		
	A. WORKS	DESCRIPTION
14A	Pavement of level crossings.	This item concerns the reconstruction of the pavement of the level crossings for the area of railway crossing only. It has been estimated that each level crossing envisages an area of about 50m by 10m.

Contract implementation period:

The contract implementation period is 30 (thirty) months from the signature of the contract.

Payments

Payment for the Works shall be made on a lump sum basis.

Technical specifications

On the next pages one can find an example of how the technical specifications for the works and materials could be.

B. Description of possible methodologies for line construction

The Contractor shall adopt one of the two methodologies here below described

B.1 METODOLOGY 1

Hereafter the procedure commonly used in Europe to implement these works with heavy machines is described (see also drawing L1.1-7):

Previous activities:

I. the P65 rail bars 25 m long are welded in bars of 100÷125 m and staked,

II. the long P65 rail bars are loaded on platforms, transported and laid down along the line on both sides of the existing track, positioned and jointed to be initially used as service track for portal cranes,

Activities to be done in the same day:

III. a work train arrive at the beginning of the stretch scheduled to be dismantled and rebuilt with P65 rails on concrete sleepers. The work train is formed by
-platforms loaded with 2 self moving portal cranes and an ancillary beam,
-platforms to be loaded with dismantled 25 m track frames,
-platforms loaded with concrete sleepers to be installed,

IV. the portal cranes and ancillary beam, unloaded from the platforms, displace themselves on the service track, stop in correspondence of the first 25 m panel, previously disjointed from the adjacent ones, lift it and, coming back along the train, unload it on a flat wagon; this operations are repeated up to complete the dismantling of the scheduled length of track (see also item 2A)

V. the excavation of the existing materials start and go on until the design depth is reached (see also item 3A),

VI. the sandy-gravel material is spread on the surface between the service rails and compacted (see also item 5A),

VII. the portal cranes by means of the ancillary beam lift the concrete sleepers from wagons, run along the service track and lay down in two phases the concrete sleepers on the sandy gravel layer (distance between sleeper axles = 0,54 cm, that is 1840 sleepers per km are to be laid down) up to cover the full length of the dismantled stretch; at this stage the Contractor shall make use of reference stakes for locating the track CL and avoid abnormal adjustments in a further stage,

VIII. the portal cranes and beam are re-loaded on their wagons,

IX. After placing the polyethylene pads on the rail seats of the sleepers, using a little machine called "positioner" the P65 rails, forming the service track till the present phase, are put in their definitive position on the concrete sleepers and fastened; at this stage 50% of fastenings will be inserted, the joints shall be assured with additional bolts The new track shall be, manually and/or using the tamping machine, leveled, aligned and put in order to allow the passage of trains at a temporary speed limit of 10 km/h,

Activities to be done in the following period:

X. the long bars are welded up to a length of 400 m (temporary section); the Contractor may weld the joints by "thermic" or flash-butt process,

XI. the finishing of the excavation and of the sandy gravel layer on both external sides is implemented,

XII. about 1 m^3 of ballast is laid down and the track lift of about 0,20 cm using the tamping machine and jacks,

XIII. additional quantities of ballast are laid down and the track is lift up to reach a level of 0÷20 mm to the design level,

XIV. during the lay down of additional ballast, the lifting and tamping operation, the ballast section profile shall be adjusted by a "profiler" machine, equipped with a brush for clearing the track,

XV. before final lifting, straightening and leveling of the track, the Contractor shall carry out the regulation of the mechanical stresses of the rails, the formation of the continuous welded rails (CWR), adjust the expansion joints and fix the 100% of the fastenings.

XVI. a final tamping of the complete track has to be carried out, making use of an heavy tamping machine, at least 60 days after all the works described in the above paragraphs have been successfully completed. The final line profiling has also to be implemented at this stage.

B.2 METODOLOGY 2

Hereafter the procedure commonly used in CIS countries to implement these works with heavy machines is described (see also drawing L1.1-8):

Previous activities

I. panels 25 meters long of concrete sleepers fastened to P65 rails are prepared in a station near the work site and loaded on the laying train,

Activities to be done in the same day:

II. a dismantling train and a laying train (loaded with the new panels to be installed), coming from one of the adjacent stations, are placed astride the first panel to be dismantled; every train has a gantry crane in its composition, put in such position to be able to work in correspondence of this panel,

III. the crane of the dismantling train lifts the first panel, whose joints have been previously unbolted, and, with a backward movement, lays it on a mobile device under crane on the platform wagon; this operation is repeated according to the possibilities given by the height of the crane, after a train displacing in successive positions correspondent to the other panels to be dismantled,

IV. the mobile device, pulled by the rope of a winch, transfer on rollers the panels stacked on it to wagons in a rear position to allow the dismantling and stacking of more panels,

V. on the dismantled stretch, excavation works start, using ballast cleaner machine, soil moving machines, motor grader, pneumatic-tired roller, leveler, to prepare and implement the new sandy-gravel layer, if it is foreseen by the design, and /or a leveled ballast surface,

VI. the crane of laying train, lays down the 25 m long new panels assembled P65 rails fastened on concrete sleepers, and provisional joints of panels are performed,

Activities to be done in the following period:

VII. new ballast is spread along the line and the tamping machine start to compact ballast and to lift the rails up to 2÷3 cm from the design level,

VIII. rails are welded in 800 m bars and provisional joints recovered,

IX. during the lay down of additional ballast, the lifting and tamping operation, the ballast section profile shall be adjusted by a "profiler" machine, equipped with a brush for clearing the track,

X. before final lifting, straightening and leveling of the track, the Contractor shall carry out the regulation of the mechanical stresses of the rails, the formation of the continuous welded rails (CWR), adjust the expansion joints and fix the 100% of the fastenings.

XI. a final tamping of the complete track has to be carried out, making use of an heavy tamping machine, at least 60 days after all the works described in the above paragraphs have been successfully completed. The final line profiling has also to be implemented at this stage.

C. Description and Specification of the Works to be executed.

1A – Topographical survey of the line and correction of the existing alignment and profile

a) Description of work

The Topographical survey is the first work to be scheduled by the Contractor in the Work Program and will provide indispensable information for subsequent activities.
It will cover, as a minimum requirement, the following operations:

- survey of the track centre line (CL),
- survey of the rails and platform levels at least every 20 m,
- survey and represent in the drawings all structures concerned to the railway line and its surroundings (bridges, culverts, fences, retaining walls, etc. and their characteristics) including public services and networks (electric power, water, sewer etc.),
- drawing of a cross section at least every 40 m, covering a minimum of 20 m for each side of the CL in 1:200 scale),
- design of the plan of the track CL in 1:2000 scale,
- design of the longitudinal profile of the track in 1:2000 horizontal scale and 1:200 vertical scale,
- staking out of the line geometry and ground levels of the platform.

The range of survey and the scales stated above shall be regarded as a minimum general requirement for the topographical survey and design. In some cases, like in railway stations, bridges, turnouts, sidings, drainage structures, level crossings or other particular cases, at the discretion of Employer's Representative, these requirements can be increased and changed to better fit the design needs.

The plan shall include the overhead double three-phase 10kV line, the single three phase 10kV line and the telecommunication line and shall indicate the position of poles. Crossings with roads, power and telecommunication lines, rivers etc. shall as well be indicated with their axle angles.

A profile of the double 10kV line in scale 1:2000 for the lengths and 1:200 for the heights shall moreover be provided, as well as sketches of crossings with roads, railway, other power lines etc. in readable scale, following the instruction of the Employer's Representative.

b) Equipment and software

The topographical survey shall be made by a qualified surveying team by means of digital reading equipment consisting of digital tachometer, total station type, and reference benchmarks shall be set out by means of a GPS (Global Position System) receiver.

Outputs from the topographical survey shall be digitally processed and drafted by means of a Computer Aided Design (CAD) station, operated by a qualified CAD operator. Software to be used for data reading, processing and design shall be fully compatible with the latest commercially versions of Microsoft© Windows Operating System and Autodesk© Autocad.

Printed outputs shall be digitally plotted in adequate paper format to suit the required scales.

Although the allocation of the above referred equipment and software to the site is mainly aimed at fulfilling the Contractor's duties under these Specifications, it shall also be made available to be used by the Employer's Representative, at his request, in co-ordination with the Contractor, on the best interest of the work.

2A – Demolition of line

a) Description of work

In all the sections in which P65 or P50 rails on wooden or wooden/concrete mixed sleepers are actually installed, making use of portal cranes or manually, the Contractor shall remove all the existing rails and wooden or concrete sleepers, load them on suitable wagons, transport and unload them in the station yard that will be indicated by the Employer's Representative, select, classify and conveniently stack them in accordance with the Employer's Representative's instructions (see points W1.1. IV or W1.2. III)

No cutting of the existing length of rails will be allowed, unless the track is formed in continuously welded rails bars, in which case cuttings in 25 m lengths will be permitted; moreover all precautions for not damaging the reusable materials (rails, fishplates, bolts, fastenings etc.) will be taken. For this reason, fishplate or bolt cutting will not be allowed and the joint material shall be lubricated some days before the removal.

b) Equipment

If portal cranes are used, a service track alongside the track to be dismantled has to be created.

3A – Excavation

3A - I) Earth Excavation

a) Purpose

This item covers for excavation works on earth materials including eolian, alluvial, residual and other materials of any type and consistency that can be excavated by high –output mechanical means and in general all materials not having the characteristics covered under the item Rock excavations.

This item applies to the excavation related to the top materials of formation, to the foundation and construction of new structures, to drainage ditches and to the regularization and reshaping of slopes in cut.

Any information regarding the characteristics of soils to be excavated which may be referred in the contract documents shall be regarded as illustrative and shall not be considered as the basis for the Contractor's determination of his tender rates.

The Contractor shall visit the site prior to preparing his tender and shall determine the nature of materials, location and accesses and all factors that may interfere with his costs in complying with the specified requirements.

b) Description

This work includes the excavation within the limits of the design, removal and satisfactory disposal of all removed materials, up to the limits of the work, and also the shaping and sloping, compacting or re-compacting of the top surfaces in accordance with the design requirements.

Excavation beyond the geometric limits defined in the drawings or as per the Employer's Representative's instructions shall be considered as over-excavation and shall be suitably backfilled with the same type of material, duly compacted and shaped to the satisfaction of the Employer's Representative, at the cost of the Contractor.

3A - II) Rock Excavation

a) Purpose

This item covers for excavation works on rock materials including all unaltered and unweathered firm and rigid igneous metamorphic and sedimentary rocks, for which it is necessary the use of blasting and/or low output mechanical means (hydraulic or pneumatic demolition hammer).

It also includes all boulders or other detached stones having a volume of 1 m^3 (one cubic meter) or more as determined by physical measurements or visually by the Employer's Representative.

This item applies to rock excavation related to the foundation and construction of new structures, to side ditches and to the regularization of slopes in cut sections.

Any information regarding the characteristic of rocks to be excavated which may be referred in the contract documents shall be regarded as illustrative and shall not be considered as the basis for the Contractor's determination of his tender rates.

The Contractor shall visit the site prior to preparing his tender and shall determine the nature of rocks, location and accesses and all factors that may interfere with his costs in complying with the specified requirements.

b) Description

This work includes the excavation within the limits of the design, removal and satisfactory disposal of all removed materials, up to the limits of the work, and also the shaping and sloping, in accordance with the design requirements.

Excavation beyond the geometric limits defined in the drawings or as per the Employer's Representative's instructions shall be considered as over-excavation and shall be suitably backfilled with the same type of material, duly compacted and shaped to the satisfaction of the Employer's Representative, at the cost of the Contractor.

4A Partial lateral rebuilding for top embankment widening

a) Purpose

Where the embankment erosion has got some extension, the original width of ballast shoulders on the sleeper ends disappears and the ballast falls down at the foot of the embankment. In these cases it is necessary to rebuild the standard section and the side path, reducing the waste of ballast, allowing the walking inspections of the line maintenance personnel, permitting little displacement of the CL, if needed, during the operation of straightening and correction of curves.

b) Description

The procedure of forming the embankment widening is shown in drawing L1.1-5.

Only approved granular materials, non-plastic, and those that will produce a dense, well compacted backfill shall be used.

Materials containing debris or organic matter shall not be used.

No backfill can be placed against any structure without permission of the Employer's Representative.

The approved backfill material shall be placed in layers not exceeding 0,2 m and each layer shall be compacted by means of suitable equipment up to a density not less than 98% of maximum dry density.

Materials of the following characteristics should be used:

4 B - Ballast

Technical specifications for ballast supplying have to comply with Standard GOST 7392-85 (see Annex TS12)

a) Technical requirements

The ballast shall be obtained by mechanical crushing of rocks, detritus, gravel.

Ballast from crushed stone is characterized by the following requirements: kernel composition, particle content with the sizes of less than 0,16mm, crushed kernels

(granular) content (in the crushed stone from boulders and gravel), durability, content of kernels (granular) of soft rocks, content of clay in lumps; frost resistance, electro insulation properties.

I. Depending on the fineness of the kernels (granular) the crushed stone (ballast) is divided into fractions, kernels' (granular) sizes of which should be in compliance with the indicated ones in table 1.

Table 1

Kernels (granular)size fraction, mm	Number of kernels (granular)				Full residue on the sieve with the holes of diameter 40 mm, % by mass
	larger than upper nominal size		smaller than the lower nominal size		
	In the limits of sizes , mm		% by mass , not more		
			total	including the particles by size less 0,16 mm	
From 25 to 60	From 60 to 70	5	5	1,5	From 25 to 75
	Over 70	0	-	-	
From 5 to 25	From 25 to 40	10	5	2	-
	Over 40	0	-	-	-

On the railways of public usage ballast of fraction from 25 to 60 mm and from 25 to 70 mm is intended for re-ballasting of main lines.

Ballast from detritus (boulders) and gravel fractions of size 25 to 60 mm should contain crushed kernels (granular) in the amount of 50% by mass.

II. Ballast durability is characterized by its abradability while tested in the shelf drum or its resistance to hammering while tested at the end of ПМ. Depending on the indications of mechanical strength ballast is divided into marks indicated in tables 2 and 3.

Table 2

Ballast mark	Abradability (loss in mass), %
Ballast of fractions from 5 to 40mm, from 25 to 60mm and from 25 to 70 mm	
И20	To 20
И40	Over 20 to 40
И50	Over 40 to 50
Ballast of fraction from 5 to 25 mm	
И20м	To 20
И40м	Over 25 to 50
И50м	Over 50 to 65

Table 3

Ballast mark	Resistance to hammering
Y 75	Over 75
Y50	Over 50 to 75
Y40	Over 40 to 50
Note: All fractions of the ballast except fractions from 5 to 20 mm are subject to test for hammering resistance	

For ballast layer of the railway main lines the ballast of the following marks due to strength should be used: и20, or У75.

III. Ballast should not contain kernels (granular) of weak rocks in the amount of 10% by mass.
To the weak rocks one can refer the rocks with the limit of strength at compression in saturated by the water condition up to 18,6 MPa (200 kg/cm^2).

IV. In the ballast of fractions from 25 to 60 mm, from 25 to 70mm and from 5 to 40 mm there should not be clay lumps, soil of the vegetative and other organic particles.

V. Due to frost resistance ballast can be divided into marks under GOST 8267 -82.
Ballast of fractions from 25 to 60 and from 25 to 70 should have mark for frost resistance not lower Mpz (frost resistance) 50.
Frost resistance is determined by alternate freezing and thawing of ballast specimen. It is allowed testing in sulfuric sodium.

VI. Electro insulation properties of the ballast are characterized by electric conductivity of fat solution, formed from ballast solubility in distilled water. Its value should not be more than 0,06 S/m. When the volume of fat solution is decreased by evaporation 10 times electric conductivity of received solution should be not more than 0,35 S/m.

b) **Acceptance rules**

Ballast acceptance is done by lot (batches). The lot is considered to be the amount of ballast of one fraction simultaneously shipped to one consumer in one railway train. When ballast is transported by cars the lot is considered to be the amount of ballast of one fraction shipped to one consumer during a day.

The amount of the delivered ballast is determined by measurement of it in the wagons, cars or other transport vehicles on the place of its shipment. When control measurements of the ballast is done on the place of unloading, its volume is re-measured taking into consideration coefficient of ballast consolidation while transported, established before the delivery under the agreement between the producer and the consumer depending on the transportation distance, kernel (granular) content and other local peculiarities. Coefficient of ballast consolidation should not be more than 1.10

The amount of the ballast delivered in weight units the consumer determines, if necessary, by the adjustment of the material volume due to its packed density. Packed density of the ballast is determined under GOST 8269 -76.
Acceptance quality control of the ballast at the enterprise (quarry)-producer is done in its laboratory within the period indicated in table 4.

For acceptance quality control of produced ballast the samples are taken from the production line (belt) transporting the ballast to the store house of ready production or the loading bunker (or from the open store house of ready production to the loading bunker in accordance with GOST 8269 -76. Total mass of a sample intended for one testing should not be less than four time exceeding one indicated in table 5.

Average thoroughly mixed sample before being sent to the laboratory is reduced by quartering or with the help of chute deviser under the methodology given in GOST 8269 – 76 until the mass two time exceeding the one indicated in table 5

Table 4

Test description	Period of test conduction	Number of samples for one testing
Determination of kernel in ballast content and particles content in it by the size less than 0,16mm.	Every day	1
Determination of crushed kernel (granular0 content in the ballast from detritus and gravel	Every day	1
Determination of clay in lumps, vegetative soil and other organic admixtures in the ballast content.	Every day	1
Determination of abradability in the shelf drum or hammering resistance on pneumatic pile-driver.	Once a quarter	2
Determination of kernels (granular) of weak rocks in the ballast content.	Every day	1
	Once a year	2
Determination of frost resistance.	When geological exploration of the deposits and once a year	3
Determination of electric insulation properties of the ballast		

Table 5

Test description	Minimum mass of the ballast sample to carry out one testing, kg			
	ballast of fractions from 25 to 60, from 25 to 70 mm.	ballast of fractions from 5 to 40mm.	ballast of fractions from 25 to 60, from 25 to 70 mm.	Ballast sample with the size of kernels (granular)from 25 to 40 mm
Determination of kernel (granular) composition and content of particles by the size less than 0,16mm.	30	20	10	-
Determination of clay lumps, soil of the vegetative layer and other organic admixture in the ballast content	15	5	1	-
Determination of crushed granular in the content of the ballast from boulders and gravel	15	5	1	-
Determination of abradability in the shelf drum	-	-	10 (2 samples per 5 kg)	20 (2 samples per 10 kg)

Test description	Minimum mass of the ballast sample to carry out one testing, kg			
	ballast of fractions from 25 to 60, from 25 to 70 mm.	ballast of fractions from 5 to 40mm.	ballast of fractions from 25 to 60, from 25 to 70 mm.	Ballast sample with the size of kernels (granular)from 25 to 40 mm
Determination hammering resistance on ПМ.	-	-	-	3 (2 samples per 1,5 kg)
Determination of granular content of soft rocks	15	5	1	-
Determination of frost resistance	-	-	3 (2 samples per 1,5 kg)	5 (2 samples per 2,5 kg)
Determination of electric insulation of ballast properties		-	18 (3 samples per 6 kg)	-

Note: Ballast samples with granular size from 25 to 40 are prepared only for testing by screenings from the ballast fractions of 25-60 and 25-70 mm. To prepare these samples the selected from the conveyer ballast mass is sent to the laboratory without its preliminary reduction.

The consumer carries out control checking of compliance of the shipped ballast with the requirements of this standard, observing the following order:

- for ballast testing the selection of point samplings is carried out from which by means of integration one can receive control sample;
- at control checking of ballast quality transported by railway transport point samples are selected when the lot's volume if three wagons – from each wagon, when large volume – from any of these three wagons. Each sample is selected from five different places of the wagon (in four corners and in the centre);
- at control checking of ballast quality transported by cars, from each lot with the volume not more than 35 m3 point samples are selected at least from five cars. Each point sample is selected in the centre of car body;
- mass of control sample selected for checking of the lot should be at least t time exceed summary mass of samples for testing indicated in table 5. Reduction of samples to the size required for testing is done by the method of quartering or with the help of chute divisor under the methodology given in GOST 8269 - 76;
- as a result of tests arithmetic mean of parallel determinations, which are provided for the corresponding method, is taken . Granular content is evaluated due to the mean value of results of three parallel tests;

- when the results are unsatisfactory at least on one of indications the test is carried out again. The result of the repeated test is final.

Test methods are fixed by the above mentioned Standard .

c) Transportation and storage

The documents on quality are attached to each lot (batch) of shipped ballast, where it is indicated:

- name of the producer and its address;
- number and date of the document issuing;
- name of the addressee and its address;
- numbers of the wagons, invoices and the amount of the shipped ballast;
- sort of ballast (ballast from rocks or from boulders and gravel) and the name of initial rock;
- fraction of the ballast, granular content, particles availability with the size of less than 0,16mm, availability of granular of soft rock as well as strength and frost resistance of the ballast, content of clay in lumps;
- indicator of electrical insulation properties of the ballast;
- marking of this standard.

Ballast is kept and transported separately due to fractions, moreover it should be protected from dirtying.

The ballast is transported by all kinds of transport.

While being transported the requirements of the Rules of transportation for cargoes and Specifications of loading and strengthening of cargo approved by the Ministry of railways should be observed and also the corresponding rules established by the entities of inland water transport and automobile transport.

The supplier should follow the measures providing full services.

5A Implementation of a Layer of Sandy Gravel Material

a) Description

Being this activity difficult and expensive, the Contractor has to organize checks every 200 m along the line equipped with wooden sleepers and P50 rails to verify the condition of the existing layer. The results of the checking shall be handed over to the Employer's Representative for scheduling the possible implementation of the new sand gravel layer. In this case the material to be used has to comply with the annexed GOST 7394-85. The material has to be stacked along the stretches and utilized during the phases W1.1 VI and XI or W1.2 V of construction of line.
The material has to be compacted by pneumatic-tired roller with optimal humidity by sequential longitudinal passing over embankment on the whole width.
The first two passes are done at the distance not less than 2 m from embankment shoulder. Then moving each next passing on 1/3 of roller width towards embankment shoulder, the edge of embankment is compacted. After that, compacting is continued moving the passing from edge of embankment to its axis with step on 1/3-1/4 of roller

width. During the passing near embankment shoulder, the roller should not approach the shoulder closer than 0.5 m.
A consolidation coefficient of 0,98 has to be obtained.
The layer standard section is shown in drawing L1.1-9

Materials of the following characteristics should be used:

6 B Sandy Gravel

a) Definition

Gravel and sandy-gravel ballast are the natural mixture formed as the result of natural destruction of rocks that are used as ballast layer of the tracks.

Gravel ballast should be used on destination and departure and other station tracks as well as to be used as a pad under the crushed stone and asbestos ballasts; sandy-gravel for small activity station, sidings and connection tracks and as a pad for all kinds of ballasts.

The Standard GOST 7394-85 (see Annex TS13) covers the specifications for this material and the supplies have to comply with it.

b) Technical requirements

Depending on granular content of natural sandy-gravel mixture the ballast is divided into the following types:

- gravel;
- sandy-gravel.

Gravel and sandy-gravel ballast should be characterized due to the following indications:

- granular content;
- content of quartz granular of solid volcanic and isomorphic rocks;
- content of granular of soft rocks;
- content of dusty and clayey particles.

Granular content of gravel and sandy-gravel ballast should meet the requirements indicated in Table 1

Table1

Sieve's holes size, mm	Full remainders on the sieves, % by mass in the ballast	
	gravel	sandy-gravel
100 60 25 5 0,63 0,16	0 To 10 - From 40 to 80 From 70 to 100 From 90 to 100	0 0 To 20 To 50 From 35 to 100 From 85 to 100
Passage through the sieve 0,16mm, %: total including dusty and clayey particles	To 10 To 2	To 15 To 3

Content of quartz granular and granular of solid volcanic and metamorphic rocks in sandy part of the ballast (fractions with the size less than 5mm) should make up not less than 50% of granular mass with the size from 0,16 to 5mm.

Content of granular of soft rocks in gravel part of the ballast should not exceed 10% of granular mass with the size more than 5mm. To the granular of soft rock can be referred the granular with the limits of strength at compression in the saturated by water condition less than 20 MPa (200 kgc/sm2)

Ballast is not subject to quality category attestation.

c) Acceptance rules

Delivery and acceptance of the ballast is carried out by lot (batches). The lot is considered to be the amount of ballast simultaneously shipped to one customer in one railway train.

When transporting the ballast by cars the lot is considered to be the amount of ballast shipped to one customer during a day.

The amount of delivered ballast is determined by volume with the help of its metering in the wagons, cars and other transport vehicles on the place of shipment. At control metering of the ballast at the place of its unloading its volume is recalculated with the account of coefficient of compaction at the transportation, set up due tot the agreement of the manufacturer and the customer depending on transportation distance. Compaction coefficient is taken not more than 1,20 for gravel and 1,15 fro sandy ballast.

The amount of delivered ballast can be determined in weight units with the help of recalculation of the material volume by its packed density. Packed density of the ballast is determined under GOST 8735 – 75.

Acceptance control of ballast quality at the enterprises (quarry) – manufacturer is carried out in his laboratory during the period indicated in Table 2.

Table 2

Test description	Period of testing	Minimum mass of the ballast sample for carrying out of one test, kg
Determination of granular content and particle content of the size less than 0,16mm.	Daily	30
Determination of the content of dust and clay particles by fractional precipitation	Once a quarter and in each case of change geological conditions of pit face	10
Determination of content of soft rocks granular in gravel part of the ballast	Once a year and in each case of change geological conditions of pit face	15
Determination of the quartz granular and granular of solid volcanic and metamorphic mountainous rock content in the sand part of the ballast	At geological exploration works	0,5

For the acceptance control of ballast quality in the quarry the point sample are selected from the furrow made in the pit face vertically from the edge up to its foundation Cross section of the furrow is 10 x 20 or 15 x 20 sm depending on the size of the material. In the furrow t point samples are selected evenly along the height of the pit face from the edge to it foot. Selected from the furrow point samples are united into middle sample and mixed properly. Middle sample should be not less than four times exceed the mass indicated in table 2.

When determining the ballast quality extracted and laid by the method of hydro-mechanization, the map of in-wash is divided for uniformity in sizes and due to the conditions of in-wash of the area with the volume not more than 500m^3 each.

From each area at least five point samples from different places are selected.

The mass of a point sample should be not less than 50 kg.

Ballast quality is evaluated for each area separately under the results of testing on selected middle sample.

Ballast middle sample before sending to the laboratory is reduced until the mass of 2 time exceeding the indicated in table 2. Reduction of the middle sample is carried out by the method of quartering under GOST 8735-75.

The customer carries out the control checking for compliance of the shipped ballast to the requirements of this standard observing at this the order given below:

For ballast testing one should carry out selection of point samples from which by joining up the control sample is received; when control checking of ballast quality delivered by railway transport, point samples are selected from each wagon when the size of the lot is three wagons; when the lot is large – from any three wagons.

Each point sample is selected from five different places of the wagon(in four corners and in the centre); when control checking of ballast quality delivered by cars, from each lot of the volume not more than 350 m^3 point samples are selected at least from five cars. Each point sample is selected in the centre of the car body.

Mass of the control sample selected for the checking of the lot should at least 5 times exceed the summary mass of test samples indicated in table

Reduction of samples until the size required for testing is carried out by quartering method or with the help of chute divisor under the methodology given in GOST 826976.

Mean arithmetic value of parallel testing provided for the corresponding method is taken as the result. Granular content is evaluated due to the mean values of three parallel testing results.
When testing results are not satisfactory at least for one of the indications the repeated testing for this indication is carried out. The result of the repeated testing is final.

Test methods are fixed by the above mentioned Standard

c) Transportation and storage

Each lot of shipped ballast should be accompanied with the document on quality in which the following is indicated:

- number and date of issuing the passport;
- name of the quarry- supplier and his address;
- name of the addressee and his address;
- number o wagons, invoices and a number of shipped ballast;
- type of ballast (gravel or sandy-gravel);
- granular content;
- content of granular of soft rocks;
- content of quartz granular and granular of solid volcanic and metamorphic rocks;
- content of dusty and clayey particles;
- number of this standard.

Ballast is transported in the open railway wagons as well as in the cars in compliance with approved in the established order rules of cargo transportation by corresponding type of transport.

While transporting by railway transport Specifications of loading and strengthening of cargo approved by the Ministry of railway Infrastructure should be observed.

While transporting the measures which provide ballast protection from dirtying(pollution) should be observed.

Gravel and sandy-gravel ballast is transported and kept in the conditions preventing the ballast from pollution.

6A Construction of Line

a) Purpose

This item covers only part of the activities necessary to have all sections between stations equipped with P65 rails on reinforced concrete sleepers.

b) Description

The most complex works are to be done on existing sections equipped with wooden sleepers and P50 rails. In this case the present item includes the activities II, VII, VIII, IX, XII, XIII, XIV described in W1.1 or the activities I, II, V, VI, VII, IX described in W1.1.

For existing sections equipped with P65 rails on wooden or mixed wooden/concrete sleepers the activities to be done are similar, with the exception, generally, of the implementation of the sandy-gravel layer. The activities covered by this item are the same.

The Contractor has to inform the Employer's Representative about the procedure used to implement the rehabilitation of the line, that could be the described W1.1 or W1.2; variations can be introduced as well as proposition of different procedures.
After the approval of the Employer's Representative, any change in the procedure activities has to obtain the relevant authorization of the Employer's Representative.

Materials of the following characteristics should be used:

1B - P65 Rails

a) Structure and dimensions

Structure and dimensions have to comply with Standard GOST 8161-75 (see annex TS01)

The geometrical and physical characteristics of P65 rail are the following:

Height, mm	180
Width, mm	
- of head	75
- of foot	150
Rail's cross section area, cm^2	82,65
Distance from the centre of gravity, mm:	
- to the foot bottom	81,3
- to upper part of the head	98,7
Moment of inertia relating axes, cm^4	3540
- on the lower part of the foot	435
- on the upper part of the head	358
- on the lateral edge of the foot	75
Theoretical mass of one meter of rail	
- (Steel density – 7830 kg/m^3), kg_m	64,72
Metal distribution on the rail cross section area, % of the whole area	
- in the head	34,11
- in the web	28,52
- in the foot	37,37

Drawing L1.1-14 shows a detailed section of this type of rail.

b) Specifications and rules of acceptance

Specifications and rules of acceptance have to comply with Standard GOST 24182-80 (see annex TS02) and Standard GOST 18267-82 (see annex TS03) for heat treated rails.

2B - Concrete Sleepers Ш1-1 Type

a) Structure and dimensions

Structure and dimensions have to comply with Standard GOST 10629 - 88 (see annex TS04)

The main characteristics of a sleeper Ш1-1 are the following:

Length, mm	2700
Height in correspondence of rail, mm	217
Volume of concrete, m^3	0,108
Weight of steel reinforcement, included washers, kg	
(44 wires of diameter 3mm)	8,5
Initial tension of all reinforcing wires, Kn	358
Transmitted strength of concrete, MPa	32

Drawing L1.1-16 shows in details the Ш1-1 type of previously tensed reinforced concrete sleepers for 1520 mm gauge tracks and P65 rails

Weight of 1 sleeper, KN about 2400

b) Specifications and rules of acceptance

Specifications and rule of acceptance have to comply with the above mentioned Standard.
The acceptance is carried out by lots of sleepers under results of sampling tests about

- concrete frost resistance
- exactness of geometrical parameters
- values of breaking load
- values of admissible load without breaking
- concrete breaking load
- state of the holes for bolts
- quality of concrete surfaces

For the breaking test 0,3% sleepers are selected, but not less than 3 pieces

3 B - Fastenings for Concrete Ш1-1 Sleepers

a) Description

Two insulated rail fastenings for each concrete sleeper are to be installed on the lines equipped with Automatic Block Line System (ABLS). Every one is formed by several components:

- the base-plate, bolts, elastic washers, nuts to fix the first one to the sleeper
- clamps, bolts, elastic washers, insulated bushings, nuts
- metallic and plastic pads beneath the foot of the rail and the base-plate

Drawing L1.1-15 shows a complete fastening in which all the components are assembled, and every single component.

b) Specifications and rules of acceptance

Every component is object of standard specifications and has to comply with them: GOST 16279-78 for base-plates, GOST 16016-79 and GOST 16017-79 for bolts, GOST 16018-79 for nuts, GOST 19115-91 and GOST 21797-90 for elastic washers, GOST 22343-90 for clamps, (see annex from TS05 to TS11).

4 B – Ballast → See the related specifications within description of activity 4A

13 B - P65 Rail Joints

a) Description

The joint for P65 rail is formed

- by two fish-plates 1000 mm long with 6 holes for bolts, three of them ovalized, six bolts, nuts, washers (I performance: 1P65 GOST 8193 – 73, see Annex TS14)
- by two fish-plates 800 mm long with 4 holes for bolts, two of them ovalized, six bolts, nuts, washers (II performance: 2P65 GOST 8193 – 73)

The ovalization of the holes allows a displacement from 0 mm to 16 mm of the jointed bars when their lengths vary in function of the temperature

Drawing L1.1-14 shows the assembled joint and every single component.

b) Specifications and rules of acceptance

Every component is object of standard specifications and has to comply with them: GOST 8193-73 (GOST 19127-73) (see Annex TS14) and GOST 4133-73 (see Annex TS15) for P65 rail fish-plates, GOST 11530-939 (see Annex TS16) for bolts, GOST 11532-93 (see Annex TS 17) for bolt nuts .

Plates should be accepted by lots and in the amount of not more than 3000 pieces. The lot should consist of the plates of one type, one sort and made of metal of one melting.

At quality control acceptance of the ready plates the following amount of plates and samples should be selected:

- for visual examination, sizes checking, straightness and location of bolts' holes – not less than 1, 0% of plates from a lot,
- for tension test – 1 sample from a lot
- for determination of hardness – 5 plates from a lot,
- for determination of chemical steel content of plates – 1 sample from a melting. For control checking of chemical content of steel one sample from tree plates of the checked lot is prepared.

14 B insulated rail joints

a) Description

See 13B. Moreover these joints have an insulated shaped sheet between the fish plates and rails, an insulated cylinder between bolts and rails and an insulated plate, shaped as the section of P65 rails, inserted between the ends of the jointed rails (see drawing L1.1-14).

7A Thermic or Flash-butt Weld of P65 Rail

a1) Description

The welding of the rails may be performed by either of two methods:

- Thermic process
- Electric process

Thermic welding

Type - The thermic welds shall be of the "rapid" type with prefabricated moulds and oxygen activated preheating.

Material and Equipment – The moulds shall be of the prefabricated type and suitable for P65 rails; they shall be stored in the cardboard boxes in which supplied.

The welding portions shall be of the type suitable for welding, with normal welding gaps, P65 rails in workshop or on site.
They shall be packed in sealed bags bearing in print the characteristic data: type of weld ("rapid"), type of rails and of steel. It is not allowed to use welding portions whose packaging has been tampered with and nothing shall be empirically added to or removed with welding portions. Should it be found necessary, in particular cases recognized as inevitable by the Employer's Representative, to weld with wider gaps than specified, use shall be made of the appropriate welding portions.
Pre-heating shall be done by means of a suitable oxy-propane burner.
Particular care shall be taken in the storage of materials; the welding portions and the moulds shall be stored in a dry room away from inflammable materials; the oxygen cylinders and propane bottles shall be stored in isolated rooms and apart from each other. The welding equipment may be stored in the room were the welding portions and moulds are stored.

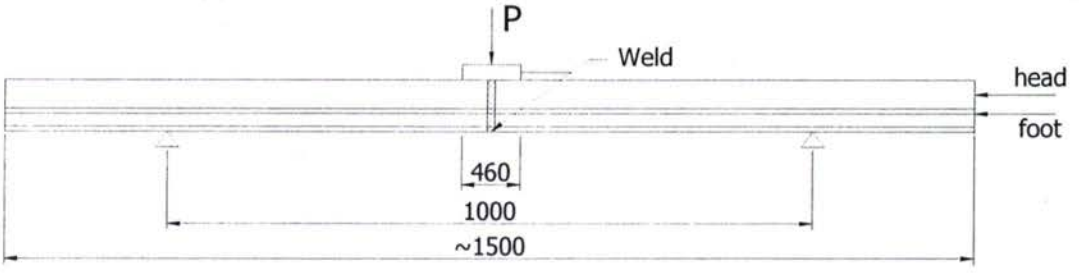
Operating procedures – The gap between the rail ends to be welded shall be between 15 and 16 mm or as specified by the manufacturer of the welding portions.
The rail ends shall be perfectly aligned in both the horizontal and vertical plane. To compensate for lowering due to thermal contraction, the two rail end sections shall be raised by 1 mm. The alignment shall be maintained during welding by inserting steel wedges. The rail ends shall be cleaned with a wire brush and any moisture dried by using the burner.
The welding casting shall not be poured directly into the mould but through a casting pocket. The slag shall be collected in an appropriate box.
The burner shall be accurately centered on the welding gap and placed with the orifice 40 mm above the running surface of the rail.
During the pre-heating, the oxygen and propane pressures shall be respectively 5 kg/cm^2 and 0.5 kg/cm^2. the pre-heating shall last not less than 6 minutes.
The above data are indicative and compliance therewith shall not relieve the Contractor from responsibility for the correct execution of the welds.
The procedures for the subsequent operations, from the ignition of the portion through removal from the moulds, are left to the worker's experience and skill.
The feed head may be removed by hammer and chisel or by a hydraulic press fitted with a suitably shaped chisel. The chiseling operation shall not result in the removal of material from the essential part of the welds.
The side surfaces and the running surface of the rail head shall be ground down by means of a suitable grinder to the normal rail profile.
On the remaining parts of the rail section the presence of the weld bead remaining from the chiseling operation shall be tolerated, after removal of the feed head and of the other superfluous parts of the weld casting, the welded joint shall be cleaned with a wire brush and protected by rust-proofing paint over a length of 20 cm.

Sample Testing and Checking

I. Moulds: visual inspection for integrity shall be performed on a 4% sample of each stock of welding moulds.

II. Portions: two portions chosen by the Employer's Representative shall be taken from each stock and two welds shall be executed on two pairs of rail sections, each 0,75 m long, so as to obtain two samples with a welded joint.

III. Bending test: samples shall be subjected to the bending test in accordance with the following sketch:



Load P shall be increased slowly from 0 to 40 tons, continuously recording the deflection of the mid portion. Under the maximum load neither cracks nor fractures shall appear. After removing the load, the residual permanent deformation shall be measured one hour after the test.

IV. Internal sections: the specimen shall be cut through the center of the weld along a plane perpendicular to the longitudinal axis and then along the plane of symmetry of the rail sections. The sulphur print of the cross section shall be taken. Inspection of the sections shall show no cavities, internal damage or porosity. At the Employer's Representative's absolute discretion, a light degree of porosity internally to the web and head may be tolerated.

- Brinell hardness: on the longitudinal section, 5 mm under the surface the hardness shall be measured aver a 300 mm length. The Brinell hardness shall be comprised in the range of 20 units less to 40 units more than that measured on the steel of the original rail. The hardness test shall be performed with a steel ball 10 mm in diameter pressed against the steel with a load rising from 0 to 3000 dN in 30 second. The impression shall be spaced to 10 mm intervals.

V. Other tests: any other test required by the Employer's Representative with a view to determine the quality of the material used for thermic welding may be carried out. In the event of failure the weld shall be rejected

Manufacture Checks and Tests

Each stock of welding portion supplied shall be accompanied by a certificate issued by an official testing Institute of the manufacturer's country, showing the results of the following tests performed on rail section welded with one of the portions from the stock, following the same procedures above outlined:

- bending test (see the preceding III. Paragraph)
- Brinell hardness (see the preceding IV. Paragraph)
- Sulfur prints of the weld cross section, and
- Chemical analysis which shall show that S and P contents not exceed each 0.05% and combined 0.09%.

b1) Systematic Weld Checks

The following checks shall be performed on the welds executed in workshop or on the line:

- Visual check - A perfectly straight ruler 1,0 m long, accurate to within 1/10 of 1mm, has to be used for lining and leveling the welded joint; the check shall be done over a length of 1 m centered on the weld and defects shall not exceed those shown in the drawing L1.1-17
- Visual check for the integrity of the weld,
- Ultrasound check by means of a special apparatus operating above the 3 MHz frequency

c1) Acceptance Conditions

- Moulds: in the event of the samples collected at the rate of 4% should prove defective, the inspection shall be extended to the entire stock. Defective moulds shall be broken up and scrapped.

- Welding portions: should be tests on the portion yield negative results and should be the test certificates from the official Institute of the manufacturer's country show S and P contents higher than the prescribed ones and/or Brinell hardness values outside the specified range, the stock shall be rejected and removed from the yard.

- Welds: all welds which prove defective after the systematic checks above described, shall be redone at the Contractor's cost.
  The Contractor shall bear the cost for laboratory testing, all machinery, instruments and equipment required for tests.

Electric Flash-butt Welding

a2) Description
Rail welding machine

The welds are executed by a welding machine that may operate either on track along the line or in the station yard.
The welding head shall be suitable for welding P65 rails and perform the following functions:

- grabbing the rail ends over a sufficient length to ensure good alignment and hold them tightened with great force for the entire duration of the process,
- heating the rail ends and bringing them to the upsetting state,
- upset-welding the rail ends with the necessary force,
- allowing the mechanical removal of the welding bead,
- leaving the rail with the joint in good alignment and condition.

All the welding process shall take place automatically without the intervention of the operators whose only jobs shall be to prepare the rails, remove the welding beads and finish the rail head surface.
After the mechanical removal of the bead produced by upsetting the head surfaces shall be finish-ground with a grinding machine, as required for the thermic welds.

For the acceptance of the welds the welding machine shall be equipped with a special apparatus recording the following data for any weld:

- current absorption,
- shortening of rails due to metal fusion,
- the batting force of the welding head.

Should the recording apparatus be out of order, no welding work will be allowed.

Sample Checking and Testing

Before beginning work, The Contractor shall prepare two sample welded joints produced with the welding machine which he plans to use. The samples shall have the same characteristics as those prepared by thermic welding and shall be subjected to the following checks and tests:

- visual check with 1 m metal ruler of the same characteristics as that used to check thermic welds,
- bending test as that used to check thermic welds
- internal sections as that used to check thermic welds
- Brinell hardness check as that used to check thermic welds

The machine shall be accepted if the result of the tests and checks prove satisfactory and and conform with the specifications. Otherwise the Contractor shall adjust the machine and repeat the tests until satisfactory results are obtained. Should the Contractor fail to obtain results conforming with the specifications, the machine shall be rejected.

b2) Systematic Weld Checks and Tests

Every flash-butt weld is subjected to:

a. visual checks as that described for thermic welds
b. integrity check

c2) Acceptance Conditions

The welds found defective by the checks and tests above outlined, shall be redone at the Contractor's cost using the same machine.

8A Regulation of mechanical tension of long welded rails

a) Purpose

The purpose of forming CWR is to eliminate all rail joints and creating in the rails an even condition of thermal stresses in order to prevent thermal expansion (stress settling). The temperature at which the CWR is formed is called ***neutral temperature*** (zero stress at all points of the rail), hereinafter abbreviate as NT.

No CWR shall be formed on curves with a radius lower than 350 m and in stations where they will be formed according to Employer's Representative's instructions.
On the lines equipped with Automatic Block, the CWR is to be interrupted in correspondence of the signals and an insulated joint in both rails has to be installed to allow the correct work of the track circuits; towards and backwards two stretches 12,5 m long have to be formed using by means of two additional normal joints.

b) Forming procedure

The CWR shall be formed at the NT. The conditions required to get the NT may be obtained either naturally or artificially, i.e. by natural heating or with the use of tensors.
The temperature of the rail shall be monitored for at least one year and the NT lies in the range of + 7 °C -3 °C of the average temperature. The NT shall be fixed by the Employer's Representative at the beginning of work.
The Contractor shall be required to have available special rail thermometers suitable for measuring rail temperatures to within 1 °C.

c) ***Natural heating***

The forming of the CWR shall be done on days when the rail reaches the NT by natural Heating and the NT is likely to remain constant within ± 3 °C through the entire duration of the forming operation. If these conditions are not obtained, the operations shall be suspended.
In a temporary section (see paragraph IX. of the item 6A Construction of line), the 36 m long central zones are defined as ***central stretches*** (CS).
The CWR is formed by welding two contiguous temporary semi-sections, through the following operations:

I. disassembling the fastenings on all sleepers, except in the CS zones of the contiguous temporary semi-sections
II. disassembling the temporary joint between the two temporary semi-sections,
III. lifting the rail by means of stakes, starting from the joint towards the CS and inserting every 9 m expansion rollers into the rail seats, after removing the pads; the expansion rollers, at least 20 mm in diameter, shall be positioned with their axles perpendicularly to the rail,
IV. jarring the rail with wooden mallet blows to facilitate its expansion and the removal of any hindrances to thermal expansion,
V. cutting thin slices off the rail ends to allow the free expansion of the temporary semi-section; this is necessary when the forming of the latter was done at temperatures below the NT. In the event of the temporary semi-sections having been formed at temperatures higher than the NT, a makeup rail shall be inserted to fill the gap due to thermal contraction. The length of the makeup rail shall be not less than 3 m. The makeup rail shall be welded to either of the temporary sections ends,
VI. having reached the NT within ± 3 °C, forming the welded gaps, forming the weld gaps, quickly removing the expansion roller (starting from the CS), reinstalling the previously removed pads,
VII. assembling the fastenings, starting to the joint towards the CS, of the first 40 sleepers and next of one sleeper every three,
VIII. welding the joint,
IX. during the welding, completing the assembling of the fastenings,

X. immediately on completion of the casting of the thermic weld, disassembling the fastenings of 46 sleepers astraddle the joint in order to allow the thermal contraction of the weld on a rail length of at least 12 m on each side,
XI. after one hour, assembling the fastenings disassembled in step X.

Rail pulling

When it proves impossible to form the CWR by natural heating, the use of rail tensor may be required.
The tensors shall be designed to permit the execution of thermic welds and be able of producing a 60 T pull without damaging the rails.
Stress settling and CWR forming shall not be allowed to be done at temperatures under + 10 °C.
When rail pulling is used, the following operations shall be carried out, after applying the rail thermometers to the rails:

1. same as per point I.
2. same as per point II.
3. same as per point III.
4. same as per point IV.
5. affixing a reference mark on the rail foot on the ends of the two temporary semi-sections, recording the rail temperature, calculating the elongation to be produced in the two temporary semi-sections, multiplying 0,000012 by the length of the two temporary semi-sections and by the difference between the NT and the temperature recorded on the rail,
6. applying the turnbuckles and pulling the rails till the calculated elongation is achieved, as checked by reference marks, jarring the rails by wood mallet blows to facilitate elongation and remove any interferences therewith,
7. cutting thin slices off the rails ends to allow elongation,
8. when the calculated elongation is reached, quickly removing the expansion rollers starting from the CS and reassembling the rubber pads,
9. assembling the fastenings, starting from the joint towards the CS,
10. welding the joint, continuing to pull the rail till 3 minutes after the casting of the thermic weld to compensate for the tension stress of weld contraction during weld solidification,
11. loosening and removing the turnbuckles 10 minutes after the casting of the weld,
12. disassembling and immediately reassembling the fastenings of 46 sleepers astraddle the weld

NOTES:

Temporary Joints
Temporary joints are used to temporary connect rails where there are not fish-bolt holes in the rails. They are formed by two fishplates, assembled symmetrically on the centerline of the rail joint and fastened by two special clamps.
The Contractor, before installation, shall submit to the Employer's Representative's approval the material he intend to use for temporary joints.

Regulation of the expansion joints

After forming the CWR, the Contractor shall carry out the regulation of the joint gaps in correspondence of the circular curves of R ≤ 350 m, in proximity of the AB signals, of the

extreme point of stations, of level crossings and of steel bridges, using procedures similar to the ones for forming CWR.
The opening of the gaps, related to the rail length and temperature are indicated in the following table.

Normal gap clearances for the rails, 12.5 m of length

Gap, mm	Rails temperature for climatic area, °C		
	Cold	Temperate	Warm
1	2	3	4
0	+55 and more	+60 and more	+65 and more
1.5	from +55 to +45	from +60 to +50	from +65 to +55
3.0	from +45 to +35	from +50 to +40	from +55 to +45
4.5	from +35 to +25	from +40 to +30	from +45 to +35
6.0	from +25 to +15	from +30 to +20	from +35 to +25
7.5	from +15 to +5	from +20 to +10	from +25 to +15
9.0	from +5 to -5	from +10 to 0	from +15 to +5
10.5	from -5 to -15	from 0 to -10	from +5 to -5
12.0	from –15 to -25	from -10 to -20	from -5 to -15
13.5	from -25 to -35	from -20 to -30	from -15 to -25
15.0	from -35 to -45	from -30 to -40	from -25 to -35
16.5	from -45 to -55	from -40 to -50	from -35 to -45
18.0	from -55 to -65	from -50 to -60	from -45 to -55

9A Final Tamping and leveling of the new line

a) Purpose and Description

This activity is envisaged in two cases:

- for the final lifting, tamping, leveling, straightening of the renewed tracks, after at least 60 days of operations,
- for the lifting, tamping, leveling, and straightening of existing tracks equipped with P65 rails on concrete sleepers.

This activity may involve laying down additional ballast, if necessary, and definitely involves the final re-profiling of the ballast section.
After this activity the main line track shall be left in his final position to enable for traffic at full speed.

Materials of the following characteristics should be used:

<u>4 B – Ballast</u> → See the related specifications within description of activity 4A

10A Ballast Cleaning on the other existing sections

a) Purpose and Description

On the sections already equipped with P65 rails on concrete sleepers, the Contractor shall screen the existing ballast bed in order to recover the material having the characteristic of technical specifications.
For the purpose an heavy duties ballast screening machine shall be used. The machine shall be able to remove all the existing ballast bed leaving the top of the platform with a cross slope of 3% in the direction (left or right) as ordered by the Employer's Representative. In the curves the cross slope shall be towards the inner side of the curve in order to reduce the necessary quantity of ballast.
The ballast screened shall be laid over the track, the fine material refused shall be thrown along the lateral slope, in case of embankment, for restoring the cross section of the embankment, or loaded in adequate wagons and unloaded where directed by the Employer's Representative, along the section.
Subsequently the track shall be lifted up to the final level +0 ÷ -20 mm, making use in a first phase of jacks or track lifting machine, in a second phase of heavy duty tampers.
During this activity, additional ballast shall be spread over the track, in accordance to the Employer's Representative's instructions and the ballast section shall be profiled according to the dimensions shown in the drawing L1.1-6
At the end of these activities the line must be left in such a condition to permit the transit of trains at 110 km/h.
The fine material disposed along the embankment slopes shall be properly shaped according to the Employer's Representative's instructions.

<u>Materials of the following characteristics should be used:</u>

<u>4 B – Ballast</u> → See the related specifications within description of activity 4A

11A Tamping, leveling and aligning the other existing section with l.w.r.

This item refers to existing section equipped with P65 rails on reinforced concrete sleepers and continuous welded rails. For description see item 9A.

<u>Materials of the following characteristics should be used:</u>

<u>4 B – Ballast</u> → See the related specifications within description of activity 4A

13A Excavation of ditches

Ditches sections and lengths have to be indicated by the Employer's Representative.

14A Pavement of Level Crossing

a) Description

One type of pavement for level crossings is envisaged.
The pavement shall be made of concrete blocks and support slabs as per drawing L1.1-18

b) Working Procedures

Before rehabilitating the track, the existing LC pavements shall be removed and the components stored aside the track. The removal shall be done by the Contractor making use of proper equipment.
After the track has been rehabilitated and brought at its final level, the Contractor will lay-down first the new supporting concrete slabs and over them the concrete blocks in order to restore the road pavement. During this operation the Contractor will carry out whatever work necessary to for connecting the LC pavement to the adjacent road pavement.
Furthermore the Contractor shall bear the responsibility for:

- getting from local Authorities any permission for the interruption of the road continuity and for the relevant signals to be installed,
- providing temporary deviation of the road traffic and temporary LC pavement,
- restoring the level of the LC pavement in case of settlement.

Materials of the following characteristics should be used:

7 B – Blocks for level crossing

a) Description

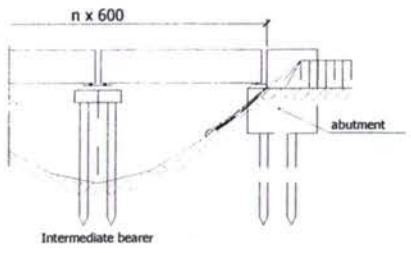
The blocks are made of reinforced concrete. Dimension and armature are shown in drawing L1.1-18.

22A Removal of bridges beams

a) Description of the actual situation and measures proposed

Along the Kungrad–Kazak Border (km 953+500) section there are 46 bridges. 45 bridges are built with an only type of beam 6.0 meters long and differ only for the bridge schemes: 1x6 m – 13 bridges; 2x6 m – 19 bridges; 3x6 – 13 bridges. All bridges are pile bridges.
General features of the bridges are given in the following figure:

Front



ıme of works	Unit	Quantity		
		The scheme of the bridge		
		1 x 6	2 x 6	3 x 6
from rails R 65	r.m.	50	50	50
ıllast on existing bridges	m^3	14	25	36
ıorks	items	60	100	100
m under the cribworks	m^2	11	22	33
ıder the cribworks	m^3	1.1	2.2	3.3
:ting bridge span l=6m	span	1	2	3
ıg carriages	m	0.376	0.752	1.128
c reinforced-concrete span l=6m	m^3	9.7	19.4	29.1
	m	1.124	2.248	3.372
alkway slabs	m^3	0.7	1.4	2.02
:onsoles with bracing	m	1.764	2.86	3.956
ayer on pad stone	m^3	0.5	0.6	0.8
way of the pad stone by mass concrete	m^3	0.4	1.35	1.6
ferro-concrete laying cordon stones on	m^3	4	4	4
ete bearing block, closet and cordon	m^3	4.78	5.88	6.48
et by a cement mortal	m^2	-	15	26
nortal of surfaces of support	m^2	-	20.5	45
y a cement mortal	m	-	3	4
je by stone ballast	m	12	23	32
	r.m.	50	50	50

Pile piers consist of the following elements:

- Piles with section of 35x35 centimeters
- Reinforced concrete nozzles for abutments and intermediate supports;
- Reinforced concrete cabinet type blocks, paving slabs, soft entrance plates for abutments;
- Metal consoles for paving slabs;
- Bearing blocks for intermediate supports.

The environment in which the bridges were built are aggressive towards the concrete, so all the beams are in bad conditions and 126 in total are to be replaced.

Sulphate-resistant Portland cement shall be therefore employed for concrete used in manufacturing the new beams.

The existing bridges have been built in 1972.

Reinforcement of the bridges cones and bed of the carriage is done by stone paving with D=16 centimeters. General view of the bridges and basic details about bridge superstructures are given in drawing L1.1-20.

b) Methodology for beams replacement

Methodology for beam substitution should be that one used in CIS here below shortly described.
Drawing L1.1-19 describes the methodology for substitution of beams of a three spans bridge.
In such case the operation considers two stages:

- I stage – replacement of the first two spans
- II stage – replacement of the third span

For bridges of two spans (which is the most common case along the line), the operation should be limited to the first stage.
Works to be carried out requires a special standard train made of two diesel loco at the ends, a platform wagon for beams, a crane (EDK-1000) including a platform wagon for the boom on rest/transport, a gondola wagon for ballast.
Stage I
Works to be carried out requires a windows of 8 hour and 20 minutes:

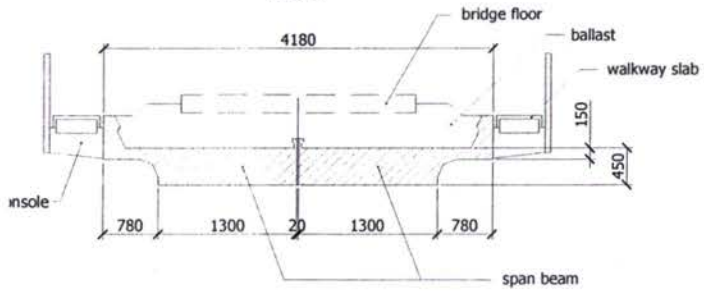
1. Closure of the line and work train leaving the station full loaded;
2. The train reaches the bridge;
3. The crane boom is freed and the train is divided into two parts positioned each one on the two different approaches to the bridge;
4. Ballast, sleepers and rails are removed from the two spans to be substituted near to the crane;
5. The crane removes the old beams from the nearest span, put them on the temporary site aside, replace the old beams with the new-ones;
6. The crane performs the same operation for the central span;
7. Ballast, sleepers and rails are replaced;
8. Old frames are collected and loaded on the train;
9. Loco N° 2 push platform for crane boom and gondola to form again an unique train;
10. Crane boom is fixed in the rest/transport position;
11. The train reaches a station;
12. Line is open to the traffic.

Stage II
Works to be carried out requires a windows of 5 hour and 30 minutes, operations are basically the same but only beams of one span are substituted. This stage is evidently not necessary for bridges of two spans or less.
The substitution of the beams should be operated before welding the rails in long bars.

c) Provision of beams

Provision of beams and relevant devices are included. All of them has to comply with the standard design of Lengiprotransmost No 557, 1969 (see the following figure).

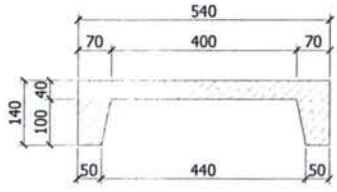
Span



The basic parameters on one span

overall length	effective span Lp, m	Building height from a sole of a rail up to pad stone m	Mark of concrete	Volume of concrete, m³			Weight of armature, ton			Weight of one block with isolation, ton
				of the beams	Of the walkway slab	Total	A I	A II	Total	
6.0	5.4	1.02	V-25	9.7	0.4	10.3	0.57	1.59	2.16	14.1

walkway slab



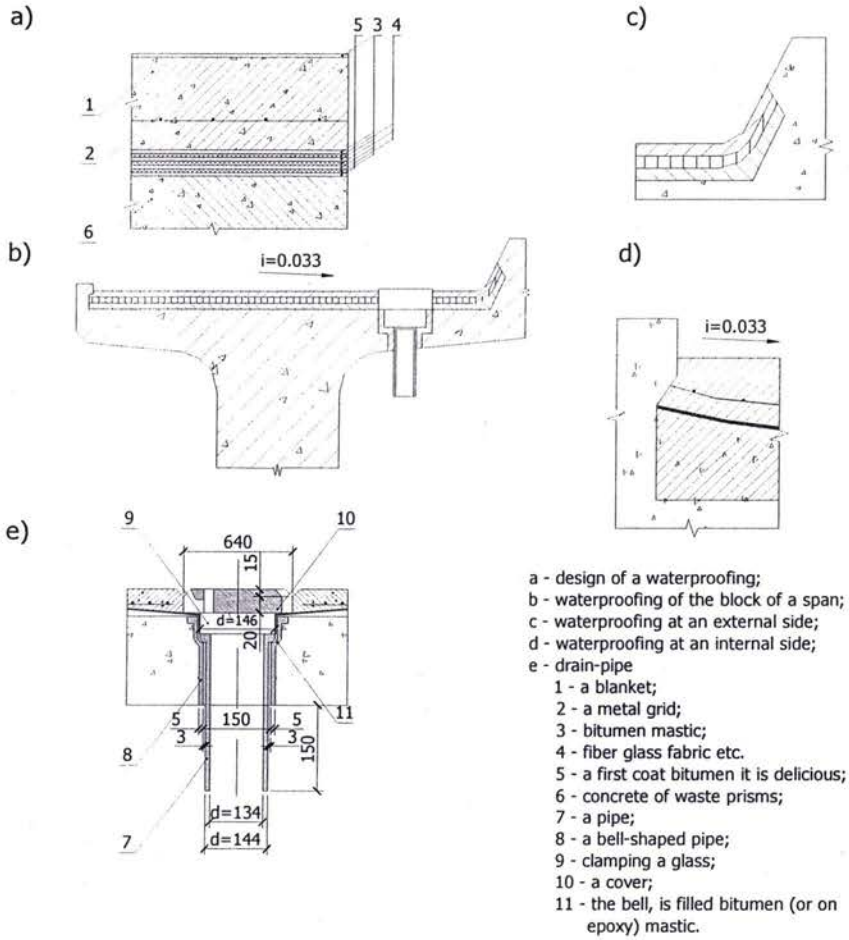
The basic parameters on one walkway slab

Mark of element	The basic sizes of elements, cm	Concrete		Weight ton	Armature steel	
		Mark of concrete	Volume of concrete, m³		Class of the armature A I, kg	Class of the armature A II, kg
P-2	173 x 54 x 15	V-25	0.058	0.145	8.5	3.0
P-5	208 x 54 x 15	V-25	0.07	0.175	10	3.7

Waterproofing of ballast plates. Life time of reinforced concrete bridge superstructures in a great extent depends on waterproofing condition and fast water diversion from ballast plate and other surfaces of bridge superstructures.
Structure of surface waterproofing consists of preparatory isolating and protective layers(see the following figures).

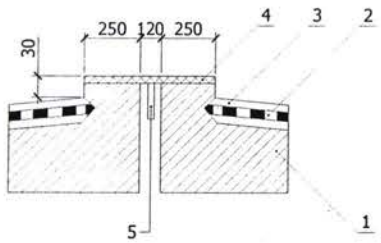
Details of a waterproofing

(the sizes in mm)



a - design of a waterproofing;
b - waterproofing of the block of a span;
c - waterproofing at an external side;
d - waterproofing at an internal side;
e - drain-pipe
1 - a blanket;
2 - a metal grid;
3 - bitumen mastic;
4 - fiber glass fabric etc.
5 - a first coat bitumen it is delicious;
6 - concrete of waste prisms;
7 - a pipe;
8 - a bell-shaped pipe;
9 - clamping a glass;
10 - a cover;
11 - the bell, is filled bitumen (or on epoxy) mastic.

Overlapping of deformation seams



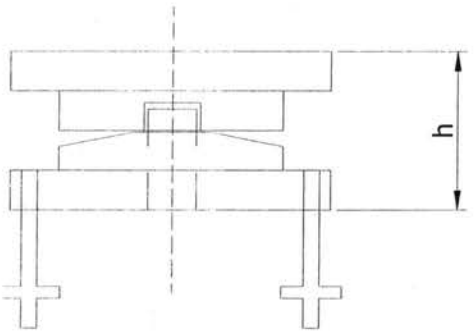
1 - preparatory layer
2 - waterproofing;
3 - blanket;
4 - steel sheet - =4 - 6 mm;
5 - the rod d=12mm, l=150 mm.

Bearings. During replacement of the bridge superstructures the replacement of defective bearings is envisaged.

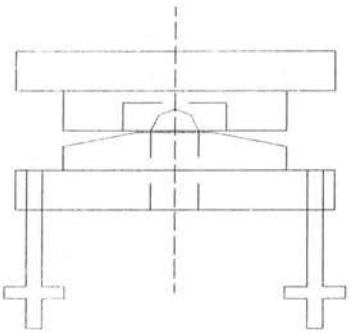
It is allowed to install the reinforced concrete bridge superstructures with the length of 6 m on welded tangential bearings with the height of 20 cm (see the following figure)

Welded tangential carriages for slab span

T1-S



T1-A



The basic parameters on one span

Height of the carriage mm	End reaction to the one carriage ton	Design move-ment mm	Sizes of the bottom bearing sheet		Distance between anchors along an axis of the bridge	Weight of one bearing sheet kg		Quantity of bearings on the span Lump of bearings on the span
			Along an axis of the bridge	Across an axis of the bridge		actuated bearing	stationary bearing	
200	109	25	430	310	300	164	8	1316

23A Rehabilitation of piers and abutments

Repair of bridge piers

According to survey data reinforced concrete bridge structures have the following damages: cracks in the concrete, corrosion of armoring, leaching of concrete,. separation of protective layer. The following works are envisaged: cleaning from dust, dirt, leaching of concrete with rehabilitation of protective layer, trimming of cracks up to 0.15 mm with "polymer compound", injection of cracks more than 0.15 mm with epoxy resin, improvement of waterproofing and water diversion defects on bridge superstructures is carried out from overhead rail package with the length of 5 m.

Overhaul works of piers are carried out from outside scaffoldings

Repair of abutment

Works implemented into "window" include:

- Cutting out of defective layer with the thickness of 4 cm on bearing blocks;
- Sealing up of chips with the monolithic concrete B 25;
- Dismantling of reinforced concrete laying, destroyed cordon stones;

- Installation of new reinforced concrete bearing blocks PB-1, PB-2
- Installation of new cordon blocks CB-1 and cabinet type blocks

The works implemented "under the train traffic conditions":

- Sealing up of chips with the thickness of 2 cm in reinforced concrete bearing blocks;
- Cement floating of abutment surface;
- Protective layer rehabilitation with cement;
- Sealing up the cracks

Labor protection and safety engineering

The works for rehabilitation and repair of the bridges are carried out on railway line operated sites, where regular traffic is available.

Civil works under line operation conditions should be carried out with provision of train traffic safety and full safety of employees working along the line, as well as without traffic delay.

When working along the line with traffic continuity work site should be protected with the signals according to instructions for safety of train traffic as well as safety engineering rules.

When working into "window" on operated lines with traffic interruption closing of span is carried out after permission of line master. If such closing will not cause the change of traffic volume and arrival and departure time to neighboring stations it may be permitted by the line master.

The project took into account the requirements for safety engineering stipulated by the normative documents:

- ShNK 3.01.03-03 – "Civil works arrangement"
- KMK 3.01.02-00 – "Safety engineering during civil works"
- KMK 3.06.07-98 – "Bridges and pipes. Survey and test rules"

Section 5

Form of Bid and Appendix to Bid

Single Stage Bidding Procedure

Section 5. Form of Bid and Appendix to Bid

Notes on Preparing Forms of Bid and Appendix to Bid

The Bidder shall complete and submit the Form of Bid and Appendix to Bid all in accordance with the requirements of the bidding documents.

Form of Bid

Name of Contract: _____
To: _____ *(Insert name of Employer)*
_____ *(Insert address of Employer)*

Gentlemen:

We have examined the Conditions of Contract, Employer's Requirements, Schedules, Addenda Nos _____ and the matters set out in the Appendix hereto. We have understood and checked these documents and have not found any errors in them. We accordingly offer to design, execute and complete the said Works and remedy any defects fit for purpose in conformity with these documents and the enclosed Proposal, for the fixed lump sum of (in currencies of payment)

_____

We accept your suggestions for the appointment of the Dispute Adjudication Board, as set out in Schedule ____ *[We have completed the Schedule by adding our suggestions for the other member of this three-person Board, but these suggestions are not conditions of this Bid].**

We agree to abide by this Bid until _____ and it shall remain binding upon us and may be accepted at anytime before that date. We acknowledge that the Appendix forms part of our Bid.

If our Bid is accepted, we will provide the specified performance security, commence the Works as soon as reasonably possible after receiving the Employer's Representative's notice to commence, and complete the Works in accordance with the above-named documents within the time stated in the Appendix to Bid.

Unless and until a formal Agreement is prepared and executed this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest or any bid you may receive.

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below:

Name and Address of Agent	Amount and Currency	Purpose of Commission or Gratuity
_____	_____	_____
_____	_____	_____
_____	_____	_____

(if none, state "none").

---

* If the Bidder does not accept, this paragraph may be deleted and replaced by:

We do not accept your suggestions for the appointment of the Dispute Adjudication Board, and propose that we jointly agree upon the appointment after the Effective Date (unless previously agreed) in accordance with Sub-Clause 20.3 of the Conditions of Contract. ***[OPTIONAL:** Our Proposal includes our suggestions for this appointment, but these suggestions are not conditions of this Bid.]*

We are, Gentlemen
Yours faithfully

Signature _____ in the capacity of _____ duly authorized to sign bids for and on behalf of _____

Address

_____

_____

Date _____

Appendix to Bid

[Note: with the exception of the items for which the Employer's requirements have been inserted, the following information must be completed before the Bid is submitted]

	Sub-Clause	
Employer's name and address _____	1.1.2.1 & 1.8*	(Insert before issue of document) _____
Contractor's name and address _____ _____	1.1.2.2 & 1.8	_____ _____
Name and address of the Employer's Representative _____ _____ _____	1.1.2.2 & 1.8	_____ _____
Time for notice to commence _____	8.1	_____ days
Time for Completion of the Works	1.1.3.4	_____ days
If Sub-Clause 13.15 does not apply:		
Foreign Currency/Currencies _____	1.1.5.3	as named in the BID
Electronic transmission systems _____	1.8	_____
Confidential details _____	1.12	(List applicable confidential details)
Time for access to the Site _____	2.2	_____ days after the Commencement Date
Amount of performance security	4.2*	Ten (10%) of the Contract Price and in the proportions of currencies which the Contract Price is payable
Time for submission of programme	4.14	_____ days after the Effective Date
Normal working hours _____	6.5	_____
Liquidated damages for the Works	8.6*	_____ % of the Contract Price per day, in the propotions of currencies in which the Contract Price is payable
Limit of liquidated damages for delay	8.6	_____ % of the Contract Price

If Clause 11 applies

Liquidated damages for failing Tests after Completion	11.4	
(details of test failure) _____		_____
(details of test failure) _____		_____
Total amount of advance payments	13.2*	Ten to twenty (10-20)% of the Contract Price
Number and timing of installments	13.2	_____
Start repayment of advance payment	13.2(a)	when payments are _____% of the Contract Price
Repayment amortization of advance payment _____	13.2(b)	_____ 25%
Percentage of retention _____	13.3(c)*	Ten (10)%
Limit of Retention Money	13.3(c)*	Five (5)% of the Contract Price

If Sub-Clause 13.5 applies:

Plant and Materials for payment When delivered to the Site	13.5	_____ [list]
Minimum amount of Interim Payment Certificates _____	13.6*	One and one-half (1.5)% of the Contract Price

If Sub-Clause 13.15 applies:

Payments in Local and Foreign Currencies — 1.1.5.3 & 13.15

Currency Unit	Amount Payable in such Currency
Local: _____ [name]	_____
Foreign: _____ [name]	_____
_____ [name]	_____

If there are Provisional Sums:	14.5(b)(ii)	_____
Percentage for Adjustment of Provisional Sums _____		_____
Amount of insurance for design	18.1	_____
Amount of third party insurance	18.3	

Periods for submission of insurance:	18.5	
(a) evidence of insurance ___	*	Not later than commencement date.
(b) relevant policies _____	*	Fourteen (14) days after commencement date.
Number of members of Dispute Adjudication Board	20.3*	Three (3) _____
Member of Dispute Adjudication Board (if not agreed) to be nominated by ___ _____	20.3*	The President of the Institution Engineers of country where works carried out.
Arbitration rules _____	20.6*	International Chamber of Commerce
Number of Arbitrators _____	20.6*	Three (3) _____
Language of arbitration _____	20.6*	English _____
Place of arbitration _____	20.6	_____ _____

If there are Sections

Definitions of Sections

Description (Sub-Clause 1.1.6.9)	Value (percentage of Contract Price) +	Time for Completion (Sub-Clause 1.1.3.4)	Liquidated Damages (Sub-Clause 8.6)
_____	_____	_____	_____
_____	_____	_____	_____

* Indicates insertion recommended by ADB.
\+ These percentage shall also be applied to the first half of the Retention Money under Sub-Clause 13.9

Initials of signatory of Bid _____

Section 6

Sample Forms

Section 6. Sample Forms

Notes on Sample Forms

Bidders shall complete and provide the Bid Security all in accordance with the requirements of the bidding documents.

Bidders should not complete the Form of Agreement at this time. Only the successful Bidder will be required to complete the Form. The Form of Agreement, when it is finalized at time of contract award, should incorporate any corrections or modifications to the accepted bid resulting from arithmetic corrections, acceptable deviations (time for completion, technical deviations, commercial deviations, etc.), spare parts or quantity variations in accordance with the requirements of the bidding documents.

The Form of Performance Security, Form of Advance Payment Security and Form of Domestic Preference Security should not be completed by the bidders at the time of bid preparation. Only the successful Bidder will be required to provide these securities in accordance with the forms indicated herein or in another form acceptable to the Employer. When Advance Payment Security and or Domestic Preference Security is not required, the form(s) should not be included in the bidding documents.

Table of Contents

Form of Bid Security 180

Form of Contract Agreement 182

Form of Performance Security 183

Form of Advance Payment Security 184

Form of Domestic Preference Security 185

Form of Bid Security (Bank Guarantee)

WHEREAS, _____ *[Name of Bidder]* (hereinafter called "the Bidder") has submitted his bid dated _____ *[Date]* for the construction of _____ *[Name of Contract]* (hereinafter called "the Bid").

KNOW ALL MEN by these presents that We _____ *[Name of Bank]* of _____ *[Name of Country]* having our registered office at _____ (hereinafter called "the Bank) are bound unto _____ *[Name of Employer]* (hereinafter called "the Employer") in the sum of _____[32] for which payment well and truly to be made to the said Employer the Bank binds himself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this ___ day of_____ 20___.

THE CONDITIONS of this obligation are:

(1) If the bidder withdraws his Bid during the period of bid validity specified in the Form of Bid:

or

(2) If the Bidder refuses to accept the correction of errors in his Bid;

or

(3) if the Bidder, having been notified of the acceptance of his Bid by the Employer during the period of Bid validity;

(a) fails or refuses to execute the Form of Contract Agreement in accordance with the Instructions to Bidders, if required; or

(b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders;

we undertake to pay to the Employer up to the above amount upon receipt of its first written demand, without the Employer having to substantiate its demand, provided that in its demand the Employer will note that the amount claimed by it is due to it owing to the occurrence of one or all of the three conditions, specifying the occurred condition or conditions.

---

[32] The bidder should insert the amount of the guarantee in words and figures denominated in the currency of the Employer's country or an equivalent amount in a freely convertible currency. This figure should be the same as shown in Clause 18.1 of the Instructions to Bidder.

This Guarantee will remain in force up to and including the date ____[33] days after the deadline for submission of bids as such deadline is stated in the Instructions to Bidders

or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE _____ SIGNATURE OF THE BANK _____

WITNESS _____ SEAL _____

_____
(Signature, Name, and Address)

[33] Usually 28 days after the end of the validity period of the Bid. Date should be inserted by the Employer before the bidding documents are issued.

Form of Contract Agreement

This Agreement made this _____ day of _____ 20 _____ between _____
_____
of _____
(hereinafter called "the Employer") of the one part and _____
of _____ (hereinafter called "the Contractor") of the other part

Whereas the Employer desires that the Works known as _____ should be designed and executed by the Contractor, and has accepted a Bid by the Contractor for the design, execution and completion of such Works and the remedying of any defects therein.

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement:

   (a) The Letter of Acceptance dated _____
   (b) The Employer's Requirements
   (c) The Addenda nos. _____
   (d) The Bid dated _____
   (e) The Conditions of Contract (Parts I and II)
   (f) The completed Schedules, and
   (g) The Contractor's Proposal.

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to design, execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor, in consideration of the design, execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

In Witness whereof the parties hereto have caused this Agreement to be executed the day and year first before written in accordance with their respective laws.

Authorized signature of Contractor	Authorized signature of Contractor
SEAL (if any)	SEAL (if any)
in the presence of:	in the presence of:
Name _____	Name _____
Signature _____	Signature _____
Address _____	Address _____

Form of Performance Security
(Bank Guarantee)

To: _____ *[name of Employer]*
_____ *[name of Employer]*

*WHEREAS*_____ *[name and address of Contractor]* (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated _____ to execute _____ *[name of Contract and brief description of Works]* (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with its obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible *to* you, on behalf of the Contractor, up to a total of _____ *[amount of Guarantee]*[34] _____ *[in words],* such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ *[amount of Guarantee]* as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until the date of issue of the Performance Certificate.

Signature and Seal of the Guarantor _____
Name of Bank _____
Address _____
Date _____

[34] An amount is to be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract, and denominated either in the currency(ies) of the Contract or in a freely convertible currency acceptable to the Employer.

Form of Advance Payment Security (Bank Guarantee)

To: _____ *[name of Employer]*
_____ *[address of Employer]*
_____ *[name of Contract]*

Gentlemen:

In accordance with the provisions of the Conditions of Contract, Sub-Clause 13.2 ("Advance Payment") of the above-mentioned Contract, _____ *[name and Address of Contractor]* (hereinafter called "the Contractor") shall deposit with _____ *[name of Employer]* a bank guarantee to guarantee its proper and faithful performance under the said Clause of the Contract in an amount of _____ *[amount of Guarantee]*[35] _____ *[in words].*

We, the _____ *[bank* or *financial institution],* as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to _____ *[name of Employer]* on its first demand without whatsoever right of objection on our part and without its first claim to the Contractor, in the amount not exceeding _____ *[amount of Guarantee]*[1] _____ [in words].

We further agree that no change or addition to or other modification of the terms of the Contract or of Works to be performed thereunder or of any of the Contract documents which may be made between _____ *[name of Employer]* and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until _____ *[name of Employer]* receives full repayment of the same amount from the Contractor.

Yours truly, _____
Signature and Seal: _____
Name of Bank/Financial Institution: _____
Address: _____
Date: _____

[35] An amount is to be inserted by the Bank or financial institution representing the amount of the Advance Payment, and denominated either in the currency(ies) of the Advance Payment as specified in the Contract, or in a freely convertible currency acceptable to the Employer.

Form of Domestic Preference Security (Bank Guarantee)

To: _____ *[name of Employer]*
_____ *[address of Employer]*

WHEREAS a joint venture among: _____ *[name and addresses of all joint venture partners]* (hereinafter called "the Contractor"), has undertaken in pursuance to Contract No. _____ dated _____ to execute _____ *[name of Contract and brief Description of Works],* (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligation stated in Sub-Clause 4.25 of the Conditions of Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of _____ *[amount of Guarantee]*[36], we undertake to pay you, upon your first written demand and without your having to substantiate such demand any sum within the limit of _____ *[amount of Guarantee].*[1]

We hereby waive the necessity of demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in anyway release us from liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee is valid until the date of the Performance Certificate.

Signature and Seal of the Guarantor _____
Name of Bank _____
Address _____
Date _____

[36] Amount to be inserted by the Guarantor in accordance with Sub-Clause 25 of the Conditions of Particular Applications.

Section 7

Schedules

Section 7. Schedules

Notes on Schedules

The Schedules are intended to provide the Employer with essential supplementary information in an organized format. Examples of more commonly used Schedules are given herein. Others may be devised and added in accordance with the requirements of the Instructions to Bidders.

All the Schedules are essential for bid evaluation and some in contract execution; they should all be incorporated in the Contract, and appropriate changes introduced with the approval of the Employer or its representative.

In Single Stage Bidding Procedure, all Schedules are to be completed and submitted with the bid.

1. The Schedules are divided into six separate Schedules as follows:

- *I. Design, Drawings and Documentation*
- *II. Plant and Equipment (including Mandatory Spare parts) Supplied from outside the Employer's Country*
- *III. Plant and Equipment (including Mandatory Spare parts) Supplied from within the Employer's Country*
- *IV. Civil Works, Installation and Other Services*
- *V. Grand Summary*
- *VI. Recommended Spare Parts*

2. The quantities shown in these schedules are estimates only.

3. The Schedules do not generally give a full description of the plant and equipment to be supplied and the services to be performed under each item. Bidders shall be deemed to have read the Employer's Requirements and other sections of the bidding documents and reviewed the Drawings to ascertain the full scope of the requirements included in each item prior to filling in the rates and prices. The entered rates and prices shall be deemed to include for the full scope as aforesaid including overheads and profit.

4. Bid prices shall be quoted in the manner indicated and in the currencies specified in the Instructions to Bidders in the bidding documents.

Section 7 – Schedules of Rates and Prices

Notes on Schedules *(continued)*

For each item, bidder shall complete each appropriate column in the respective Schedules, giving the price breakdown as indicated in the Schedules.

Prices given in the Schedules against each item shall be for the scope covered by that item as detailed in the Employer's Requirements, Drawings or elsewhere in the bidding documents.

5. Items left blank will be deemed to have been included in other items. The TOTAL for each Schedule and TOTAL of the Grand Summary shall be deemed to be the total price for executing the facilities and sections thereof in complete accordance with the Contract.

6. These schedules are intended primarily to provide information for bid evaluation but not intended to be used for the evaluation of work done for the purpose of interim payment. They may, however, be used as a reference for the adjustment of the Schedule of Payment should the need arise.

7. These schedules can be used as a basis to value variations of work done under the Provisional Sum.

SCHEDULES OF PRICES

I. Design, Drawings and Documentation

Item	Description	Quantity	Rate		Total Price	
			Foreign Currency[a]	Local Currency[a b]	Foreign[a]	Local[a]
	TOTAL (To Grand Summary)					

a Currencies shall be in accordance with Clause 16 of the Instructions to Bidders.
b Include duties and taxes.

II. Plant & Equipment, including mandatory spare parts, supplied from outside the Employer's Country

Item	Description	Country of Origin	Foreign Currency[a]		Local Currency		Total Price	
			FOB	CIF	Taxes & Duties	Local Transport	Foreign[a]	Local[a]
	TOTAL (To Grand Summary)							

a Currencies shall be in accordance with Clause 16 of the Instructions to Bidders.

III. Plant & Equipment, including mandatory spare parts, from within the Employer's Country

Item	Description	Quantity	Ex-factory Price[a]	Sales Tax[a]	Total
	TOTAL (To Grand Summary)				

a Currencies shall be in accordance with Clause 16 of the Instructions to Bidders.

IV. Civil works, installation and other services

Item	Description	Quantity	Rate		Total Price	
			Foreign Currency[a]	Local Currency[a b]	Foreign[a]	Local[a]
	TOTAL (To Grand Summary)					

a Currencies shall be in accordance with Clause 16 of the Instructions to Bidders.
b Include duties and taxes.

V. Grand Summary

Item	Description	Total Price	
		Foreign ( )[a]	Local ( )[a]
1	Schedule 1. Design, Drawings and Documentation		
2	Schedule 2. Plant and Equipment, including Mandatory spare parts, supplied from abroad		
3	Schedule 3. Plant and Equipment, including Mandatory spare parts, from within the Employer's Country		
4	Schedule 4. Civil Works, installation and other services		
	TOTAL **(To Grand Summary)**		

a Specify currency.

VI. Recommended Spare Parts

Item	Description	Quantity	Unit Price		Total Price	
			From Abroad ( )[a]	Local Ex-Factory ( )[a]	Foreign ( )[a]	Local ( )[a]
	TOTAL					

a Specify currency.

SCHEDULE OF PAYMENT

(a) If payment is on a periodic basis according to pre-estimated construction progress.

Payment	Month	Percent	Amount	Cumulative%	Milestone[1]
1st Payment 2nd Payment 3rd Payment **Final Payment**					
Total					

1 Where available and applicable.

Note: The Employer and the Contractor may make necessary adjustments to the payment schedule if the progress of work is substantially ahead of or behind the program referred to in Sub-Clause 4.14.

(b) If payment is based on completion by stages.

Stage (insert brief description	Percent	Amount	Cumulative%
1st 2nd 3rd **Final**			
Total			

SCHEDULE OF COEFFICIENT AND INDICES FOR PRICE ADJUSTMENT

Coefficient Scope of Index	Country of Origin; Currency of Index	Source of Index; Title/Definition	Value on stated dates	
			Value	Date
a = _____ _____ b = _____ _____ c = _____ _____ d = _____ _____ e = _____ _____				

SCHEDULE OF
MAJOR ITEMS OF CONSTRUCTIONAL PLANT

Description (Type, Model, Make)	No. of Each	Year of Manufacture	New or Used	Owned (O) Or Leased (L)	CIF Value	Est. Power Rating	Capacity t or m^3

The Employer should select appropriate major headings to suite the nature of the Works. The bidder shall enter in this Schedule all major items of Construction Plant which he proposes to bring on site, both owned and leased (rented), and shall indicate the proposed port of entry.

SCHEDULE OF KEY PERSONNEL

	Name		Summary of qualifications
	(i) (ii)	Nominee Alternate	Experience and Present Occupation
Headquarters			
Partner/Director			
Other Key Staff			
(give designation)			
Site Office			
Site Superintendent			
Deputy			
Superintendent			
Supervising			
Engineers			
Construction			
Supervisors			
Other Key Staff			

The bidder shall list in this Schedule the Key personnel (including first nominee and the second choice alternate) he will employ from headquarters and from Site Office to direct and execute the Work, together with their qualifications, positions held and their nationalities.

SCHEDULE OF SUBCONTRACTORS

Element of Work	Approximate Value	Name and Address of Subcontractor	Statement of Similar Works Previously Executed

The bidder shall enter in this Schedule a list of the sections and appropriate value of the work for which he proposes to use subcontractors, together with the names and addresses of the proposed subcontractors. The bidder shall also enter a statement of similar works previously executed by the proposed subcontractors, including description, location and value of work, year completed, and name and address of the Employer/Employer's Representative. Notwithstanding such information the bidder, if awarded the Contract, shall remain entirely and solely responsible for the satisfactory completion of the Works.

Section 8

List of Eligible Member Countries of The Asian Development Bank

Section 8. List of Eligible Member Countries Of The Asian Development Bank

Notes on List of Eligible Member Countries of the ADB

The list of eligible member countries of the ADB must be included in the bidding documents. Executing Agencies should verify with ADB that the list is current.

LIST OF ELIGIBLE MEMBERS OF THE ASIAN DEVELOPMENT BANK

(As of 23 July 2003)

Afghanistan
Australia
Austria
Azerbaijan
Bangladesh
Belgium
Bhutan
Cambodia
Canada
China, People's Republic of
Cook Islands
Denmark
East Timor, Democratic Republic of
Fiji Islands
Finland
France
Germany
Hong Kong, China
India
Indonesia
Italy
Japan
Kazakhstan
Kiribati
Korea, Republic of
Kyrgyz Republic
Lao People's Democratic Republic
Malaysia
Maldives
Marshall Islands, Republic of the
Micronesia, Federated States of
Mongolia
Myanmar
Nauru
Nepal
Netherlands, The
New Zealand
Norway
Pakistan
Papua New Guinea
Philippines
Portugal
Samoa
Singapore
Solomon Islands
Spain
Sri Lanka
Sweden
Switzerland
Taipei,China
Tajikistan
Thailand
Tonga
Turkey
Turkmenistan
Tuvalu
United Kingdom
Unites States
Uzbekistan
Vanuatu
Viet Nam, Socialist Republic of

For the latest list, please see http://www.adb.org/About/members.asp

Section 9

Drawings

Section 9. Drawings

Due to the number and the size (A3) of drawings to be provided Section 9 has been provided in a separate volume.

Section 10

Notes on Selected Clauses of the Conditions of Contract

Section 10. Notes on Selected Clauses of the Conditions of Contract

Preamble

Those clauses marked with an asterisk (*) indicate that a corresponding sample clause appears in Section 3, Part II – Conditions of Particular Application. They are generally given to explain the changes made to clauses of FIDIC conditions of contract to conform to ADB requirements.

Other notes provide ADB's comments on some sub-clauses suggested by FIDIC for Part II as well as discuss possible alternative scenarios that may arise under a number of other sub-clauses and how these sub-clauses could be reconstructed to suit the circumstances of each case. The latter has been largely drawn from FIDIC's Part II – Guidance for the Preparation of Conditions of Particular Application, First Edition 1995.

Notes on Selected Clauses of the Conditions of Contract

Sub-Clause 1.5 Contract Agreement (*)	As a matter of good practice ADB requires a Contract Agreement to be executed without exception.
Sub-Clause 1.6 Priority of Documents	ADB requires a clear precedence for the various documents involved in the contract to be established. It does not recommend adoption of FIDIC's alternative of modifying the clause to cater for the case where no precedence is prescribed.
Sub-Clause 1.14 Joint and Several Liability	Requirements which apply prior to the Contract becoming effective should be included in the Instructions to Bidders. The Employer will require the leader of the joint venture to be appointed at an early stage, providing a single point of contact thereafter, and will not wish to be involved in a dispute between the members of a joint venture.
Sub-Clause 3.1 Employer's Representative's Duties and Authority (*)	A specific number of examples are given to amplify on FIDIC's general statement given in Part II.
Sub-Clause 4.1 General Obligations (*)	It is important that the Contractor check the design criteria and calculations (if any) before submitting a bid, hence a specific clause to this effect is recommended. ADB does not agree to FIDIC's alternative suggestion of allowing a reasonable period after the Commencement Date for the Contractor to check the design as this approach could lead to fundamental disagreement on design not being uncovered until well after contract formation and in the worst case scenario the contract may have to be aborted to the detriment of all parties concerned.
Sub-Clause 4.2 Performance Security (*)	The Sub-Clause provided in Part II, Conditions of Particular Application should replace FIDIC Sub-Clause 4.2 {Parts I and II), Performance Guarantee and Surety Bond for Performance (included as Annexes A and B of FIDIC Part II), are not recommended by ADB as these represent conditional guarantees. The suggestions in FIDIC Part II of the alternative of an insolvency guarantee in certain cases and of a performance bond guaranteeing the due and proper completion of the works without specifying the amounts or currencies are also not recommended. ADB recommends an unconditional Performance Bank guarantee as set forth in the sample in Section 6.
Sub-Clause 4.3 Contractor's Representative (*)	If the Representative is known at the time of submission of Bid, the Proposal can include the Representative's name; however, the Tenderer may wish to propose alternatives, especially if the contract award is likely to be delayed.

Sub-Clause 4.4 Coordination of The Works (*)

These documents are for a Design-Build and Turnkey Contract wherein the Contractor carries out most if not all of the Works. If there are other contractors on site they would likely be those of local authorities and performing relatively minor Works incidental to the main Works to be undertaken by the Contractor. The required coordination from the Contractor should be "with" and not "of" other contractors. ADB does not agree to the suggestion in FIDIC Part II that the work can be let under several separate contracts as this invalidates the basic concept of a Design-Build or Turnkey mode of contracting. For these same reasons FIDIC's suggestions in Part II under Sub-Clauses 4.17 Safety Precautions and 4.22 Security of the Site are not appropriate under the circumstances.

Sub-Clause 4.6 Assignment of Subcontractor's Obligation

If the Contractor is required to assign its right to subsequently make a claim against the Subcontractor for defective performance, it may be appropriate for the terms of the assignment to entitle the Contractor to require the Employer to make such claim on the Contractor's behalf.

Sub-Clause 4.9 Site Data (*)

This amendment covers data which cannot be physically or legally reproduced and distributed with the bidding documents, as for instance borehole cores, pit samples, meteorological records and maps of restricted areas which can be made accessible for inspection by bidders and later by the Contractor.

Sub-Clause 4.14 Program (*)

It is not deemed appropriate to specify the technique to be used to develop the program.

Sub-Clause 4.16 Contractor's Equipment

If the Contractor is not to provide all the Contractor's equipment necessary to complete the Works, the Employer's obligations should be specified (under Sub-Clause 4.20 for example).

Sub-Clause 4.25 Domestic Preference Security (*)

This is an additional clause to be used when Domestic Preference is permitted by the Loan Agreement and called for under Instructions to Bidders.

Only a joint-venture contractor who wins the contract by the application of the Domestic Preference provisions will be required to provide the security.

Sub-Clause 5.2 Construction Documents (*)

While the Employer may rightfully require prior approval before commencement of construction it would be unfair to expect the Contractor to wait indefinitely without recourse for such approval.

Sub-Clause 5.4 Technical Standards (*)

The additional provision for acceptability of other national and international standards is necessary to comply with ADB's requirement of non-restrictiveness.

Sub-Clause 6.5 Working Hours

If the Employer does not wish to specify working hours in the Appendix to Bid, or to restrict them (in order to plan the Employer's Representative's supervision, for example), this sub-clause may be deleted.

Sub-Clause 6.6 Facilities for Staff and Labour	If the Employer will make accommodation available to the Contractor its obligation should be specified.
Sub-Clause 6.8 Contract's Superintendence (*)	English is the official language for use on ADB Contracts.
Sub-Clause 7.7 Restriction on Eligibility (*)	This provision is necessary to comply with the ADB Guidelines for Procurement which require all goods and services for Bank financed project to originate from eligible source countries only.
Sub-Clause 8.2 Time for Completion	If the works are to be taken over in stages, these stages should be defined as sections in the Appendix to Bid.
Sub-Clause 8.6 Liquidated Damages for Delay	These pre-defined damages must be a reasonable pre-estimate of the Employer's probable loss in the event of delay. If the Contract Price is to be quoted as the sum of figures in more than one currency, it may be preferable to define these damages (per day) as a percentage reduction applicable to each of such figures. If the Contract Price is expressed in the Local Currency, the damages per day may either be defined as a percentage or be defined as a figure in such Local Currency; however, unless all payments are to be made in the Local Currency, the currencies of payment should be specified.
Sub-Clause 10.1 Taking-Over Certificate	If the Works are to be taken-over in stages, these stages should be defined as Sections in the Appendix to Bid. Precise geographical definitions are advisable, and the Appendix should include a table, so as to define the aspects relating to the retention money releases, time for completion and liquidated damages for delay (the table is shown in the sample Appendix).
Sub-Clause 11.4 Failure to Pass Tests After Completion	If the first part of this Sub-Clause is to apply, the method of calculating liquidated damages (based on the extent of the failure) should be defined in the Appendix to Bid, and the Employer's Requirements should specify the minimum acceptable performance criteria.
Sub-Clause 12.5 Removal of Defective Work	If the Plant to be supplied under the Contract is such that the value of an item which might have to be removed from the site is substantial (compared, for example, with the amount of the performance security), it may be appropriate to amend the Sub-Clause, so as to require the Contractor to provide additional security in these circumstances.
Sub-Clause 12.10 Unfulfilled Obligations	It may be necessary to review the effect of this Sub-Clause in relation to the period of liability which the applicable law may impose.
Sub-Clause 13.1 Contract Price (*)	ADB requires the inclusion of price adjustment provisions generally for all work contracts and supply contracts with delivery periods which extend beyond one year (or even for shorter periods in countries with high inflation rates).

Sub-Clause 13.2 Advance Payment (*)

The modification introduces the requirement for the execution of the Form of Agreement and the provision of an unconditional bank guarantee, both of which are deemed to be important by ADB.

The total of the advances (and the number of installments) must be specified in the Appendix to Bid. The rate of deduction for the repayments should be checked to ensure that repayment is achieved, before completion; the typical figures in sub-paragraphs (a) and (b) of the Part I Sub-Clause are based on the assumption that the total of the advances is less than 20% of the Contract Price. The acceptable form(s) of guarantee should be included in the bidding documents; an example form may be found in Section 6.

Sub-Clause 13.4 Schedule of Payments (*)

Part I contains provisions for interim payments to the Contractor, which can be based on a Schedule of Payments or any other basis for determining interim valuation; if a latter basis is adopted, details should be added in Part II. If payments are to be specified in a Schedule of Payments, the "minimum amount of interim certificates" could be omitted from the Appendix to Bid, and the Schedule of Payments could be in one of the following forms:

(a) an amount (or percentage of the Contract Price) could be entered for each month during the Time for Completion, which assumes the Contractor's progress to substantially conform to the expectation on which the Schedule was based; or

(b) the Schedule could be based on actual progress achieved in executing the Works, which necessitates careful definition of the payment milestones.

The figures inserted by the Bidder in the Schedule of Payments should be compared with its bid program (if any), to assess whether they are reasonably consistent with each other.

For Bank financed Design-Build or Turnkey contracts it is recommended that a Schedule of Payment linked to construction progress and, where possible, evidenced by easily identifiable milestones be adopted.

Sub-Clause 13.8 Delayed Payment

If the discount rate of the Central Bank in the country of the currency of payment, plus 3% is not a reasonable indication of the Contractor's financing costs, a new rate may need to be defined; alternatively, the actual financing costs could be paid, taking account of local financing arrangements.

Sub-Clause 13.15 Calculation of Payments in Foreign Currency

Instead of the Contract Price being quoted in the currencies of payments, this Sub-Clause relates to the situation where it is quoted in Local Currency only, but is paid, by application of percentages and exchange rates, in various currencies (which may, but need not, include the Local Currency). If this Sub-Clause is to apply, the name of the Local Currency must be stated in the Bid, so that the Contract Price is a sum in that currency only, and the Appendix to Bid should include a table for insertion of the proportions and exchange rates (the Table is shown in the sample

Appendix). If all payments and deductions are not to be in the same currency proportions, an additional Sub-Clause will be required: also, an additional table will be required in the Appendix to Bid if there are Sections.

Sub-Clause 13.17 Adjustment for Changes in Cost (*)

As noted under Sub-Clause 13.1, ADB requires the inclusion of price adjustment provisions generally for all works contracts and supply contracts with delivery periods extending beyond one year.

For a Design-Build or Turnkey contract, whose outstanding feature is simplicity and characterized by a lump sum price structure, it is deemed appropriate to apply the price adjustment mechanism to the whole lump sum of each interim payment and not to each type of construction work performed and plant supplied as in the case of civil work contract where payments are based on measurement.

Sub-Clause 13.18 Taxation (*)

This sub-clause reflects ADB's standard approach adopted for all Bank-financed contracts in respect of both foreign and local taxes.

Clause 14 Variations

Variations can be initiated by any of three ways:

(a) the Employer's Representative may instruct the variation under Sub-Clause 14.1, without prior agreement as to feasibility or price;

(b) the Contractor may initiate its own proposals under Sub-Clause 14.2, to the benefit of both parties; or

(c) the Employer's Representative may request a proposal under Sub-Clause 14.3, seeking prior agreement so as to minimize dispute.

In order to value variations, the Bidder can be required to submit a detailed breakdown of the contract price, including quantities, unit rates and other pricing information, otherwise the Employer's Representative must have the necessary expertise to value any variations which may be required.

Sub-Clause 14.5 Provisional Sums

Although generally inappropriate for this type of contract, a Provisional Sum may be required for parts of the Works which are not required to be priced at the risk of the Contractor; for example, to cover goods which the Employer wants to select, or to deal with a major uncertainty regarding sub-surface conditions. It is essential to define the scope of each Provisional Sum (in a Schedule, probably), since such scope will then be excluded from the other elements of the Contract Price.

If a Provisional Sum is likely to be valued under Sub-Clause 14.5(b), the percentage should be quoted by bidders in the Appendix to Bid. If Provisional Sums relate to radically different types of work, it may be appropriate to permit tenderers to quote a different percentage for each Provisional Sum.

Sub-Clause 15.2 Termination

The Employer should verify that the wording of the sub-clause, and anticipated termination is not in conflict with the applicable law of the country.

Sub-Clause 16.2 Termination

The Employer should verify that the wording of this sub-clause is not in conflict with the applicable law; the Contractor should verify that the anticipated termination is not in conflict with such law.

Sub-Clause 17.3 Employer's Risks (*)

The wordings of a similar clause in the ADB Standard Bidding Documents for Procurement of Civil Works are adopted for consistency except that loss or damage due to the design of the works is removed as an Employer's risk since in a Design-Build or Turnkey contract the contractor is responsible for the design of the Works.

Sub-Clause 18.2 Insurance for Works and Contractor's Equipment (*)

The amendments are made for consistency with ADB Standard Bidding Documents for Procurement of Civil Works and especially to conform to ADB's requirement that the insurance be valid from the first working day after the Commencement Date.

Clause 19 Force Majeure

The Employer should verify that the wording of this clause and any anticipated action under it is not in conflict with the applicable law.

Sub-Clause 20.3 Dispute Adjudication

The Contract should include provisions which, whilst not discouraging the parties from reaching agreement as the works proceed, allows them to refer contentious matters to impartial individual(s) with suitable technical qualifications. The provisions depend, for their success, on the parties' confidence in the agreed individual(s) and in the individual's personal and professional qualities. Therefore, it is essential that the arrangements are not imposed by either party on the other party, and that the nominating authority is wholly impartial.

The Institution of Engineers or equivalent professional association in most countries maintain a list of experienced arbitrators and the President of the institution/association could be named as the authority to nominate the arbitrators. It is preferable, but not essential, for the individual(s) to be agreed by the time the Bid is accepted: the parties may be able to agree to the appointment immediately after the award of the Contract, when relationships are usually favorable. The "Dispute Adjudication Board" is the defined term for such individual(s), but such definition does not preclude the use of one expert, who would thus act as a one-person Board. At an early stage, consideration should be given as to whether a one-person or three-person Board is preferable for a particular project, taking account of its size, duration and the fields of expertise which will be involved.

For a one-person Board, the Employer may suggest (in a schedule possibly, with curriculum vitae) the names of acceptable persons for the Dispute Adjudication Board, for bidders to select. From the list, each bidder would nominate acceptable potential members, preferably with alternates in case some subsequently decline the appointment.

For a three-person Board, the Employer may similarly propose one member, and invite bidders to approve and to suggest (in a Schedule, possibly, with curriculum vitae) the names of acceptable persons for another member of the Dispute Adjudication Board, for

the Employer's approval. The Employer could similarly suggest names of acceptable persons for the third member of the Dispute Adjudication Board, for bidders to select. Whichever method is used by the parties to attempt agreement on the appointment of the Dispute Adjudication Board, it is important to avoid the matter becoming a major part of the pre-contracting negotiations. The example wording in the Bid therefore seeks to avoid the bidder's suggestions becoming a condition of the Bid, introducing a potential delay to the award of a contract

Sub-Clause 20.5 Amicable Settlement

The provisions of this sub-clause are intended to encourage the parties to settle a dispute amicably; for example, by direct negotiation, mediation or conciliation. Amicable settlement procedures depend, for their success, on confidentiality and on agreement of the procedure; therefore, it is preferable that such procedures are not imposed by either party on the other party. The parties could consider initiating proposals for such procedures upon award of the Contract, when relationships are usually favorable.

Sub-Clause 20.6 Arbitration

The Contract should include provisions for the resolution by arbitration of any disputes which are not resolved amicably. Arbitration has practical advantages over litigation and may be more mutually acceptable to the parties.

Careful consideration should be given to ensuring that the international arbitration rules chosen are compatible with the provisions of Clause 20 and the other elements to be set out in the Appendix to Bid. The Rules of Arbitration of the International Chamber of Commerce (the ICC) are recommended. The number of arbitrators, place of arbitration and language of arbitration, shall be specified in the Appendix to Bid.

APPENDIX

to Section IV. Employer's Requirements

Design-Build and Turnkey Contracts

ITALFERR
A project implemented by Italferr S.p.A.

GOST 8161-75
Rails of R65 type
Structure and Dimensions

Standard non-observance is prosecuted under the Law.

1. This standard covers hardened and non-hardened railway rails R65 type and set up their structure and dimensions.

This standard is in compliance with CMEA(Council for Mutual Economic Assistance) under standardization of PC 1936-69.

2. Structure and dimensions of the cross section of the rails should be in compliance with accordance the drawing 1, and location and the dimensions of holes in the web at the end of the rails in the drawing 2.

Due to the order of the Customer the rails can be made without the holes in the web and without hardening the surface of rolling of the head on the one or both ends.

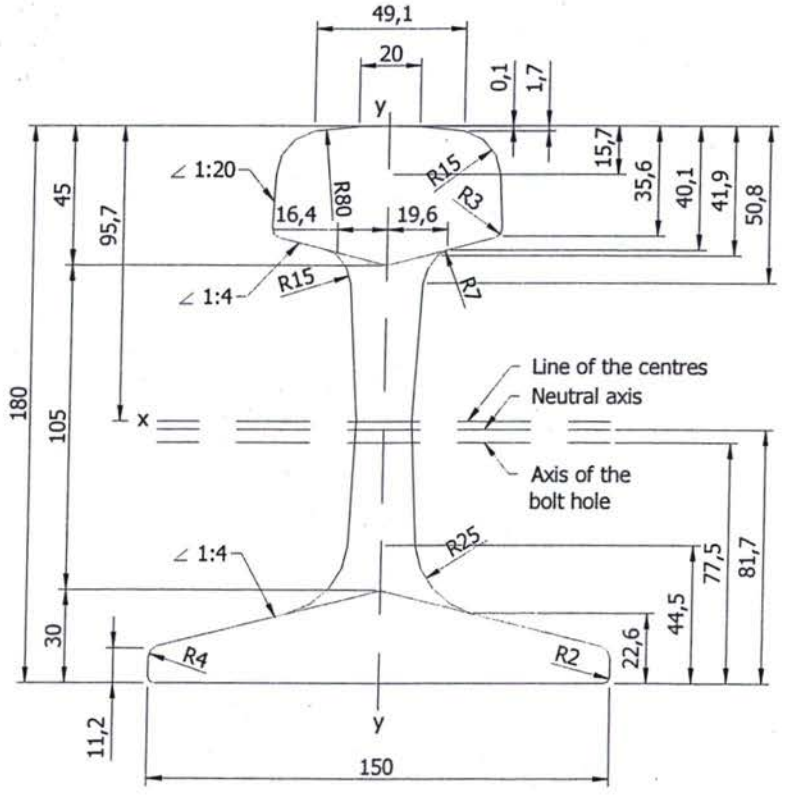
It is allowed due to the agreement between the manufacturer and the Customer the amendments (changes) of the holes at the ends of the rails

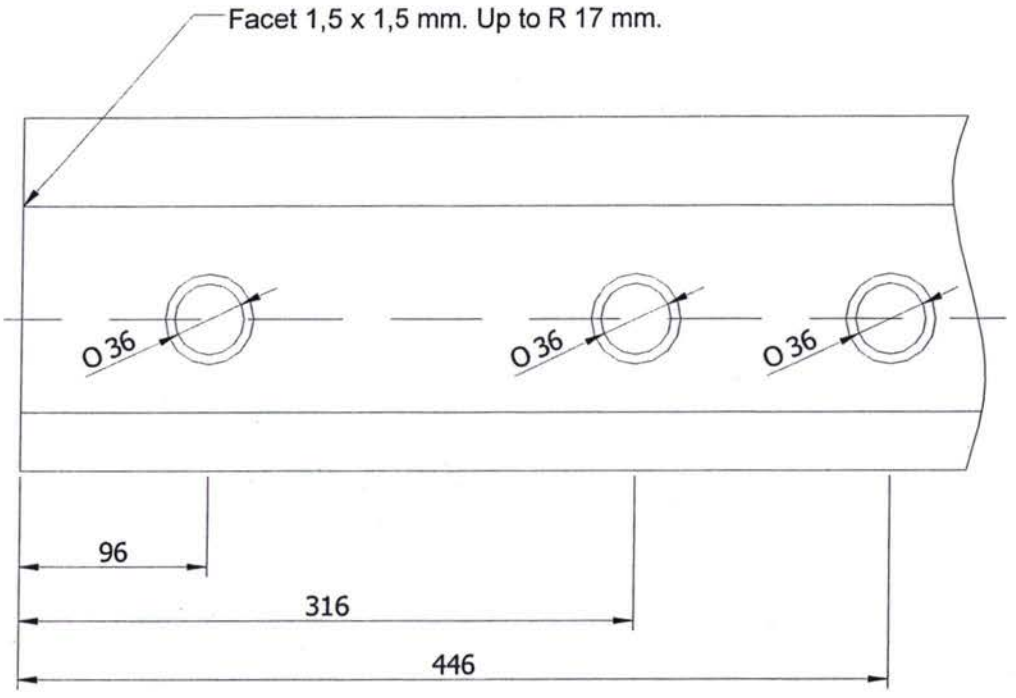
3. The utmost deviation on the head convexity (camber) when measured along the symmetry axis of the cross section of the rail should be ± 0,5 mm, and on the uniform rail foot convexity- 05 mm. Concavity of the rail foot is not allowed.

Drawing 1

The dimensions are provided with the tool

R 65





Drawing 2 *Bolts holes locations*

Legend of the railway rail R65 type.

Rail R65 type GOST 8161 -75.

4. Dissymmetry of the profile of the rail cross section concerning its vertical axis is not allowed: on the foot – more than 1mm and on the head – more than 0,3 mm.

5. On holes edges in the rail web beveling should be done with the dimension from 1 to 2 mm under the angle about 45 degrees and in the end and lower edges of the head of three-dimensional hardened rails -0 facet(face) with the height and length of about 1,5 mm.

6. Rails length should be as indicated in the table:

Length, m	**Allowed deviations on the length, mm, for rails**		**Holes availability in the web at the rails ends**
	hardened*	not hardened	
25,00	± 9	± 6	On both ends
24,92	± 9	± 6	ditto
24,84	± 9	± 6	ditto
25,00	+10; -20	± 6	Without holes
12,5	± 7	± 6	On both ends
12,52	± 7	± 6	On both ends
12,46	± 7	± 6	On both ends
12,42	± 7	± 6	ditto
12,38	± 7	± 6	ditto

* For surface- hardened rails along its whole length with high frequency current heating , tolerances for the length should be set up with the same tolerances as for the non hardened rails.

Annex to GOST 8161 – 75

CALCULATED DATA

Rail's cross section floor area, cm2	82,65
Distance from the centre of gravity(weight), mm:	
to the foot bottom	81,3
to upper part of the head	98,7
Moment of inertia relating axes, sm4	3540
on the lower part of the foot	435
on the upper part of the head	358
on the lateral edge of the foot	75
Theoretical linear density of one meter of the rail Steel density – 7830 kg/sm3), kg	64,72
Metal distribution on the rail cross section area, % of the whole area	
in the head	34,11
in the web	28,52
in the foot	37,37

GOST 24 182 -80
Martencite steel rails P 75, P 65 and P 50 types, for wide gauge track

(Instead of GOST 8160 -63, GOST 6944 -63)

Standard nonobservance is persecuted by the Law

This standard covers non hardened on the whole length rails P75, P65 and P50 types (hereinafter – rails) made of matrtencite steel and intended for laying on the wide gauge tracks.

1. Specifications

1.1 Rails should be done in accordance with the requirements of this standard under the working drawings approved in the established order.
Rails design and dimensions in accordance with GOST 7174-75, GOST 8161-75 and GOST 16210-77

1.1.1 Rail should be group I and II

Rail group I should be martencite steel deoxidized in the ladle by complex deoxidizers without use of aluminum or other deoxidizers, forming in steel harmful non-metallic inclusions.

1.1.2 Rail group II should be made from calm martencite steel deoxidized by aluminum or marganese-aluminum alloy.

1.2 Chemical content of steel should be in compliance with the norms indicated in Table 1

Notes:

1. In marking steel the letter "M" indicates the method of steel smelting (open-hearth), figures – average content of carbon in hundredth portion of %.
2. In rails made from Kerch ores, it is allowed the content phosphorus content not more than 0,040 %, sulfur not more than 0,050%, arsenic not more than 0,15%

Table 1

Rails Group	Rail type	Steel brand (mark)	Mass portion, %							
			carbon	manganese	silicon	Vanadium	titanium	zirconium	Phosphorus	sulfur
									Not more	
I.	P75, P65	M76B	0,71-0,82	0,75-1,05	0,25-0,45	0,03-0,07	-		0,035	0,045
		M76T			0,18-0,40	-	0,007-0,025			
		M76BT				0,01-0,02	0,005-0,025			
		M76Ц				-	-	0,001-0,050		
	P50	M74T	0,69-0,80				0,007-0,025	-		
		M74Ц					-	0,001-0,050		
II.		M76	0,71-0,82							
		M74	0,69-0,80							

1.3 Steel mechanical properties for rail group I and II while tested for tension should be complied with norms. Indicated in Table 2.

Table 2

Rails type	Steel brand(mark)	Ultimate strength	Elongation, %
		not less	
P75, P65	M76	90,0	4.0
P50	M74	50.0	5.0

1.4 Steel rails with carbon content more than average can be referred to hard ones. Steel rails the carbon content of which is equal or lower than average value can be referred to normal.

1.5 Technology of rail production should guarantee the absence of flakes in them as well as local non-metallic inclusions (alumina, carbide and nitrides alumina cemented by silicate) elongated along rolling direction as truck lines(rows) more than 2mm for the rails group I and with the length of more than 8 mm for the rails group II.
Note. Alumina, cemented by silicates are to be alumina lines , 2mm length for the rails group I and to 8 mm for the rails group II which are in the limits of silicates lines(rows) The length of silicates lines is not taken into consideration.

1.6 Total drawing (stretching) when roll rails from an ingot should be not less 35. Reduced ingot (blooms) and rolled out of it rail bar should be cut until full removal of shrink hole, sub-shrinkage pipe and harmful liquation.
There should not be also other harmful heterogeneity of macrostructure (spot liquation, rippled surface, white and dark spots, blackness, flaws (gas pockets), foreign metallic and slag inclusions and so on).

1.7 The surface of the rail head at its end should not be subjected to hardening from roll heating or induction heating by the currents of high frequency.
Rails intended for welding or other special purposes due to the Consumer's requirement it is allowed to make with length of not less than 6,0 m without hardening of one or both ends.
When hardening of rails ends the following should be provided:

- hardness on the surface of the harden layer HB 311...401, length of the harden layer is 50-80 mm;
- depth of harden layer, determined due to hardness not less than 5,0 mm; hardness on the depth of 5,8 mm must be HB 300;
- absence in harden layer structures of overheating, areas of martensite, hardening cracks; correct configuration of metal harden layer along cross-section and rails length. Harden layer should start at the distance not more than 4,0 mm from the end and cross section should not be expanded lower than the beginning of roundness of vertical lateral edges of the head of head rolling;
- gradual transition from harden metal layer to non-harden both on cross-section and on the surface of head rolling.

1.8 Rails after complete cooling down can undergo cool straightening on mangle machines and pad presses.
Before cold straightening it is allowed even common along the whole length the rails curvature in vertical and horizontal planes with camber (deflection) not more than 1/60 of the rail length.

1.9 After cold strengthening it is allowed:

- Even rail curvature in horizontal and vertical plane along the whole length of the rail with camber (deflection) not more than 1/2200 of the rail length;
- Single local deformation (sags) not more than 0, 5 mm measured relating to the edge of the ruler with the length of 1 m. and the surface of the rail;
- End curves in vertical and horizontal planes of the rails without bolt holes (for welding) not more than 0, 5 mm and the rails with bolt holes in horizontal plane not more than 1, 0 mm and in vertical plane not more than 0,5 mm, when determining them by applying the ruler with the length of 1,0 m along at a tangent to the straight part of the rail.

It is not allowed:

- repeated cold strengthening of the rails on roll-driving machines in one and the same plane;
- cold pad strengthening of the rails ends, if the curvature of the ends in the limits of bolt holes locations;
- rails dropping down from the height of 1,0 m;
- corrugation and twisting of rails. Rail is considered to be twisted if being measured on the control rack it has clearances at the ends between the edge of the base and rack (cornerwise) more than 1/10000 of its length.

1.10 The rail's surface should be without expanded contamination, pockets (cavity), cracks, flaws, skins, nestling boxes, blisters, rolling marks, wrinkles, rolled kinks, ripple markings, marks.

It is not allowed on the surface of the rails:

- Individual rolled blisters(bubble) and wrinkles with the length not more than 1m and depth not more than 1,00 mm, and in the middle third part of the base bottom width with the depth not more than 0,3 mm;
- longitudinal marks and scratches with the depth not more than 0, 5 mm and in the middle third part of the base bottom width and on the surface of the head with depth not more than 0,5 mm, and in other places – not more than 1,0 mm;
- mark (print) of to 5,0mm height on the rail neck outside of the surfaces of the connections with baseplates;
- stamping with scraping bright by abrasive tool of the marks on the surface of neck connection with baseplates with observance of the rails dimensions and allowable tolerances.

1.11 Rails ends should be cut perpendicularly longitudinal axis of the rail.
Skewing of ends should not be more than 1,00mm when measured in any direction. To cut and break defective ends of the rails is not allowed.
Bolt holes at the rails ends should be drilled perpendicular to the vertical longitudinal plane of the rail. The surfaces of bolt holes and rails ends should be without flaws, burrs and traces of shrinkage as separations and cracks. Burrs and metal rolls near bolts' holes and on the ends of the rails should be removed by cleaning.

1.12 Sample part of the rail for pile-driver test should go through the test at the temperature from 0 degree to plus 40 degrees C for hammering without fracture, cracks and indents of the base(both in spans and in supports).

1.13 Sample part of the rail to test for base durability should stand static load without cracks or fractures before sag 4, 00 mm.

1.14 Rails in conformity with all requirements para. 1.1-1.12 can be referred to the first grade.

1.15 To the second grade one can refer the rails which have at least one of the following deviations from the requirements para. 1.1 -1.12:

- By the content in steel: carbon – up to minus 0,03 %, manganese – up to ± 0,1%, silicon – up to ±0,03 %; phosphorus- up to plus 0,005%, sulfur – up to minus 0.01%, arsenic – up to plus 0,05%.
- By the length of track lines of non metallic inclusions (para.1.5) by the length more than 8,0mm;
- By temporary resistance – up to minus 100 мп;
- By relative expansion (length) – up to minus 1,0 abs. %;
- By sag until cold straightening – exceeding not more than twice indicated in para 1.8;
- By dimension, exceeding not more than twice allowable under GOST 7174-75, GOST 8161 -75, GOST 16210-77 ultimate deviation for the rails of the first grade except the width of the base where allowable deviations can be not more minus 3,0 and plus 1,0 mm;
- By individual rolled wrinkles, blisters(pockets), marks and pitted surface with the depth not more than 3,0 mm and in the middle third of the base – not more than 1,00mm;
- With gently sloping cleaning of rolled impurities, blisters, crusts, rolling skin and fissures at the depth not more than 3,0 mm, except edges and middle third of the width of the base as well as top surface of the rail head where the depth of gently sloping cleaning should not exceed 1mm.

1.16 For laying on the main lines of the Ministry of the Railways the rails of the second grade P75 and P65 types with the rolled impurities, blisters and cracks on the middle third of the base bottom with the depth more than 0,3 mm are not allowed; rails of the second grade P50

2. Rules of Acceptance

2.1. At commissioning and acceptance for checking of produced rails conformity to the requirements of this standard control should be carried out;
- surface condition, linearity, rails and bolt dimensions (para. 1.1, 1.8 – 1.11);
- chemical content of steel (para 1.2);
- mechanical properties of steel (para 1.6);
- impact durability of rails (para 1.12);
- macrostructure of rails (para 1.6)
- impurity of rails by line non-metallic inclusions;
- absence of flakes in rails (para. 1.5);
- hardening of rails ends (para. 1.7)
- durability of rail base (para 1.13)

2.2. Commissioning-acceptance testing of the rails is carried out by each melting. If steel is melted in the furnace of big volume and pour into two and more ladles, each ladle is considered to be individual melting. Rails from bars of one and the same melting, rolled at different time, are subject to commissioning-acceptance testing as the rails of different melting.

2.3. Each rail should be subject to control of the surface condition, straightness, rails and bolt holes dimensions. Rails dropped from the height of more than 1, 0 m considered to be not appropriate the requirements of this standard.

2.4. When non-conformity of the chemical content of steel by at least one element of the requirements of para. 1.2 and 1.15 all the rails of such melting are considered to be not appropriate the requirements of this standard.

2.5. When satisfactory results of the primary or repeated testing for tension (para 1.3 and 1.15) all the rails of controlled melting are considered to meet the requirements of this standard.
When non-conformity of the results of repeated testing for tension at least of one of the sample to the requirements para 1.3 and 1.15 all the rails of the controlled melting should be recognized as not in conformity with the requirements of this standard.

2.6. When satisfactory results of the primary or repeated testing for hammering under impact (para 1.12) all the rails of one melting are considered to be in conformity to the requirements of this standard. When receiving unsatisfactory results of the repeated testing for the hammering under impact relating to at least one sample length the head(shrinking) part of 12,5 m length of all first head rails(with mark "1") is considered to be non compliant with the relating requirements of this standard.

At satisfactory results of the third testing for hammering under impact (para. 1.12) all rails of such melting except the head part (shrinking) of 12,5 m of length all the first head rails (with mark "1") are considered to be in compliance with the requirement of this standard. At unsatisfactory results of the third testing for hammering under impact in relation with at least one sample length all rail of this melting considered to be non compliant to the requirements of this standard. Due to the requirement of the inspector of the Ministry of railways there should be the study of broken under impact testing of the sample lengths to find out the reasons of fragility of the rails.

2.7. Each melting of macro control subjects to sampling chosen by the inspector of the Ministry of Railways – one rail from bottom (with mark "X") and head (with mark "1") of each melting. When there are stable satisfactory results and macro control can test only the rails of each tenth melting.
Stable satisfactory results are those results where four tested meltings in succession no defects of macrostructure have been found.

2.8 In case if remnants of shrinking cavity, sub-shrinking porosity , harmful liquation, rippled surface, impurities, separations, spot liquation are found at each melting of macro control (para. 3.6 -3.10) in the head rails (with mark "1"), all first head rails of controlled melting are considered to be non compliant with the requirement of this standard.

In case foreign metallic and non metallic inclusions (choking up), sub rippled surface blisters, dragging off, white and dark sport(rippled surface) are found at macro control of bottom rails (with mark "X"), all the bottom rails of the controlled melting should be recognized non compliant to the requirements of this standard. It is allowed to subject the head and bottom rails by the piece to macro control and sorting.

When sport liquation in other rails (not head with mark "1") are found, all rails of controlled melting should be recognized non compliant with the requirements of this standard.

2.9 Head (with mark "1") and bottom (with mark "X") rails when controlled by piece the macrostructure which do not meet the requirements of para. 1.6 is found, should be recognized as non compliant to the requirement of this standard.

2.10 Chosen by the inspector of the Ministry of Railways 6 samples from head and bottom rails of any melting out of each thirty rolled melting should subject to control for the absence in the rails local concentrations of non metallic inclusions as lines. (para 1.5).

2.11 Rails of group I of those meltings at control of which local accumulations of non metallic inclusions as lines(para 1.5) of length more than 2,0 mm but not more than 8,0 mm can

be found at least on one of the micro section metallographic specimen are to be referred to the rails of the first grade group II.

2.12 Rails group I and II of those melting when local accumulation of non-metallic inclusions as lines (para 1.5) of 8,0 mm of length can be found at least on one the micro section metallographic specimen should be referred to the rails of the second grade.

2.13 Rails which did not go slow cooling or isothermal treatment to prevent flakes formation as well as those which were treated with violation of the regimes which provide the absence of flakes are to be considered non compliant with the requirements of this standard. When flakes are found in the rails which undergone slower cooling or isothermal treatment, all the rails of this melting are considered to be non compliant to the requirements of this standard.

2.14 If results of hardness control of the rails ends do not meet the requirements of para 1.7, it is allowed:

2.15 If at the control for hardened layer at least at one of the templates(para. 3.13 -3.17) or outer examination of the hardened rails ends the structure of overheating area of martensite, hardening cracks or hardening of other elements of the profile, except the head surface are to be found, the rails of this melting or part of the melting which undergone the hardening on this hardening facility, the cutting of the ends can be done and per smelting control of the rails ends are carried out until the receiving the stable satisfactory results after which the control is introduces in accordance with para 3.13 – 3.17.

Stable satisfactory results are the results when during the day at per melting control of the hardened rails ends no deviation from the requirements para 1.7 is not found.

2.16 In case of deviations from the right configuration of the hardened area not dangerous for the work of the rails, these rails are allowed to be accepted in accordance with para 1.7 as the rails with the not hardened ends. Non dangerous deviation for the work rails from the right configuration of the hardened area are to be considered the following:

- Insufficient length and depth of the hardened layer;
- Asymmetric location of the hardened layer in cross section without its transition lower the round place of vertical lateral edges to the surface of rolling;
- Deviation of the hardened zone from the end of the rail more than 4,0 mm.

2.17 Testing for durability of the base by static load (para 1.13) is optional.

2.18 Rails quality control and their commissioning is done by the technical control department of the manufacturer. Technical acceptance of the rails is done by the inspector of the Ministry of the Railways.

2.19 An inspector of the Ministry of Railways is entitles by the right to control at random the technology of rails manufacturing, make samplings of any melting and to do jointly with rails quality control department necessary additional testing and checking the quality of produced rails.

2.20 Standard technological instruction on all the stages of manufacturing of the rails should be approved by the Ministry of the USSR and and to inform the Ministry of the Railways.

3. Testing methods.

3.1 Linearity (para.1.9), dimensions and bolt holes (para. 1.1, 1.11) of each rail should be checked with the relating tools and templates of the manufacturer, agreed with the inspectors of the Ministry of Railways. If necessary linearity of the rails should be measured on the testing rack when the rail rests on the base.
Control of the surface conditions and ends of each rail (para 1.10 -1.11) should be carried out by visual inspection. If necessary the availability and depth of surface defects and separations in the ends are checked by testing chipping out or other way which guarantee the correctness of the determination.
Separation or splitting of the chips when being chipped can be considered as the sign of defect.

3.2 To determine in steel the content(para. 1.1) carbon – due to GOST 22536.1 -77, manganese due to GOST 22536.5 -77, silicon – due to GOST 22536.4 -77, phosphorus due to GOST 22536.3 -77, sulfur due to GOST 22536.2 -77, arsenic due to GOST 22536.6 -77.
Selection of tests to define chemical content of the rail steel are done under GOST 7565 – 81. Due to the requirement of the inspector of the Ministry of Railways the control chemical analyses of the selected by him rail should be done, and for analyses the chips which were received due to the chipping out of the rail end along the cross section.

3.3 Testing for tension (para 1.3) should be carried out under GOST 1497-73) on proportional cylindrical samples by the diameter of do = 15 mm with the estimated length lo = 150 mm, which should be turned along the direction of rolling probable close to the surface from the upper angle of the head of the rail bar.
One sample should subject to initial testing, for which the rail bar under the choice of the inspector of the Railways Ministry is selected in hot state from ten smelting rolled for the rails or from the head end of the head rail with the mark "1" after the removal of the hardened end. If the result of the initial testing does not comply with the requirements of para 1.3 retesting is carried out of two samples from two other bars chosen by the inspector of the Railways Ministry, from two rails with the mark "1" of the same smelting after the removal their hardened ends. Rail bars should be marked by the number of a smelting and the mark of the inspector.

3.4 For initial testing of the rails for hammering under impact (para 1.12) of one of the rail bars of each smelting under the choice of the inspector of the Ministry of the Railways followed the normal cutting of the shrinking end of the bar or from the head rail with the mark "1" after removal of the hardened end one should cut testing bar 1,3m of length which marked by the number of the smelting and the mark of the inspector of the Ministry of the Railways.

3.5 Testing rail bar is laid by the head upward on the supports with radius of 125 mm and the distance between then 1m and hammer if once with the ram with the mass of 1000 kg(with round block head of a hammer with the radius of 125 mm), falling from the height:

8,2 m – for the rails P75 type;
7,3 m – for the rails P65 type;
6,1 m – for the rails P50 type;

After hammering it is necessary to measure sag relating to the ruler of the edge 1 m of length, which attached to the surface of rail head rolling, at this it should be taken into consideration the sag of the bar before testing.

Results of the sag measuring are not the reason to reject the rails but can be the base for testing of the steel for tension.

If the results of the initial testing for hammering do not meet the requirements of para 1.12 then from the shrinking end of the rail from which the sample was taken for the initial testing and from shrinking end of other head rail of the same smelting one testing bar is taken for another hammering testing. In case of unsatisfactory results of the second testing concerning at least of one of these bars, then two more testing bars taken from the same rails at the distance from their shrinking ends not more than 12,5 m should be subject to the third testing.

3.6 Samples for each smelting macro control of the rails (para 1.6) should be cut from the head and bottom rail bars in hot condition followed the normal cut of their shrinking and bottom ends or from shrinking end of the first head rail with the mark"1" and from the bottom end of the last rail from the ingot with the mark "X".

3.7 To discover macrostructure from the selected samples (para 3.6) by the methods of cold treatment (gouging, grinding) in accordance with GOST 10243-75 transverse macro templates of full section of the rail are made.

3.8 Macrostructure of the rails (para 1.6) should be revealed deep pickling in hot (60-80 degrees C) water(50%) solution of hydrochloric acid with the density of 1,19kg/m3. Macro templates for deep pickling are submerged into the water solution of the acid on heated state (up to 60-80 degrees C) of the controlled surface upward. The water of the acid solution of the controlled surface of a macro template should be at least 2 cm. pickling of macro templates should be done before full revealing the macro structure but at least 20 min.

3.9 When each piece of the macro structure of the rails is controlled, selection of samples, production of macro templates, revealing of macro structure should be done in compliance with para. 2.8, 3.6 -3.8.
It is allowed to do the revealing of macro structure by making sulfur mark under Bauman directly from the ends of the controlled rails after the corresponding preparation.

3.10 Evaluation of macro defects and structures of overheating of the hardened layer at the rail ends should be done according to the specimen agreed by the manufacturer with the Railways Ministry.
(Changed edition, Change # 1)

3.11 Samples for control to reveal the absence of accumulation of non metallic inclusions, elongated along the direction of rolling as lines (para 1.5) can be taken from the rails or rail bars in hot state after their normal cutting from the head and bottom ends. Selected samples should be marked by the number of the smelting and the mark of the inspector from the Railways Ministry. From each sample selected by means of cold treatment or any other method which does not change the structure, micro section metallographic specimen with the length at least 35 mm should be produces in accordance with the drawing. Polished plane of micro section metallographic specimen must be strictly parallel to the direction of the rolling and removed from the lateral edge of the rail head for 15 mm.

3.12 For local accumulation of non-metallic inclusion as lines (para1.5) one can take the visible on the polished surface of the micro section metallographic specimen a group of dotted or continuous inclusions elongated along the direction of the rolling.

When evaluating the length of the lines under the metallographic microscope (enlargement 90 110x) or binocular microscope (at small enlargements) broken line is evaluated as a continuous one if:
Total distance between individual groups of inclusions located on the same line does not exceed the total length of these groups;
Parallel located groups of inclusions mixed relating each other at the distance of not more than 0,5mm.

3.13 Hardness of the surface of hardened ends (para 1.7) of the rails should be determined under GOST 9012-59 on the middle longitudinal line of the rolled surface and at the distance at least 20 mm from the rail ends. It is allowed to determine hardness by indestructible control methods.

Hardness of the hardened rails ends when hardened with smelting heating one should determine at each end of three rails or one end of six rails from each smelting selected by the inspector of the Railways Ministry.

When hardening the rail ends with induction heating by the current of high frequency the hardness is determined on the both ends of the three rails from each smelting selected by the inspector of the Railways ministry.

The place to determine hardness should be hollow scraping bright without burns and scales at the depth of to 0,8mm. When having unsatisfactory mark it is allowed to do repeated hardness determination on the same rail by two marks at that the values of their hardness should be I within the limits provided in para 1.7.

3.14 For control of correctness of configuration for the hardened zone, the structures of hardened ends and absence of hardened cracks on one and the same rail of one smelting from fifty under the selection of the inspector of the Railways Ministry two samples are selected with the length 100-200 mm which are marked by the number of the smelting and the mark of the inspector.. From selected specimen by the method of cold treatment (gouging, grinding) in compliance with GOST 10243-75 one longitudinal template of the rail head is made, the surface of which coincide with the symmetry plane and one transverse template of full section.
For cutting templates on the surface of the rail head for the selected samples hardness under Brinell under GOST 9012-59 is measured. Marks for hardness measurements should be located in three rows in checkerboard fashion in each 200mm by length at least 100 mm.

Note. It is allowed for the manufacturer where more than 70% of produced rails are subject to hardening along the whole length to make control of hardened ends without thermal treatment along the whole length of the rails not less than two times a month irrespective of a number of smelting.

3.15 Control for length, depth and location along the whole length of hardened zone, gradual transition of hardened metal to un hardened area (para 1.7) is made by the measurement of hardness under Rockwell under GOST 9013-59, scale C:

- in longitudinal direction on longitudinal template, at the distance of 5 mm from the surface of the hardened layer in each 3mm by length at least 100mm;
- in transverse direction at the distance of 20, 40, 60 and 80 mm from the end of the rail on the symmetry axis of the transverse template in 2 mm (in checkerboard fashion) on all the depth of the hardened layer and transition zone of the hardened metal toward unhardened one.

3.16 Configuration of the hardened zone and hardening cracks (para 1.17) should be checked after hardness measurement (para 3.15, 3.16) by pickling of longitudinal and traverse templates in 15% water solution of nitric acid.

3.17 For macro structure control and absence of overheating of the hardened layer on the rail ends) para 1.17) one should select one micro section metallographic specimen from the same sample from which the transversal template is cut (para 3.14). Micro section metallographic specimen should be cut along the symmetry axis of the rail head on the whole depth of the hardened layer and the zone of transition of the hardened metal toward unhardened one .

3.18 Control of rails for flakes (para 1.5) should be done by ultrasound flaw detector or by deep pickling of longitudinal templates of the length 200 ±20 mm cut on the vertical plane of the rail symmetry. The order of samples selection. Method of revealing of flakes and frequency of rails control for flakes is due to the instructions agreed by the manufacturer and the railways Ministry.

3.19 Testing for static sagging of the base (para 1.13) should be done on one of the specimen rail bar with the length of 100 ±10 mm, selected under the instruction of the inspector of the Railway Ministry from the bottom end of the last rail from the ingot of the ten-th smelting. When enough powerful; presses are not available it is allowed to test two bars of the length up to 50 ±5 mm.

While testing specimen of the rail bar, marked by the number of the smelting and the inspector's mark one should set up the edges of the base on two roll supports. The distance between the supports' axes should be:

- 120 mm for the rails P75 and P65 types;
- 100mm for the rails P50 type.

The load on the rail head should grow smoothly until receiving the base sagging for 4mm. In the test certificate one should indicate; dimension of the testing, unit load for 1 cm of the sample length when the required sagging was received or the sample was broke down; nature of the sample destruction, type and dimensions of visible defects on the surfaces of the base destruction.

3.20 The results of the acceptance quality control for the rails should be included into the ACTs(certificates) signed by the representative of the manufacturer And inspector of the Railways Ministry.

4. Marking

4.1 On one side on the middle line of the web of each rail there should be embossed(not less than 1mm) with smooth transition figures and letters with the height from 30 to 40 mm in the following order:

- marking of the manufacturer, agreed with the Customer;
- month(by Latin figures) and two last figures of the year for rails
- production;
- type of the rails;
- marking with an arrow the head end.
-

In addition to it is allowed to make not more than 4 marks as embossed dots with the diameter from 2,0 to 3,0 mm, with the height of about 1mm.

4.2 On the web along each rail axis (on the same side, where embossed marks are situated) should be put in hot state the following:

- number of the smelting, in 2-6 places along the rail length at the distance not less than 1,0 m from its ends (number of smelting of the rails group I should begin with the letter "П");
- marking of the ordinal number of the rail;
- figure "1" at the distance of 1-2 m from the ends of the first head rails rolled from the shrinking part of the ingot;
- figure "2" at the distance of at least 1,0 m from the ends of the second head rails;
- mark "X" at the distance of at least 1,0 from the bottom ends of the rails rolled from the bottom part of ingot.

4.3 Marks, put on the neck of the hot rail should be of the height of 12,0 mm and deepened into the body for 0,8 -1,5 mm. They should be clear without sharp forms of the marks contours and their tops. The distance between the marks should be 20-40 mm.

It is not allowed:

- to put or correct the marks and markings in cold condition;
- to put additional marks and markings on the lateral surfaces of the rails and in the places which were not specified by this standard.

4.4 After finishing the rails on one end of the rails through marking in cold condition should be put the following:

- number of the smelting on the end of the base;
- marks of the head and bottom rails on the end of the upper quarter of the web.

4.5 On each accepted rail of the first and second kind(grades) there should be put in cold condition the following:

- Marks of acceptance by the inspector of the Railways ministry and technical control of the manufacturer on the end of the rail head;
- Mark on the hardening of the rail "K" on the end of the lower quarter of the rail web.

4.6 Accepted first grade(kind)rails should be marked by contour of acceptance marks on the head contour by washfast paint;

- blue color - the rails of group I;
- white color – the rails of group II;

Accepted rails of the first grade additionally should be marked:

With hardened ends by the transverse band with the width about 20mm, put on the surface of the rail head at the distance about 0,5 m from the ends with acceptance marks by washfast paint;

- blue color - the rails of group I;
- white color – the rails of group II;
- hard (para 1.4) by yellow washfast paint at the ends width the acceptance marks of upper surfaces of the base at the length of 100 mm.

Shortened rails of the first grade for the laying in the curve parts of the line should be marked by white paint(blue paint for the rails of group I);

- rails with the length of 24,92 and 12,46 m by painting portion of the ends of both edges of the base;
- rails with the length of 24,84 and 12,42 m by painting of the portion of the ends of the edges of the base.

4.7 The end of the base and half of the end of the web of accepted rails of the second grade should be painted by the washfast paint and on both ends of these rails two bases (pivot) should be embossed.

4.8 On both ends of the rail head which do not meet the requirements of this standard three center-pops (pivots) should be embossed and the ends should be painted by dark blue washfast paint.

4.9 It is allowed additional marking by washfast paint the rails of different length ordered for switches and other purposes.
The form of such marking, colors of paints and places on the rails are agreed due to the agreement between the Customer and manufacturer.

4.10 Shipped to Customer rails should be accompanied with the documents (Certificate of technical fitness(worthiness of the rails) signed by the representative of the manufacturer and inspector of the Railway Ministry, proving the compliance of the rails with the requirements of this standard in which it should be indicated:

- mark of the manufacturer ;
- numbers of standard in compliance with which the rails were manufactured and accepted and number of the order;
- grade and type of rails;
- marks or description of acceptance marks and marking of rails by paints;
- number of rails with indication of their length and weight;
- name and address of addressee (recipient)

GOST 18267-82
Rails P50, P65 and P75 types for wide gauge, heat treated through oil quenching.

Non-observance of the standard is persecuted under the Law.

This standard covers rail R50, R65 and R75, made of martencite high carbon steel subject to heat treatment on all the length by three dimension hardening in oil quenching with further tempering.

1 Technical requirement

1.1 Rails for heat treatment should meet the requirements for the rail of the first sort(grade0 made under GOST 24182-80(except the ends hardening); GOST 8161-75, GOST 7174-75, GOST 16210- 77(except the dimensions along the length in each of the standards)
It is allowed to subject to hear treatment the rails of the second sort(grade) made under GOST 24182-80 under the agreement between the manufacturer and the Customer. Hardened rails referred into the second sort due to surface defects are intended only for the laying on the railways which do not belong to the Ministry of Railways.

1.2 Chemical content of the rail steel should be in compliance with GOST 24182-80.

1.3 Rails after heat treatment should meet the requirements of GOST 24182-8-, GOST 7174-75, GOST 8161-75 and GOST 16210-77.

1.10 Faces with the dimension not more than 3x3 mm along the contour of the head and the web and not more than 5 x 5 mm on the contour of the foot through edge dressing of the rails ends . On the rails with the bolt holes beveling on the top and bellow of the head is required.

1.11 Hardened rails should be divided into the rails of the first and second sorts. First sort rails are divided into the rails of first group of the first and second class and the second group of the first and second class. Rails division into the groups and sorts are under GOST 24182-80.

1.12 Heat treated hardened rails cab be referred to the rails of the first class which meet the requirements of para 1.1-1.9.

1.13 Rails can be referred to the second class when being accepted and commissioned the following deviation were found:

- reduction of hardness on the rolled surface up to HB 311;
- variations of hardness along the length of the rail up to HB 50;
- reduction of temporary resistance on the longitudinal samples to 1098 MPa (112 kgm/mm2);
- reduction of impact elasticity to 0,15 MDj/m3 (1,5 kgc.m/sm2);
- for the rails with the length of 25 m: with the bolt holes ±15 mm;
- for the rails with the length of 25 m: without the bolt holes +15 - 20mm;
- for the rails with the length of 12, 5 m: to ±1o mm ;
- ends contortion(curvature) in horizontal plane, the rails with bolt holes to 1,0mm.

1.14 Rails which meet the requirements for the rails of the first class can be referred to the highest quality category and it is allowed to attest them for the State Quality Mark.

2. ACCEPTANCE RULES AND METHODS OF TESTING

2.1 Acceptance tests and acceptance control for hardened rails should be done for each smelting (fusion). Rails of the fusion heat treated under one regime during 10 days are taken as rail of one and the same fusion. Rails heat treated with big time lag are taken as the rail of different smelting(fusions). Under the agreement between the manufacturer and the Consumer it is allowed to form for the heat treatment a lot(batch) of rails of different smelting in the volume not mere than 100 pieces. The volume and the procedure of acceptance control of such lot is in compliance with the smelting.

Note: In accordance with GOST 24182-80 each ladle is considered to be independent smelting. Two ladles from one and the same furnace - related smelting(fusions).

2.2 All hardened rails undergo visual examination to detect outer(visual) defects and measurement under GOST 24182 -80, GOST 7174-75, GOST 8161-75 and GOST 16210-77.

2.3 All hardened rails intended for the laying on the railways of the Ministry of the Railways subject to nondestructive check to find inadmissible inner defects under GOST 24182-80 in accordance with GOST 18576-80. Norms of admissible defects should meet the requirements of the control documentation approved in the established order.

2.4 Acceptance tests are carried out I as follows:

- in compliance with the requirements of para 1.4 to determine hardness on the rolling surface – 5% of hardened rails from two related smelting but not less than 3 pieces; it is allowed to determine the hardness of each 20-th rails during the technological process;
- in compliance with the requirements of para 1.4 to determine hardness along the cross section – one rail from one of the related(adjacent) smelting;
- in compliance with the requirements of para 1.5 when controlling the micro structure- one rail from each 20-th smelting. When in the smelting head rails are not available it is allowed to test any rail of such smelting;
- in compliance with the requirements of para 1.6 when testing for the tension- 2 samples cut in longitudinal direction, second in transverse direction concerning the longitudinal rail axis, per rail from each 20-th smelting;
- in compliance with the requirements of para 1.7 for hammering test – one sample bar from the head rail from two adjacent smelting which underwent heat treatment and straightening;
- in compliance with the requirements of para 1.8 when controlling residual tensions – one sample rail bar selected from one of the ready(finished) (hardened or straighten) rails of each 40-th smelting, but at least one time a whole day.

2.5 Technical acceptance of the rails is carried out by the inspection pf the Ministry of the Railways under the relating technical documentation approved in the established order.

2.6 Control over chemical content of the rails is under GOST 22536.0-77 – GOST 22536.6-77 and other methods which underwent metrological attestation under GOST 8.010 -72. Selection of the specimen for chemical content control is under GOST 7565-81.

2.7 Hardness on the rolling surface and on the cross section of the rails (para 1.4) are under GOST 9012-59.

Peculiarities of hardness control on the rolling surface of the rail in the condition of the plant is determined by the method agreed between Ministry of Ferrous Metals of the USSR and the Ministry of Railways. It is allowed to measure the rails hardness by magnetic method.

Hardness on the rolling surface is determined along the middle line of the head on both ends at the distance of not more than 1m from the ends and middle part of the rail. The place for hardness determination should be cleaned from scales (calx) and without carbon layer of metal.

Hardness on section of the head, web and foot is controlled on transverse template. Template with the width of 30-50 mm is cut at the distance of not less than 150 mm from the end of the hardened rail. Hardness on template is determined in five points; in the head at the distance from the rolling surface 8 and 16 mm, in the middle of the web, on the blade of foot at the distance of 8 mm from its edge and on the rolling surface. Rolling surface of the template should be cleaned to remove the layer without carbon.

If the results of hardness measurement do not meet the requirements of para 1.4, then it is allowed to carry out the repeated test of hardness on the same rail by two prints.

When there are unsatisfactory results at the second hardness test it is allowed at least one printing:

- per piece to sort due to hardness all the rails of the given smelting(at smelting control) or 10 rails before and 10 after the 20-th number of rail(at the control over each 20-th rails);
- to submit as the rails of second class or to make another single heat treatment (hardening and tempering) with the subsequent control under para. 1.4 – 1.9 on the doubled number of specimen of the rail the hardness of which on the rolling surface is lower then minimal norm;
- to subject to the repeated tempering with the subsequent hardness control the rails the hardness of which is higher of the maximum norm;
- to hand over under GOST 24182 – 80 the rails the hardness of which is lower than minimum norm for the second class.

2.8 Micro structure (para 1.5) is tested on micro section metallographic specimen cut from the upper part of the rail head.

2.9. Tests for tension (para 1.6) are under GOST 1197-73 on cylindrical samples by the diameter do =6 mm and calculated length lo = 5do or on the samples lo = 10 do, the first type of the sample is more preferable. The specimen are turned in the direction of smelting from the upper angles of the head and crosswise the rolling direction of the end of the finished rail with the mark "1" which nore nearer to the surface and at the distance not less than 150 mm from the end of the rail. If the rails after testing for tension do not meet the requirements of para 16, then repeated test should be carried out on the double number of the samples of this smelting.

When there are unsatisfactory results of the second test(at least of one of the samples) all the rails of this smelting are allowed to be subject:

- single full heat treatment(hardening and tempering) with the subsequent control of all the parameters(properties) under para 1.4-1.6)
- single additional tempering with the subsequent control for hardness and mechanical properties under para 1.4 and 1.6.

Rails of the smelting which have unsatisfactory results of the tension test of reduced hardness, are allowed to submit as non hardened rails under GOST 24182-80.

1.10 Samples for impact elasticity test (para 1.6) are to be cut along the direction of the rolling from the upper angles of the head crosswise the direction of rolling the most close areas to

the surface. Tests are under GOST 9454-78 on the samples of the dimension 10x 10 x 55 mm with the cut R=5,0 mm with the depth of 2,0 mm of transverse. The cut on the samples are done on the surface of head of the rail rolling. If the rails after impact elasticity tests do not meet the requirements of para 1.6, then the repeated tests should be done on the double number of the samples for the checked smelting on the two specimen for the adjacent one. Each adjacent smelting is attested separately when tested repeatedly. When there unsatisfactory results of the second test(at least on one of the specimen) the rails of this smelting are allowed to be subject to:

- Additional furnace tempering with the subsequent control for hardness and impact elasticity under the para 1.4 and 1.6.
- Single full heat treatment (hardening and tempering) with the subsequent control of all the parameters under the para 1.4 – 1.6 on the double number of the samples.

The rails of the smelting which have the impact elasticity lower than the norm o,15 MJ/m2 it is allowed to subject to high tempering and hand them over after control for hardness (hardness should be YB 255... 302) as non hardened rails under GOST 24182 -80.

2.11 One specimen of the rail bar with the length of 1,3 m should be subject to hammering test (para 1.7), selected from the head end of one of the head rail from two adjacent smelting.

The width of groove should be 5-7 mm. Difference of the groove is determined due to the change of the height of the sample rail bar at the cut end before and after cutting. When there are unsatisfactory results of the test 20 rails are subject to the repeated tempering before taking specimen and 80 rails after with the subsequent hardness control and residual tension of this rails (para 1.4 – 1.8)

When the results do not meet the requirements of para 1.4 and 1.8, the rails should be subject to high tempering for hardness HB 255... 302 and be accepted under GOST 24182 - 80.

2.13 End curvature of the rails and vertical planes downward and in horizontal (para 1.9) are measured through applying the ruler of the length of 2 m to the straight part of the rail at a tangent and to determine clearance between the ruler and the end of the rail.
When there is curvature at the end in vertical plane upward the value of curvature is measured by the determination of the clearance between the ruler and the head of the rail at the distance of 350 -400 mm from the end.

3. MARKING

3.1 Additionally to the marking under GOST 24182 -80 on the hardened rails along the web on hot state the conventional sign is being put which differ the hardened rails from non hardened. This mark represent by itself the ring with the outer diameter 15-20 and inner diameter 12-15 mm. The mark is put in the middle part of the web at the distance of 1-3 m from each end of the rail from the place where number of smelting is put and at the depth os about 1mm. The rails underwent high tempering and handed over as non hardened, this mark should be removed.

3.2 On the end of each accepted hardened rail through the cold marking there should be put:
Marks of the inspector of the Ministry of Railways and Quality Control
Section of the manufacturer;

3.3 At the distance of 0,7 -1,0 m from the end of the rail where the acceptance marking was put, transverse strip of the width about 20 mm should be done by the oil paint of pistachio color

(light- green) on the web of all the hardened rails. Character image of the state Quality Mark under GOST 1.9-67 is put by washfast paint on the web of the rails near the marking strip. Acceptance marking being put on the end of the head of the rails accepted by the inspection are painted :

- on the rails of the first group by the blue paint, additionally the transverse strip of the pistachio color(light green) is put on the web of the end of the rail of the first class, the second class – transverse strip of the yellow color.
- On the rail of the second group – by white paint, additionally the transverse strip of pistachio color (light green) paint on the web of the end of the first class rails, the second class by the transverse strip of the yellow color.

The foot and half part of the web of rails ends for the second class are painted by the pistachio color(light green) paint.

3.4 The rails should be accompanied with the documents signed by the representatives of the manufacturer and the inspector of the Ministry of the Railways certifying the compliance to the requirements of this standard and contain:

- the name of manufacturer;
- the name of production and way of heat treatment;
- type, class and group of rails;
- steel brand, from which the rails were manufactured;
- indication of this GOST;
- printing or description of the acceptance marks as well as the description of marking the rails by paints;
- number of rails with indication of their length;
- name and address of the Consumer;
- image of the state Quality Mark under GOST 1.9 -67

Due to the requirement of the Consumer he should be given additionally number of smelting, results of chemical analysis and acceptance tests.

GOST 10629 -88

Prestressed reinforced concrete sleepers for 1520 mm gauge railways.

Standard non-observance is prosecuted under the Law.

This standard covers prestressed reinforced concrete sleepers for 1520 mm gauge railways and rails R75,R65 and R50 on which standard rolling stock of the general railways network of the USSR is running.

1. Technical Requirements

1.1 Sleepers should be made in accordance with the requirements of this standard under the technological documentation approved in the established order.

1.2 Basic parameters and dimensions.

1.2.1. Sleepers depending on the type of the rail fastening are divided into:
Ш1 - for the separate fastening (type КБ) with bolt fastening of the baseplate to the sleeper;
Ш2 - for clip-bolt rail direct fixation fastening (БПУ type) with bolt fastening of the baseplate or rail to the sleeper.

1.2.2. Form and dimensions of sleepers should be in compliance with the indicated in Table 1 and on the drawing 1-4. Performance of sleepers material capacity are shown in Annex 1.

Table1

Sleeper's grade	Distance between supporting edges of both ends of the sleeper a, mm	Distance between supporting edges of one end of the sleeper a1, mm	Distance between axes of holes for bolts, a2,mm	Distance between the axis of holes and supporting edge , a3, mm	Tilt angle of the supporting edges	Direction of bigger side of the hole for the bolt concerning longitudinal axes of the sleeper
Ш1-1	2012	404	310	47	55	Transverse
Ш1-2	2000	392	310	41	72	Ditto
Ш2-1	2012	404	236	84	55	longitudinal

Note:

1. On the edges, adjusting to foot and ends of the sleeper, faces are allowed with the width of not more than 15 mm.

2. Due to the agreement of the manufacturer and the customer it is allowed to produce the sleepers the dimension and locations of recesses on the foot are different from those on the drawing 1, and the form and dimensions of vertical grooves for bolts plates are different from those indicated on the drawing 2-4.

3.

1.2.3 Sleepers are marked by the marks in compliance with the requirements of GOST 23009, Mark of the sleeper consists of two letter-figure groups divided by dash.

The first group contains the designation of the sleeper type (para 1.2.1)/ In he second group the option of sub-rail area performance is indicated (Table 1).
The example of the legend (mark) of Ш1 type sleeper, first option of sub-rail area:
Ш1 – 1

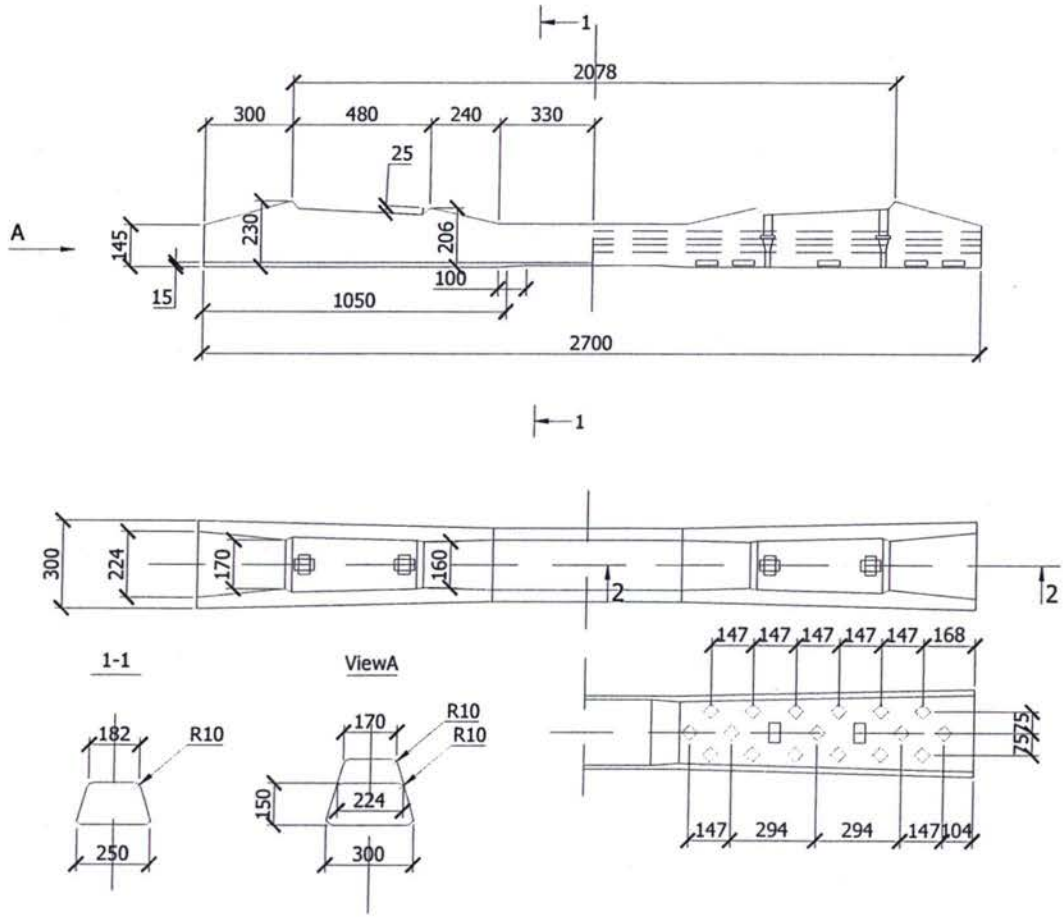
1.2.4. Depending on crack resistance, precision of geometrical parameters, quality of concrete sleepers surfaces are subdivided into two types (sorts): first and second.
Sleepers of the second sort are intended for the laying on the line carrying little traffic, station and siding lines. Second sort sleepers are produced only due to the customers consent.

1.3. Characteristics

1.3.1. Sleepers should meet the requirement for crack resistance adopted when designing, and take test control loads indicated in table 2.

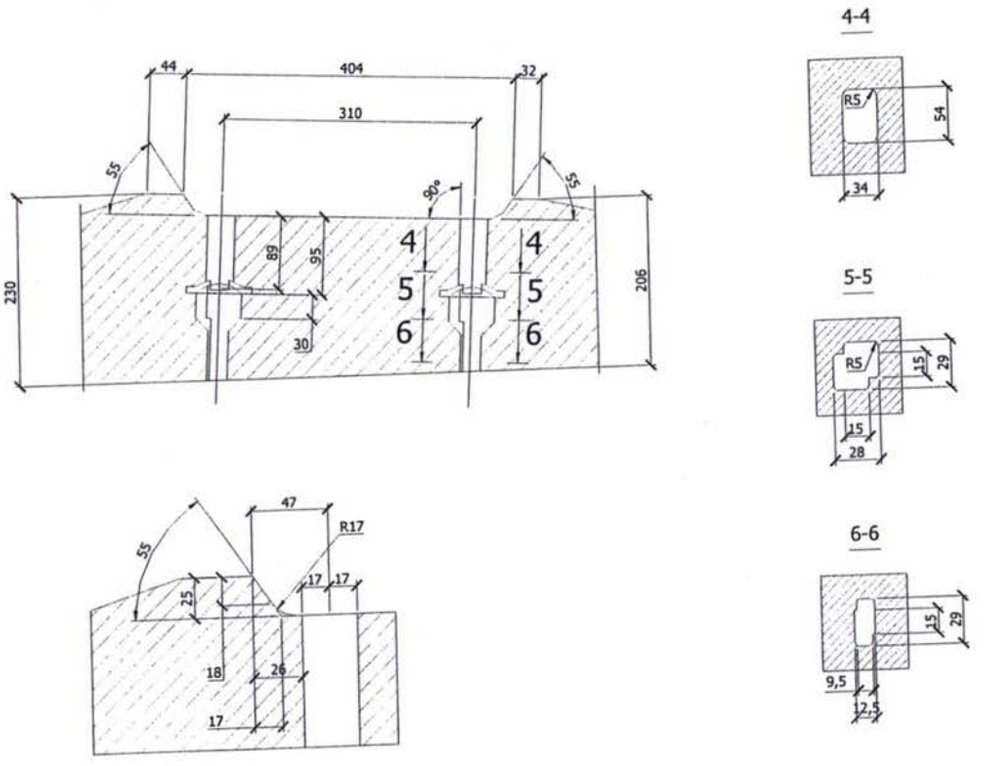
Table 2

Tested cross section of the sleeper	Control load, kH (тс), for sleepers	
	the first sort	the second sort
Sub-rail	130(13,2)	120(12,2)
Average(middle)	98(10,0)	88(9,0)



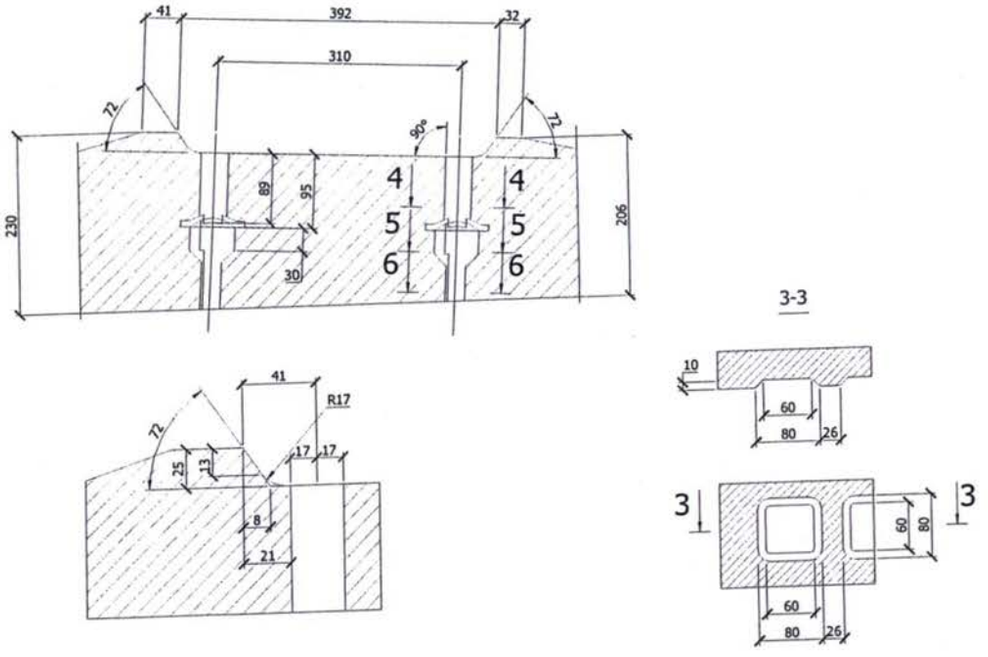
DRAWING 1

Under rail part of the sleeper



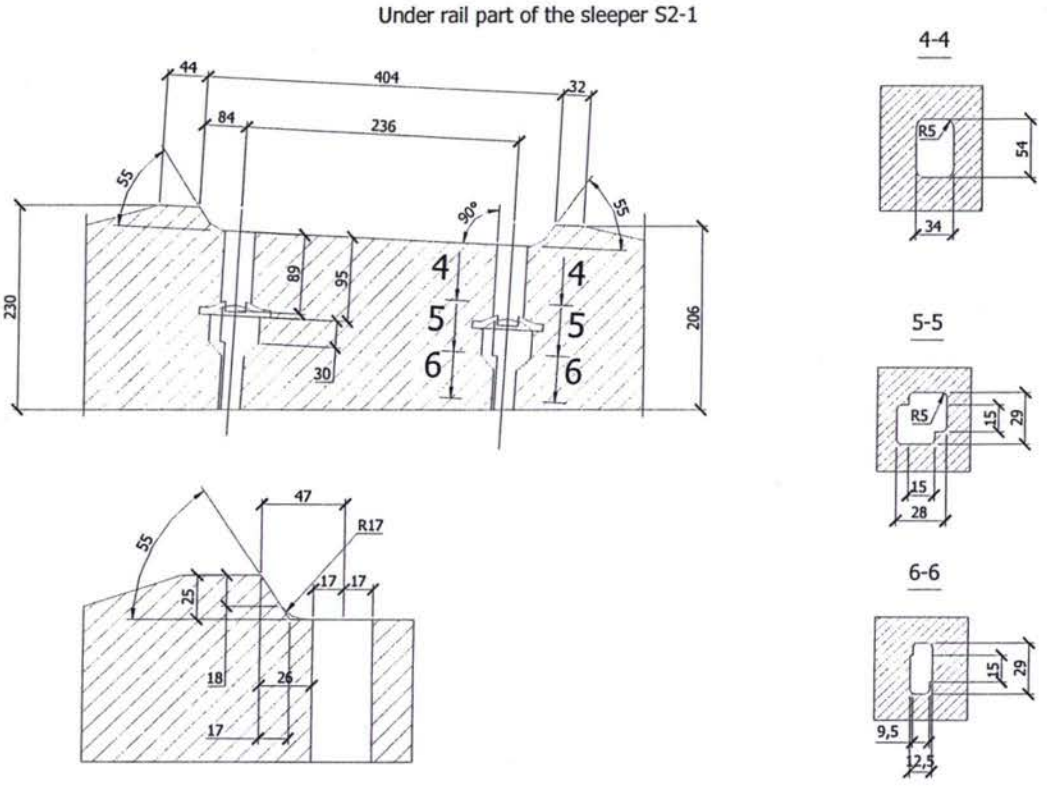
DRAWING 2

Under rail part of the sleeper S1-2

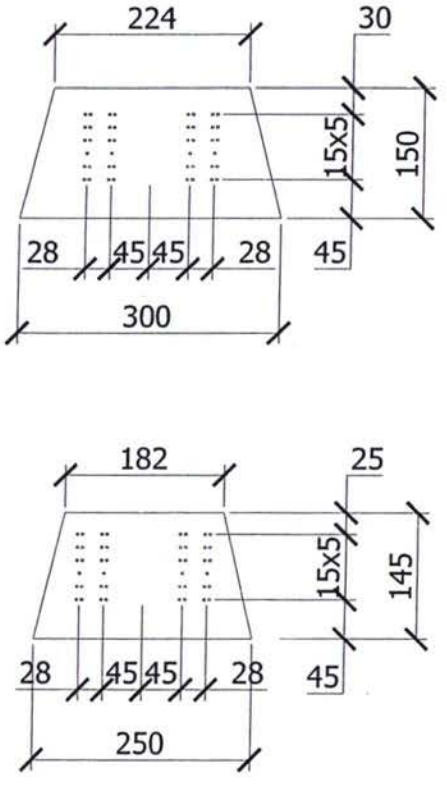


DRAWING 3

Under rail part of the sleeper S2-1



DRAWING 4



DRAWING 5

1.3.2. Sleepers should be made of hard concrete under GOST 26633 class of durability(strength) for pressure test B40.

1.3.3. Actual durability(strength) of concrete (design age, transmitted and handling) should be in compliance with the requirements of GOST 13015.0.

1.3.4. Normalizable handling strength of concrete should be equal to 32 MPa (326 kgs/sm2)

1.3.5. Handling strength of concrete is equal to transmitted strength of concrete.

1.3.6. Mark of the concrete for frost resistance should be not lower F200.

1.3.7. For concrete of the sleepers ballast of natural stone or gravel ballast of fraction 5-20 mm under GOST 10268 should be used. It is allowed with the agreement between the manufacturer and the customer to use:

- ballast with fraction 20-40mm in the amount of 10% from the ballast mass of fraction 5-20mm under GOST 10268;
- ballast from the natural stone of fraction 2-25 mm under GOST 7392 being in compliance to all other of its requirements of GOST 10268.

1.3.8. As reinforcement of the sleepers steel wire of die-rolled section class Bp with 3mm of diameter should be used under GOST 7348 and TY 14-4-1471-87.

1.3.9. Nominal number of reinforced wire in the sleeper 44. Distribution(placement) of wires, controlled at the ends of a sleeper should be in compliance indicated on the drawing 5. The distance on vertical line in the light between pairs and separate wires, in case of their deviation from the design location should not be less than 8 mm. Wires pairs turn for 90 degrees is allowed when the indicated above distance is kept.
To provide design location of the wires separating spacers can be used which were left in the concrete body of the sleeper(see Annex 2) Due to the agreement between the manufacturer and the customer it is allowed to use spacers different from the indicated in Annex 2.

1.3.10. General strength of the initial tension of all reinforced wires in the packet should be not less than 358 kH (36,4 tc). Average value of strength of one wire initial tension at their nominal number should be 8,12 kH (827 kgc) Tension strength of separate wires should not be different from the average value more than 10%.
Reduction of tension strength of separate wires over 10% due to slippage of the wire in seizure should not be more than at one wire in the sleepers of the first sort and at two wires in the sleepers of the second sort.

1.3.11. Deviations from the nominal number of the reinforced wires are allowed provided their common strength of tension of the wires available is not less than indicated in para 1.3.10. At this the extreme deviations due to the number of the wires should not exceed ±2 pieces.

1.3.12. Ends of stressed reinforcement should not be protruded over the ends of the first sort sleepers surfaces more than 15 mm and the second sort sleepers – more than 20 mm.

1.3.13. Washers should be in compliance with GOST 23157.

1.3.14. Values of actual deviations of sleepers geometrical parameters should not exceed the maximum shown in table 3 .

Table 3

Description of the geometrical parameter deviation	Description of the geometrical parameter	Indicated deviation for sleepers	
		first sort	second sort
Deviation from linear dimension	Distance a	±2	+3; -2
	Distance a1	+2; -1	+3; -1
	Distance a2 and a3	±1	±1
	Depth of washer embedment into concrete	+6; -2	+6; -2
	Sleeper's length	±10	±20
	Sleeper's width	+10; - 5	+20; -5
	Sleeper's height	+8; -3	+15; -5
Deviation from linearity of the profile sub-rail area along the whole length or width	-	1	1

Note: Dimensions, for which the utmost deviation were not indicated, are the reference ones

1.3.15. Gradient of sub-rails areas toward the longitudinal axis of the sleeper in vertical plane running through axis (sub- gradient) should be within the limits 1: 18 – 1: 22 for the sleepers of the first sort and 1: 16 – 1: 24 for the sleepers of the second sort.

1.3.16. The difference of gradients of sub-rail areas of different end of the sleepers in transverse to the sleeper's axis direction (propellerness) should not exceed 1: 80.

1.3.17. Values of actual deviations of the width protective layer of the concrete until the reinforcement upper row should not exceed, mm:

+7 for the sleepers
- 5 of the first sort
+10 for the sleepers
- 5 of the second sort

1.3.18. Dimensions of blisters on the concrete surfaces and concrete chipping of the sleepers edges should not exceed the values indicated in table 4.

Table 4

View of the sleeper's surface	Utmost dimensions, mm							
	blisters				chippings of concrete edges			
	Depth		diameter (the most dimension)		Depth		Length along the edge	
	sleepers of the first sort	sleepers of the second sort	sleepers of the first sort	sleepers of the second sort	sleepers of the first sort	sleepers of the second sort	sleepers of the first sort	sleepers of the second sort
Sub-rails areas	10	15	10*	15*	15	30	30	60
Support edges of sub-rails areas	10	15	10**	15**	10	10	20	40
Upper surface of the middle part of the sleeper	10	15	30	45	15	30	30	60
Other parts of the upper surface	15	25	60	90	15	30	not regulated	not regulated
Lateral and end surfaces	15	25	60	90	30	60	ditto	ditto

* Not more than tree blisters on the same area
** Not more than a blister

Notes:

1. Marks from joint weld availability on the longitudinal edges of the sub- rails area between stationary sub-rails plates and form are allowed
2. Marks of diaphragms rigidity elements availability with the depth of not more than 5 mm is allowed

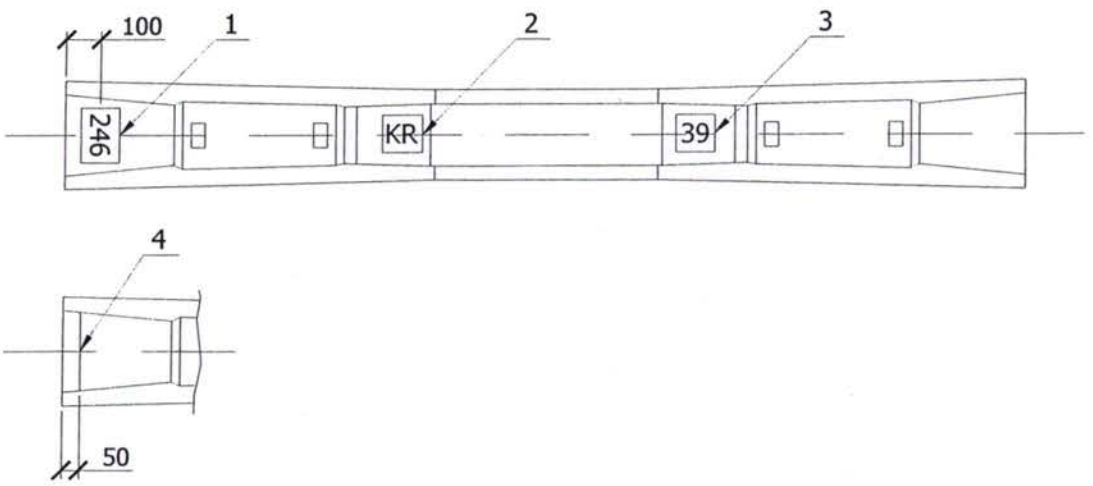
1.3.19. The depth of gaps (clearance) between the wires and concrete on the sleepers' ends should not exceed 45 mm for the sleepers of the first sort and 30 mm for the sleepers of the second sort.

1.3.20. It is not allowed in the sleepers:

- local overflow of concrete in the bolts holes, preventing from free fixation and turning these bolts into the working position;
- local overflow of concrete on sub-rails areas;
- turning of bolts of he rail fastening in grooves of the sleeper when the nuts are screwed up;
- cracks in concrete.

To form grooves(holes) for bolts the setting up of inner elements, construction are allowed and material of which are agreed with the customer.

Marking of the sleeper



DRAWING 6

1.4. Marking

1.4.1. Marking of the sleepers should meet the requirements of GOST 13015.2 and this standard.

1..4.2. When forming the following should put on the upper surface of the sleepers by punching:

trademark or short name of the manufacturer on each sleeper; year of manufacturing(two last figures) – not less than 20% of sleepers of each lot.

At the end part of each sleeper by red paint it is put:

- the mark of the Production Control Department;
- number of the lot.

1.4.3. The places of marking signs are indicated on drawing 6.

1.4.4. Marking signs should be done by the print with the height not less than 50 mm.

1.4.5. On the both ends of the second sort sleeper a transverse band with the width of 15 -20 mm(see drawing 6) is painted.

2. ACCEPTANCE

3.1. Acceptance of sleepers is carried out by lots in accordance with the requirements of GOST 13015.1 and this standard.

3.2. Sleepers are accepted;

- under the results of sampling tests – for the indices of concrete frost resistance and exactness of geometrical parameters of sleepers except the dimension a of sleepers Ш1-2;
- under the results of acceptance tests – for the indices of crack resistance of sleepers, concrete durability(concrete class for pressure durability, transmission and handling strength), condition of grooves for bolts, accuracy of dimension for sleepers of Ш1-2 type, quality of concrete surfaces of sleepers.

3.3. Sampling tests of sleepers for the indices of concrete of frost resistance are done once a year, for exactness of geometrical parameters – once a month.

3.4. Due to precision of geometrical parameters sleepers are accepted under the results of test sampling. When the volume of sleepers is 3200 pieces plan of test sampling should be under GOST 23616.

2.5 For the crack resistance test from each lot the control sleepers are selected in a number of 0, 3% but not less than 3 pieces. The lot is accepted for crack resistance if selected sleepers for the test stand for control loading. The sleepers is considered to withstand the crack resistance test if under the control loading one can not find visible cracks in sun- rail and middle cross sections. Visible transverse crack in concrete is considered to be that one which is with the length of more than 30mm from the edge of a sleeper and the opening at the base of more than 0,05 mm.
When there is an unsatisfactory test result for the crack resistance it is allowed to divide the lot for more small parts and subject them to the repeated test for the crack resistance. At the unsatisfactory result of the repeated test it is allowed to carry out the complete test of all the sleepers of the lot.

2.6 Sleepers' acceptance for the condition of the grooves for bolts and quality of concrete surfaces are carried out due to results of complete control.

3. CONTROL METHODS

3.1. Concrete strength for pressure is under GOST 10180 on the samples series made from the concrete mix of working composition, kept in the conditions established under GOST 18105.

3.2. Frost resistance of concrete is under GOST 10060.

3.3. Common strength of reinforcement tension is controlled under the manometer registration in accordance with GOST 22362 with parallel switching on the self-registering device to record tension efforts.
Tension strength of separate reinforcement wires are measured by the method of transverse ambages under GOST 22362.

3.4. For the measurement of linear dimensions of sleepers as well as blisters and chippings of concrete metallic measurement instruments are used under GOST 13015. The depth of blisters as well as clearances(gaps) between wires and concrete on the ends of sleepers are measured with sliding calipers with the pointed bar.

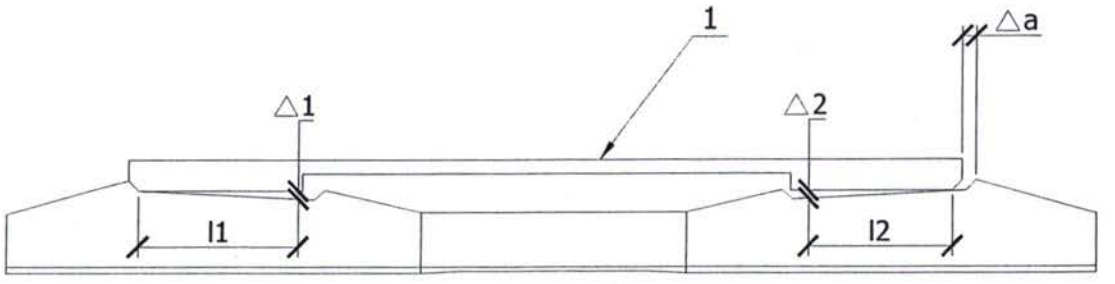
3.5. The distance between support edges of the deepening sub-rail areas of different sleepers' ends *a* are measured by template put simultaneously on both sub-rails areas of the sleeper (drawing 7).

Distances between edges of deepening of one end of the sleeper *a1* between the holes axes for bolts *a2* and from holes axes to the support edge *a3* provide with the check of these dimensions on the form at metallic plates formed the deepening in sub-rail areas when forming sleepers.

3.6. Gradient of sub-rail areas in longitudinal and transverse direction to the axis of the sleeper (syb0gradient and propellerness) is measured by the indicator put simultaneously on both sub-rail areas of the sleeper (drawing 7 and 8).

3.7. Deviation from straightforwardness of sub-rail areas are under GOST 13015 by measurement of the most clearance between the surface of the area and the edge of metallic surface of the ruler.

The scheme of the control of accuracy of the size a (△a)
and under rail cant platforms (l1 and l2)

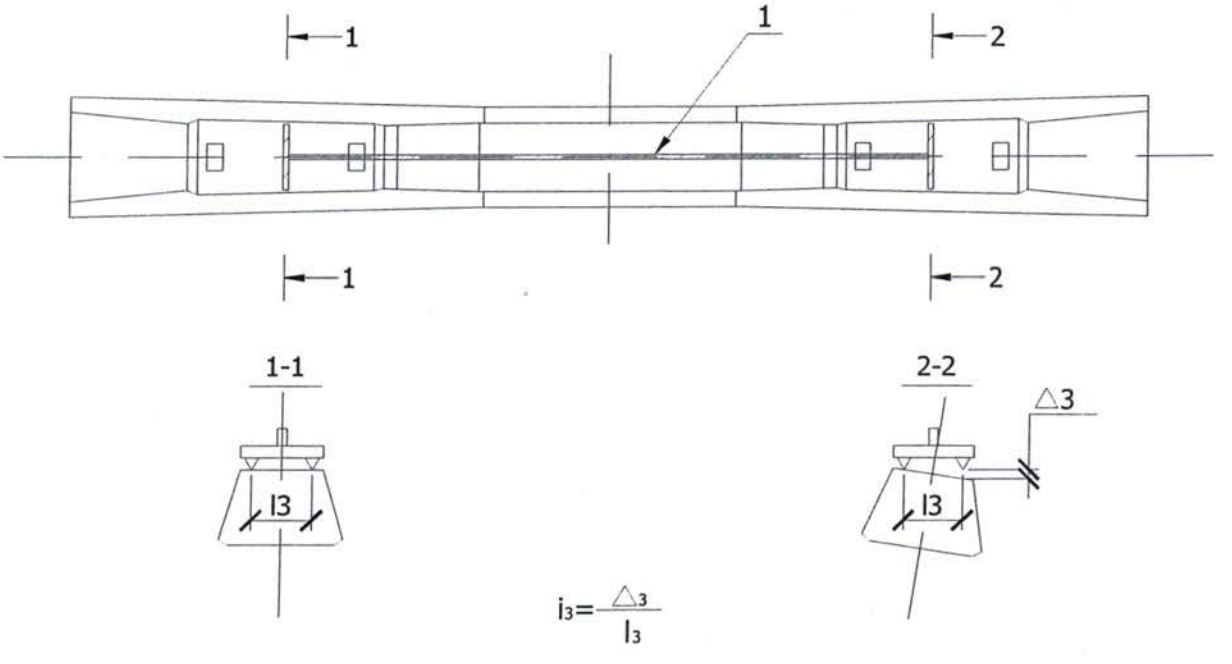


$i_1=\frac{\triangle_1}{l_1}$ $i_2=\frac{\triangle_2}{l_2}$

1-template or indicator device

DRAWING 7

The scheme of the control of propeller of the sleeeper



$i_3=\frac{\triangle_3}{l_3}$

1-measuring device

DRAWING 8

3.8. The depth of the washers inserting into concrete is controlled by the facility put into the groove of the sleeper and turned on 90 degrees (drawing 9).

Absence in the grooves of the sleeper of concrete influx which prevent the setting and turning of the bolt in the working position as well as turning of the bolt when screwing up the nut is checked by baseplate bolt under GOST 16017 with maximum plus deviations of the head dimensions. All the four grooves of the controlled sleeper are checked.

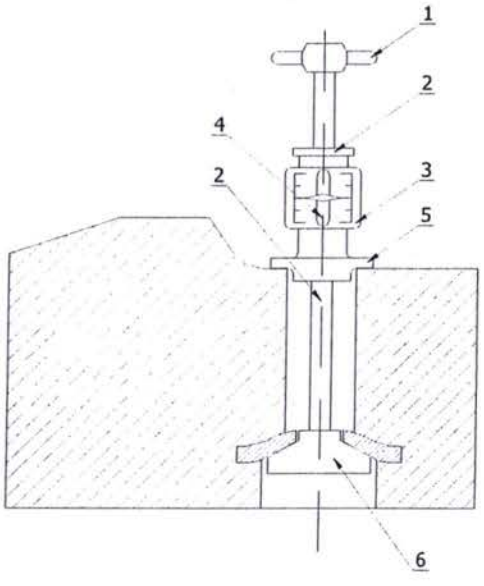
3.9. The width of the protective layer of concrete over the upper row of reinforcement is controlled in the middle of the sleeper by the method shown in drawing 10. It is allowed

3.10. under the agreement of the manufacturer with the customer to control the width on the ends of the sleeper by metallic ruler.

3.11. The height of the sleeper is checked by a sliding calipers in cross sections in the middle of each sub-rail are and in the middle of the sleeper.

3.12. Each sleeper, selected for the tests for crack resistance, is tested by dead load in series in sub-rail and middle cross section under the schemes given in drawing 11.
The load is increased evenly with the intensity not more than 1 kH/c (100kgc/c) and bring it to control one indicated in table 2. This load is kept to be constant during 2 min, after which the lateral surfaces of two sides of the sleepers should be looked at tested cross-section to find visible cracks in the tensile concrete zone.. The surface of the concrete is not watered at this. Light of the concrete surface is not less than 3000 лк. To measure the length of cracks metallic ruler is used and for the width of the cracks opening – measuring magnifier is used under GOST 25706 with partition of 0,05 mm.

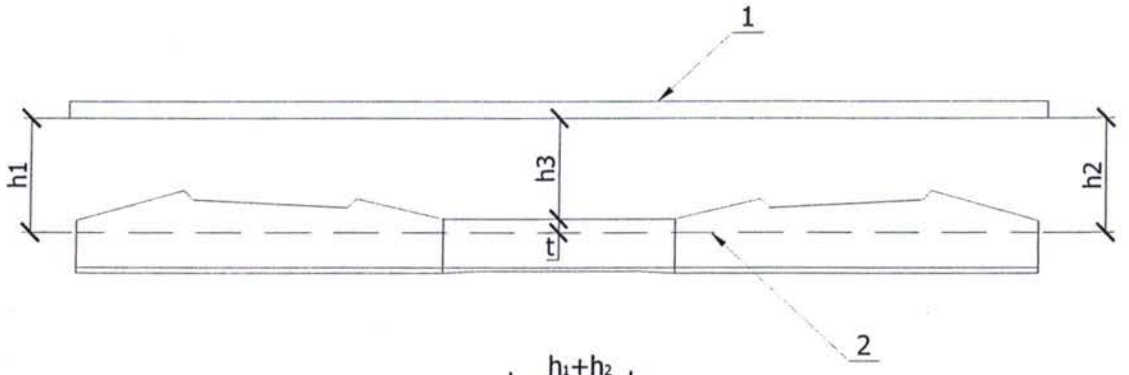
THE SCHEME OF THE DEVICE FOR MEASUREMENT
OF DEPTH OF TERMINATION OF WASHERS



1-handle; 2-stock; 3-scale; 4-arrow; 5-case; 6-head.

Drawing 9

The scheme of gauging the thickness of a blanket of beton above the overhead row of the armature in the middle of the sleeper



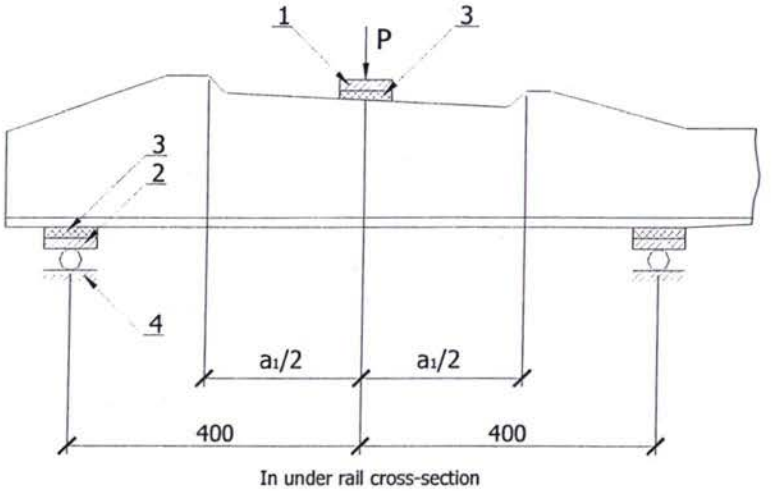
$$t = \frac{h_1 + h_2}{2} - h_3$$

1-measuring rod; 2-Wire of the overhead lines of the armature

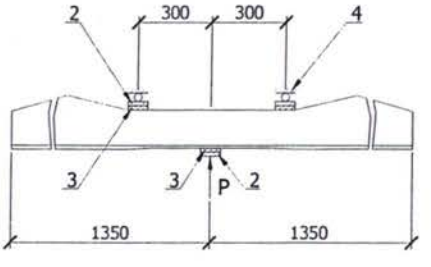
Drawing 10

The scheme of test of the sleeper on crack resistance

In under rail cross-section



In under rail cross-section



1-the 250x100 mm size steel plate with a grade of the bottom basis 1:20, average of thickness 25 mm; 2-the steel plate size 250x100x25 mm; 3-rubber laing a size 25x100x10 mm; 4-the steel beading fillet diameter 40 and length 250 mm.

Drawing 11

3.13. The list of the devices, indicators and templates for the control of geometrical parameters of the sleepers is given in Annex 3.

3.14. All no standard facilities for measurements and tests should go through metrological attestation in accordance with GOST 8.326.

4. TRANSPORTATION AND STORAGE

4.1. Transportation and storage of the sleepers should meet the requirements of GOST 13015.4 and under this standard.

4.2. Sleepers should be transported and kept in stacks in horizontal row in the working position (foots downwards). The stack's height should be not more than 16 rows.
Baseplates for the sleepers and plates between the sleepers in the stack should be placed in the deepening of the sub-rail areas of the sleepers. The width of wooden plates and rail pads should be not less than 50mm. It is allowed under the agreement between the manufacturer and the customer to use wooden pads with cross section not less than 40x40 mm. placing them at the distance of 30-40 mm from impact edges of the deepening and sub-rails areas of the sleepers.

4.3. The sleepers are transported in open wagon or cars. Transportation of sleepers of different marks (brand) and sorts in one open wagon or car is not allowed.

5. MNAFACTURER'S GUARANTEES

5.1. The manufacturer guarantees the compliance of the sleepers with the requirements of this standard under the observance by the Customer the rules of their operation, transportation and storage.

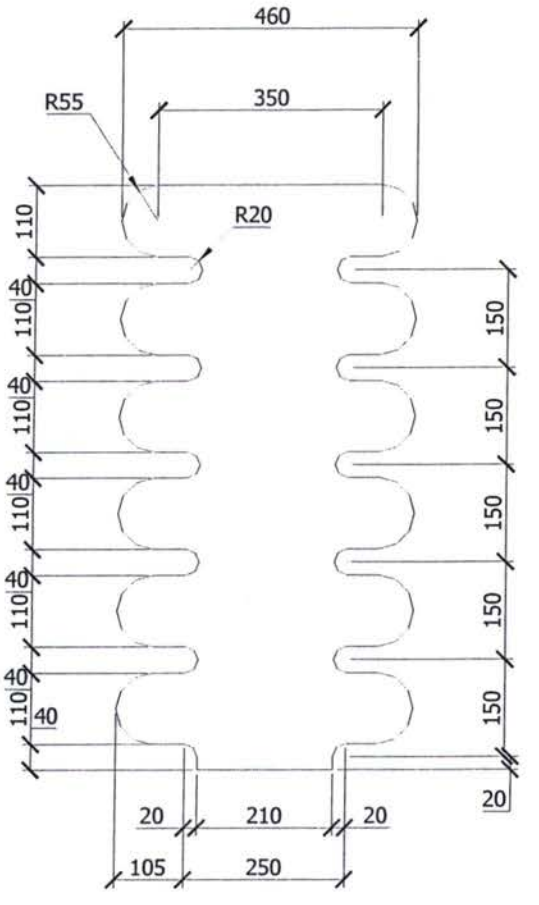
5.2. Warranty period of the sleepers operation is three years from the date of their laying on the track. Warranty period itself starts not later than 9 months from the date of delivery of the sleepers to the customer.

Indices of sleepers' material capacity

Indices of sleepers' material capacity made under typical mass line aggregate production in deca (ten)-nests forms (without taking into consideration technological and production losses outside the boundaries of the form):

volume of concrete for one sleeper 0,108 m3
steel consumption for 1m3 of concrete:
stressed wire with diameter 3mm 67,2kg
washers fastenings ..... 11,8 kg

THE DIVIDING SPASER



Material - St-3
Thickness - 1 mm
Weight - 0.037

DRAWING 12

Annex 3
Reference

LIST OF ACCESSORIES< INDICATORS AND TEPMLATES FOR CONTROLLING OF GEOMETRICAL PARAMETERS OF SLEEPERS

For control of geometrical parameters of reinforces sleepers it is recommended to use the set of devices, indicators and templates developed by the Institute "Industroyproekt" and approved by the Ministry of Industrial amterials of the USSR.

Description of geometrical parameter	Description of the device, indicator or template	Code of the project
The distance between trust edges of the deepening in sub-rail areas of both ends of the sleeper a	Template of measurement control a at railway sleepers with the an gradient angle of the edges 55 degrees	3477/10
Gradient of sub-rail areas in longitudinal and transverse direction to the sleeper's axis.	Indicator of control for gradients and propellerness of sub-rail areas of the railway sleepers.	3477/4-A
The depth of inserting washers' plates into concrete	Device for control of the depth of washers' plates insertion.	3633/4
The width of protective layer of concrete in the middle part of the sleeper	Device for control of width for concrete protective layer.	3633/3
The depth of blisters and gaps between the wire and concrete	Device for measurement	3633/5

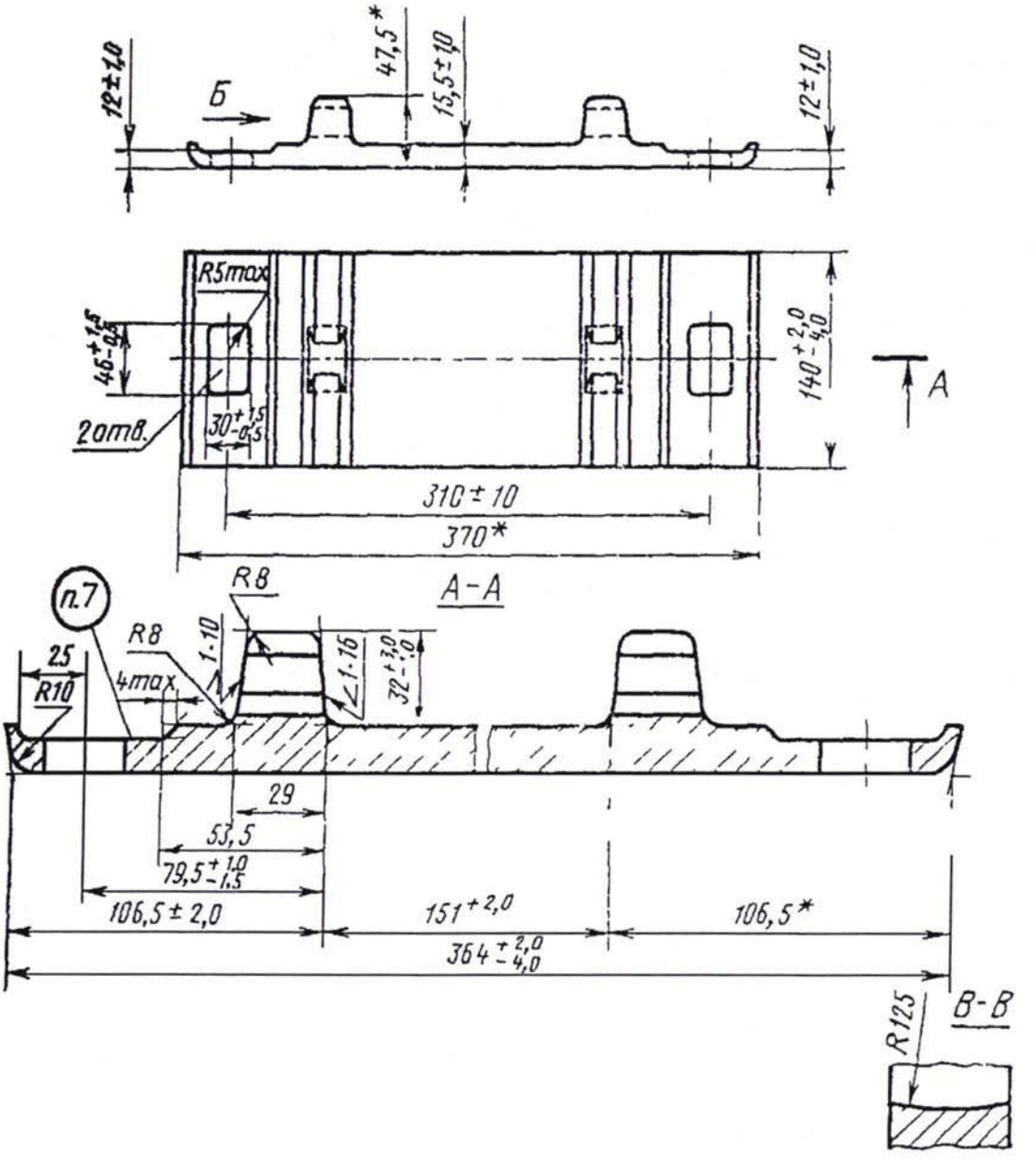
GOST 16279-78

The plates of separate fastening for railway P65 and P75 types Design and dimensions.

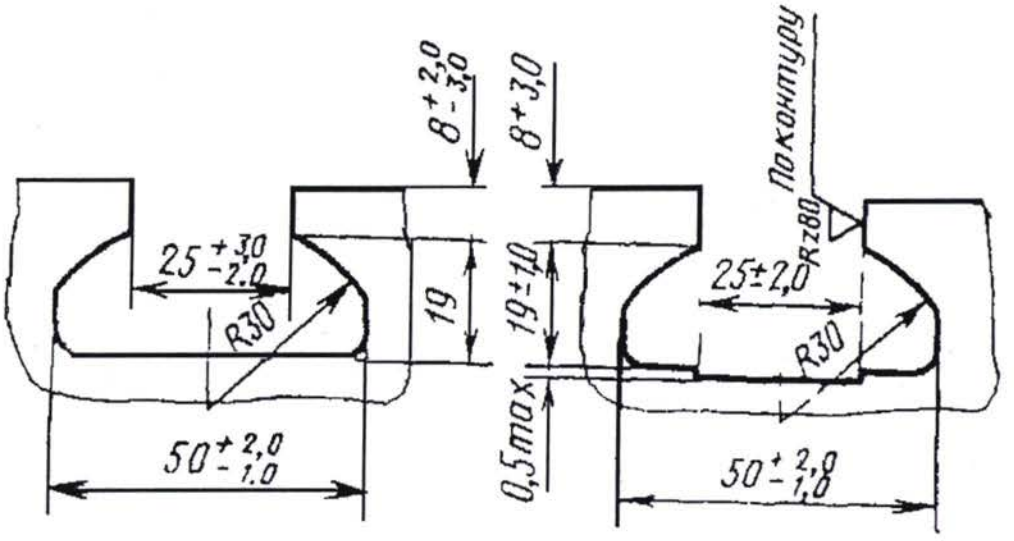
Non-observance of the standard is prosecuted under the Law.

1. This standard covers flat plates of separate fastening КБ фтв СК types(hereinafter – plates to the railway rails R65 and R75 types).
   Plates КИ type are intended for laying on reinforced sub-rail foundations, and plates of СК type – for joints and crossing of lines on wooden bars and sleepers.

2. Design and dimensions of the plates КБ type should be in compliance with those indicated on the drawing 1.



Performance I Performance II



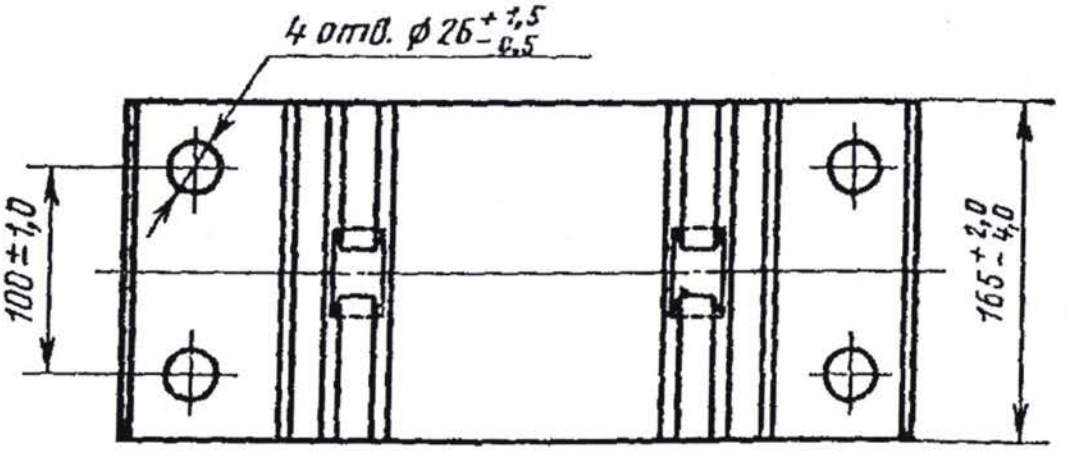
DRAWING 1

* Dimensions for reference

NOTES:

1. Dimensions with not indicated limit tolerances are provided by the tool.

2.1 Plates СК type should be made from profile bars as well as the plates of КБ type. Dimensions which differ them from КБ type plates should correspond to the indicated ones on Drawing 2



DRAWING 2

Example for the legend of КБ type plate for the rails R65 type with groove of performance 1:

Plate 1 КБ 65 GOST 16279 -78

The same with the increased width of sub-rail area, for example 18mm:

Plate 1 КБ 65 x 18 GOST 16279 -78

The same for СК type plate:

Plate 1 СК 65 x 18 GOST 16279 -78

In case when it is possible to use plates with groove by both -performance 1and performance 2, the performance is not indicated.
2.2.1 **(**Changed edition, Change №1)

3. (Excluded, Changed № 1).

4. Asymmetry of holes axes location relating to transverse plate axis – not more than 2,0 mm, grooves axes in ledges – not more than 3,0 mm.

5. Dimensions of curving radius which are not indicated in the drawings should not exceed 3mm. It is allowed to do couplings inside of the groove by facets of dimension not more than 3 x 45o.

6. Not indicated extreme deviations are ±1,0 mm.

7. Technical requirements, marking and material are under GOST 16277 – 84.

8. Mass of plates is indicated in Reference Annex.

ANNEX

Reference

Area of rolling cross section and mass of plates

Legend of plates	**Area of profile cross section, sm2**	**Mass, kg**	
		1m of rolling	**of one plate**
1КБ65б, 2КБ65 !СК65б, 2СК65	70,07	55,0	7,0 8,45

Note:

1. Mass of plates is determined out of nominal dimensions and with steel density of 7850 kg/m3.
2. **(Excluded, Change №1).**

GOST 16016 -79
Clamp bolts for rail track fastening
Design and dimension
Technical requirements

Non-observance of the standard is prosecuted under the Law.

This standard covers clamp bolts of normal and rough accuracy used for fastening of the rail to the plate in separate rails fastening

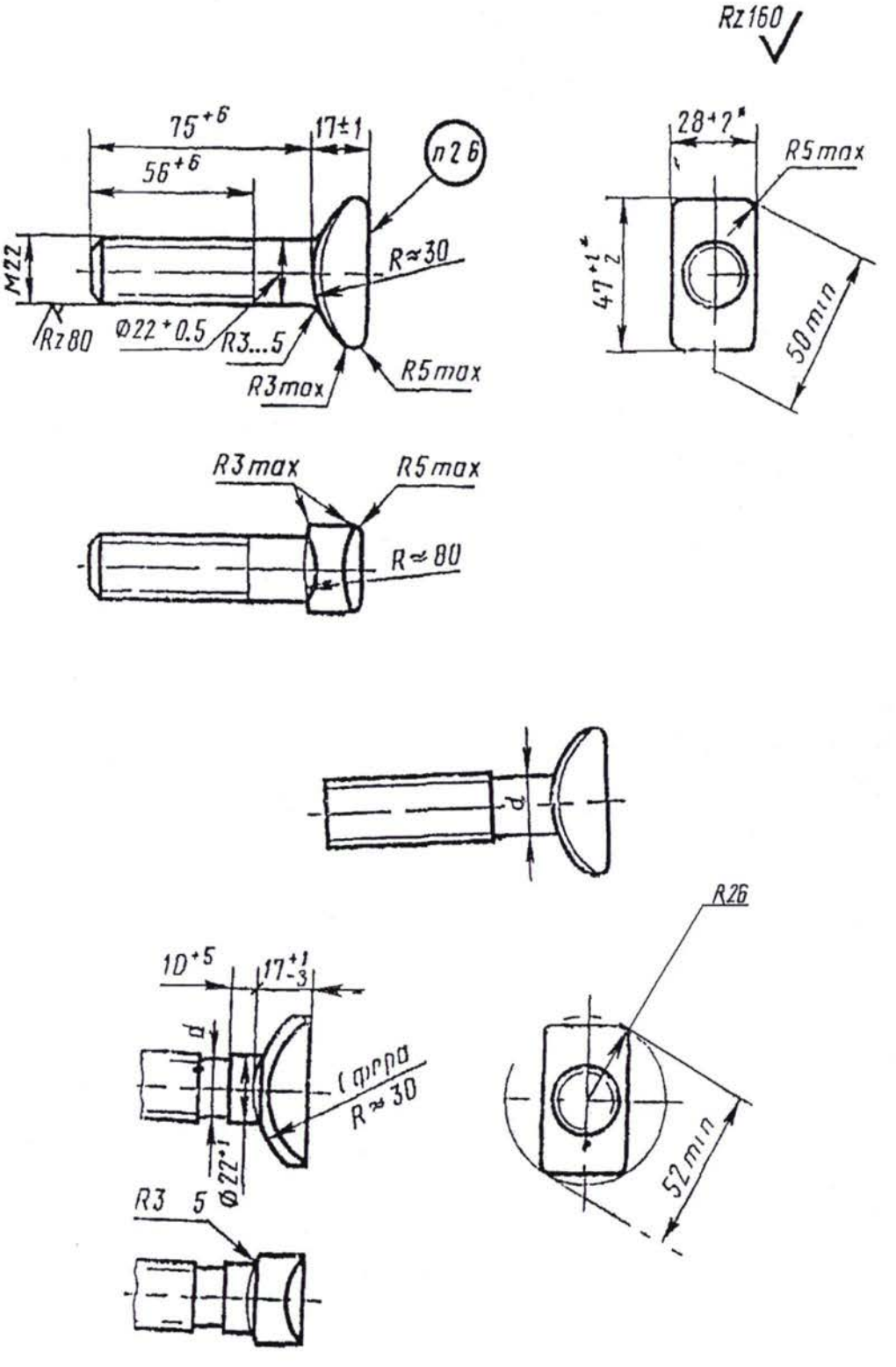
1. DESING AND DIMENSIONS

1.1 Design and dimensions of clamp bolts should be complied with those indicated on the drawing.

1.2 It is allowed to make bolts with the length from 65 to 105 mm and the length of thread from 40 to 72 mm under the agreement between the Customer and the manufacturer. At this the length of the bolt should be done divisible 10mm, and the length of thread divisible:

4mm – at the length of thread to 60mm including;
6mm - -"- "-" over 60 mm.

1.3 Option of production of the bolt head is established by the manufacturer.



Example of the legend of clamp bolt in performance 1, with the length 75mm, class of strength 4.8, without coating

Bolt M22 X 75.48 GOST 16016 – 79

The same, from finished steel with zinc coating with chromium plating with the width of 9 mkm:

Bolt M22 X 75.48 C.019 GOST 16016 – 79

The same in performance 2, without coating:

Bolt M22 X 75.48 C GOST 16016 – 79

2. *TECHNICAL REQUIREMENTS*

2.1 Clamp bolts should be made according the requirements of this standard and GOST 1759 -70 due to the working drawings approved in the established order.

2.2 Mechanical properties of the bolts should be in compliance of class of strength 3.5 or 4.8 under GOST 1759 -70

2.3 Clamp bolts should be made without coating. Under the agreement between the Customer and the manufacturer the clamp bolts can have zinc with chromium plating coating with the width of 9-15 mkm. Requirements to coating are under GOST 9.301 - 78.

2.4 Tread are under ST CMEA 182-75. Tolerance range 8g under GOST 16093 -81.

2.5 Displacement of the head axis concerning the core axis of the bolt should not be more than 0,9 mm.

2.6 To mark: trademark or the legend of the manufacturer and the year of production (two last figures).
The height of markings is not less than 8mm, width – not less than 1mm, salience – not less than 0,5 mm.

2.7 Mass of 1000 bolts (reference):
345 kg – performance 1;
335 kg – performance 2.

Notes:
1. When it possible to use bolt of performance 1, as well of performance 1, in the design documentation the mass of performance 1 should be indicated.

2. Change of mass of 1000 bolts while changing their length by 10 mm should not be more:
29,8 kg – for performance 1;
25,7 kg – for performance 2.

2.8 Acceptance rules are under GOST 17769-72.

2.9 Testing methods are under GOST 1750 -70.

2.10 Control of quality of zinc coating is under GOST 9.302 -79.

2.11 Zinc coating on clamp bolts should be controlled by appearance and width under GOST 9.301 -78.

2.12 Bolts packing and marking of tare is under GOST 18160 – 72.

2.13 Bolts should be completed with nuts under GOST 16018 – 79.
Bolts and nuts without packing are allowed, at this there should not be the possibility of their mixing.

2.14 Bolts transportation without packing on railways platforms(flat wagons) is not allowed.

GOST 16017 -79
Inserted bolts for rail track fastening
Design and dimension
Technical requirements

Non-observance of the standard is prosecuted under the Law.

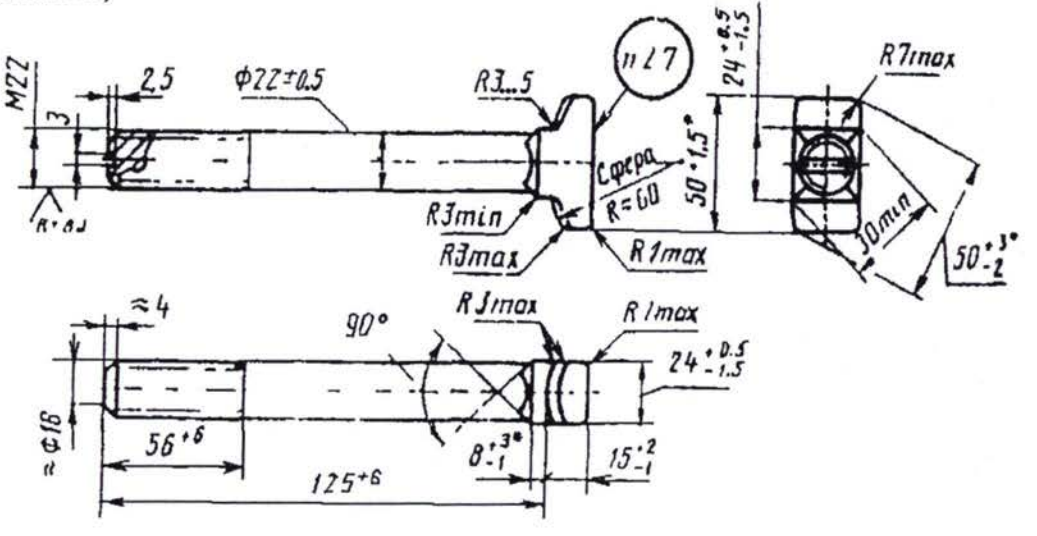
This standard covers inserted bolts of normal and rough accuracy used for fastening of metal plates or rails to reinforced sub-rail base in rail fastening.

1. DESING AND DIMENSIONS

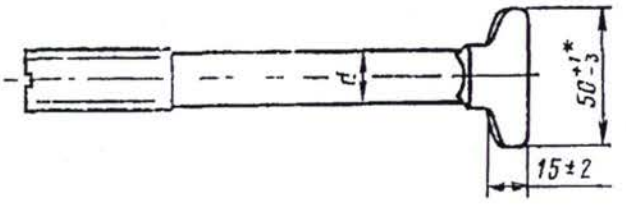
a. Design and dimensions of inserted bolts should be complied with those indicated on the drawing.

Performance I

Performance I
(normal exactness)

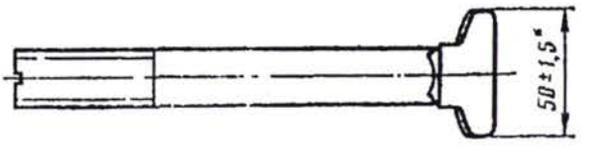


Performance II
(rough exactness)

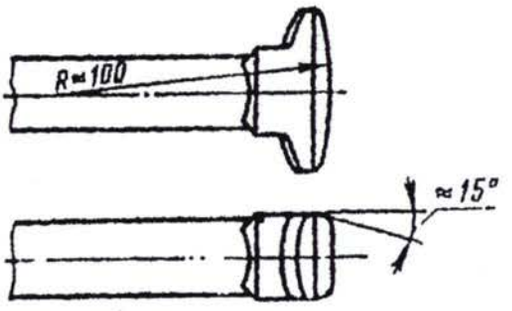


* Dimensions are indicated taking in to consideration joint height, from matrix cut-off point, metal building up in subhead angle and burrs from fin (flash) punching.

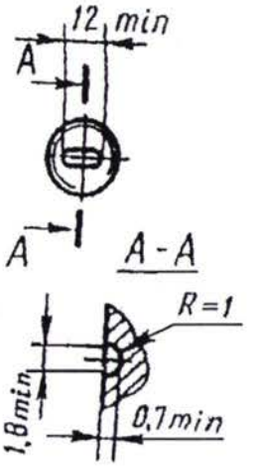
Performance II
(rough exactness)



Variant of the head



Variant of the indicating groove



Example of the legend of inserted bolt in performance 1, with the length of 175mm, class of strength 4.8, zinc coating with chromium plating of width of 15 mkm

Bolt M22 X175.48.0115 GOST 16017 – 79

The same in performance 2, from finished steel of the length 225mm:

Bolt M22 X 175.48 C 0115 GOST 16017 – 79

b. It is allowed to make bolts of the length from 145 to 225 mm and with the tread length within 40-84 mm under the agreement between the Customer and the Manufacturer. At this the length the bolt length should be multiplied by 10 mm, and the length of tread should be multiplied by:
   4mm – when the length of tread to 60 mm including;
   6 mm " - " " – " over 60mm
c. Option of head performance and indicating groove is chosen by the manufacturer.

2. TECHNICAL REQUIREMENTS

a. Clamp bolts should be made according the requirements of this standard and GOST 1759 -70 due to the working drawings approved in the established order.
b. Mechanical properties of the bolts should be in compliance of class of strength 3.5 or 4.8 under GOST 1759 -70
c. Clamp bolts should be made without coating. Under the agreement between the Customer and the manufacturer the clamp bolts can have zinc with chromium plating coating with the width of 9-15 mkm. Requirements to coating are under GOST 9.301 -78.
d. Tread is under ST CMEA 182-75. Tolerance range 8g under GOST 16093 -81.
e. Displacement of the head axis concerning the core axis of the bolt should not be more than 0,9 mm.
f. To mark: trademark or the legend of the manufacturer and the year of production (two last figures).

The height of markings is not less than 8mm, width – not less than 1mm, salience – not less than 0,5 mm.

g. Mass of 1000 bolts (reference):
   345 kg – performance 1;
   335 kg – performance 2.

Notes:

1. When it possible to use bolt of performance 1, as well of performance 1, in the design documentation the mass of performance 1 should be indicated.

2. Change of mass of 1000 bolts while changing their length by 10 mm should not be more:
   29,8 kg – for performance 1;
   25,7 kg – for performance 2

h. Acceptance rules are under GOST 17769-72
i. Testing methods are under GOST 1759 -70
j. Control of quality of zinc coating is under GOST 9.302 -79.
k. Zinc coating on clamp bolts should be controlled by appearance and width under GOST 9.301 -78.
l. Bolts packing and marking of tare is under GOST 18160 – 72.
m. Bolts should be completed with nuts under GOST 16018 – 79.

n. Bolts transportation without packing on railways platforms (flat wagons) is not allowed. Bolts and nuts without packing are allowed, at this there should not be the possibility of their mixing.
o. Transportation of bolts on railway flat wagons without packing is not allowed.

GOST 16018 -79
Nuts for clamps and inserted bolts of rail track fastening
Design and dimensions
Technical requirements

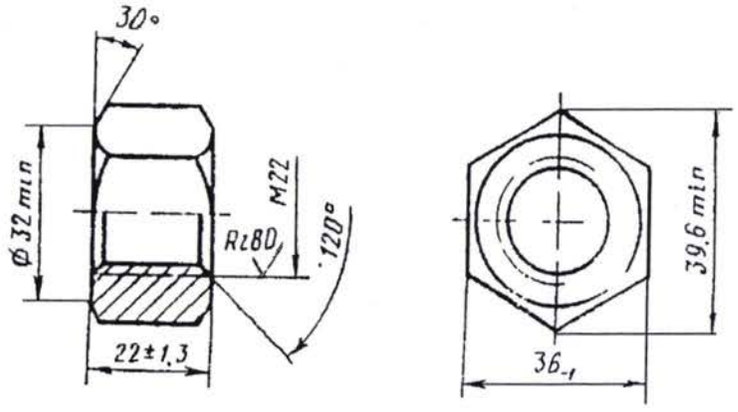
Non-observance of the standard is prosecuted under the Law.

This standard covers nuts of normal and rough accuracy used for rail track fastenings .

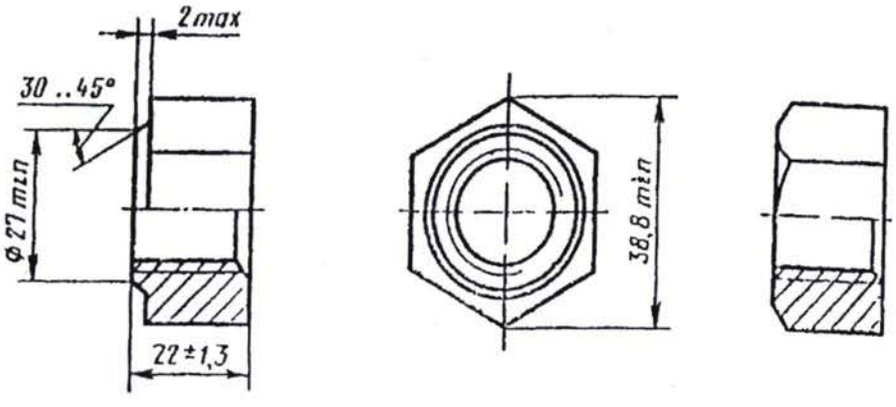
1. DESING AND DIMENSIONS

1.1 Design and dimensions of nuts should be complied with those indicated on the drawing.

Performance I
(normal exactness)



Performance II
(rough exactness)



Example of the legend of the nut in performance 1, with the height of 22 mm, class of strength 5, without coating

Nut M22 X 22,5 GOST 16018 – 79

The same , with zinc coating of chromium-plating of width 9 mkm:

Nut M22 X 22,5 GOST 16018 – 79

The same in performance 2, without coating:

Nut 2 M22 X 22,5 GOST 16018 – 79

1.2 It is allowed to make nuts in performance 1, of height 18 and 20 mm under the agreement of the Customer and the Manufacturer

1.3 Option of nut end in performance 2 is chosen by the manufacturer.

2. TECHNICAL REQUIREMENTS

2.1 Nuts should be made according the requirements of this standard and GOST 1759 -70 due to the working drawings approved in the established order.

2.2 Mechanical properties of the nuts should be in compliance with strength class of 5 or 6 under GOST 1759 -70.

2.3 Nuts should have the same coating as component bolts. The width of coating should be 9 -15 mkm. Requirements to the coating is under GOST 9.301 – 78. Under the agreement between the Customer and the Manufacturer nut can be done without coating.

2.4 Tread is under ST CMEA 182-75. Tolerance range 7H under GOST 16093 -81. Faces on the end of nuts' tread are under GOST 10549 -80.

2.5 Displacement of nut hole axis concerning symmetry axis should not be more than 0,9 mm.

2.6 In nuts in performance 2 it is allowed metal tightening which can bring to local lessening of the edges height not more than 3mm.

2.7 Mass of 1000 nuts (reference):
114 kg – performance 1;
126 kg – performance 2.

Notes:

1. When it possible to use nuts of performance 1, as well of performance 1, in the design documentation the mass of performance 1 should be indicated.

2. Change of mass of 1000 nuts while changing their height by 1mm should not be more than 6,5 kg.

2.8 Acceptance rules are under GOST 17769-72.

2.9 Testing methods are under GOST 1759 -70.

2.10 Control of quality of zinc coating is under GOST 9.302 -79.

2.11 Zinc coating on nuts should be controlled by appearance and width under GOST 9.301 -78.

2.12 Nuts should be shipped in complete with bolts for rail fastening
It is allowed the transportation of nuts as separate articles. In this case the packing of nuts and tare marking is under GOST 18160-72.

GOST 19115 -91

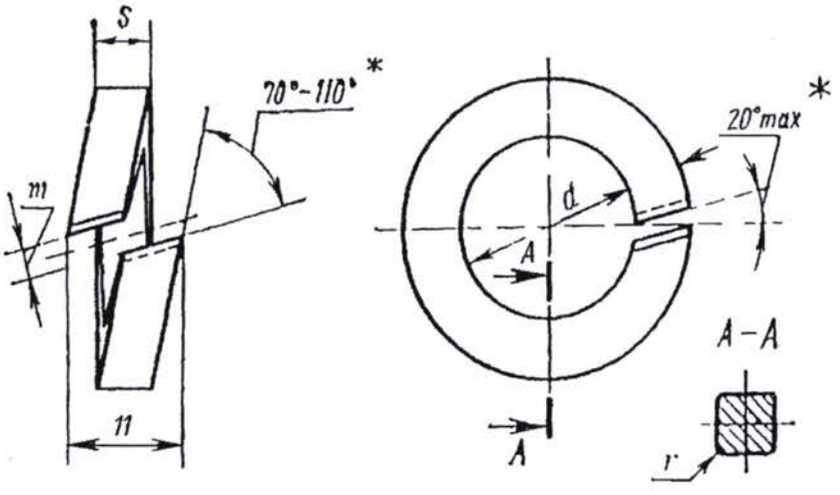
Railway spring washers.

This standard covers single- turn spring washers accuracy class C, used in construction of permanent way of railway lines

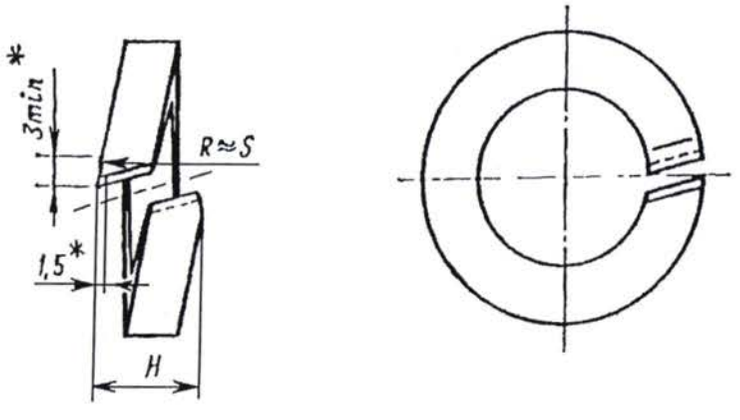
1. DESIGN AND DIMENSIONS

1.1 Designs and dimensions of spring washers should be in compliance with those indicated on drawing and in table

Performance I



Performance II



$$m \leq 0,7(s+1,05)$$

* Dimensions are provided by the tools

Legends on the drawing: d-washer diameter; s-washer depth; b-washer width.

Rated diameter of the bolt tread			22	24	27
d (supposed deviation ± 1,05)			24	26	29
Cross section (supposed deviation ± 0,45)		s	8	9	10
		b			
r, not more			2,0		
H for performance	1	Not less	13,5	15,0	16,5
		Not less	18,5	20,0	23,0
	2	Not less	12,5	14,0	15,5
		Not less	17,5	19,5	22,0

Example of the spring washer's legend by performance 1 for the bolt by diameter 22mm, from steel of mark 65Г, without protective coating:

Washer 22 GOST 19115 -91

The same, performance 2:

Washer2. 22 GOST 19115 -91

The same, from steel of grade 60C2A:

Washer 2.60C2A2 GOST 19115 -91

Washers of performance 2 are made under the agreement between the Manufacturer and the Customer

2. TECHNICAL REQUIREMENTS

2.1 Main technical requirements are under GOST 6402.

2.2 Spring washers should be made from the wire under GOST 11850, from steel of grade 65 Г, 60 C2A or other grade of steel with mechanical properties not lower than for steel of grade 65 Г under GOST 14959. In case of use of steel of grade 60C2A or other steel, the grade of steel is indicated in legend.

2.3 Under the requirement of the Customer each washer after the thermal treatment should be subject to trice-repeated reduction until the flat condition.

2.4 At control checking of elastic properties after the reduction of washers until the flat condition during 24 hours the reduction of H size should not exceed 0,8 mm.

2.5 Theoretical mass of washers is indicated in Annex.

2.6 Temporary anticorrosion protection, washers package and tare marking are under GOST 18160.

3. ACCEPTANCE

Rules of acceptance are under GOST 17769 for the goods of accuracy class C.
The volume of the lot from 10001 to 35000 pieces

4. CONTROL METHODS

Control methods are under GOST 6402, except checking viscosity

5. MARKING, PACKING AND TRANSPORTATION

Washers transportation is carried out by any type of transport in accordance with the transportation rules existing for this type of transport.

Annex Reference

Rated diameters of the bolt tread, mm	Theoretical mass 1000 washers, kg
22	49,1
24	67,9
27	93,4

GOST 21797 -76

Two-turn spring washers for railway track

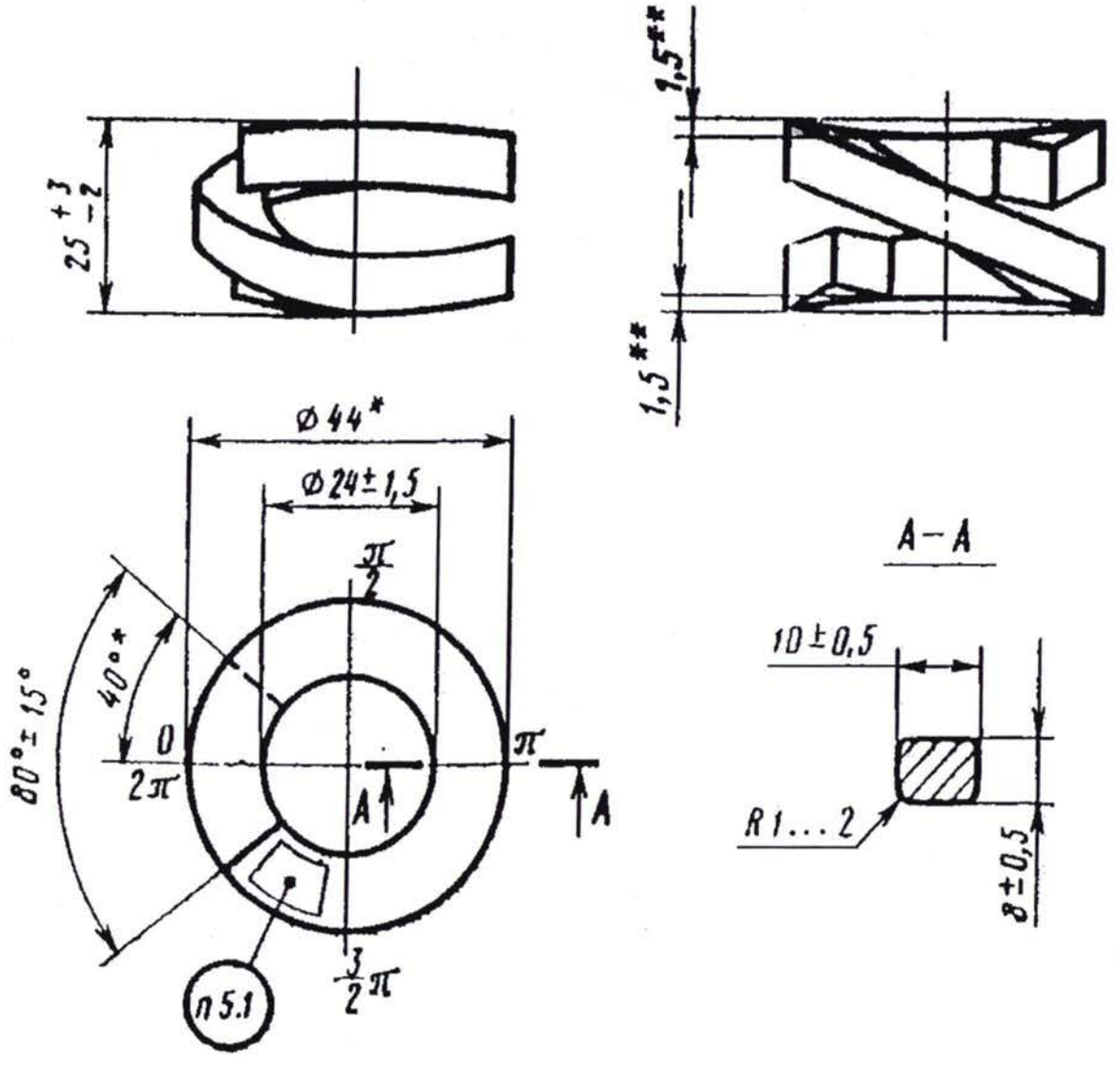
Standard non-observance is prosecuted under the Law.

This standard covers two- turn spring washers intended to be used with bolts of diameter 22mm in constructions of the permanent way of the railway track

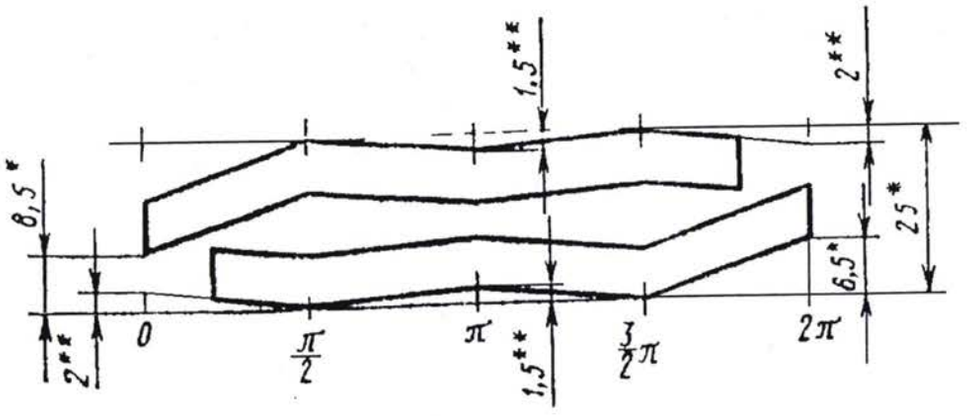
1. DESIGN AND DIMENSIONS

1.1 Designs and dimensions of spring washers should be in compliance with those indicated on drawing 1 and 2

Performance I

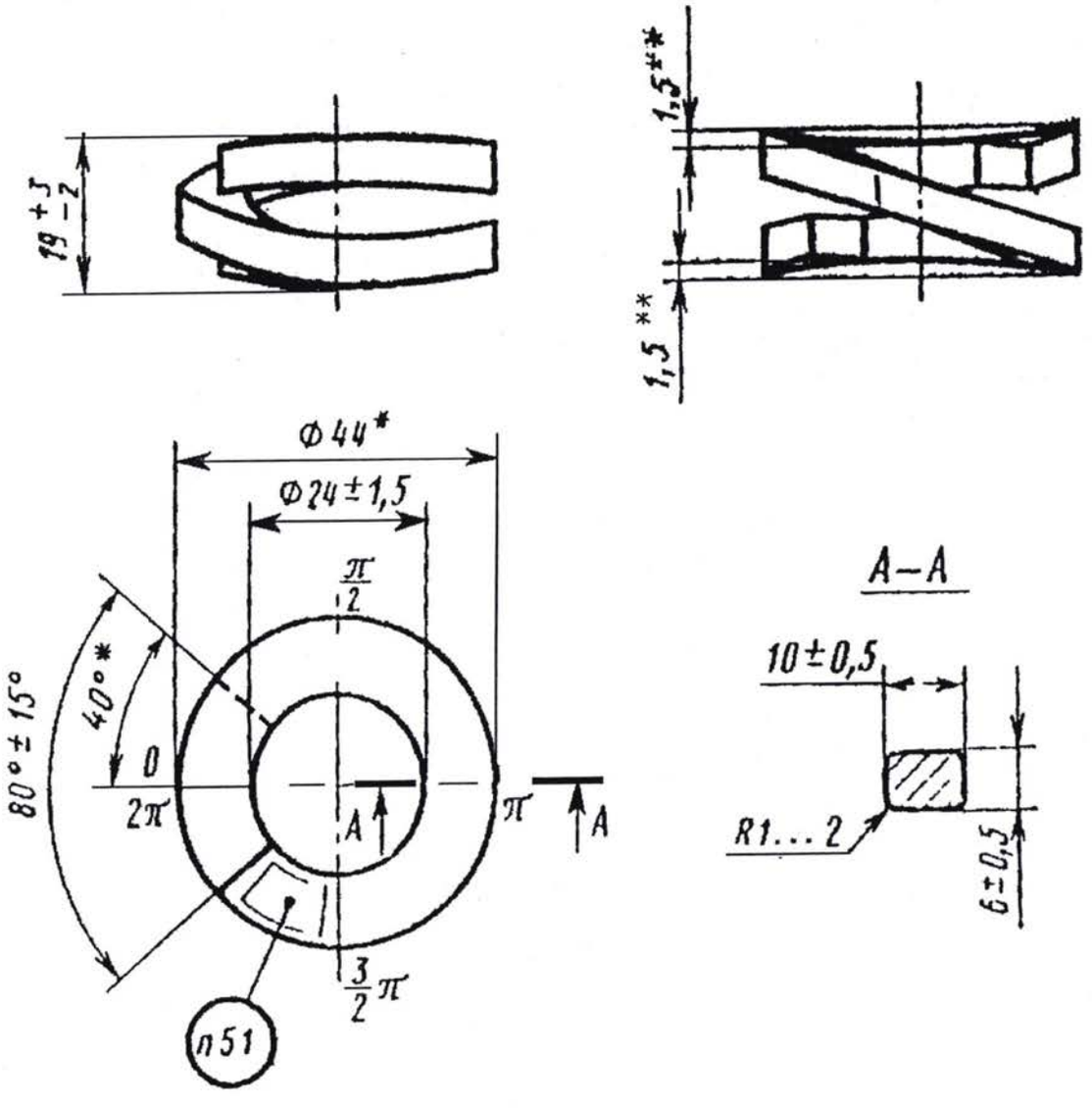


Detailed position for tool's structure

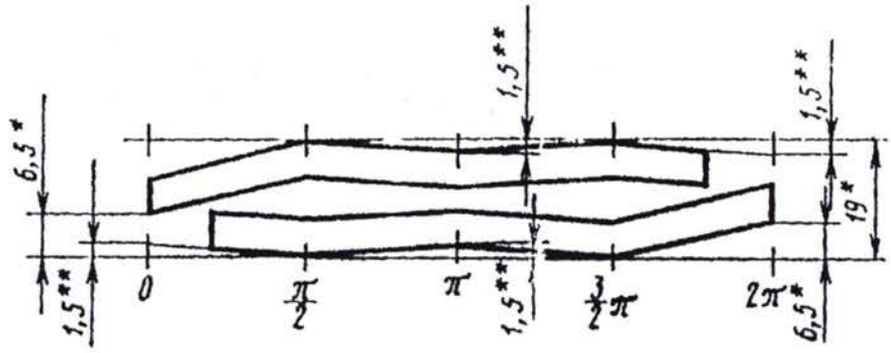


* Reference dimensions
** Dimensions are provided by the tools

Performance II



Detailed position for tool's structure



* Reference dimensions
** Dimensions are provided by the tools

Example of two-turn spring washer's legend by performance 1 from steel of grade 69C2A without protective coating:

Two-turn washer 24 GOST 21797 -76

The same, performance 2:

Two-turn washer 2. 24 GOST 21797 -76

The same, zinc coating with chromate treatment with width 12mkm:

Two-turn washer 2. 24.01.12 GOST 21797 -76

The same, from steel of grade 60C2:

Two-turn washer 2. 24.01.60C2.01.12 GOST 21797 -76

Note. Graphic legend of the two-turn washer in design documentation should correspond to drawing 3.

2. TECHNICAL REQUIREMENTS

2.1 Two-turn spring washers should be made from steel of grade 60C2A under GOST 6402.
It is allowed to make washers from steel of grade 60C2 under GOST 14959-69 or from steel of other grades with mechanical properties not lower than the above-said steel. In this case steel grade is indicated by legend.
Note: It is allowed to mage two-turn spring washers from steel of grade 65Г under GOST 14959 -79 or GOST 1050-74.
(Changed edition, Changed № 1)

2.2 Washers should be made without metallic coating.
Under the agreement of the Manufacturer with the Customer spring washers are allowed to be made with zinc coating with chromate treatment. Hydrogen brittleness of washers which appeared in the process of coating should be taken away.

2.3 On the surface of the washers there should not be blisters, cracks, bubbles, exfoliations and collar marks. Calx availability on the surface of the washers and torsion (propellerness of turns) are not considered to be defects.

2.4 On the surface of the washers it is allowed the marks like dent and burrs by the depth not more than 0,5 and by width to 5mm from falling, winding and molding instrument. Under the requirement of the Customer each washer after the thermal treatment should be subject to trice-repeated reduction until the flat condition.

2.5 On the surface of cut ends it is allowed chips of metal by depth not more than 1,5 mm and burrs by height not more than 1,5 mm.

2.6 Outside diameter of the washer in compressed condition should not exceed 48,5 mm.

2.7 Thermally treated two-turn spring washers should have hardness HRC 40... 50.

2.8 Each washer after thermal treatment should be subject to thrice-repeated reduction until the height:

- 18 ± 0,5mm or by effort of 5000 kgs – for the washers of performance 1;
- 14 ± 0,5mm or by effort of 4000 kgs – for the washers of performance 2;

After the trice-repeated reduction washers height should be within the limits indicated in drawings 1 and 2.

2.9 At control checking of washers elastic properties for lengthy placing under tension the washers height (after keeping trice-repeated washers reduction in reduced condition during 24 hours) should not be reduced more than , mm

- 1,8 – for the washers of performance 1;
- 2,0 for the washers of performance 2.
-

Washers height after trice-repeated reduction is taken as the initial one.

2.10 After trice-repeated reduction (P.2.8) and control checking of elastic properties (P.2.9) washers should not have breakages and cracks..

2.11 Mass (reference) of one washer, kg:

- 0,120 of performance 1;
- 0,090 of performance 2.

3. ACCEPTANCE RULES

3.1 The manufacturer should carry out acceptance tests to check the compliance of two-turn washers to the requirements of this standard.
Each lot of two-turn spring washers should be tested for their compliance with the requirements of p.p. 1.1, 2.1 -2.10.

3.2 Two-turn spring washers should be subject to acceptance by lots under GOST 17769 -72 for the goods of rough accuracy. Number of washers in a lot should not exceed 50 000 pieces.

4. CONTROL METHODS

4.1 It is necessary to check dimensions of two-turn spring washers (p.p. 1.1 and 2.6) by gages and universal measurement tools. Design and dimensions of gages are given in recommended Annex.

4.2 Appearance of two-turn spring washers (p.p. 2.2 - 2,5, 2.10) should be checked visually without use of magnifying devices.

4.3 While checking outer diameter (p.2.6) washers are reduced until the height, mm:

- 20 ± 1 for performance 1;
- 16 ± 1 for performance 2;

4.4 Hardness of spring washers (p.2.7) is checked under GOST 9013 -59 after the removal of the surface layer in the place of measurement at the depth of not less than 0,2 mm.

4.5 For lengthy placing under tension test (p.2.9) spring washers separated from each other by flat washers are put on the bolt's core of diameter not less than 16mm and reduced until the height, mm:

- 18,7 ± 0,2 for performance 1;
- 14,7 ± 0,2 for performance 2;

In such state the washers are fixed and kept during 24 hours.
It is allowed to carry out testing of each washer separately.

5. MARKING, PACKING AND TRANSPORTATION

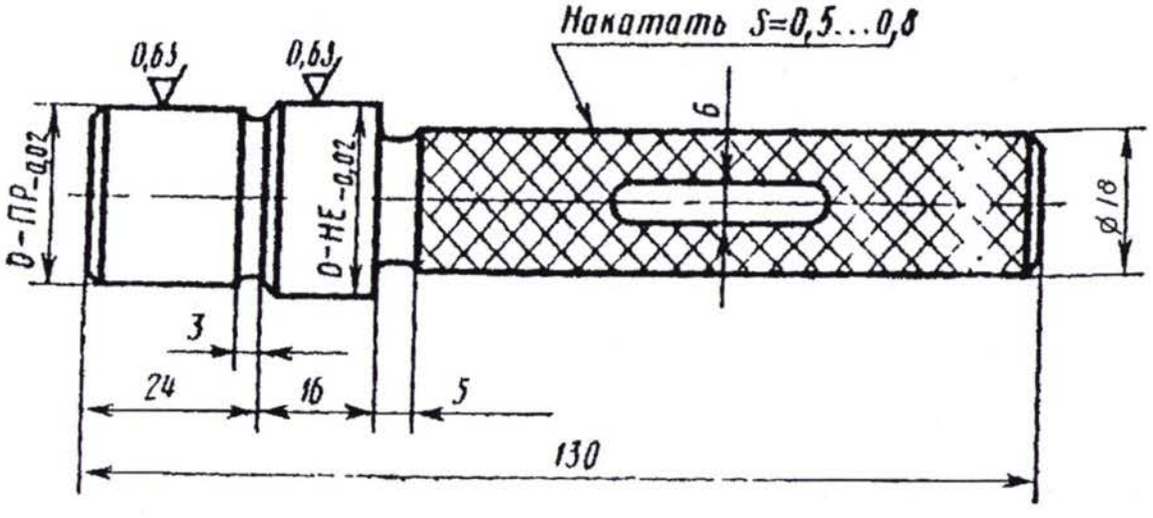
5.1 On each washer in the place indicated in drawings 1 and 2 there should be the following marking:

- legend (figures and letters) or trademark of the manufacturer;
- year of production (two last figures)

Note. It is allowed not to mark washers if they are produced on the equipment which do not provide its marking.

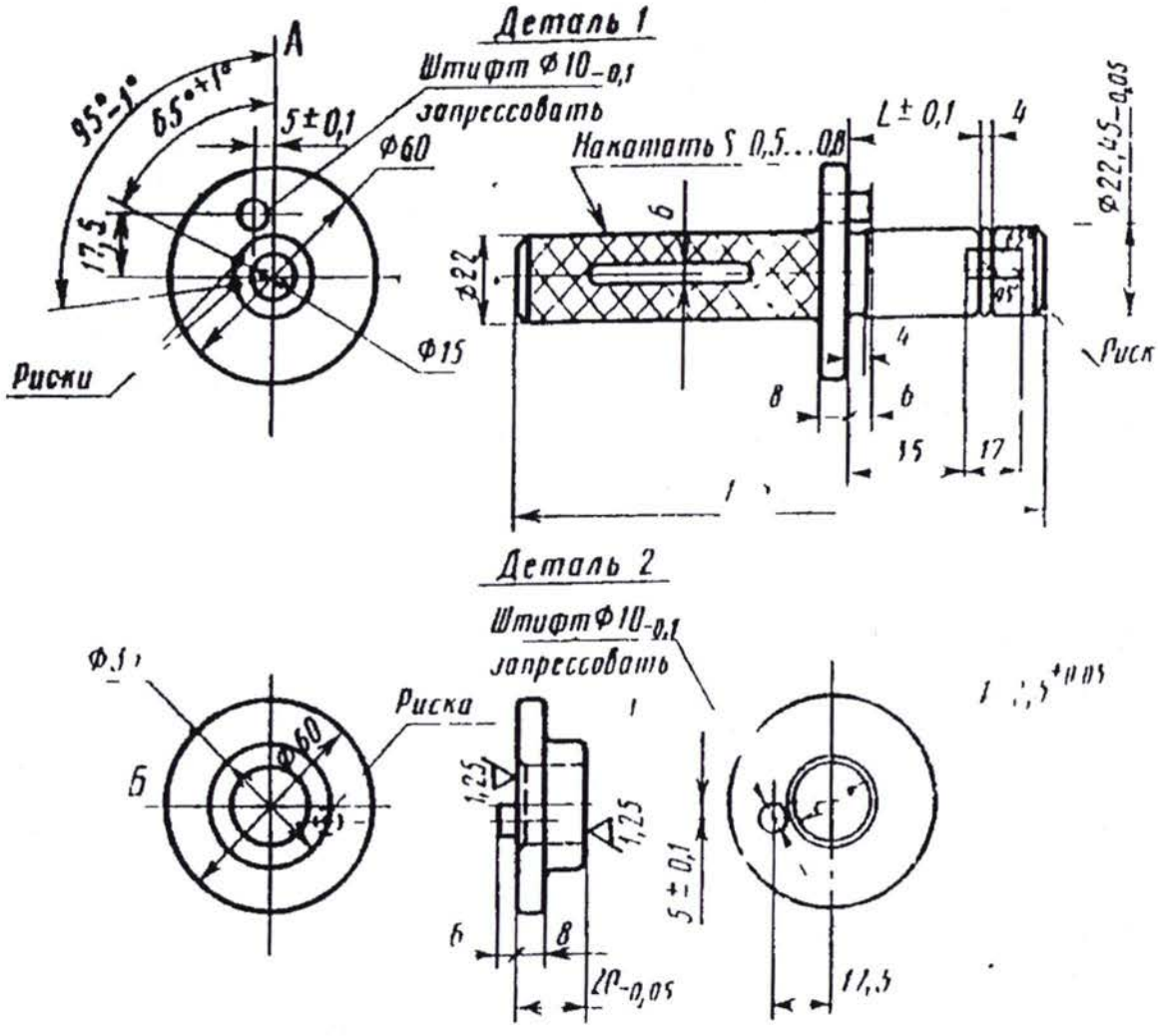
5.2 Washers packing and tare marking is under GOST 18160 -72.
Washers are allowed to be packed into tare of mass net to 2, 5 ton.
Under the agreement with the customer it is allowed not to pack spring washers.
Under the agreement with the customer it is allowed to transport spring two-turn washers without packaging by any type of transport except the railway transport.

Annex



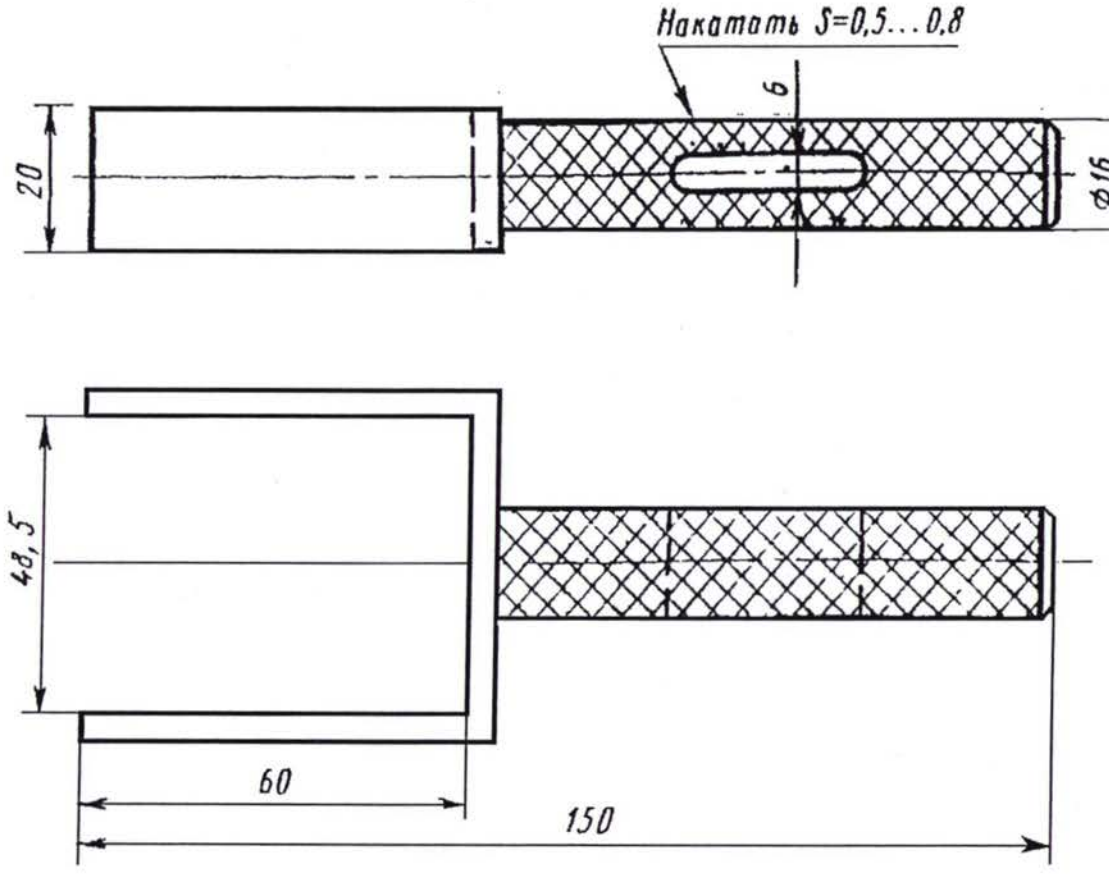
mm

Washers inner diameter f		D-ПР	D-НЕ
Rated	Supposed deviations		
24	±1,5	22,54	25,5



mm

Washers cross section dimension	1
6X 10	38
8X10	44


Накатать S=0,5...0,8
6
20
Ø16
48,5
60
150

GOST 22343 -90

Clamps of individual rail fastening of railway.

This standard covers rigid clamps ПК (hereinafter clamps) used for rails fastening in individual rail fastenings on reinforced and wooden sleepers.

1. DESIGN AND DIMENSIONS

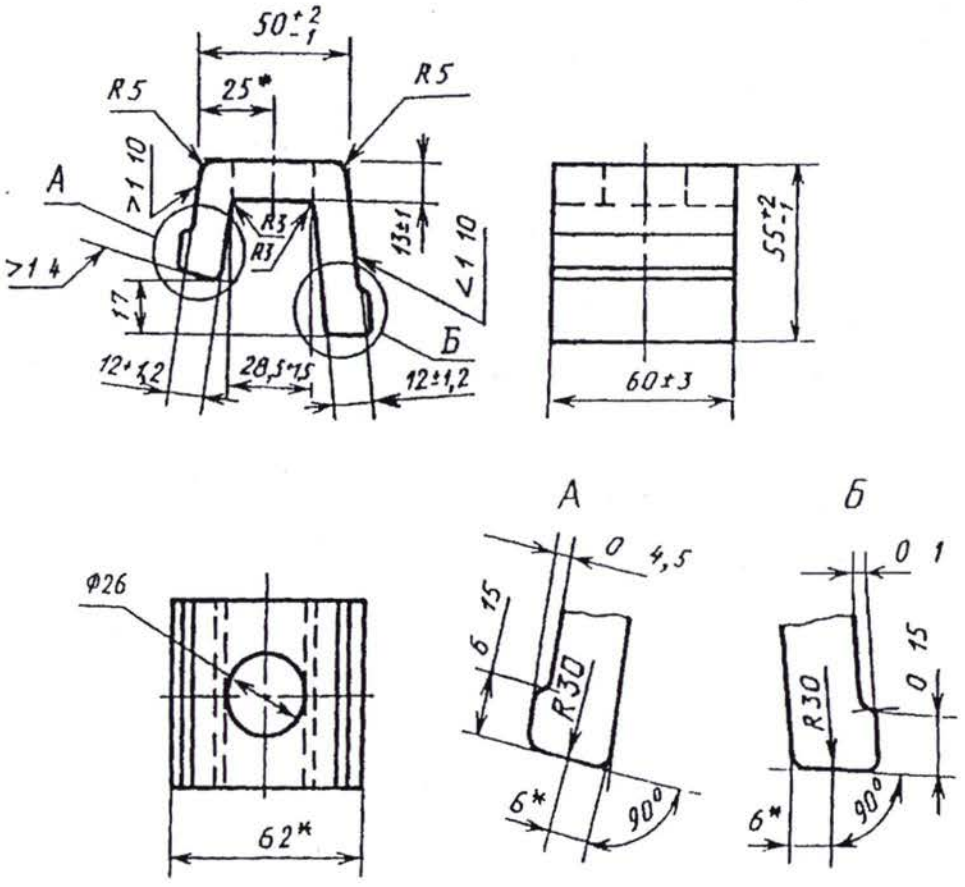
1.1 Clamp design and dimensions should be in compliance with those indicated on drawing 1.

Example of clamp's legend:
Clamp ПК GOST 22343 -90

1.2 Not indicated limit deviations ± 1,0 mm serve for profile construction and in ready clamps are not controlled. Limit deviations of holes dimensions from the side of punching are ± 1,0 mm.

1.3 Sectional area of profile and clamp's mass are indicated in Annex 1.

PK clamp



* Dimensions for reference

2. TECHNICAL REQUIREMENTS

2.1 Clamps should be made from bars rolled from steel of grade Ст4кп, Ст4пс, Ст4сп under GOST 380, categories 1 or 2 under GOST 535.

2.2 Surface of abutment of the clamp to the rail foot and plate should be even. It is allowed uniform longitudinal convexity of clamps surface abutment to the rail base and plate not more than 1,0 mm.
Concavity of the surface of clamp abutment to the rail base is not allowed.

2.3 Cracks, rolling marks and other surface defects with the depth of more than 1,0 mm are not allowed.
Mark from chisel on the crossing of vertical and horizontal planes of the clamp near the hole from the side of punching is not allowed.

2.4 Surfaces of the clamp ends and holes for clamp bolts should not have the marks of shrinkage like cracks- splitting.

2.5 Surfaces of the clamp's ends should be perpendicular to the longitudinal axis. It is allowed obliquity of cut in horizontal and vertical planes of the clamp not more than 3,0 mm.
It is allowed wave, chip of metal on the end surface of the clamp in vertical plane not more than 4,0mm, dents from mould (stencil) with the depth of not more than 1,5 mm. It is allowed on the supportive surfaces of the clamp dents from knife not more than 3,00 mm and metal tightening not more than 3,00 mm with smooth transition to basic surface at the distance of not more than 15 mm from the end.

2.6 At insertion of the holes for clamp bolts replacement of the hole from the central location in longitudinal direction is allowed, at this minimum size from the edge of the hole to the clamp end should be not less than 15 mm.

2.7 Burrs on the clamp's ends near holes for clamp bolts and on the outer not working surfaces of the clamp with the height of not more than 1,00mm are allowed.
On the working surface of the clamp's legs in the place of metal tightening the burrs with the height of not more than 1,5 mm which do not come out of the limits of the working surfaces are allowed.

2.8 In the places of rollers cutoff points nib not more than 1,5 mm is allowed.

3. ACCEPTANCE

3.1 For quality control of clamps production acceptance tests should be carried out at which one should check:

- appearance and basic sizes (points 1.1, 2.2 – 2.8):
- mechanical properties (point 2.1)

3.2 Technical acceptance of ready clamps is done by the inspector of the Ministry of Railways in accordance with the requirements of this standard.

3.3 Clam[s should be prepare for acceptance by lots, by mass not more than 20 ton.

3.4 For visual inspection and checking of basic dimensions (points 1.1, 2.2 -2.8) not less than 1% of clamps from each lot are selected.

3.5 Samples to determine mechanical properties of steel (point 2.1) should be cut along the rolling direction from the support angle of clamp's profile. Two samples from each melting are tested.

3.6 When in the sampling at least one clamps can be found with concavity of the surface of abutment to the rail's base and to plate or deviations in sizes in five or more clamps then the lo should be subject to regarding and to be prepared for acceptance again. When the results of tension test are not satisfactory then repeated testing of the double amount of samplings are to be carried out. Results of repeated test are considered to be final and cover the whole lot.

3.7 At acceptance of clamps which went through acceptance tests the document is made up which verifies the compliance of clamps with the requirements of this standard in which the following should be indicated:

- name of the manufacturer and its address;
- clamp's legend;
- designation of the standard due to which clamps were made and
- accepted;
- number of the lot;
- number of clamps in pieces and mass of the lot.

Above said document should be signed by technical control department of the manufacturer and by the inspector of the Ministry of Railways.

4. CONTROL METHODS

4.1 Quality of the clamp's surface is controlled visually. Defects availability and their depth are checked by trial cutting or other method which can provide the correctness of determination.

4.2 Geometrical sizes and straightforwardness of the clamp are checked with the help of measurement tools under GOST 8326, GOST 166, GOST 2216 or by templates given in Annex 2.

4.3 Test for tension (point 3.5) is carried out under GOST 1497 on round samples of fivefold length by diameter 10 mm. At relative lengthening compliant with norms indicated in GOST 535, upper value of resistance is not limited.

5. MARKING, PACKING AND TRANSPORTATION

5.1 For each lot of the clamps two metallic tags(labels) are hanged on which the following should be indicated:

- trademark or legend of the manufacturer;
- number of the lot;
- mass of the lot;
- mark of the technical control of the manufacturer and inspector of the Ministry of railways.
- Tags(labels) should be securely tied by the wire to two clamps of each accepted lots.

5.2 Clamps should be with attached document, verifying the compliance of clamps with the requirements of this standard made up in accordance with point 3.7.

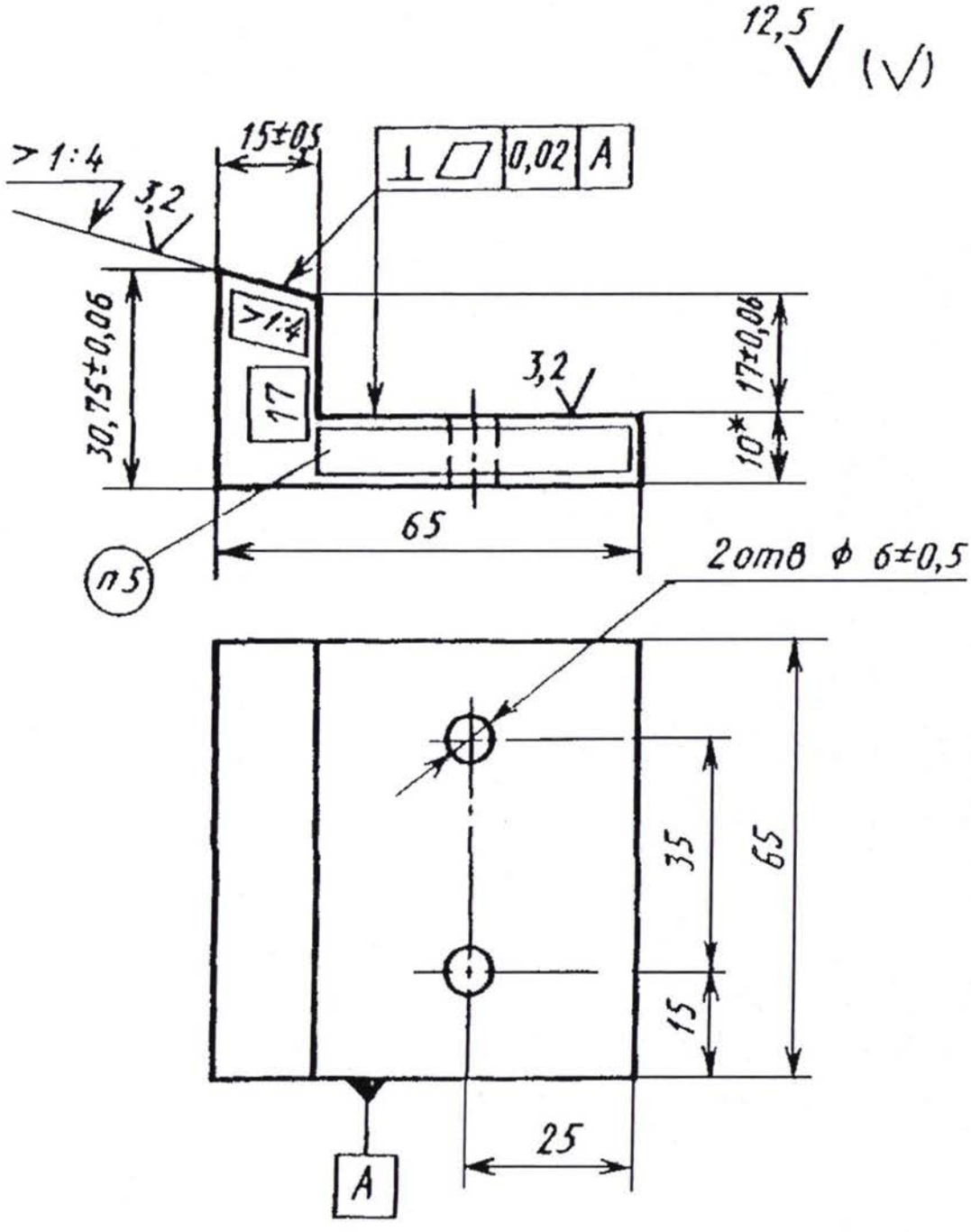
5.3 Clamps transportation is carried out without packing by any type of transport in accordance with the existing rules of cargo transportation.

Annex 1
Reference

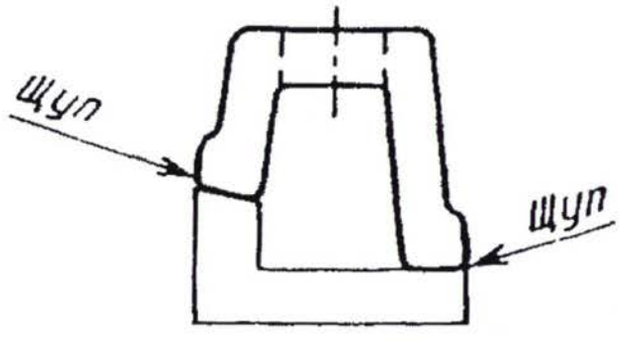
Sectional area of the profile, sm2	**Mass. kg**	
	1 m of roll	**One clamp**
14,7	11,5	O,64

Note: Mass of clamps is determined due to rated dimensions and steel solidity 7850 kg/m3

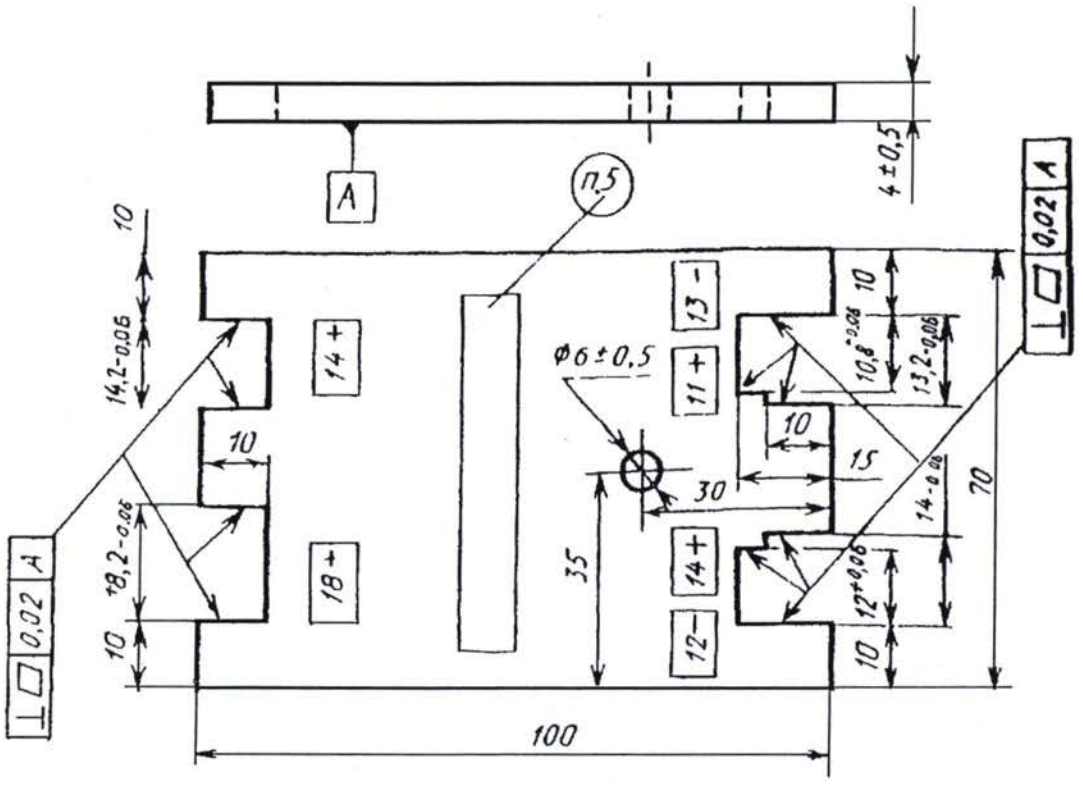
Device for measurement of the dent and metal tightening on support surfaces



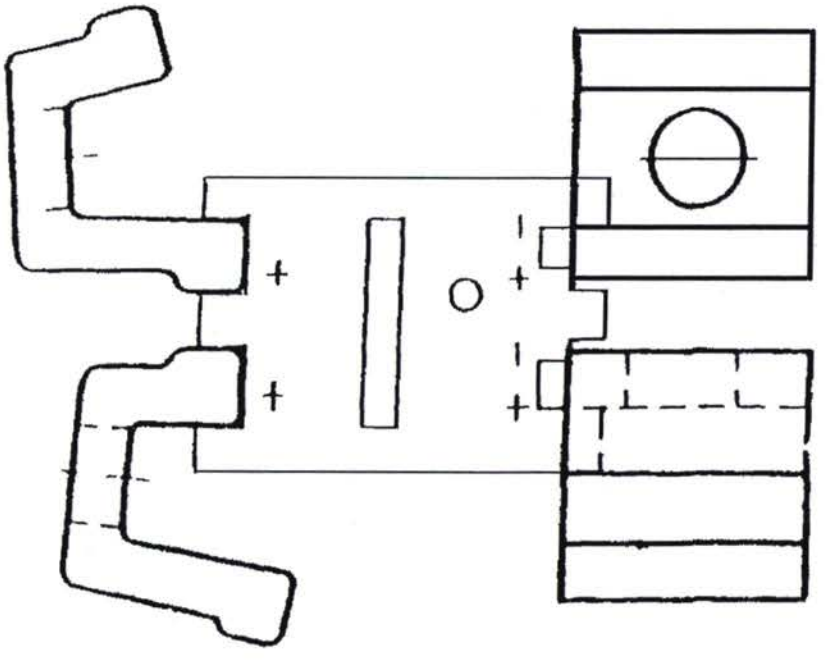
Метод контроля

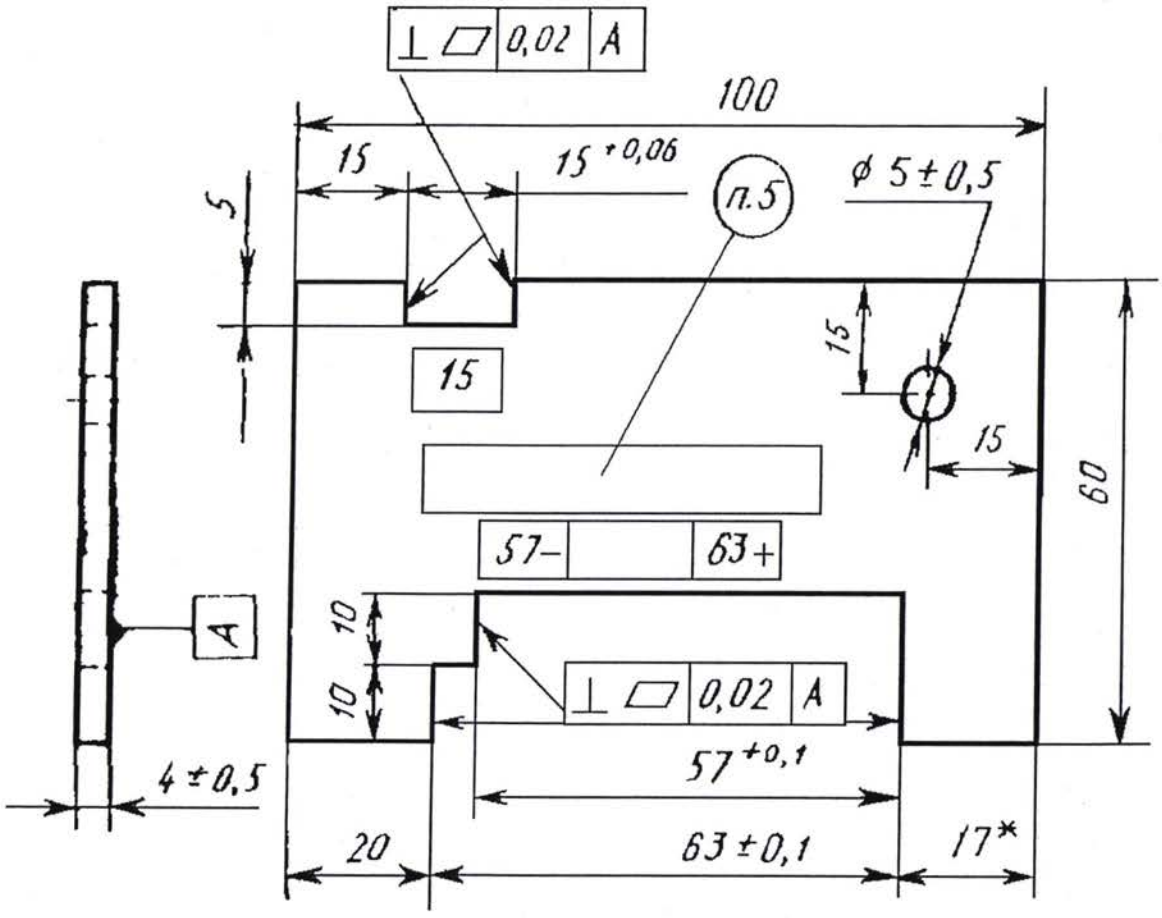


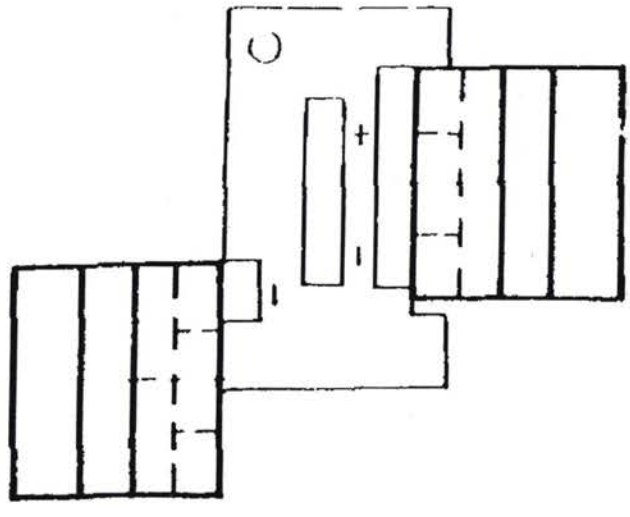
The template to measure clamp's sheet width (plus and minus) height of the not more then 2,0 mm



Control method







* Dimensions for reference

NOTES:

1. Not indicated tolerances of dimensions ± 1mm.
2. Hardnes59...65 HRSa.
3. Cemented, depth of not cemented layer 6.0...1.0mm.
4. Sharp edges.
5. Mark: clamp PK GOST 22343, shop's number of the pattern.

GOST 7392-85

Crushed natural stone for railway ballast.

Non-observance of the standard is prosecuted under the Law.

This standard covers crushed natural stone received by crushing of rocks and used for public railway ballast, as well as for the railways of the entities and organizations of the Soviet Union. Crushed stone should be used in accordance with the building norms and rules and other normative documents, approved in the established order.

1 Technical requirement

1.1 Crushed stone should be prepared to meet the requirements of this standard.

1.2 Depending on the type of initial rock the crushed stone can be done: from rocks; detritus and gravel.

1.3 There are the following indications requirements to the crushed stone; kernel composition; particle content with the sizes of less than 0,16mm; crushed kernels (granular) content (in the crushed stone from boulders and gravel); durability; content of kernels (granular) of soft rocks, content of clay in lumps; frost resistance, electro insulation properties.

1.4 Depending on the fineness of the kernels (granular) the crushed stone (ballast) is divided into fractions, kernels' (granular) sizes of which should be in compliance with the indicated ones in table 1.

Table 1

Kernels (granular)size fraction, mm	**Number of kernels (granular)**				**Full residue on the sieve with the holes of diameter 40 mm, % by mass**
	larger than upper nominal size		smaller than the lower nominal size		
	In the limits of sizes , mm		% by mass , not more		
			total	including the particles by size less 0,16 mm	
From 25 to 60	From 60 to 70	5	5	1,5	From 25 to 75
	Over 70	0	-	-	
From 5 to 25	From 25 to 40	10	5	2	-
	Over 40	0	-	-	-

Note:

1. At operating plants when there available the activities on transition to produce standard ballast of fraction 25-60 mm for the period of reconstruction but not later than 1991 it is allowed the production of ballast of fraction 25-70 mm. At this the number of kernels (granular) by size from 70 to 90, should not exceed 5% of total mass of ballast. Due to

other indications kernel (granular) content of fraction 25 to 70 mm. should be in compliance with the values established for fractions from 25 to 60 mm.

2. At the plants operating on the base of gravel-boulder deposits with the content in rock mass of large fractions which do not provide necessary number of crushed kernels (granular) in the ballast is allowed under the permission of the Ministry of Railways to produce the ballast with kernels (granular0 of the size from 5 to 40 mm, at this the number kernels(granular) in such ballast with the size of 40 to 70 mm should not exceed 5% of total ballast mass and kernels (granular)with the size of less than 5mm – not more than 5% of total mass including the particles with the size less than 0,16 mm – not more than 2%.

3. Under the agreement with the consumer the ballast with kernels of size from 5 to 25 mm can be used in construction, At this due to kernel (granular)content it should be in compliance with the requirements of this standard and due to other indications to be complied with the requirements of GOST 8267-82, GOST 10260-82.

On the railways of public usage ballast of fraction from 25 to 60 mm and from 25 to 70 mm is intended for re- ballasting of main lines, ballast of fractions from 5 to 25 mm for re-ballasting of stations and approach tracks.
On the railways of industrial railway transport the usage of ballast of different fractions is regulated by the branches rules for repair and maintenance of enterprises railways.

1.5 Ballast from detritus (boulders) and gravel fractions of size 25 to 60 mm should contain crushed kernels (granular) in the amount of 50% by mass. Kernels (granular) are to be considered crushed when their surface is broken by half. In ballast of fraction from 5 to 40 mm crushed kernels (granular) should not be more than 40% and fractions from 5 to 25 mm – not less than 35 %.

1.6 Ballast durability (strength) is characterized by its abradability while tested in the shelf drum or its resistance to hammering while tested at the end of ПМ. Depending on the indications of mechanical strength ballast is divided into marks indicated in tables 2 and 3.

Table 2

Ballast mark	Abradability (loss in mass), %
Ballast of fractions from 5 to 40mm, from 25 to 60mm and from 25 to 70 mm	
И20 И40 И50	To 20 Over 20 to 40 Over 40 to 50
Ballast of fraction from 5 to 25 mm	
И20м И40м И50м	To 20 Over 25 to 50 Over 50 to 65

Table 3

Ballast mark	Resistance to hammering
Y 75	Over 75
Y50	Over 50 to 75
Y40	Over 40 to 50
Note: All fractions of the ballast except fractions from 5 to 20 mm are subject to test for hammering resistance	

1.7 For ballast layer of the railway the ballast of the following marks due to strength should be used: и20, И20мб И40, И40м or У75, У50. Production of ballast marks И50, И50м and Y40 is allowed only on operation ballast plants, and its usage for the ballast layer of the railways under the permission of the Ministry of railways – when there available special feasibility studies.

1.8 Ballast should not contain kernels (granular) of weak rocks in the amount of 10% by mass. To the weak rocks one can refer the rocks with the limit of strength at compression in saturated by the water condition up to MPa (200 kg/sm2).

1.9 In the ballast of fractions from 25 to 60 mm, from 25 to 70mm and from 5 to 40 mm there should not be clay lumps, soil of the vegetative and other organic particles. In the ballast of fraction from 5 to 25mm the content of clay lumps should not be more than 0,25 % by mass with total amount of particles less than 0,16mm.

1.10 Due to frost resistance ballast can be divided into marks under GOST 8267 -82. Ballast of fractions from 25 to 60 and from 25 to 70 should have mark for frost resistance not lower Mpz (frost resistance) 50 of fractions from 5 to 25 and from 5 to 40 mm – not less Mpz (frost resistance)25. It is allowed at the operating plants under the permission of the Ministry of Railways to produce ballast of fractions from 25 to 60 and from 25 to 70 mm with mark for frost resistance Mpz (frost resistance)25. Frost resistance is determined by alternate freezing and thawing of ballast specimen. It is allowed testing in sulfuric sodium.

1.11 Electro insulation properties of the ballast are characterized by electric conductivity of fat solution, formed from ballast solubility in distilled water. Its value should not be more than 0,06 Cm/m. When the volume of fat solution is decreased by evaporation 10 times electric conductivity of received solution should be not more than 0,35 Cm/m.

2. ACCEPTANCE RULES

2.1 Ballast acceptance is done by lot (batches). The lot is considered to be the amount of ballast of one fraction simultaneously shipped to one consumer in one railway train. When ballast is transported by cars the lot is considered to be the amount of ballast of one fraction shipped to one consumer during a day.

2.2 The amount of the delivered ballast is determined by measurement of it in the wagons, cars or other transport vehicles on the place of its shipment. When control measurements of the ballast on the place of unloading its volume is re- measured taking into consideration coefficient of ballast consolidation while transported, established before the delivery under the agreement between the producer and the consumer depending on the transportation distance, kernel (granular) content and

other local peculiarities. Coefficient of ballast consolidation should not be more than 1, 10. The amount of the ballast delivered in weight units the consumer determines, if necessary, by the adjustment of the material volume due to its packed density. Packed density of the ballast is determined under GOST 8269 -76.

2.3 Acceptance quality control of the ballast at the enterprise (quarry)-producer is done in its laboratory within the period indicated in table 4.

2.4 For acceptance quality control of produced ballast the samples are taken from the production line (belt) transporting the ballast to the store house of ready production or the loading bunker (or from the open store house of ready production to the loading bunker in accordance with GOST 8269 -76. Total mass of a sample intended for one testing should not be less than four time exceeding one indicated in table 5.

Average thoroughly mixed sample before being sent to the laboratory is reduced by quartering or with the help of chute deviser under the methodology given in GOST 8269 – 76 until the mass two time exceeding the one indicated in table 5

Table 4

Test description	Period of test conduction	Number of samples for one testing
Determination of kernel in ballast content and particles content in it by the size less than 0,16mm.	Every day	1
Determination of crushed kernel (granular0 content in the ballast from detritus and gravel	Every day	1
Determination of clay in lumps, vegetative soil and other organic admixtures in the ballast content.	Every day	1
Determination of abradability in the shelf drum or hammering resistance on pneumatic pile-driver.	Once a quarter	2
Determination of kernels (granular) of weak rocks in the ballast content.	Every day	1
Determination of frost resistance.	Once a year	2
Determination of electric insulation properties of the ballast	When geological exploration of the deposits and once a year	3

Table 5

Test description	Minimum mass of the ballast sample to carry out one testing, kg			
	ballast of fractions from 25 to 60, from 25 to 70 mm.	**ballast of fractions from 5 to 40mm.**	**ballast of fractions from 25 to 60, from 25 to 70 mm.**	**Ballast sample with the size of kernels (granular)from 25 to 40 mm**
Determination of kernel (granular) composition and content of particles by the size less than 0,16mm.	30	20	10	-
Determination of clay lumps, soil of the vegetative layer and other organic admixture in the ballast content	15	5	1	-
Determination of crushed granular in the content of the ballast from boulders and gravel	15	5	1	-
Determination of abradability in the shelf drum	-	-	10 (2 samples per 5 kg)	20 (2 samples per 10 kg)

Continuation of Table 5

Table 5

Test description	Minimum mass of the ballast sample to carry out one testing, kg			
	ballast of fractions from 25 to 60, from 25 to 70 mm.	**ballast of fractions from 5 to 40mm.**	**ballast of fractions from 25 to 60, from 25 to 70 mm.**	**Ballast sample with the size of kernels (granular)from 25 to 40 mm**
Determination hammering resistance on ПМ.	-	-	-	3 (2 samples per 1,5 kg)
Determination of granular content of soft rocks	15	5	1	-
Determination of frost resistance	-	-	3 (2 samples per 1,5 kg)	5 (2 samples per 2,5 kg)
Determination of electric insulation of ballast properties		-	18 (3 samples per 6 kg)	-

Note: Ballast samples with granular size from 25 to 40 are prepared only for testing by screenings from the ballast fractions of 25-60 and 25-70 mm. To prepare these samples the selected from the conveyer ballast mass is sent to the laboratory without its preliminary reduction.

2.5 The consumer carries out control checking of compliance of the shipped ballast with the requirements of this standard, observing the following order:

- for ballast testing the selection of point samplings is carried out from which by means of integration one can receive control sample;
- at control checking of ballast quality transported by railway transport point samples are selected when the lot's volume if three wagons – from each wagon, when large volume – from any of these three wagons. Each sample is selected from five different places of the wagon (in four corners and in the centre);
- at control checking of ballast quality transported by cars, from each lot with the volume not more than 35 m3 point samples are selected at least from five cars. Each point sample is selected in the centre of car body;

- mass of control sample selected for checking of the lot should be at least t time exceed summary mass of samples for testing indicated in table 5. Reduction of samples to the size required for testing is done by the method of quartering or with the help of chute divisor under the methodology given in GOST 8269 - 76;
- as a result of tests arithmetic mean of parallel determinations, which are provided for the corresponding method, is taken . Granular content is evaluated due to the mean value of results of three parallel tests;
- when the results are unsatisfactory at least on one of indications the test is carried out again. The result of the repeated test is final.

3 TEST"S METODS

3.1 Ballast testing to determine the content of crushed granular in the ballast from boulders and gravel, content of clay in lumps, soil of vegetative layer and other admixtures, abradability in the shelf drum, hammering resistance on pneumatic pile-driver, content of soft rock granular, frost resistance is carried out under GOST 8269 -76. At this the ballast of fraction from 25 to 40 or from 5 to 25 mm is subject to testing in the shelf drum and on frost resistance, the ballast of fraction from 25 to 40 mm is subject to testing in pneumatic pile-driver, and other testing – the ballast of fraction from 25 to 60, from 25 to 70, from 5 to 40 or from 5 to 25 mm correspondingly without dispersing them into fractions provided by GOST 8269 -76.

3.2 Determination of granular content of the ballast and content in it of particles with the size less than 0,16mm.

3.2.1 Equipment

Table cup-shaped scales under GOST 24104-80 or platform one under GOST 23711 -79, drying chamber.
Sieves with round holes of diameter 70; 60; 40; 25; and 5 mm.
Ring caliber of diameter 90mm.
Sieves with mesh № 1 and 0,16 under GOST 3584 – 73.

3.2.2 Testing procedure

Ballast sample by mass indicated in table 5 is dried in the dry chamber until steady mass (G)

The dried sample of ballast pours out into the vessel pour out water and mix energetically. After mixing the received turoid (muddy) water is dumped through protective sieves with the holes of diameter 5 mm, with mesh of 1 and 0,16 mm, and ballast pour out on the upper sieve and washed by clean water until the flowing water is clear. Washed in such a manner ballast remained on the sieves with the holes of diameter 5mm and cells 1 and 0,16 mm, is combined and dried in the dry chamber until steady mass (Go). The dried sample of the ballast is bolted (sift) through a set of sieves with the holes of size:

- 70; 60; 40; and 25 mm – when ballast of fraction from 25 to 69 mm;
- 40; 25 and 5 mm – when ballast of fraction from 5 to 25mm;
- 60; 40 and 25 mm, as well as ring caliber by diameter of 90mm – when ballast of fraction from 25 to 70 mm;
- 70; 40 and 5 – when ballast of fraction from 5 to 40mm.

Ballast granular which do not go through the ring-caliber, remainder on each sieve and the ballast which went through the sieve with the holes of diameter 25 mm (or 5 mm when the ballast of fraction from 5 to 25) are weighed separately.

3.2.3 Results treatment

Granular content of the size more than 70mm (X70); 60mm (X60);

40mm (X40); 25mm (X25); 5mm (X5) and of size less than 25 mm (X-25); 5mm (X-5); 0,16mm (X-16) in per cent is calculated under the equations:

$$X70 = \frac{G70}{G} \times 100 ; \qquad X40 = \frac{G40}{G} \times 100 ;$$

$$X60 = \frac{G60}{G} \times 100 ; \qquad X25 = \frac{G25}{G} \times 100 ;$$

$$X5 = \frac{G5}{G} \times 100 ;$$

$$X\text{-}25 = \frac{G\text{-}25}{G} \times 100 ;$$

$$X\text{-}5 = \frac{G\text{-}5}{G} \times 100 ;$$

$$X\text{-}0{,}16 = \frac{G - Go}{G} \times 100$$

Where G70, G60, G40, G25, G5 – remainders on the sieves with the holes of diameter, correspondingly, 70; 60; 40; 25, and when analyzing the ballast of fraction from 5 to 25 mm on the sieve with the holes of diameter 5mm;

G-25, G-5, G -0,16 – the ballast mass which went through the sieve with the holes of diameters 25; 5 and 0,16 mm.

Full content of the particles with the size of less than 25 mm (X-25n) or, correspondingly, less than 5 mm (X-5n) for the ballast of fraction from 5 to 25 mm in per cents is calculated under the equations:

$$X\text{-}25n = X\text{-}25 + X\text{-}0{,}16;$$

$$X\text{-}5n = X\text{-}5 + X\text{-}0{,}16.$$

Checking of granular availability with the size of more than 90 mm in the ballast of fractions 25 – 70 mm is carried out with help of ring-caliber of diameter 90mm.

3.3 Determination of electric insulation properties of the ballast

Electric insulation properties of the ballast is determined due to electric conductivity of fat solution which received at the ballast dilution in distilled water.

3.3.1. Equipment

Amperemeter of AC, class 1,0 with the scale to 300 mA under GOST 8711-78.
Voltmeter of AC, class1,0 with the scale to 300 V under GOST 8711-78.
Laboratory regulating transformer 250 V x 2A (ЛАТР) .
Transformer 220/24V
Measuring cube made of insulated material (Plexiglas) with internal sizes of 50 x 50 x 50 mm.
Two electrodes with the size of 50x50x1mm.
Sieves with round holes.
A dry chamber.
Table cup=shaped scales under GOST 24104-80.
Cylindrical zinc bucket without markings of volume 10l.

Cylindrical bucket with two markings (belts) on inner wall corresponding to the volume of 3,5 and 4 l.

Vessel for evaporation of the solution with two markings corresponding to the volume of 0,2 and 2l.

A funnel.

3.3.2. *Tests' procedure*

The sample of the ballast of mass 6 kg is ground in laboratory crusher and sifted through the sieve with the holes of diameter 3mm.

The mixture gone through the sieve is put into cylindrical bucket until the marking 4l with equal layers compacting until the steady volume.

Measured in such a manner the volume of mixture is poured out into cylindrical zinc bucket of volume 10 liter, pour out 3,5 l of distilled water and carefully mixed until receiving fat solution,

Solubility of the solution is determined through periodic measurement of its electric conductivity in the measuring cube. After measurement the solution is poured out back into the bucket without markings.

Mixing the solution and determination of its electrical conductivity is carried out until electrical conductivity is stabilized. Stable electric conductivity of the solution testifies that the solution became fat.

Then the fat solution with the volume of 3 liters into the vessel for evaporation and evaporated it until the volume of 0,2 liters. Cooled the received solution up to room temperature, the solution is poured out into the measuring cube and determine its electrical conductivity.

3.3.3 *Determination of electrical conductivity of the solution.*

Electrode are cleaned until lustre and set up on two opposite lateral walls of the measuring cube. The cube is washed by distilled water and pour out into it received fat solution the electrical conductivity of which is to be determined. The level of poured solution should coincide with upper edges of the electrodes. Leads of electrodes are connected with measurement scheme.

The voltage between electrodes to be equal to 5 – 10 V is set by rotation of the handle of the laboratory regulating transformer, and the current which runs through the measuring cube is measured at one and the same voltage between electrodes.

Drawing of the procedure

Electrical conductivity Y is determined under the equation

$$Y = \frac{I}{U},$$

Where I is the strength of the current at fixed voltage, A;

U is the voltage between the electrodes , B

3.3.4 To receive the values of electrical conductivity of the solution it is necessary calculated values of electrical conductivity in compliance with para. 3.3.3 to multiply on constant coefficient 20 for the measuring cube.

4 TRASPORTATION AND STORAGE

4.1. The documents on quality is attached to each lot (batch) of shipped ballast, where it is indicated:

- name of the producer and its address;
- number and date of the document issuing;
- name of the addressee and its address;

- numbers of the wagons, invoices and the amount of the shipped ballast;
- sort of ballast (ballast from rocks or from boulders and gravel) and the name of initial rock;
- fraction of the ballast, granular content, particles availability with the size of less than 0,16mm, availability of granular of soft rock as well as strength and frost resistance of the ballast, content of clay in lumps;
- indicator of electrical insulation properties of the ballast;
- marking of this standard.

4.2. Ballast is kept and transported separately due to fractions, moreover it should be protected from dirtying.

4.3. The ballast is transported by all kinds of transport.

4.4. While being transported the requirements of the Rules of transportation for cargoes and Specifications of loading and strengthening of cargo approved by the Ministry of railways should be observed and also the corresponding rules established by the entities of inland water transport and automobile transport.

4.5. The supplier should follow the measures providing full usage.

GOST 7394 -85
Gravel and sandy-gravel ballast for railway track.

Non-observance of the standard is prosecuted under the Law.

This standard covers gravel and sandy-gravel ballast which is the natural mixture formed as the result of natural destruction of rocks and used as ballast layer of the tracks as well as the roads of enterprises and organization.

Gravel ballast should be used on destination and departure and other station tracks as well as to be used as a pad under the crushed stone and asbestos ballasts; sandy-gravel for small activity station, sidings and connection tracks and as a pad for all kinds of ballasts.

1. Technical requirements

1.1. Gravel and sandy-gravel ballast should be produced in accordance with the requirements of this standard under the technological documentation approved in the established order.

1.2. Depending on granular content of natural sandy-gravel mixture the ballast is divided into the following types:
- gravel;
- sandy-gravel.

1.3. Gravel and sandy-gravel ballast should be characterized due to the following indications:
- granular content;
- content of quartz granular of solid volcanic and isomorphic rocks;
- content of granular of soft rocks;
- content of dusty and clayey particles.

1.4. Granular content of gravel and sandy-gravel ballast should meet the requirements indicated in Table 1.

Table1

Sieve's holes size, mm	**Full remainders on the sieves, % by mass in the ballast**	
	gravel	**sandy-gravel**
100 60 25 5 0,63 0,16	0 To 10 - From 40 to 80 From 70 to 100 From 90 to 100	0 0 To 20 To 50 From 35 to 100 From 85 to 100
Passage through the sieve 0,16mm, %: total including dusty and clayey particles	To 10 To 2	To 15 To 3

1.5. Content of quartz granular and granular of solid volcanic and metamorphic rocks in sandy part of the ballast (fractions with the size less than 5mm) should make up not less than 50% of granular mass with the size from 0,16 to 5mm.

1.6. Content of granular of soft rocks in gravel part of the ballast should not exceed 10% of granular mass with the size more than 5mm. To the granular of soft rock can be referred the granular with the limits of strength at compression in the saturated by water condition less than 20 MPa (200 kgc/sm2).

1.7. Ballast is not subject to quality category attestation.

2. Acceptance rules

2.1 Delivery and acceptance of the ballast is carried out by lot (batches). The lot is considered to be the amount of ballast simultaneously shipped to one customer in one railway train.
When transporting the ballast by cars the lot is considered to be the amount of ballast shipped to one customer during a day.

2.2 The amount of delivered ballast is determined by volume with the help of its metering in the wagons, cars and other transport vehicles on the place of shipment. At control metering of the ballast at the place of its unloading its volume is recalculated with the account of coefficient of compaction at the transportation, set up due tot the agreement of the manufacturer and the customer depending on transportation distance. Compaction coefficient is taken not more than 1,20 for gravel and 1,15 fro sandy ballast.
The amount of delivered ballast can be determined in weight units with the help of recalculation of the material volume by its packed density. Packed density of the ballast is determined under GOST 8735 – 75.

2.3 Acceptance control of ballast quality at the enterprises (quarry) – manufacturer is carried out in his laboratory during the period indicated in Table 2.

Table 2

Test description	Period of testing	Minimum mass of the ballast sample for carrying out of one test, kg
Determination of granular content and particle content of the size less than 0,16mm.	Daily	30
Determination of the content of dust and clay particles by fractional precipitation	Once a quarter and in each case of change geological conditions of pit face	10
Determination of content of soft rocks granular in gravel part of the ballast	Once a year and in each case of change geological conditions of pit face	15
Determination of the quartz granular and granular of solid volcanic and metamorphic mountainous rock content in the sand part of the ballast	At geological exploration works	0,5

2.4 For the acceptance control of ballast quality in the quarry the point sample are selected from the furrow made in the pit face vertically from the edge up to its foundation Cross section of the furrow is 10 x 20 or 15 x 20 sm depending on the size of the material. In the furrow t point samples are selected evenly along the height of the pit face from the edge to it foot. Selected from the furrow point samples are united into middle sample and mixed properly. Middle sample should be not less than four times exceed the mass indicated in table 2.

When determining the ballast quality extracted and laid by the method of hydromechanization, the map of inwash is divided for uniformity in sizes and due to the conditions of inwash of the area with the volume not more than 500m3 each. From each area at least five point samples from different places are selected.The mass of a point sample should be not less than 50 kg. Ballast quality is evaluated for each area separately under the results of testing on selected middle sample. Ballast middle sample before sending to the laboratory is reduced until the mass of 2 time exceeding the indicated in table 2. Reduction of the middle sample is carried out by the method of quartering under GOST 8735-75.

2.5 The customer carries out the control checking for compliance of the shipped ballast to the requirements of this standard observing at this the order given below:

- for ballast testing one should carry out selection of point samples from which by joining up the control sample is received;
- when control checking of ballast quality delivered by railway transport, point samples are selected from each wagon when the size of the lot is three wagons; when the lot is large – from any three wagons. Each point sample is selected from five different places of the wagon(in four corners and in the centre);
- when control checking of ballast quality delivered by cars, from each lot of the volume not more than 350 m3 point samples are selected at least from five cars. Each point sample is selected in the centre of the car body.

Mass of the control sample selected for the checking of the lot should at least 5 times exceed the summary mass of test samples indicated in table 2.
Reduction of samples until the size required for testing is carried out by quartering method or with the help of chute divisor under the methodology given in GOST 8269 - 76. Mean arithmetic value of parallel testing provided for the corresponding method I taken as the result. Granular content is evaluated due to the mean values of three parallel testing results. When testing results are not satisfactory at least for one of the indications the repeated testing for this indication is carried out. The result of the repeated testing is final.

3. Test methods

3.1 Ballast testing to determine granular content and particle content of size less than 0,16mm, content of granular of soft rocks, dusty and clayey particles is carried out under GOST 8269-76. Samples to determine granular content is sifted on the sieves with the holes of size 0,16; 0,63; 5,0; 25,0; 60,0 mm, granular content of size more than 100mm is determined with the help of ring-caliber of diameter 100mm.; Determination of amount of dusty and clayey particles in ballast is carried out by the method of fractional precipitation.

3.2 Content of quartz granular and granular of other volcanic and metamorphic mountainous rock is determined under GOST 8735-75.

4. Transportation and Storage

4.1 Each lot of shipped ballast should be accompanied with the document on quality in which the following is indicated:

- number and date of issuing the passport;
- name of the quarry- supplier and his address;
- name of the addressee and his address;
- number o wagons, invoices and a number of shipped ballast;
- type of ballast (gravel or sandy-gravel);
- granular content;
- content of granular of soft rocks;
- content of quartz granular and granular of solid volcanic and metamorphic rocks;
- content of dusty and clayey particles;
- number of this standard.

4.2 Ballast is transported in the open railway wagons as well as in the cars in compliance with approved in the established order rules of cargo transportation by corresponding type of transport. While transporting by railway transport Specifications of loading and strengthening of cargo approved by the Ministry of railway Infrastructure should be observed.

4.3 While transporting the measures which provide ballast protection from dirtying(pollution) should be observed

4.4 Gravel and sandy-gravel ballast is transported and kept in the conditions preventing the ballast from pollution.

GOST 8193-73

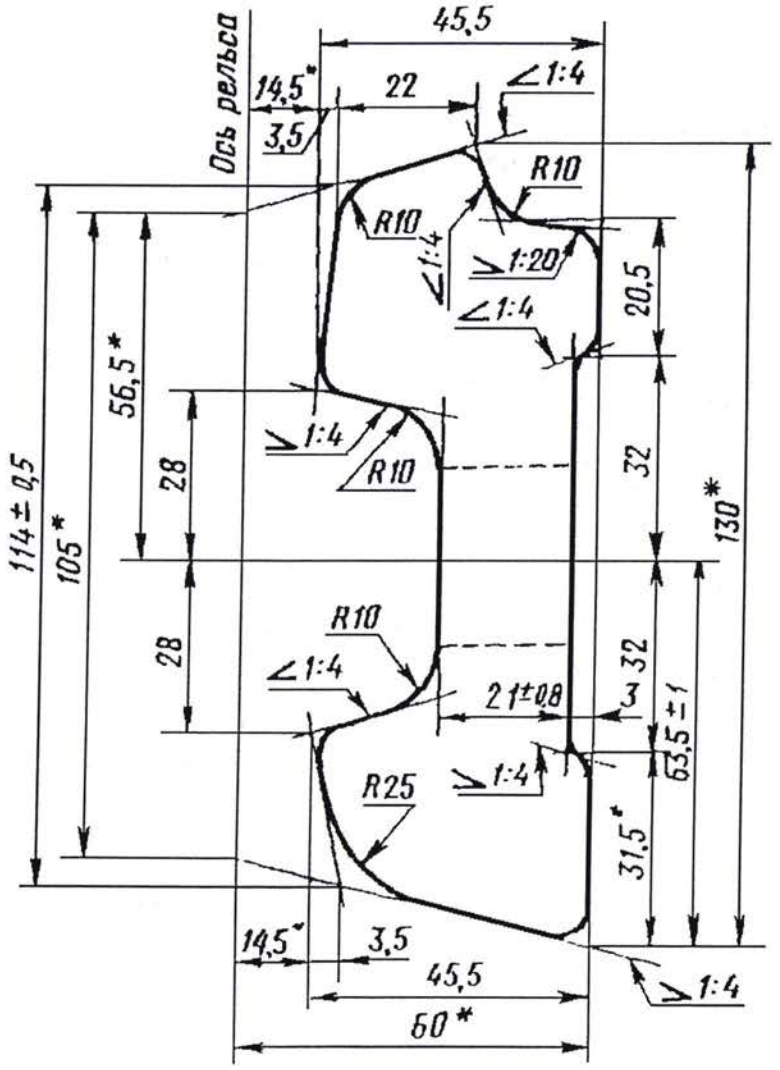
Bull-headed (two-headed) fishplates for rails R65, R75 types. Design(construction) and dimensions.

Non-observance of the standard is prosecuted under the Law.

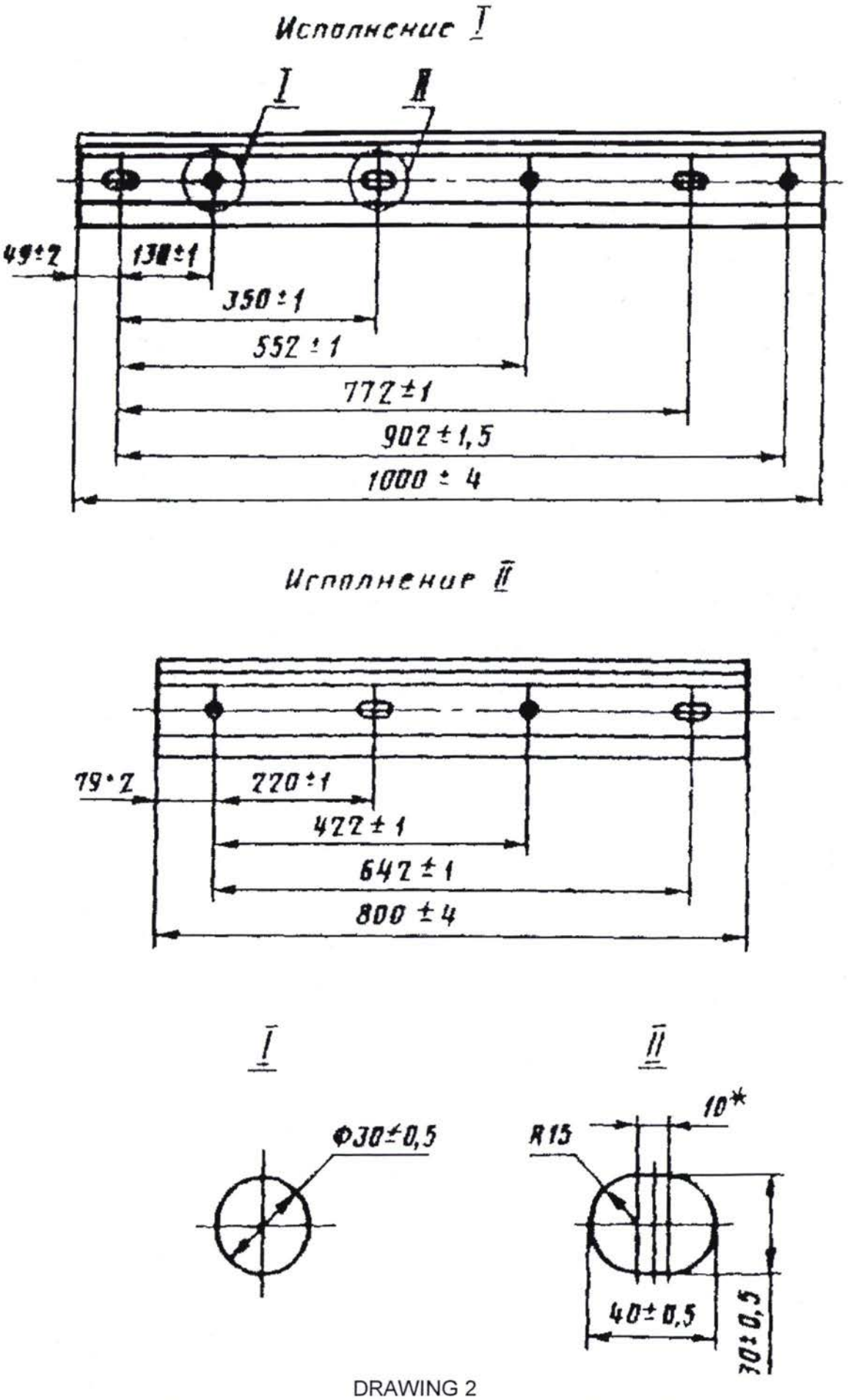
1. This standard covers bull headed fishplates for the railway rails R65, R75 types. The requirements of CMEA recommendations on standardization of PC 1940-69 were taken into account in the standard.

2. Design (construction) and dimensions of the plates should be in compliance with those indicated on drawing 1 (design data are indicated in Reference Annex).

3. Performance of plates and location of bolt holes from exterior side should be in compliance with those indicated on drawing 2.
   Choice of plates performance is established under the agreement of parties.



DRAWING 1



DRAWING 2
Legend of the plate for the rails R65 and R&5 types of performance 1

Plate 1P65 GOST 8193 – 73

The same, performance 2:

Plate 2P65 GOST 8193 – 73

2,3. (Changed, Ch. №1)
4-6. (Excluded. Ch.№1)

7. Technical requirements under GOST 4133-73

ANNEX

Reference

Design data

Area of cross section of the rolling, sm2	38,75
Distance to the centre of gravity, sm:	
- from upper part of the plate	6,42
- from bottom part of the plate	6,33
- from exterior edge	2,01
Inclination angle of the axes to horizon:	
- main	- 3o22'
- neutral	27o46'
Moment of inertia, sm4:	
- horizontal	528,0
- vertical	53,3
- centrifugal	-28,05
concerning main axes:	
- the most	530,0
- the least	51,6
Drag torque, sm3	
-over top	82,5
- over bottom	83,8
- over exterior edge (the most)	26,5
Mass, kg:	
1 m of rolling	30.42
- plate of performance 1	29,50
- plate of performance 2	23,78

Note. Mass is determined out of nominal dimensions and relative steel density 7,85.

GOST 4133-73

Bull-headed (two-headed) rail plates for broad gauge tracks. Technical requirements

Non-observance of the standard is prosecuted under the Law.

This standard cover bull-headed plates volume-hardened through oil quenching, used for butt joint of rails for broad gauge tracks.

The standard is in compliance with CT CMEA 1669-79 relating to technical requirements concerning the plates.

(Changed edition, Change №2)

1. Technical requirements

1.1 Plates should be made from profile bars rolled from fully deoxidize calm marten cite steel. Chemical content should be in compliance with the indicated one in table 1

Table 1

Elements content						
Description of the mark	Carbon	Manganese	Silicon	Phosphorus not more than	Sulfur	Arsenic
M 54	From 0,45 to 0,62	From 0,50 to 0,85	From 0,15 to 0,35	0,04	0,05	0,08

Note: In the steel for plates made from Kerch high phosphorus ore, it is allowed the content of arsenic to 0,15%, phosphorus to 0,05 %.

(Changed edition, Change. №2)

1.2 Total draft at profile bar rolling should be not less than 20. Pressed ingot and rolled from it profile bar should be cut until full removal of shrink blister and harmful segregate zone. It is not allowed feckless and foreign inclusions –choking-ups

1.3 Cutting of profile bars into measured sections of the plates can be done both in hot and cold condition. Gas flame and electroarc is not allowed cutting.

(Changed edition, Change. №2)

1.4 Holes for bolts on plates should be done in hot condition perpendicular to the surface of plate's web.

1.5 Due to the request of the Customer it is allowed to make the plates without bolt holes and without the hardening in oil quenching. It is allowed to make holes for bolts by methods of cold mechanical treatment.

1.6 On the ends of the plates and around bolt holes should not have burrs and roughness as bulges; it is allowed cleaning of these defects observing the established sizes for the plates and allowable deviations. It is not allowed roughening of the metal, which might arise at cutting the plates from profile bar or at insertion the bolt holes.

1.5, 1, 6 **(Changed edition, Change. №2)**

1.7 On the surface of the plates it is not allowed cracks, rolling marks, flaws, and slag shots. It is allowed single blisters, microflaws, longitudinal hairlines with the depth of more than 0,5mm. Blisters should be cleaned.

1.8 On area of bearing of the plates faced the rails it is not allowed projections and bulges with height of more than 0,5 mm.
It is allowed abrasive cleaning of projections and bulges observing the established for the plates sizes and allowable deviations.

(Changed edition, Change. №2)

1.9 It is not allowed welding or sealing of any defects on the profile bar or on the plates.

1.10 Plates should be upright. It is allowed even curvature along the whole length of the plate which does not exceed the values indicated in table 2.

Table 2

Value of curvature in mm for the plate with length		**Curvature type**
less than 1 m	1 m and more	
1	1,6	Relief (protuberance) in the direction of the rail head in vertical plane.
0,5	0,8	Relief (protuberance) in the direction of the rail foot in vertical plane.
2	3	Relief (protuberance) in the direction of the rail web in horizontal plane.
1,5	2,4	Relief (protuberance) in the direction of the rail web in vertical plane.

Note. **(Changed edition, Change. №2)**

1.11 It is allowed correcting of the plates in cold condition. The efforts at correcting should be smooth without hammering.

1.12 Mechanical properties of the plates ready hardened in oil quenching should be in compliance with the indicated in table 3.

Table 3

Tens. str.(point of maximum load), H/mm2 (kgc/mm2)	**Yield point, H/mm2 (kgc/mm2)**	**Extension strain after rupture, %**	**Contraction after rupture, %**	**Brinell hardness - HB**
not less				
844 (86,0)	530 (54,0)	10,0	30,0	235 - 388

(Changed edition, Change. №2)

1.13 Samples cut from the ready plates should stand curve in cold condition by angle 20o (external) without fracture, cracks and tears.

1.14 Plates corresponding to the requirements para. 1.1 – 1.13 can be referred to the first sort.

1.15 The plates which have at least one of the following deviations from the norm provided by this standard for the plates of the first sort can be referred to the second sort:

- by breaking point - to minus 1,0 Mpa (10,0 kgc/mm2);
- by yield point - to minus 0,7 Mpa (7,0 kgc/mm2);
- by extension strain - to minus 4,0 % (absolute):
- by contraction - to minus 10,0% (absolute);
- by hardness – to minus HB 34;
- by content in steel:
- carbon - to plus 0,03%
- manganese – to plus 0,05 %, minus 0,10%;
- phosphorus – to plus 0,005 %;
- sulfur – to plus 0,005 %;
- by sizes exceeding not more than twice utmost deviations provided for this type of plates except the height of the plate;
- by bulges on area of bearing to 0,75 mm, and on other surfaces to 1,0 mm;
- by exceeding not more than twice utmost deviations on external defects and by plates curvature.

1.16 Laying the plates of the second sort on the railways of the Ministry of railways is not allowed. Plates of the second sort can be used on the industrial ways.

1.17 Plates' transportation to the Customer should be done with the indication of plates units in the shipped lot. At this theoretical mass is determined by its nominal sizes and relative density of steel 7,85.
(Introduced additionally, Change № 2).

2. Acceptance rules

2.1 Quality control of plates' production if done by technical control of the manufacturer. Technical acceptance of ready plates is made by the inspector of the Ministry of Railways. The results are legalized by Acts (Certificate) signed by him(her) and by the representative of technical control of the manufacturer.

2.2 Plates should be accepted by lots and in the amount of not more than 3000 pieces. The lot should consist of the plates of one type, one sort and made of metal of one melting. The remainder of the plates less than 100 pieces should be added to one of the lot of this melting or can be accepted by a separate lot.

Note. If steel for plates is melted in furnaces of large capacity and pout out into two ladles, then each ladle is considered to be a separate melting.

2.3 At quality control acceptance of the ready plates the following amount of plates and samples should be selected:
a) for visual examination, sizes checking, straightness and location of bolts' holes – not less than 1, 0% of plates from a lot;
b) for tension test – 1 sample from a lot;
c) for determination of hardness – 5 plates from a lot;
d) for determination of chemical steel content of plates – 1 sample from a melting. For control checking of chemical content of steel one sample from tree plates of the checked lot is prepared.

2.3, 2.3 **(Introduced additionally, Change № 2).**

2.4 In case if there are unsatisfactory results of visual examination of the plates after their regarding (para 3.9) all the plates of such lot are considered not to meet the requirements of this standard or the plates of the second sort, if they meet the requirements para 1.15.
In case of unsatisfactory results of some repeated test (para 3.8) all plates of such lot if did not subject to additional thermal treatment (para 3.9) is considered not to be in compliance with this standard or the plates of the second sort if the meet the requirements of para 1.15.

2.5 After repeated thermal treatment (para 3.9) the lot of plates should be subject to all acceptance tests as a new lot. In case of unsatisfactory results of these tests all plates of such lot are considered not to meet unsatisfactory to the requirements of this standard or plates of the second sort if they meet the requirements of para 1.15.

2.6 (**Excluded , Change. №2)**

3. Test methods

3.1 Control of the condition of plates' surfaces should be done through its visual checking.
In necessary cases the availability and depth of defects are checked by sample cutting of by another way which guarantee the correctness of definition. When cutting exfoliation and bifurcation of the chips is considered to be the sign of defect.

(Changed edition, Change. №2)

3.2 Sizes and straightness of plates, sizes and location of bolts' holes should be checked with the help of measurement tools or templates.

3.3 Tension test of samples under GOST 1497-73.
For tension testing a round sample should be cut with diameter 15mm with fivefold design length from the top angle of the upper head of the plate close to its bearing surface.
To determine the yield point tension test of samples is allowed under the agreement between manufacturer and the customer with fivefold design length of another diameter provided by GOST 1497 -73.

3.4 Bending test of samples under GOST 14019-80. For bending test flat sample from the plate should be cut with the width of a = 15± 20 mm and with length l =5a+ 150 mm with the keeping of the rolling surface from one side. Cutting of samples should be done in cold condition so that the plane of the cutting should be parallel to the lower bearing surface of the plate. Rolling surface when testing for bending should be from the inner side in the zone of tension. Diameter of support and mandrel should be equal of trice repeated width of a sample. Load at testing for curve should grow smoothly without jerks and hammering.

3.5 Determination of hardness under GOST 9012 -59.
Place for hardness determination should be in middle line of external surface of plate web and should be cleaned at the depth of 0,5mm.

3.6 Selection of samples for chemical analysis of steel is under GOST 7565 -73 when pouring out steel, and in necessary cases from ready plates.

3.7 Determination in steel carbon content is under GOST 22536.1 -77, manganese under GOST 22536.5-77, silicon under GOST 22536.4 -77, phosphorus under GOST 22536.3-77, sulfur under GOST 22536.2 -77, arsenic under GOST 22536.6-77.
(Changed edition, Change. №2)

3.8 In case of unsatisfactory results of visual examination (para 2.3a) or some other test (para 23 б, в, г) the repeated visual examination is allowed or that type of the test resulted unsatisfactorily, for this purpose double plates or samples should be selected from the lot.

3.9 In case of unsatisfactory results of the repeated tests of visual examination (para 3.8) the manufacturer is entitled to subject this lot of plates pieces regrading and new round of acceptance in accordance with para 2.3a. In case of unsatisfactory results of the repeated tests (para 3.8) the manufacturer is entitled to subject such lot of plates to additional thermal treatment- tempering and hardening.

3.10 **(Changed edition, Change. №2)**

3.11 Norms and the procedure of samples selection as well as the method of control of macrostructure of plates are established under the agreement of the Ministry of railways with the manufacturer

4. Marking

4.1 On each profile bar on the exterior side of the plate web in each 500-600 mm embossed letters and figures with the height of not less than 0,5mm in the following order:
designation of the manufacturer:
A – metallurgical plant "Azovstal"
K – Kuznetsky metallurgical industrial complex
Month (Roman figures) and two last figures the year of plate production;
Designation of the plate type(type of the rail for which the plates is intended).
Embossed letters and figures should be with the height of 15-20 mm and to have transition to the surface of the plate.

4.2 Plates accepted as the second sort one end should be marked (by the band not less than 20mm) by indelible red paint. The plates which do not meet the requirements of this standard should be stained with lime.

4.3 On each accepted lot of the plates four metallic labels should be hanged in which there should be indicated:
- the name of the manufacturer;
- year and month of plates production;
- type of plates;
- sort of plates and designation of this standard;
- number of plates in the lot in pieces and number of the lot;
- acceptance marking of the inspector of the Ministry of railways and technical control of the manufacturer.

Labels should be reliably tied by the wire to the four plates of each accepted lot.

4.4 Shipped plates' lots should be accompanied with the Act testifying the compliance of the plates to the requirements of this standard in which there should be indicated:
- name of the manufacturer;
- number and amount of lots;
- number of plates in each lot in pieces and total amount of plates in pieces;
- type and sort of plates;
- type of thermal treatment;
- results of chemical analysis;
- designation of this standard.

Indicated document should be signed by the representative of technical control of the manufacturer and the inspector of the Ministry of railways.

GOST 11530 - 76
Rail joint bolts

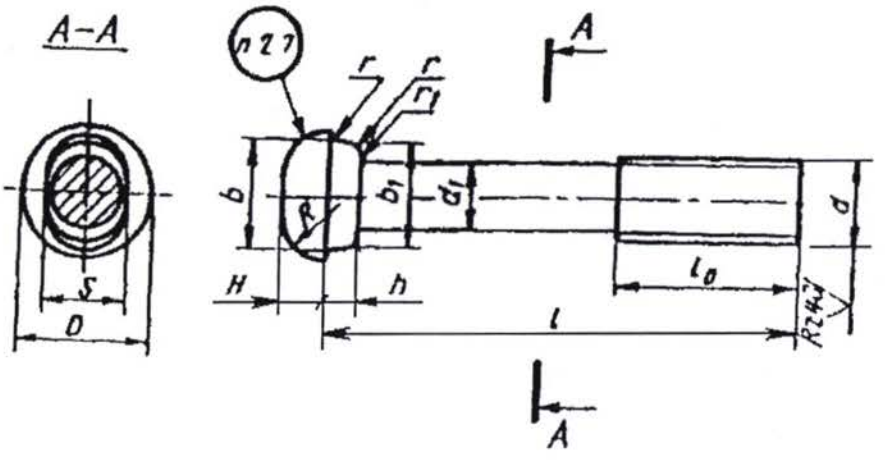
Standard non-observance is prosecuted under the Law.

This standard covers the bolts with round head and oval sub-head (side- head rest) used for fastening by two-head plates of rail joints type R38, R43, R50, R65, R75 and also on the bolts with reduced height of oval side-head rest(sub-head) for isolating joints of above-said rails. This standard provides bolts production of rough accuracy, normal and enhanced durability. The standard is in compliance with ST CMEA 4092 -83 concerning bolt M27 design and dimensions of performance 1(see reference annex 2) **(Changed edition, Changed № 2)**

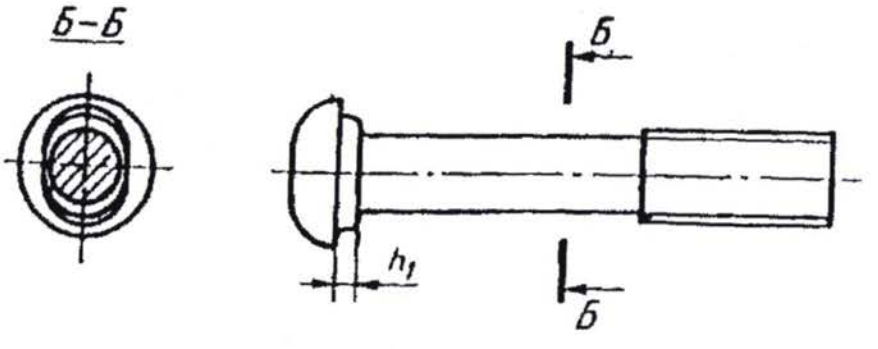
1. DESIGN AND DIMENSIONS

1.1 Designs and dimensions of bolts should be in compliance with those indicated on the drawing and in table.

Performance I



Performance II



R=H; d1¬da; da -average thread diametr

mm

Rated diameter of thread *d*		M22	M24	M27
Diameter of the head D (supposed deviation ± IT17/2)		37	40	46
Head height, H (supposed deviation ± IT17/2)		13	14	17
Axis misalignment of the head axis concerning the core axis, not more		0,9		
Dimensions of Head rest	h(supposed deviation h16)	31	33	38
	h1 (supposed deviation h15)	30	32	37
	S(supposed deviation h17)	22	24	27
	h(supposed deviation h17)	12		
	h1(supposed deviation h17)	6		
Radii of transitions	r	From 1 to 2		
	r1	Not less than 3		
Tread length, lo (supposed deviation + 6)		56	66	
Bolt length l (supposed deviation + 6) for rails of type: R38; R43	performance 1	135	-	-
	performance 2	140	-	-
R50	performance 1	-	150	-
	performance 2	-	160	-
		-	140	-
R65, R75	performance 1	-	-	160
	performance 2	-	-	180
		-	-	170

Example of the bolt legend by performance 1, tread diameter 24mm length 150mm, normal durability:

Bolt M24 X 150.8.8 GOST 11530 - 76

The same, of improved durability:

Bolt M24 X 150.109.40 X GOST 11530 - 76

The same, performance 2:

Bolt 2 M24 X 150.109.40 X GOST 11530 - 76

(Changed edition, Changed № 1, 2)

2. TECHNICAL REQUIREMENTS

2.1 Bolts for rail joints should be made in compliance with the requirements of this standard, under GOST 1759 -70 and under the working drawings approved in the established order.
(Changed edition, Changed № 1)

2.2 Bolts of normal durability should be made of class 8.8 durability under GOST 1759 – 70 from steel grade 35 or from steel grade 35P of microalloyed by boron or other grades of steel of this durability class,

Bolts of improved durability should be made of durability class 10.9 under GOST 1759-70 from steel of grade 40X or other steel grades of this durability class.

2.3 Tread is under GOST 24705 -81
(Changed edition, Changed № 1)

2.4 Tolerance range 8g - under GOST 16093 -81, it is allowed tolerance range 8h.

2.5 It is allowed:

a) round-up of the head ends with radius to 1,5mm, which do not bring out the head diameter out of the limit deviations;
b) a burr or a fin of size to 1,5 mm located along the perimeter of the bolt head perpendicular to its axis.

2.6 Bolts should be subject to all types of testing corresponding to durability class of the article(good) under GOST 1759-70 except tests for durability of the head connection with the core (rod) and test for long -time strength. Test for tensile strength on taper washer and measurement of the value coaly less layer should be carried out due to the customer demand (request).
(Changed edition, Changed № 1)

2.7 On each bolt in the place indicated on the drawing there should be marking which indicate the trademark or the legend of the manufacturer. On the bolts of improved durability there should be additional letter –П.)

2.8 Bolts should be complete by nuts under GOST 11532 -76. Bolts M22 are allowed to be complete with nuts under GOST 16018 -79. Packaging in one tare of the bolts together with nuts of one and the same size type is allowed. Under the agreement with the customer it is allowed the transportation of bolts without packaging with nuts which screwed on them or packed in tare.

2.9 Transportation of bolts and nuts should be done together. Under the agreement with the customer it is allowed to transport the bolts without packaging by any type of transport except railway platforms.

2.10 Mass of bolts is indicated in the reference annex.

Annex 1

Reference

Theoretical mass of 1000 bolts, kg

Bolts description	Mass
M22 X 135	448
M24 X 150	585
M27 X 160	818
2M22 X 140	449
2M24 X 160	592
2M27 X 180	872
2M24 X 40	522
2M27 X 170	827

Note. Mass of bolts is determined due to rated dimensions and steel density 7850 kg/m.
(Changed edition, Changed № 1)

Annex 2

Reference

Information data about the compliance to GOST 11530 – 76
ST CMEA 4092 – 83

GOST 11530 -76	ST CMEA 4092 - 83
Performance 1 Design and dimensions of bolt M27	Performance 2 Design and dimensions of bolt M27

(Introduced additionally, Change. № 2)

GOST 11532 - 93
Nuts for rail joints

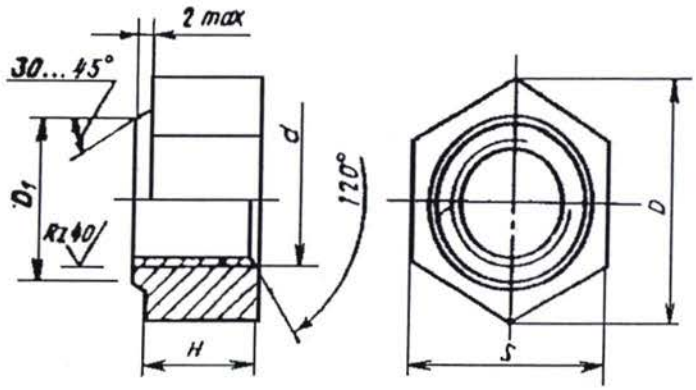
Standard non-observance is prosecuted under the Law.

This standard covers the nuts for the bolts of diameter M22, M24 and M27 used for rail joints fastening. This standard provides nuts production of rough and normal accuracy. The standard is in compliance with ST CMEA 4093 -83 concerning the design and dimensions (see reference Annex 2)
(Changed edition, Changed № 1)

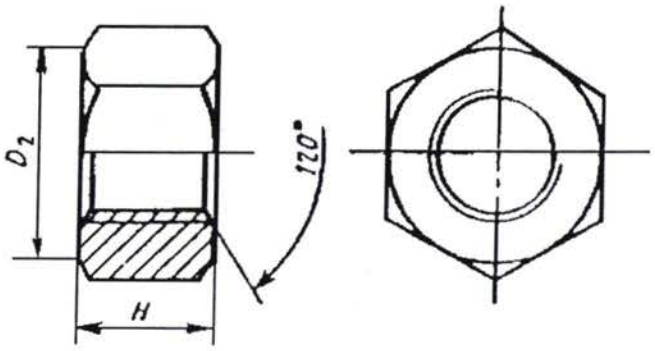
1. DESIGN AND DIMENSIONS

1.1 Designs and dimensions of nuts should be in compliance with those indicated on the drawing and in table.

Performance I
(nuts of round exactness)



Performance II
(nuts of rated exactness)



$$D_1 = (0{,}90 \ . \ . \ . \ 0{,}95)\,S$$

mm

Rated diameter of thread *d*			M22	M24	M27
Dimension for "turnkey" S (supposed deviations h15			36		41
Height H	Rated		25	27	30
	Supposed deviation	Performance 1	± 1,3	± 1,5	± 2,0
		Performance 2	$\pm \frac{IT17}{2}$		
Diameter of described circumference *D*, not less than		Performance 1	38,8		44,4
		Performance 1	39,6		45,2
Displacement of holes axis relating to edges, not more than			1		

Example of the nut legend by performance 1, tread diameter 24mm:

Nut M24 GOST 11532 - 76

The same, performance 2:

Nut 2M24 GOST 11532 - 76

(Changed edition, Changed № 1,)

2. TECHNICAL REQUIREMENTS

2.1 Technical requirements, methods of tests, marking and packing - under GOST 1759 - 70.

2.2 Nut for bolts of normal durability should be made of class 5 durability and nuts for bolts of improved durability – class 8 durability under GOST 1759 – 70.

2.3 It is allowed the production of nuts performance 2 without facets at angle 30 degrees on of its ends.

2.4 Tread is under GOST 24705 -81.

2.5 Tolerance range 7H – under GOST 16093 -81, it is allowed tolerance range 7 g.

2.6 Facets at the end of nut tread – under GOST 10549 – 80.

2.7 In nuts of performance 1 it is allowed metal tightening, which can bring to local reduction of the ribs height not more than 3mm.

2.8 Letter П should be put on one of the bearing area of nuts of improved durability.

2.9 Nuts should be transported in complete with bolts under GOST 11530 -76
Under the customer's request it is allowed not to complete nuts with bolts and transport them as separate articles.

2.10 Mass of nuts is given in reference Annex 1

Annex 1

Reference

Theoretical mass of 1000 nuts, kg

Diameter of a nut	Mass of nuts	
	performance 1	performance 2
M22 M24 M27	154 155 222	152 153 220

Notes:

1. Mass of nuts due to the rated dimensions and density of steel 7850 kg/m3.
2. In case, when it is possible to use nuts of performance 1 also of performance 2, in design documentation the mass of nuts of performance 2 should be indicated

Annex 2

Reference

Information data about the compliance to GOST 11532 – 76
ST CMEA 4093 – 83

GOST 11532 -76	ST CMEA 4093 - 83
Performance 1,2 Design and dimensions	Performance 1, 2 Design and dimensions

(Introduced additionally, Change. № 1)