

## **SPECIAL CONDITION AND SPECIFICATION OF CONTRACT PART-II**

**OPENING ON -06.07.2026**

### **GENERAL GUIDANCE TO TENDERERS AND DETAILS AND SCOPE OF WORK**

- 1 Name of work:-"Vadodara division- Rehabilitation of of turn table at BRCY, Bridge Godhra & protective painting of various bridges in the section of SSE/BR/BRC & Schedule painting of Br No 502,452,471UP/DN,520UP/DN, 504A in jurisdiction of SSE(B)BH and SSE(B )BRC of Vadodara division(Balance Quantity)."**

### **2 BRIEF DESCRIPTION OF WORK:**

The work broadly includes:

- A. Repair/replacement of corroded and perforated members such as bottom flange, top flange, stiffener angle, bracing angles, web, rivets at top flange and bottom flange/defective rivets etc of existing turn table.
- B. Metallising and Painting of girder component and other works as covered under Tender Schedule.
- C. Supplying, Fabrication, erection at desired location including transportation of steel members for replacement of deteriorated corroded and perforated members such as bottom flange, top flange, stiffener angle, bracing angles, web, as per standard approved drawings of railway or RDSO at bridge site.
- D. Supplying for fabricating Assembling and fixing various structural steel items i.e. plate, angle, channel, flats gussets and some other members. as per railways approved plan/requirement of fabricated steel members at work site as per railway approved drawing/requirement with welding or bolting as per standard method & Railway codal Provision/ Specifications etc. Shifting /Placement of assembled steel members at appropriate location at work site at nominated place as per approved drawing at any height or as per instruction of engineer in charge.
- E. Replacement of corroded rivets by removing old rivets and providing new rivets.
- F. Transportation of released material like steel items etc by mechanical transport including loading, unloading and stacking from site of work to specified place as per direction of engineer -in-charge.
- G. Providing temporary arrangement such as scaffolding etc. For safe completion of the work. No any extra payment shall be made.

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- H. The work is to be executed as per the Railway's approved plan. This plan is only for general guidance & actually item to be operated shall be as per the tender schedule & site condition. Decision of Engineer-in-charge or his representative shall be final and binding on the contractor. The plan is available in the Drawing Office of DY.CE/BRIDGE VADODARA for reference. Tenderers are requested to visit the site of work before quoting their rates.
- I. All materials to be used in the work shall be as per relevant IS specification, wherever applicable, and shall be approved by Engineer in charge before use in work.
- J. Speed restriction may be arranged if required for carrying out the work, suitable protective arrangements protection shall be arranged for carrying out work by the contractor
- K. Contractor shall take all care to avoid any damage to underground cables, telephone cable, OFC cables, water pipe lines, sewerage system etc. Any damage to the railway property on account of contractor's negligence shall be made good at contractor's cost.
- L. In case any ambiguity between special conditions and general standard condition, special conditions shall prevail. In case of any dispute arising out of the punctuation and or any typographical error in the schedule, the same will be corrected with reference to USSOR-2021 of Western Railway in original manuscript available with COS/WA -DYCE BR BRC OFFICE.
- M. The work shall be done as per instructions given by site Engineer and as per Railway's standard Specification for materials and works.
- N. Other ancillary works as per schedule and as required for successful completion of work.

Contractor will not be entitled for any claims if any of the items indicated in the schedule is not got done or not given to him.

It is necessary to keep one four wheeled vehicles like Bolero, Sumo or similar at work site for safety of worker in any kind of emergency during block working. the vehicle can also be used for movement of Railway supervisor/officers assigned for this work only.

Contractor shall have to provide a temporary office/ porta cabin for Railway administration having minimum 6 chairs, 1 table, 1 stool, one filing cabinet, computer with printer, scientific calculator at no extra cost.

Contractor shall have to arrange precision measuring instrument /equipment like levelling instrument, digital elcometer, laser distance meter, staff, tape etc during execution of the work.

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**3. SITE AND LOCATION:-**

Tentative List of various bridge over which work is to be done under SSE(B) BRC and SSE BR BH section in BRC Division

<b>BRIDGE LIST FOR PLATE GIRDERS SCHEDULE PAINTING</b>					
SR NO	Br. No.	SPAN	Between Station	Section	Location Kms
1	452-S1	1X57.01	ST-URN	ST-MYG	269/9-42
2	452-S2	1X57.01	ST-URN	ST-MYG	269/9-42
3	452-S3	1X57.01	ST-URN	ST-MYG	269/9-42
4	452-S4	1X57.01	ST-URN	ST-MYG	269/9-42
5	452-S5	1X57.01	ST-URN	ST-MYG	269/9-42
6	452-S6	1X57.01	ST-URN	ST-MYG	269/9-42
7	452-S7	1X57.01	ST-URN	ST-MYG	269/9-42
8	502-S6	1X87.50	AKV-BH	ST-MYG	323/33-325/10
9	502-S7	1X87.50	AKV-BH	ST-MYG	323/33-325/10

**Note :-** The details given above are as per Railway's records and are given only for general guidance of the tenderer(s). Tenderer must inspect the site themselves and get the idea of location/approaches and other features of the Bridge/site before quoting their rates.

#### **4. METHOD OF DOING WORK.**

Tenderers are supposed to develop and submit the complete detail scheme their own and same will require to be approved by Railway Engineer in charge of work. The scheme shall be developed under the following guide line.

The scheme shall be so made as to minimize the requirement of nos of blocks and duration of blocks as well as speed restriction on the bridge.

The scheme should not require use of railway locomotive power, Tower wagons, Railway cranes and slewing of Over Head Electric line.

Before developing the scheme, the contractor should study the site condition including the road approach as well as acquaint himself/themselves well with pattern of flow of river etc.

The new fabricated components shall be kept ready before the block and shall be so kept in position to insert the same in the given block.

Execution of all items is governed by general and special conditions of contract. Conditional offers will not be considered.

All the temporary arrangements for the work shall be made in such a way that these should not infringe the schedule of dimensions at any time except under traffic block.

The tenderer should carefully study all the general/special conditions and specification accompanying the tender schedule/form in general and get himself/ themselves acquainted with the site conditions. In case of any confusion/contradiction the same may please be clarified.

Rates includes all taxes i.e. GST, sales tax, octroi, excise duty, other levies etc. and all other incidental and unforeseen expenditures, if any.

Detail report along with sketches about the work done have to be submitted by contractor in two Copies duly incorporating photographs of the work done at various stages.

The relevant notes applicable to the respective sub chapter of USSOR 2021 will apply to the items of the tender schedule and should be considered as having been incorporated in the contract agreement and shall be binding to the contractor.

Necessary survey should be carried out at the site of work with Railway's representative with all latest survey instruments, levelling and collection of all data to become aware of the condition of work.

Procurement of plants, jacking equipment's, jack pumps, front shield, cutting shield, intermediate jacking station, rear shield etc. should be done by the contractor at his own cost and no extra payment will be made.

Removal of existing underground as well as overhead obstruction in the Railway area near the site of work which is likely to obstruct the work of box is to be removed before obtaining blocks by the contractor at his own cost.

Necessary records of the tests of materials shall be maintained in the form of registers. In addition to these registers, site order book, labour register, progress register, steel registers or any other register warranted by the Engineer in charge shall be provided and maintained by the Contractor and shall be available at site office for inspection of the officials.

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All the material used shall confirm to standard Railway specifications as updated till date unless otherwise specified.

Payment of steel shall be made for actual steel used in work. No payment will be made for steel brought extra at site, wastages etc.

The contractor will transport his tools and plants, labour to the bridge site by his own means. Railway will not provide any new service roads for movement of contractor's vehicles. However existing service road can be used by the contractor free of charge. At other places, contractor will have to make his own arrangements for movement of his vehicle.

In case any train is detained at the approach of work site or at a station on account of its passage being considered unsafe by Railway supervisors due to bad workmanship of contractor or the parameters being unsatisfactory for the passage of trains or due to the contractor leaving the work unfinished or due to work delayed by the contractor, due to crane failure, resulting in bursting of block, Railway shall be entitled to recover damages caused by the contractor to restore situation by deploying Railway resources, charges from the contractors bills or security deposit or any other dues etc., as determined by the Railways shall be final and binding upon the contractor.

The speed restriction board and protection of site as required for safety of track would be arranged by the railways by the sectional PWIs/BRI"s. No work under track should be commenced unless the Engineer in charge or his representative has imposed traffic block. Work will be undertaken only in presence of SSE/JE (bridge).

The contractor will be held responsible for any loss or damages or injury during course of work to the labours or to public/private persons, contractor shall bear all the loss and expenditure involved.

The Contractor shall keep his look out man for warning the works of the arrival of train etc. to ensure safety of the workman and equipment.

The contractor should make at his own cost arrangement for supply of water required for the works including water, required for testing purpose as well as for drinking purpose.

If Railway power is available nearby, the same can be provided to the contractor with necessary charges as per extant rules. Usage charges shall be borne by the Contractor. If Railway power is not available, the contractor shall make arrangement for power connection at his own cost. Since the execution of the work may extend beyond the day hours, the site should be amply lit. No extra payment shall be done on this account.

All rates quoted in the tender shall be deemed to be inclusive of all taxes including GST, turnover tax, Sales Tax, excise, VAT, Octroi or any other Government tax. No additional amount will be paid or claim entertained on this account by Railway. The contractor is liable to pay any charges/fees levied by the local authority/Government during execution.

No mobilization advance shall be payable for the above work. The contractor shall make necessary arrangements of machinery, tools and plants to complete the above work at his own cost. The mode of payment will be as per the rate of items given in the Tender schedule. The payment will be done as per the quantity executed by the contractor as per the specification of the railway. The payment will be made in different stages through on account bills. The quantities shall be measured for the final finished works.

**ADDITIONAL SPECIFICATIONS OF WORK:**

Following specifications and detailed scope of work shall form the part of scope of work for the individual items of the tender. These shall be applicable in addition to those specifications which are given in this special condition.

**GENERAL**

- A) The contractor shall arrange for sufficient manpower, equipment and tools as to ensure that the blocks are cleared on time. The arrangements shall be sufficient to ensure timely completion of work in the block period granted even when there is failure of some equipment and tools. For this purpose, the contractor shall arrange sufficient standby equipment and tools and skilled personnel at site who can quickly carry out ordinary repairs at site itself.
- B) TRANSPORTATION ARRANGEMENTS: During block, since a large number of labours are working for carrying out the work, the contractor shall arrange for transportation in the form of a three/four wheeled vehicle with driver handy at site for use in the event of any unusual/accident at site and also to help in making any arrangements in the event of failure of any equipment, tools etc. from the market. The vehicle must be not more than three years old. The cost of deploying such vehicle shall be deemed inclusive in the rates quoted for various USSOR items of the schedule.
- C) The waterway of the bridge shall be kept clear for the flow of water at all times except under specific permission to be granted by the executive engineer in charge of the work on contractor's applying for the same, if required as per contractor's approved scheme of working, in which case, the waterway must be blocked to the minimum extent necessary and for the minimum duration necessary as per the approved scheme of work. Even when the permission has been granted for the girders/components to be stacked in the river bed, the contractor has to be ready for the girders/components to be removed from the river bed at short notice if warranted as per flow conditions in the river. If the safety of the bridge/railway line is endangered or considered endangered based on the available river flow/weather indicators by the railway administration, the railway shall be entitled to get the girders/components removed at a short notice from the river bed at contractor's cost and the contractor shall not be entitled to any claim on this account except for extension of time period for the completion of work. The transportation/restacking of the girders/components in river bed for subsequently carrying out the work shall have to be carried out by the contractor at his own cost. The cost of deploying such vehicle shall be deemed inclusive in the rates quoted for various USSOR and NS and CPWD DSR items of the schedule.
- D) ELECTRICAL ARRANGEMENTS: The work is normally to be carried out during day only. ever, in case the sufficient working margin between trains is not available, the work may have to be carried out during the night. In such a case and in case where due to any reason What so ever, the block granted during the day extends to period where the daylight is not sufficient to carry out the work, the contractor has to arrange for sufficient lighting as to enable the work to be completed safely and satisfactorily. The contractor shall not be paid for such electrical arrangements and the rates quoted for various items shall be deemed to include the charges for such arrangements.
- E) The contractor has to make arrangements as and when called for by the site engineering charge of the work for two nos. 110/220 Volt AC/DC lights along with source of lighting for the purpose of enabling the railway's personnel to carry out the inspections of the new girders, temporary

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girders and approaches during the night after work has been carried out on the same by the contractor. Alternatively, the contractor may arrange for two high powered rechargeable electric lights for the purpose of inspection. The arrangement made shall be got approved from the site engineer in charge of the work before the start of the work. The contractor shall not be paid for such electrical arrangements and the rates quoted for various items shall be deemed to include the charges for such arrangements.

- F) The span referred to in the name of work and various items of the schedule is nominal span as used in normal railway parlance unless specified otherwise. Where nominal span is given, actual overall length of the girder shall be as per design and site conditions.
- G) The work is to be done carefully especially when using torch flames at site. The cutting of rails, rivets, girder components and girders using torch flames is to be resorted to only when specifically permitted by the site engineer in charge of the work as per the contractor's approved scheme of work. The indiscriminate use of flame cutting can have disastrous effects on the safety of the trains. The contractor must ensure that the torch flame is not used to cut any rail, girder, girder component without specific approval of the site engineer and no cutting work shall be carried out on the running rails and girders (new/under service) except under the direct supervision of railway's representative.
- H) The work shall be planned and laid out in such a manner as to ensure safety of the trains and workers under all circumstances. All temporary arrangements shall be made such as not to infringe the maximum moving dimensions taking due care to anchor all temporary arrangements to guard against any slipping due to vibrations and shrinkage of the ground under load.
- I) The blocks if required for carrying out the work shall be arranged by the railway as per the contractor's agreed program of work conveyed before the start of work. The blocks shall be arranged as per the traffic pattern on the particular line on the particular day. The railway shall make all efforts to provide blocks as per agreed program, however there is no guarantee of blocks of any duration/ frequency being granted on any specific day. Nothing extra shall be paid, in case Railway fails to arrange the blocks on any particular day/duration other than extension of time period of completion of work. The rates quoted by the tenderers shall be deemed to be inclusive of the wastage/idling of labours/ T & P etc. on this account. possible to provide caution order and blocks simultaneously in all bridges/ line. Work may have to be carried out by completing each bridge/line separately and relaxing caution order to normal.
- J) The contractor must acquaint himself with the site conditions, road approach, track conditions, access to the bridge, availability of stacking area at the bridge approach, patterns of traffic flow on the bridge, river water flow, local site conditions such as availability of water, consumables etc. nearby and law and order problems in the vicinity of the bridge if any before quoting for the tender and the tender shall be deemed to have been submitted only after familiarization of the tenderer with the site condition.
- K) The material issued by the railway for the work such as girders, fabricated components, steel channel sleepers etc. shall be handled carefully while working and shall not be damaged. Any material damaged shall be made good by the contractor at his own cost. Recovery shall be made for any material damaged beyond repairs. Decision of executive engineer in charge of work regarding condition of material and repairs to be done shall be final and binding.

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**SCOPE OF WORK AND GENERAL FEATURE OF THE TENDER.**

Repair/replacement of deteriorated cross bracing, gusset plate, defective rivets, bulged /defective elastomeric bearing, bed plates, chequered plate corroded top gussets, lateral bracing & defective rivets etc. Metalizing& Painting of girder component, chequered plates Repairs ROB"s by injection grouting & epoxy mortar/concrete grouting, providing drainage, epoxy painting, transportation of release material to scrap stores/nominated place.

**Contractor should read carefully the following scope of work and special conditions before quoting the rates**

5. **Name of work :- "Vadodara division- Rehabilitation of turn table at BRCY, Bridge Godhra & protective painting of various bridges in the section of SSE/BR/BRC & Schedule painting of Br No 502,452,471UP/DN,520UP/DN, 504A in jurisdiction of SSE(B)BH and SSE(B )BRC of Vadodara division(Balance Quantity)."**

Contractor should read carefully the following scope of work and special conditions before quoting the rates.

**Tender for the work consists Three Schedule. Schedule A- USSOR 2021 Item Metallising of steel work. Schedule B-Painting work based on Western Railway Unified Standard Schedule of Rate – 2021 Items. Schedule C Strengthening of ROB NS Item. The tenderer/s is/are required to quote his/their rates in percentage above/below/at par for each schedule separately.**

**GENERAL FEATURE OF THE TENDER.**

The tenderer/s is/are required to quote his/their rates in percentage above/below/at par for each schedule separately.

Railway reserves the right to accept the tender in whole or part or reject any tender of tenderer without assigning reasons for any such action.

Scope of work as mentioned above is tentative and to give fair idea of work. This does not give minute details of activities involved in successful completion of the item. Rate quoted shall be inclusive of such activities not mentioned above and incidental to complete the whole work. The location of site and span may vary according to approved drawings.

The sequence of the work and work site shall be decided by the Engineer in charge depending upon accessibility and availability of land/site.

Work shall be done as per approved drawings or as directed by the Engineer in charge on site order book including other incidental works as per the general drawing. As per the site conditions, occasionally the proposal for the bridges may have to be changed and the contractor shall be bound to execute the work at the rates provided in the tender for the increase/decrease of quantities of items due to such changes.

The contractors shall note that all excavation if found to slip shall be protected by them with proper shoring or sheet piling at their own cost and nothing extra will be paid on this account. The quoted rates shall be deemed to include cost of any such work and no claim whatsoever on this account shall be entertained from the contractor.

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**Measures to be ensured prior to start the work.**

Before starting the execution of works like earth work, supply of ballast, P.way works, bridge works, precast box launching etc. where the Schedule of Dimension is likely to be infringed, the Officer / Supervisor in charge of construction work (civil engineering, S&T or Electrical) shall ensure the following. Inform ADEN/XEN of the section about

- Name & Address of the contractor assigned to execute the work.
- Location, duration and timing during which the vehicles are to be plied.
- Detailed planning of work including protection of track and safety measures proposed to be adopted. Driving licenses are available and record of the drivers and vehicles is kept.

Training to supervisor / staff of contractor – Competency certificate as given in Annexure (Safety) -I shall be issued by AXEN/XEN/Railway Engineer in Charge of Site. The contractor's certified supervisor will not be changed without prior permission. Violation of the clause by contractor will attract penalty.

**COMPETANCY CERTIFICATE**

**Annex-I**

Certified that Shri .....P.way/Bridge supervisor of M/s. .... has been Examined regarding P.way/Bridge working on.... work. His knowledge has been found satisfactory and he is capable of supervising the work safety.

Assistant Engineer

**CHECK LIST**  
(While work is in progress)

Name of work: .....

Location: .....

Duration of work: From..... To.....

Date of Inspection: .....

S.No		Yes	No
1	Does the contractor's supervisor have the certificate		
2	Does the knowledge of contractor's supervisor on safety of track & work site is up to the mark		
3	Is Railway's supervisor of const. Organization/other department's available at site		
4	Is knowledge of railway's supervisor O.K.		
5	Is lime marking/Barricading done?		
6	Are adequate safety precaution taken		
7	Are communication facility (walkie – Talkie sets) available at site		
8	Are only identified drivers driving the vehicle/machinery?		
9	Is whole work site safe for working of men/vehicle & train		
10	Are adequate lighting arrangement done at site?		
11	Are adequate protection equipment available at site?		
12	Is caution order to trains being issued?		
13	Are train drivers following the enforced temporary speed restrictions?		
14	Has work permit been taken for working in Electrified territory/station yards (P&C areas)		

Signature of Inspecting Officer  
Designation.....

Contractor's supervisor and Railway supervisor shall conduct a survey of site to assess the precautions to be taken at site for working of trains and materials required for protection. Information as indicated above shall be obtained from contractor prior to the start of work.

Sectional ADEN(Br) should know the name of supervisor of construction organization / other organization who are going to be in charge of work site.

Before starting of work, the land strips adjacent to running track where road vehicles / machinery is to ply for the work shall be demarcated by line in advance at an appropriate distance from the center of existing track in consultation with Railway Supervisor. Sketches showing the location of marking are given in Annexure (Safety) – II(For Annexure Safety please see the attachment as Annexure F on IREPS) whenever necessary.

Barricading (of portable and reusable type) as per drawing as per design given in Annexure (Safety) - II shall be provided in the complete length of work area along the track. Adequate watchman shall be also provided.

The work site shall be suitably demarcated to keep public and passengers away from area. Necessary signage boards such as "WORK IN PROGRESS" etc. shall be provided at appropriate locations to warn the public/passengers.

Check list given in Annexure (safety) - IV shall be used to ensure that all the required measures have been taken before start of the work.

**Measures to be ensured during the execution of the work.**

Contractor has deputed trained supervisors at work site duly certified by ADEN/XEN/in charge of the work. Drivers of vehicle have been briefed about safety and precautions to be taken while moving/working close to traffic.

Contractor shall ply road vehicles only between Sunrise and Sunset. In case of emergency where it is necessary to work during night hours, sufficient illumination shall be ensured in the entire work area for the safety of public and passengers. Also necessary additional staff shall be posted for night working.

Wherever provided, engineering indicator boards shall be retro-reflective.

Contractor shall ensure that road vehicle/machinery ply in such a way that they do not infringe the line of demarcation.

Lookout man shall be posted where necessary.

In unusual circumstances, where the operator apprehends infringement to track while working truck/machinery near running track, the following action shall be taken:

The contractors/supervisor/vehicle operator immediately advise the situation to Railway official and assist him in protecting the track.

Protections shall be done as for other emergencies.

Individual vehicle/machinery shall not be left unattended at site of work. If it is unavoidable and becomes necessary to stable the road vehicle/machinery at plant near running track, these shall be properly secured against any possible roll-off and always be manned even during non-working hours.

All temporary arrangement required to be made during execution of work shall be made in such manner that moving dimension do not infringe. Necessary checks shall be exercised by site in charge from time to time.

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In case, work has been planned to be done within 6M of Centre of track but at more than 3.5M it shall be ensured that:-

Necessary precautions for protection of track have been taken and caution order issued to trains. Look out man has been posted along the track at a distance of 800M from the location of work with red flag and whistle to warn the road vehicles regarding approaching trains.

In case, work is planned to be done within 3.5M of centerline of running track, it shall be ensured that work is done under block protection only and necessary safety precautions for protection to track as per Para No. 806 and 807 of IRPWM are taken.

Mobile phones or walkie talkie sets should be provided where necessary at work sites.

While inspecting the worksite, checklist given in Annexure (Safety) V shall be used to ensure that all the requisite measures have been taken during execution of work.

**Precautions required to be taken during execution of work requiring traffic blocks.**

Any work, when infringing the moving dimensions, shall be started only after block has been imposed and track protected.

At locations where night working is unavoidable, proper illumination arrangement should be made. Before closing the work, the track shall be left with proper track geometry so that trains run safely.

After completion of work, the released material and T&P/M&P should be properly stacked away from the track to be kept clear of moving dimensions.

Block shall be cleared only when all the temporary arrangements, machineries, tools, plant etc. have been kept clear of moving dimensions.

**Stacking of materials along the track.**

The sites for material stacking shall be selected in advance ensuring that no part of the stacked material would infringe the standard moving dimensions. A plan of proposed stacking locations be made and signed jointly by an authorized Railway representative and contractor's representative.

The selected locations shall be marked by time in advance.

Presence of an authorized Railway representative during unloading and stacking shall be ensured.

The material shall be stacked to such a height that it does not lead to infringement to Schedule of Dimension in case of accidental roll off.

Released material or T&P etc should not leave unmanned near track in unsafe condition.

**Safety aspects to be observed while working in running track area.**

No material or T&P/M&P will be shifted through running track without traffic block.

No electric connection etc. can be tapped from OHE.

The structure bonds, track bonds, cross bonds, longitudinal rail bonds are not disturbed and is disconnected for the work they are reconnected properly when the work is completed.

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The track level is not raised beyond the permissible limit during the work.  
Telecom cable/ S&T cables are passing through bridge should not be disturb.

No extra payments shall be made for any precautionary measures, deputation of labours for safety.

### **SPECIFICATION FOR FABRICATION AND WORKMANSHIP**

1. Welding electrodes shall be used as per IRS Class B2. All electrodes shall be kept under dry condition. Any electrode with parts of its flux coating broken away or otherwise damages shall be rejected. Any electrode older than date of expiry as specified by manufacture should not be used.
2. Fabrication, workmanship shall generally comply with current IRS specification No. B1 with latest corrections/amendments thereof unless otherwise specified, in this special specification or as specially directed by the Engineer in writing.
3. The work is generally to be carried out as per IRS and railway specifications. Where there are no railway specifications, the IS and IRC specifications as applicable shall be followed.

### **CODE OF PRACTICE**

The work will be executed based on provisions in the following Codes and also the structural design to be submitted for launching, erection & temporary arrangements is to conform to the standard codes with the latest amendments till the date of tender opening. Any other codes, references made use of by the tenderer/s in execution/design shall be specifically brought out in their tender along with the results and advantages of the same including brief design calculations and plans.

#### **Indian Railway Standard specifications/codes of practice**

**IRBM, Indian Railways Bridges Rules** - Rules specifying the loads for design of Superstructure and sub-structure of bridges and for assessment of strength of the existing bridges including Chapter-VII of the Rules for the opening of a Railway - adopted - 1941 - Revised - August 1982 incorporating Correction Slips No.1 to 42 (Hereinafter referred to as the Bridge Rules).

**Indian Railway's Standard (IRS) Bridge Substructures and Foundation Code** - Code of Practice for the design of substructure and foundations of bridges - adopted 1936 - Revised - 1985. (Hereinafter referred to as "the Substructure Code") incorporating Correction Slips No.1 to 29.

**IRS Concrete Bridge Code** - Code of Practice for Plain, reinforced and prestressed concrete for general bridge construction incorporating Correction Slips 1 to 13 and SI Units - adopted 1936 - Revised 1997 (hereinafter referred to as "the Concrete Bridge Code").

Indian Railway Schedule of Dimensions -2004 -1676mm gauge including correction slip up to date.

**Indian railways Unified Standard Specifications (Works & materials) of 2021.**

**IRS specifications B-1 and B-2** as per the latest version. This will be applicable for fabrication and erection of mild steel liners, welded member construction shall be used.

**RDSO's Specification** No. GE.IR.2 (final) dated July 2005: Mechanically produced blanketing material for Railway Formation including Guidelines for laying.

**RDSO's Specification** No. GE : G1 dated July 2003 : Guideline for Earthwork in Railway project.

#### **Indian Standard codes of Practices.**

- (1) IS : 456 :2000 for Plain and Reinforced concrete.
- (2) IS : 2911 - Part I/Section 1 & 2 of 1979 for design and Construction of piles
- (3) IS : 2911 -Part I/Section 3 & 4 of 2010 for design and Construction of piles.

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- (4) IS : 2911 -Part III -1980 for under reamed piles
  - (5) IS : 2911- Part IV -1979 - Load test on piles.
  - (6) IS : 1343 -1980 Indian Standard Code of Practice for prestressed Concrete.
  - (7) IS : 1892 -1979 Codes of Practice for sub-surface investigation (First Revision)
  - (8) IS : 226 - for Structural (Mild) Steel.
  - (9) IS : 1786-2008- High Strength Deformed Steel bars and Wires for Concrete Reinforcement.
  - (10) IS : 14268-1995 -Uncoated stress relieved low relaxation strand for prestressed concrete.
  - (11) IS : 800-1984 - General Construction and Steel.
  - (12) IS : 12330-1988- Code of practice for Sulphate Resistance Cement.
  - (13) IS : 10262 -1982 – Code of guideline for concrete Mix Design.
  - (14) IS : 2062 - 1975 - Specification for structural steel (Standard quality) - First Revision.
  - (15) IS : 875 - 1964 - Code of Practice for structural Safety of Buildings and loading standards.
  - (16) IS : 1893-1975-Criteria for Earthquake resistant design and structures (Third Revision- 1976).
  - (17) IS : 383-1970-Specification For Coarse And Fine Aggregates From Natural Sources For Concrete
  - (18) IS : 2386 – 1963 Part I to VIII – Methods Of Test For Aggregates For Concrete
  - (19) IS : 9103 – 1999 - Concrete Admixtures – Specification.
  - (20) IS : 4925 – 1968 - Specification For Concrete Batching And Mixing Plant.
  - (21) IS : 269 – 1989 Ordinary Portland Cement, 33-Grade - Specification
  - (22) IS : 8112 – 1989 - 43Grade Ordinary Portland Cement - Specification
  - (23) IS : 12269 – 1987 Specification For 53 Grade Ordinary Portland Cement
  - (24) IS : 8041 – 1990 - Rapid Hardening Portland Cement – Specification.
  - (25) IS : 455 -1983 – Portland slag cement
  - (26) IS : 1489 - 1991 (Part I & II) - Portland-Pozzolana Cement-Specification
  - (27) IS : 4031 – 1988 - Method of Physical tests for hydraulic Cement
  - (28) IS : 10080 – 1982 - Specification For Vibration Machine.
  - (29) IS : 2720 – Part I to XLI (with latest update) - Methods of test for soils.
  - (30) IS : 1498 – 1970 – Classification and identification of soils for general engineering.
  - (31) IS : 6403-1981-Code Of Practice For Determination Of Breaking/Bearing Capacity Of Shallow Foundations.
  - (32) IS : 4926 – 2003- Ready Mixed Concrete.
  - (33) IS : 383 - 1970 – Course & fine aggregate from natural source for concrete.
- Other references
- (1) Indian Road Congress (IRC): - Codes for items not specifically covered by any of the Railway codes or provisions mentioned in these documents.
  - (2) UIC 772 - Bearing for rail bridges.
  - (3) MOST's Guidelines for Recommended Practice for grouting of post tensioned cables in prestressed concrete bridges.
  - (4) Super structure is steel girder. Approved design of steel girder by RDSO for the purpose is available. Following specifications listed in the RDSO drawing for various component of work shall be followed.  
 IS : 9595-96 – Metal arc welding  
 IS : 4000-1992 – HSFG Bolt design  
 BS : 111 (RDSO) – Guideline for HSFG Bolts  
 BS: 113 (RDSO)  
 IS : 1367 (Part 1 to 14) – Bolts, nuts and washers  
 IS : 3935-66, EN ISO: 13918-08, BS EN ISO 6892 – Shear studs

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IRS-B1 – Steel fabrication

IS : 2062-2011- Steel for all member except bearing : E250W grade BO or As specified in IRS-B1 or relevant item.

In case of clarification about following a particular specification, decision of Engineer in charge shall be final.

In the event of any difference of opinion in regard to any item of work not explicitly covered by specifications or Codes or in regard to the interpretation of specifications including Codes, the directions and decisions of the Chief Engineer in charge shall be final and binding on the successful tenderer. All such changes, modifications to designs and decisions shall not be entitled for any claim or compensation for payment. No plea of customs or usage shall be entertained. The tenderer should note that there might be changes after approval of design as per site conditions, which they are bound to carry out and comply with. There may be changes in the design even during the construction stage or before completion of the work and the successful tenderer shall not be entitled for any claim or compensation on this account and shall be bound to carry out without additional liability as covered in agreement, such changes, modifications, revised designs as may be required to suit the completion of this work.

**PRIORITY-WISE REFERENCES:**

In case of any discrepancy or disagreement between different specifications to be followed for any item of work, the following preferences shall be adopted in the order of precedence as they appear below: -

Provisions in the NIT as modified/supplemented/ /clarified in the "Technical and Price Bid"

IRS Codes of Practice/Standard Specifications.

BIS. Codes.

Indian Roads Congress specifications.

British Standard Specifications.

American standard specification;

**Provision of any other relevant Codes: For items not covered by any of the above standards and specification, Engineering Practices as approved otherwise shall be followed. Decision of the Chief Bridge Engineer /Principle Chief Engineer, Western Railway, Churchgate, Mumbai, for the application of any other Code shall be final and binding..**

**MATERIAL SUPPLIED BY CONTRACTOR: -**

Material conforming to various IS/Railway standards shall only be supplied and used in work after getting the approval for the same in writing from Engineer-in-Charge.

The contractor shall have to submit the Original cash memo and Challan along with the lot of steel/cement purchased from various retail factory outlets to SSE/BR in token of proof of purchases of steel or cement from reputed dealers. Steel/Cement shall not be allowed to be used by SSE/BR without these documents. The test certificate from manufacturer or any other approved laboratory shall be produced at the beginning and subsequently at intervals as decided by the Engineer.

Contractor shall remove from site such materials as rejected by the Engineer-in-charge within reasonable time as specified by him.

The payment of steel/cement shall be as per quantity calculated and actually used by the Railway according to prescribed specification and approved drawings. If any extra quantity of

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steel / cement over and above shown in the drawing and standard laid down has been used by the contractor, in the opinion of Engineer-in-charge for any other reasons such as wastage or bad workmanship or any reasons if any, in the opinion of Engineer-in-Charge, then the cost of such material steel/cement shall not be paid by the Railway. All excess consumption shall be borne by the contractor.

## 6) ITEM WISE SPECIFICATION

### TECHNICAL SPECIFICATIONS OF METALLISING

Work to be carried as per WR USSOR -2021 and as per latest correction slip issued if any.

**041040/041042:- Metallizing of steel work of girders with sprayed aluminium after surface preparation by Sand/grit blasting, followed by one coat of etch primer (IS:5666) & one coat of Zinc Chrome primer (IS:104) and two coats of aluminium paint (IS:2339) with all labour, T&P and material as a complete job duly conforming to all relevant specifications and process given under Clause 39 of IRS-B1-2001. Note: Nominal Thickness of sprayed Aluminium coating shall be 150 microns. DFT of Zinc chrome primer shall be 25-30 microns and DFT of each coat of Aluminium paint shall be 12-14 microns. For maintenance work under running traffic.**

**Note:- All steel components of girder, chequered plate shall be metalized under WR USSOR 2021 Item 041040/041042.**

### SURFACE PREPARATION:

#### 1. Cleaning prior to Blasting:

Grease paint and any other foreign matters should be removed from the area to be sprayed as well as adjoining areas, for which petroleum hydrocarbon solvent to IS-1745-1978 shall be used.

#### Blasting:

**1.2. Abrasive for blasting:** Material used as a Grit should not create pollution in environment / water & it shall be of grade G-C 100 to G-C 42 as specified in IS-4683-1968 (Appendix 'A' in IS 5905-1970) and as per Clause 3 of IS-6586- 1972./IRS-B-1-2001(Revised).

Standard of cleanliness and surface:

**Roughness:** Surface should be thoroughly cleaned and roughened by compressed air blasting or centrifugal blasting with grit as specified in clause 1.2.1 above immediately before spraying, it shall be ensured that the surface is free from grease, scale, rust, moisture or any other foreign matter. It shall then have a uniform metallic colour and correspond in appearance to prints designated Sa 2.1/2 (Say two and half) in IS 9954-1981/IRS-B-1-2001(Revised) i.e. near white metallic surface. It shall be comparable in roughness with a reference surface produced in accordance with Appendix 'A' of IS 5905-1970/IRS-B-1- 2001(Revised) and shall provide an adequate key for the subsequently sprayed metal coating.

#### Blasting Method:

Blasting method shall be in accordance with IS-6586-1972. /IRS-B-1-2001(Revised)

#### SPRAYING:

Purity of Aluminum:

The chemical composition of aluminum to be sprayed shall be 99.5% aluminum conforming to IS: 2590-1987 grade-3 /IRS-B-1-2001(Revised)

#### Spraying procedure:

Procedure followed should be strictly in accordance to as specified in IS-6586-1989, following all the safety precautions.

The metal spraying should be carried out without delay after the surface has been prepared by grit blasting, but in any case within such a period that the metal is sprayed on to a surface which is still completely clean and dry, without visible oxidation. If deterioration in the surface to be coated is observed by comparison with a freshly prepared metal surface of similar quality, which has undergone the same preparation, the preparation treatment shall be repeated on surface to be coated.

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The wire method shall be used for the purpose of Metallizing, the diameter of the wire being 3mm or 5mm. Specified thickness of coating shall be applied in multiple layers and in no case less than 2 passes of the metal spraying unit shall be made over every part of the surface. At least one layer of the coating must be applied within 4 hours of blasting and the surface must be completely coating to the specified thickness within 8 hours of blasting.

**Appearance:**

The surface of the sprayed coating should be of uniform texture and free from lumps, coarse areas and loosely adhered particle.

**Thickness of coating:**

The nominal thickness of the coating shall be 150 microns .The minimum local thickness shall not be less than 110microns.

**Adhesion:**

The sprayed metal coating shall be subjected to an adhesion test given in clause 3.2

below. Inspection:

Determination of thickness of Coating:

Thickness shall be measured by commercially available Elcometer. Method adopted shall be in accordance to IS: 3203-1982 / IRS Specification B1-2001. Equipment / Elcometer which is to be used should be "any magnetic or electromagnetic thickness meter that will measure local thickness of known standard with an accuracy of + 10 percent. After completion of work Elcometer shall be handed over to concern BRI for future use as a property of Railway. No extra payment will be paid for the above.

Calibration of Instrument: Calibration and checked the meter on one of the following standards (as appropriate) :

I. (Applicable to magnetic and electro-magnetic meters other than the pull-off type) A soft brass shim, free from burrs, in contact with the grit-blasted surface of the base metal prior to its being sprayed. The thickness of the shim shall be measured by micrometer and shall be approximately the same as the thickness of the coating.

II. A sprayed metal coating of uniform known thickness approximately the same as the thickness of the sprayed coating to be tested, applied to a base of similar composition and thickness to the article being sprayed, grit-blasting in accordance with Clause 1.2.2

Procedure of Testing: For each measurement of local thickness, make an appropriate number of determinations, according to the type of instrument used.

With instrument measuring the average thickness over an area of not less than 0.645 cm<sup>2</sup>, the local thickness shall be the result of the one reading.

With instrument having one or more pointed or rounded probes, the local thickness shall be the mean of three readings within a circle of 0.645 cm<sup>2</sup> area.

With meters having two such probes, each reading shall be the average of two determinations with the probes reversed position.

The above mentioned method/procedure of testing and taking measurement of the thickness to be included in a separate register and accordingly measurement readings are to be entered in it.

NOTE:- At least one reading per 10(ten) Sqm. average area shall be taken uniformly over the surface of girder/ member and shall be recorded in a register for every coat of painting/Metallizing by the Engineer in charge and duly signed by contractor.

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Method for Adhesion test:

Using a straight edge and as hardened steel scribe which has been ground to a sharp 30 degree point, scribe two parallel lines at a distance apart, equal to approximately ten times the average coating thickness. Inscribing the two lines, apply enough pressure on each occasion to cut through the coating to the base metal, in a single stroke.

The sprayed metal coating shall be subjected to an adhesion test using the method described above. If any part of the coating between the lines breaks away from the base metal, it shall be deemed to have failed the test.

Articles, which have been rejected shall have the defective sections blasted clean of all sprayed metal prior to re spraying. Where the rejection has been solely due to too thin a coating, sprayed metal of the same quantity may be added provided that the surface has been kept dry and is free from visible contamination.

Stage Inspection: All components/fabricated girders undergoing surface preparation and Metallizing shall be checked in following stages and joint record will be maintained for every item, signed by Engineer's representatives and Contractor or their authorized representative.

I-Stage:- After grit blasting for ensuring surface finish to Sa 2.1/2 ( Sa two and half) to IS-9954-1981 i.e. near white metallic surface and ensure proper removal of oil and grease.

II- Stage:- After Metallizing- Nominal thickness of the coating shall be 150microns & local thickness shall be not less than 110 microns as per IRS-B-1-2001.

III- Stage: - After etch primer application- For ensuring proper application and finish as per IS-5666.

IV- Stage :- After application of aluminum paint to IS :2339- Total thickness of coating including Metallizing should not be less than 175 Microns

Re-treatment of Defective Areas: Any defective area shall be cleaned of all sprayed metal by blasting and re-prepared to confirm the requirement of clause 1 prior to re-spraying.

Where the defect has been solely due to, too thin a coating, sprayed metal of same quality may be added, provided that the surface has been kept dry and is free visible contamination.

Additional Protective Coating of Paints:

After Metallizing, the components are to be painted, as described below: -

First Coat: - One coat of etch / wash primer conforming to IS-5666 of 1970 (or Latest).

Etch primer should be applied immediately after metal spraying to minimize the chances of contamination Of the sprayed metal by moisture or pollutant.

One coat of Zinc-Chromate primer to IS: 104-1979 with additional provision that Zinc-Chrome to be used in manufacturing of primer shall confirm to type 2 of IS:51.

Two coats of aluminum paint to IS: 2339-1963.

The paint primer and aluminum paint should be purchased from RDSO approved lists of venders.

2nd, 3rd and 4th coating shall be applied either by brushing or spraying (as required) after the hard drying of first, second and third coat respectively.

Total thickness of coating after painting (including Metallizing) should not be less than 175 microns.

Corrosion pits and gaps between members connected together should be filled with putty confirming to IS: 419-1967, before applying final coat.

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Linseed oil, raw or boiled used for mixing paints shall correspond to IS: 77-1976.

Manufacture's test certificates for each lot of primers / paints / purity of aluminum wire shall be submitted to the Engineer –In charge for verification.

Other Specification:

In case of any doubt regarding specification, stipulation of IRS-B-1-2001 (Latest correction) will be final and binding on the Contractor.

Safety precautions:

The normal precautions against fumes and dust hazards, such as wearing of mask and proper ventilation should be observed.

Any warning printed on containers by the paint manufacturer should be strictly observed and the user should consult him in all cases doubt regarding health and fire hazards arising from the use of product. Grit Blasting, Metallizing and painting operations should be carried out in dry weather conditions, painting should not be done during damp or rainy weather.

Painting or sprayed coating should be applied without undue delay and contamination of sprayed surface with oil, grease dirt should be removed before application of first coat of paint i.e. primer. The painting surface shall be free from flaking, peeling, cracking and blistering or any other form of paint film failure. Adequate precautions should be taken for operator safety particularly during grit/ sand blasting and aluminum spraying and other ancillary works as per schedule and as required for successful completion of work.

**STAGES OF PAYMENT:**

a) Progressively on completion of the metalizing activity complete except final coat of painting.	Payment at the rate of <b>90%</b> of the accepted unit rate of relevant item of tender.
b) Progressively on final coat of painting and repair to damaged surface during handling including painting of the support point of scaffolding.	Payment at the rate of <b>10 %</b> of the accepted unit rate of relevant item of tender.

### Standards and Specification for Metallizing

Sr. No.	Description	Reference																		
1(a)	<p><b>Locations:</b> The Bridge falling in area up to 30 km from sea coast (Coastal zone) are considered to be in aggressive corrosive environment. The bridges/ steel structures in these areas are susceptible to severe corrosion, which in turn will warrant frequent maintenance attentions and painting. On Western Railway following sections in divisions are considered to be Coastal Zone.</p> <table><tr><th>S.No.</th><th>Division</th><th>sections</th></tr><tr><td>1</td><td>BCT</td><td>CCG-VR-ST</td></tr><tr><td>2</td><td>BRC</td><td>ST-BH, BH-SAMN-DHF, PTD-CBY</td></tr><tr><td>3</td><td>ADI</td><td>MALB-SIOB-GIM-NBVJ-NLY, GIM-KDLP</td></tr><tr><td>4</td><td>RJT</td><td>DAC-NLK, DAC-MALX, HAPA-KNLS-OKHA</td></tr><tr><td>5</td><td>BVP</td><td>VRL-BDDR, WSJ- PBR, TAV- SMNH, TAV-PCC-DVA,RLA-MHV, RLA-PPBR, BVP-SOJN</td></tr></table>	S.No.	Division	sections	1	BCT	CCG-VR-ST	2	BRC	ST-BH, BH-SAMN-DHF, PTD-CBY	3	ADI	MALB-SIOB-GIM-NBVJ-NLY, GIM-KDLP	4	RJT	DAC-NLK, DAC-MALX, HAPA-KNLS-OKHA	5	BVP	VRL-BDDR, WSJ- PBR, TAV- SMNH, TAV-PCC-DVA,RLA-MHV, RLA-PPBR, BVP-SOJN	Para 3,4, 5 & 5 (a) of PCE circular 73
	S.No.	Division	sections																	
	1	BCT	CCG-VR-ST																	
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	<p>Para 218 of IRBM also stipulates Metallizing for locations where girders are exposed to corrosive environment, like girders in industrial, suburban or coastal areas etc. As per ACS-8 dated: 27-08-2014 to Fabrication Specifications (IRS: B1-2001, all New Steel girder bridges shall be metalized.</p>	Para 218 of IRBM and ACS-8 to IRS: B1-2001																		
	<p>All new steel Girder Bridges (Track Bridge/ROBs and Overhead crossings) shall be metalized. The girders and floor system of all FOBs (excluding columns) should also be metalized. However, complete FOBs constructed in Coastal region shall be metalized.</p>																			
1 (b)	<p>For the metalized steel structures in corrosive environment, the frequency of painting shall be once in 5 years or later based on the evidence of corrosion in structure. The need for painting of a metalized structure after 5 years shall be decided by Dy.CE/Br/Line in-charge after inspection.</p>	Para 5 (c) of PCE circular 73																		
2.	<p><b>Metalizing:</b> In metalized protection, Zinc or aluminum is sprayed on the surface prepared by grit / sand blasting. The sprayed metal (zinc or aluminum) is lost by the atmospheric action, while the base metal (steel) remains unaffected.</p>	Para 218/1 of IRBM-1998																		
3.	<p><b>Surface preparation:</b></p>																			
3(a)	<p>The surface of steel to be metalized shall be free from oil, grease, bituminous material or other foreign matter and shall provide an adequate key for the sprayed metallic coating. This may be achieved by flame cleaning or by sand blasting. However, the abrasive once used for cleaning heavily contaminated surface should not be reused even though rescreened.</p>	Para 218/1/(i) of IRBM-1998																		
3(b)	<p>The effective life of a coating of anticorrosive paint applied to a steel surface is to a very large extent dependent on how thoroughly the surface has been prepared prior to painting. It is also important to specify clearly the quality of preparation required in each particular case.</p>	Clause 0.2 of IS:9954-1981																		
3(c)	<p>The initial surface to be metalized is described in terms of Rust grade as follow: <b>Rust Grade:</b> The steel surfaces have been grouped into the four grades i.e. A, B, C and D. The appearance of the rust grades shall correspond to the prints designated as A, B, C and D. These surfaces determine the extent of cleaning effort required.</p>	Para 0.3, 3 of IS:9954-1981																		
3(e)	<p>Millscale, rust and foreign matter shall be removed to the extent that the only traces remaining are slight stains in the form of spots or strip. Finally, the surface is cleaned with a vacuum cleaner, clean dry compressed air or a clean brush. It shall then correspond in appearance to the prints designated Sa 2-1/2.</p>	Clause 4.1.2.3 of IS:9954-1981																		
4.	<p><b>Specifications of Abrasive charge used for Blasting:</b></p>																			
4(a)	<p><b>Silica Sand:</b> Silica sand or special crushed slag, flint or garnet is used outdoors where the abrasive cannot be reclaimed and re-used. It should be hard, sharp and angular as might be produced by crushing. Round silica sand or similar materials should never be used.</p>	Clause 4.3 of IS:6586-1989																		

	River sands which are hard and sharp. The sand shall be free from loam and mud, and it shall be sharp and hard.	Clause 6.2.4 of IS:1477-1971																				
	The grain size of sand should be between 600 microns and 1700 microns and a minimum of 40 per cent should be retained on a 850 microns sieve, conforming to IS 460 (Part I): 1985.	Clause 4.3.2(a) of IS:6586-1989																				
4(b)	<b>IRON GRIT</b> Crushed chilled iron or steel grit is most commonly used where the abrasives may be reclaimed. Round steel shot grounded grit should never be used. Chilled iron Grit Grade GC-100 to GC-42 should be used.	Clause 4.3.1, 4.3.2 of IS:6586-1989																				
	The grit particles shall show good angularity in the form of sharp cutting edges and shall be substantially free from half rounds (viz. shots split into halves)	Clause 2.2, 5.3 and 6.1 of IS: 4683-1968																				
	Chilled grit shall conform to IS: 4683 and they are designated by GC standard, which is aperture size of retaining screen in hundredth of millimetres. The particle size shall be determined by testing with the sieves complying to IS: 460- 1962. The proportions retained and passed shall comply with the limits given in the Table-2 attached.																					
4(c)	<b>COPPER SLAG</b> Copper slag used as blasting material shall be vitreous amorphous material and shall not absorb water. The material shall be free from corrosive constituents and adhesion impairing contaminants. It shall meet following requirements:	ISO 11127, ISO 11126																				
	<table><tr><td>S.No</td><td>Property</td><td>Requirement</td><td>Test</td></tr><tr><td>1.</td><td>Apparent Density</td><td>3.3 to 3.9 X 103 Kg/m3</td><td>ISO 11127-2</td></tr><tr><td>2.</td><td>Hardness</td><td>Min 6</td><td>ISO 11127-3</td></tr><tr><td>3.</td><td>Moisture</td><td>Max 0.2%</td><td>ISO 11127-1</td></tr><tr><td>4.</td><td>Size</td><td>Particle size 1.4- 2.8 mm; Residue on 2.8 mm sieve- Max. 10%</td><td>ISO 11126-3</td></tr></table>		S.No	Property	Requirement	Test	1.	Apparent Density	3.3 to 3.9 X 103 Kg/m3	ISO 11127-2	2.	Hardness	Min 6	ISO 11127-3	3.	Moisture	Max 0.2%	ISO 11127-1	4.	Size	Particle size 1.4- 2.8 mm; Residue on 2.8 mm sieve- Max. 10%	ISO 11126-3
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4.	Size	Particle size 1.4- 2.8 mm; Residue on 2.8 mm sieve- Max. 10%	ISO 11126-3																			
5(a)	<b>Blasting:</b>																					
	Nozzle position: At right angles to and approximately 22.5 cm. from the surface Nozzle dia: Not exceeding 12 mm The final surface roughness achieved shall be comparable to the reference surface produced in accordance with Annex A of IS:5905 and shall provide an adequate key for subsequently sprayed metal.	Para - 218/1/(i)/b of IRBM-1998																				
5(b)	<b>Blasting method:</b> Common blasting methods in use of metal spraying are pressure blasting and centrifugal blasting (airless blasting). While pressure blasting is suitable for manual or mechanized operation, centrifugal blasting is used only as a mechanized system.	Clause 4.4 of IS:6586-1989																				
5(c)	<b>Manual Pressure Blasting:</b> Pressure blasting is the process most often used for preparing surfaces prior to metal spraying. It is particularly useful for large area job, work of varied shapes, which have to be treated manually in works blast room. For site work blasting, it is almost universally in use. The air pressure at the grit container should not be less than 4 kg/cm2.	Clause 4.4.1 of IS:6586-1989																				
5(d)	<b>Blasting technique:</b> Manual blasting should systematically cover the entire surface to be treated, by traversing the nozzle at a fairly constant speed in straight paths, each succeeding pass partially overlapping the preceding one and exposing clean metal. The nozzle distance when treating materials like steel should be 150 to 250 mm. The angle of blasting is generally 15° to 30° from normal to the blasted surface. The blast nozzle should be replaced when diameter of the orifice has been increased for 25 % by wear.	Clause 4.4.1.1 of IS:6586-1989																				
6(a)	<b>Comparing the final prepared steel surface :</b>																					
	The final surface roughness achieved shall be comparable to roughness with a reference surface produced in accordance with Annex-A (clause 4.1) of IS: 5905-1989 and shall provide an adequate key for subsequently sprayed metal. The surface prepared by sand or grit blasting should conform to Sa 2-1/2 of IS:9954 i.e. near white metallic surface.	Para 218/1/(i)/c of IRBM-1998 Para 39.2.2 of Specification																				

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		<b>81-2001.</b>
6(b)	<p><b>Procedure of comparison of prepared surface</b> by making use of the prints in practice.</p> <p>1.0 Hold the book right way up with light coming towards the viewer.</p> <p>2.0 Ascertain the initial condition of the steel by comparing the untreated steel with prints of rust Grades A, B, C or D.</p> <p>3.0 After cleaning the steel, select those pages that show preparation Grades (St) or (Sa) and compare the condition of the steel with the print equivalent to the preparation grades. If necessary, continue the cleaning procedure until the steel surface matches the print.</p>	<b>Clause 5 of IS:9954-1981</b>
7.	<b>Metallizing:</b>	
	The Specifications, procedure and materials used for metallizing with Sprayed aluminum for Bridge girders at sites and in shops is detailed in Appendix VII of IRS 81-2001 (attached), which should be followed. The materials used shall be tested as per the specifications/ codes referred therein.	<b>Appendix VII of IRS 81-2001</b>
8.	<b>Manufacturer's test certificate shall be obtained for every material used for the work like abrasive for blasting, aluminum wire, Etch/wash primer, Zinc chromate paint primer, Aluminum paint.</b>	
9.	<b>SAFETY PRECAUTIONS:</b> The normal precautions against fumes and dust hazards, such as, wearing of masks and proper ventilation should be used. For indoor spraying on smaller jobs, it is preferable to use a spray booth to collect zinc or aluminium powders released during spraying. Any safety measures or precautions suggested by the equipment or paint manufacturer should be observed.	

**Specification for Metallising with Sprayed Aluminium for Bridge Girders****1. Surface Preparation**

The surface shall be thoroughly cleaned and roughened by compressed air blasting or centrifugal blasting with a suitable abrasive material in accordance with Clause 3 of IS:6586. Immediately, before spraying it shall be free from grease, scale, rust, moisture or other foreign matter. It shall be comparable in roughness with a reference surface produced in accordance with appendix A of IS:5905 and shall provide an adequate key for the subsequently sprayed metal coating.

**2. Metal Spraying**

The metal spraying shall be carried out as soon as possible after surface preparation but in any case within such period that the surface is still completely clean, dry and without visible oxidation. If deterioration in the surface to be coated is observed by comparison with a freshly prepared metal surface of similar quality which has undergone the same preparation, the preparation treatment should be repeated on the surface to be coated.

The wire method shall be used for the purpose of metallising the diameter of the wire being 3mm or 5mm. Specified thickness of coating shall be applied in multiple layers and in no case less than 2 passes of the metal spraying unit shall be made over every part of the surface. At least one layer of the coating must be applied within 4 hours of blasting and the surface must be completely coated to the specified thickness within 8 hours of blasting.

**2.1 Purity of Aluminium**

The chemical composition of aluminium to be sprayed shall be 99.5% aluminium conforming to IS:2590.

**2.2 Appearance Of The Coating**

The surface of the sprayed coating shall be of uniform texture and free from lumps, coarse areas and loosely adherent particles.

**2.3 Thickness Of The Coating**

The nominal thickness of the coating shall be 150  $\mu$ (microns). The minimum local thickness, determined in accordance with procedure given in clause 3.1 below, shall be not less than 110  $\mu$ (microns).

**3. Shop Painting**

Any oil, grease or other contamination should be removed by thorough washing with a suitable thinner until no visible traces exist and the surfaces should be allowed to dry thoroughly before application of paint. The coatings may be applied by brush or spray. If sprayed, pressure type spray guns must be used. One coat of wash primer to IS:5666 shall be applied first. After 4 to 6 hours of the application of the wash primer, one coat of Zinc chrome primer to IS:104 with the additional proviso that zinc chrome to be used in the manufacture of primer shall conform to type 2 of IS:51 shall be applied. After hard drying of zinc chrome primer, one coat of Aluminium paint to IS:2339 (brushing or spraying as required) shall be applied.

#### 4. Site Painting

After the steel work is erected at site a second cover coat of Aluminium paint to IS:2339 (brushing or spraying as required) shall be applied after touching up the primer and the cover coat given in the shop if damaged in transit.

#### 5. Method for the Determination of Local Thickness

##### 5.1 Equipment

Any magnetic or electro-magnetic thickness meter that will measure local thickness of a known standard with an accuracy of  $\pm 10$  percent.

##### 5.2 Calibration of Instrument

Calibrate and check the meter on one of the following standards(as appropriate):

(i) (Applicable to magnetic and electro-magnetic meters other than the pull-off type) A soft brass shim, free from burrs, in contact with the grit-blasted surface of the base metal prior to its being sprayed. The thickness of the shim shall be measured by micro meter and shall be approximately the same as the thickness of the coating.

(ii) A sprayed metal coating of uniform known thickness approximately the same as the thickness of the sprayed coating to be tested, applied to a base of similar composition and thickness to the article being sprayed, grit-blasted in accordance with Clause 1.

##### 5.3 Procedure

For each measurement of local thickness, make an appropriate number of determinations, according to the type of instrument used.

With instrument measuring the average thickness over an area of not less than  $0.645 \text{ cm}^2$ , the local thickness shall be the result of the one reading.

With instruments having one or more pointed or rounded probes, the local thickness shall be the mean of three readings within a circle of  $0.645 \text{ cm}^2$  area.

With meters having two such probes, each reading shall be the average of two determinations with the probes reversed position.

#### 6. Method Of Test For Adhesion

Using a straight edge and hardened steel scribe which has been ground to a sharp 30 degree point, scribe two parallel lines at a distance apart equal to approximately 10 times the average coating thickness. In scribing the two lines, apply enough pressure on each occasion to cut through the coating to the base metal in a single stroke.

#### 7. Inspection

##### 7.1 Determination of Local Thickness

The minimum local thickness shall be determined by the method described above.

##### 7.2 Adhesion

The sprayed metal coating shall be subjected to an adhesion test using the method described above. If any part of the coating between the lines breaks away from the base metal, it shall be deemed to have failed the test.

Articles, which have been rejected shall have the defective sections blasted clean of all sprayed metal prior to respraying. Where the rejection has been solely due to too thin a coating, sprayed metal of the same quality may be added provided that the surface has been kept dry and is free from visible contamination.

TABLE 2 GRIT GRADE NUMBERS

(Clauses 2.2 and 5.1)

IS SIEVE DESIGNATION	WIDTH OF APERTURE mm	GRIT NUMBER											
		G-C236	G-C200	G-C170	G-C140	G-C118	G-C100	G-C85	G-C60	G-C42	G-C30	G-C18	G-C09
3-35 - mm	3-35												
2-80 - mm	2-80	80 10											
2-36 - mm	2-36		80 10										
2-00 - mm	2-00			80 10									
1-70 - mm	1-70				80 10								
1-40 - mm	1-40					75 10							
1-18 - mm	1-18						75 15						
1-00 - mm	1-00							75 15					
850-micron	0-850								70 15				
710-micron	0-710												
600-micron	0-600												
500-micron	0-500	None pass, except 2 percent, Max allowed for fines											
425-micron	0-425												
355-micron	0-355												
300-micron	0-300												
180-micron	0-180												
90-micron	0-090												

Note - When IS sieves are not available, equivalent BS or ASTM sieves specified in Appendix A may be used.

## **PAINTING WORK**

### **SPECIFICATIONS FOR STEEL WORK PAINTING:**

1.0: ALL STEEL WORK PAINTING WHETHER UNDER SOR OR NON-SCHEDULE ITEMS SHALL BE CARRIED OUT UNDER FOLLOWING SPECIAL CONDITIONS:

**Work to be carried as per WR USSOR -2021 and latest correction slip if any.**

1. Contractor should make his own arrangements for scaffolding and derricks etc. for completion of work.
2. No chemical of any kind whatsoever should be used in the removal of oil, paint or rust.
3. SURFACE PREPARATIONS: The surface preparation is the most important part of painting. The surface preparation shall be done to ensure removal of all loose dirt, dust, contaminants, loose and perished paint, and rust from the surface being painted and shall ensure sufficient adhesion to the paint layers being applied. The area where only top paint film shows deterioration, the cleaning shall be done using water/detergents, light wire brushing and light sand papering etc. (CLEANING). The area where rust has appeared and where existing primary coat has developed blisters, cracks, brittleness etc. or is peeling, are to be scrapped and manually hand cleaned by use of emery paper, wire brushes, scrappers etc., ensuring that they are not blunt. Acid paint removers flame etc. shall not be used for removing Corrosion, paints etc. (SCRAPPING)
4. While painting on new steel, the same shall be properly hammered and scrapped to remove factory/mill scale taking care that steel is not deformed / damaged during the process. In newly welded structures, the painting shall be carried out after complete slag on the welding is removed by chipping etc.
5. QUANTITY FOR SCRAPPING: The quantity for scrapping complete paint film will be decided by the bridge inspector-in-charge of the work and shall be conveyed before start of work. Decision of engineer in charge in respect of dispute in this respect shall be final. The area scrapped should be followed by primer. If for any reasons beyond contractor's control painting cannot immediately follow surface preparation (within 24 hours) corrosion should be prevented for a short time by means of temporary coating of linseed oil applied uniformly and thinly (one third litre on 10 Sq. m area will be sufficient).
6. The work will generally be carried out as per provision for painting work as per IRBM para 217 sub- para 1 to 4.

**Railway's standard specifications and as per instructions given by Engineer-in- charge. Following points may be noted.**

- 1) Paint should be mixed in small quantities sufficient to be consumed within 1 (one) hour in the case of red lead paint and 5(five) days in the case of red oxide paint.
- 2) While painting with red oxide paint, a little quantity of lamp black shall be added to the paint while doing the first coat, similarly in the case of Aluminum paint a little blue paint can be added instead of lamp black for 1st coat.
- 3) Paint should be used within the prescribed shelf life from the date of manufacture. The quantity for paint procured should be such that it is fully utilized before the period prescribed for its use.

**THE SHELF LIFE OF VARIOUS PAINTS USED IN THE RAILWAYS IS AS FOLLOWS:**

<b>1</b>	<b>Paint red lead ready mixed (IS:102)</b>	<b>04 Months</b>
<b>2</b>	<b>Paint red oxide ready mixed (IS:123)</b>	<b>01 year</b>
<b>3</b>	<b>Paint Aluminum (IS:2339)</b>	
	<b>(i)When paste and oil are not mixed</b>	<b>01 year</b>
	<b>(ii)When paste and oil are mixed</b>	<b>04 Months</b>
<b>4</b>	<b>Paint Zinc Chrome ate primer (IS:104)</b>	<b>01 year</b>
<b>5</b>	<b>Paint Red oxide Zinc Chrome (IS:2074)</b>	<b>01 year</b>

The paint containers supplied by contractor shall indicate date of manufacture clearly and no paint shall be used after expiry date as above. No claim shall be entertained on account of unused paint if any.

4) The coat of paint applied shall be such that the prescribed dry film thickness is achieved by actual trial for the particular brand of paint. The applied coat of paint shall be uniform and free from brush marks, sags, blemishes, scattering, crawling, uneven thickness, holes, lap marks, lifting, peeling, staining, cracking, checking, scaling, holidays and allelating.

5) The entire contents of a paint drum should be mixed thoroughly either by pouring a number of times or by mechanical mixing to get uniform consistency. The paint should not be allowed to settle down during painting by frequent stirring or mixing. Dryers such as spirit or turpentine should not be used.

6) Mixing of Kerosene oil is strictly prohibited.

7) CONTROL OF PAINT FILM THICKNESS: It is desirable to control and check the thickness of paint applied to a structure. The wet film thickness can be monitored by means of the wet film gauges and from the rate of paint consumption at intervals during application. To provide a recognizable surface appearance and assist in rapid visual inspection during the course of the work, a reference patch or patches of required thickness should be painted on the structure.

Measurements of dry film thickness (DFT) should be done systematically over the whole structure and results assessed. Attention should be paid not only to the average DFT but also to uniformity of application. The normal thickness as also the minimum thickness of the dry film should be specified and ensured during execution. Any deviation from the above shall be made with the approval of Executive Engineer-in-charge of the work.

8) The contractor shall arrange for an Elcometer (magnetic or electronic) in perfect working condition having accuracy  $\pm 10\%$  and supply the same with calibration gauge to Bridge Inspector in charge of work. The Elcometer shall remain in possession of railway for the purpose of supervision till the completion of the work.

9) The necessary paints should be procured from one of the reputed paint manufacturers as per ISI marked sealed pack of reputed manufacturer approved by Engineer-in-charge of the work.

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10) The lot of paint along with the purchase bills shall be brought to site of work and shall be produced for approval of the field engineer in charge of the work. The paint containers are to be opened in the presence of the railway representative only who shall inspect the container and the details of the paints including weight, batch no, lot no etc and the specifications etc. Only after the railway representative is satisfied regarding the quality of paint shall the same be applied on the structures. Any painting work carried out without satisfying the site engineer in charge of the work regarding the quality of paint shall not be measured and paid for. The structure shall be required to be scrapped at contractor's cost only and painted with proper quality paint. The consumption of the paint shall be correlated with the painted area and the balance stock of paint available at site. Proper records shall be maintained at site by the contractor for this purpose and the record, stock and other details shall be kept open for inspection at all times.

11) If thinner is to be added to the paint supplied by the contractor it should be of the same Manufacturer as that of the paint and to the manufacturer's recommendations. In all the cases, thinner will be added where necessary in the presence of Railway's representative. The Kerosene oil shall never be used as thinner. The Railway's representative shall check the viscosity of the paint at the time of application. The quantity of thinner should be decided after trial. Only required quantity of thinner shall be added such that the requisite thickness is obtained for each coat and the decision of the Site Engineer in charge in this respect shall be final and binding on the contractor.

12) Through scrapping wherever required will be done with scrappers, wire brushes and chipping hammers ensuring that they are not blunt. Acid paint removers, flames etc. shall not be used for removing corrosion, paints etc.

13) PAYMENT CONDITIONS: The payment shall be made on the basis of the steel area painted in all respects i.e. painting with one/two primer coats, as required, and one/two top coats, as specified in the schedule of painting, as per specifications and to the satisfaction of the Bridge engineer in charge of the work.

i) No payment shall be made for steel areas as partially painted. The height of work shall be measured with reference to flooring systems of structures.

ii) The tenderers are invited to see the site of work and ascertain the nature of work, approaches to site of work etc.

iii) The tenderer will have to make his own arrangements for supply of power, water etc. required for the work at his own costs.

iv) While working in OHE area, care shall be exercised especially when transporting material and while working that no person(s) shall enter the OHE area without the OHE being shut down and properly earthed. While carrying out the work, the safety of the labour will be the responsibility of the contractor. He should depute lookout man with whistle etc. to warn the workers about the movement of trains. All regulation of control, state and local government and accident insurance in respect of labour employed shall be fully followed by the contractor.

v) In case the Engineer-in-charge desires to get the paint tested the samples shall be sent to CMT-PAREL or any other laboratory approved by the Engineer-in-charge. The testing charges shall be borne by the Railway.

#### 1. Safety precautions:

- The normal precautions against fumes and dust hazards, such as wearing of mask and proper ventilation should be observed.
- Any warning printed on containers by the paint manufacturer should be strictly observed and the user should consult him in all cases doubt regarding health and fire hazards arising from the use of product.

- Grit Blasting, Metallizing and painting operations should be carried out in dry weather conditions, painting should not be done during damp or rainy weather.
- Painting or sprayed coating should be applied without undue delay and contamination of sprayed surface with oil, grease dirt should be removed before application of first coat of paint i.e. primer.
- The painting surface shall be free from flaking, peeling, cracking and blistering or any other form of paint film failure.
- Adequate precautions should be taken for operator safety particularly during grit/ sand blasting and aluminum spraying and other ancillary works as per schedule and as required for successful completion of work.

**Stages of payment:-** Payment shall be made on progressive basis

#### **SPECIAL CONDITIONS FOR USSOR ITEMS Indian Railway Unified Standard Specification 2021**

##### **SPECIFICATION OF CEMENT**

A) The cement used shall be any of the following and type selected should be appropriate for the intended use.

- i) 33 Grade Ordinary Portland Cement conforming to IS:269
- ii) 43 Grade Ordinary Portland Cement conforming to IS:8112
- ii) 53 Grade Ordinary Portland Cement conforming to IS:12269
- iv) Rapid hardening Portland Cement conforming to IS:8041
- v) Portland slag cement conforming to IS:455
- vi) Portland pozzolona Cement (Fly ash based) conforming to IS:1489(Part-1)
- vii) Portland pozzolana Cement (calcined clay based) conforming to IS:1489(Part-2)
- viii) Hydrophobic Cement Conforming to IS:8043
- ix) Low heat Portland cement conforming to IS:12600
- x) Sulphate resisting Portland cement conforming to IS:12330

Note:- Pozzolona Portland Cement shall not be used for PSC Works

- B) The cement shall be packed in jute sacking bags conforming to IS:2580-1982, double hessian bituminized (CRI type) or woven HDPE conforming to IS:11652-1986 woven polypropylene conforming to IS:11653-1986, jute synthetic union conforming to IS:12174- 1987, or any other approved composite bags, bearing the manufacturers name or his registered trade mark if any, and grade and type of cement.
- C) Every delivery of cement shall be accompanied by a producer's certificate confirming that the supplied cement conforms to relevant specification. These certificates shall be endorsed to the Engineer for his record. Certified copy of the same shall be submitted to Divisional Office along with running bills/final bills.
- D) Every consignment of cement must have identification marks on packages indicating date of manufacture and grade and type of cement. Cement when brought to work shall not be more than 6 weeks old from the date of manufacture. In case due to some reason it is not possible to use the cement within three months then it should be ensured that older lot is used in the lean concrete or other unimportant items of work. Effective precautionary measures shall be taken to eliminate dust nuisance during loading or transferring cement. The procurement of cement shall be planned by the contractor this does not affect the progress of work.
- E) Cement in bags shall be stored and stacked in a shed which is dry, leak proof and as moisture proof as possible. Flooring of the shed shall consist of the two layers of dry bricks laid on well consolidated earth to avoid contact of cement bags with the floor. Stacking shall be done about 150 to 200mm clear above the floor using wooden planks, old wooden sleepers or scrap GI sheets. Cement bags shall be stacked at least 450mm clear of the walls and in rows of two bags leaving in a space of at-least 600mm between two

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consecutive rows. In each row the cement bags shall be kept close together so as to reduce air circulation. Stacking shall not be more than 10 bags high to avoid lumping under pressure. In stacks more than eight bags high, the cement bags shall be arranged in header and stretcher fashion, i.e. alternately lengthwise and crosswise so as to tie the stacks together and minimize the danger of toppling over.

- F) Different type of cement shall be stacked and stored separately. Cement bags shall be stacked in a manner to facilitate their removal and use in the order in which they are received. For extra safety during monsoon, or when cement is expected to be stored for an unusually long period, each stack shall be completely enclosed by a water proofing membrane, such as polyethylene/tarpaulin, which shall cover the top of the stack. Care shall be taken to see that the water proofing membrane is not damaged at any time during use. Cement which is set or partially set should on no account be used.
- G) "Cement shall be procured/purchased from cement factories/authorized dealers/retailers from various popular brands e.g. ACC(ASSOCIATED CEMENT CO.)/ ULTRA TECH / GUJRAT AMBUJA CEMENT/ JK/ L&T / JP CEMENT/ WONDER CEMENT./ HATHI/ HI-BOND/ SIDDHI CEMENT/ SANGHI/ JSW/ MP BIRLA , KAMAL, J K SUPER, J K PLATINUM, J K SIXER, LAFARGE, BANGAR, COROMANDEL etc. or as per latest prevailing instructions. (Any relaxation in these cement brands should require prior approval of tender accepting authority) The contractor shall have to submit the cash memo along with the lot of cement purchased from the various cement factories/authorized dealers/retailers to Engineer in Charge in token proof of purchase of cement from reputed cement factories/authorized dealers/retailers. No cement shall be accepted by the Engineer in charge without cash memo. Certified copy of the same shall be submitted to Divisional office along with running bills/final bills."
- H) After receipt of each lot of cement at go-down a sample of cement at the direction of Engineer in charge shall be tested at contractor's own cost for (a) Fineness, (b) Soundness, (c) Setting time (initial and Final), (d) Compressive strength & (e) consistency of standard cement paste as prescribed in IS code) IS:4031 Part-II, Part- III, Part V & Part-VI for each lot or every 50 tonnes or part thereof. Only on receipt of satisfactory certificates this cement shall be allowed to be used on the work. Certified copy of the same shall be submitted to Divisional Office along with running bills/final bills.
- I) Although cement payment is in MT as per item of tender, total quantities so paid shall be limited to quantity actually used in work, subject to further not exceeding the quantity laid down in Indian Railway Unified Standard Specifications (Works and Materials) Vol. I & II whichever is less.
- J) No payment shall be made for the cement used in works rejected by Engineer. All empty bags shall be taken away by the contractor after use of cement and cost of empty cement bags shall not form part of quoted rates against the item of cement.
- K) Cement bags left after completion of work shall be taken away by the contractor and Railway shall not make any payment against these bags.

To ensure the proper account of cement used at worksite, the following guidelines are issued regarding the proper storage, handling and documentation of cement used at worksite:

**1. In case of cement is received in bags:** Cement shall be stored at the work site or nearby in a contractor's maintained shed which is dry, leak proof and moistures proof.

**2. In case cement is received in silos:** The silos shall be stacked near the concrete batching plant. Proper access shall be provided for the refilling of silos.

**3. Storage of cement** at work site shall be at the **contractor's expenses and risk**. Any damage occurring to cement due to faulty storage in shed/silo or on account of negligence on his part shall be the liability of the contractor.

**4. Cement consumption register** shall be maintained giving quantity of work done/ consumption of cement datewise. ( Dy. CE (Works&SD) Letter no. WR-HQ0ENGG(WWTC)/2/2021/E-132054 dtd.29.12.2025)

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Office of PCE  
Western Railway, HQ,  
Churchgate,  
Mumbai-400 020

WR-HQ0ENGG(WWTC)/2/2021/E-132054

Date:29.12.2025

**Sr.Den(Co)- MMCT/ADI/RJT/BVP/BRC/RTM**  
**Dy.CE(Br.)-DDR/ADI/BRC**

**Sub: Regarding Maintenance of Cement Consumption Register.**

**Ref: CE(Works&SD) letter no. WR-HQENGG(WWTC)/2/2021/E-132054 Dated 03.04.2025**

During a vigilance investigation in one of the divisions of WR, it was observed that no cement consumption register was being maintained at the worksite.

Guidelines regarding the proper storage, handling, and documentation of cement at the worksite have already been issued by HQ vide the letter at reference. These guidelines must be strictly adhered to ensure effective accounting of cement at the worksite.

DA:As above

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by SURENDRA  
KUMAR  
Date: 2025.12.29  
17:04:16 +05'30'  
**SURENDRA KUMAR**  
(Surendra Kumar Chaudhary)  
Dy.Chief Engineer(Works&SD)



Office of the,  
Principal Chief Engineer  
Western Railway HQ  
Churchgate,  
Mumbai-400 020

WR-HQENGG(WWTC)/2/2021/E-132054

Date: 03.04.2025

Sr.DEN(Co.)-ADI/MMCT/BRC/RJT/BVP/RTM

Dy. CE (Co.)-DDR | BRC | ADI

Sub: System improvement regarding **special Condition in tender Document** reg.

During the vigilance investigation in one of the Division of WR, it has been found that there had been a special tender condition stipulating that "*Procured cement should be stacked into IOW's godown at contractor's cost and from there the requirement for day to day use shall be drawn by the contractor against hand receipt. The cement shall not be directly taken to the site of work*". This condition was relevant when Railway use to procure cement by its own and use to issue cement to agency but now cement is paid as per the consumption and is procured & used directly by the agency; therefore, such condition is not to be incorporated now onwards.

To ensure the proper accountal of cement used at worksite, the following guidelines are issued regarding the proper storage, handling, and documentation of cement used at worksite:

1. **In case of cement is received in bags:** Cement shall be stored at the work site or nearby in a contractor's maintained shed which is dry, leak proof and moisture proof.
2. **In case cement is received in silos:** The silos shall be stacked near the concrete batching plant. Proper access shall be provided for the refilling of silos.
3. **Storage of cement** at the work site shall be at the **contractor's expense and risk**. Any damage occurring to cement due to faulty storage in shed/ Silo or on account of negligence on his part shall be the liability of the contractor.
4. **Cement consumption register** shall be maintained giving quantity of work done/consumption of cement datewise.

These guidelines must be strictly adhered to for the effective accountal of cement at worksite; Special tender condition needs to be modified accordingly.

PAWAN  
KUMAR  
GARG

(Pawan Kumar Garg)  
Chief Engineer (Works & SD)

Digitally signed by  
PAWAN KUMAR GARG  
Date: 2025.04.03  
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SPECIFICATION OF STEEL ITEMS**REINFORCEMENT STEEL (TMT BARS) AND STRUCTURAL STEEL**

- A. All Reinforcement Steel (TMT Bars) and structural Steel shall be procured as per specifications mentioned in BIS's documents-IS: 1786 and IS: 2062 respectively. Independent tests shall be conducted, wherever required, to ensure that the materials procured conform to the specifications.
- B. Steel shall be procured only from those firms, which are established, reliable, indigenous and Primary producers of steel, having integrated steel plants (ISP), using iron ore as the basic raw material and having in- house iron rolling facilities, following by production of liquid steel and crude steel, as per Ministry of Steel's guidelines i.e. "SAIL / TISCO/ JINDAL / RINL / ESSAR/ IISCO (ONLY PRIMERY MANUFACTURE) and for Reinforcement steel (TMT Bars) only i.e. SRMB / JINDAL PANTHER, NAKODA TMT / ADHUNIK TMT / SHYAM / ELECTROSTEEL / SUPER SHAKTI / AF STAR / GOEL TMT / NEOSTEEL / GK TMT / RASHMI / RELIABLE / MSP TMT / BALAJI SHAKTI / NANDAN TMT / ET TMT / SEL /V-XEGA, TATA/ RINL/ SAIL/ TISCO/ JINDAL/ RINL/ ESSAR/ IISCO/ JSW/ ARCELAR MITTAL (ONLY PRIMERY MANUFACTURE) and latest prevailing instruction. (Any relaxation in these steel brands should require prior approval of tender accepting authority).
- C. However, only certain isolated sections of structural steel, not being rolled by ISPs, can be procured from the authorized re-rollers of ISPs or authorized licensee of BIS having traceability system and who use billets produced by ISPs. Traceability shall be ensured by an officer specially authorised by the concerned SAG officer of Zonal Railway on case to case basis for this purpose. (Rly Brd's Letter No- 2007/CE-I/CT/8, Dtd:01/05/2012).
- D. The steel procured shall be reasonably free from cracks, surface flaws, laminations, rough and imperfect edges and all other harmful defects. Steel sections, shall be free from excessive rust, scaling and pitting and shall be well protected. The decision of the Engineer regarding rejecting any steel section on account of any of the above defects shall be final and binding.
- E. Structural steel work shall conform to the requirement as specified in Indian Railway Unified Standard Specifications (Works and Materials) Vol. I & II.
- F. "The original invoice of material should be obtained to ensure traceability & usage for each and every material component (including, steel, cement, etc.)".
- G. Details such as agency, name of project, site location shall be noted on the Invoices. The invoices should be signed by Railway officials, SSE/JE, to confirm their acceptance. Proper attention/care should be taken, if any fake invoices are details such as agencies. The original invoices of cement/steel/other materials etc. with details such as name of agency, name of project, site location etc. by executives must be ensured before passing bills. Consolidated record of the invoices in the work shall be meticulously maintained.
- H. It may also be ensured that third party material test certificate have Batch no./ lot no./ cast no./ batch code along with agency, name of project, site location, GSTIN number etc endorsed by executive before passing the bill to ensure traceability of each and every test report for correlation at later stage.

- I) Necessary purchase bill along with test certificate for steel shall be obtained and submitted to the Engineer in Charge. Steel without the test certificate from NABL laboratory shall not be used in the work. Certified copy of the same shall be submitted to Divisional Office along with running bills/final bills. Steel shall be tested for Tensile strength and bend test as per IS: 1599 as specified in Indian Railway Unified Standard Specifications (Works and Materials) Vol. I & II.
- J) Quantity for this item shall be calculated as per nominal weight of steel section for the length actually used in the work. No payment will be made for the wastage and the contractor will be allowed to take away the scrap and excess steel away from site.
- K) The contractor shall be responsible for getting the measurement of steel entered in to steel register and signed by the Engineer in charge of the work before concreting is done to avoid dispute regarding quantity of steel used in the work.
- L) The rates quoted for this item is deemed to be inclusive of the cost of binding wire and no separate payment shall be admissible for the same.
- M) The steel shall be kept by the contractor under his custody at the site of work and Railway will not be responsible for any theft thereof.
- N) The quantity so payable under relevant item shall be restricted to the quantity as per approved plan/drawing and decision of the Engineer in Charge in this regard shall be final and binding upon the contractor.

**Additional specifications of Work:**

**Quality Control**

1. Steel procured by the contractor for the work shall be conforming to IS:2062 1911, Grade -A or 'B0/BR' as defined in the relevant item. A test certificate as regard the quality of the steel shall be produced by the contractor from its manufacturers/NABL testing Lab. If the test certificate is not produced, Railway may get the testing done at contractor's expenses.
2. One number independent laboratory test for the metallurgical and structural properties of steel shall be conducted at government engineering college/ NABL LAB at contractor's cost for every 30 MT, or part thereof, of supply of steel under this item. The first test shall be carried out only if supply exceeds 20 MT. However, if there is any doubt regarding the quality of the steel as applied to be used by the contractor, the sample of the steel may be sent to the CMT Workshop, Sabarmati or other Railway workshop as per testing facility availability for the testing at the Railway's cost.
3. One-month time shall be made available to Railway in case testing is to be got done by Railway. The Railway on the basis of such certificates, as produced by the Contractor, or as per testing got done by Railway, shall decide the suitability of steel. Only after this, the steel shall be allowed to be used in the works. Any steel that fails in such test(s) shall be promptly removed by the contractor from the site of work.
4. The scope of this item includes supply of steel, transportation to the site of work, cutting to proper shape and size, handling at site etc. including contractor's own material, T&P, consumables, labour, temporary arrangements, scaffolding etc. The rate is inclusive of all taxes, levies, duties etc. leviable on the same as per government rules.
5. Rolled materials before being laid off or worked, must be made straight. If straightening or flattening is necessary, it shall be done by methods that will not damage the material. Material with kinks and bends shall be rejected. Gas cutting will be permitted only with the approval of concerned ADEN (BRIDGE) in charge of the work based on skill of the workers and methodology adopted. The decision of concerned ADEN (BRIDGE) in charge in this regard will be final & binding on the contractor. In case gas cutting is permitted, the edges of steel member shall be required to be ground to proper size and shape. Gas cutting shall be done in the thin members taking adequate care to ensure that the plates do not lose shape due to overheating.

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6. The steel supplied shall be cut to size & profile as required as per the site requirement, which can be decided by joint inspection and as directed by the Engineer-in-charge of the work.
7. The rate for the item included all taxes, levies, octroi, royalty, transportation, fabrication, handling, tools, plant, M & P etc. for bringing the steel to site and fabricating by cutting to correct shape and size as per requirement of work.
8. Unit of measurement is taken as metric tons or as per USSOR/NS specified.
9. Paying quantity shall be worked as under :  
Payment against the item shall be made only on the basis of sectional weight of members as per steel table and as per dimensions of fabricated steel members (i.e. cut to the size items) without any deduction for holes made in the members as per drawing. Nothing shall be paid for the unused waste pieces of steel sections etc. which shall be the property of the contractor.
10. The scope of work for this item includes the field drilling of holes 21.5mm to 25mm in diameter in the new members to be fabricated, which requires high precision marking and drilling. For this, the contractor will have to prepare proper size template, jig and fixture to ensure that no mismatching of holes at the time of replacement/erection occurs. For ensuring best possible accuracy, very competent concerned staff and required tool and plant will have to be deployed.
11. For the purpose of making jig/template, the contractor shall be required to make a sample Component, where direct measurements are not possible due to obstructions by sleepers, stiffeners etc. the sample component made shall be paid for by weight under relevant item or supply of steel even when the same is not inserted in the girder due to inaccurate holes/ dimensions. The member fabricated shall be the property of the railway after the work is completed.
12. Proper care shall be taken in fabrication and drilling of holes so that excessive drifting is not required for insertion of turn bolts. Fabricated item shall be checked for dimensional accuracy on gauge made specifically for this purpose against this item and certified by the site in charge of the work prior to availing of block for replacement. Fabricated items not conforming to dimensional tolerances specified shall be rejected & not inserted in the girder due to inaccurate holes/ dimensions. The member fabricated shall be the property of the railway after the work is completed.
13. Reaming of holes for the purpose of matching of holes shall not be permitted.
14. Holes for rivets and bolts shall be drilled to conform to provision of IRS B1 and clause 10 of ARE: 7215. All holes, except as stated hereunder, shall be drilled to the required size or sub-punched 3 mm less in diameter and reamed thereafter to the required size. Thickness of the material for sub-punching shall not be greater than 16 mm. All matching holes for rivets or bolts shall register with each other so that a gauge of 0.8 mm less in diameter than the holes can pass freely through the members assembled for riveting or bolting in the direction at right angle to such members. When the number of members to be riveted in an assembly exceeds three or the total thickness is 90 mm or more, the holes shall be drilled or reamed in position.
15. After assembly, except when steel bushed jigs are used. The parts shall be firmly bolted together during such block drilling and taken apart for removal of burrs after drilling work. The payment shall be made in such a case considering the complete thickness of drilling as plate of one thickness only.
16. No holes shall be made by gas cutting process.
17. Fabricated components, which do not comply with the above-mentioned dimensional tolerances, are liable to be rejected including with recovery of cost of the material.

18. Drilled out material shall become the property of the contractor.  
If, however, the holes are made out of proper location, the girder members shall be assessed for the loss of strength as a result of the bad workmanship and any reaming for riveting, and spicing etc. required for the member so damaged shall have to be done at contractor's cost only and nothing extra shall be paid for the same. The decision of the engineers in charge and the railway's design office in this matter shall be final and binding in this respect.
19. Making of holes by gas cutting in the girder or its components is strictly prohibited.
20. Drilled out material shall become the property of the contractor.
21. Chequered plates confirming to IS: 3502 shall be procured.
22. For steel confirming to IS: 2062, Gr. 'A' or Gr. 'B', requirement as per relevant concerned item shall be followed.
23. HSFG bolts shall be provided as per RDSO specification as per BS-111 (rev-7)

**Work to be carried as per WR USSOR -2021 and latest correction slip if any.**

**Item wise specifications SCHEDULE- "C" NS Item:-Strengthening of ROB**

**NS-1:- Cleaning by washing lights and blasting and coating of old concrete surface of Prestressed concrete girders with four coat epoxy coating as approved by CECRI as per special conditions of contract and detailed specifications of the item attached with the tender with contractor's own material, paints, scaffolding, labour, consumables, plant, all leads, lifts etc. The work is to be carried out as per specifications of four coat painting system of CECRI (Central Electro-Chemical Research Institute, Karaikudi) for coating over concrete surfaces consisting of epoxy polyamided iron oxide primer coat, epoxy polyamide micaceous iron oxide under coat, epoxy polyamide titanium dioxide third coat and aliphatic top coat.**

The work is to be carried out as per specifications of four coat painting system of CECRI (Central Electro-Chemical Research Institute, Karaikudi) for coating over concrete surfaces consisting of epoxy polyamide iron oxide primer coat, epoxy polyamide micaceous iron oxide under coat, epoxy polyamide titanium dioxide third coat, and aliphatic topcoat.

The work shall be carried out under the following special conditions:

1. The work of painting of epoxy based painting on concrete surface of prestressed concrete girders shall be carried out after careful surface preparation as per scheme developed and recommended by CECRI Karaikudi with contractor's own material, paints, scaffolding, labour, consumables, tools, plant, all leads, lifts etc.
2. Contractor should make his own arrangements for scaffolding and derricks etc. for completion of work.
3. The tenderers are invited to see the site of work and ascertain the nature of work, approaches to site of work etc.
4. The contractor will have to make his own arrangements for supply of power, water etc, required for the work at his own costs.
5. SURFACE PREPARATION: The surface preparation shall aim at providing clean and suitably rough surface to allow proper bonding of the primer coat with the concrete surface. The surface

preparation shall be done as per specifications laid down by CECRI. The following steps of surface preparation are to be taken:

(a) WASHING: Washing with water to remove salts and debris accumulated on the surface of the concrete structure. The washing shall be done as per recommendations of CECRI and the paint manufacturer, as approved by engineer - in - charge of the work. The water to be used shall be free of deleterious impurities that can stain or contaminate the surface of the concrete to be coated. The saline water shall not be used for cleaning purpose.

(b) LIGHT SAND BLASTING: The concrete surface shall be light sand blasted to remove all loose, perished paint and all peeling off/ cracked mortar etc, and all dirt, dust, debris etc accumulated at the surface. The sand blasting shall be done as to produce the surface of the roughness equivalent to that mentioned in the specifications of CECRI and paint manufacturer, as approved by the site engineer in charge of the work.

6. PAINTING OF SCAFFOLDING SUPPORT LOCATIONS: The scaffolding erected shall be sufficiently strong to ensure safety of the workers and shall facilitate easy inspection of all parts of the structure and shall be so erected keeping the navigational requirement and headroom, if required, in mind. The support points of the scaffolding may be left in painting as well as surface preparation. The arrangement shall be made as to allow the support points to be shifted for proper surface preparation and painting thus ensuring proper and uniform coating on the concrete surface. In case the same is not done, the support points shall be properly washed and cleaned manually/mechanically and painted with all coats of paint as specified taking due care to ensure the painting layers cover the left over and adjoining areas without any joints that may allow the corrosion to start from these locations. In case the support points are not sand blasted, the areas painted after manual/mechanical surface preparation shall be paid for at 50 % of the agreed unit rate of the item.

7. It is to be ensured that the surface is fully cleaned and free from all contaminants that are deleterious to the paint coatings being applied. The bridge is located in severe corrosive environment and any delay in application of coating after surface preparation may require the surface to be prepared again. The scope of work of this item shall be inclusive of any re preparation of surface required to be done.

8. No painting shall be carried out on surface not properly prepared under the supervision of and to the satisfaction of site engineer in charge of the work. No painting shall be done on wet surface.

9. A register shall be opened to monitor the progress of the work and approval of the site engineer in charge of the work or his authorized representative shall be obtained on the same for the surface prepared/ coating layer applied before any subsequent coating is applied.

10. The necessary paints should be procured from reputed paint manufacturers only. The supplier of paints shall be got approved from the executive engineer in charge of the work before the start of the work. Any RDSO approved list of paint suppliers for epoxy paints on concrete surfaces shall have to be followed. The contractor shall arrange for the test certificates from the manufacturer along with original purchase bills for each lot of paints brought to the site of work. The contractor shall also arrange for supply of a copy of paint manufacturer's technical and user specifications for the paints supplied. The technical and user specifications given by paint manufacturer shall clearly state the chemical composition, recommended locations of use, over coating and surface preparation specifications, precautions to be taken while using the paints, range of physical parameters such as temperature, humidity etc while application and in

service and other relevant details.

11. The paints brought to site shall be got tested for chemical and physical tests for the purpose of verifying the suitability or otherwise of the paints to the CECRI recommended painting scheme from CECRI Karaikudi or any institute accredited by CECRI for the same at contractor's cost. No payment shall be released till such tests certify the suitability of the paints as per the painting scheme.

12. In case the Engineer-in-charge desires to get the paint tested the samples shall be sent to CMT-PAREL or any other laboratory approved by the Engineer-in-charge. The testing charges shall be borne by the Contractor. In case the railway decides to get the paints tested, one month's time shall be made available for obtaining the results.

13. Paints have to be used as per manufacturer specifications and no paint shall be used after the prescribed shelf life and/or pot life etc is over or the condition of paint is not as per recommendations of the paint manufacturer. The paints shall be mixed such that the same are used up within the specified potlife of the paint. Any wastage on account of non-usage of the paint shall be on contractor's account and no extra payment shall be made for the same.

14. No painting work shall be done in extremely misty, dusty and wind blowing conditions or any such conditions as laid down as deleterious to the coating quality by the paint manufacturer or CECRI. The work is to be carried out only in the temperature, humidity and other physical parameters as specified by the manufacturer or CECRI. The handling and storage of the paints shall be done in manner as specified by the paint manufacturer or CECRI to avoid any loss in quality of the paints. Any paint rendered unfit for use on the structure due to not being properly stored and/or handled or for any other reason shall not be used and shall be promptly removed from the site of work.

15. Payment shall be made for the painted surface completed in all respects. No payment shall be made for areas partially painted. The contractor shall assess the paint requirement and accordingly procure and bring to site the paints in required quantity. No payment shall be made for paints procured but not utilized on the work including partially consumed drums of paint.

16. CONTROL OF PAINT FILM THICKNESS: It is desirable to control and check the thickness of paint applied to a structure. To provide a recognizable surface appearance and assist in rapid visual inspection during the course of the work, a reference patch or patches of required thickness should be painted on the structure. Measurements of dry film thickness (DFT) should be done systematically over the whole structure on steel plates fixed with epoxy on the concrete surface at the rate of one per 10 (ten) sqm and results assessed. The steel and epoxy used for the same shall be deemed inclusive in the scope of this item. Attention should be paid not only to the average DFT but also to uniformity of application. The wet film thickness shall be monitored by means of the wet film gauges and from the rate of paint consumption at intervals during application for quality control. The normal thickness as also the minimum thickness of the dry film should be specified and ensured during execution. Any deviation from the above shall be made with the approval of Engineer-in-charge of the work.

17. The paints shall be applied such that the minimum dry film thickness prescribed for all the coats by CECRI shall be attained. If the minimum dry film thickness is not achieved for any coat in any portion of the structure or complete area, the same shall be required to be recoated at contractor's expense only. The over coating of a paint layer shall be done after the same is properly dry as per paint manufacturer/CECRI recommendations.

18. The contractor shall arrange for an elcometer (electronic/digital) in perfect working condition having accuracy +/- 10% and supply the same with calibration gauge to SSE (Bridge) in charge of work. The elcometer shall remain in possession of railway for the purpose of supervision till the completion of the work. The contractor shall also arrange for 02(two) nos wet film gauges for the purpose of supervision of the work.

19. While working in OHE area, care shall be exercised especially when transporting material and while working that no person(s) shall enter the OHE area without the OHE being shut down and properly earthed.

20. While carrying out the work, the safety of the labour will be the responsibility of the contractor. He should depute look out man with whistle etc ,to warn the workers about the movement of trains. All regulation of central, state and local government and accident insurance in respect of labour employed shall be fully followed by the contractor.

21. The lot of paint shall be brought to site of work along with the original purchase bills and shall be produced for approval of the field engineer in charge of the work. The paint containers are to be opened in the presence of the railway representative only who shall inspect the container and the details of the paints including weight, consistency, batch no, lot no etc and the specifications etc. Only after the railway representative is satisfied regarding the quality of paint shall the same be applied on the structures. Any painting work carried out without satisfying the site engineer in charge of the work regarding the quality of paint shall not be measured and paid for. The structure shall be required to be scrapped at contractor's cost only and painted with proper quality paint. The consumption of the paint shall be correlated with the painted area and the balance stock of paint available at site. Proper records shall be maintained at site by the contractor for this purpose and the record, stock and other details shall be kept open for inspection at all times.

22. If thinner is to be added to the paint supplied by the contractor it should be of the same manufacturer as that of the paint and to the manufacturer's recommendations. In all the cases, thinner will be added where necessary in the presence of Railway's representative. Only required quantity of thinner shall be added such that the requisite dry and wet film thickness is obtained for each coat and the decision of the Site Engineer in charge in this respect shall be final and binding on the contractor.

23. The scaffolding shall be dismantled slowly and carefully ensuring complete safety. The painted surface shall be protected and in the event of any damage to the same during handling of scaffolding or any other reason on contractor's account, the exposed area shall be repaired at contractor's cost against this item only. The scheme for repair shall be as approved by the site engineer incharge of the work.

#### 24. STAGES OF PAYMENT:

On completion of painting work after proper surface preparation as per detailed specifications and scope of work and submission of original purchase bill for the paints, manufacturer's test certificate and test certificate for the quality of paint from CECRI Karaikudi. Payment @ 80 % of the agreed unit rate of the item. On satisfactory painting of support points of the scaffolding and patch repairing the painted surface after complete dismantling of scaffolding. Payment @20 % of the agreed unit rate of the item.

DYCE-BR-BRC-08-2026-27

भारत सरकार / GOVERNMENT OF INDIA  
रेल मंत्रालय / MINISTRY OF RAILWAYS  
(रेलवे बोर्ड / RAILWAY BOARD)

\*\*\*\*\*

No. 2022/19/CE-III/BR/RDSO/1 (E-3422013)

New Delhi, Dated: As Signed

Principle Chief Engineers,  
All Zonal Railways.

Chief Administrative Officers,  
All Zonal Railways.

Sub: Core Test, Permeability Test & NDT Test in addition to Cube Test for concrete works  
in Bridges.

Ref: ED/B&S-II/RDSO's letter No. CBS/Codes/A&C dated 04.05.2026

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The quality of structural concrete components of bridges is presently assessed primarily through cube tests, sampled as per Para 8.7.2.2 and tested in accordance with Clause 4.3.1.2 of the Concrete Bridge Code (CBC), based on the quantity of concrete poured at a time. In view of certain issues observed relating to the quality of construction in bridge works, RDSO has recommended the adoption of additional tests for comprehensive assessment of concrete quality.

Based on the recommendations of RDSO, the Competent Authority has decided that, henceforth, in addition to the mandatory cube tests, Core Test, Permeability Test and Ultrasonic Pulse Velocity (UPV) Test shall also be conducted for all works involving construction of Mega and Major Bridges. The frequency and locations for conducting these tests for various structural elements shall be as specified in Annexure-I enclosed herewith.

It has further been decided that the above testing regime shall be implemented with immediate effect for all Mega and Major Bridge works presently under construction.

This issues with the approval of the Competent Authority.

DA: As Above

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by ABHIMANYU  
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Date: 2026.05.19  
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(Abhimanyu Lamba)  
Director, Civil Engg./B&S-I  
Railway Board

Copy to: (i) DG/IRICEN for information please.  
(ii) PED/Infra-I & PED/Infra-II for information & necessary action please.

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Room No. 110, Rail Bhawan, New Delhi- 110001.

## Annexure-I

Schedule of test to be performed on various element of Mega/Major Bridge in addition to cube test.

BRIDGE ELEMENT	CORE TEST	PERMEABILITY TEST	ULTRASONIC PULSE VELOCITY (UPV) TESTING
<b>Foundation (Each)</b>	Minimum 4 cores shall be obtained from: a) different lifts in case of open foundation b) Pile cap by dividing the cap in 4 zones and one core from every zone in case of pile foundation c) Well cap by dividing the cap in 4 zones and one core from every zone in case of well foundation <b>Equivalent cube strength of minimum three Cores:</b> Average core strength $\geq 0.85 f_{ck}$ Individual core strength $\geq 0.75 f_{ck}$	One test per 300 cum of concrete subject to minimum one test. The test should be conducted in accordance with clause 5.4.2 of IRS CBC.	Random 5 spots of 0.6 m x 0.6 m size shall be identified and Ultrasonic Pulse velocity testing shall be carried out in accordance with IS:516 (Part 5/Sec 1). The concrete quality shall be excellent.
<b>Pier/Abutment (Each)</b>	The pier/abutment shall be divided into 4 zones. Minimum one core shall be obtained from each zone. <b>Equivalent cube strength of minimum three Cores:</b> Average core strength $> 0.85 f_{ck}$ Individual core strength $> 0.75 f_{ck}$	One test per 300 cum of concrete subject to minimum one test. The test should be conducted in accordance with clause 5.4.2 of IRS CBC.	Random 5 spots of 0.6 m x 0.6 m size shall be identified and Ultrasonic Pulse velocity testing shall be carried out in accordance with IS:516 (Part 5/Sec 1). The concrete quality shall be excellent.
<b>Piercap/Abutment cap (Each)</b>	Minimum 4 cores shall be obtained from different region of cap <b>Equivalent cube strength of minimum three Cores:</b> Average core strength $> 0.85 f_{ck}$ Individual core strength $> 0.75 f_{ck}$	One test per 300 cum of concrete subject to minimum one test. The test should be conducted in accordance with clause 5.4.2 of IRS CBC.	Random 2 spots of 0.6 m x 0.6 m size shall be identified and Ultrasonic Pulse velocity testing shall be carried out in accordance with IS:516 (Part 5/Sec 1). The concrete quality shall be excellent.
<b>Concrete Super-structure (Slat/Girder), Deck slab of concrete composite Girder</b>	Minimum 4 cores shall be obtained from different region of one span/super-structure and from deck slab <b>Equivalent cube strength of minimum three Cores:</b> Average core strength $> 0.85 f_{ck}$ Individual core strength $> 0.75 f_{ck}$	One test per 300 cum of concrete subject to minimum one test per slab/girder and deck slab. The test should be conducted in accordance with clause 5.4.2 of IRS CBC.	Random 5 spots of 0.6 m x 0.6 m size shall be identified and Ultrasonic Pulse velocity testing shall be carried out in accordance with IS:516 (Part 5/Sec 1). The concrete quality shall be excellent.

Note:

1. Cube Test results shall satisfy the acceptance criteria as per clause 8.7.6 of IRS CBC.
2. Acceptance of core test results shall be based on Annex B of IS 516 (Part-4).
3. Wherever core test is not possible due to any reason at any location/zone, the dispensation shall be given by Chief Engineer/Construction or CBE as the case may be satisfying personally that extraction of core for testing is not practically possible.
4. The acceptance of any element of bridge shall be based on the results of cube test, core test, permeability test and ultrasonic pulse velocity test. If the concrete is deemed not to comply to requirement mentioned herein, the structural adequacy of the parts affected shall be investigated and any consequential action as needed shall be taken.

ABHIMAN  
YU LAMBA

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**8) Additional special condition to Contract:-** if required by Railway during any accident/natural calamities, Railway Administration can utilize the tools and plants along with machineries of the contractor working as required as the situation warrants. The hire charges shall be payable to contractor. In this connection a new NS item will be operated by the Railway Administration. No claim shall be entertained on this account". The contractor has to submit the list of tools, plants and machineries available at site to the Engineer – In – Charge at the time of starting the work at site other than specified elsewhere in the Tender Documents.

**EPFO** – Certification given by firm in respect to labour deployed will be assumed to be correct. If during the execution of work, labour exceed more than minimum stipulation as per labour act necessary action should be taken by firm under intimation to Railway. If the certificate found to be incorrect an appropriate action has not been taken then Railway reserved the right to take appropriate action against the firm

**"THE WORK IS TO BE CARRIED OUT UNDER THE SUPERVISION OF SECTION ENGINEER (BRIDGES), AEN(BRIDGES) AND DYCE(BRIDGES) WHO WILL RESPECTIVELY BE "THE SITE ENGINEER-IN-CHARGE", AND THE "ENGINEER - IN - CHARGE" OF THE WORK. FOR ANY DISPUTE BETWEEN CONTRACTOR AND ANY OF THESE, THE DECISION OF ENGINEER-IN-CHARGE SHALL BE FINAL"**

VADODARA DIVISION								
TENDER SCHEDULE								
Name of Work:- Vadodara division- Rehabilitation of turn table at BRCY, Bridge Godhra & protective painting of various bridges in the section of SSE/BR/BRC & Schedule painting of Br No 502, 452,471UP/DN, 520UP/DN, 504A in jurisdiction of SSE(B)BH and SSE(B)BRC of Vadodara division.(Balance Quantity).								
SNo.	Item Code	Item Qty	Qty Unit	Unit Rate	Basic Value	Escl.(%)	Amount	Bidding Unit
Schedule A-Metallising of Steel work (Item Directory - WR-HQ-IR-USSOR 2021-3-Ver-1 )							504828.50	Above/ Below/ Par
1	041042	550.00	Sqm	917.87	504828.50	At Par	504828.50	
	Description: Metallizing of steel work of girders with sprayed aluminium after surface preparation by Sand/grit blasting, followed by one coat of etch primer (IS:5666) & one coat of Zinc Chrome primer (IS:104) and two coats of aluminium paint (IS:2339) with all labour, T&P and material as a complete job duly conforming to all relevant specifications and process given under Clause 39 of IRS-B1-2001. Note: Nominal Thickness of sprayed Aluminium coating shall be 150 microns. DFT of Zinc chrome primer shall be 25-30 microns and DFT of each coat of Aluminium paint shall be 12-14 microns. For maintenance work under running traffic							
SNo.	Item Code	Item Qty	Qty Unit	Unit Rate	Basic Value	Escl.(%)	Amount	Bidding Unit
Schedule B-Painting Work (Item Directory - WR-HQ-IR-USSOR 2021-3-Ver-1 )							15547460.56	Above/ Below/ Par
1	View Details In Item Breakup Below				15547460.56	At Par	15547460.56	
	Description: Painting Work							
SNo.	Item Code	Item Qty	Qty Unit	Unit Rate	Basic Value	Escl.(%)	Amount	Bidding Unit

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Schedule C-NS Items (Item Directory - Not Applicable )							2899925.54	Above/ Below/ Par
1	NS1	10200.00	Sqm	282.19	2878338.00	0.75	2899925.54	
	<b>Description:</b> Cleaning by washing lightsand blasting and coatingof old concrete surface of Prestressed concrete girders with four coat epoxy coating as approved by CECRI as per special conditions of contract and detailed specifications of the item attached with the tender with contractor's own material, paints,scaffolding, labour,consumables, plant, all leads, lifts etc. The work is to be carried out as per specifications of four coat painting system of CECRI(Central Electro-Chemical Research Institute,Karaikudi) for coating over concrete surfaces consisting of epoxy polyamided iron oxide primer coat, epoxy polyamide micaceous iron oxide under coat, epoxy polyamide titanium dioxide third coat and aliphatic top coat.							

## ITEM BREAKUP

Schedule	B-Painting Work					
Item - 1	Painting Work					
S No.	Item No	Description of Item	Unit	Qty	Rate	Amount
		Surface preparation of steel work of bridge plate/composite girders by cleaning with scrappers and/or wire brushes to remove all rust and loose or perished paint to prepare perfectly clean & dry bare metal surface free from all dirt/foreign material & ready for initial coat of paint for new or existing steel girders. Rate includes cost of labour, consumables, brushes, tools & plants, ladders, scaffoldings, jhoola, hanging scaffolding staging etc.				
1	041221	Existing girders with old paints	Sqm	683	54.17	36998.11
		Surface preparation of steel work of bridge triangulated girders by cleaning with scrappers and/or wire brushes to remove all rust and loose or perished paint to prepare perfectly clean & dry bare metal surface free from all dirt/foreign material & ready for initial coat of paint. Rate includes cost of labour, consumables, brushes, misc. tools and plants, ladders, scaffoldings, jhoola, hanging scaffolding, staging etc.				
2	041231	Existing girders with old paints	Sqm	27917.3	81.25	2268280.63
3	041250	Surface preparation for painting of bridge Triangulated girders where the finishing coat shows signs of deterioration; but primer coat of paint is sufficiently in good condition and there are no signs of rusting etc. Surface shall be cleaned free from oil grease, scaling and other foreign matters without disturbing the primer coat.	Sqm	28606.3	45.75	1308738.23
		Painting of cleaned plate/composite bridge girders including all scaffolding along with provision of Jhoola / hanging scaffolding ladders etc. where required.				
4	041261	With one coat ready mix Zinc Chromate conforming to IS:104 with DFT of 25-30 Microns followed by one coat of Zinc Chromate red oxide conforming to IS:2074 DFT of 25 Microns	Sqm	683	94.69	64673.27
		Painting cleaned triangulated bridge girders including all scaffolding, along with provision of Jhoola / hanging scaffolding ladder where				

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		required.				
5	041271	With one coat ready mix Zinc Chromate conforming to IS:104 with DFT of 25-30 Microns followed by one coat of Zinc Chrome red oxide conforming to IS:2074 with DFT of 25 Microns.	Sqm	27917.3	114.19	3187876.49
6	041273	With two coats Aluminium paint in dual containers conforming to IS:2339 with DFT of 15 - 20 Microns for each coat.	Sqm	54484.9	135.84	7401228.82
7	041231(041280)	Extra for working under traffic conditions over items 041220 to 041274 [RATE = 10%]	Sqm	27917.3	8.13	226967.65
8	041250(041280)	Extra for working under traffic conditions over items 041220 to 041274 [RATE = 10%]	Sqm	28606.3	4.58	131016.85
9	041271(041280)	Extra for working under traffic conditions over items 041220 to 041274 [RATE = 10%]	Sqm	15917.3	11.42	181775.57
10	041273(041280)	Extra for working under traffic conditions over items 041220 to 041274 [RATE = 10%]	Sqm	54484.9	13.58	739904.94
					<b>Total</b>	<b>15547460.56</b>

**END OF SPECIAL CONDITION OF CONTRACT PART-II**