

ISO 9001:2015	Document No: TDG 0021	Version No: 2.0 3.0	Date Effective: 25.04.2023
Document Title: Item Specific Guidelines & Schedule of Technical Requirements for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.			



**RESEARCH DESIGNS & STANDARDS ORGANISATION  
MANAK NAGAR, LUCKNOW – 226011**

**Document No.:** TDG 0021

**Document Title:** Item Specific Guidelines & Schedule of Technical Requirements for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.

**1.0 Amendment History:**

S. No.	Amendment Date	Version	Reasons for Amendment
1.	26.11.2011	1.0	First issue under new Documentation System.
2.	25.04.2023	2.0	<p>STR Document No. QC-G-7.1-21 Ver.1.0, effective from 26.11.2011 (OLD DOC. TDG 0021, Rev.1 effective from 26.11.2002) &amp; STR Document No. TDG 0036, Rev.1 (effective from 24.04.2012) has been merged in a single Document No. TDG 0021, Version 2.0 with Title: 'Item Specific Guidelines &amp; Schedule of Technical Requirement for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.'</p> <p>Following replacements have been made:</p> <ol style="list-style-type: none"> <li>1. Initial Capability Assessment by Fresh Vendor Registration.</li> <li>2. General Guidelines for Vendor Approval by relevant ISO Apex Documents of RDSO-Latest Version.</li> <li>3. Re-assessment by Quality audit.</li> <li>4. Part-II by Developmental Vendors;</li> <li>5. Part-I by Approved Vendor;</li> <li>6. Renewal by Quality Audit;</li> </ol> <p>Para (vii) of TDG 0036, Rev.1 modified to add that status of vendor available in Item Master uploaded on RDSO/ IREPS/ UVAM Portal &amp; on RDSO Vendor Registration IREPS Portal- <a href="http://www.rdsso.indianrailways.gov.in">http://www.rdsso.indianrailways.gov.in</a></p> <p>Assessment Proforma Clause No. 3, revised for adding Mobile no. &amp; WhatsApp no. and Clause No. 5 is added for GST No. Document formatted for as per ISO Norms in Page No. 2.</p> <p>Inclusion of drawings no. RDSO/T-6412 for 1:12/60kg &amp; RDSO/T-6441 for 1:8.5/60kg Weldable CMS Crossings under heading (A) (i). Flash Butt Welding Plant (FBWP) with all facilities required for WCMS crossings added in Plant &amp; Machineries and Assessment Proforma. UVAM Portal on IREPS is added in clause vii) of Part (A). Clause 5. &amp; 6. of Declaration has been modified.</p>
3.	00.00.2023	3.0	The Minimum Facilities & Machineries Required has been modified to include the "Electronic dimensional measurements with auto recording facility". Para 2.0 is also modified accordingly.
ADE/Track/P&C		Jt. Director/Track – III	
Prepared By:		Issued By:	
		Printed: 25.04.2023	
		Page 1 of 11	

ISO 9001:2015	Document No: TDG 0021	Version No: 2.0 3.0	Date Effective: 25.04.2023
Document Title: Item Specific Guidelines & Schedule of Technical Requirements for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.			

			Section-A Clause (iv) & (vii) modified for better clarity. Section-B modified to incorporate minimum capacity of some machinery, also, some machinery added. Quality Assurance Plan Clause 9 modified.
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## 2.0 Purpose:

This Item Specific Guidelines covers all technical requirements for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings used for Fresh Vendor Registration/ Quality Audit of Vendors. These guidelines replace the provisions of earlier guidelines issued vide Document No. TDG 0021, Version No. 2.0, effective from 25.04.2023.

## 3.0 Scope of Application:

This shall be applicable for Fresh vendor registration, Quality Audit, up-gradation of Vendors and maintaining their approved list of vendors. In case of any variation between the procedure /provision given in the work instructions and that in this 'Item-Specific Guidelines', the later shall prevail. The competent authority wherever referred to in this document shall mean Executive Director Track-II / Principal Executive Director, Infra-I.

## 4.0 Procedure / Details: Procedure/ details are annexed.

## 5.0 Referred Document:

Document Name	Document No.
Indian Railway Standard Specification for Cast Manganese Steel (CMS) Crossings and Weldable Cast Manganese Steel (WCMS) Crossings	IRS: T-29 (latest revision)

## 6.0 Referred Documents of External Origin:

None

## 7.0 Associated Records:

Nil

## 8.0 Responsibility and Authority:

Activity	Responsible	Approver	Supporting	Consulted	Informed
Creation, maintenance of this document	ED/Track-II/ Director/Track Design-III	PED/Infra-I	DD/AIE/ ADE	M&C Dte.	All vendors/ concerned Through website
Compliance of directives contained in this document	DD/AIE/ADE	Director/Track Design-III	----	----	----
Requirement of deviation from this directive	ED/Track-II/ Director/Track Design-III	PED/Infra-1	DD/AIE/ ADE	M&C Dte.	----

## 9.0 Abbreviations

PED/ Infra-1	Principal Executive Director / Infrastructure-I
ED/Track Design-II	Executive Director/ Track Design-II
RDSO	Research Designs & Standards Organization
DD	Deputy Director
AIE	Assistant Inspecting Engineer
ADE	Assistant Design Engineer
M&C Dte.	Metallurgical & Chemical Directorate

ADE/Track/P&C	Jt. Director/Track – III	Printed: 25.04.2023
Prepared By:	Issued By:	Page 2 of 11

ISO 9001:2015	Document No: TDG 0021	Version No: 2-0 3.0	Date Effective: 25.04.2023
Document Title: Item Specific Guidelines & Schedule of Technical Requirements for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.			

#### A. ITEM SPECIFIC GUIDELINES FOR FRESH VENDOR REGISTRATION / QUALITY AUDIT OF FIRMS FOR MANUFACTURING OF CMS / WELDABLE CMS CROSSINGS:

In addition to the “ISO Apex Documents of RDSO (Latest version)” the following shall also be applicable for fresh Vendor Registration/Quality Audit of the firms for manufacturing CMS/WCMS Crossings.

##### CMS/WCMS CROSSINGS:

- i) The list shall be common for CMS Crossings with variants of Acute CMS crossings viz. RDSO/T-4867 (1:8.5/52kg), RDSO/T-4967 (1:8.5/60kg), RDSO/T-4734 (1:12/52kg), RDSO/T-4220 (1:12/60kg), RDSO/T-5693 (1:16/60kg), RDSO/T-6093 (1:8.5 LH/60kg), RDSO/T-6096 (1:8.5 RH/60kg), RDSO/T-6099 (1:4.25/60kg), RDSO/T-8113 (1:12 LH/60kg), RDSO/T-8110 (1:12 RH/60kg) & RDSO/T-8116 (1:6/60kg) and Obtuse CMS crossings viz. RDSO/T-5265 (1:8.5/52kg), RDSO/T-6495 (1:8.5/60kg), RDSO/T-6102 (1:4.25/60kg) & RDSO/T-8119 (1:6/60kg) and the list shall be separate for WCMS Crossings with variants e.g. RDSO/T-6412 (1:12/60kg), RDSO/T-6441 (1:8.5/60kg). The firm should be in possession of all the requisites of Class ‘A’ foundry, as per Bureau of Indian Standards at the time of initial approval.
- ii) The firm shall be required to manufacture two sets of each design of CMS/WCMS Crossings for Internal Development (including one set for solidity test) and both should pass the tests. During Internal Development, all types of tests as mentioned in the relevant specifications shall be carried out by the firm. Seven stage inspections shall be required to be carried out during internal development /Prototype inspection.
- iii) After successful completion and approval of Internal Development (ID), the firm shall be asked to produce Eleven sets of Prototypes of the design under consideration (including one set of each design for solidity test). The initial approval as developmental vendor shall be given to the firm by the competent authority after the approval of all the above offered Prototypes and fulfilling other requirements as per ISO Apex Documents of RDSO-Latest Version.
- iv) For the purpose of Quality Audit the firm shall be required to produce two samples of CMS/WCMS Crossings of each design for inspection by RDSO officials (including one sample for solidity test) and both should pass the tests.
- v) The gauges shall be approved/ revalidated at the time of inspection of infrastructural facilities during fresh Vendor Registration/Quality Audit of the firm. -
- vi) The inspection gauges, internal development (ID) and Prototypes shall be approved by RDSO for each design of CMS/WCMS Crossings on order before start of regular production.
- vii) Up-gradation of Vendors from Developmental Vendors to Approved Vendors shall be done for sub item CMS/Sub item WCMS separately and provisions of as per “ISO Apex Document of RDSO (Latest Version) and status of the Vendor in Item Master shall be uploaded on IREPS-UVAM Portal. Vendor should have supplied minimum 100 CMS/WCMS Crossings of that particular design combining all variants of sub item CMS/Sub-item WCMS (as the case may be) for being eligible for up-gradation. In addition, desired consistent quality in the finished product should have been achieved, measured in terms of rejection rate which should be less than 5% (combining internal and external inspection) before consideration for up gradation. The rejection rate shall be measured with respect to the last 100 CMS/WCMS crossings of that particular design manufactured and supplied by the vendor.

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ADE/Track/P&C	Jt. Director/Track – III	Printed: 25.04.2023
Prepared By:	Issued By:	Page 3 of 11

ISO 9001:2015	Document No: TDG 0021	Version No: 2.0 3.0	Date Effective: 25.04.2023
Document Title: Item Specific Guidelines & Schedule of Technical Requirements for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.			

**B. MINIMUM FACILITIES & MACHINERIES REQUIRED FOR MANUFACTURING OF CMS/WCMS CROSSING:**

S.No.	Description	Minimum Capacity	Minimum Quantity
1.	Covered Area: i) For CMS crossings ii) For WCMS crossings manufacturers only	-- --	2000 sq. m 3200 sq. m
2.	Sand Mullers	500 kg. 300 kg.	One No. One No.
3.	Sand Testing laboratory (With standard Equipment's)	--	One Complete Set
4.	Patterns/Core making facilities	As required	One set.
5.	Mould/Core Drying facilities & mould boxes	As required	One set
6.	Electric Arc Furnace (with other refining & alloying facilities) and temperature measuring equipment	5T (approx.)	One No.
7.	Ladle for molten metal	5 T	One No.
8.	Heat treatment furnace: For 1:4.25/60kg, 1:6/60kg, 1:8.5/52kg, 1:8.5/60kg, 1:12/52kg, 1:12/60kg & 1:16/60kg CMS crossings	6m long with matching width x Height	One No.
9.	Shot Blasting Arrangement (complete)	--	One No.
10.	Quenching tank (with water circulating & agitating facility with digital temperature measuring equipment): For 1:4.25/60kg, 1:6/60kg, 1:8.5/52kg, 1:8.5/60kg, 1:12/52kg, 1:12/60kg & 1:16/60kg CMS crossings	6m x 2.5m x 2.5m	One No.
11.	Fettling Equipment a) Oxy-cut b) Grinders	As required As required	One No. Five Nos.
12.	Hydraulic Press	400 T	One No.
13.	Welding facility for Austenitic manganese steel with proper cooling arrangements	--	One set
14.	Finishing Equipment a) Pneumatic or rotary grinder b) Fettle Arc machine/ Gouging machine c) Heavy duty planers or Plano millers: For 1:4.25/60kg, 1:6/60kg, 1:8.5/52kg, 1:8.5/60kg, 1:12/52kg, 1:12/60kg & 1:16/60kg CMS crossings d) Marking Table (with measuring instruments): For 1:4.25/60kg, 1:6/60kg, 1:8.5/52kg, 1:8.5/60kg, 1:12/52kg, 1:12/60kg & 1:16/60kg CMS crossings	-- -- 6 m stroke 6 m x 1m	Five Nos. One No. One No. One No

ADE/Track/P&C	Jt. Director/Track – III	Printed: 25.04.2023
Prepared By:	Issued By:	Page 4 of 11

ISO 9001:2015	Document No: TDG 0021	Version No: 2-0 3.0	Date Effective: 25.04.2023
Document Title: Item Specific Guidelines & Schedule of Technical Requirements for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.			

S.No.	Description	Minimum Capacity	Minimum Quantity
15.	Testing Machines/Facilities: a) Vacuum Spectrometer  b) Universal Testing Machine c) Brinell Hardness Testing Machine  d) Poldi Hardness Testing Kit e) DP Testing Equipment f) Polishing Machine g) Metallurgical Microscope  h) Radiograph Check-up Arrangement i) *USFD Machine (For WCMSC manufacturers only)	One spectrometer having vacuum emission CCD/PMT with printing facilities should be available for carrying out chemical analysis.  40 T BHN hardness tester with ball size 2.5 to 10mm dia. -- -- -- Using microscope of magnification up to 500x with digital recording & printing facilities -- Digital type	One No.  One No. One No.  One No. One No. One No. One No.  One No. One No.
16.	Handling Equipment	5 T	One No.
17.	EOT Cranes	10 T	Two Nos. in each bay
18.	Inspection Bay	--	Separate leveled area should be dedicated for proper inspection of finished crossings with Suitable Nos. of Stands and their End Fittings.
19.	Dedicated area with all above machineries installed in a proper flow line. i) For CMS crossings manufacturers ii) For WCMS crossings manufacturers only	-- --	1800 sq.m. 3000 sq.m approx. (In case of FBW Plant for WCMS crossings manufacturers only)
20.	Flash-Butt Welding Plant with all facilities. (For WCMS Crossings only)	--	One Unit (Complete) With tri-metallic welding facilities.
21.	Straight Edge. (For WCMS Crossings only).	1.0 m 10 cm	One No. One No.
22.	Electronic dimensional measurements with auto recording facility	Adequate to measure complete CMS/WCMS Crossing at critical locations as per relevant drawings	One No.

ADE/Track/P&C	Jt. Director/Track – III	Printed: 25.04.2023
Prepared By:	Issued By:	Page 5 of 11

ISO 9001:2015	Document No: TDG 0021	Version No: 2.0 3.0	Date Effective: 25.04.2023
Document Title: Item Specific Guidelines & Schedule of Technical Requirements for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.			

S.No.	Description	Minimum Capacity	Minimum Quantity
23.	Static Bend Testing (SBT) Machine	Microprocessor based duly calibrated Static bend Testing Machine of capacity 200T (min.) equipped with servo control valve with facility for load rate control and operation of machine through a personal computer from a safe distance from location of Static Bend Testing machine.	One No.
24.	Rail Cutting Machine (Band saw type)	900 mm dia.	One No.

\* For Rails used for manufacturing WCMS Crossings: - The head, web and foot of each rail shall be ultrasonically tested by the manufacturers deploying a competent person before using the rails for manufacturing WCMS Crossing. A person possessing a competency certificate issued by Director General (M&C) RDSO shall be deemed to be a competent person.

**Note:** - It is preferable to have all the manufacturing and testing facilities covered under STR located at one premises. However, firm can be permitted to have facilities spread in more than one place provided they are under the same ownership with same name. The activities including testing and inspection carried out at these premises shall be clearly spelt out in the Quality Assurance Programme (QAP). These locations shall be termed as Ancillary units. The place where the material shall be offered for final inspection shall also be indicated in the QAP.

#### C. ASSESSMENT PROFORMA FOR APPROVAL OF MANUFACTURER FOR FRESH VENDOR REGISTRATION / QUALITY AUDIT OF CMS / WCMS CROSSINGS

(To be prepared by the firm in duplicate – Attach extra sheets wherever necessary)

#### SECTION - I GENERAL INFORMATION (FOR RECORD PURPOSE ONLY)

1. Name of the firm:
2. Postal Address of –
  - 2.1 Head Office:
  - 2.2 Works:
3. Telephone No. (with STD Code)/ Mobile No. cum WhatsApp number –
  - 3.1 Head office:
  - 3.2 Works:
4. Fax & E-mail Address of –
  - 4.1 Head Office:
  - 4.2 Works:
5. GST Identification Number of Firm:
6. Description of Works

ADE/Track/P&C	Jt. Director/Track – III	Printed: 25.04.2023
Prepared By:	Issued By:	Page 6 of 11



ISO 9001:2015	Document No: TDG 0021	Version No: 2.0 3.0	Date Effective: 25.04.2023
Document Title: Item Specific Guidelines & Schedule of Technical Requirements for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.			

- 6.1 Total Land area (in sq. meters)
- 6.2 Total Covered area (in sq. meters)
- 6.3 Different sub-units
- 6.4 A fully dimensioned plan of the works showing covered area and different shops shall be enclosed:
- 6.5 Special features, if any
7. Number of personnel employed (category-wise)
  - 7.1 Managerial
  - 7.2 Supervisory (Enclose list of Managers/Technical Supervisors)
  - 7.3 Skilled/Artisans
  - 7.4 Unskilled
8. Hours of working
9. State whether the firm is already in the Approved list of Vendors with RDSO for supply of CMS/WCMSC Crossings. If so, please give details of last approval:
  - 9.1 Letter date and issued by -
  - 9.2 Date of expiry of validity of approval -
10. If this application is an application for Quality Audit, have inclusion of any additional items in the approved list also been requested?

ADE/Track/P&C	Jt. Director/Track – III	Printed: 25.04.2023
Prepared By:	Issued By:	Page 7 of 11

ISO 9001:2015	Document No: TDG 0021	Version No: 2.0 3.0	Date Effective: 25.04.2023
Document Title: Item Specific Guidelines & Schedule of Technical Requirements for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.			

## SECTION-II TECHNICAL INFORMATION

1. Production Capacity
  - 1.1 Per month
  - 1.2 Per year
2. Type of Stores / Items which the firm is capable of manufacturing.
3. Details of Stores / Items / Parts / Components for which Fresh Vendor Registration / Quality Audit is sought (please indicate complete description and drawing nos.)
4. Total Power availability (In kVA/kW)
  - 4.1 From State Electricity Board or other regular source (Enclose a copy of current Electricity Bill)
  - 4.2 From own stand-by Power Generating sets (also give make, capacity & other details of each generating set).
5. Crane facility
 

	No. of Cranes	Make	Capacity
5.1 EOT Crane			
5.2 Mobile Crane			
5.3 Jib Crane			
6. Manufacturing facilities
  - 6.1 Steel making**
    - 6.1.1 Type of furnace
    - 6.1.2 Capacity
    - 6.1.3 Stages of checking bath samples
    - 6.1.4 Bath homogenization arrangement
    - 6.1.5 Carbon boil to be maintained
    - 6.1.6 Steel killing practice. If Aluminum killing is followed please specify maintaining of the residual Aluminum content of the product
    - 6.1.7 Whether facilities for secondary refining of molten steel exist? If so, please give details.
  - 6.2 Proposed Raw Material to be used:**
    - 6.2.1 Proposed charge mix for CMS Crossing
    - 6.2.2 Preventive measures taken to reduce tramp elements in the product. Please specify.
    - 6.2.3 Weighing facilities for ingredients and additives charged into the furnace and ladle.
    - 6.2.4 Overhead Crane facility & capacity.
  - 6.3 Pattern making**
  - 6.4 Foundry (Sand Control System)**
    - 6.4.1 Moulding {Hand /Machine (s) and Mix Testing facilities}
    - 6.4.2 Core making
    - 6.4.3 Mould and Core drying
    - 6.4.4 Decoring and shake-out
  - 6.5 Dressing facilities (Mainly before and after heat treatment)**

ADE/Track/P&C	Jt. Director/Track – III	Printed: 25.04.2023
Prepared By:	Issued By:	Page 8 of 11



ISO 9001:2015	Document No: TDG 0021	Version No: 2.0 3.0	Date Effective: 25.04.2023
Document Title: Item Specific Guidelines & Schedule of Technical Requirements for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.			

## 6.6 Shot Blasting facilities (Travel type/Discrete loading type).

## 6.7 Heat treatment

- 6.7.1 Size of the furnace
- 6.7.2 Type of furnace
- 6.7.3 Size of Quenching tank (L x B x H):
- 6.7.4 Cooling water system of the quenching tank & digital temperature measuring devices
- 6.7.5 Distance of quenching tank from the furnace
- 6.7.6 Handling facility of crossing from furnace to quenching tank
- 6.7.7 Digital temperature indicating and recording facility of furnace (Pyrometric control device).
- 6.7.8 Heavy duty hydraulic press for straightening CMS/WCMS Crossings (indicating type and capacity)

## 6.8 Finishing facilities

- 6.8.1 Welding repair & grinding facilities
- 6.8.2 "Fettle Arc" Gouging machine
- 6.8.3 Plano milling machine with vertical cutter
- 6.8.4 Milling/Boring machine with horizontal cutters and rotating table
- 6.8.5 Other machines / facility for finishing fishing plane of fish plated area, flange way, wheel tread, bottom surface etc.
- 6.8.6 Facilities for checking welding defects on the crossings.

## 6.9 Inspection bay facilities (Inspection table with lighting arrangement handling facilities etc.)

General working conditions i.e. proper lighting, ventilation and cleanliness.

## 6.10 A fully dimensioned plan of the works showing locations of various equipment and facilities for manufacture of CMS crossings/WCMSC, flow line indicating locations of various operations during manufacture in proper sequence and storage facilities for finished products may please be enclosed.

## 6.11 Flash Butt Welding Plant for WCMS crossings:

- 6.11.1 Flash Butt Welding Plant with all facilities required for WCMS crossings (indicating Make)  
[For tri-metallic welding with CMS, INOX & 60E1-880 grade/ R-260 grade rails]

## PAST PERFORMANCE

1. List of important customers of the firm  
(as relevant to the works for which requisition is sought)
2. Details of important orders executed in past, in reference to the supplies made.
  - 2.1 To other important firms/companies/undertakings etc.
  - 2.2 Directly to the Railways
3. Important Orders in hand:

ADE/Track/P&C	Jt. Director/Track – III	Printed: 25.04.2023
Prepared By:	Issued By:	Page 9 of 11

ISO 9001:2015	Document No: TDG 0021	Version No: 2.0 3.0	Date Effective: 25.04.2023
Document Title: Item Specific Guidelines & Schedule of Technical Requirements for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.			

## QUALITY ASSURANCE PROGRAMME

1. Does the factory have any established Quality Assurance Programme as per ISO:9001 series? If yes, please enclose a copy of the write-up in sequential order.
2. Details of Quality Assurance Organization. Name of key personnel, their qualification, designation and positions in overall management structure (Explain with organizational chart, if necessary).
3. Quality Control testing facilities laboratory equipment available to be listed along with the make, year of procurement and commissioning.
4. Calibration of Laboratory Test Equipment / Gauges, as indicated in Para 3 above (Enclose copy of Calibration Certificates):
  - 4.1 How the calibration is done:
  - 4.2 Frequency of calibration of each instrument:
5. Source of procurement of raw materials / bought out items and steps taken to ensure their quality.
6. Brief details of manufacturing process as relevant to the items for which registration is sought.
7. Details of inspection / checks done on material during various stages of the above manufacturing process (Enclose copy of QAP of CMS /WCMS Crossing).  
Has the acceptable value for the parameters inspected during above stage checks been laid down? If yes, the action taken against values of the parameters inspected does not meet the desired laid-down value.
8. System for documentation of the results of the above stage check.  
Maintenance of Records: Records in respect of manufacture of CMS/WCMS Crossings should be maintained in proper registers.
9. Whether facilities for carrying out the following tests are available, also indicate the capacity of each equipment maker's name and calibration details etc.
  - 9.1 Chemical Analysis
  - 9.2 Spectrometric/Instrumental Analysis
  - 9.3 Hardness test
  - 9.4 Tensile Bend Test
  - 9.5 Impact Bend Test
  - 9.6 Izod / Charpy Impact Test
  - 9.7 Macroscopic test
  - 9.8 Dye-penetrant test
  - 9.9 Portable tester for checking residual magnetism
  - 9.10 Microscopic test (~~if microscope with photographic attachment available~~) – **Using microscope of magnification up to 500X with digital recording & printing facilities.**
  - 9.11 X-Ray
  - 9.12 Gamma Ray
  - 9.13 Any other test
  - 9.14 Static Bend Test (200T min. capacity)**
10. Whether two sample set of CMS/ WCMS Crossings of any one design are ready for inspection during Quality Audit (Report to be submitted by Inspecting Officials)?
11. Whether the firm is possessing officially issued prints of relevant Drawings and Specifications?

ADE/Track/P&C	Jt. Director/Track – III	Printed: 25.04.2023
Prepared By:	Issued By:	Page 10 of 11

ISO 9001:2015	Document No: TDG 0021	Version No: 2.0 3.0	Date Effective: 25.04.2023
Document Title: Item Specific Guidelines & Schedule of Technical Requirements for Vendor Approval for manufacture and supply of Cast Manganese Steel (CMS) Crossings / Weldable Cast Manganese Steel (WCMS) Crossings.			

#### DECLARATION:

1. We do hereby declare that the above particulars are correct and no discrepancy shall be found during actual investigation before and during execution of order on our firm.
2. Any change in the Plant & Machinery, change of place of office and of works site shall be brought to the notice of RDSO for clearance and approval.
3. We also declare that our concern has not been black listed by Railway, Railway Board/RDSO for business with the Railways.
4. We hereby undertake that all our equipment for manufacturing and testing as listed above shall be maintained in good working order at all times.
5. We hereby declare that the contents and instructions of ISO Apex Documents of RDSO have been read by us and our firm shall agree to abide by all the stipulations laid therein.
6. We hereby undertake to maintain the record of the procurement of raw material for production of CMS crossings/WCMSC, supply of CMS crossings/WCMSC & disposal of scrap of CMS crossings/WCMSC in the proper format.

Place:

Signature of Manufacturer  
Office Seal

Date:

ADE/Track/P&C	Jt. Director/Track – III	Printed: 25.04.2023
Prepared By:	Issued By:	Page 11 of 11