

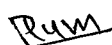
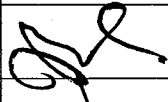


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## Schedule of Infrastructure Requirements For Stainless Steel Fabrication Items

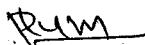
Specification No. MDST 102, Rev-03

Date: 20.03.2020

Page 1 OF 9

Name	Designation	Signature	Date	Level
Pramod Kumar	SSE/Body Shell/Design		20.03.2020	Prepared
J.P. Singh	SSE/Body Shell/Design		20.03.2020	Agreed
Kamal Kumar	Dy. CME/D-1		20.03.2020	Reviewed
Manish Bhimte	CDE		20.03.2020	Approved

Issue/Rev.	Detail of changes	Date
<b>Rev-01</b>	1. Welding consumable defined in clause #3 2. Numbering of other clauses changed accordingly.	30.08.2010
<b>Rev-02</b>	* In clause 2.1.3 name of steel manufacturer deleted (M/s Jindal and SAIL) * Clause 2.1.6.1 modified as - Firm should have atleast one CNC laser cutting machine in working order. Availability of CNC laser cutting machine is must for "approved vendors." However, developmental order can be placed on a firm having valid tie-up in the form of MoU with the agency having CNC laser cutting machine in house in working order. A copy of MoU is to be submitted along with the tender in absence of above, offers shall be deemed as incomplete and may not be considered.	10.04.2017
<b>Rev-03</b>	Clause 1 added & clause 3.1 updated. Clause 3, 10 to 15 added for adoption of new processes & IRIS Certification by the firms. Clause 16 added for warranty.	20.03.2020



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# Schedule of Infrastructure Requirements For Stainless Steel Fabrication Items

Specification No. MDST 102, Rev-03

Date: 20.03.2020

Page 2 OF 9

## 1.0 GENERAL :

This schedule covers infrastructure requirements for manufacture, testing and supply of completely finished stainless steel fabricated items.

## 2.0 SCOPE OF SUPPLY :

This schedule describes the infrastructure requirements for stainless steel fabrication at the tendered premises in working order. Tenderer should submit clause-wise comments specifying the availability of infrastructure with them alongwith capacity and make.

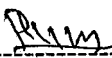
## 3.0 CERTIFICATIONS & OTHER REQUIREMENT :

- 3.1 The tenderer shall have valid ISO 9001-2008 series certification.
- 3.2 It is desirable that the tenderer is accredited with ISO-3834 certificate.
- 3.3 The tenderer shall provide list of M&P 's and past performance documents.
- 3.4 The tenderer shall have adequate manufacturing facilities mentioned in Para 4, 5,6 &7. Complete stainless steel fabricated items will be manufacture as per specified drawings and specification mentioned in purchase order.
- 3.5 The tenderer shall have accredited with IRIS of ISO/TS 22163:2017 certification within 2 years and preferences will be given for award of order.
- 3.6 Firm may adopt new processes for manufacturing of stainless steel fabricated items or improving the quality without financial implication with the approval from CDE/RCF.

## 4.0 AVAILABILITY OF INFRASTRUCTURE FACILITY AT MANUFACTURER PREMISES IN WORKING ORDER:-

### 4.1 Must infrastructure for Stainless steel Profile cut items for tenderers:

- 4.1.1 Separate covered area for manufacturing only stainless steel to avoid iron contamination and also having adequate space underneath for storage of raw materials e.g.. sheets, billets, round corner squares, rounds etc. The covered area should have display board Showing different: colour shades nominated b different grades of steel to avoid mix up of materials. Arrangement of painting the billets, rounds etc with particular paint shade previously nominated according to the grade of steel should be available.
- 4.1.2 Fabrication should be confined to an area where only one grade of material is being worked.
- 4.1.3 Procurement of raw material should be done only from the authorized distributors of following reputed stainless steel manufactures. Proof of procurement of raw material from OEM or from his authorized distributor is to be enclosed with the supply. Necessary tescertificate for raw material

  
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## Schedule of Infrastructure Requirements For Stainless Steel Fabrication Items

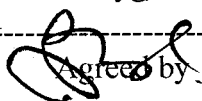
Specification No. MDST 102, Rev-03

Date: 20.03.2020

Page 3 OF 9

- conforming to specified grade of steel shall be submitted from OEM along with supply.
- 4.1.4 The raw materials e.g. electrodes, hardware, rubber gaskets should be procured from the authorized distributor of original manufacturer and firm should procure material with test certificate.
- 4.1.5 Handling equipments such as slings, hooks and lift truck forks should be protected with clean wood, cloth or plastic buffers to reduce contact with the iron surface.
- 4.1.6 Following Machinery and Plant, in working order, should be available at tenderer premises in working condition:
- 4.1.6.1 Firm should have atleast one CNC laser cutting machine in working order. Availability of CNC laser cutting machine is must for "approved vendors". However, developmental order can be placed on a firm having valid tie-up in the form of MoU with the agency having CNC laser cutting machine in-house in working order. A copy of MoU is to be submitted along with the tender in absence of above, offers shall be deemed as incomplete and may not be considered.
- 4.1.6.2 For components weighing more than 100 Kg, At least 1 No. Fork-lift or 1No. Over-head crane of 2t (Min.) capacity.
- 4.1.6.3 At least one shearing machine of suitable capacity and of standard make.
- 4.1.6.4 Adequate machining facilities comprising of universal milling machine, drilling, lathe with pipe threading facility etc of suitable capacities and standard makes should be available facility etc. of suitable capacities and Standard makes should be available.
- 4.1.6.5 At least one press brake of suitable capacity.
- 4.1.6.6 At least one-hand grinders for removal of fins & burrs shall be available. Grinding wheels shall be free from iron, iron oxide, zinc or other undesirable materials that may cause contamination on the surface.
- 4.1.6.7 Adequate number of fine punches for stamping marking particulars on finished components.
- 4.2 **Must Infrastructure for Stainless steel fabrication items (involving welding) for tenderers:** Besides requirements mentioned in clause 4.1, following should also be available at firm premises for stainless steel fabricated items involving welding.
- 4.2.1 TIG with only Argon gas or MIG welding shall be used only with Tri- Mixture gas (90% Argon +5% O2 +5%CO2 gas). No Stick electrode welding shall be done. Tenderer should have at-least two nos of TIG/MIG welding machine.
- 4.3 **Must Infrastructure for Stainless steel fabrication items (involving spot welding) for tenderers:** Besides requirements mentioned in clause 5.1 and 5.2, following should also be available at firm premises for stainless steel fabricated items involving spot welding such as endwalls, lavatory sidewalls etc.
- 4.3.1 At least one spot welding machine of one-meter arm length should be available in working condition,
- 4.4 The Tenderer shall comply with IS:822 regarding, storage of consumables, calibration of welding equipment ,training of welder, testing of welding and remedies for welding defects. The welder shall have a minimum of 2 years experience of the same type of welding.
- 4.5 The contractor shall have adequate fabrication and process capability to obtain all the tolerances and geometrical tolerances and shall have arrangement of jig/

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## Schedule of Infrastructure Requirements For Stainless Steel Fabrication Items

Specification No. MDST 102, Rev-03

Date: 20.03.2020

Page 4 OF 9

fixture/clamping device for main assembly & sub-assembly work.

4.6 RCF reserves the right to summarily reject the offers received without submitting clause wise comments on this schedule of requirements.

### 5 Welding Consumable:

5.1 All the joints shall be welded using filler metal conforming to the table given below for various combination of metals:

#	Parent Metal A	Parent Metal B	Filler Metal (material no) as specified in AWS
1	X2CrNi12 to RDSO Spec C-K201 (409M)	X2CrNi12 to RDSO Spec C-K201 (409M)	E308L
2	X5CrNi1810 to RDSO Spec C-K201 (304)	X5CrNi1810 to RDSO Spec C-K201 (304)	
3	X2CrNi12 to RDSO Spec C-K201 (409M)	X5CrNi1810 to RDSO Spec C-K201 (304)	
4	X2CrNi12 to RDSO Spec C-K201 (409M)	IRS: M41-97	E309L
5	X5CrNi1810 to RDSO Spec C-K201 (304)	IRS: M41-97	

5.2 The welding consumable shall be procured from the RDSO approved sources as indicated in RDSO vendor directory for MIG and MAG welding.

### 6 Treatment of weld areas, except spot weld areas, of Stainless Steel fabrication items:

6.1.1 Weld area contaminates such as free iron, oxide scale, rust, grease, oil, metal chips, dirt or other non-volatile deposits might adversely affect the metallurgical or sanitary condition or stability of the weld. These may impair the normal corrosion resistance or result in later contamination of the stainless steel or cause product contamination at a later stage and should be cleaned and de-scaled. Weld areas to be pickled and passivated as under.

Conc. HF4	6% by volume
Conc. HNO3	15-20% by volume.
Immersion Time	10-15 Minutes (max.)
Temperature	30-40 °C (When temp. is low exposure time may be increased)

6.1.2 Rinse the weld area with water. Over pickling must be avoided.

6.1.3. A neutralizing treatment of weld area, after completion of acid cleaning and passivation, by using aqueous caustic solution containing NaOH 10% by weight for a period of 5-60 minutes should be used as a final treatment to remove smut. After that thorough water rinsing and drying operation is to be carried out. The pH of the rising water shall be from 6-8

NaOH	10% by weight
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## Schedule of Infrastructure Requirements For Stainless Steel Fabrication Items

Specification No. MDST 102, Rev-03

Date: 20.03.2020

Page 5 OF 9

- 6.1.4 The process of acid cleaning, water rinsing, neutralization treatment, final fresh water rinsing must be done in sequence without giving any waiting time between the processes to avoid staining on the surface.
- 6.1.5 Free iron examination test (Ferroxyl test) should be carried out immediately after acid pickling and neutralization treatment to confirm that there is no free iron available on the weld surface. In case of positive test for free iron the whole process of acid pickling neutralization and water rinse should be repeated.

Following solution should be used for ferroxyl test solution;

Distilled water	01 liter
Nitric acid (Conc.)	20 ml
Potassium Ferricyanide	30g

Tanks for keeping acid solution, neutralizing solution and water for rinsing should be made of stainless steel plates with FRP lining.

### 7 Testing Facilities:

7.1 **Chemical Lab:** The tenderer should have permanent arrangement with NABL certified Lab or a reputed steel making company for arranging the spectrum analysis of the material.

7.2 **Physical Testing Lab:** The tenderer should have physical lab at firm premises with following facilities or should have permanent arrangement with NABL certified Lab:

7.2.1 Universal Testing machine of 40t capacity with load/ deflection plotting arrangement to conduct UTS, Yield strength.

7.2.2 The firm shall have arrangement for conducting non-destructive tests for welding as per requirement of the purchaser in house.

7.3 **Must Measuring Instruments with tenderer Firm** should following measuring instruments, duly calibrated, at firm's premises:

7.3.1 Digital Vernier Calipers - 0 mm to 300 mm.

7.3.2 Measuring scale - 3 meter

7.3.3 Inside & outside Micrometers - Ranging from 0 to 150 mm

7.3.4 GO & NO-GO gauges.

7.3.5 Profile gauges

7.3.6 Filler gauges

8 **Quality Control Requirements:** There should be a system to ensure the traceability

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# Schedule of Infrastructure Requirements For Stainless Steel Fabrication Items

Specification No. MDST 102, Rev-03

Date: 20.03.2020

Page 6 OF 9

of the product from raw material stage to finished product stage. This system should also facilitate to identify the raw material composition from the finish product stage.

- 8.1 Ensure that there is a QAP for the product detailing various aspects.
- 8.2 QA Organizational Chart
- 8.3 Flow Process Chart
- 8.4 Stage inspection details
- 8.5 Various parameters and to ensure control over them.
- 8.6 There should be at least one full time technologist having a minimum bachelor's degree in relevant field & 5 years experience or a person with diploma in relevant field with 12 years experience. The firm should have acquired ISO: 9001 series certification and the product for which an approval is sought should be broadly covered in the scope of the certification for manufacture and supply.
- 8.7 The Quality manual of the firm for ISO: 9001 should clearly indicate at any stage the control over manufacturing and testing of the said railway product
- 8.8 The firm shall ensure that proper analysis is being done on monthly basis to study the rejection at various internal stages and it is documented.
- 8.9 The firm shall ensure that all the relevant specifications, IS standards are available with them.

## 9 Practices to be followed for Handling, Storage and Transportation

- 9.1 Walking on the stainless steel surface should be avoided, where unavoidable, personal should wear clean shoe covers each time. Kraft paper, blotting paper, paper board or flannel or other protective material should be laid over areas where personals are required to walk. Supplier needs to make all these arrangements.
- 9.2 Shearing tables, press brakes, layout stand and other carbon steel work surfaces should be covered with dean kraft paper, blotting paper, paper board or flannel or other protective material to reduce the contact with carbon steel.
- 9.3 Hand tools, brushes, molding tools and other tools and supplies required for fabrication should be segregated from similar items used in the fabrication of carbon steel equipment and should be restricted to use on one material. Tools and supplies used with other materials should not be brought into the SS fabrication area.
- 9.4 Grinding wheels and Sanding material should not contain iron, iron oxide, zinc or other undesirable materials that may cause contamination on the surface. Grinding wheels and sanding material and wire brushes previously used on other metals should not be used on stainless steel. Wire brushes should of stainless steel which is equal in corrosion resistance to the material being worked on.
- 9.5 Measures to protect the cleaned surfaces should be taken as soon as final cleaning is completed and should be maintained during all subsequent fabrication, inspection, storage and installation. The basic guidelines are as

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# Schedule of Infrastructure Requirements For Stainless Steel Fabrication Items

Specification No. MDST 102, Rev-03

Date: 20.03.2020

Page 7 OF 9

- 9.5 Measures to protect the cleaned surfaces should be taken as soon as final cleaning is completed and should be maintained during all subsequent fabrication, inspection, storage and installation. The basic guidelines are as follows:
- 9.5.1 Do not remove wrappings and seals from incoming materials until they are at use site, ready to be used or installed.
  - 9.5.2 Do not store the finished cleaned materials and components stored directly on the ground or floor and do not permit these to come in contact with galvanized or carbon steels, Zinc, lead Brass etc.
  - 9.5.3 Do not use carbon or galvanized steel wire for bundling and galvanized steel identification tags.

## 10.0 QUALITY CONTROL REQUIREMENTS :

There shall be a system to ensure trace ability of the product from raw material stage to finished product stage. Quality Assurance Plan (QAP) for the following aspects shall be ensured and approved by CDE/RCF.

- 10.1 Process flow chart.
- 10.2 Stage wise inspection details from raw materials stage to finished product.
- 10.3 Check list for critical monitoring of stages to be prepared and followed
- 10.4 Various parameters to be checked and level of acceptance of such parameters indicated and method to ensure and control over them.
- 10.5 Disposal system of rejected raw material and components.
- 10.6 The Quality Assurance Plan (QAP) to be submitted for approval.

## 11.0 DOCUMENTATION :

Following documentation should be maintained:

- i) Incoming raw material register.
- ii) Stage inspection results including finished products results as per QAP.
- iii) Record of internal rejection and its analysis vis-à-vis action plan.
- iv) Record of final products inspection by external agencies.
- v) Record of maintenance schedule of machinery and plant.
- vi) Record of training imparted, Quality assurance, safety parameters and maintenance of machinery etc.

## 12.0 REQUIREMENT OF WELDING ACTIVITIES

- 12.1 Welder qualified with ITI or equivalent qualification and qualified as per ISO: 9606-1 for all critical joints, position shall be only employed. Laser weld and Spot welding operator shall be qualified as per ISO 14732.

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# Schedule of Infrastructure Requirements For Stainless Steel Fabrication Items

Specification No. MDST 102, Rev-03

Date: 20.03.2020

Page 8 OF 9

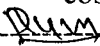
- 12.2** Supervisor shall have sufficient welding knowledge having minimum qualification of diploma in mechanical engineering. Firm shall identify and nominate a welding coordinator responsible for all welding operations. The welding coordinator should preferably have qualified as per ISO 14731 of IWE/IWT/IWS, diploma awarded by Indian Institute of Welding or certificate from WRI/Trichy or AWTI/ICF.
- 12.3** Inspection and testing personnel shall have qualification as per ISO 9712 level-2 or SNT-TC-1A level 2.
- 12.4** All welding plants should be calibrated as per ISO 17662/BS EN 50504.
- 12.5** Proper grinding using iron free grinding disc followed by buffing shall be done on all weld joints other than spot weld.
- 12.6** Record of above details shall be maintained for verification.
- 13.0 PROTOTYPE INSPECTION :**
- 13.1** First article inspection/Pilot sample inspection/ Prototype inspection will be done by CDE/RCF or its authorized agency. Successful tenderer would be required to submit quality assurance plan (QAP) and all relevant documents required for FAI, including special processes.
- 13.2** After passing above four FAI's Bulk supply will be made after First article approved by CDE/RCF.
- 13.3** Whenever there is a change in design/material/process, first article inspection will be done by CDE/RCF.
- 13.4** Audit inspection shall be done during regular production in the firm for certify quality of product.
- 13.5** FAI (First Article Inspection) shall be carried out as per requirement of ISO/TS 22163:2017.
- 13.6** External provider shall carryout FAI as per ISO/TS22163:2017 requirement prior to submission of documents to RCF, Kapurthala.
- 13.7** Validation of all Special process (including outsourced Special Process) shall be carried out as per requirement of ISO/TS22163:2017.
- 13.8** Firm has to fulfill all the requirements of IRIS to ISO/TS22163:2017.

## **14 MARKING/QR CODING :**

The tenderer name or initial with month and year of manufacture shall be marked in the finished products unless otherwise specified in the relevant drawings.

## **15 PACKING INSTRUCTION :**

The supplier to ensure the safe transit and delivery of material up to consignee by adopting suitable mode of transport and handling transit damage if any shall be the cost of supplier.

  
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## Schedule of Infrastructure Requirements For Stainless Steel Fabrication Items

Specification No. MDST 102, Rev-03

Date: 20.03.2020

Page 9 OF 9

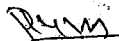
The surface shall be properly protected against rubbing /impact/ scratches during transportation via wagon / truck / trailers by wooden blocks / rubber pads at suitable locations in the transportation fixtures.

Due care should be taken to avoid mechanical damage during loading / transit / unloading. The packing should be such that while un packing the consignment at RCF there should be no damage / dent mark to the finished products. As far as possible recyclable material to be used in packing of sub assemblies.

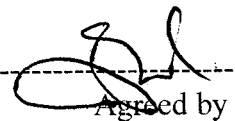
Transit insurance shall be in the scope of supplier.

### 16 Warranty:

The manufacturer shall warranty for a period of 96 months from the date of supply or 84 months from the date of service whichever is earlier, for material, manufacture and workmanship as regards trouble-free and satisfactory service performance. If any defects are noticed during service with regards to manufacture/ welding quality of the Side wall complete, action shall be taken by the supplier to carry out any repairs/rectification or replacement at his cost. The decision of the purchaser in this regard shall be final.



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