

INTEGRAL COACH FACTORY , CHENNAI- 600 038					
SCHEDULE OF REQUIREMENTS TO MANUFACTURE OF HEAVY FABRICATION ITEMS OF MILD STEEL AND CORTEN STEEL					ICF/MD/SPEC-147 ISSUE STATUS:01 Rev.: 02 DATE: 21/ 07 /2006
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Date Of Issue	12-02-07	02-08-25			

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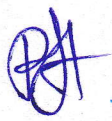
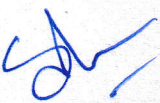
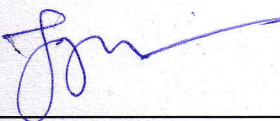

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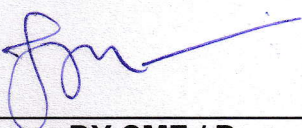

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Amendment No-02	Date-02-08-2025	Pages - 1 of 1

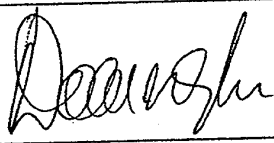
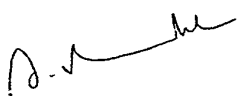
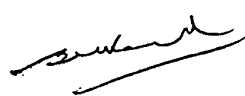

Clause amended as below:
Ref :E office No-304704

Page No.	Clause No.	Existing	Revised
2 of 4	7.3.1	Newly added	<p>A portable spectrometer should be available in-house for inspection of raw materials and assemblies, prior to manufacturing and during inspection by ICF or by ICF authorized inspection agencies.</p> <p>The manufacturer shall also cross verify the raw material and other sub- assemblies at different stages and maintain records.</p>

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AMENDMENT SLIP NO. : 01 DATED.12-02-07	No. of Pages: 1

PAGE	CLAUSE	EXISTING	REVISED
1	1.1	This schedule covers infrastructural requirements for manufacture and supply of finished mild steel and corten steel heavy fabrication items.	This schedule covers infrastructural requirements for manufacture and supply of finished mild steel and corten steel heavy fabrication items, such as bogie Frame, Bogie bolster, Body bolster, Head stock etc.,
2	4.3	<ul style="list-style-type: none"> ➤ Stress relieving after welding ➤ Shot/grit blasting 	<p>Stress relieving after welding as per relevant specification</p> <p>Shot/grit blasting to get surface finish equivalent to Sa 2.5 of ISO specification No.8501-1-88. It shall be noted that the primer should be applied immediately after grit blasting.</p>
2	7.2	<p>The firm shall have in house testing facilities for the following and supply run out piece with the finished components.</p> <ul style="list-style-type: none"> ➤ Chemical and Mechanical properties of raw material. ➤ Macro etch test for fusion of fillet weld ➤ Die penetration test 	<p>The firm shall have in house testing facilities for Macro etch test for fusion of fillet weld and Die penetration test and supply run out piece with the finished components. The firm shall produce test certificates from Government or NABL approved laboratory for chemical and Mechanical properties of raw material.</p>

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1.0 SCOPE

- 1.1** This schedule covers infrastructural requirements for manufacture and supply of finished mild steel and corten steel heavy fabrication items.

2.0 REQUIREMENTS

- 2.1** All vendors seeking registration with ICF must fulfil the requirements of this schedule.

3.0 COVERED AREA

The firm shall have adequate covered area for storage of raw material, finished products and work in progress.

4.0 MACHINERY AND INFRASTRUCTURE REQUIRED

- 4.1** The firm shall have the following machinery and infrastructure with them as a requirement for manufacture of heavy fabricated items.

SL No.	MACHINERY	CAPACITY	ACCEPTANCE/ ALTERNATE PROCESS
1	Shearing machine	Thickness 16 mm Length 3000 mm	PUG gas cutting, plasma, laser, equal capacity
2	Straightening machine	Thickness 16 mm width 600 mm Length 3000 mm	Hydraulic straightening, equal capacity
3	Press brake	400Tons capacity length of bed 3000 mm	Hydraulic press, equal capacity
4	Hydraulic press for bush pressing	60 tons	No alternative
5	Profile gas cutting machine	Thickness 25 mm Bed length 3 mtrs. X 1.5 mtrs. Width	PUG cutting M/c, equal capacity
6	Radial drilling machine	60 mm capacity	Any drilling machine of 36 mm capacity or plasma cutting
7	Submerged auto welding	3 mtrs. Length	MIG welding

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- 4.2 The firm shall have facilities for edge preparation and also have adequate jigs & fixtures as per the requirements to ensure dimensional controls.
- 4.3 The firm shall have in house facility or tie up with other firms for the following
- Stress relieving after welding
 - Shot/grit blasting
- 5.0 **ELECTRODES**
- Required electrodes shall be procured from RDSO approved sources only.
- 6.0 **MAN POWER**
- 6.1 welders qualified with ITI or equivalent qualification shall be only employed.
- 6.2 Supervisors with minimum qualification of diploma in mechanical engineering shall be employed for monitoring production and quality control.
- 7.0 **INSPECTION & TESTING FACILITIES**
- 7.1 The firm shall have calibrated measuring gauge, Vernier calliper, throat gauge, straight edge, level bed, GO & NO GO GAUGES etc.
- 7.2 The firm shall have in house testing facilities for the following and supply run out piece with the finished components.
- Chemical and Mechanical properties of raw material.
 - Macro etch test for fusion of fillet weld
 - Die penetration test
- 7.3 The firm shall have in house facility or tie up for radiographic test conforming to Blue standard of IIW (International Institute of Welding)
- 7.4 **PROCEDURE MACRO ETCH TEST**
- 7.4.1 The run-out sample shall be cut perpendicularly and the cross section of the welded area shall be ground to smooth finish without any tool/file marks. The welded area shall be etched using dilute nitric acid about 15% v/v for about one minute and washed thoroughly in running water. After washing it shall be dried. The etched welded zone shall be viewed either by naked eye or using magnifying lence of 40X. for fusion level and other weld defects.

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7.5 ACCEPTANCE FOR MACRO ETCH TEST

- 7.5.1 Fillet welds shall have fusion to the root of the joint.
- 7.5.2 Shall have complete fusion between a adjacent layers of weld metal and with base metal.
- 7.5.3 Shall have no cracks.
- 7.5.4 Shall have no under-cut exceeding 1 mm in depth.
- 7.5.5 Shall have weld profiles as shown in the ANNEXURE-A

8.0 QUALITY CONTROL REQUIREMENTS

- 8.1 The manufacturer shall have ISO: 9000 series certification.
 - 8.2 There shall be a system to ensure traceability of the product from raw material stage to finished product stage.
 - 8.3 Quality Assurance Plan (QAP) for the following aspects shall be ensured.
 - Process flow chart
 - Stage inspection details from raw materials stage to finished product stage.
 - Various parameters to be checked and level of acceptance of such parameters indicated and method to ensure and control over them.
 - Disposal system of rejected raw material and components
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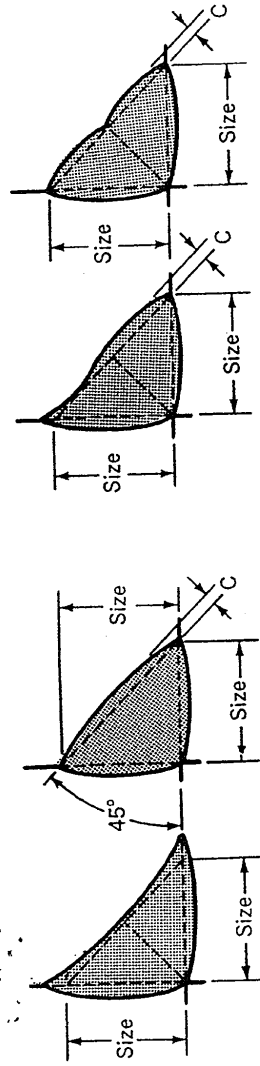
8.4 DOCUMENTATION

- Incoming raw material register.
- Stage inspection results including finished products results as approved by QAP.
- Records of internal rejection and its analysis vis -a - vis action plan.
- Records of final products inspection by external agencies.
- Records of maintenance schedule of machinery and Plant
- Records of training imparted in Production, quality assurance, safety parameters and maintenance of machinery etc.

9.0 MARKING

Manufacturers name or initial with month and year of manufacture shall be available in the finished products as specified in the relevant drawings.

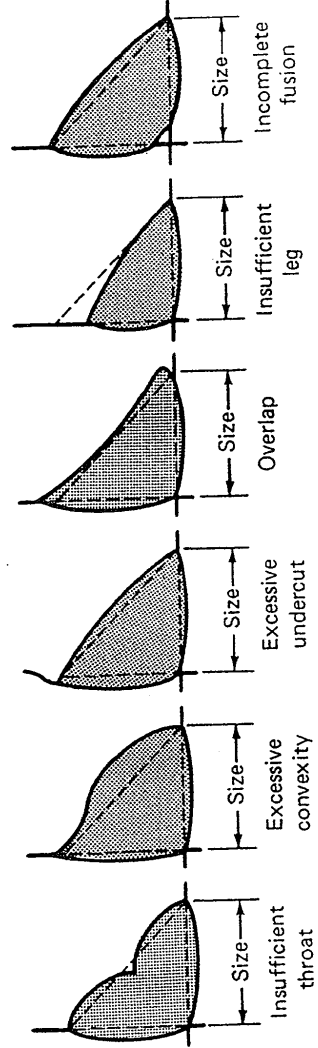
ANNEXURE - A



(A) Desirable fillet weld profiles

(B) Acceptable fillet weld profiles

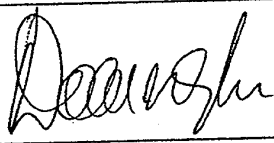
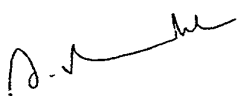
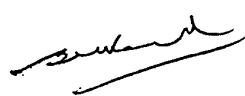

Note: Convexity, C, of a weld or individual surface bead shall not exceed 0.07 times the actual face width of the weld or individual bead respectively, plus 0.06 in. (1.5 mm) unless otherwise specified in the applicable section.



(C) Unacceptable fillet weld profiles

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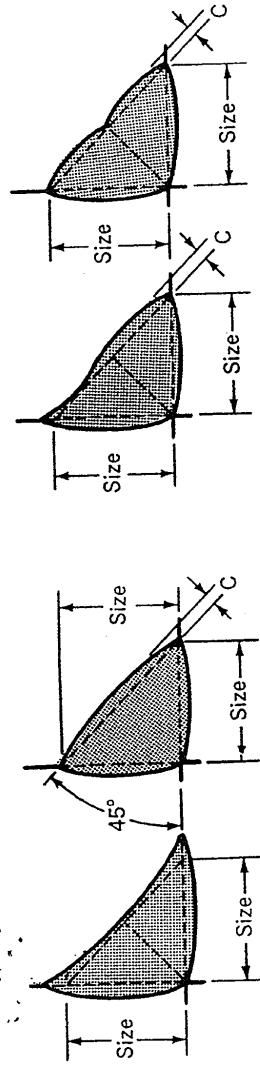
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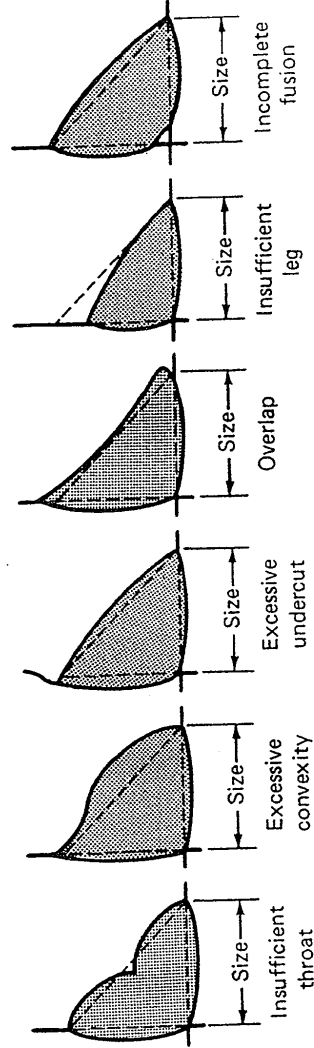
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