 	PROJECT		Standby SRU & Additional Tanks	
	CLIENT		INDIAN OIL CORPORATION LIMITED	
SPECIFICATION FOR MS GRATINGS	Project No. 080557C001	Document No. 080557C-000-JSS-1800-002	Rev. No. C	Page 1 of 7

SPECIFICATION FOR MS GRATINGS

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1. INTRODUCTION

INDIAN OIL CORPORATION LIMITED (IOCL) has awarded Fax of Acceptance (FOA) dated 29th August 2019 to M/s. Technip India Limited (TPIL) for Consultancy services (PMC/EPCM services) for overall project management, FEED Review / FEED, Detailed Engineering, Procurement & expediting services, Tendering & award, Construction Management & Supervision, Assistance in start-up, Commissioning & performance test runs for installation of a Standby SRU of 525 TPD capacity and execution of Additional tanks for Paradip Refinery, Odisha, India.

2. DEFINITIONS & ABBREVIATIONS

Abbreviation	Definition /Expanded form
IOCL/ CLIENT	Indian Oil Corporation Limited
PMC/ CONSULTANT	Technip India Limited
LICENSOR	Party selected by IOCL for process technology ownership for any UNIT
CONTRACTOR	Party whose services are obtained for performing the works specified as part of LSTK / packages.
EPCM	Engineering, Procurement & Construction Management Services.
LSTK	Lump Sum Turn Key portion of the work to be executed by CONTRACTOR
FEED	Front End Engineering Design
AUTHORISED REPRESENTATIVE	IOCL's/ CONSULTANT's representative authorized to act for and on behalf of them.
VENDOR	Any third party supplying the equipment/materials for setting up the Plant
PROJECT	Indicates Standby SRU and Additional tanks Project, Paradip Refinery
SITE	Indicates Paradip Refinery in Odisha, India
UNIT	Indicates any particular portion of the project to be built which can be Process related or Utilities/Offsites related
SRU	Sulphur Recovery Unit
BIS	Bureau of Indian Standards

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3. SCOPE

The purpose of this document is to lay down the specifications and requirements for Mild Steel Gratings, clamps and fasteners for use as flooring and stair tread in industrial structures and which are to be manufactured and supplied by the contractor as per approved drawings.

This JSS covers typical General specification for some standard items only and the CONTRACTOR shall comply with the requirement as given in 080557C-000-JSD-1700-001/002 for specific cases and for any other items not mentioned/specified in this JSS. The requirement for various type of Buildings /Unit / Structures etc., as specified in the document 080557C-000-JSD-1700-001/002 shall be the governing one.

The CONTRACTOR shall submit the detailed specification for the items not covered in this specification for Approval by OWNER'S/ENGINEER IN CHARGE during execution.

4. APPLICABLE CODES

The Indian Standard codes applicable to this section shall include but not limited to the following:

- ◆ IS 1364 : Hexagon Head Bolts, Screws and Nuts of Product Grades A and B
- ◆ IS 1367 : Technical Supply Conditions for Threaded Steel Fasteners
- ◆ IS 2062 : Steel for General Structural Purposes
- ◆ IS 2629 : Recommended Practice for Hot-Dip Galvanizing of Iron and Steel
- ◆ IS 2633 : Methods for testing uniformity of coating of zinc coated articles
- ◆ IS 6745 : Method for determination of mass of zinc coating on zinc coated iron and steel articles
- ◆ 080557C-000-LD-1890-001 : Construction standards for steel works.

5. MATERIALS

Floor gratings shall be fabricated from mild steel flats, and the component materials shall be of weldable quality rolled steel free from surface defects and conforming to the IS codes indicated below:

Flats and MS rounds : E250 A/BR/BO confirming to IS: 2062



Bolt/Nuts : E250 A/BR/BO confirming to IS: 2062

Bearing flats and End flat shall be as per IS:1730.

Flat for Clamps shall be as per IS:513

Bolts and nuts shall conform to the requirements of IS: 1364.

Bolts shall be ordinary strength conforming to IS: 1367, Property class 4.6.

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6. SPECIFICATION

Gratings shall be minimum 25mm deep. Hot dip galvanized and Electro Forged/ Electric arc welded as per Standard (080557C-000-LD-1890-001).

These shall be of readymade bought out type and designed to carry specified loads with limitations on permissible deflections.

The specifications for the floor gratings to be fabricated shall be as follows:

Peripheral End Flats around panel : 25 x 6 mm

Transverse Main Flats : 25 x 6 mm @ 35mm c/c

Longitudinal Secondary Rounds : 8 mm sq. twisted bar @ 100 mm c/c

The specifications for the stair tread (gratings) to be fabricated shall be as follows:

End Carrier plate : 75 x 6 mm

Transverse Main Flats : 25 x 6 mm @ 35mm c/c

Longitudinal Secondary Rounds : 8mm sq. twisted bar at 75 mm c/c Nosing
: 6mm thick chequered plate

Commercial quality material shall be allowed only after ascertaining its weldability and strength.

All gratings shall be galvanized unless otherwise specified.

7. DESIGN LOADS AND PERMISSIBLE DEFLECTION

Unless otherwise mentioned, all floor gratings shall be capable of carrying a uniformly distributed load of 500 kg per square metre or 1000 kg (Area of application shall be as per handling requirement) at mid span, in handling area for maintenance, whichever is governing. The span for the above loading conditions shall be designed including deflection criteria. The deflection shall not exceed Span/200 or 6 mm whichever is less.



The design shall be done as per IS: 800, and it shall be mandatory for the Contractor to submit the design calculations, drawings and manufacturer's literature, when applicable, and get them approved from the Engineer-in-Charge prior to fabrication or procurement.

8. FABRICATION DRAWINGS AND DETAILS

Based on the arrangement of supporting beams on design drawings, the Contractor shall prepare shop fabrication drawings and get the same approved as per the procedure outlined for shop fabrication drawings for structural steel work. The Contractor shall ensure that the dimensions of gratings are as per specifications and in conformance to the design floor GA drawings.

Gratings for stair treads shall be provided with nosings of chequered plate of approved size and thickness, as per the standard (080557C-000-LD-1890-001).

Gratings shall be prepared by welding secondary members over the main members at junctions. All end flats of each grating panel shall have full contact with the supporting members at each end.

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In case of grating panels with cut-outs/openings adequate strengthening shall be done using flats 25x6 around the periphery of openings up to 300 mm in diameter. For openings, greater than 300 mm in diameter relevant design drawings shall be referred to.

Galvanized U-clamps made out of 25x6 MS flats, with an 8 mm diameter hole at bottom for fixing M6 bolt to the 25x6 flat tack welded to the structural member, shall be used as fastenings over secondary members. The spacing between clamps shall not exceed 600 mm and a minimum of four such clamps shall be provided in a grating or stair-tread panel for fixing.

All unsupported edges of adjacent grating panels shall be connected by galvanized U-clamps.

9. GALVANISATION

All floor gratings shall be hot dip galvanized in accordance with IS:2629 and tested as per IS:2633 and IS:6745. The minimum thickness of galvanizing shall be 120 microns.

It shall be mandatory that a prototype of the grating fulfilling the following be demonstrated to the satisfaction of OWNER/Engineer-in-Charge prior to placement of bulk order. Particular attention shall be paid to the following requirements for approval/acceptance:

1. Conformance to all requirements defined above.
2. In the case of gratings manufactured using electro-forging/weld-forging process, the un-fused joints shall not be in excess of 5% of the total joints. If un-fused joints are found to be in excess of 5%, the prototype shall stand rejected. A fresh prototype shall then be prepared.
3. The projection of secondary member above the main member shall not be more than 1.5mm.
4. The un-fused 5% joints of (b) above shall be welded by SMAW/GMAW process.
5. The joints shall be able to sustain a minimum pull out load of 1.2 times the allowable shear capacity of the secondary member.

10. INSPECTION



Gratings made by electro-forge/weld-forge process shall be subjected to inspection as per Quality Control Plan for approval and subsequent acceptance.

11. SITE PREPARATION

Gratings shall be stacked and dispatched in a proper way so that distortion/damage of the panels are avoided.

All dispatched gratings shall carry material certification and release note by OWNER's inspection / Authorized Inspection Agency.

All gratings shall be identified as per Tag Numbers indicated in the fabrication drawings before dispatch of gratings to site.

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12. GUARANTEE

The CONTRACTOR shall guarantee all materials supplied against any defect in respect of quality of material used, conformance to these Specification and dimensional tolerances against proper fitments.

13. PAYMENT (APPLICABLE FOR ITEM RATE TENDER)

Gratings shall be paid on the basis of the area of M.S. Gratings and frame actually laid. Full deduction shall be made for openings equivalent to 300 mm dia and above.

The rate shall include cost of preparation of fabrication drawings, supplying of readymade gratings and transporting to site, smoothing ends if necessary and fixing in positions by welding or clips as per the design drawings.

The rates shall also include all incidental costs and charges such as carriage, Octroi, loading, unloading, storing, safe custody, watch and ward, etc.