



Product: HOT/COLD ROLLED COILED FLATS FOR FIN WELDED PANELS TO ASTM A576 & SA387 GR12 & GR22 FOR BOILERS

**Revision record:**

Rev: 00: Fresh issue  
Rev: 01: Clause 5.0 to 11.0 Edited and renumbered. Requirement for packing enhanced.  
Rev: 02: Text re-written, Criteria for finish clarified.  
Rev: 03: Clause 4.0, 5.0, 7.0 & 8.0 altered.  
Rev: 04: Cold rolled permitted. Cl. No.2.0, 4.0 modified  
Rev: 05: Cl 1 and title of TDC modified  
Rev: 06: Cl 3.0 OD Dimension minimum added. Cl 4.0 – Delivered product condition for SA 387 Gr 12 & 22 added. Cl 7.0 – Weldable primer added  
Rev 07: Dated 04/04/2017: Cl.4.0 - Details for Heat Treatment added. Cl.9.0 modified  
Rev 08: Dated 11/05/2018: Cl.7.0 modified based on feedback from Shop, MM and OP&C.  
Rev 09: Dated 19/09/2023: Cl. 4.0 modified, Cl. 5.0 modified, Cl. 8 – Visual Examination added

**1. MATERIAL:**

ASTM & ASME {Latest on date of Purchase Order (PO)} : Test certificate to indicate actual grade supplied  
Carbon Steel - ASTM A 576 Gr.1008, 1010, 1012, 1015 & 1016; Alloy Steel - SA 387 Gr 12 & SA 387 Gr 22  
Additional Requirement : As listed below (supplementary to Specification).  
Size, Grade and Qty. : As per Purchase order

**2. PROCESS OF MANUFACTURE:**

Flats to be in hot/cold rolled coiled form and shall be of weldable quality.

**3. DIMENSIONAL TOLERANCES:**

Thickness : As per specification Coil ID: 508 mm  
Width : +/- 0.5 mm Coil OD: Minimum: 1400mm, Maximum: 1800 mm Coil weight: 2 Tonnes (max.)

**4. HEAT TREATMENT: As Delivered Condition – For Alloy Steel: Normalized and Tempered as per the temperatures indicated below:**

| Material            | Heat Treatment Temperature (°C) |           |
|---------------------|---------------------------------|-----------|
|                     | Normalizing                     | Tempering |
| SA387 Gr 12 Class 2 | 920-960                         | 650 - 700 |
| SA387 Gr 22 Class 2 | 920-960                         | 680 - 750 |

*It is generally recommended to do normalizing in a Continuous Discharge Furnace (CDF) in de-coiled condition. However, if normalizing is done in batch furnace (i.e in coiled condition), appropriate control measures shall be followed to ensure uniform properties.*

Tempering shall be done after slitting operation. *Note that cooling from the tempering temperature should be carried out within the heat treatment furnace in a controlled manner to minimize stresses that could affect de-coiling*

The furnaces, thermocouples, temperature measuring instruments and recorders used for carrying out the heat treatment operations shall have valid calibration. Calibration shall be done by Government approved Agencies. Calibration reports shall be furnished when called for.

*In addition to the routine tests undertaken as per Material Specification the following additional checks shall be performed in case of coils Normalized in Batch Type Furnace as part of process qualification test (PQT):*

*In the first coil, tensile tests & hardness measurements shall be done on outer most & inner most layers of the coil to ensure uniformity in properties. Additionally, micro examination shall be done on aforesaid specimens to ensure uniformity in structure.*

**5. FINISH AND REPAIR**

Flats to have a workman like finish, be free of harmful defects like cracks, laminations, scrabs etc., and surfaces to be free from *mill and loose scales*, rust, pitting, wrinkles etc. *and not to be oiled*.

For hot rolled coils the edges of coils to be of machine cut (cold slit) ends in order to ensure squareness of edges & flatness of width. Edges cut by shearing or hot saw cut are not acceptable. Flats to be without fish tails. Coils should not contain any weld seams. Repair by fusion welding is prohibited. When defects are rectified by mechanical means, min. thickness as per specification shall be met and the rectified areas to be smoothly dressed up.



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**6. MARKING:** (in English only)

Following details to be marked on the flats at ends of coils & on the packing by paint stenciling.

1. Specification and grade
2. Melt number
3. Purchase order No
4. Maker's emblem/code
5. Coil number and Weight
6. Size (width & thickness).

**7. PACKING & PRESERVATION:**

It is the responsibility of the supplier to ensure that no damage occurs during transit.

Individual coils to be packed in air/water tight polythene covering of sufficient thickness and strength with adequate desiccant to withstand rigorous handling.

Coils to be wrapped with 1 inch hoop iron bands at one place along the circumference and at 8 places through the eye of the coil and supported on suitable wooden skids/ steel crates.

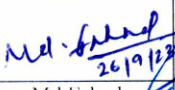
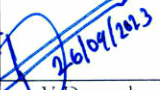
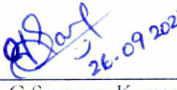
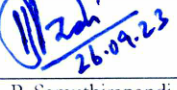
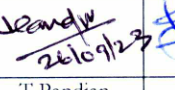
**8. INSPECTION AND CERTIFICATION:**

Products must be inspected and tested at works and the details as below furnished in mill test Certificate legibly, in English language only:

1. Purchase Order No.(BHEL), TDC No. & Test certificate number
2. Specification and Grade with applicable year of Standard, Quantity, Heat Number, Plate number.
3. Steel making & finishing process
4. Chemistry including incidental elements. Heat Treatment details with actual temperature and soaking time, Mechanical test Results.
5. Dimension report (Width, thickness, flatness, squareness)
6. *Visual Examination for surface condition and results.*

**9. END USE**

The coils are for use as fins by welding to tubes to form fin-welded tubular panels by automatic submerged arc welding machines, MIG welding or Flux cored arc welding machines.

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| Dy. Manager/QA                                                                                 | DGM/QA                                                                                          | AGM/PE-FB                                                                                              | AGM/MM                                                                                                  | AGM/QC                                                                                            | AGM/QA & BE                                                                                                |
| Prepared By                                                                                    | Reviewed By                                                                                     |                                                                                                        |                                                                                                         |                                                                                                   | Approved By                                                                                                |