



## 1.0 SCOPE

- 1.1 This TDC specifies the requirements for the supply of structural plates conforming to ASTM B575 UNS N06059 to the latest edition.
- 1.2 The Size and Quantity shall be as specified in Enquiry/Purchase order.

## 2.0 MATERIAL SPECIFICATION:

- 2.1 PLATES : Alloy 59, NiCr23Mo16Al (2.4605)
- 2.2 Additional Requirement : As listed below (This TDC gives requirements over and above the mandatory requirements of the specification)

### 3.0 CHEMICAL COMPOSITION

As per ASTM B575-17 Table 1.

## 4.0 DIMENSIONAL TOLERANCES

|     |                                      |   |
|-----|--------------------------------------|---|
| 4.1 | The following tolerances shall apply |   |
|     | a) Thickness/Width/Length tolerance  | As per ASTM B906  |
|     | b) Straightness                      | Edgewise curvature(depth of chord) of plate shall not exceed 0.04 mm multiplied by the length in cm.                        |
|     | c) Squareness                        | For plates of all thickness and widths of 152.4mm or more, the angle between adjacent sides shall be $90 \pm 0.015^\circ$ . |
|     | d) Edges                             | Plates shall have sheared or cut (machines, abrasive cut, powder cut) edges as specified.                                   |

## 5.0 HEAT TREATMENT:


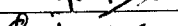
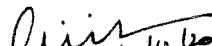
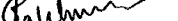
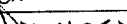
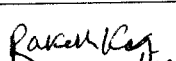
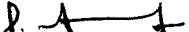

**HEAT TREATMENT:**  
Plate should be solution annealed between 1100-1180°C and cooled quickly. Water Quenching is preferred to obtain maximum corrosion resistance.

## 6.0 MECHANICAL TESTS:


- Frequency of tests: Minimum of 2 samples per heat.
- All mandatory tests shall be as per the applicable materials specifications.

## 7.0 MECHANICAL PROPERTIES

| MECHANICAL PROPERTIES     |         |
|---------------------------|---------|
|                           | Metric  |
| Tensile strength (Min)    | 690 MPa |
| Yield strength (Min)      | 310 MPa |
| Elongation at break (Min) | 45%     |
| Rockwell Hardness (Max)   | 100 HRB |

| Prepared by   | Reviewed by       | Signature   | Name           | Approved by   |
|---|-------------------|---|----------------|---|
|                  | ENGG (AQCS)       |           | K. B. Padhi    | <br>21/12/2017 |
|   | ENGG (FGD)        |           | K. M. KABILASH |   |
|   | QC (PROC)         | <br>20/12 | R. K. Savaan   |   |
| <br>Rakesh Kumar | MATERIAL PLANNING |           | P. ANNAMALAI   | (Head/QA)   |
|   | QA                |           | R. Annamalai   |   |

Issued by QUALITY ASSURANCE

|   |  |   |
|---|--|---|
| <br><b>Ranipet</b> | <b>TECHNICAL DELIVERY CONDITIONS<br/>FOR PLATES TO SPECIFICATION<br/>ASTM B 575 UNS N06059</b> | DOC No: <b>TDC: RTS: 001</b><br>Rev: <b>00</b><br>Effective Date: 14/12/2017<br>Page: <b>2 of 2</b> |
|---|--|---|

#### 8.0 PHYSICAL PROPERTIES:

|   | Metric               |
|---|----------------------|
| Density   | 8.6g/cm <sup>3</sup> |
| Thermal expansion coefficient(@20-100°C/68-212°F) | 11.9 µm/m°C          |
| Thermal conductivity                              | 10.4W/mK             |

#### 9.0 FINISH AND REPAIR:

Plates shall be free from all mill scales, edge crack and other injurious defects. Repairs by fusion welding is prohibited. Mechanical removal of defects permitted subject to meeting minimum thickness and smooth surface.

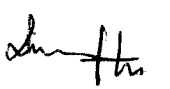

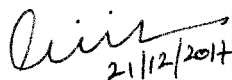
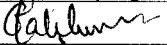

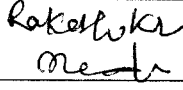
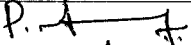
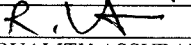
#### 10.0 MARKING (by mill):

1. Specification
2. Grade
3. Melt number
4. Maker's emblem/Code/ Identification and
5. Plate number. PO No (BHEL PO only), buyer name & Weight to be painted on the product. Marking shall be done as indicated below:
  - i. Sl no: 1 to 5 by paint stenciling on the top of each pile/ packet.
  - ii. The markings shall have no deleterious effect on the material or its performance and shall be sufficiently stable to withstand normal handling.

#### 11.0 INSPECTION AND CERTIFICATION:

Products must be inspected & tested at supplier's works. Test certificate, in English, shall accompany each product with the following details:

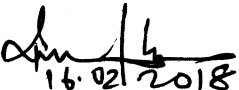

- a) Purchase Order No. (BHEL PO only), TDC No. & its Revision No., Test certificate No. & Date, Size, Plate number and Quantity-Melt wise.
- b) Material Specification and Grade with applicable year of code, Heat Number, Steel making process, de-oxidation process (Specification designation)
- c) Chemistry, Carbon equivalent and Heat Treatment details.
- d) Mechanical test values, including impact values and through thickness ductility (where applicable), shall be reported.
- e) NDE results with reference and acceptance standards.

| Prepared by   | Reviewed by       | Signature   | Name           | Approved by   |
|---|-------------------|---|----------------|---|
|  | ENGG (AQCS)       |  | K. B. Padhi    | <br>21/12/2017 |
|   | ENGG (FGD)        |  | K. M. KABILASH |   |
|   | QC (PROC)         |  | R. Kesavan     |   |
|  | MATERIAL PLANNING |  | P. ANNAMALAI   | (Head/QA)   |
|   | QA                |  | R. Annamalai   |   |

Issued by QUALITY ASSURANCE

| QUALITY ASSURANCE   |                 |
|---|-----------------|
| QWI NO: TDC:RTS:001 Rev.00 Dtd.14.12.2017                     |                 |
| Amendment to Quality Work Instruction (QWI)                   |                 |
| Amendment No: A1  | Date:16.02.2018 |
| Title: TDC FOR Plates to Specification ASTM B 575 UNS N06059. |                 |

| Details of Amendment   |  |                     |
|------------------------|--|---------------------|
| Clause No              | Amended As   | Basis for Amendment |
| Refer Clause no 4.1(c) | Squareness: For plates of all thickness and widths of 152.4mm or more, the angle between adjacent sides shall be $90 \pm 0.15^\circ$ | Typographical error |

| Prepared By (QA)  |  | Reviewed & Approved By   |
|---|--|--|
| <br>16.02.2018<br>Rakesh Kumar Madhu(SER/QA) |  | <br>16/2/18<br>R Arunachalam DGM/QA & QC-OLI |