

**Technical Delivery Conditions for Stainless Steel Pipes
conforming to ASME SA 312/ASTM A312 & Duplex
Stainless Steel Pipes ASME SA 790/ASTM A790****Project : BIFPCL MAITREE STPP - 2X660 MW****Records of Revn:00 :- Fresh Issue.****1.0 GENERAL**

Materials: ASME SA 312 (Austenitic Stainless Steel Pipes), SA 790 (Duplex Stainless Steel Pipes).

- 1.1 This Technical Delivery Conditions specify the additional requirements for the supply of Austenitic and Duplex Stainless Steel Pipes (Seamless and Welded) to material specification indicated above.
- 1.2 The pipes shall conform to the size, grade and quantity as specified in the purchase order.
- 1.3 **Seamless pipes** shall be supplied unless welded pipe requirement is specified in the purchase order.

2.0 PROCESS AND CHEMICAL ANALYSIS

- 2.1 The chemical composition of the steel shall conform to the requirements of the respective material specification.
- 2.2 If the welded pipes are specified in the P.O, then they shall be made by an automatic welding process with no addition of filler metal in the welding operation.
- 2.3 Product analysis as per material specification shall be furnished in the Test certificate.
- 2.4 Pipes shall be checked for radioactive contamination and reported. Survey meter shall be used to measure at 5cm near the surface. Acceptance limits: Shall be less than 0.1 milli Rontgen (MR) per hr or 1 micro Sievert per hr.

3.0 DIMENSIONAL TOLERANCES

The pipes shall conform to the dimensional tolerances specified in ASTM A999.

4.0 HEAT TREATMENT

All pipes shall be supplied in the heat treated condition as specified in the respective material specification.

5.0 MECHANICAL TEST

- 5.1 The pipes shall be subjected to mechanical tests as specified in material specification and report shall be furnished.
- 5.2 The number of test samples shall be selected as per respective material specification.

6.0 HARDNESS TEST FOR DUPLEX SS PIPES

Hardness test shall be carried out on each SA 790 duplex Stainless Steel pipe and values shall meet the specification requirements. The hardness values shall be indicated in test certificate.

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7.0 HYDROSTATIC PRESSURE TEST

Each length of pipe shall be subjected to hydrostatic pressure test, at a pressure as specified in the purchase order.

8.0 FINISH & REPAIR

The Inside & outside surfaces of the pipes shall be free from any imperfections & defects like laps, seams, folds, cracks, pitting etc;. Repair by welding is prohibited. Localized imperfections, if any, may be removed mechanically ensuring the wall thickness. Local depressions or ground spots are not acceptable.

The pipe shall meet the dimensional tolerance (clause 3.0 above) after any mechanical repair as permitted in the respective standard.

All pipes shall have a finish as specified in respective material specification.

9.0 MARKING AND PACKING

The following details are to be marked on the consignment for identification

- | | | |
|----------------|---------------------------|--------------------------|
| 1) PO Number | 2) Supplier's emblem/code | 3) Specification & grade |
| 4) Heat number | 5) Size | 6) Inspector's seal |

OD up to 31.8 mm (excluding)	Details 1 to 6 shall be stamped on metal / plastic tag attached to bundle
OD 31.8 mm to OD 76.1mm (including)	- Details 1 to 5 shall be paint stencilled on each pipe. - Details 1 to 6 to be stamped on Metal / Plastic tag attached to bundle.
OD above 76.1 mm	- Details 2 to 6 shall be hard stamped / engraved at 100mm from an end of each pipe. - Details 1 to 5 shall be paint stencilled on each pipe.

- 9.1 The Pipes dispatched directly to project site as **DTS** shall be punched and paint stencilled with DU code (14 digit work order du detail-) as given by purchase in addition to marking done as per para 9.0.

- 10.0 COLOUR CODING :** All pipes shall be colour coded longitudinally to full length of the pipe as given below.

SA312 TP304 : Blue & Yellow.

SA312 TP304H : Black, Blue & Yellow.

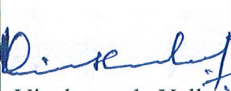
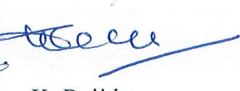
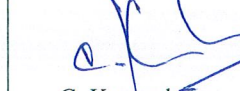
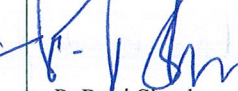
SA312 TP316 : Black & Green.

SA312 TP316L : Black, Blue & Brown.

SA312 TP321 : Blue & Brown.

SA312 TP347 : Blue, Red & White.

SA790 UNS S32205 : Red , White & Green

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All Pipes shall be surface treated as per ASTM A380 both inside and outside. Pipe ends shall be machined as per PO and shall be secured with caps.

12.0 INSPECTION AND CERTIFICATION (In English Only)

- 12.1 Supplier shall have valid ISO:9001-2015 certificate for the duration of the contract. However, ISO:9001-2008 certification is acceptable till 14th September 2018.
- 12.2 Finished pipes shall be inspected at suppliers works and certified as per BS EN 10204 Type 3.2 by any ASME Authorised Inspection Agency or their subsidiaries covering all details listed in Cl.12.3 to 12.6
- 12.3 Signed Manufacturer's Test Certificate shall include a) Manufacturer's Name, Purchase Order no.(BHEL), TDC no., Test Certificate No & TC date, Pipe size and quantity- melt wise, Actual Weight per metre b) Specification and grade with year of code, Code case (if applicable), Heat no., Steel & Pipe making process, chemistry including incidental elements on Ladle and Product analysis, c) Heat treatment details with actual temperature and soaking time & d) Mechanical results.
- 12.4 Detailed NDT reports with reference norms, acceptance standards and test results shall be furnished along with Test certificates.
- 12.5 Hydrostatic Pressure Test report.
- 12.6 Valid ISO 9001 certificate.
- 12.7 Test Certificates for the starting raw materials (ingots/blooms/billets) shall be submitted to BHEL by the supplier.

13.0 AUDIT CHECKS AT BHEL

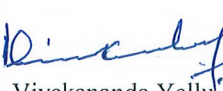
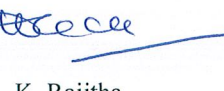
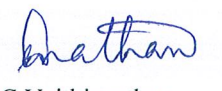
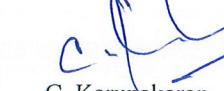
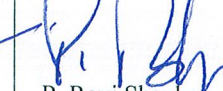
BHEL reserves the right to carry out audit checks for Chemistry, HT condition, Mechanical test and NDT on Pipes.

Supplies found defective during check at BHEL are liable for rejection.

14.0 END USE

These Pipes are meant for use in Maitree-2X660MW Super Critical Boiler applications including Auxiliary Boiler.

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