

Bayu Undan / Darwin LNG Facilities Technical Delivery Terms

Material Description: Bolting Components for Structural Applications	
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1 SCOPE

This document outlines the general technical requirements for the supply of both carbon steel and stainless steel structural bolting for the ConocoPhillips (COP) Bayu-Undan and Darwin LNG Facilities.

Specifically, bolting materials shall be manufactured under the general requirements of the following codes and standards:

ASTM A193	Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service.
ASTM A194	Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service.
ASTM A325	Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
ASTM A563	Carbon and Alloy Steel Nuts.
ASTM F436	Hardened Steel Washers.
ASTM A700	Packaging, Marking and Loading Methods for Steel Products for Domestic Shipment.
AS CK13	Code of Recommended Practice for Preparation of Metal Surfaces for Electroplating.
AS 1897	Electroplated Coatings on Threaded Components.
AS 2331	Methods of Test for Metallic and Related Coatings.
EN 10204	Metallic Products – Types of inspection documents.

2 MATERIALS

Bolts and nuts for which the nominal diameter is less than 16mm shall be made of stainless steel AISI Type 316 to ASTM A193 (B8M) and ASTM A194 (8M).

Isolation washers for these bolts shall be COP approved rigid polyurethane, PTFE or similar.

Bolts, nuts and washers for which the nominal diameter is 16mm or larger shall be made of carbon steel, quenched and tempered and cadmium plated or sherardised, all in accordance with ASTM A325, ASTM A563 and ASTM F436. Property class shall not exceed 8.8 strength level.

3 CERTIFICATION

All materials shall be supplied with EN 10204 type 2.2 test certificates for each batch/heat. In addition, the bolting materials shall also be supplied with EN 10204 – 2.1 Certificates of Conformity related to the coating requirements. These certificates shall relate batches of bolts to typical test results obtained (i.e. EN 10204 – 2.2 certificates). The Supplier shall retain all specific coating test results on file which may be subject to audit by COP.

All the documents relating to quality assurance and quality control including certifications shall be in English and readily legible. Documents provided in other languages or illegible shall not be accepted and shall be referred to COP before clearing final inspection.

4 CADMIUM PLATING OF BOLTING COMPONENTS

This section defines the technical requirements for the application of cadmium plating of bolting components in service up to 200°C.

The supplier shall verify that the manufacturing tolerance is adequate to accommodate the proposed coating thickness without interfering with the fit of the nut by a method of trial fitting. Thread accuracy shall be such that all plated nuts of a particular size can be hand threaded onto the full length of all plated bolts of that same size.

4.1 Requirements for Cadmium Plating

The plating shall be carried out in accordance with the “Barrel Method”. The surface of all bolting components which require plating shall be prepared and conform with the requirements of Code of Practice AS CK13.

The plating applied to the bolting components shall contain not less than 98.5% cadmium and shall be free from all mercury. The total impurities excluding zinc and nickel shall not exceed 0.5%.

The bolting components shall be heavy cadmium plated in accordance with AS 1897 Service Condition 3 (severe). After plating, all bolting components shall be chromate treated in accordance with AS 1897 Type C – (yellow iridescent). The passivated cadmium plated components shall not be handled for 24 hours to allow for hardening of the chromate conversion plating.

4.2 Inspection and Testing

Sampling for visual examination and plating thickness testing shall be carried out in accordance with the recommended sampling procedure given in Appendix E of AS 1897. If the maximum number of defective products is above the specified amount, then the Supplier shall advise COP of the corrective action they propose. COP reserves the right to reject the batch until corrective action has been approved.

The plating shall be free from misses, high spots or other defects likely to compromise plating performance. Any misses and high spots which, after final coating, would affect the ability of carrying out the thread fit shall be unacceptable.

The required number of samples shall be tested to verify the plating thickness. The plating thickness tests shall be determined by one of the methods described in AS 2331.1. The testing shall be carried out on bolt ends and nut faces. The plating thickness shall not be less than that required by code. In the event of dispute, the microsectioning method shall be used in accordance with AS 2331.1.1.

5 PACKING, SUPPLY AND DOCUMENTATION

The stud bolts and nuts shall be preserved, packed and supplied in accordance with good industry practice.

Each material and each size shall be packed separately.

Minimum preservation requirements as specified in ASTM A700 shall be met.

Packing information details as specified during the procurement stage shall be met.