

APPROVAL OF MANUFACTURER CERTIFICATE

This is to certify:**That****HI Quality Steel Castings Ltd.
Chesterfield, United Kingdom**is an approved manufacturer of
Steel Castingsin accordance with
**Det Norske Veritas' Rules for Classification Pt. 2
DNV-OS-E304 Offshore Steel Wire Ropes**

and the following particulars:

Steel types	Carbon and carbon-manganese, Alloy, Austenitic stainless
Max. weight	8 000 kg
Remarks	Including castings for offshore mooring wire rope sockets, see page 2

Manufacturer approved by this certificate is accepted to deliver according to DNV GL, DNV and GL rules.

This Certificate is valid until **2017-06-30**.Issued at **Høvik** on **2015-11-04**DNV GL local station: **Manchester**Approval Engineer: **Dechun Lou**for **DNV GL**

**Hanne Anita Hjerpetjønn
Head of Section**

Job Id: **263.11-002698-4**
Certificate No: **AMMM000006F**

Particulars of the approval:

Castings for offshore mooring wire rope sockets

Grade	Max. thickness (mm)	Max. weight (Kg)	Delivery condition	Casting method
ASTM 487M Grade 10B with modified properties ¹⁾ ²⁾	140	1 798	Annealed, quenched and tempered	Sand casting
ASTM 487M Grade 4B ¹⁾	125	1 306	Normalised, quenched and tempered	
ASTM 487M Grade 4C ¹⁾	130	398		

Remarks:

¹⁾ a) Unless otherwise specified, chemical composition and mechanical properties shall be in accordance with relevant ASTM standard and DNV-OS-E304.

b) Periodical analysis of Sn, Sb and As is required. In such cases, the maximum content shall be 0.010 % for Sn, 0.010 % for Sb and 0.025 % for As.

²⁾ Mechanical properties for ASTM 487M Grade 10 B with modified properties:

Tensile strength, min.	700 MPa
Yield stress, min.	470 MPa
Impact energy, average min.	50 J at -20°C
Elongation, min.	15 %
Reduction of area, min.	35 %