

APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM00001FA
Revision No:
2

This is to certify:

That
Buderus Edelstahl GmbH
Wetzlar, Germany

is an approved manufacturer of
Steel Forgings

in accordance with
DNV GL rules for classification – Ships
DNV GL offshore standards

and the following particulars:

Products	Free forgings, forged bars, rolled round and square bars and semi-finished products, e.g. ingots, slabs
Steel type(s)	Carbon, Carbon-Manganese, Alloy, Ferritic Stainless, Martensitic Stainless, Austenitic Stainless
Max. weight	95 000 kg (free forgings) 70 000 kg (forged bars) 160 000 kg (semi-finished products, ingots)
Max Diameter	190 mm (rolled round and square bars)

Manufacturer(s) approved by this certificate is/are accepted to deliver according to DNV GL, DNV and GL rules. Materials to be applied to DNV GL classed object shall fulfill the material requirements in the applicable DNV GL class rules.

Issued at **Hamburg** on **2018-09-06**

for **DNV GL**

This Certificate is valid until **2020-06-30**.

DNV GL local station: **Essen**

Approval Engineer: **Stefan Röhr**

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Thorsten Lohmann
Head of Section



Job Id: **263.11-003975-4**
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Particulars of the approval

1. Clean steel forgings in carbon, carbon-manganese and alloy steel grades are qualified for approved applications. The steels are to comply with the DNVGL Rules Pt. 2, Ch. 2, Sec. 6.1.6.
2. Including Premium Clean Steel according to customer specification PR DL for application in forged crankshafts
3. Including free form forged crankshafts of "Clean Steel" (see pt. 1+2 above) for approved applications
4. Blanks cut from forged bars of "clean steel forgings" (see pt. 1 above) to a diameter of max. 1450 mm are qualified with respect to fatigue endurance limits for gears.
Ref. DNVGL Rules Pt. 4, Ch. 2, Sec. 1.5.1
5. Sawn discs in special grade 18CrNiMo7-6 / ISO B following EN 10084 from forged bars with tensile strength in range between 1080 MPa and 1500 MPa with toughness properties (v-notched impact test) at ambient temperature of minimum 40 Joule (longitudinal) and 30 Joule (tangential/transversal) respectively delivered in "pre-hardened" condition for applications to be subject to special approval
6. Including the delivery of hot rolled semi-finished square bars (300 mm x 300 mm) intended for subsequent closed die forging operations and heat treatment