# APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
**AMMM00000EH**
Revision No:
**3**

## This is to certify:

**That**

**Hammerwerk Erft G. Diederichs GmbH & Co. KG**
**Ernst-Diederichs-Strasse 1,**
**53902 Bad Münstereifel,**
**Germany**

is an approved manufacturer of
**Steel Forgings**

in accordance with
**DNV rules for classification – Ships**
**DNV-OS-B101 – Metallic materials**

and the following particulars:

| | |
|---|---|
| **Application area** | **Forgings for hull structures and equipment**<br>**Forgings for shafting and machinery**<br>**Forgings for crankshafts**<br>**Forgings for gearing**<br>**Forgings for boilers, pressure vessels and piping systems**<br>**Ferritic steel forgings for low temperature service**<br>**Stainless steel forgings** |
| **Steel type** | **Carbon and carbon-manganese,**<br>**Alloy,**<br>**Austenitic stainless,**<br>**Martensitic stainless,**<br>**See page 2** |
| **Forging method** | **Open die forging/ ring rolling** |
| **Max. weight** | **See page 2** |
| **Max. diameter / section** | **See page 2** |
| **Heat treatment condition** | **See page 2** |
| **Additional approval conditions** | **See page 2** |

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 classed object shall fulfill the material requirements in the applicable DNV class rules.

Issued at **Hamburg** on **2022-07-07**

This Certificate is valid until **2025-03-07**.
DNV local station: **Essen**

Approval Engineer: **Christian Wildhagen**

for **DNV**
Digitally Signed By: Roehr, Stefan
Location: DNV Hamburg, Germany
Signing Date: 07.07.2022 , on behalf of

**Thorsten Lohmann**
**Head of Section**

## Particulars of the approval

**Forgings for hull structures and equipment**

| Steel type | Grade[3)] | Forging method[1)] | Max. weight [kg] | Max. thickness / height [mm] | Outer diameter [mm] | Heat treatment condition[2)] |
|---|---|---|---|---|---|---|
| C and C-Mn | NV F400UW, NV F440UW, NV F480UW, NV F520UW, NV F560UW, NV F600UW | OD | 15 000 | 1 800 | - | N, NT, QT |
| | | RR | 4 000 | 620 | 2800 | |
| Alloy | NV F550AW, NV F600AW, NV F650AW | OD | 15 000 | 1 800 | - | QT |
| | | RR | 4 000 | 620 | 2800 | |

**Forgings for shafting and machinery**

| Steel type | Grade[3)] | Forging method [1)] | Max. weight [kg] | Max. thickness / height [mm] | Outer diameter [mm] | Heat treatment condition[2)] |
|---|---|---|---|---|---|---|
| C and C-Mn | NV F400U, NV F440U, NV F480U, NV F520U, NV F560U, NV F600U, NV F640U, NV F680U, NV F720U, NV F760U | OD | 15 000 | 1 800 | - | N, NT, QT |
| | | RR | 4 000 | 620 | 2800 | |
| Alloy | NV F600A, NV F700A, NV F800A, NV F900A, NV F1000A, NV F1100A | OD | 15 000 | 1 800 | - | QT |
| | | RR | 4 000 | 620 | 2800 | |

**Forgings for boilers, pressure vessels and piping systems**

| Steel type | Grade[3)] | Forging method [1)] | Max. weight [kg] | Max. thickness / height [mm] | Outer diameter [mm] | Heat treatment condition[2)] |
|---|---|---|---|---|---|---|
| C and C-Mn | NV F450H, NV F490H | OD | 15 000 | 1 800 | - | N, NT, QT |
| | | RR | 4 000 | 620 | 2800 | |
| Alloy | NV F0.5Mo, NV F1Cr0.5Mo, NV F2.25Cr1MoN, NV F2.25Cr1MoQT | OD | 15 000 | 1 800 | | NT, QT |
| | | RR | 4 000 | 620 | 2800 | |

**Ferritic steel forgings for low temperature service**

| Steel type | Grade[3)] | Forging method [1)] | Max. weight [kg] | Max. thickness / height [mm] | Outer diameter [mm] | Heat treatment condition[2)] |
|---|---|---|---|---|---|---|
| C and C-Mn | NV F450L, NV F490L | OD | 15 000 | 1 800 | - | N, NT, QT |
| | | RR | 4 000 | 620 | 2800 | |
| Alloy | NV F3.5Ni, NV F5Ni, NV F9Ni* | OD | 15 000 | 1 800 | - | NT, QT (*NNT) |
| | | RR | 4 000 | 620 | 2800 | |

**Steels acc. other standards**

| Steel type | Grade[3] | Forging method [1] | Max. weight [kg] | Max. thickness / height [mm] | Outer diameter [mm] | Heat treatment condition[2] |
|---|---|---|---|---|---|---|
| C and C-Mn | Acc. to EN 10083-2 | OD | 15 000 | 1 800 | - | N, NT, QT |
| | | RR | 4 000 | 620 | 2 800 | |
| | Acc. to EN 10250-2 | OD | 15 000 | 1 800 | - | N, NT, QT |
| | | RR | 4 000 | 620 | 2 800 | |
| | Acc. to SEW 550 | OD | 15 000 | 1 800 | - | N, NT, QT |
| | | RR | 4 000 | 620 | 2 800 | |
| | Acc. to EN 10084 | OD | 15 000 | 1 800 | - | NT, QT |
| | | RR | 4 000 | 620 | 2 800 | QT |
| | Acc. to EN 10222-2 | OD | 15 000 | 1 800 | - | N, NT, QT |
| | | RR | 4 000 | 620 | 2 800 | NT, QT |
| | Acc. to EN 10222-4 | OD | 15 000 | 1 800 | - | N, QT |
| | | RR | 4 000 | 620 | 2 800 | N, NT, QT |
| | Acc. to EN 10269 | OD | 15 000 | 1 000 | - | N, QT |
| Alloy | Acc. to EN 10083-3 | OD | 15 000 | 1 800 | - | QT |
| | | RR | 4 000 | 620 | 2 800 | |
| | Acc. to EN 10250-3 | OD | 15 000 | 1 800 | - | QT |
| | | RR | 4 000 | 620 | 2 800 | |
| | Acc. to SEW 550 | OD | 15 000 | 1 800 | - | QT |
| | | RR | 4 000 | 620 | 2 800 | |
| | Acc. to EN 10084 | OD | 15 000 | 1 800 | - | QT |
| | | RR | 4 000 | 620 | 2 800 | |
| | 18CrNiMo7-6 acc. to EN 10084 [4][5] | OD | 15 000 | 1 800 | - | QT |
| | | RR | 4 000 | 620 | 2 800 | |
| | Acc. to EN 10222-2 | OD | 15 000 | 1 800 | - | NT, QT |
| | | RR | 4 000 | 620 | 2 800 | |
| | Nickel steel acc. to EN 10222-3 | OD | 15 000 | 1 800 | - | NT, NNT, QT |
| | | RR | 4 000 | 620 | 2 800 | |
| | Nitriding steel acc. to EN 10085 | OD | 15 000 | 1 800 | - | QT |
| | | RR | 4 000 | 620 | 2 800 | QT |
| Martensitic | Steel acc. to EN 10088-3 | OD | 15 000 | 1 800 | - | QT |
| | | RR | 4 000 | 620 | 2 800 | |
| | Steel acc. to EN 10222-2 | OD | 15 000 | 1 800 | - | QT |
| | | RR | 4 000 | 620 | 2 800 | |

Remarks:

1) OD: Open die forging
   RR: Ring Rolling
2) QT: Quenched and tempered
   N: Normalised
   NNT: double normalised and tempered
   NT: Normalised and tempered
3) Incl. equivalent grades in acc. to other standards

Special conditions:

4) Clean steel forgings of grade 18CrNiMo7-6 acc. to EN 10084 are qualified for approved applications (see pt. 2). Special requirements for clean steel forgings are given in DNV Rules Pt. 2, Ch. 2, Sec.6, [1.6.10].
5) Subject to special approval, clean steel forgings of grade 18CrNiMo7-6 acc. to EN 10084 are approved for further processing to gears acc. to DNV GL Class Guideline No. DNV-CG-0036, and classed to “high grade”.