DNV·GL

APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM00000EH
Revision No:
1

This is to certify:

That

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

Product	**Open die forgings (incl. bars and seamless rolled rings)**
Steel type(s)	**Forgings for hull structures and equipment**
	Forgings for shafting and machinery
	Forgings for gearing
	Forgings for boilers, pressure vessels and piping systems
	Ferritic steel forgings for low temperature service
	Stainless steel forgings
Max. weight	**15000 kg**
Delivery Condition	**Normalized, (double) normalized + tempered, quenched + tempered**
Remarks	**see Particulars of the approval (incl. clean steel forgings)**

Manufacturer(s) approved by this certificate is/are accepted to deliver according to DNV GL, DNV and GL rules.

This Certificate is valid until **2019-03-07**.

Issued at **Hamburg** on **2016-03-09**

DNV GL local station: **Essen**

Approval Engineer: **Oliver Krömer**

for **DNV GL**
Digitally Signed By: Wildhagen, Christian
Location: DNV GL Hamburg, Germany
Signing Date: 2016-03-10, on behalf of

Thorsten Lohmann
Head of Section

Particulars of the approval

Forgings:

Grade	Product	Supply Condition	Casting Method	Thickness [mm], max.	Weight [kg], max.
Forgings for hull structures and equipment					
F400UW, F440UW, F480UW, F520UW, F560UW, F600UW	FF, ST	N, N+T, Q+T	CC, IC	1800	15000
F550AW, F600AW, F650AW	FF, ST	Q+T	CC, IC	1800	15000
Forgings for shafting and machinery					
F400U, F440U, F480U, F520U, F560U, F600U, F640U, F680U, F720U, F760U	FF, ST	N, N+T, Q+T	CC, IC	1800	15000
F600A, F700A, F800A, F900A, F1000, F1100A	FF, ST	Q+T	CC, IC	1800	15000
Forgings for boilers, pressure vessels and piping systems					
F450H, F490H	FF, ST	N, N+T, Q+T	CC, IC	1800	15000
F0.5Mo, F1Cr0.5Mo	FF, ST	N+T, Q+T	CC, IC	1800	15000
F2.25Cr1MoN	FF, ST	N+T	CC, IC	1800	15000
F2.25Cr1MoQT	FF, ST	Q+T	CC, IC	1800	15000
Ferritic steel forgings for low temperature service					
F450L, F490L	FF, ST	N, N+T, Q+T	CC, IC	1800	15000
F3.5Ni, F5Ni	FF, ST	N+T, Q+T	CC, IC	1800	15000
F9Ni	FF, ST	N+N+T, Q+T	CC, IC	1800	15000
Non-alloy steels					
C & C-Mn steels acc. to EN 10083-2	FF, ST	N, N+T, Q+T	CC, IC	1800	15000
C & C-Mn steels acc. to EN 10250-2	FF, ST	N, N+T, Q+T	CC, IC	1800	15000
C & C-Mn steels acc. to SEW 550	FF, ST	N, N+T, Q+T	CC, IC	1800	15000
C & C-Mn steels acc. to EN 10084	FF, ST	N+T, Q+T	CC, IC	1800	15000
C & C-Mn steels acc. to EN 10222-2	FF, ST	N, N+T, Q+T	CC, IC	1800	15000
C & C-Mn steels acc. to EN 10222-4	FF, ST	N, Q+T	CC, IC	1800	15000
C & C-Mn steels acc. to EN 10269	ST	N, Q+T	CC, IC	1000	15000

Grade	Product	Supply Condition	Casting Method	Thickness [mm], max.	Weight [kg], max.
Alloy steels					
Alloy steels acc. to EN 10083-3	FF, ST	Q+T	CC, IC	1800	15000
Alloy steels acc. to EN 10250-3	FF, ST	Q+T	CC, IC	1800	15000
Alloy steels acc. to SEW 550	FF, ST	Q+T	CC, IC	1800	15000
Alloy steels acc. to EN 10084	FF, ST	Q+T	CC, IC	1800	15000
18CrNiMo7-6 acc. to EN 10084[1),2)]	FF, ST	Q+T	CC, IC	1800	15000
Alloy steels acc. to EN 10222-2	FF, ST	N+T, Q+T	CC, IC	1800	15000
Nickel steels acc. to EN 10222-3	FF, ST	N+N+T, N+T, Q+T	CC, IC	1800	15000
Nitriding steels acc. to EN 10085	FF, ST	Q+T	CC, IC	1800	15000
Alloy steels acc. to EN 10269	ST	Q+T	CC, IC	1000	15000
Stainless steels					
Martensitic steels acc. to EN 10088-3	FF, ST	Q+T	CC, IC	1800	15000
Martensitic steels acc. to EN 10222-5	FF, ST	Q+T	CC, IC	1800	15000

FF: open die forgings ST: forged bars N: normalized N+T: normalized + tempered Q+T: quenched + tempered
N+N+T: double normalized + tempered CC: continuous castings IC: ingot casting

Remarks:

1) 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 GL rules Pt. 2, Ch. 2, Sec.6, [1.6.10].
2) 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. DNVGL-CG-0036, and classed to "high grade".

Connecting Elements and Fittings:

Grade	Product	Supply Condition	Casting Method	Outer Dia. [mm], max.	Height [mm], max.	Weight [kg], max.
Forgings for hull structures and equipment						
F400UW, F440UW, F480UW, F520UW, F560UW, F600UW	NR	N, N+T, Q+T	CC, IC	Ø2800	620	4000
F550AW, F600AW, F650AW	NR	Q+T	CC, IC	Ø2800	620	4000
Forgings for shafting and machinery						
F400U, F440U, F480U, F520U, F560U, F600U, F640U, F680U, F720U, F760U	NR	N, N+T, Q+T	CC, IC	Ø2800	620	4000
F600A, F700A, F800A, F900A, F1000, F1100A	NR	Q+T	CC, IC	Ø2800	620	4000
Forgings for boilers, pressure vessels and piping systems						
F450H, F490H	NR	N, N+T, Q+T	CC, IC	Ø2800	620	4000
F0.5Mo, F1Cr0.5Mo	NR	N+T, Q+T	CC, IC	Ø2800	620	4000
F2.25Cr1MoN	NR	N+T	CC, IC	Ø2800	620	4000
F2.25Cr1MoQT	NR	Q+T	CC, IC	Ø2800	620	4000
Ferritic steel forgings for low temperature service						
F450L, F490L	NR	N, N+T, Q+T	CC, IC	Ø2800	620	4000
F3.5Ni, F5Ni	NR	N+T, Q+T	CC, IC	Ø2800	620	4000
F9Ni	NR	N+N+T, Q+T	CC, IC	Ø2800	620	4000
Non-alloy steels						
C & C-Mn steels acc. to EN 10083-2	NR	N, N+T, Q+T	CC, IC	Ø2800	620	4000
C & C-Mn steels acc. to EN 10250-2	NR	N, N+T, Q+T	CC, IC	Ø2800	620	4000
C & C-Mn steels acc. to SEW 550	NR	N, N+T, Q+T	CC, IC	Ø2800	620	4000
C & C-Mn steels acc. to EN 10084	NR	N+T, Q+T	CC, IC	Ø2800	620	4000
C & C-Mn steels acc. to EN 10222-2	NR	N, N+T, Q+T	CC, IC	Ø2800	620	4000
C & C-Mn steels acc. to EN 10222-4	NR	N, Q+T	CC, IC	Ø2800	620	4000
Alloy steels						
Alloy steels acc. to EN 10083-3	NR	Q+T	CC, IC	Ø2800	620	4000
Alloy steels acc. to EN 10250-3	NR	Q+T	CC, IC	Ø2800	620	4000

Grade	Product	Supply Condition	Casting Method	Outer Dia. [mm], max.	Height [mm], max.	Weight [kg], max.
Alloy steels acc. to SEW 550	NR	Q+T	CC, IC	Ø2800	620	4000
Alloy steels acc. to EN 10084	NR	Q+T	CC, IC	Ø2800	620	4000
18CrNiMo7-6 acc. to EN 10084[1),2)]	NR	Q+T	CC, IC	Ø2800	620	4000
Alloy steels acc. to EN 10222-2	NR	N+T, Q+T	CC, IC	Ø2800	620	4000
Nickel steels acc. to EN 10222-3	NR	N+N+T, N+T, Q+T	CC, IC	Ø2800	620	4000
Nitriding steels acc. to EN 10085	NR	Q+T	CC, IC	Ø2800	620	4000
Stainless steels						
Martensitic steels acc. to EN 10088-3	NR	Q+T	CC, IC	Ø2800	620	4000
Martensitic steels acc. to EN 10222-5	NR	Q+T	CC, IC	Ø2800	620	4000

NR: seamless rolled rings N: normalized N+T: normalized + tempered N+N+T: double normalized + tempered
Q+T: quenched + tempered CC: continuous castings IC: ingot casting

Remarks:

1) 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 GL rules Pt. 2, Ch. 2, Sec.6, [1.6.10].
2) 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. DNVGL-CG-0036, and classed to "high grade".