DET NORSKE VERITAS

SPECIAL PROCESS APPROVAL

SPA NO. SPA-16
This SPA consists of 2 pages

This is to confirm that the

Forgings for pinions and wheels

produced and tested by

Hammerwerk Erft GmbH & Co. KG.

BAD MÜNSTEREIFEL – ARLOFF
GERMANY

is approved with the following conditions

Separate forgings for pinions and wheels made in accordance with this process are classed as special high grade steels with reference to DNV Classification Note 41.2 Calculation of Gear Rating for Marine Transmisions and DNV Rules for Classification of Ships, HSLC and NSC Part 4 Chapter 2 Sec. 5.

Material: **18 CrNiMo 7-6**
HWE-High-Grade

The approval is based on the conditions on page 2

Place and date
Høvik, 2002-11-08
for DET NORSKE VERITAS AS

Medhat Bahgat
Head of Section

DET NORSKE VERITAS * 1864 *

Local Office
DNV Essen

Erik Sandberg
Surveyor

The approval is based on the following conditions:

1. The steel (18CrNiMo7-6 HWE-High-Grade) are to comply with the following chemical requirements :

Sulphur	≤	0.005%
Phosphur	≤	0.010%
Oxygen	≤	25 ppm

2. The cleanliness according to ISO 4967 is to be checked on a forging made from a specific ingot/melt and serves as documentation for the whole ingot/melt. The acceptance criteria are:

Procedure per method A, Plate II, inspected area appr. 200 mm^2 and the following table :

A		B		C		D		DS		
Fine	Thick	Fine	Thick	Fine	Thick	Fine	Thick	Fine	Thick	
1.0	1.0	1.5	1.0	1.0	1.0	1.0	1.0	0	0	1.)
0.5	0.5	1.5	1.0	0.5	0.5	1.0	0.5	0	0	2.)

1.) DNV Requirement
2.) Hammerwerk Erft requirement

3. The forging process is to be 3 dimensional and with a minimum total reduction ratio of 4,5 : 1.

4. Upon renewal of this SPA the isotropy is to be documented on a test piece taken from a forged product. Documentation to be made by Charpy V tests in three directions and the results to be within +/- 10% of the average.

5. The product are to be delivered with work certificate as specified in the MSA No. R-1678.

Place and date
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End of SPA