

APPROVAL OF MANUFACTURER CERTIFICATE

This is to certify:**That****Hüttenwerke Krupp Mannesmann GmbH
Ehinger Strasse 200, 47259 Duisburg, Germany**is an approved manufacturer of
Steelmakingin accordance with
**DNV GL rules for classification – Ships
DNV GL offshore standards**

and the following particulars:

Product	Semi-finished products; slabs and rounds for forging or rolling stock, see particulars of the approval
Grade(s)	Carbon and carbon-manganese, Alloy Nickel alloy
Steelmaking	Basic oxygen converter, Continuous casting
Deoxidation	Killed
Fine grain elements	See particulars of the approval

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 **2016-11-15**for **DNV GL**This Certificate is valid until **2019-12-31**.DNV GL local station: **Essen**Approval Engineer: **Christian Wildhagen**

**Thorsten Lohmann
Head of Section**

Particulars of the approval

Semi-finished products:

- **Slabs and rounds for forging stock (machinery applications)**

Steel type	Steelmaking	Fine grain treatment	Max. thickness (mm)
Carbon and carbon-manganese, Alloy	BOC, CC	Al or Al+Nb	Not applicable

BOC: Basic Oxygen Converter

CC: Continuous Casting

- **Slabs for rolling stock**

Grades	Steelmaking	Fine grain treatment	Max. thickness (mm)
Hull structural steel			
Normal strength steels	BOC, CC	Al	Not applicable
High Strength steels	BOC, CC	Al+Nb+Ti or Al+V+Nb+Ti or Al+Nb	
Extra high strength steels	BOC, CC	Al+Nb+Ti or Al+Nb	
Boiler and pressure vessel steel			
Carbon and carbon-manganese	BOC, CC	Al+Nb+Ti or Al+Nb	Not applicable
Alloy	BOC, CC	Al+Ti	
Steel for low temperature service:			
Carbon and carbon-manganese	BOC, CC	Al+V+Nb+Ti or Al+Nb	Not applicable
Alloy, Nickel alloy	BOC, CC	Al+Nb+Ti or Al	

BOC: Basic Oxygen Converter

CC: Continuous Casting