

APPROVAL OF MANUFACTURER CERTIFICATE

This is to certify:

That

Dannenmann GmbH
Heidenheim, Germany

is an approved manufacturer of
Steel Pipes and Fittings

in accordance with
DNV GL rules for classification – Ships

and the following particulars:

Product	Fittings (Elbows)
Application area	Piping fittings
Material type	Austenitic stainless, Ferritic-austenitic (Duplex) stainless, Ni-base Alloys
Manufacturing method	Cold forming, welding, see page 2
Max. outer diameter	See page 2
Max. wall thickness	See page 2
Heat treatment condition	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 GL classed object shall fulfill the material requirements in the applicable DNV GL class rules.

Issued at **Hamburg** on **2020-05-29**

This Certificate is valid until **2023-05-28**.

DNV GL local station: **Essen**

Approval Engineer: **Stefan Röhr**



for **DNV GL**

Digitally Signed By: Wildhagen, Christian

Location: DNV GL Hamburg, Germany

Signing Date: 2020-06-02, on behalf of

Thorsten Lohmann
Head of Section

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Particulars of the approval

Piping fittings (elbows)

Material type	Grade	Manufacturing method ¹⁾	Max. outer diameter [mm]	Max. wall thickness [mm]	Heat treatment condition ²⁾
Pipe fittings acc. EN 10253-4					
Austenitic	1.4307	CF, MAG	813	15	AW
	1.4306				
	1.4301				
	1.4541				
	1.4404				
	1.4571				
	1.4539				
	1.4547				
1.4529					
Pipe fittings acc. EN 10253-4					
Austenitic-ferritic (duplex)	1.4462	CF, MAG	813	15	AW
	1.4410	CF, GTAW			
	1.4501	CF, GTAW			
Pipe fittings in Ni Alloys acc. to customer specification					
Nickel Alloy	2.4068	CF, MAG	813	15	AW
	2.4360				
	2.4600				
	2.4602				
	2.4605				
	2.4610				
	2.4858				

Remarks:

- 1) CF: Cold forming;
MAG: Metal Active Gas (MAG) Welding;
GTAW: Gas Tungsten Arc Welding (GTAW)
- 2) AW: As welded