



APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM00000ZY
Revision No:
5

This is to certify:

That

TK Corporation

**117-12, Noksansaneop-daero, Gangseo-gu, Busan,
Republic of Korea**

is an approved manufacturer of
Steel Pipes and Fittings

in accordance with

DNV rules for classification – Ships

and the following particulars:

Product	Fittings
Application area	Piping fittings
Steel type	Carbon and carbon-manganese, Austenitic stainless, Ferritic-austenitic (Duplex) stainless
Manufacturing method	Hot formed, Cold formed
Max. outer diameter	See page 2
Max. wall thickness	See page 2
Heat treatment condition	See page 2
Additional approval conditions	Approved as independent heat treatment company, see page 3

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 **2022-10-07**

for **DNV**

This Certificate is valid until **2025-04-30**.

DNV local station: **Busan**

Approval Engineer: **Christian Wildhagen**

Thorsten Lohmann
Head of Section

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Particulars of the approval

Piping fittings

Steel type ³⁾	Grade	Manufacturing method ¹⁾	Max. outer diameter [mm]	Max. wall thickness [mm]	Heat treatment condition ²⁾
Pipe fittings made from pipes acc. EN 10216-1 and EN10216-2:					
C and C-Mn	P235TR2, P265GH	HFS, CFS	1220	60	N
Pipe fittings acc. EN 10253-3 and EN 10253-4					
Austenitic	1.4301, 1.4306, 1.4307, 1.4401, 1.4404, 1.4435, 1.4436, 1.4541, 1.4550	HFS, CFS	1220	60	SHT
Pipe fittings acc. ASTM A403					
Austenitic	WP304, WP304L, WP316, WP316L, WP321, WP347, UNS S31254	HFS, CFS	1220	60	SHT
Pipe fittings acc. JIS B 2312					
Austenitic	SUS304, SUS304L, SUS316, SUS316L, SUS321, SUS321	HFS, CFS	1220	60	SHT
Pipe fittings acc. ASTM B366					
Nickel Alloy	WPNCMC	HFS, CFS	1220	60	Acc. standard
Pipe fittings acc. ASTM A815					
Ferritic-austenitic (Duplex) stainless	UNS S31803, UNS S32750, UNS S32760	HFS, CFS	1220	60	SHT

Remarks:

- 1) HFS: hot finished seamless
CFS: cold finished seamless
- 2) N: Normalised
SHT: Solution Heat Treated (solution annealing)
- 3) Incl. equivalent grades in acc. to other standards given in DNV-RU-Ship Pt.2 Ch.2 Sec.5 [6]

Approval scope for Independent Heat Treatment Company

Item	Description
Product type	Steel Pipes and Fittings
Steel Type	Carbon and carbon-manganese, Alloy, Austenitic stainless Ferritic-austenitic (Duplex) stainless
Maximum Loading Weight	Furnace No. 8011: 5 ton Furnace No. 8018: 5 ton
Max. Thickness	Carbon and carbon-manganese: 63 mm Alloy: 30 mm Austenitic stainless: 31 mm
Heat Treatment Type	Furnace No. 8011: Solution heat treatment, Quenching, Normalizing, Tempering, Stress relieving Furnace No. 8018: Normalizing, Tempering, Stress relieving
Furnace Details	Car bottom type, Working zone (mm): Furnace No. 8011: Length 5 500, Width 4 000, Height 2 500 Furnace No. 8018: Length 1 800, Width 4 360, Height 2 000
Heat Treatment Procedure	Doc. No. HP-TK-DNV-01 Rev.01 dtd. 2018-12-11
Temperature Uniformity Survey Procedure	Doc. No. UF-TK-DNV-01 Rev.01 (8011) dtd. 2018-12-11 Doc. No. UF-TK-DNV-01 Rev.01 (8018) dtd. 2018-12-11