

TYPE APPROVAL CERTIFICATE

Certificate No:
TAP00001JC
Revision No:
2

This is to certify:

That the Pipe Flange, Welded Connection

with type designation(s)
High Pressure Hydraulic Flanges

Issued to

Parker Hannifin Manufacturing Germany GmbH & Co. KG
Bielefeld, Germany

is found to comply with

DNV rules for classification – Ships Pt.4 Ch.6 Piping systems
DNV-OS-D101 – Marine and machinery systems and equipment, Edition July 2021
ISO 6162-1:2012 – Hydraulic fluid power – Flange connections with split or one-piece flange clamps and metric or inch screws – Part 1: Flange connectors, ports and mounting surfaces for use at pressures of 3,5 MPa to 35 MPa, DN 13 to DN 127
ISO 6162-2:2018 – Hydraulic fluid power – Flange connections with split or one-piece flange clamps and metric or inch screws – Part 2: Flange connectors, ports and mounting surfaces for use at a pressure of 42 MPa (420 bar), DN 13 to DN 76
ISO 6164:2018 – Hydraulic fluid power – Four-screw, one-piece square flange connections for use at pressures of 42 MPa, DN 25 to 80

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Temperature range: -55°C up to +400°C
Max. working press.: up to 420bar

Issued at **Hamburg** on **2023-08-03**

This Certificate is valid until **2028-08-02**.

DNV local unit: **Essen**

for **DNV**

Approval Engineer: **Hagen Markus**

Sven Klingner
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") 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.



Product description

Flange connections conforming to ISO 6162-1/2 and ISO 6164. Detailed design as specified in Section M of Parker Hannifin Catalogue 4100/UK.

Overview

Flange type ¹	Fitting connection	Type designation
SAE Flange clamps	Not applicable	FHS, FUS, FUSM, FHSF, FUSF
SAE Flange adapters	EO24° cone end	GFS, WFS
	BSPP 60° cone end	GFS-G, WFS-G
	Male NPT thread	GFS-N
	O-Lok ORFS end	L(O)HQ, L(O)EMQ, L(O)VQ
	Triple-Lok 37° flare end	XHQ, XEMQ, XVQ
	But weld end	ASR, AS, ASL, WAS
	Socket weld end	ES, ESL
SAE full flanges	BSPP Female thread	PFF-G, PCFF-G, PAFSF-G, PEFF-G
	Female NPT thread	PFF-N, PCFF-N, PEFF-N
	EO 24° cone end	PFF-...S/L, PAFG-90M
	BSPP 60° cone end	PAFG-G-90G, PAFG-G
	Triple-Lok 37° flare end	PAFG-X, PAFG-90X
	O-Lok ORFS end	PAFG-L, PAFG-90L
	But weld end	PAFS-B, PGFS-B, PAFS-90B
	Socket weld end	PAFS-S, PGFS-S, PAFSF-S, PAFS-90S
	Complete flange connections	PDFS-G, PDFS-B, PDFS-S
SAE Flange accessories	Not applicable	PCFF, PCCFF, CPM, AP, PMQ flat, PMQ, PAGL-(G/M), PRF
ISO 6164 Square Flanges	Not applicable	PSFC, PSFA-B, PSFP, PSF-B, PDSF-B

Note

¹ Gear pump and flanges made of aluminium are not included in this certificate.

For the following fittings limitations as specified in the Rules Pt.4 Ch.6 are to be observed:

Flanges with threaded sealing connections are limited in the application as follows:

Pipe connector design	Range of application ¹	
..with tapered or parallel thread	not approved for toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur	
..with parallel thread	approved for pipe class III	up to outside diameter 60.3mm
..with tapered thread	approved for pipe class I	up to outside diameter 33.7mm
	approved for pipe class II, III	up to outside diameter 60.3mm

Note

¹ Refer to DNV Rules, Pt.4 Ch.6 – Section 9 – 5.2.6.

This is applicable to the following flange types:

Type	Designation
GFS-G	BSPP 60° cone end
WFS-G	
GFS-N	Male NPT thread
PFF-N, PCFF-N, PEFF-N	Female NPT thread
PAFG-G, PAFG-90G	BSPP 60° cone end

All other flanges not listed above are approved and not limited in the application.

Materials

The tables below specify the standard types of materials.
 For detailed material designation refer to Parker Hannifin Catalogue 4100UK, Section C.

Component	Material designation
Flange, bolts	Carbon steel
	Stainless steel
Sealing	Elastomeric seal of NBR, FKM

Tubes

For selection of the tubes refer to Parker Hannifin Catalogue 4100/UK, Section R - Tubes.
 In addition the minimum wall thicknesses specified in the DNV Ship Rules Pt.4 Ch.6, Section 9, Tables 2 (carbon steel) and 3 (stainless steel) are to be observed.

Selection of materials

It shall be noted that the selection of the materials considers the applicable service condition with respect to type of media, flow velocity, media temperature and installation area of the piping system.
 In particular, the resistance to corrosion, erosion, oxidation and other deterioration during projected service life are to be considered.

The standard stainless-steel materials 1.4571, 1.4404, 1.4571 or 1.4401 are not approved for application in sea water systems or unprotected installation on the open deck.
 For these applications stainless materials with a minimum pitting resistance equivalent number (PREN) of > 33 shall be used. Reference is made to "Parker Hannifin catalogue 4100/UK, Section C – "Special Materials".

In addition to the above it shall be noted that for the selection of the materials the intended service condition and installation area of the piping system is to be considered.
 In particular, the resistance to corrosion, erosion, oxidation and other deterioration which may occur during intended service life.

Material certificates

Component	Pipe class	Design temperature ≤ 400°C
Flanges, bolts	I, II, III	Material test report MTR ¹
Tubes	I	MC issued by Society ²
	II, III	
	I, II, III	DN<50

Note

¹ Type 2.2 inspection certificate in accordance with ISO 10474, ² Type 3..2 inspection certificate in accordance with ISO 10474
³ Type 3..1 inspection certificate in accordance with ISO 10474

Production sites

This certificate includes in addition the following production places:

Parker Hannifin Sp.z.o.o. ul.
 Eugeniusza Kwiatkowskiego 16, PL- 55011 Siechnice, Poland

Responsibility

Parker Hannifin Manufacturing Germany GmbH & Co. KG takes the responsibility for the design and the production procedures with relation to ensuring continued consistent production of the type approved products.
 Reference DNV CP-0338 Type approval scheme, Section 4.

Application/Limitation

The Parker Hannifin High Pressure Hydraulic Flanges are type approved for application in pipe class I, II and III piping systems.

The flange connection is classified as “Compression couplings, flared type” according to DNV Ship Rules Pt. 4 Ch. 6, Sec. 9- Table 8 Examples of mechanical joints.

Range of application according to Table 9 Application of mechanical joints. Connectors with elastomeric seals are limited to application in piping systems with classification “fire endurance test not required.”

In general, mechanical joints are not approved for application in high pressure fuel injection systems of combustion engines.

For installation on Offshore units the requirements specified in the applicable DNV Rules for classification of Offshore units (RU-OU) are to be observed.

Size and pressure range

Size range	ISO standard / Pressure series
DN13 up to DN127	ISO 6162-1 – 3000 PSI Series
DN13 up to DN76	ISO 6162-2 – 6000 PSI Series
DN25 up to DN80	ISO 6164 – 420 bar Series

Note

Nominal pressure for the individual flange sizes according to the Parker Hannifin Catalogue 4100/UK – Chapter N.

Temperature range

The temperature range for the Hannifin High Pressure Hydraulic Flanges are limited by the soft sealing selected for the flanges. Refer to “Parker Hannifin catalogue 4100/UK, Section C”.

Material	Temperature range
Steel	-20°C ¹ up to +250°C
Stainless steel	-55°C up to +400°C
NBR	-35°C / -40°C ² up to +100°C / +120°C ²
FKM	-25°C / -35°C ² up to +200°C

Notes

¹ Lowest medium temperature. Lowest environmental temperature -40°C. Reference DIN 3859-1 Compression couplings Part 1 Technical delivery conditions

² Permitted Ambient temperature.

Temperature range examples

Flange made of steel with NBR sealing	Media: -20°C up to +100°C Ambient: -40°C up to +120°C
Coupling made of stainless steel FKM sealing	Media: -25°C up to +200°C Ambient: -35°C up to +200°C

Assembling and Installation

For assembling and installation the “Parker Hannifin catalogue 4100/UK, Section F” is to be observed.

Type Approval documentation

Tests carried out

DNV CP-0185

Tightness test, Burst pressure and cyclic endurance testing.

Marking of product

For traceability to this type approval the individual components delivered by Parker are to be marked at least with:

Component	Example
Flange	Parker identification sign, size
Trap seal / O-Ring	Color NBR: black, FKM: green

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment to verify that the conditions for the Type Approval are complied with. Refer to the Class Programme DNV-CP-0338, Sec.4.

In addition burst tests according to CP-0185 are to be carried out in the presence of DNV surveyor.

To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>

End of certificate