

TYPE APPROVAL CERTIFICATE**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 GL rules for classification – Ships Pt.4 Ch.6 Piping systems**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 GL.****Temperature range: Refer to certificate.****Max. working press.: up to 420bar. Refer to certificate.**Issued at **Hamburg** on **2018-09-25**This Certificate is valid until **2023-09-24**.for **DNV GL**DNV GL local station: **Hamburg**Approval Engineer: **Hagen Markus**.....
**Olaf Drews
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.



Product description

Flange connections conforming to ISO 6162-1/2 and ISO 6164. Detailed design as specified in Section N of Parker Hannifin Catalogue 4100-11/DE.

Overview

Flange type	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
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
	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

The following flange types are not included in this certificate:

- Socket weld end adapters and socket weld full flanges,
- Gear pump flanges
- Aluminium flanges

Materials

The table below specify the standard types of materials.

For detailed material designation refer to Parker Hannifin Catalogue 4100-11/DE, Section N9.

Component	Materials ¹
Flange	Carbon steel
	Stainless steel ²
Sealing	Elastomeric seal of NBR, FKM

Notes

¹ Special materials acc. to Parker Hannifin overview "List of material grades" are included.

² For application in sea water systems and unprotected installation against green sea on open deck stainless steel grades with a minimum pitting resistance equivalent number (PREN) of > 33 shall be used. Reference is made to Parker Hannifin overview "List of material grades".

Material certificates

Component	Pipe class	Design temperature $\leq 400^{\circ}\text{C}$
Flanges and bolts	I, II, III	Material test report TR ¹

Note

¹ Type 2.2 inspection certificate acc. to ISO 10474 is accepted.

Application/Limitation

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

Refer to DNV GL Ship Rules Pt. 4, Ch. 6, Sec. 9 Table 9 Type of flange connections.

The flanges are not approved for application in high pressure fuel injection systems of combustion engines.

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

- Parallel thread are not approved for pipe class I and II.
- Tapered or parallel thread is not approved for toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur.
- Tapered thread connections are approved in pipe class I up to pipe outside diameter not more than 33.7mm and up to 60.3mm for pipe class II and III.

Refer to DNVGL 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
PPF-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.

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.

Reference is made to DNVGL Rules Pt.4, Ch.6 – Section 2 – Materials.

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 4100-11/DE – 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 4100-11/DE, Section C2.

Material	Minimum allowable Temperature	Maximum allowable Temperature
Steel	- 40°C	+ 250°C
Stainless steel	- 55°C	+ 400°C
NBR	-35°C / -40°C ¹	+ 100°C / +120°C ¹
FKM	-25°C / -35°C ¹	+ 200°C

Notes

¹ Ambient temperature of hydraulic and pneumatic applications.

Operating temperature range examples

- Carbon steel flange with NBR sealing: - 35°C up to +100°C
- Stainless steel flange with FKM sealing: - 25°C up to +200°C

Assembling and Installation

For assembling and installation the Parker Hannifin Catalogue 4100-11/DE, section F is to be observed.

Type Approval documentation

Miscellaneous documents

Tests carried out

Marking of product

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

Component	Marking/Identification criteria
Flange	Parker identification sign, size
Trap seal / O-Ring	Colour NBR: black FKM: green

Periodical assessment

For retention of the type approval certificate periodical assessments shall be carried out at production places by DNVGL surveyor.

The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered.

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Certificate No: **TAP00001JC**

Main scope of the assessment:

- verification of the production and quality control system
- review of quality control documentation of recent deliveries
- review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application
- verification of the product marking

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

In connection with the renewal assessment, burst pressure tests on test assemblies are to be carried out in the presence of the DNV GL surveyor.

The test assemblies shall consist of two pieces of tubing connected with a mechanical joint of straight type. Selection of joint sizes and quantity of test assemblies is to be determined prior to the assessment.

At least one of the test assemblies is to be manufactured in the presence of the surveyor according to the manufacturers specification.

End of certificate