

TYPE APPROVAL CERTIFICATE

This is to certify:

that the **Expansion Joint for Pipe, Slide Type and Flexible Type**

with type designation(s)

Dresser Type F-1 and F-3, Dresser Type F-2, Sleeve Type F-S and F-SL, Dresser Type F-R (fire resistant)

issued to

Taiyo Joint Co., Ltd.
Kitakyushu, FUKUOKA, Japan

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

DNV class programme DNV-CP-0185 – Type approval – Mechanical joints

Application:

Products approved by this certificate are accepted for installation on vessels classed by DNV.

Type:	Temperature range:	Max. working press.:	Sizes:
Dresser Type F-1 and F-3	0°C to 100°C	10 barg	40 to 600 mm
Dresser Type F-2	0°C to 100°C	10 barg	40 to 1500 mm
Sleeve Type F-S and F-SL	0°C to 150°C	5/10/16 barg	40 to 350 mm
Dresser Type F-R (fire resistant)	0°C to 150°C	5/10/16 barg	25 to 400 mm

Issued at **Høvik** on **2024-08-21**

This Certificate is valid until **2029-05-20**.

for **DNV**

DNV local unit: **Hiroshima**

Approval Engineer: **Andreas Hansen**

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

Slip-on joints - Slip type for connection of pipes.

Sleeve Type F-S & F-SL: Sleeve type expansion joints for pipes; Non-fire resistant.

Material: Body: FCD450-10
Sleeve: SUS304
Sleeve Flange: SS400
Packing: Graphite / Glass fibre / Aramid fibre

Dresser Type F-1 / F-2 / F-3: Dresser type expansion joint for pipes; Non-fire resistant.

Material	F-1	F-2	F-3
Socket	FCD450-10	SS400	SS400
Flange	FCD450-10	SS400	FCD450-10
Gasket/packing	SBR / NBR		

Dresser Type F-R: Dresser type expansion joint for pipes; Fire resistant.

Material: Socket: SS400/STKM13A/STPG370/SUS304
Flange: SS400/SUS304
Gasket/Packing: NBR/EPDM/FKM

Application/Limitation

The slip-on joints (Slip type) are approved and are allowed for Class II and III below piping systems:

1) Flammable fluids (flash point $\leq 60^{\circ}\text{C}$) - Cargo oil lines ⁽⁴⁾ - Crude oil washing lines ⁽⁴⁾ - Vent lines ⁽³⁾ 2) Inert gas - Water seal effluent lines - Scrubber effluent lines - Main lines ^{(2) (4)} - Distributions lines ⁽⁴⁾ 3) Flammable fluids (flash point $> 60^{\circ}\text{C}$) - Cargo oil lines ⁽⁴⁾ - Fuel oil lines ^{(2) (3)} - Lubricating oil lines ^{(2) (3)} - Hydraulic oil ^{(2) (3)} - Thermal oil ^{(2) (3)} 4) Fresh water - Cooling water system ⁽¹⁾ - Condensate return ⁽¹⁾ - Non-essential system	5) Sea water - Bilge lines ⁽¹⁾ - Water filled fire extinguishing systems, e.g. sprinkler systems ⁽³⁾ - Non water filled fire extinguishing systems, e.g. foam, drencher systems ⁽³⁾ - Fire main (not permanently filled) ⁽³⁾ - Ballast system ⁽¹⁾ - Cooling water system ⁽¹⁾ - Tank cleaning services - Non-essential systems 6) Sanitary/drains/scuppers - Deck drains (internal) ⁽⁶⁾ - Sanitary drains 7) Sounding/vent - Water tanks/dry spaces - Oil tanks (f.p. $> 60^{\circ}\text{C}$) ^{(2) (3)} 8) Miscellaneous - Service air (non-essential) - Brine - Steam ⁽⁵⁾
If mechanical joints include any components which may readily deteriorate in case of fire, they are to be of an approved fire resistant type under consideration of the following footnotes: (1) Inside machinery spaces of category A - only approved fire resistant types. (2) Not inside machinery spaces of category A or accommodation spaces. May be accepted in other machinery spaces provided the joints are located in easily visible and accessible positions. (3) Approved fire resistant types except in cases where such mechanical joints are installed on exposed open decks, as defined in SOLAS II-2/Reg. 9.2.3.3.2.2(10) and not used for fuel oil lines. (4) Not permitted in pump rooms and open decks. Footnotes - General: (5) May be used for pipes on deck with a design pressure of 10 bar or less. (6) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships.	

Slip-on joints type F-S, F-SL, F-1, F-2, F-3 have not been fire tested and are not considered fire proof.

The joints are to be assembled and mounted according to manufacturer's instructions.

Rubber elements and other parts subject to wearing to be replaced by new parts in case of repeated use of the joints.

Material designation SUS 304 shall not be used in direct contact with sea water.

The materials used in the joints must be resistant to the fluid carried in the pipe and to the surrounding fluid if the joints are mounted in a tank.

Allowable temperature range for the joints are dependent on the sealing material as specified in table below:

Type of joint	Sealing Material	Maximum allowable temperature °C
Dresser Type F-1 / F-2 / F-3	SBR (Styrene-butadiene Rubber)	40
	NBR (Nitrile Butadiene Rubber)	100
Sleeve Type F-S & F-SL	Glass fibre	150
	Aramid fibre	150
	Graphite	150
Dresser Type F-R	NBR (Nitrile Butadiene Rubber)	100
	EPDM (Ethylene Propylene Diene terpolymer)	80
	FKM (Fluorelastomers, e.g. Viton)	150

For elevated temperatures the maximum allowable pressure is to be reduced according to reduction factors specified in table below:

Temperature °C	20	50	100	150
Carbon steels	1	1	1	0.89
Stainless steels	1	0.95	0.85	0.77

Type Approval documentation

Test report HIR-10-4065, Renewal test report dated 2010-03-24, Fire test reports dated 2011-12-20, Renewal test report HIR-14-4221 dated 2013-12-20, Renewal test report, date 2017-12-20.

Drawings: 111450 Rev.1 (Dresser Type Expansion Joint, Free type F-R, 2020-04-20), 101398 Rev.1 (Sleeve Type Expansion Joint, 5K F-S, 2020-04-21), 101399 Rev.1 (Sleeve Type Expansion Joint, 10K F-S, 2020-04-21), 101400 Rev.1 (Sleeve Type Expansion Joint, 5K F-SL, 2020-04-21), 101401 Rev.1 (Sleeve Type Expansion Joint, 10K F-SL, 2020-04-21), 101402 Rev.1 (Sleeve Type Expansion Joint, 16K F-SL, 2020-04-21), 100369 Rev.1 (F-1 Type, 2020-04-21), 100370 Rev.1 (F-2 Type, 2020-04-21), 100371 Rev.1 (F-3 Type, 2020-04-21)

Tests carried out

Dresser Type F-1, F-2, F-3: Tightness and burst test / Sleeve Type F-S, F-SL: Tightness and burst tests

Dresser Type F-R: Tightness, burst, vacuum and fire tests

Marking of product

For traceability to this type approval, the products are to be marked with:

- Manufacturer's name or trademark
- Type designation.
- Size.
- Max. design pressure or pressure class

Periodical assessment

This certificate is only valid if required periodical assessments are carried out with satisfactory results.

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNV-CP-0338.

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