



Certificate no.:  
**TAD00001JX**

# TYPE APPROVAL CERTIFICATE

**This is to certify:**  
**that the Miscellaneous**

with type designation(s)  
**Expansion Joint, 20in. OD, 550mm OAL, Dwg. No. 0952, Rev. 10**  
**Expansion Joint, 28in. OD, 550mm OAL, Dwg. No. 0951, Rev. 13**

issued to  
**A.R. Thomson Engineered Solutions Inc.**  
**Surrey, BC, Canada**

is found to comply with  
**DNV-OS-E201 – Oil and gas processing systems, Edition July 2021**

## Application:

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

Issued at **Houston** on **2024-02-01**

for **DNV**

This Certificate is valid until **2029-01-31**.

DNV local unit: **Vancouver**

Approval Engineer: **M. Kevin Mandeville Jr.**

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.



**The following codes and standards were used as a reference:**

EJMA, *Standards of the Expansion Joint Manufacturers Association, Inc.*, 10<sup>th</sup> Edition  
 DNV's Class Program, DNV-CP-0185, *Mechanical Joints*, 2021 Ed.

**Product description**

Flanged and Reinforced Expansion Joints in 20in and 28in nominal diameters, with an overall length of 550mm each

**Application/Limitation**

Design Parameters	Value	Equivalent
Maximum Allowable Working Pressure	1765 kPa	256 psi
Hydrostatic Test Pressure	2647.5 kPa	384 psi
Minimum Design Metal Temperature	-29°C	-20°F
Design Metal Temperature	80°C	176°F
Corrosion Allowance	0mm	0in
Overall Length	550mm	21.65in
Axial Movement Limit	35mm	1.38in
Lateral Movement Limit	2mm	0.08in
Angular Movement Limit	0deg	
Cycle Limit	7000 Cycles	
Heat Treatment	None	

**Type Approval documentation**

**Drawings**

Dwg. Number	Revision	Description
4T0951	13	28in Limited Expansion Joint x 550mm OAL
4T0952	10	20in Limited Expansion Joint x 550mm OAL
AR0869	00	DN500 and DN700 JIS 16K Slip-On Flanges

*Note: Other part numbers or updated revisions may be acceptable under this certificate, provided that the critical aspects of the design remain the same. Changes shall be documented and approved, via Engineering Change Notice or similar, by the manufacturer's engineering and/or quality department as appropriate. DNV's local surveyor shall verify the change before issuance of the Product Certificate.*

**Calculations**

Document Number	Revision	Description
CAL0951A	02	28in Inner Bellows Design Calculations
CAL0951B	01	28in Outer Bellows Design Calculations
CAL0952A	02	20in Inner Bellows Design Calculations
CAL0952B	01	20in Outer Bellows Design Calculations
CAL0951C	01	28in Joint Lug Design Calculations
CAL0952C	01	20in Joint Lug Design Calculations

### Tests carried out

Type testing carried out on 20in expansion joint with Serial No. TAD00001JX-04 and 28in expansion joint with Serial No. TAD00001JX-09.

### Marking of product

For traceability, the following marking is to be carried out on each product:

1. Serial Number
2. Manufacturer's name or trademark
3. Additional Marking at Manufacturer's discretion

### Periodical assessment

For retention of this Type Approval, DNV's Surveyor shall perform periodical assessment after two and after three-and-a-half years in accordance with DNV's Class Programme DNV-CP-0338.

### Other Conditions/Comments

1. Procedures related to testing, welding, NDT, and other quality control requirements are to be reviewed and approved by DNV's local surveyor.
2. DNV Ref: A1336788

END OF CERTIFICATE