

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Valve for Liquefied Gas

with type designation(s)
Camfex 35000 1" - 12" cryogenic regulation/throttle valves

Issued to

DRESSER PRODUITS INDUSTRIELS SAS
Condé sur Noireau, France

is found to comply with
DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers
DNV GL class programme DNVGL-CP-0186 – Type approval – Valves

Application :

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

Issued at **Høvik** on **2017-11-24**

This Certificate is valid until **2022-10-07**.

DNV GL local station: **Le Havre**

for **DNV GL**

Approval Engineer: **Mehdi Rowshan**

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Marianne Marveng
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

This type approval certificate covers the Camflex 35000 range of regulation/throttle valves manufactured by GE Energy-Dresser Produits Industriels intended for LNG/LPG service.

Types:	Maximum design pressure:
1" Flanged class 150	12.5 bar
1.5" Flanged class 150	12.5 bar
2" Flanged class 150	10 bar
3" Flanged, class 150	10 bar
3" Flangeless, class 150	15 bar
4" Flanged class 150	11.5 bar
4" Flanged class 300	25 bar
6" Flanged class 150	11.5 bar
6" Flangeless class 150	10 bar
8" Flangeless class 150	10 bar
10" Flangeless class 150	10 bar
12" Flangeless class 150	10 bar
12" Flanged class 150	10 bar

Min./Max. design temperature: -196/+20 °C

Design:

All valves are rotary control valves with a circular body and a rotary motion disk obturator, pivotally supported by its shaft. Valves are actuated via a diaphragm/spring and lever arm. Valves are operated via a solenoid or can be manually operated by a handwheel.

Valves are designed to EN 1349 and the body/strength calculations follow EN 12516-1.

Materials:

Part / Material	Grade
Body Stainless Steel	A351 CF3M – 1" to 6" , 12" : flanged valves A351 CF8M – 3", 6", 8", 10", 12" flangeless valves
Shaft Stainless Steel	A479 type 316
Disc Cobalt based alloy Stainless Steel + Cobalt based alloy	Stellite 6 Alloy – 1", 1.5" and 2" valves ASTM A479 316L + Stellite 6 Alloy – 3" to 12" valves
Packing	Carbon core braided PTFE

Application/Limitation

This type approval does not cover the valves actuators or operating gear for remote control of the valves.

Valves covered by this certificate are not considered fire safe & are not be installed in systems where fire safe applications are required.

Prototype Testing

Cryogenic prototype testing is required for valves intended for LNG/LPG application. Testing in this case was conducted to GE Energy-Dresser Produits Industriels internal procedure SC 148 referencing ANSI FCI 70-2 Control Valve Seat Leakage.

- Hydrostatic testing of the valve body was undertaken at 1.5x maximum allowable working pressure.
- Stem seal leakage testing was undertaken at 1.1x maximum design pressure.
- Seat leakage testing was undertaken at 3.5 bar following ANSI FCI 70-2 Test Procedure A for Class IV valves – see the following limitations.

In light of the reduced cryogenic seat leakage testing, these valves are only to be used where complete shut-off of the process flow is not required. The valves covered by this type approval certificate are not designed to hold the full line pressure. Due consideration should be given to this fact when considering their use in any system.

Production Testing

Each valve housing shall be subjected to production testing (hydrostatic testing of valve body plus seat leakage) according to the procedure and requirements of EN12266-1:2012 (rate A).

In addition to the above tests, cryogenic testing (in the presence of the Society's representative – for valves which need DNV GL certificate) consisting of valve operation and leakage verification for a minimum of 10% of each type and size of valve intended to be used at a working temperature below -55°C shall be undertaken (DNV GL Ship Rules P.5 Ch.7 Sec.5 [13.1.1]).

Certification

Valve bodies shall be delivered with VL material certificate for sizes greater than 4" (DN>100) and minimum design temperature less than -55°C. Otherwise, it shall be delivered with work certificate (W).

Materials with VL and W certificates shall be manufactured in an approved manufacturer by the society. All valves which DN≥100 (sizes not smaller than 4") or working temperature below -55 °C shall be delivered with DNV GL product certificate. Otherwise manufacturer's certificate is required.

Type Approval documentation

Flanged Camflex 35000 – 1" class 150	35000 Flanged valve, DN 25, CL 150, pressure shell material: ASTM A 351 Gr CF3M
Flanged Camflex 35000 – 1.5" class 150	35000 Flanged valve, DN 40, CL 150, pressure shell material: ASTM A 351 Gr CF3M
Flanged Camflex 35000 – 2" class 150	35000 Flanged valve, DN 50, CL 150, pressure shell material: ASTM A 351 Gr CF3M
Flanged Camflex 35000 – 3" class 150	35000 Flanged valve, DN 80, CL 150, pressure shell material: ASTM A 351 Gr CF3M
Flangeless Camflex 35000 – 3" class 150	35000 Flangeless valve, DN 80, CL 150, pressure shell material: ASTM A 351 Gr CF8M
Flangeless Camflex 35000– 6" class 150	35000 Flangeless valve, DN 150, CL 150, pressure shell material: ASTM A 351 Gr CF8M
Flangeless Camflex 35000– 8" class 150	35000 Flangeless valve, DN 200, CL 150, pressure shell material: ASTM A 351 Gr CF8M
Flangeless Camflex 35000– 10" class 150	35000 Flangeless valve, DN 250, CL 150, pressure shell material: ASTM A 351 Gr CF8M
Flangeless Camflex 35000– 12" class 150	35000 Flangeless valve, DN 300, CL 150, pressure shell material: ASTM A 351 Gr CF8M
Flanged Camflex 35000 – 4" class 150	35000 Flanged valve, DN 100, CL 150, pressure shell material: ASTM A 351 Gr CF3M
Flanged Camflex 35000 – 4" class 300	35000 Flanged valve, DN 100, CL 300, pressure shell material: ASTM A 351 Gr CF3M
Flanged Camflex 35000 – 6" class 150	35000 Flanged valve, DN 150, CL 150, pressure shell material: ASTM A 351 Gr CF3M
Flanged Camflex 35000 – 12" class 150	35000 Flanged valve, DN 150, CL 150, pressure shell material: ASTM A 351 Gr CF3M

Tests carried out

Cryogenic prototype testing (note that seat leakage testing was undertaken following ANSI FCI 70-2 and the test pressure was limited to 3.5 bar – see application/limitations).

Marking of product

The open or closed position of the valve should be easily visible and the direction of manual operation must be clearly marked.

Each valve shall be clearly marked for identification. The identification marking may be performed on the body or on a plate of non-corrosive material. When a metallic plate is used, the plate shall be permanently fixed to the body.

Identification marking on the body shall be located to nonstressed areas and shall be clearly legible. The identification marking shall as a minimum include the following:

- manufacturer's name or trade mark
- valve type designation
- size
- maximum design pressure
- arrow to indicate direction of flow on one way flow valves.

Periodical assessment

For retention of the Type Approval, a DNV GL 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 DNVGL-CP-0338.