

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Hydraulic Cylinders**with type designation(s)
Double Acting Hydraulic Cylinders

Issued to

Forum U.S. Inc, dba DYNACON
Bryan, TX, USAis found to comply with
DNV GL class guideline DNVGL-CG-0194 – Hydraulic cylinders**Application :****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**

Design pressure (push)	See Page 2
Design pressure (pull)	See Page 2
Cylinder sizes	See Page 2

Issued at **Houston** on **2018-11-19**This Certificate is valid until **2023-11-18**.for **DNV GL**DNV GL local station: **Certification & Inspection Services**Approval Engineer: **Ronald Quiballo**

Nick Prokopuk
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

Double acting hydraulic cylinders:

Type	Max work press. push	Max work press. pull	Cylinder sizes
5" Bore 3" Rod Toggle Cylinder	3,000 psi	3,000 psi	5"
6" Bore 4" Rod Trunion Mounted Cylinder	3,000 psi	3,000 psi	6"
8" Bore 4" Rod Hydraulic Cylinder	3,000 psi	3,000 psi	8"
8" Bore 4.5" Rod Hydraulic Cylinder	3,000 psi	3,000 psi	8"
8" Bore 4.5" Rod (5201/5301) Hydraulic Cylinder	3,000 psi	3,000 psi	8"
10" Bore 4.5" Rod Hydraulic Cylinder	3,000 psi	3,000 psi	10"
10" Bore 5" Rod Hydraulic Cylinder	2,750 psi	2,750 psi	10"
12" Bore 5.5" Rod Hydraulic Cylinder	3,000 psi	3,000 psi	12"

Application/Limitation

Design temperature(min/max): -20 °C / 121 °C

All welding is to be carried out by qualified welders and according to approved welding procedures. Non-destructive testing of all welds are to be performed according to DNVGL-CG-0194 - Hydraulic Cylinders. Minimum requirement to NDT is UT and MT.

Materials for the pressure containing parts are to meet Charpy V-notch energy values of minimum 27J at minimum design temperature.

This is a renewal of Type Approval P-14867 issued 2014-05-10

Type Approval documentation

Production test and Certification

Each cylinder is to be hydraulically pressure tested to 1.5 times of the design pressure and be delivered with a DNV GL product certificate. The test pressure is to be applied on both sides of the piston in sequence. Testing are to be in accordance with to DNVGL class guideline CG-0194 - Hydraulic Cylinders in presence of DNV GL surveyor.

Materials for cylinder tube, piston rod, and end covers shall be delivered with 3.1 material certificates (according to EN 10204 or equivalent).

Marking of product

The hydraulic cylinders are to be marked with manufacturer's name or trademark, type designations and serial number.

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.