

# Chemical Injection Throttle Valve (CTV)

## High Flow (CTV-HF)

CTVs provide continuous, controlled subsea injection of chemicals into the well stream. The valves are remotely operated and ROV retrievable.



### FEATURES

**Field proven - more than 1,100 valves subsea**

**Self cleaning design - no subsea filtration required**

**Accurate flow over a long service life**

## Technical data:

General		Mechanical design	
Part number / name	CTV-HF	Design life	30 years
Type	High flow	1 in couplers Pressure rating	6,670 psi/460 bar
1 in couplers		½ in couplers Pressure rating	10,000 psi/690 bar
Minimum flow rate*	2 liters/min Turndown ratio (dependent on flow rates and viscosity)	Water depth	11,155 ft/3,400 m
Maximum flow rate*	200 liters/min 65:1 (typical)	Size - length	36 in/910 mm + ROV handle for ½ in couplings, 37.6 in/955 mm + ROV handle for 1 in couplings
½ in couplers		Size - OD	6.7 in/170 mm
Minimum flow rate*	2 liters/min Turndown ratio (dependant on flow rates and viscosity)	Weight - in air	~174 lb/79 kg (½ in couplings)
Maximum flow rate*	110 liters/min 35:1 (typical)	Weight - in water	~150 lb/ 68 kg (½ in couplings)
Flow measurement accuracy (%)**	± 5-10% of full scale flow (FSC)	Temperature rating - design	14 to 158° F -10 to 70° C
Flow measurement type - primary	Differential pressure: absolute pressure sensors at each end of a variable restriction	Temperature rating - electronic	-0.4 to 158° F -18 to 70° C
Flow measurement type - secondary	Look up chart	Temperature rating - operating	23 to 104° F -5 to 40° C
Minimum differential pressure for accurate flow measurement	290 psi, 20 bar	Temperature rating - storage	-4 to 122° F -20 to 50° C
1 in couplers Maximum differential pressure	6,670 psi/460 bar	Debris tolerance / fluid cleanliness	Class 12B-F
½ in couplers Maximum differential pressure	10,000 psi/690 bar	Min/max restrictor opening	0.04 in / 0.18 in 1 mm / 4.5 mm
Maximum differential pressure while operating the motor	5,000 psi/345 bar	Inlet screen / filter size	No filters required
Time of full travel (close to open)	~ 20 min	Design standards	ISO 13628-6 (API 17F)
Valve failure mode	Fail as is, flow rate can be controlled with differential pressure		

## Materials

### External parts wetted by sea water

Valve body	Super duplex (UNS S32750)
Hydraulic couplings	Nitronic 50 (UNS S20910), ToughMet® (3 at 110)
Fasteners	Inconel 625 (UNS N06625)

### Internal parts wetted by chemicals

Flow parts	SuperDuplex (UNS S32750), Ceramic FZM, Nitronic 50, AISI 316
Pressure sensor	Inconel 625 (UNS N06625)
Hydraulic couplings	Nitronic 50 (UNS S20910), Monel K500 (UNS N05500), ToughMet® (3 at 110)

## Other parts

Seals - chemical to sea water	PTFE, NBR, PEEK
Seals - chemical to internal	PTFE, NBR, PEEK
Seals - seawater to electronics	NBR, Silver plated metal seal
Hydraulic couplers	National 1/2" or 1" UO- series metal/ chemraz seal, PEEK poppet seal / crown seal, bleeding poppets or no poppets
Electronics housing	1 atmosphere nitrogen filled
Electrical connector	Tronic or ODI
Cleaning method	FlushThrough

## Electrical Design

Motor type	Stepper
Gear type	Harmonic gear
Input voltage	24 +/- 4 VDC
Power consumption - Operating, Motor running	Typical 9 W (max 12 W)
Power consumption - Idle	Typical 1.7 W (max 3 W)
Inrush current at power up	230-250 mA (for ~200 ms)
Position indicator	Calculation of position based on stepper motor drive pulses
Redundant position indicator	Proximity switch detecting gear output movement
Communication Protocol	RS485 Modbus, Canbus (CiA 443 SII S L2), Canbus (CiA 401), Profibus
Pressure Transmitter Accuracy	Absolute accuracy < +/- 0.25 bar (within all operating conditions)

\* Max/Min flow can vary depending on viscosity.

\*\* The flow measurement accuracy is dependent of differential pressure and known viscosity. These numbers are conservative, and accuracy better than 2.5 % of FSC flow is typical.

\*\*\* Fluid with high viscosity may require less differential pressure.



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