

# Directional Control Valve



Directional Control Valves (DCV) are used to position the control rods as a part of the BWR control rod drive system. DCV type 2538 was designed to original specifications and fits exactly into the existing mounting configuration of the BWR Hydraulic Control Unit with no hardware modification needed.

Proven design with no reported malfunctions since initial installation in 1999.

Seitz provides spare parts, replacement solenoids and maintenance services for the DCVs. No preventative maintenance required throughout the qualified lifetime of 20 years in operation.

## Qualifications

<b>Safety class</b>	2
<b>Seismic category</b>	I
<b>Electrical class</b>	1E passive
<b>Seismic</b>	4.95 g; 8 to 31.5 Hz
<b>Radiation</b>	$3 \times 10^5$ rad (40 years)
<b>Qualification and design bases</b>	IEEE 323-1974; IEEE 382-1980; IEEE 344-1987; ASME III NC Edition 95; SPTE/97/004 Rev. 1; GSKL SS-001 1-3 Rev. 1
<b>Qualified lifetime</b>	20 years

## Harsh environment

<b>Medium temperature</b>	138 °C (280.4 °F)
<b>Pressure</b>	138 bar (2001 psig)
<b>Ambient temperature</b>	85 °C (185 °F)
<b>Relative humidity</b>	100%

## Specifications

<b>Solenoid type 2F25</b>	
<b>Rated voltage</b>	24 to 250 V AC/DC
<b>Tolerance</b>	+10% / -15%
<b>Rated power</b>	12 W / 12 VA
<b>Frequency range</b>	48 to 62 Hz
<b>Ingress degree</b>	IP 55 (NEMA 3S/4)
<b>Weight</b>	0.510 kg (1.124 lbs)
<b>Ambient temperature</b>	-20 to 60 °C (-4 to 140 °F)

## NPP references

<b>Leibstadt</b>	Switzerland
<b>Mühleberg</b>	Switzerland

## Specifications

<b>Valve type 2538</b>	
<b>Operating system</b>	Pilot operated with system media fluid
<b>Function</b>	2-way, NC
<b>Fluid</b>	Dem mineralized water
<b>Nominal diameter</b>	7 mm (0.28 in)
<b>Flow coefficient Kv (Cv) (throttle fully open)</b>	0.48 (0.55)
<b>Flow rate (throttle fully open)</b>	0.48 m <sup>3</sup> /h (2.11 gpm)
<b>Reverse flow differential pressure</b>	0.45 bar (6.5 psig)
<b>Max. differential pressure</b>	137 bar (1987 psig)
<b>Testing overpressure</b>	207 bar (3002 psig)
<b>Design temperature</b>	138 °C (280.4 °F)
<b>Open/Close time</b>	< 50 ms / < 400 ms
<b>Pressure range</b>	6 to 138 bar (87 to 2002 psig)
<b>Ambient temperature</b>	4.4 to 49 °C (40 to 120 °F)
<b>Leakage</b>	Max. 0.12 NI/h (2 scc/min)
<b>Weight</b>	2.8 kg with throttle (6.2 lbs) 2.6 kg w/o throttle (5.7 lbs)
<b>Material</b>	Body: 316L (EN 1.4435) Elastomers: FKM
<b>Mounting Details (SIL No. 678. Nov. 30<sup>th</sup> 2015)</b>	4 x cap screws with GEOMET 500 <sup>®</sup> coating