

PRESSURE LOCKING EVALUATION FOR REQUIRED PULLOUT FORCE (for Double Disc Split Wedge)

= INPUTS

MOV

2-FCV-63-25

Valve type =

DD Split Wedge

ARK No. 380jB

VALVE DWG 93-12859

EPRI NP-6516 Calc Meth

VALVE DESIGN DATA $\mu = 0.4$

theta (A) = 0 deg

a = 1.8438 inches

ro = 0.625 inches

b = 0.625 inches

v = 0.3

(D) Mean Seat Dia $(D1+E1)/2 =$

3.6875 in

(d) Stem Dia =

1.825 in

(S2) Valve Seat Area $((D)^2 \cdot \pi / 4 =$ 10.68 (in)²(Vf) $\mu / (\cos A + \sin A) =$

0.4000

(St3) Stem Area $((d)^2 \cdot \pi / 4 =$ 2.07 (in)²

(PI) Packing Load (Calculated) =

1625 lbs

(PI) Packing Load (Actual, average) =

0 lbs

EPRI MOV PPP INTERNAL DESIGN INFO, Ref. _____

D1 E1 M1

4.5 2.875 1.25

a = $((D1 + E1) / 2) / 2 = 1.84375$ b = $M1 / 2 = 0.625 = ro$

v = Poisson's Ratio = 0.3

 μ = seating surfaces friction coef
based on Calc method. & EPRI resultstheta = 1/2 total valve
disk angleValve Seat Area Based on:
D1, E1PRESSURE and TEMPERATURE DATA

(Pb) Pbon =

2735 psi

(Pu) P up =

2600 psi

(Pd) P down =

0 psi

DP =

2600 psid

PRESSURE INDUCED, PRESSURE LOCKING THRUST REQUIREMENT:

$$\text{THRUST} = [\{ (Pb - Pu) + (Pb - Pd) \} \cdot (S2) \cdot (Vf)] - [(ST3) \cdot (Pb)] + PI + \text{UNWEDGING}$$

WHERE: Pb = Pressure in valve Bonnet
Pu = Pressure upstream of Valve
Pd = Pressure downstream of Valve

UNWEDGING = 0 lbs

S2 = Valve Seat Area
Vf = Valve Friction Factor
St3 = Stem Area
PI = Packing load (maximum value)

THRUST = 8213 lbs

PRESSURE INDUCED, P L - MAXIMUM BONNET PRESSURE @ ACT/VALVE LIMITING CAP

$$\text{PRESSURE} = \{ A/VLIMTH + (S2 \cdot Vf \cdot (Pu + Pd)) - PI \} / \{ (2 \cdot S2 \cdot Vf) - St3 \}$$

PRESSURE = 3991 psi

PRESSURE LOCKING REQUIREMENT =

8213 lbs

ACTUATOR/VALVE CAPABILITY EVALUATION

CALCULATION:

2-FCV-63-25

Actuator Model

SMB-0

Motor Start Torque (MT)

15 ftlbs

Overall Gear Ratio (OGR)

87.2

Pullout Efficiency (PE)

40 %

Application Factor (AF)

0.9 or 1.0

1

Valve Factor (VF)

1.0 or (VF/460)**2

0.6383

367.5VAC

Stem Factor (SF)

0.0187

Max Temperature (Temp)

215 F

Loss Percentage (elevated temp)

21.4 %

Note 1

Torque Loss Factor = $1 - \text{Loss}\% \cdot (\text{Temp} - 104) / (356 - 77)$

0.9149

Actuator Torque Capability = $(\text{MT} \cdot \text{OGR} \cdot \text{PE} \cdot \text{AF} \cdot \text{TLF} \cdot \text{VF})$

305.53 ftlbs

SF =

Actuator Thrust Capability = Torque/Stem Factor

16338 lbs

0.0187

Actuator Thrust /Torque Rating

33600 lbs

500.00 ftlbs

Valve Weak Link Thrust/Torque Rating

49870 lbs

SF =

932.57 ftlbs

0.0187

Seismic Thrust/Torque Rating

33600 lbs

SF =

628.32 ftlbs

0.0187

Note 1: Reference: Limitorque Technical Update 93-03

RESULTS:

PRESSURE LOCKING REQUIREMENT =

8213 lbs

ACTUATOR / VALVE LIMITING CAPABILITY =

16338 lbs

1 CUT = MOTOR CAP

COMMENTS:

Rev.

Prepared:

Checked: