



TELEDYNE
TEST SERVICES
A Teledyne Technologies Company

Sixth Annual QUIKLOOK Users Group Meeting

August 15th & 16th, 2012

Marion, Massachusetts



TELEDYNE
TEST SERVICES
A Teledyne Technologies Company

AOV Software

ACE Fundamentals

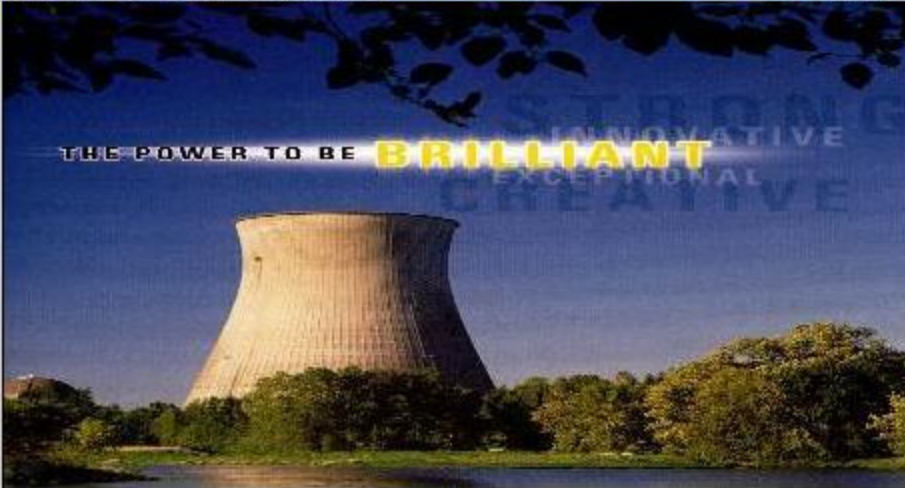
QUIKLOOK Users' Group


2012 Annual Meeting

August 15-16, 2012
Tabor Academy
Marion, MA




Exelon AOV Program (2012.53)



ACE 4.0 

- Limerick
- Peach Bottom
- Braidwood
- Byron
- Dresden
- LaSalle
- Quad Cities
- Clinton
- Three Mile Island
- Oyster Creek
- Verification 2011

ACE DP 

- Limerick
- Peach Bottom
- Braidwood
- Byron
- Dresden
- LaSalle
- Quad Cities
- Clinton
- Three Mile Island
- Oyster Creek
- Verification 2011

Integrated

Design Calculation Software ACE

Test Analysis Software ACETEST

ACE - ZZ-RSTESTCASE

File Edits Tables References Help

ZZ-RSTESTCASE **Globe - Balanced - Flow Over - Down to Close**
Diaphragm - Direct Acting

Packing Accessories Adjustment Factors Output
General Configuration Valve Actuator

Parameter	Dir	Value	Ref
Calculation Number		80054-1	1
Calculation Revision		0	1
System		011	2
Name		Name	3
Fail Position		Open	6
Media		Water	7
Flow Diagram / P&ID		P&ID	8
Max. Fluid Temperature (Deg F)		100	9
Line Pressure Upstream	(C)	200.00	10
Line Pressure Upstream	(O)	100.00	11
Line Pressure Downstream	(C)	20.00	12
Line Pressure Downstream	(O)	10.00	13
Category		1	14
Air System Name		Air System	15
Stem Material		Stainless Steel	16
Young's Modulus (E)		29,000,000	17
Poisson's Ratio (v)		0.290	18

General Comments
Discussion on the method used to determine the line pressures. - LP Discussion

Eric Solla 08/01/2011 13:06 NOT APPROVED N/A

ACETest for ACE & Manual Input Valves - All Plants - ALL VALVES

File Tables Tools Help

FCV-006-112A **Globe - Pilot - Flow Over**
Diaphragm - Direct Acting

Design Rev: 0 Preparer: Eric Solla Verifier: NOT APPROVED

FUNCTION	OPEN	Last Edit	SIGNOFF	Last Signoff	PRINT
Pre-Test		07/26/12 09:33		N/A	
Post Test Evaluation		07/30/12 12:47		N/A	

Add New Work Order

Work Order	AOVDR Rev	Test Date	Test of Record
NEW W/O	2	1/1/2000	...
NEW W/O	1	1/1/2000	...
NEW W/O	0	1/1/2000	...



- 2009 – Purchase ACE 3.0 from Areva
- 2011 – ACE 4.0 Beta
 - New User Interface Similar to Midas
 - Calcs and Methodologies Stay Same as ACE 3.0
 - Added many of the Standard Midas Features
- 2012 – ACE 4.0 Release



- ACE DP
 - Separate program
 - Same functionality as ACE 3.0 system module



Functionality Review for V&V-TESTCASE

Edits Print Exit

General Information Configuration Licensing Basis / Plant Doc Review Scenarios

Parameter	Dir	Value	Ref	
Calculation Number		TTS-CC-166.1	1	
Calculation Revision		0	1	
System		Test System	46	
Valve Name		System Test Calc	47	
P&ID / Flow Diagram		M-202	36	
Normal Position		Open	35	
Fail Position		Open	34	
Safety Position		IC	41	
Category		1C	33	

Open Functional Description

This valve has an ACTIVE safety function in the CLOSED position to provide reactor coolant pressure boundary integrity.

Close Functional Description

The valve has no safety function in the OPEN position.

Functional Review Comments

No Comments

Rich Enos 12/03/2011 08:12 NOT APPROVED N/A



DP Calculation for V&V-TESTCASE (Readonly)

Edits Print Exit

General Information	Scenario Details	DP Review		
Scenario: 1 Direction: <input type="text" value="Open"/> Basis: <input type="text" value="Beyond Design Basis"/>		<input type="button" value="Previous"/> <input type="button" value="Next"/>		
Name: <input type="text" value="From Close to Open"/>		<input type="checkbox"/> Not Calculated		
Media: <input type="text" value="Two-Phase"/>		Calculated Line Pressures		
Max Flow: <input type="text" value="120"/> units: <input type="text" value="GPM"/>				
Temperature: min: <input type="text" value="212"/> max: <input type="text" value="677"/>		Upstream (LPUP) <input type="text" value="322.4"/> psig.		
Alternate Line Pressures (psig):		$LPUP = UPR + (UPSE + UPH - VE) \times \frac{UD}{144}$		
Upstream: <input type="text" value="0.0"/> Downstream: <input type="text" value="0.0"/>		Downstream (LPDN) <input type="text" value="10.1"/> psig.		
Upstream		$LPDN = DPR + (DPSE - VE) \times \frac{DD}{144}$		
Density: (UD) <input type="text" value="12.81"/> lbs/ft3 (DD) <input type="text" value="8.62"/> lbs/ft3		Differential Pressure (DP) <input type="text" value="312.3"/> psig. (LPUP_LPDN)		
Pump Head: (UPH) <input type="text" value="14"/> ft.				
Pressure: (UPR) <input type="text" value="317.60"/> psig. (DPR) <input type="text" value="10.12"/> psig.		<input type="text"/>		
Elevation: (UPSE) <input type="text" value="650"/> ft. (DPSE) <input type="text" value="610"/> ft.				
<input type="text" value="9"/> in. <input type="text" value="5"/> in.		Reference for: <input type="text"/>		
Upstream Pressure Source: <input type="text" value="The water level in the pressurizer is conservatively assumed to be at the tc"/>				
Downstream Pressure Source: <input type="text" value="The downstream pressure is containment pressure."/>				
Dave Thrall		12/13/2011 16:32	NOT APPROVED	N/A



Design Calculation Software

- Inputs (General, Valve, Operator, Accessories & others)
- Calculated Outputs
- Input References
- Tools
- Margins
- Reports
- Documentation

General

ACE - ZZ-RSTESTCASE

File Edits Tables References Help

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Eric Solla 08/01/2011 13:06 NOT APPROVED N/A



Configuration

ACE - ZZ-RSTESTCASE

File Edits Tables References Help

ZZ-RSTESTCASE

Globe - Balanced - Flow Over - Down to Close
Diaphragm - Direct Acting

Packing Accessories Adjustment Factors Output

General Configuration Valve Actuator

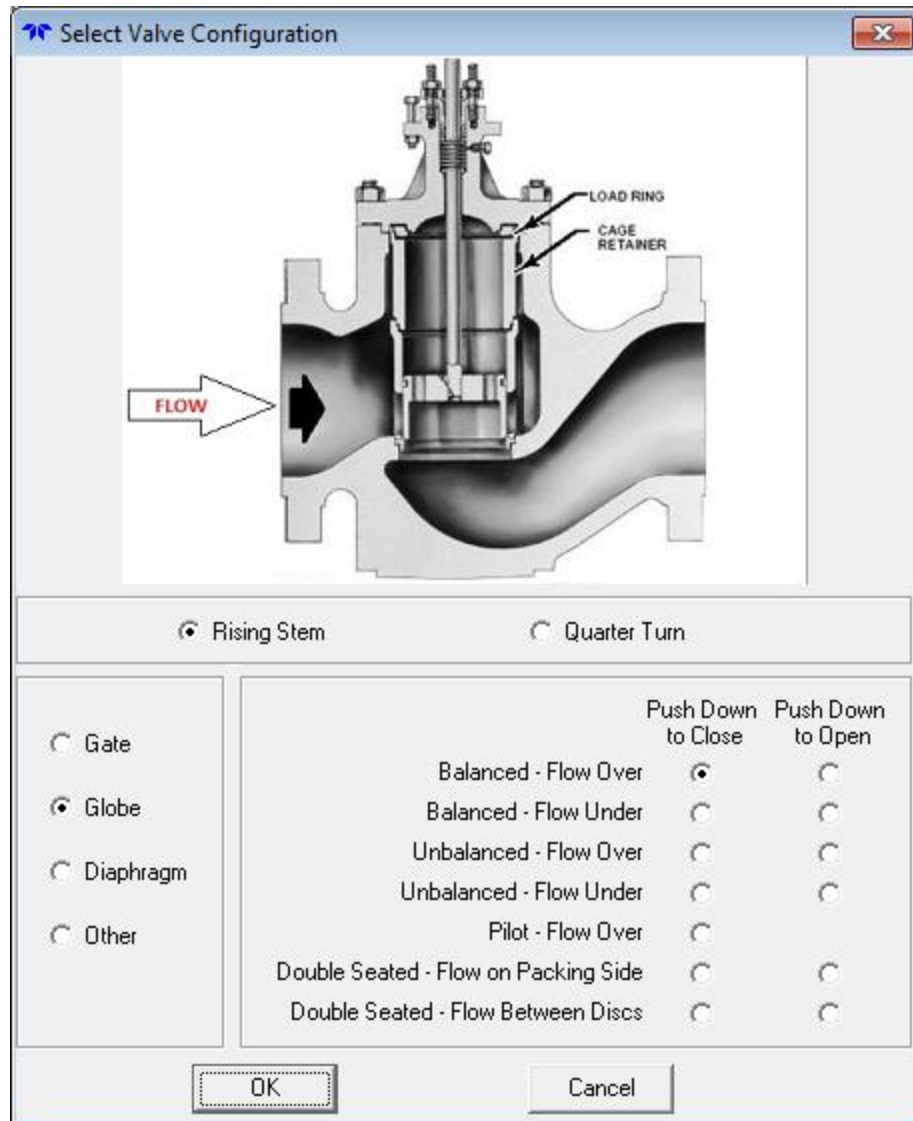
Parameter	Dir	Value	Ref
Valve Configuration		Rising Stem	4
Valve Type		Globe	4
Bal / Unbal / Dbl Seated / Pilot		Balanced	4
Flow Diection		Flow Over	4
Valve Action		Push Down to Close	4
Actuator Type		Diaphragm	5
Actuator Action		Direct	5

N/A

Eric Solla 08/01/2011 13:06 NOT APPROVED N/A

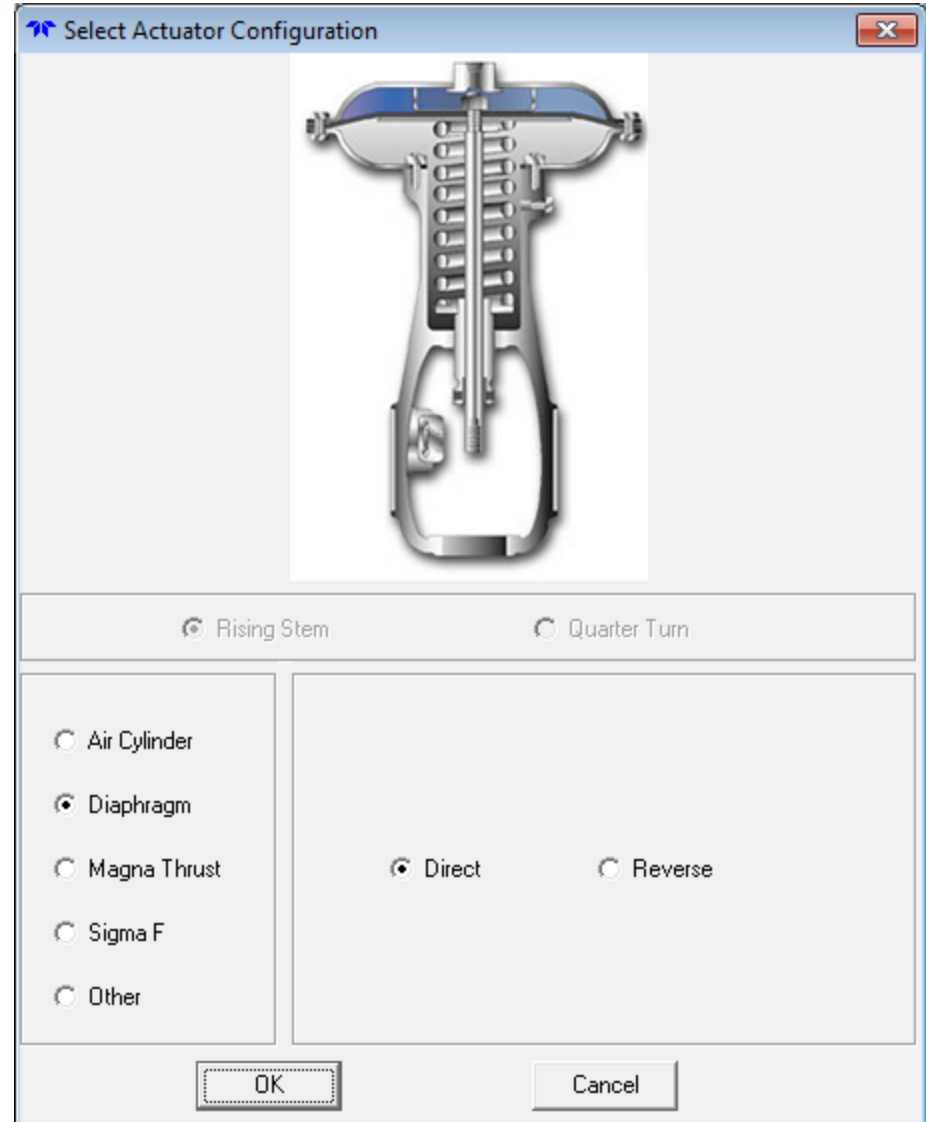


Valve Configuration





Actuator Configuration





Configuration

ACE - ZZ-RSTESTCASE

File Edits Tables References Help

ZZ-RSTESTCASE

Globe - Balanced - Flow Over - Down to Close
Diaphragm - Direct Acting

Packing Accessories Adjustment Factors Output

General Configuration Valve Actuator

Parameter	Dir	Value	Ref
Valve Configuration		Rising Stem	4
Valve Type		Globe	4
Bal / Unbal / Dbl Seated / Pilot		Balanced	4
Flow Diection		Flow Over	4
Valve Action		Push Down to Close	4
Actuator Type		Diaphragm	5
Actuator Action		Direct	5

N/A

Eric Solla 08/01/2011 13:06 NOT APPROVED N/A



Valve

ACE - ZZ-RSTESTCASE

File Edits Tables References Help

ZZ-RSTESTCASE

Globe - Balanced - Flow Over - Down to Close
Diaphragm - Direct Acting

Packing Accessories Adjustment Factors Output
General Configuration **Valve** Actuator

Parameter	Dir	Value	Ref
Manufacturer		Valve Manufacturer	2
Model		Model	3
Shop Order Number		SO Number	5
Serial Number		Serial	6
Valve Type		N/A	1
Size		4.00	4
DP Load used in MRSTC Calc	(C)	Alternate	1
Alternate value to use for the DP Load	(C)	200.0	10
DP Load used in MRSTO Calc	(O)	Calculated	1
Alternate value to use for the DP Load	(O)	100.0	9
Seal Friction Option		Alternate	1
Seal Ring Coefficient		0.000	1
Number of Seal Rings.		0	1
Seal Ring Width.		0.000	1
Static Seal Force.		0.0	1
Alternate Dynamic Seal Friction		0.0	1
Maximum Allowable Thrust (Weak Link)	(C)	12,000	14
Maximum Allowable Thrust Component	(C)	Close Component	16
Maximum Allowable Thrust (Weak Link)	(O)	11,000	15

Basis for the additional load input. - ALC Basis
Basis for the additional load input. - ALO Basis
Basis for the selection of the Cracking Option - Cracking Basis
Basis for the selection of the DP Load Close Option - DBLCBasis
Basis for the selection of the DP Load Open Option - DPLOBasis

Eric Solla 08/01/2011 13:06 NOT APPROVED N/A

Actuator

ACE - ZZ-RSTESTCASE

File Edits Tables References Help

ZZ-RSTESTCASE **Globe - Balanced - Flow Over - Down to Close**
Diaphragm - Direct Acting

Packing Accessories Adjustment Factors Output
General Configuration Valve **Actuator**

Parameter	Dir	Value	Ref
Manufacturer		Actuator Manufacturer	2
Model		Act Model	3
Size		Act Size	4
Shop Order Number		Act SO Number	5
Serial Number		Act Serial Number	6
Actuator Stem Diameter		0.750	1
Actuator Rated Travel		6.000	7
Diaphragm Effective Area - Extended		0.00	1
Diaphragm Effective Area - Extended - Tol (%Dec)		0.000	1
Diaphragm Effective Area - Retracted		0.00	1
Diaphragm Effective Area - Retracted - Tol (%Dec)		0.000	1
Actuator Spring Part Number		N/A	1
Fully Compressed (Solid) Spring Length		0.00	1
Spring free length (Uncompressed)		0.00	1
Maximum Safe Spring Force		0.0	1
Min and Max Spring Rate Calc Option		Vendor Supplied (lbf/in)	1
Measured Nominal Spring Rate		0.0	1
Uncertainty Associated with Measured Spring		0.00	1
Vendor Supplied Nominal Spring Rate		600.0	1

Notes on the Actuator Inputs - Actuator Comments
Basis for selecting the Option for Piston Breakaway Force - FB Basis
Basis for selection the Air Pressure Option - Air Pressure Discussion

Eric Solla 08/01/2011 13:06 NOT APPROVED N/A



Accessories

The screenshot shows the 'ACE - ZZ-RSTESTCASE' software window. The 'Accessories' tab is selected, and the 'Accumulator' sub-tab is active. The interface includes a menu bar (File, Edits, Tables, References, Help), a dropdown menu for 'ZZ-RSTESTCASE', and a status bar at the bottom with fields for user name, date, and approval status.

Configuration details:
Globe - Balanced - Flow Over - Down to Close
Diaphragm - Direct Acting

Navigation tabs: General, Configuration, Valve, Actuator, Packing, **Accessories**, Adjustment Factors, Output

Sub-tabs: Limit Switch, Positioner, SOV, **Accumulator**, Air Regulator, Booster

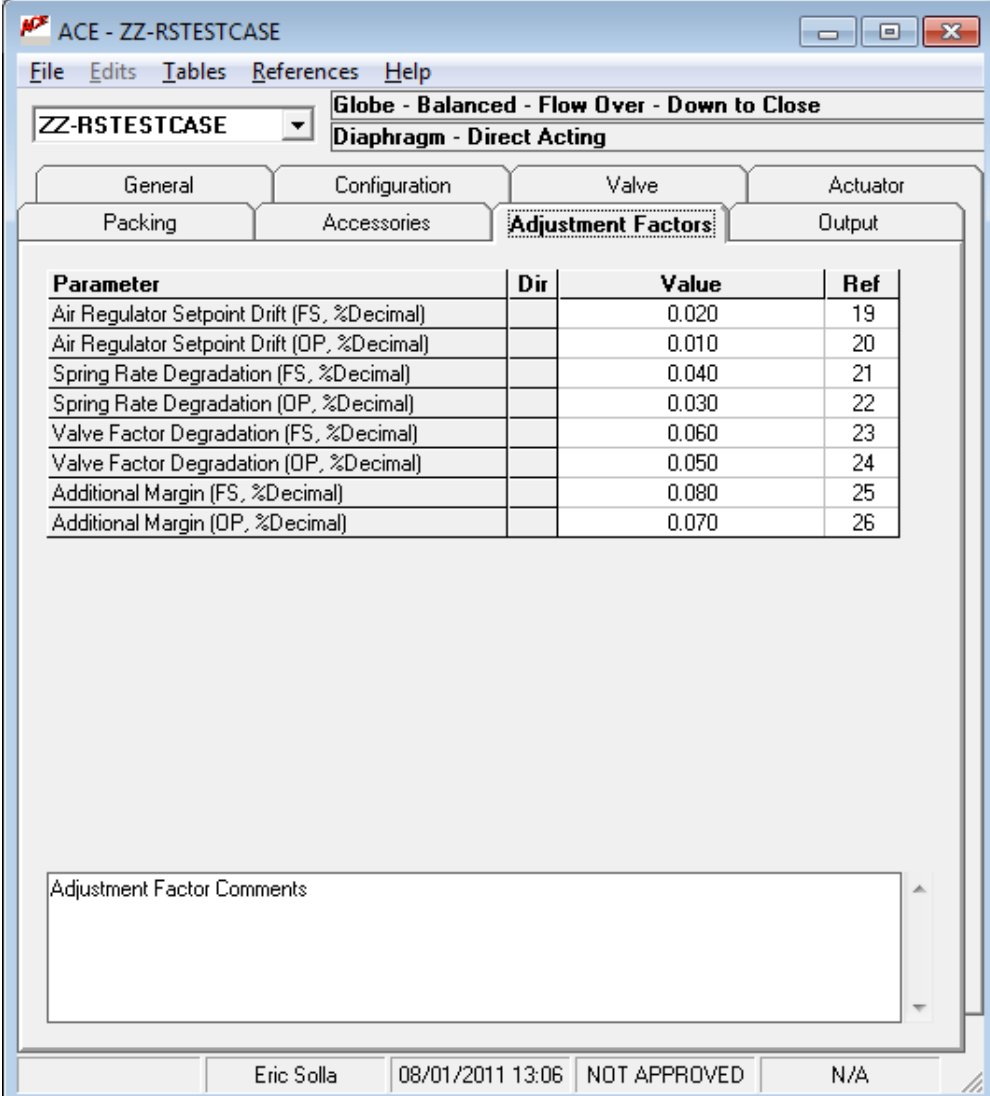
Buttons: Add Accumulator, Delete Accumulator

Parameter	Dir	Value	Ref
Equipment ID		Accumulator 1	1
Manufacturer		Accumulator Manuf	2
Model Number		Accum Model	3
Shop Order Number		Accum SO Number	4
Serial Number		Accum SN	5
Accumulator Length		36.00	6
Accumulator Capacity		7.1	7
Maximum Rated Pressure		250.0	8

N/A

Eric Solla | 08/01/2011 13:06 | NOT APPROVED | N/A

Adjustment Factors



ACE - ZZ-RSTESTCASE
 File Edits Tables References Help
 ZZ-RSTESTCASE
 Globe - Balanced - Flow Over - Down to Close
 Diaphragm - Direct Acting

General Configuration Valve Actuator
 Packing Accessories **Adjustment Factors** Output

Parameter	Dir	Value	Ref
Air Regulator Setpoint Drift (FS, %Decimal)		0.020	19
Air Regulator Setpoint Drift (OP, %Decimal)		0.010	20
Spring Rate Degradation (FS, %Decimal)		0.040	21
Spring Rate Degradation (OP, %Decimal)		0.030	22
Valve Factor Degradation (FS, %Decimal)		0.060	23
Valve Factor Degradation (OP, %Decimal)		0.050	24
Additional Margin (FS, %Decimal)		0.080	25
Additional Margin (OP, %Decimal)		0.070	26

Adjustment Factor Comments

Eric Solla 08/01/2011 13:06 NOT APPROVED N/A



- **Other Inputs** (Depending on Valve & Actuator Configuration)
 - Packing
 - Dynamic
 - Alt Dynamic
 - Alt Actuator
 - Coefficients



Outputs - Rising Stem

The screenshot shows the ACE software interface for a valve configuration. The window title is "ACE - ZZ-RSTESTCASE". The configuration is for a "Globe - Balanced - Flow Over - Down to Close" valve with a "Diaphragm - Direct Acting" actuator. The "Output" tab is selected, displaying a table of parameters and their values.

Parameter	Dir	Value
Valve Stem Area		0.79
Valve Seat Area		0.00
Seating Load		0
Packing Load		1,000
DP Load (Closing) (FS)		0
DP Load (Closing) (OP)		0
DP Load (Opening) (FS)		0
DP Load (Opening) (OP)		0
Dynamic Seal Force (Close)		0
Dynamic Seal Force (Open)		0
Total Seal Force Close		0
Total Seal Force Open		0
Min Req'd Thrust to Close (FS)		0
Min Req'd Thrust to Close (OP)		0
Min Req'd Thrust to Open (FS)		0
Min Req'd Thrust to Open (OP)		0
Min Req'd Thrust at Fully Open (FS)		1,000
Min Req'd Thrust at Fully Open (OP)		1,000
Spring Preload (Minimum)		713

N/A

Eric Solla 08/01/2011 13:06 NOT APPROVED N/A

Margin Review

Margin Review - Globe - Balanced - Flow Over - Down to Close

Optimize Exit

Capability Margin | Pressure Rating | Spring Margin | Weak Link | Setpoints

	Close	Open	Full Open	
Operability Margin				
Min. Required Thrust (MRST):	0	0	1,000	lbf.
Actuator Output (FA):	0	0	0	lbf.
Margin (Margin):	0.0	0.0	0.0	%
Setup Margin				
Min. Required Thrust (MRST):	0	0	1,000	lbf.
Actuator Output (FA):	0	0	0	lbf.
Margin (Margin):	0.0	0.0	0.0	%

Optimize Setup

Optimized Setup Range ✕

Exit

OPTIMIZED SETUP RANGES FOR 0% MARGINS
FOR INFORMATION ONLY
ZZ-RSTESTCASE

FAIL POSITION: Open ACTION: Push Down to Close

	Minimum	Maximum	
Spring Preload	<input type="text" value="0"/>	<input type="text" value="0"/>	lbf.
Lower Bench Set	<input type="text" value="0"/>	<input type="text" value="0"/>	psig.
Air Set	<input type="text" value="0"/>	<input type="text" value="0"/>	psig.

	Nominal		Tolerance
Spring Preload	<input type="text" value="0"/>	lbf +/-	<input type="text" value="0"/>
Lower Bench Set	<input type="text" value="0"/>	psig +/-	<input type="text" value="0"/>
Air Set	<input type="text" value="0"/>	psig +/-	<input type="text" value="0"/>

Based on the following Assumptions:

Actual Packing Load < lbf

lbf/in < Actual Spring Rate < lbf/in

sq in < Actuator Area Extended < sq in

sq in < Actuator Area Retracted < sq in

CHANGE: **TO:**



Minimum Required Thrust

Minimum Required Thrust - Diaphragm - Direct Acting

Print Exit

Parameter	Dir	Value	Units
Valve Stem Area		0.79	sq. in.
Valve Seat Area		0.00	sq. in.
Seating Load		0	lbf.
Packing Load		1,000	lbf.
Dynamic Seal Force (Close)		0	lbf.
Dynamic Seal Force (Open)		0	lbf.
Total Seal Force Close		0	lbf.
Total Seal Force Open		0	lbf.

Parameter	Dir	Operability	Setup	Units
DP Load (Closing)		0	0	psig.
DP Load (Opening)		0	0	psig.
Min Req'd Thrust to Close		0	0	lbf.
Min Req'd Thrust to Open		0	0	lbf.
Min Req'd Thrust at Fully Open		1,000	1,000	lbf.



Actuator Output

Actuator Output - Diaphragm - Direct Acting

Print Exit

Parameter	Dir	Value	Units
Spring Preload (Minimum)		713	lbf.
Spring Preload (Maximum)		788	lbf.
Min. Spring Rate (Derived)		540	lbf./in.
Max. Spring Rate (Derived)		660	lbf./in.
Upper Bench Set (Maximum)		3,758	lbf.
Minimum Air Pressure		0.00	psig.

Parameter	Dir	Operability	Setup	Units
Upper Bench Set (Minimum)		3,070	3,046	lbf.
Force Output to Retract		3,070	3,046	lbf.
Force Output to Extend		0	0	lbf.
Force Output at Fully Retracted		713	713	lbf.
Force Output at Fully Extended		-3,758	-3,758	lbf.

Outputs

- Quarter Turn

ACE Calculations for All Plants ALL VALVES

File Edits System Tables References Help

ZZ-QTTESTCASE Quarter Turn - Triple Offset - Shaft Upstream
Scotch Yoke - Spring Return - Fail Close

General Configuration Valve Actuator Accessories Adjustment Factors
Dynamic Alt Dynamic Alt Actuator Coefficients **Output**

Parameter	Dir	Value
Packing Torque - TP		6.0
Seating Torque - TS		211.5
Unseating Torque - TUS		211.5
Hydrostatic Torque - THS		0.0
Maximum Minimum Required Thrust to Close - MaxMRSTC_Fs		320.0
Maximum Minimum Required Thrust to Open - MaxMRSTO_Fs		330.0
Spring Preload (Minimum) - SPmin		0
Spring Preload (Maximum) - SPmax		0
Min. Spring Rate (Derived) - SRMin		0
Max. Spring Rate (Derived) - SRMax		0
Minimum Air Pressure - P Amin		0.00
Piston Breakaway Force - FB		0
Maximum Required Spring Preload (FS) - MaxSPReq_Fs		0.0
Maximum Required Spring Preload (OP) - MaxSPReq_OP		0.0
Maximum Required Actuator Supply Pressure (FS) - MaxPReq_Fs		0.0
Maximum Required Actuator Supply Pressure (OP) - MaxPReq_OP		0.0
Minimum Required Torque at Seating (FS) - TTS_Fs		320.0
Minimum Required Torque at Seating (OP) - TTS_OP		320.0
Minimum Required Torque at Unseating (FS) - TTUS_Fs		330.0
Minimum Required Torque at Unseating (OP) - TTUS_OP		330.0
Maximum Air Pressure - P Amax		150.00
Available Pressure vs. Design Pressure Limit (FS) - MPress_FS		-24.8
Available Pressure vs. Design Pressure Limit (OP) - MPress_OP		-30.3
Max. Spring Preload Allowed (FS) - SPAllowed_FS		0
Max. Spring Preload Allowed (OP) - SPAllowed_OP		0
Spring Preload Allowed vs. Max Spring Preload (FS) - MSpring_FS		0.0
Spring Preload Allowed vs. Max Spring Preload (OP) - MSpring_OP		0.0
Max Torque Output at Seating or Unseating (FS) - T Aseatmax_Fs		370.0
Max Torque Output at Seating or Unseating (OP) - T Aseatmax_OP		370.0
Max Require Torque at Seating or Unseating (FS) - T Amax_Fs		320.0
Max Require Torque at Seating or Unseating (OP) - T Amax_OP		320.0
Maximum Required Torque at Seat (FS) - TRFQDseatmax_Fs		330.0
N/A		

Eric Solla 08/09/2011 16:14 NOT APPROVED N/A

Margin Review

Margin Review															
Exit															
<u>Act Capability</u>		Pressure				Spring				Structural				Setpoints	
Angle (degrees)	Field Setup						Operability								
	MRT		TA		Margin		MRT		TA		Margin				
	Close (ft-lbs)	Open (ft-lbs)	Close (ft-lbs)	Open (ft-lbs)	Close (%)	Open (%)	Close (ft-lbs)	Open (ft-lbs)	Close (ft-lbs)	Open (ft-lbs)	Close (%)	Open (%)			
0	320.0	330.0	300.0	370.0	-6.3	12.1	320.0	330.0	300.0	370.0	-6.3	12.1			
1	17.0	0.0	257.0	320.0	1,411.8	0.0	17.0	0.0	257.0	320.0	1,411.8	0.0			
2	17.0	0.0	225.0	286.0	1,223.5	0.0	17.0	0.0	225.0	286.0	1,223.5	0.0			
3	17.0	0.0	202.0	257.0	1,088.2	0.0	17.0	0.0	202.0	257.0	1,088.2	0.0			
4	17.0	0.0	185.0	235.0	988.2	0.0	17.0	0.0	185.0	235.0	988.2	0.0			
5	17.0	0.0	171.0	219.0	905.9	0.0	17.0	0.0	171.0	219.0	905.9	0.0			
10	17.0	0.0	161.0	207.0	847.1	0.0	17.0	0.0	161.0	207.0	847.1	0.0			
15	17.0	0.0	154.0	198.0	805.9	0.0	17.0	0.0	154.0	198.0	805.9	0.0			
20	17.0	0.0	149.0	187.0	776.5	0.0	17.0	0.0	149.0	187.0	776.5	0.0			
25	17.0	0.0	147.0	190.0	764.7	0.0	17.0	0.0	147.0	190.0	764.7	0.0			
30	17.0	0.0	145.0	193.0	752.9	0.0	17.0	0.0	145.0	193.0	752.9	0.0			
35	17.0	0.0	146.0	195.0	758.8	0.0	17.0	0.0	146.0	195.0	758.8	0.0			
40	17.0	0.0	149.0	199.0	776.5	0.0	17.0	0.0	149.0	199.0	776.5	0.0			
45	17.0	0.0	153.0	208.0	800.0	0.0	17.0	0.0	153.0	208.0	800.0	0.0			
50	17.0	0.0	160.0	210.0	841.2	0.0	17.0	0.0	160.0	210.0	841.2	0.0			
55	17.0	0.0	169.0	211.0	894.1	0.0	17.0	0.0	169.0	211.0	894.1	0.0			
60	17.0	0.0	183.0	211.0	976.5	0.0	17.0	0.0	183.0	211.0	976.5	0.0			
65	17.0	0.0	198.0	212.0	1,064.7	0.0	17.0	0.0	198.0	212.0	1,064.7	0.0			
70	17.0	0.0	221.0	238.0	1,200.0	0.0	17.0	0.0	221.0	238.0	1,200.0	0.0			
75	17.0	0.0	223.0	261.0	1,211.8	0.0	17.0	0.0	223.0	261.0	1,211.8	0.0			
80	17.0	0.0	230.0	291.0	1,252.9	0.0	17.0	0.0	230.0	291.0	1,252.9	0.0			
85	17.0	0.0	234.0	295.0	1,276.5	0.0	17.0	0.0	234.0	295.0	1,276.5	0.0			
90	17.0	0.0	250.0	300.0	1,370.6	0.0	17.0	0.0	250.0	300.0	1,370.6	0.0			

Minimum Required Torque

Minimum Required Torque												
Exit	Constant Results				Angle Dependant Results				Choking			
Angle (degrees)	Hydrodynamic Torque		Bearing Torque				Eccentricity		Min Required Torque			
	TD	TD	TB FS	TB FS	TB Op	TB Op	TE	TE	MRST FS	MRST FS	MRST Op	MRST Op
	Close (ft-lbs)	Open (ft-lbs)	Close (ft-lbs)	Open (ft-lbs)	Close (ft-lbs)	Open (ft-lbs)	Close (ft-lbs)	Open (ft-lbs)	Close (ft-lbs)	Open (ft-lbs)	Close (ft-lbs)	Open (ft-lbs)
0	0.00	0.00	13.3	13.3	13.3	13.3	23.6	23.6	320.0	330.0	320.0	330.0
1	-1.19	1.19	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
2	-2.38	2.38	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
3	-3.56	3.56	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
4	-4.75	4.75	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
5	-5.94	5.94	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
10	-11.68	11.68	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
15	-18.02	18.02	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
20	-21.38	21.38	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
25	-29.11	29.11	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
30	-41.38	41.38	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
35	-54.05	54.05	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
40	-75.83	75.83	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
45	-106.52	106.52	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
50	-145.33	145.33	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
55	-205.92	205.92	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
60	-279.97	279.97	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
65	-382.14	382.14	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
70	-524.30	524.30	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
75	-684.49	684.49	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
80	-724.68	724.68	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
85	-643.50	643.50	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0
90	-425.25	425.25	11.0	11.0	11.0	11.0	23.6	23.6	17.0	0.0	17.0	0.0

Actuator Output

Actuator Output														
Exit														
Constant Results								Angle Dependant Results						
Angle (degrees)	Field Setup							Operability						
	TA	TA	TA Max	TA Max	PReq	PReq	SPReq	TA	TA	TA Max	TA Max	PReq	PReq	SPReq
	Close (ft-lbs)	Open (ft-lbs)	Close (ft-lbs)	Open (ft-lbs)	Close (psig)	Open (psig)	(lbf)	Close (ft-lbs)	Open (ft-lbs)	Close (ft-lbs)	Open (ft-lbs)	Close (psig)	Open (psig)	(lbf)
0	300.0	370.0	300.0	370.0	0.0	0.0	0.0	300.0	370.0	300.0	370.0	0.0	0.0	0.0
1	257.0	320.0	257.0	320.0	0.0	0.0	0.0	257.0	320.0	257.0	320.0	0.0	0.0	0.0
2	225.0	286.0	225.0	286.0	0.0	0.0	0.0	225.0	286.0	225.0	286.0	0.0	0.0	0.0
3	202.0	257.0	202.0	257.0	0.0	0.0	0.0	202.0	257.0	202.0	257.0	0.0	0.0	0.0
4	185.0	235.0	185.0	235.0	0.0	0.0	0.0	185.0	235.0	185.0	235.0	0.0	0.0	0.0
5	171.0	219.0	171.0	219.0	0.0	0.0	0.0	171.0	219.0	171.0	219.0	0.0	0.0	0.0
10	161.0	207.0	161.0	207.0	0.0	0.0	0.0	161.0	207.0	161.0	207.0	0.0	0.0	0.0
15	154.0	198.0	154.0	198.0	0.0	0.0	0.0	154.0	198.0	154.0	198.0	0.0	0.0	0.0
20	149.0	187.0	149.0	187.0	0.0	0.0	0.0	149.0	187.0	149.0	187.0	0.0	0.0	0.0
25	147.0	190.0	147.0	190.0	0.0	0.0	0.0	147.0	190.0	147.0	190.0	0.0	0.0	0.0
30	145.0	193.0	145.0	193.0	0.0	0.0	0.0	145.0	193.0	145.0	193.0	0.0	0.0	0.0
35	146.0	195.0	146.0	195.0	0.0	0.0	0.0	146.0	195.0	146.0	195.0	0.0	0.0	0.0
40	149.0	199.0	149.0	199.0	0.0	0.0	0.0	149.0	199.0	149.0	199.0	0.0	0.0	0.0
45	153.0	208.0	153.0	208.0	0.0	0.0	0.0	153.0	208.0	153.0	208.0	0.0	0.0	0.0
50	160.0	210.0	160.0	210.0	0.0	0.0	0.0	160.0	210.0	160.0	210.0	0.0	0.0	0.0
55	169.0	211.0	169.0	211.0	0.0	0.0	0.0	169.0	211.0	169.0	211.0	0.0	0.0	0.0
60	183.0	211.0	183.0	211.0	0.0	0.0	0.0	183.0	211.0	183.0	211.0	0.0	0.0	0.0
65	198.0	212.0	198.0	212.0	0.0	0.0	0.0	198.0	212.0	198.0	212.0	0.0	0.0	0.0
70	221.0	238.0	221.0	238.0	0.0	0.0	0.0	221.0	238.0	221.0	238.0	0.0	0.0	0.0
75	223.0	261.0	223.0	261.0	0.0	0.0	0.0	223.0	261.0	223.0	261.0	0.0	0.0	0.0
80	230.0	291.0	230.0	291.0	0.0	0.0	0.0	230.0	291.0	230.0	291.0	0.0	0.0	0.0
85	234.0	295.0	234.0	295.0	0.0	0.0	0.0	234.0	295.0	234.0	295.0	0.0	0.0	0.0
90	250.0	300.0	250.0	300.0	0.0	0.0	0.0	250.0	300.0	250.0	300.0	0.0	0.0	0.0



References

The screenshot shows a software window titled "All References" with a menu bar containing "Find", "Sort", and "Exit". Below the menu bar is a table with the following columns: Index, Document #, Rev #, Date, and Title. The table contains several rows of reference data. An "Edit Reference # 15" dialog box is overlaid on the table, containing input fields for Document #, Rev #, Date, and Title. The dialog box also has "OK" and "Cancel" buttons.

Index	Document #	Rev #	Date	Title
11	FP-PE-MOV-01	1		Grouping of MOV's for Selection of Test Frequency Program Position Paper
12	Limited Method			Used in the Valves
13	SEL-1			Kerotest
14	NE-15			Valves
15	NP-66			EPRI Application Guide for Motor Operated Valves in Nuclear Power Plants
16	NX-33			motors
17	1707			
18	SEL-4			
19	Altran 94111-C-02	0	4/20/1994	Valve Thrust Calculation for 10" Crane 300# Gate Valve Cat. No. 63174-U, Valves MV-32084, MV-32085, MV-320187, MV-32188
20	Crane Letters	0	5/12/1994	MV-32084, MV-32085, MV-32187 Yoke (10") Asst. Engr. David B. Bruce Crane Asst. Engr.

Buttons: Edit, Add



- Export to Excel – provides the capability to export any input or output parameters for a user defined valve selection to an Excel spreadsheet



ACE Version 4.1

- **SQL Compatible**



ACE Questions?

- **History**
- **Basic Capabilities**
- **Tools**
- **Margins**
- **Reports**
- **Verification & Validation**
- **Documentation**