

MOV Design & Test Database Software Midas & Midastest

*MIDAS MOV
Design Software*

Parameter	Ess	Value	Reference
Valve Type	Y	GATE	171
Gate Valve Disc Type	Y	Flexible Wedge	171
Valve Vendor	Y	WALWORTH	171
Valve Size	Y	6	171
Valve Seat Diameter	Y	5.688	8
Gate Valve Wedge Half-Angle	Y	5	1
Calculation Method (close)		VF	10
Calculation Method (open)		VF	10
EPRI PPM Thrust (close)		0	10
EPRI PPM Thrust (open)		0	10
Valve Factor (close)	Y	0.67	56
Valve Factor (open)	Y	0.67	56
Non-Safety Related Valve Factor	Y	0.56	171
HELB Related Valve Factor	Y	0.58	N/A
Gate Valve Condition Load	Y	0	N/A
Stuffing Box Load (close)	Y	1250	1
Stuffing Box Load (open)	Y	1250	1
Valve Limiting Thrust (close)	Y	43400	290
Valve Limiting Thrust (open)	Y	31800	290

FUNCTION	OPEN	Last Edit	SIGNOFF	Last Signoff	PRINT
Sensitivity Calculations		01/10/11 09:06	SIGNOFF NOT REQUIRED		
Control Circuit Changes		01/10/11 09:06		N/A	
Pre-Test Information		01/10/11 09:06		N/A	
Limit Switch Settings		01/10/11 09:06		N/A	
Data Review		01/10/11 09:06		N/A	
Trending		01/10/11 09:06		N/A	

Work Order	Schedule	Status	Test Date	Test of Record
Test Case 4	NOW	Pre-Test	2/1/11	—
Test Case 3	NOW	Pre-Test	1/10/11	—
Test Case 2	NOW	Pre-Test	1/10/11	—
Test Case 1	NOW	Pre-Test	1/10/11	—
C0195426	N/A	Ready for Test	9/16/01	YES

MIDATEST MOV Test Software

Teledyne LeCroy Test Services, together with our clients, have developed the most comprehensive MOV Design (MIDAS) and Test (MIDATEST) Databases available to the industry for utility MOV program control.

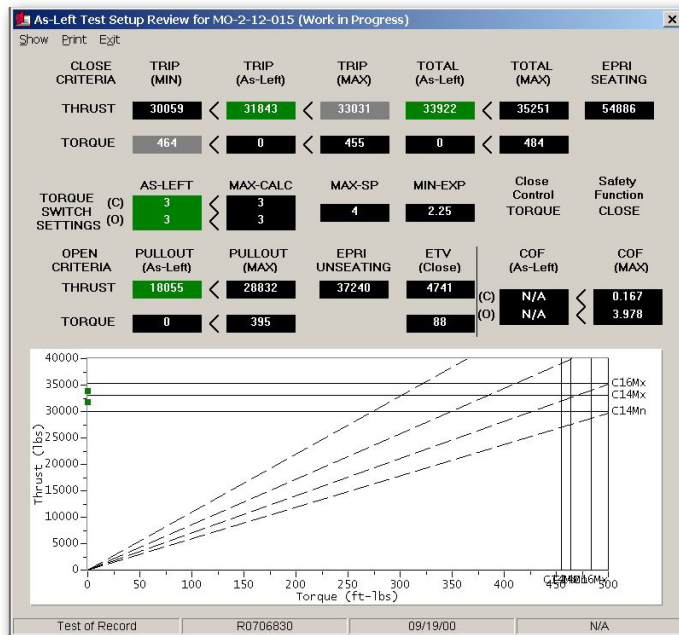
Many utilities, including Exelon, Entergy, NMC, Progress Energy, First Energy, FPL, PSE&G, and PPL have contracted with TTS to implement this software at their sites.

MIDAS and MIDATEST software are developed, maintained and documented using software Quality procedures developed by Teledyne. MIDAS and MIDATEST are delivered with a Certificate of Conformance attesting to this fact.

Teledyne has developed a client/server implementation for MIDAS and MIDATEST. This allows for a single installation on a server for the entire utility, including all remote sites. Teledyne provides an unlimited usage license for the entire utility.

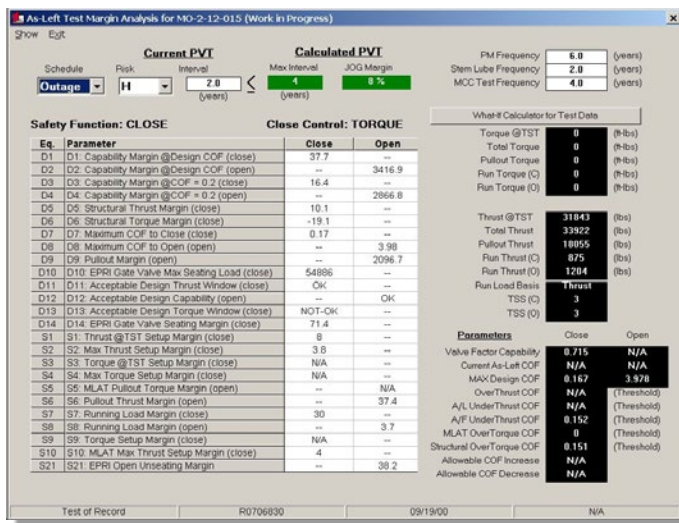
See white paper 'Utility-wide MOV Database Software Implementation' for an example.

MOV Design & Test Database Software



MIDAS is the primary MOV engineering tool for a utility. It provides:

- Thrust/torque set-up window criteria
- Design margins, setup margins, and stem COF analysis
- PVT margin and interval analysis
- What-if margin analysis
- Configuration control
- Stem nut wear methodology
- Powerful export to Excel reporting tool
- Global parameter evaluating tool



Status for MO-2-12-015

Ready For Check

☐ Yes ☒ No

Design Change Type

☒ Type 1 - Design Input Change Only

☐ Type 2 - Design Input/Output Change

☐ Type 3 - Configuration Document Change Only

☐ Type 4 - Physical Design Change

Design Change Control

Reason: N/A

Calc: MO-2-12-015

Rev: 0 Existing Rev (0)

MOV Design & Test Database Software

AC Voltage Drop Calculation for MO-2-12-015

Print Exit

Voltage Drop Methodology: **STD**

RELANCE 25 H-bbs, 1700 RPM, 460V, (M1480)

Cable Terms

☒ Calculate ☐ Input

Cable Resistance	Cable Reactance	TOL Resistance
0.361	0.018	0.20425

Voltage Divider Terminology (STD)

Power Factor	Locked Rotor Amps	Current Loss
0.830	25.10	0.231000

	CLOSE SAFETY	OPEN NON-SAFETY	
Ambient Temperature	76.00	76.00	(°C)
Voltage at MCC	427.2	427.2	(Volts)
Motor Impedance	11.181	11.181	(ohms)
Motor Resistance	9.496	9.496	(ohms)
Motor Reactance	5.902	5.902	(ohms)
Total Reactance	5.92	5.92	(ohms)
Total Resistance	10.061	10.061	(ohms)
Voltage at Motor	409.2	409.2	(Volts)
Voltage Ratio	0.89	0.89	

Other MIDAS technical capabilities include:

- Voltage drop analysis using ComED or voltage divider methods
- AC motor torque analysis using ComED, Limitorque, or Rotork methods
- DC motor torque analysis and stroke time analysis using BWROG methodology
- EPRI butterfly torque methodology
- EPRI unwedging analysis for gate valves
- JOG Classification and CAI Rating using JOG methodology
- Pressure Locking analysis using ComED methodology (WOG)

BWROG DC Methodology for BWROG-19

Print Exit

General Information Valve Information Detailed Results

Parameters

Valve Type: **GLOBE**

Load Profile Method: **Input Stem Thrust**

User Defined Stem Thrust: **Edit Close Edit Open**

Use FAC for position controlled strokes? ☐ Yes ☒ No

	CLOSE NON-SAFETY	OPEN SAFETY
Degraded Voltage at Motor (VDC)	120.8	120.8
Instantaneous Actuator Torque (ft-lbs)	175.5	175.5
FAC: Functional Actuator Capability (ft-lbs)	0	0
Predicted Stroke Time (sec)	24.17	24.17

Calculation Feedback

FAC not calculated for Load Profile Method=Input Stem Thrust
 FAC not calculated for Load Profile Method=Input Stem Thrust
 Maximum D-P (close) = 0
 Maximum D-P (open) = 0
 DC Valve Pressure at Full Open (close) = 0
 DC Valve Pressure at Full Open (open) = 0
 System Flow Rate = 0
 DC Fluid Density (lbs/ft³) = 0
 DC Length of Upstream Piping, diameters = 0
 DC Additional Stroke Time (close) = 0

JOG PV Methodology for MO-2-12-015

Print Exit

JOG Class: **0** CAI Rating: **1** Valve Family: **1** Schedule: **Outage** Risk: **H** Interval: **2.0** (years) Max Margin: **4** (years) Margin: **5%**

Current PVI: **2.0** Calculated PVI: **4**

Safety Function: **CLOSE** Close Control: **TORQUE**

Parameter	CLOSE SAFETY VP	OPEN NON-SAFETY VP	Reference
Valve Factor (Design Input)	0.50	0.50	56
Valve Factor (Effective)	0.57	0.57	56
Valve Factor based on COF Threshold	0.75	0.66	56
Valve Factor Effective + Allowance	0.74	0.69	56
Valve Factor Capability	0.715	0	56
COF based on Effective Valve Factor	0.63	0.71	56
COF based on Effective Valve Factor + Allowance	0.58	0.73	56
COF based on Valve Factor Capability	0.57	0	56

Implementation / Evaluation Details

WIP Evaluator Rich Ends 2/12/11 13:14

EPRI Butterfly Methodology for EPRI-BF-03

Print Exit

General Information DP Information Detailed Results

Valve System Coefficients

Parameter	Value	Reference
Valve Disc Configuration	Symmetric	N/A
Valve Disc Shaft Location	Centered	N/A
Valve Disc Aspect Ratio (thick/dia)	0.220	N/A
Valve Nominal Diameter (in)	30.000	N/A
Valve Stem Orientation	HORIZONTAL	N/A
Valve Stem Diameter (in)	3.480	N/A
Packing Torque (CLOSE) (ft-lbs)	350.0	N/A
Packing Torque (OPEN) (ft-lbs)	350.0	N/A

Calculated Values	@VALVE	@ACTUATOR
Total Unseating Torque	2061.8	114.54
Total Seating Torque	2061.8	114.54
Total Dynamic Opening Torque	144	8
Total Dynamic Closing Torque	2116.6	117.59
Required Opening Torque	2061.8	114.54
Required Closing Torque	2116.6	117.59

Calculation Feedback

Kv_min Calculated using BF Valve Flow Coefficient (Full Open)
 BF Double Offset Dimension (in) = 0
 BF Pressure Dependent Seal TQ Coef = 0

MOV Design & Test Database Software

Pre-Test Setup for MO-2-12-015 WO# C0222222

Close Control Scheme: TORQUE Safety Function: CLOSE

Setup Setup (cont'd) As-Found As-Left Previous Test

Reason For Diagnostic Test: GL96-05 PVT

Recommended Diagnostic Test System: Quiklook

Test Criteria Selection Basis: Thrust & Torque

Recommended Device to Acquire Thrust: OSS

Recommended Device to Acquire Torque: OSS

Running Load Criteria Selection Basis: ☐ Thrust ☐ Torque ☒ Handwheel

Packing Adjustment Method (select one):

☐ N/A

☒ Wrench Tight

☐ Maximum Packing Gland Torque and Expected Running Load Range

Maximum Allowable Running Current: 28.00

Maximum CLOSE Stroke Time: 32 seconds

Maximum OPEN Stroke Time: 31 seconds

Maximum Handwheel Run Torque: 66.00 ft-lbs

Exit Rich Enos 1/13/11 16:06:15 NOT APPROVED 1/13/11 16:06:15 Cancel

Trending for MO-3-23-014 WO# OLD 97 Test

Trend Data		Evaluation		Feedback		Generic	
Parameter	Previous Test Data		Interval	Current Test Data		PM	
	AF Test Data	AL Test Data		AF Test Data	AL Test Data		
Work Order Number	OLD 92 Test		*	OLD 97 Test		*	
Test Type	N/A		*	Thrust & Torque		*	
Test Date	8/17/92		*	4/17/97		*	
Test Number	92a9mjnj	92a9mpuq	*	970trrge	970trrty0	*	
Close TSS	1.5	1.5	*	1.5	1.5	*	
C14	Thrust (lb)	12883	37424	-10	33700	37378	10.9
	Torque (ft-lb)	32	88	2403.4	2203	2187	-0.7
	Current (amps)	30.04	30.53	-16	25.64	24.18	-5.7
	Power (kW)	2.64	2.81	75.1	4.92	4.16	-15.4
C16	Power Factor	0.75	0.51	78.4	0.91	0.79	-13.2
	Thrust (lb)	16010	39978	*	39803	44599	*
	Torque (ft-lb)	38	93	*	2558	2598	*
	Thrust (lb)	12883	37424	-47.6	19613	18142	-7.5
O9	Torque (ft-lb)	32	88	-92	7	10	42.9
	Current (amps)	30.04	30.53	*	13.43	8.55	*
	Power (kW)	2.64	2.81	*	1.65	2.12	*
	Power Factor	0.75	0.51	*	0.8	0.64	*

Current Test Data --> OLD 97 Test N/A Complete 4/17/97 ...

Previous Test Data --> (Highlight Row to Select)

Work Order	Schedule	Status	Test Date	Test of Record
C0195426	N/A	Complete	9/16/01	YES
C0180487	N/A	Legacy	3/21/98	...
OLD 97 Test	N/A	Complete	4/17/97	...
OLD 92 Test	N/A	Legacy	8/17/92	...
Review V&V	2005	Pre-Test	12/3/91	...

Exit Rich Enos 1/5/07 13:03
TELEDYNE 1/5/07 13:19 Cancel

MIDATEST is the primary MOV maintenance tool for a utility. It provides:

- MOV diagnostic test preparation
- Powerful export to Excel reporting tool
- Diagnostic test and PM data review

- Comparison of as-found to as-left performance
- MOV data analysis and trending
- Direct import of as-found and as-left test data and results

Data Review for MO-3-12-068 WO# R0546205

Work Done		Data Review (1)		Data Review (2)		As-Found Inspection	
As-Found Data		As-Left Data		Evaluations		Completion	
Import	Test Identification	N/A	Test Date	10/11/99	Close TSS	1.250	Open TSS
Parameter	Marker	Thrust	Torque	Disp	Current	Power	PF
Torque Switch Trip	C14	18501	166.0	0.000	2.80	0.00	0.00
CLOSE Maximums	C16	21556	189.0	0.000			
Disk Pullout	O9	0	0.0	0.000	0.00	0.00	0.00
CLOSE Run	ARC	2272	29.0	0.000	2.80	0.00	0.00
OPEN Run	ARO	2180	28.0	0.000	2.90	0.00	0.00
CLOSE InRush	C1				18.80	0.00	0.00
OPEN InRush	O1				17.10	0.00	0.00
Flow Cutoff (DP)	C10	0	0.0	0.000	0.00	0.00	0.00
Hard Seat	C11	0	0.0	0.000	0.00	0.00	0.00
Direction		C to C (Time)	CDO (Time)	TS Bypass (Time)	MSTT (Time)		
CLOSE		19914	0.014	0.000	0.000		
OPEN		19563	0.000	0.000	0.000		

OK TELEDYNE 12/21/06 11:19:53 NOT APPROVED 12/21/06 11:19:53 Cancel

Import Test Data from 980dthip

Double Click on a row to select an alternate marker definition		Test Comments		Double Click on a column to select an alternate channel definition		Thrust votes fo		Torque cart cap		Spring Pack worms dis		DC Current raw moto		Power votes fo		Power Factor	
Parameter	Name	Marker	Time	Thrust	Torque	Spring Pack	DC Current	Power	Power Factor								
Motor Start (C)	c0	c0	22.963	2147	2.4	0.001	0.81	N/A	N/A								
Peak Thrust (C)	c1	c1	22.906	2001	0.0	0.001	31.62										
Thread Transition Star	c3a	c3a	23.431	1127	19.3	0.002	2.56										
Zero Transition (C)	c3	c3	23.433	1127	21.7	0.002	2.56										
Thread Transition End	c3b	c3b	23.434	1127	130.3	0.002	2.56										
Close Bypass (C)	c7	N/A	*	*	*	*	*										
Flow Cutoff (C)	c10	N/A	*	*	*	*	*										
CST (C)	c14	c14	39.810	31025	2200.4	0.099	15.02										
Motor Stop (C)	c15	c15	39.865	33679	2417.5	0.118	1.10										
Max Sealing Current	c15	c15	39.865	33679	2417.5	0.118	1.10										
Max Thrust	c16	c16	39.909	34957	2449.9	0.122	0.06										
Max Torque	c16	c16	39.909	34957	2449.9	0.122	0.06										
Max Displacement	c16	c16	39.909	34957	2449.9	0.122	0.06										
Motor Start (C)	c0	c0	2.870	33007	2439.2	0.124	6.81										
Peak Thrust (C)	c1	c1	2.895	32367	2439.2	0.124	30.40										
Thread Transition Star	c4a	c4a	3.540	2439	2.4	0.001	2.81										
Zero Transition (C)	c4	c4	3.540	2439	2.4	0.001	2.81										
Thread Transition End	c4b	c4b	3.554	2439	7.3	0.001	2.81										
Unsealing (C)	c8	c8	4.091	8895	53.1	0.001	3.79										
Open Bypass (C)	c12	N/A	*	*	*	*	*										
Open Light (C)	c16	c16	19.545	2505	12.0	0.001	2.56										
Motor Stop (C)	c17	c17	19.502	2585	16.9	0.001	0.86										
Average (C)	c14-c5	*	*	400	75.2	0.002	2.83										
Average (C)	u13-u14	*	*	2872	20.1	0.001	2.84										

Import ☒ Import Mechanical Properties ☒ Import Limits ☒ Import Power Cancel