Control Valve Diagnostic Testing

Tag Number:	**TEST 5**
Mfgr. Serial Number:	**F000374959**
Alt. Serial Number:	**N/A**
Unit Name:	**NEW UNIT**
Plant Name:	**PRATTVILLE MILL**
Company:	**INTERNATIONAL PAPER**
Location:	**VALVE SHOP**
P&I Drawing Number:	
Valve Application:	**TESTING**

Date of Report:

01/04/2022

4:58:44PM

Report Prepared By:

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BenchMark
Control Valve Diagnostics

Valve Configuration Summary

Tagnumber	**TEST 5**
Mfgr. Serial #	**F000374959**
Alt. Serial #	**N/A**

Valve Identification

Company	**INTERNATIONAL PAPER**	P&I Drawing Number	
Plant	**PRATTVILLE MILL**	Valve Application	**TESTING**
Location	**VALVE SHOP**	Year Installed	**2021**
Unit	**NEW UNIT**	Risk Class	**NOT RATED**
Notes			

Valve Configuration

Configuration	**ROTARY**		Packing Type	**SINGLE-VEE**	
Manufacturer	**FISHER**		Packing Mat'l	**PTFE**	
Valve Type	**V-BALL**		Stem (Shaft) Diameter	**0.50**	in
Valve Model	**FIS V150**		Specified Friction		lbf
Pressure Class	**150**	psig	Specified Torque	**0.00**	in-lbf
Rotary Type	**DIRECT CONNECT**		Moment Arm	**0.00**	in
Flow Direction			Link Arm	**0.00**	in
Valve Size	**1.00**	in			
Notes					

Valve Seat (Trim)

Seat Diameter		in	Balance/Unbalanced	
Rated Cv			PBal Seat Mat'l	
Seat Leak Class	**CLASS IV**		Unbalance Area	in2
Flow Characteristic				
Notes				

Valve Actuator

Actuator Style	**DOUBLE ACTING**		Nominal Stroke	**90.0**	deg
Actuator Mfgr	**OTHER**		Spring Displ.	**0.00**	in
Actuator Model	**OTHER**		Springrate		lbf/deg
Air Action	**ATO**		Benchset, Min.		psig
Fail Mode	**IN-PLACE**		Benchset, Max.		psig
Actuator Area	**25.00**	in2			
Bottom Area	**25.00**	in2			
Notes					

Valve Positioning System

Signal Range	**4-20 MA**	I/P Nominal, Min.	**3.00**	psig
Signal Source	**HART**	I/P Nominal, Max.	**15.00**	psig
Positioner		Air Pressure, Min.	**0**	psig
Cam Profile	**LINEAR**	Boosters/QExhaust		

BenchMark Control Valve Diagnostics

BenchMark Baseline Test

Tag Number	**TEST 5**
Mfgr. Serial #	**F000374959**
Alt. Serial #	**N/A**

Test Identification

Test Number	**B20004P2**			Company	**INTERNATIONAL PAPER**
Test Date	**1/4/2022**	**16:27**		Plant	**PRATTVILLE MILL**
Ramp Time	**50**	sec	(Nominal Span)	Unit	**NEW UNIT**
Operator	**VALVE SHOP**			Location	**VALVE SHOP**

Test Results

Parameter	Results	Units	Status	Max Std	Min Std	Comment
Measured Total Travel						
Measured Total Rotation	**90.2**	deg				
Signal, Min Travel	**3.97**	mA				
Signal, Max Travel	**19.82**	mA				
Signal, Nom Travel	**19.79**	mA				
HDL Error, Average	**1.41**	% fs				
HDL Error, Max	**2.32**	% fs				
Linearity Error	**0.52**	% fs				
Friction, Average	**110**	lbf				
Friction, Max	**167**	lbf				
Torque, Average	**101**	in-lbf				
Torque, Maximum	**136**	in-lbf				
Benchset, Min						
Benchset, Max						
Spring Rate	**0.7**	lbf/deg				
Seatload Act & Spring						
Seatload Spring Only						
Signal Pressure, Min Travel						
Signal Pressure, Max Travel						
Signal Pressure, Nom Travel						
Pos HDL Error, Average	**1.41**	% fs				
Pos HDL Error, Max	**2.32**	% fs				
Pos Linearity Error	**0.52**	% fs				
Pos Balance Pressure	**47.4**	% nom				
I/P Output, Min Signal						
I/P Output, Max Signal						
I/P HDL Error, Average						
I/P HDL Error, Maximum						
I/P Linearity Error						
Nominal Air Supply	**60.1**	psig				
Air Supply Decrease	**22.2**	% nom				

Valve Configuration **[Partial Specification]**

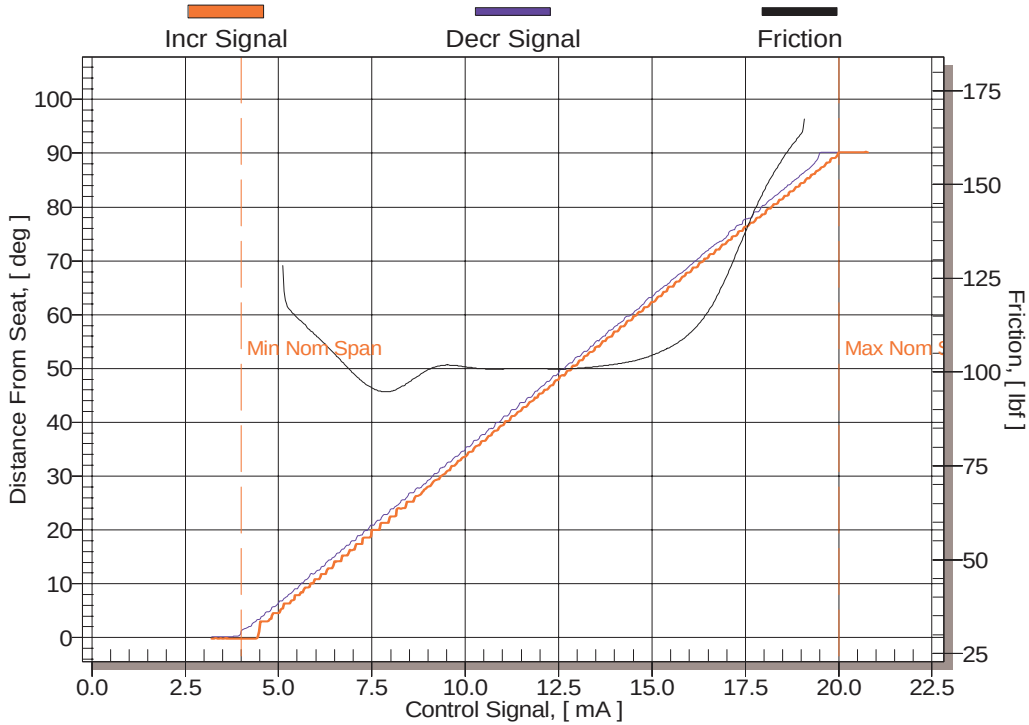
Manufacturer	FISHER		Actuator	OTHER		Positioner	
Valve Size	1	in	Actuator Style	DOUBLE ACTING		Pos Cam	LINEAR
Configuration	ROTARY		Actuator Area	25	in	Signal Source	HART
Packing Style	SINGLE-VEE		Nominal Stroke	90.00	deg	Signal Range	4-20 MA
Packing Material	PTFE		Air Action	ATO		Seat Leakage	CLASS IV
Flow Direction			Fail Mode	IN-PLACE		Rotary Type	DIRECT CONNECT

Test Notes

1/4/2022/16:27 /
PASSED

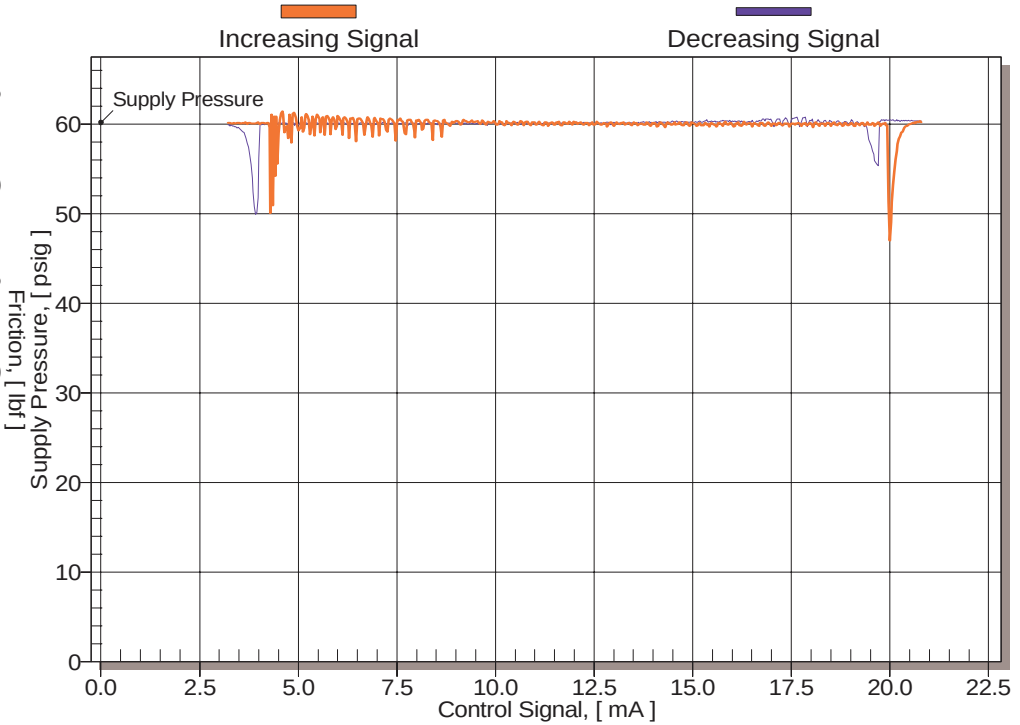
BenchMark Overall Valve Performance

B20004P2 / TEST 5/F000374959/N/A



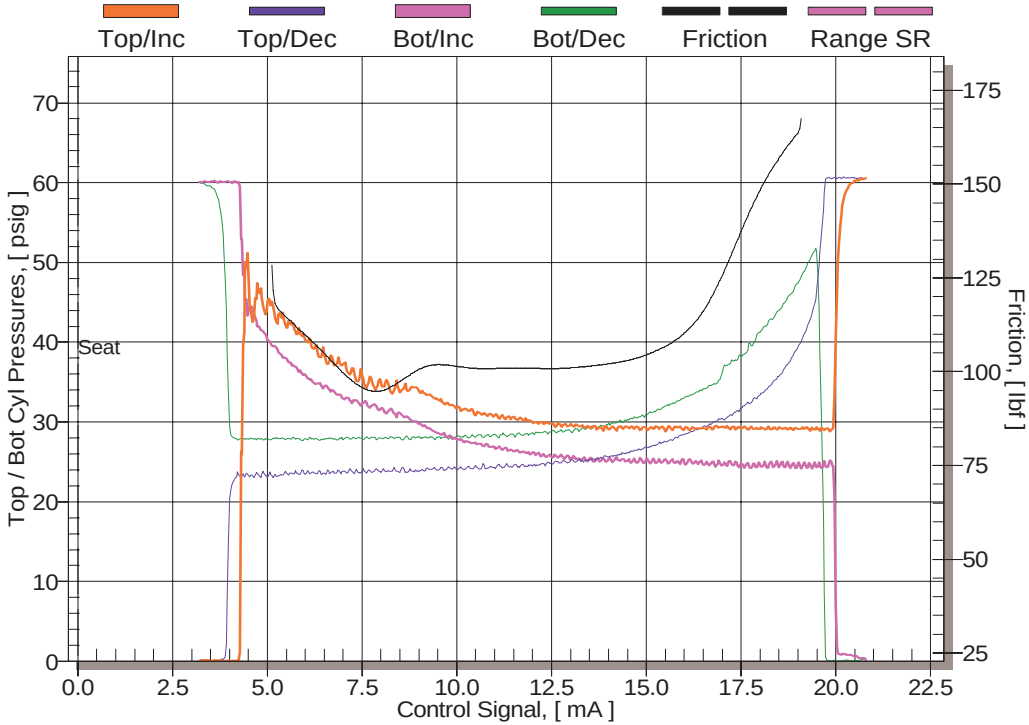
Supply Pressure Response

B20004P2 / TEST 5/F000374959/N/A



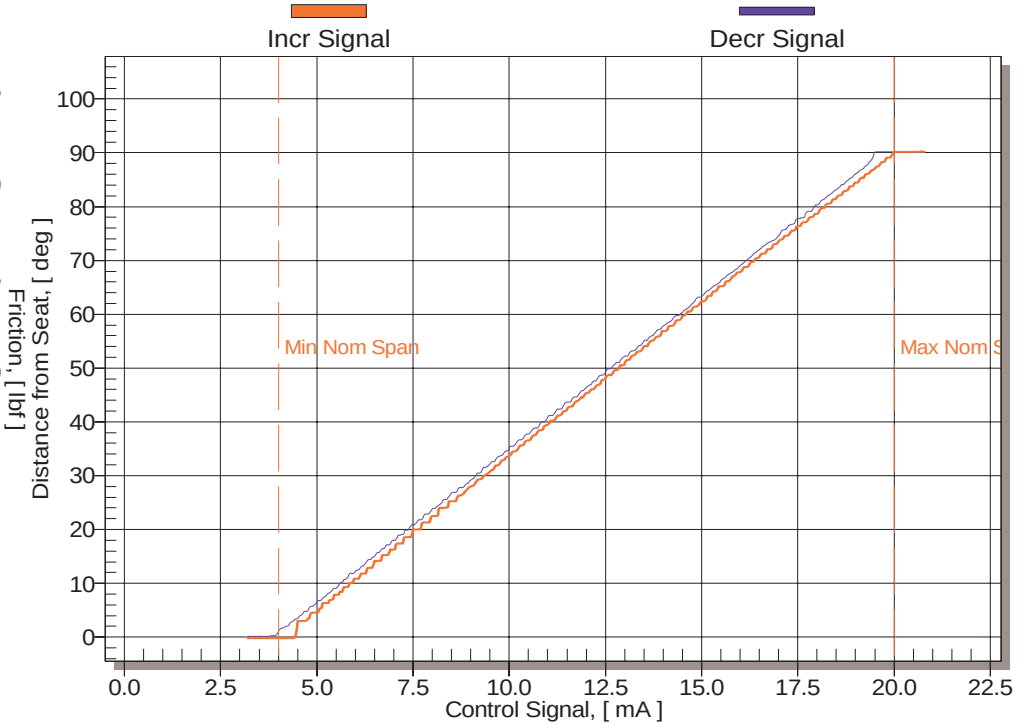
Actuator Performance

B20004P2 / TEST 5/F000374959/N/A



Valve Positioner Performance

B20004P2 / TEST 5/F000374959/N/A



BenchMark HDRL Test

Tag Number	**TEST 5**
Mfgr. Serial #	**F000374959**
Alt. Serial #	**N/A**

Test Identification

Test Number	**H20001P2**	Company	**INTERNATIONAL PAPER**
Test Date	**1/4/2022**	Plant	**PRATTVILLE MILL**
Test Time	**16:40**	Unit	**NEW UNIT**
Operator	**VALVE SHOP**	Location	**VALVE SHOP**

Positioning System HDRL Results

Parameter	Results	Units	Status	Max Std
Hysteresis + Db, Avg	0.18	% fs		
Hysteresis + Db, Max	0.30	% fs		
Repeatability, Avg	0.12	% fs		
Repeatability, Max	0.29	% fs		
Linearity	0.32	% fs		

I/P Transducer HDRL Results

Parameter	Results	Units	Status	Max Std
Hysteresis + Db, Avg		% fs		
Hysteresis + Db, Max		% fs		
Repeatability, Avg		% fs		
Repeatability, Max		% fs		
Linearity		% fs		

Hold Time 15 sec

Valve Configuration **[Partial Specification]**

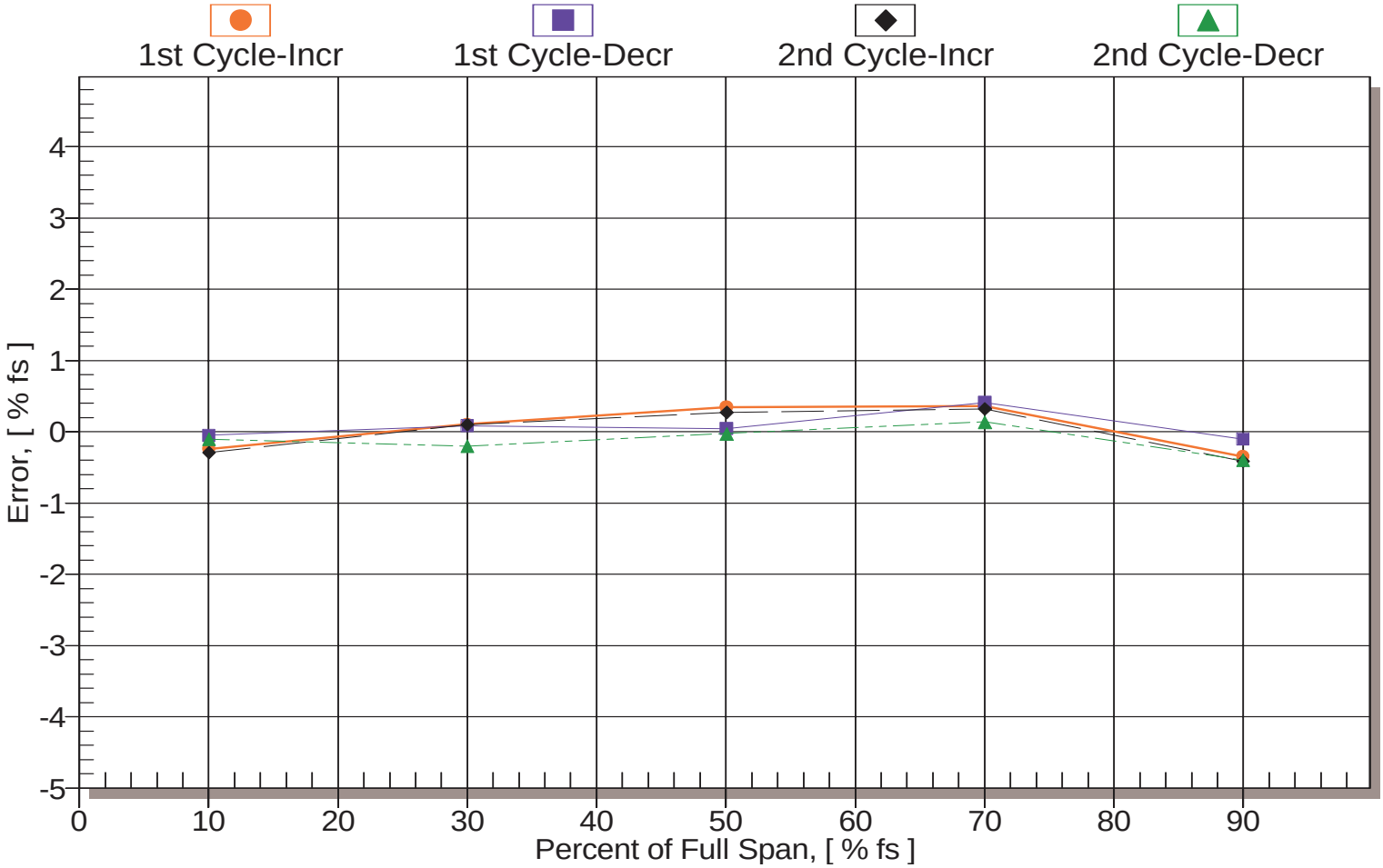
Manufacturer	FISHER	Nominal Stroke	90.00	deg
Valve Size	1 in	Air Action	ATO	
Configuration	ROTARY	Fail Mode	IN-PLACE	
Packing Style	SINGLE-VEE	Positioner		
Packing Material	PTFE	Pos Cam	LINEAR	
Flow Direction		Signal Source	HART	
Actuator	OTHER	Signal Range	4-20 MA	
Actuator Style	DOUBLE ACTING	Seat Leakage	CLASS IV	
Actuator Area	25 in	Moment Arm		in

Test Notes

1/4/2022/16:40/
PASSED

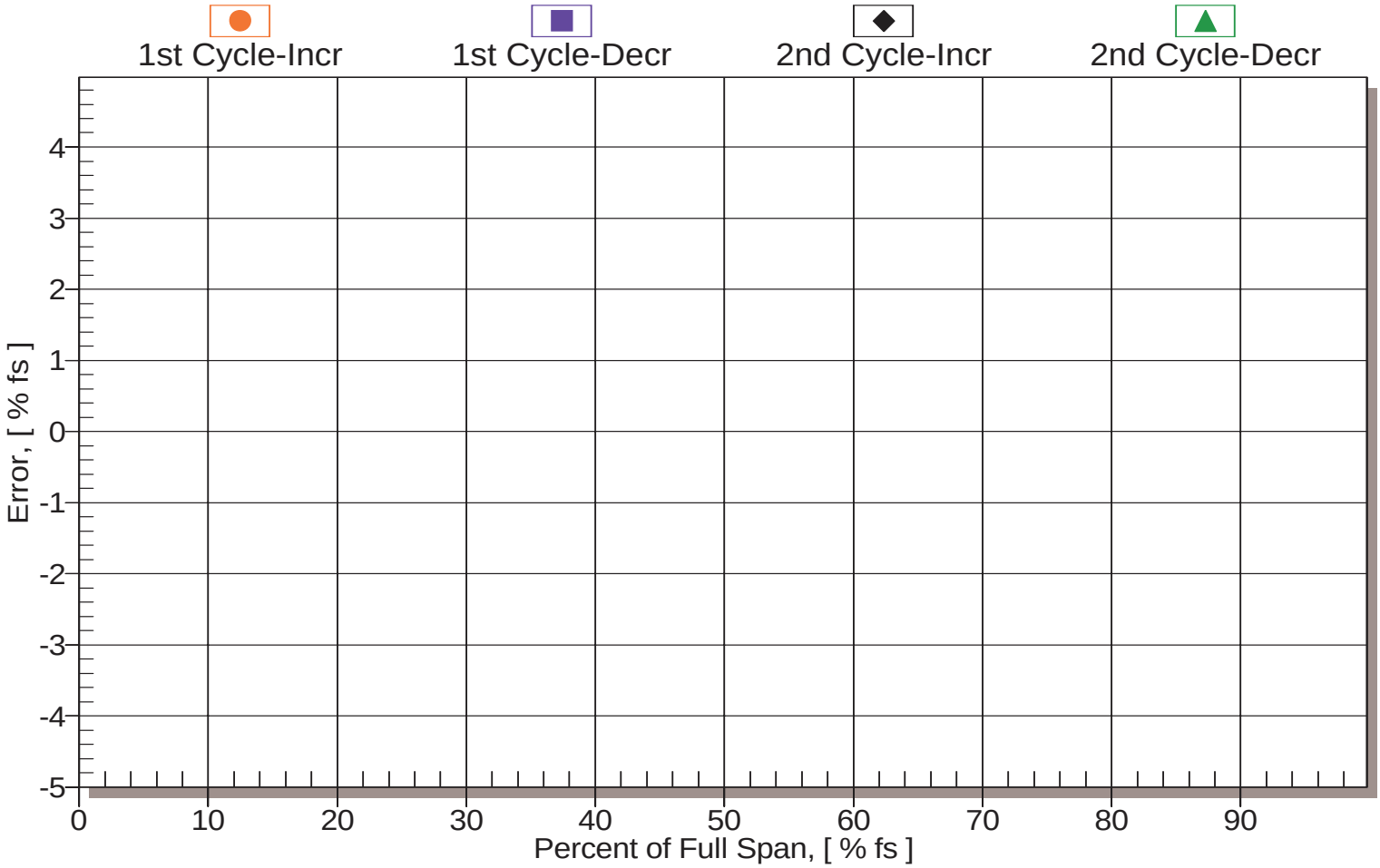
Overall Positioning HDRL Results

H20001P2 / TEST 5/F000374959/N/A



I/P Transducer HDRL Results

H20001P2 / TEST 5/F000374959/N/A



BenchMark Resolution Test

Tag Number	**TEST 5**
Mfgr. Serial #	**F000374959**
Alt. Serial #	**N/A**

Test Identification

Test Number	**R20003P2**	Company	**INTERNATIONAL PAPER**
Test Date	**1/4/2022**	Plant	**PRATTVILLE MILL**
Test Time	**16:54**	Unit	**NEW UNIT**
Operator	**VALVE SHOP**	Location	**VALVE SHOP**

Test Results

Parameter	**%**	**5%**	**5%**	**2%**	**2%**	**1%**	**1%**	**0.5%**	**0.5%**
Signal		INCR	DECR	INCR	DECR	INCR	DECR	INCR	DECR
Ideal Step	deg	4.511	4.511	1.804	1.804	0.902	0.902	0.4511	0.4511
Actual Step	deg	4.650	4.552	1.821	1.773	0.763	0.826	0.5789	0.4224
Step Error	deg	0.139	0.041	0.017	-0.032	-0.139	-0.076	0.1278	-0.0287
Step Error	%step	3.1	0.9	0.9	-1.7	-15.4	-8.4	28.3	-6.4
Standard	%step								
Test Result									

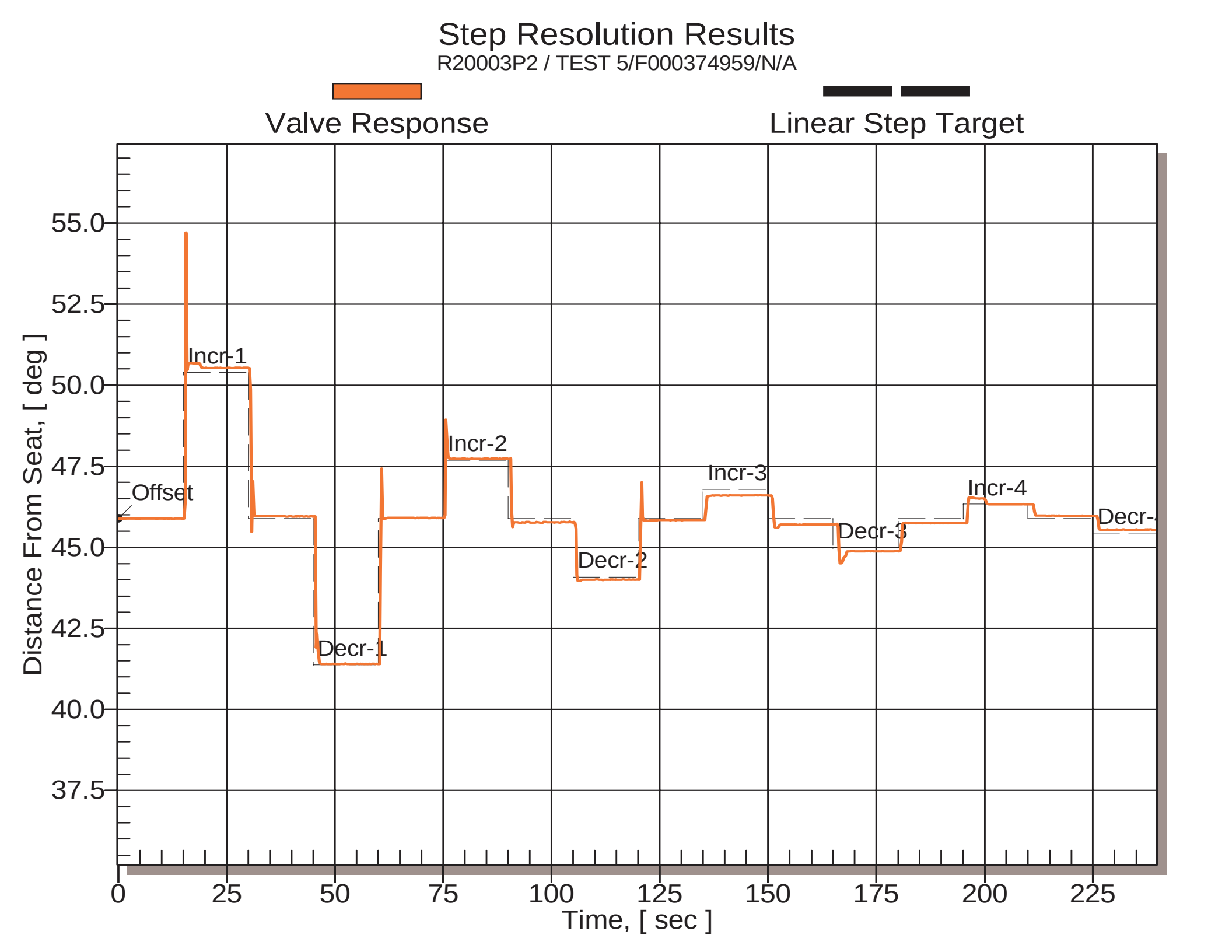
HoldTime	15 sec	
Offset	50.0 % fs	
Measured Stroke	90.2	deg

Valve Configuration **[Partial Specification]**

Manufacturer	FISHER		Nominal Stroke	90.00	deg
Valve Size	1	in	Air Action	ATO	
Configuration	ROTARY		Fail Mode	IN-PLACE	
Packing Style	SINGLE-VEE		Positioner		
Packing Material	PTFE		Pos Cam	LINEAR	
Flow Direction			Signal Source	HART	
Actuator	OTHER		Signal Range	4-20 MA	
Actuator Style	DOUBLE ACTING		Seat Leakage	CLASS IV	
Actuator Area	25	in	Moment Arm		in

Test Notes

1/4/2022 / 16:54/
PASSED


Step Resolution Results
R20003P2 / TEST 5/F000374959/N/A
Valve Response
Linear Step Target
Distance From Seat, [deg]
55.0
52.5
50.0
47.5
45.0
42.5
40.0
37.5
Offset
Incr-1
Decr-1
Incr-2
Decr-2
Incr-3
Decr-3
Incr-4
Decr-4
0
25
50
75
100
125
150
175
200
225
Time, [sec]

BenchMark Sensitivity Test

Tag Number	**TEST 5**
Mfgr. Serial #	**F000374959**
Alt. Serial #	**N/A**

Test Identification

Test Number	**N20001P2**	Company	**INTERNATIONAL PAPER**
Test Date	**1/4/2022**	Plant	**PRATTVILLE MILL**
Test Time	**16:48**	Unit	**NEW UNIT**
Operator	**VALVE SHOP**	Location	**VALVE SHOP**

Test Results

Parameter	**Units**	**5%**	**5%**	**2%**	**2%**	**1%**	**1%**	**0.5%**	**0.5%**
Signal		INCR	DECR	INCR	DECR	INCR	DECR	INCR	DECR
Ideal Step	deg	4.511	4.511	1.804	1.804	0.902	0.902	0.4511	0.4511
Actual Step	deg	4.738	4.594	1.792	1.897	0.841	0.959	0.5314	0.2214
Step Error	deg	0.227	0.083	-0.012	0.093	-0.062	0.057	0.0803	-0.2296
Step Error	%step	5.0	1.8	-0.7	5.2	-6.8	6.3	17.8	-50.9
Standard	%step								
Test Result									

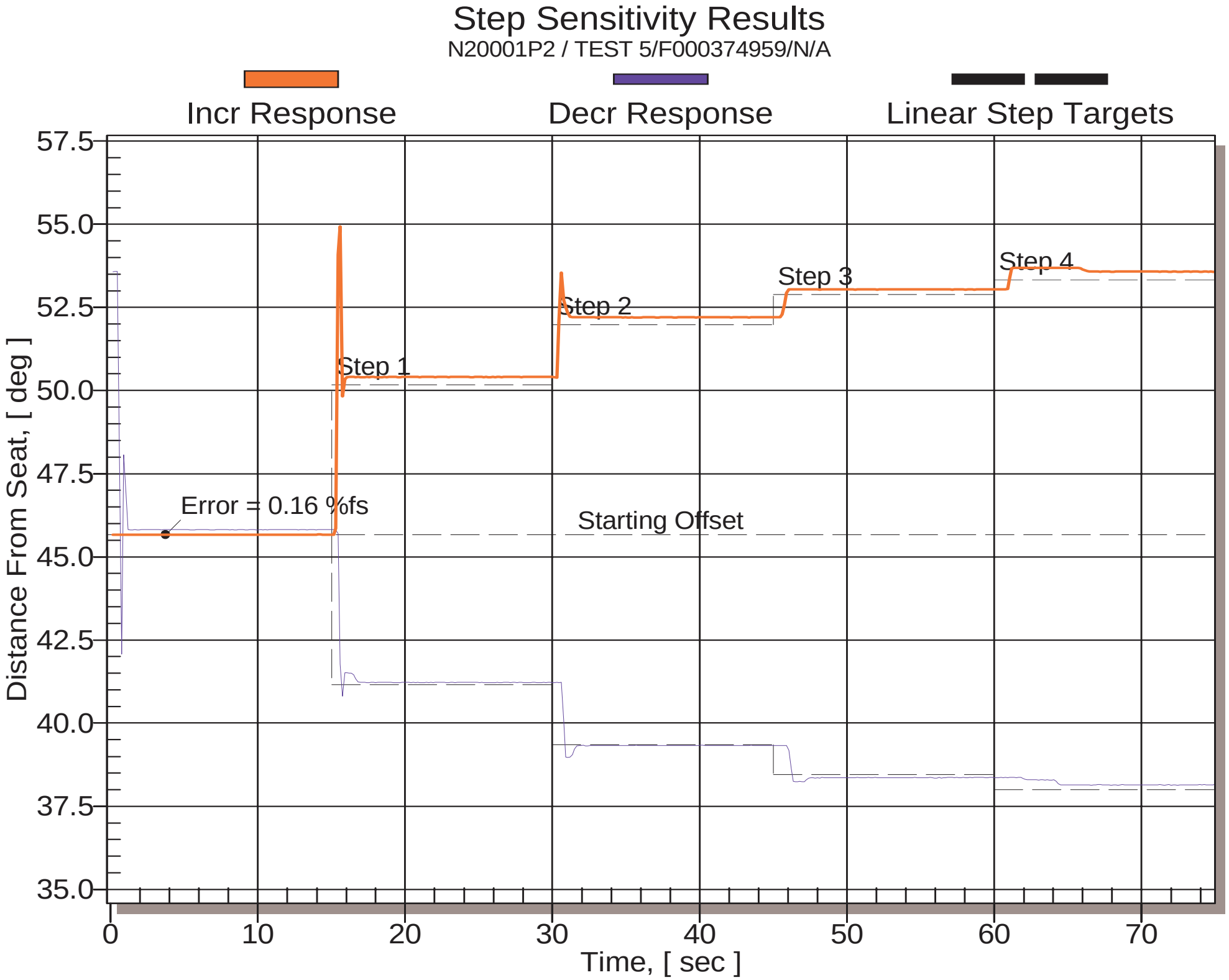
HoldTime	15 sec	
Offset	50.0 % fs	
Measured Stroke	90.2	deg
HD Error	0.16	% fs

Valve Configuration [Partial Specification]

Manufacturer	FISHER		Nominal Stroke	90.00	deg
Valve Size	1	in	Air Action	ATO	
Configuration	ROTARY		Fail Mode	IN-PLACE	
Packing Style	SINGLE-VEE		Positioner		
Packing Material	PTFE		Pos Cam	LINEAR	
Flow Direction			Signal Source	HART	
Actuator	OTHER		Signal Range	4-20 MA	
Actuator Style	DOUBLE ACTING		Seat Leakage	CLASS IV	
Actuator Area	25	in	Moment Arm		in

Test Notes

1/4/2022 / 16:48/
PASSED


Step Sensitivity Results
N20001P2 / TEST 5/F000374959/N/A
Incr Response
Decr Response
Linear Step Targets
Distance From Seat, [deg]
57.5
55.0
52.5
50.0
47.5
45.0
42.5
40.0
37.5
35.0
0
10
20
30
40
50
60
70
Time, [sec]
Step 1
Step 2
Step 3
Step 4
Error = 0.16 %fs
Starting Offset