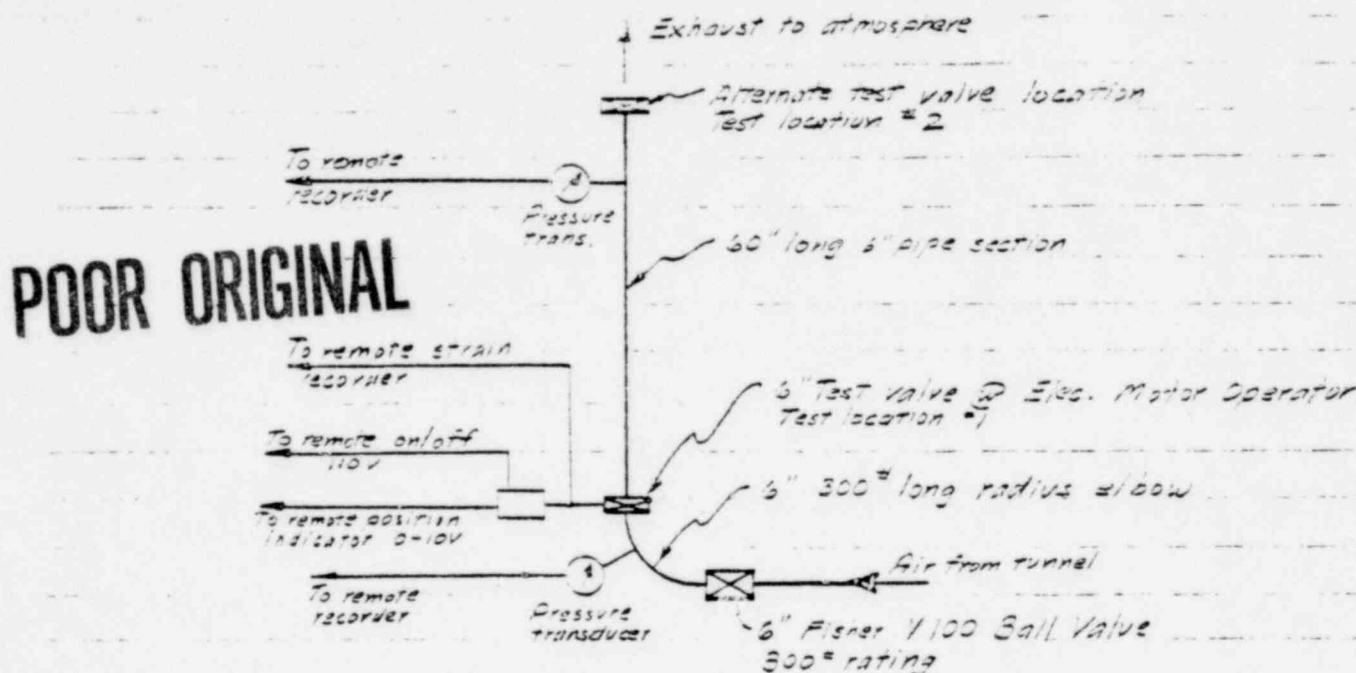


CUSTOMER NASA / Langley Research Center		DATE 10/9/77		SHEET 1 OF 2	
SUBJECT 6" Butterfly Valve Air Tests			PRELIM.	FINAL	
DRAWING NUMBER		LITHO IN U.S.A. - A-C		CALCULATED BY R. Zelders	
ENGINEERING CALCULATION SHEET					
ALLIS-CHALMERS			FORM 6715-1		

Schematic of test set up elevation



Test Valve Description:

6" Streamseal I butterfly valve - water style with 150 PSI body rating.
(3) different discs will be used. Each disc has a different thickness to diameter ratio (t/d).

Disc 1: $t/d = .29$

Disc 2: $t/d = .17$

Disc 3: $t/d = .125$

All discs are offset with the same exterior tapered shape.

The valve is equipped with a Limitorque electric motor operator.

Limitorque specs:

H08C & SMC-04 & 5 1/2" motor (1700 rpm)

460 V/3P/60 Hz

Torque switch setting 150 ^{lb}

90° timing = 5.2 sec.

Integral reversing starter complete with R-66

remote pushbutton station S3211,

SMC-04 to include 50 ohm potentiometer with calibrating resistor for 0-10V output for remote strain

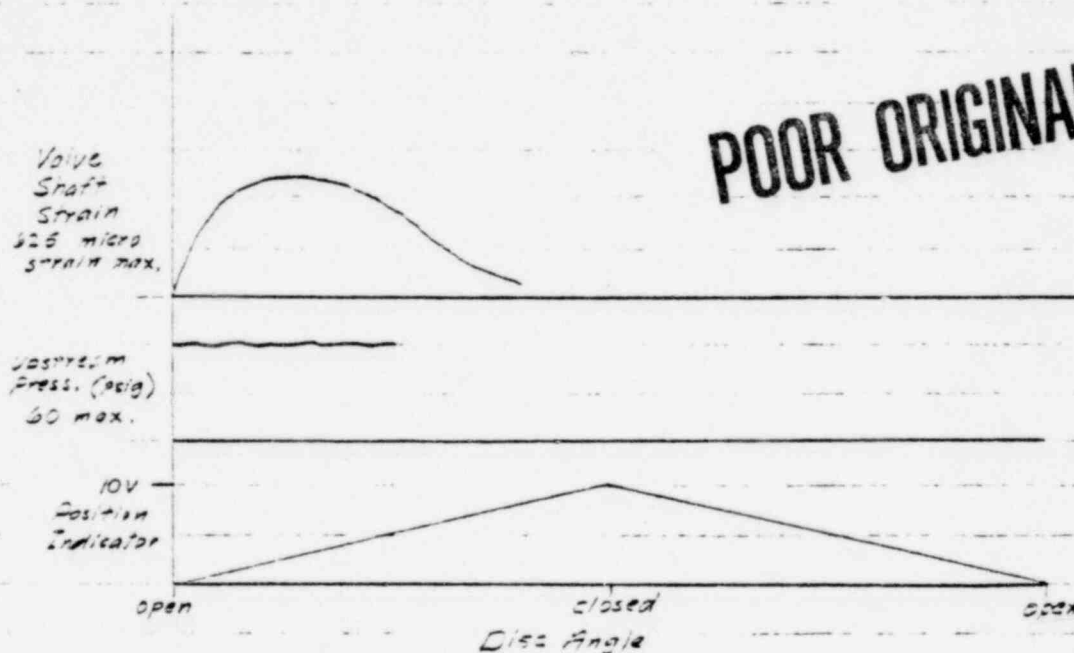
7911050350

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CUSTOMER NASA/Langley		DATE		SHEET 2 OF 2	
SUBJECT 6" SFV Air Tests		PRELIM.		FINAL	
DRAWING NUMBER		LITHO IN U.S.A. - A-C		CALCULATED BY R. Zeiders	
		ENGINEERING CALCULATION SHEET			
		ALLIS-CHALMERS		FORM 6715-1	

Valve shafts (3) will be equipped with strain gages for torque measurement and recording.

Recorded data for each test:

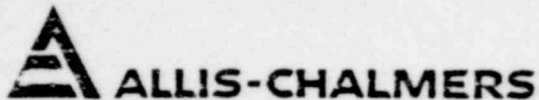


Test Matrix for Each of (3) Valve Discs

Test	Valve Location	Valve Shaft Orientation	Valve Seat Orientation
1.	At elbow outlet	in plane @ elbow	upstream
2.	" " "	90° out of plane	upstream
3.	" " "	in plane	downstream
4.	" " "	90° out of plane	downstream
5.	End of line	—	upstream
6.	" " "	—	downstream

Each of the above tests will be done @ upstream pressure ranging from 60 psig — 10 psig. If upstream pressure can be controlled in 10 psig increments, Total number of tests = 6 x 3 disc styles x 3 press. increments = 108 tests

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ALLIS-CHALMERS

BOX M-93 • YORK, PENNSYLVANIA 17405/717-848-1126

YORK PLANT
VALVE DIVISION

10/18/79

6" Streamseal I - NASA Aero Flow Tests

I. Valve installation and testing.

A. #1 Valve Installation - Close Mounted to elbow -
(1" Dia. Shaft)

1. Install butterfly valve #1, with disc facing upstream (flat side towards elbow), and shaft in plane of elbow.
2. Connect electric motor of operator to power source (460V/3Ø/60HZ)
3. Connect strain gauge leads and potentiometer leads to strip recorder.
4. Cycle valve open-close-open a few times to ensure proper operation.
5. Valve is cycled to open position.
6. Start strip recorder, & timer.
7. Open V-Ball valve until discharge pressure approaches 60 psig on the upstream x-ducer of the butterfly valve.
8. Cycle butterfly valve closed. (5-6 sec.)
9. Note that strain, rotation, upstream pressure and time interval are being recorded properly.
10. Cycle valve to open position while recording data.
11. Cycle valve twice more under the same conditions.
12. Return valve to open position.
13. Vent until upstream pressure approaches 50 psig.
14. Again, cycle valve, open-shut-open or three cycles and note data recorder.

15. Continue cycle testing as above, reducing upstream pressure each time by 10 psi (60, 50, 40, 30 etc.) until the 10 psi test has been completed. Close V-Ball and depressurize valve assy.
 16. After test phase has been completed, turn valve 90° so that shaft is out of plane at elbow. Flat side of disc still upstream.
 17. Valve is cycled to open position.
 18. Repeat steps 6 through 15, for 60 psig through 10 psig upstream pressure. As above, each test is to be performed 3 times at each pressure setting.
 19. After completing tests above, remove valve and reinstall with flat side of disc downstream and shaft in plane with elbow.
 20. Repeat steps 6-15 for in plane testing of butterfly valve.
 21. Turn valve 90° and retest per step 18.
- B. #1 Valve Installation - Remote Mounted.
1. Bolt pipe extension to elbow flange.
 2. Install valve on pipe flange, disc flat facing upstream and secure with companion flange provided, mount with shaft in plane of elbow.
 3. Cycle valve to open position.
 4. Repeat steps 6-15 as above for remote mounted tests, disc upstream.
 5. Remove valve & reposition with disc in downstream (atmospheric) position. Shaft in plane of elbow.
 6. Repeat steps 6-15 as above.
- C. #2 Valve Installation - Close Mounted (5/8" shaft)
1. Install butterfly valve #2, with disc facing upstream and shaft in plane of elbow.
 2. Repeat steps 2-15 as above for upstream disc and shaft-in-plane, except as noted below:

NOTE: For reduced diameter shaft testing, maximum applied upstream pressure is to be determined from the results of testing valve #1. If a pressure less than 60 psig is used for shaft stress reasons, strain should be monitored carefully and should not exceed 625 microstrain.

3. Reposition valve with disc in upstream position and shaft 90° out of plane.
4. Repeat steps 6-15 as above.
5. Remove and reposition valve with disc in downstream position and shaft in plane of elbow.
6. Repeat steps 6-15 as above.
7. Reposition valve with disc in downstream position and shaft 90° out of plane.
8. Repeat steps 6-15 as above.

D. #2 Valve Installation - Remote Mounted.

1. Refer to Section B above for the general mounting arrangement. Valve is to be mounted with disc flat facing upstream and shaft in plane of elbow.
2. Continue testing of Valve #2 as outlined in Section A steps 6-15, and Section C step 2 notes.
3. Reposition valve #2 with disc flat facing downstream, shaft in plane of elbow.
4. Repeat steps A6-15 and C 2 as above.

E. #3 Valve Installation - Close Mounted (1/2" shaft)

1. Install valve #3, with disc flat facing upstream and shaft in plane of elbow.
2. Repeat steps 2-15 in Section A above, and Section C step 2 notes.
3. Continue testing valve #3 as valves #1 and #2 above.
4. Valve #3 is to be tested in both close mounted and remote mounted configurations as outlined in Section A-15, and Section B above, with the exceptions noted in Section C step 2 as performed with valve #2 reduced diameter shafting.