

KEROSENE FIRE-SAFE VALVE TEST SUMMARY

TEST #: FT-0058

TEST DATE: 7/16/91

TEST PROCEDURE: PROPOSED KEROSENE TEST

VALVE: VELAN NPS 6" ANSI 300 # CLASS
FLANGES - RAISED FACE
BONNET - MODIFIED TO FLAT FACE

PACKING TESTED: MANUFACTURER: GARLOCK
STYLE: 9000 EVSP SIMPLIFIED
NO. OF RINGS: 2-98; 5-GL
GLAND PEN: .179"
SET COMPRESSION: 28.2 %
NO. OF PREVIOUS TESTS: 1

GASKETS TESTED:

FLANGES: MANUFACTURER: GARLOCK
STYLE: 9900 (X-3427)
THICKNESS: 1/16"
TORQUED TO: 120 FT-LBS
INCREMENTS OF: 30 FT-LBS
NO. OF PREVIOUS TESTS: 1

BONNET: MANUFACTURER: GARLOCK
STYLE: 9900 (X-3427)
THICKNESS: 1/16"
TORQUED TO: 120 FT-LBS
INCREMENTS OF: 30 FT-LBS
NO. OF PREVIOUS TESTS: 0

COMMENTS: BOTH THE PACKING AND GASKETING PASSED THE TEST. THE PACKING EXPERIENCED NO LEAKAGE DURING THE ENTIRE TEST. THE BONNET AND FLANGE GASKETS SHOWED NO SIGNS OF LEAKAGE DURING THE ENTIRE TEST.

TEST PERSONNEL: MARK ADAMS
MARK CLEMENT
TOM ENRIGHT
TIM HURLEY

KEROSENE FIRE-SAFE VALVE TEST DATA

TEST #: FT-0058

TEST DATE: 7/16/91

I. SYSTEM DATA

A. FILL AND VENT

B. TANK LEVEL - START: 3.3" AT 25 psig.

C. TANK LEVEL - END: 3.2" AT 25 psig.

D. DELTA HEIGHT 0 INCHES

E. (DELTA HEIGHT) X (2259.31) = 0 ml

II. PRE-BURN PROCEDURE

A. PRESSURIZE SYSTEM

1. 540 psig \pm 10 % (486 - 585 psig)

2. RECORD TIME 9:50

B. CHECK SYSTEM

1. N AND S FLANGES OK

2. BONNET OK

3. PACKING OK

4. SYSTEM PIPING OK

5. RECORD TIME 9:55

III. START-UP

A. REDUCE PRESSURE TO 25 psig MINIMUM

B. START FLAMES 10:12

IV. FIRE TEST

A. RECORD PRESSURE EVERY 2 MINUTES

B. T2 AND T3 MUST REACH 1200°F WITHIN 10 TO 20 MINUTES

C. MAINTAIN 1200°F TEMPERATURES FOR 15 MINUTES

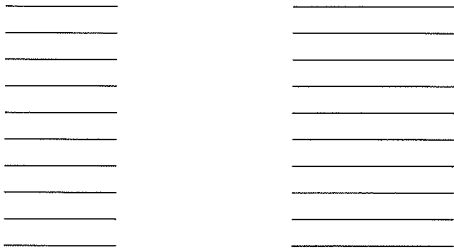
D. MAINTAIN 25 psig MINIMUM PRESSURE

KEROSENE FIRE-SAFE VALVE TEST DATA

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TEST DATE: 7/16/91

<u>TIME</u>	<u>PRESSURE</u>	<u>COMMENTS</u>
<u>10:12</u>	<u>25</u>	<u>START - FLAMES A&F ONLY</u>
<u>10:14</u>	<u>25</u>	
<u>10:16</u>	<u>25</u>	
<u>10:18</u>	<u>26</u>	
<u>10:20</u>	<u>26</u>	<u>FLAMES THROTTLED BACK</u>
<u>10:22</u>	<u>27</u>	<u>UP TO REQUIRED TEMPS</u>
<u>10:24</u>	<u>27</u>	
<u>10:26</u>	<u>27</u>	
<u>10:28</u>	<u>28</u>	
<u>10:30</u>	<u>28</u>	
<u>10:32</u>	<u>28</u>	
<u>10:34</u>	<u>28</u>	
<u>10:36</u>	<u>29</u>	
<u>10:37</u>	<u>29</u>	<u>FLAMES OFF</u>



FLAME F

T2

T3

FLAME A

T8

T7

T1

T4

T6

T5

KEROSENE FIRE-SAFE VALVE TEST DATA

TEST #: FT-0058

TEST DATE: 7/16/91

V. POST BURN:

A. QUENCH VALVE TO 200°F

1. QUENCH START 10:38

2. QUENCH END 10:42

B. STABILIZE TEMPERATURE AND PRESSURE (1 MINUTE MINIMUM)

C. ACTUATE VALVE OPEN 10:48

D. LOW PRESSURE TEST

1. REDUCE PRESSURE TO 10 psig + 1/2 psi 10:48

2. START 10 MINUTE LEAK TEST 10:48

3. END 10 MINUTE LEAK TEST 10:58

4. PACKING LEAK RATE 0 ml/10 min

5. BODY SEALS LEAK ~~THEMOCOUPLER~~ LOCATIONS

E. MEDIUM PRESSURE TEST

1. INCREASE PRESSURE TO 324 psig + 5 psi 10:59

2. START 10 MINUTE LEAK TEST 11:01
3. END 10 MINUTE LEAK TEST 11:11
4. PACKING LEAK RATE 0 ml/10 min
5. BODY SEALS LEAK RATE 0 ml/10 min

F. HIGH PRESSURE TEST

1. INCREASE PRESSURE TO 540 psig + 5 psi 11:12
2. START 10 MINUTE LEAK TEST 11:15
3. END 10 MINUTE LEAK TEST 11:25
4. PACKING LEAK RATE 0 ml/10 min
5. BODY SEALS LEAK RATE 0 ml/10 min

KEROSENE FIRE-SAFE VALVE TEST DATA

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LOW PRESSURE TEST (10 psig)

<u>10:48</u>	<u>10</u>	<u>START</u>
<u>10:50</u>	<u>10</u>	
<u>10:52</u>	<u>10</u>	
<u>10:54</u>	<u>10</u>	<u>NO LEAKAGE</u>
<u>10:56</u>	<u>10</u>	
<u>10:58</u>	<u>10</u>	<u>END</u>

MEDIUM PRESSURE TEST (324 psig)

<u>11:01</u>	<u>324</u>	<u>START</u>
<u>11:03</u>	<u>324</u>	
<u>11:05</u>	<u>324</u>	
<u>11:07</u>	<u>324</u>	<u>NO LEAKAGE</u>
<u>11:09</u>	<u>324</u>	
<u>11:11</u>	<u>324</u>	<u>END</u>

HIGH PRESSURE TEST (540 psig)

<u>11:15</u>	<u>540</u>	<u>START</u>
<u>11:17</u>	<u>540</u>	
<u>11:19</u>	<u>540</u>	
<u>11:21</u>	<u>540</u>	<u>NO LEAKAGE</u>
<u>11:23</u>	<u>540</u>	
<u>11:25</u>	<u>540</u>	<u>END</u>

BREAK AWAY TORQUES (ft-lbs)

	<u>40</u>	<u>45</u>
<u>40</u>		<u>50</u>

BONNET

65

55

65

60

70

55

KEROSENE FIRE-SAFE VALVE TEST SUMMARY

TEST #: FT-0058

TEST DATE: 7/16/91

VALVE: VELAN 6" ANSI 300# CLASS

PACKING:

MANUFACTURER: GARLOCK

STYLE: 9000 EVSP SIMPLIFIED

I. LOW PRESSURE BURN

EXTERNAL LEAKAGE RATE OF 0 ML/MIN/IN

OCCURRED DURING A **25** MINUTE BURN PERIOD.

LEAKAGE SHALL NOT RESULT IN FLAMES MORE THAN 4 INCHES HIGH.

II. LOW PRESSURE TEST

EXTERNAL LEAKAGE RATE OF 0 ML/MIN/IN

OCCURRED DURING A **10** MINUTE PERIOD.

ALLOWABLE PACKING LEAKAGE RATE IS 10 DROPS/MIN (.4 ML/MIN)

ALLOWABLE BODY LEAKAGE RATE IS 30 DROPS/MIN (1.1 ML/MIN)

III. MEDIUM PRESSURE TEST

EXTERNAL LEAKAGE RATE OF 0 ML/MIN/IN

OCCURRED DURING A **10** MINUTE PERIOD.

ALLOWABLE PACKING LEAKAGE RATE IS 10 DROPS/MIN (.4 ML/MIN)

ALLOWABLE BODY LEAKAGE RATE IS 30 DROPS/MIN (1.1 ML/MIN)

IV. HIGH PRESSURE TEST

EXTERNAL LEAKAGE RATE OF 0 ML/MIN/IN

OCCURRED DURING A **10** MINUTE PERIOD.

ALLOWABLE PACKING LEAKAGE RATE IS 10 DROPS/MIN (.4 ML/MIN)

ALLOWABLE BODY LEAKAGE RATE IS 30 DROPS/MIN (1.1 ML/MIN)

GARLOCK FIRE-TEST

TEST#: FT-0184

DATE: 4/25/97

PROCEDURE ISO 10497 (modified)

The intent of the following fire test was to evaluate the performance of the stem packing and bonnet gasket in accordance with the above standard. No attempt was made to evaluate the through seat leakage. System limitations restricted the pre-burn hydrostatic test pressure to 600 psig.

VALVE 6" Velan gate valve; 300# class
 Stuffing Box - 1.250" x 1.875"
 Flanges - raised face
 Bonnet - modified to flat face

PACKING Manufacturer: Garlock
 Style No: 9000-EVSP-S
 No. of Rings: 7 Ring
 Gland Pen: 0.500"
 Compression: 33.4%
 Stud Torque: 300 in-lbs
 No. of Tests: 2

GASKETS

BONNET Manufacturer: Garlock
 Style No: IFG 5500
 Thickness: 1/16"
 Torqued to: 200 ft-lbs
 Increments of: 67 ft-lbs
 No. of Tests: 0

FLANGE Manufacturer: Garlock
 Style No: 3123
 Thickness: 1/16"
 Torqued to: 200 ft-lbs
 Increments of: 50 ft-lbs
 No. of Tests: 8

PERSONNEL Scott Tanner
 Jim Smith
 Ed Earsing

COMMENTS

GARLOCK FIRE-TEST

TEST#: FT-0184

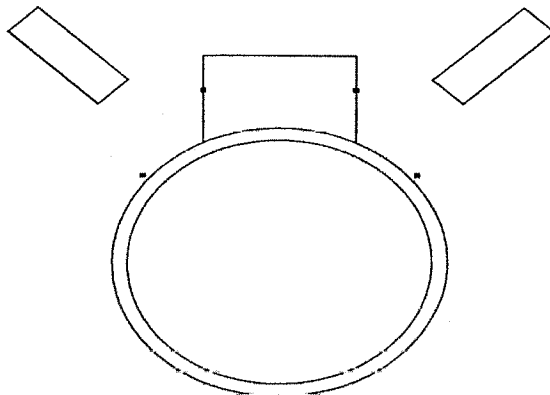
DATE: 4/25/97

I. PRE-BURN PROCEDURE

- A. Locate the flame environment and calorimeter cubes in the positions shown in figures 1.
- B. Pressurize system to 600 psig +/- 10% (540 - 660) .
- C. Check for and eliminate any system leaks.
- D. Reduce pressure to 563 psig +/- 10% (507 - 619).
- E. Record the tank level 8.1".

II. START-UP

- A. Start flames and record time 3:03.
- B. Record pressure at two minute intervals.
- C. Average temperature of the two flame environment thermocouples (T5 and T6) must reach 1382°F within 2 minutes from the start of the burn. Maintain the average temperature between 1382°F to 1832°F, with no reading less than 1292°F for the remainder of the 30 minute burn.
- D. Average temperature of the two calorimeter cubes (T1 and T2) must reach 1202°F within 15 minutes from the start of the burn. Maintain the minimum average temperature of 1202°F, with no calorimeter cube temperature falling below 1040°F.
- E. Maintain 507 to 619 psig during entire 30 minutes.



GARLOCK FIRE-TEST

TEST#: FT-0184

DATE: 4/25/97

IV. POST BURN

- A. Allow the valve to cool to 212°F or less and record time 13:36.
- B. Record the tank level 8.1”
- C. Calculate the burn and cool leakage.

Tank level change x 2259 = 0 ml.

D. Low Pressure Test

- 1. Reduce pressure to 58 psig +/- 10% (52 - 64).
- 2. Start five minute leak test 13:40.
- 3. End five minute leak test 13:45.
- 4. Record external leakage rate 0 ml/5 min.

E. High Pressure Operational Test

- 1. Increase pressure to 563 psig +/- 10% (507 - 619).
- 2. Actuate valve to the open position.
- 3. Start five minute leak test 13:56.
- 4. End five minute leak test 14:01.
- 5. Record external leakage rate 0 ml/5 min.

GARLOCK FIRE-TEST

TEST#: FT-0184

DATE: 4/25/97

V. PERFORMANCE SUMMARY

A. High Pressure Burn and Cool

External leakage rate of 0 ml/in NPS/min occurred during a 33 minute burn and cool down period. Allowable leakage rate is 100 ml/in NPS/min.

B. Low Pressure Burn and Cool

External leakage rate of 0 ml/in NPS/min occurred during a five minute period. Allowable leakage rate is 20 ml/in NPS/min.

C. High Pressure Operational Test

External leakage rate of 0 ml/in NPS/min occurred during a five minute period. Allowable leakage rate is 200 ml/in NPS/min.

FIRE-SAFE VALVE TEST SUMMARY

TEST #: FT-0014

TEST DATE: 7/26/89

TEST PROCEDURE: API 607 3rd EDITION

VALVE: NIBCO NPS 6" ANSI 300 # CLASS
FLANGES - RAISED FACE
BONNET - MODIFIED TO FLAT FACE

PACKING TESTED: MANUFACTURER: GARLOCK
STYLE: 1298
NO. OF RINGS: 5
GLAND PEN: ?
SET COMPRESSION: 30 %
NO. OF PREVIOUS TESTS: ?

GASKETS TESTED:

FLANGES: MANUFACTURER: GARLOCK
STYLE: 9850
THICKNESS: 1/16"
TORQUED TO: 90 FT-LBS
INCREMENTS OF: 30 FT-LBS
NO. OF PREVIOUS TESTS: 1

BONNET: MANUFACTURER: GARLOCK
STYLE: 9850
THICKNESS: 1/16"
TORQUED TO: 90 FT-LBS
INCREMENTS OF: 30 FT-LBS
NO. OF PREVIOUS TESTS: 1

COMMENTS: BOTH THE PACKING AND GASKETING PASSED THE TEST. THE PACKING
LEAKED DURING THE COOL DOWN AND PRESSURE TESTS. THE GASKETING
SHOWED NO SIGNS OF LEAKAGE.

TEST PERSONNEL: JIM DRAGO

FIRE-SAFE VALVE TEST SET-UP

TEST #: FT-0014

TEST DATE: 7/26/89

I. SYSTEM DATA

A. FILL AND VENT

B. TANK LEVEL - START: 8.63" AT 0 psig

- C. TANK LEVEL - END: 3.5" AT 0 psig
- D. DELTA HEIGHT 5.13 INCHES
- E. (DELTA HEIGHT) X (2259.31) = 11,578 ml

II. PRE-BURN PROCEDURE

A. PRESSURIZE SYSTEM

- 1. 540 psig + 10 % (486 - 585 psig)
- 2. RECORD TIME 9:04

B. CHECK SYSTEM

- 1. N AND S FLANGES OK
- 2. BONNET OK
- 3. PACKING OK
- 4. SYSTEM PIPING OK
- 5. RECORD TIME 9:16

III. START-UP

- A. START FLAMES 9:22

IV. FIRE TEST

- A. RECORD PRESSURE EVERY 2 MINUTES
- B. T1 AND T2 MUST REACH 1200°F WITHIN 15 MINUTES
- C. MAINTAIN AVERAGE OF 1200°F FOR REMAINDER OF 30 MINUTES
- D. MAINTAIN 486 TO 594 psig DURING ENTIRE TEST

FIRE-SAFE VALVE TEST DATA

TEST #: FT-0014

TEST DATE: 7/26/89

TIME	PRESSURE	COMMENTS	
	<u>535</u>	<u>START</u>	<u>9:22</u>
<u>9:24</u>	<u>535</u>		
<u>9:26</u>	<u>535</u>		
<u>9:28</u>	<u>535</u>		
<u>9:30</u>	<u>535</u>		<u>9:32</u>
	<u>535</u>	<u>UP TO REQUIRED TEMPS</u>	<u>9:34</u>
<u>540</u>			
<u>9:36</u>	<u>540</u>		
** <u>9:37</u>	<u>540</u>		
<u>9:38</u>	<u>540</u>		<u>9:40</u>
	<u>540</u>		
<u>9:42</u>	<u>540</u>		
<u>9:44</u>	<u>540</u>		

FIRE-SAFE VALVE TEST SUMMARY

TEST #: FT-0014

TEST DATE: 7/26/89

VALVE: NIBCO 6" ANSI 300# CLASS

PACKING:

MANUFACTURER: GARLOCK

STYLE: 1298

I. HIGH PRESSURE BURN AND COOL

EXTERNAL LEAKAGE RATE OF 50.76 ML/MIN/IN.

OCCURRED DURING A 218 MINUTE BURN AND COOL DOWN PERIOD.

ALLOWABLE LEAKAGE RATE IS 100 ML/MIN/IN.

II. LOW PRESSURE TEST

EXTERNAL LEAKAGE RATE OF .33 ML/MIN/IN.

OCCURRED DURING A 5 MINUTE PERIOD.

ALLOWABLE LEAKAGE RATE IS 20 ML/MIN/IN.

III. HIGH PRESSURE TEST WITH VALVE FULL OPEN

EXTERNAL LEAKAGE RATE OF 16.8 ML/MIN/IN.

OCCURRED DURING A 5 MINUTE PERIOD.

ALLOWABLE LEAKAGE RATE IS 200 ML/MIN/IN.