

SMARTFLEX™

Pressure Test





SMARTFLEX PRESSURE TEST

All SMARTFLEX installations must be pressure tested prior to being placed into service.

The primary pipe and secondary containment pipe (where applicable) shall be tested separately. The primary pipe shall be tested before completing all the welds in the secondary system.

A pressure gauge with test pressure at mid-scale is recommended. If the SMARTFLEX Pressure Test Device SENS010 is used as testing device please refer to its specific instruction guide.

If the installation has pressure constraints due to the installation of auxiliary devices, please contact our technical office before testing.

The following table provides testing parameters. Higher test pressures must be approved by the manufacturer.

	Gaseous Fluids		Liquid Fluids	
	Test Pressure	Test Duration	Test Pressure	Test Duration
Primary pipe	87 psi	2 hours	116 psi	2 hours
Secondary pipe	58 psi	2 hours	58 psi	2 hours
Rubber termination fittings	5 psi	2 hours	5 psi	2 hours

The conditions above are valid for the pipe at ambient temperature (68°F). For higher temperatures, wait for the conditions to be restored. The pipe shall NOT be tested when it is hot (pipe temperature > 95°C). It is recommended to carry out the pressure test in the early morning during the warm season of the year.

The pressure test shall be carried out on pipe runs with a maximum length of 300 ft in order to avoid that small pressure drops due to micro leaks will spread on the entire system under test and will not be detected.

The SMARTFLEX system includes a special testing device (Model SENS010) to be connected to the welding unit and the fluids generator. Barcode PRESSURE TEST CARDS are available for test performing.

Prior to commencing any pressure test it is good practice to inspect all welded fittings to ensure all fittings have been welded correctly.

The fluids recommended for the tests are: compressed air, nitrogen, helium or water.

Make sure that the filling phase of the sumps to be monitored is carried out gradually, avoiding overpressures.

CAUTION:

Before testing the primary pipe, ensure that the test ports on the double wall fittings are open and the interstice is properly vented.

CAUTION:

If gaseous fluids are employed for the pressure test, adequate safety precautions must be exercised.





Record the ambient temperature at the beginning and at the end of testing, as temperature changes will affect gas pressure inside the pipe.

Pressure change due to temperature (only for gaseous fluids) is 0.19% for °F. [e.g. $\pm \Delta T = -18^\circ\text{F}$ will cause $\Delta P = -3.5\%$, hypothesizing that the temperature at the start of the test is around 60°F].

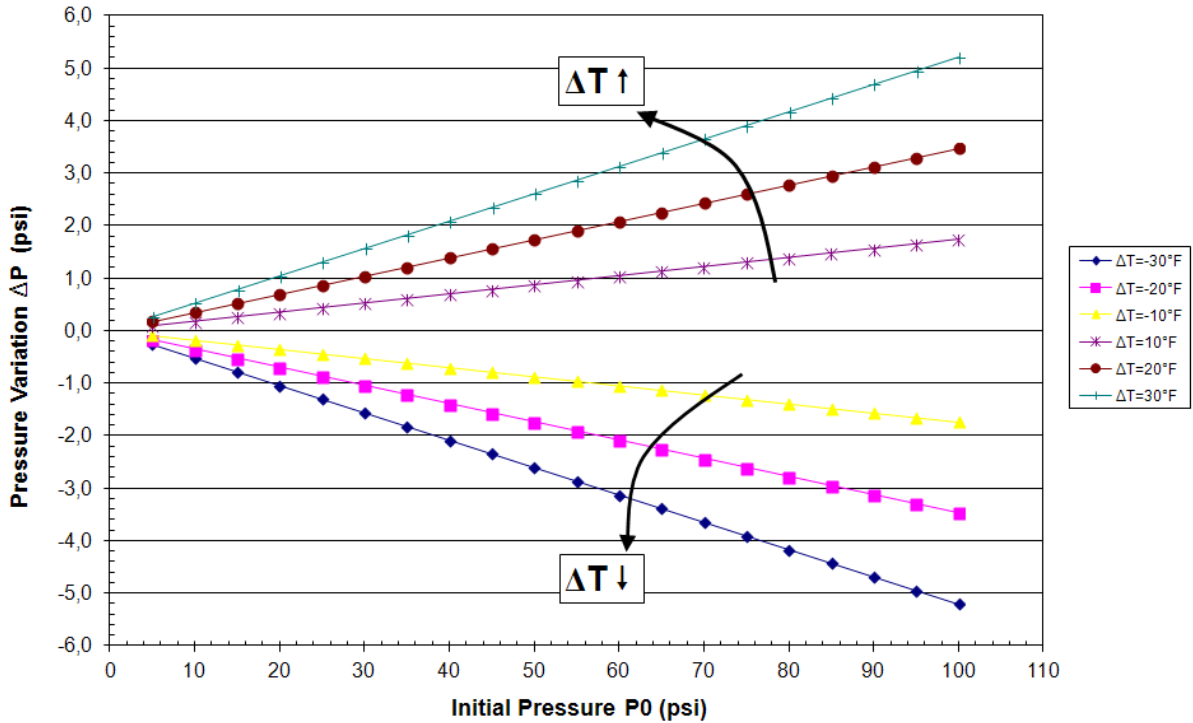
A net pressure change (after temperature compensation) of -2% is typically considered acceptable to take into account eventual micro leakage of testing devices.

The following table shows the final pressure P (psi) in function of initial pressure P0 (psi) and of temperature change ΔT (°F).

Initial pressure (psi)	Temperature variation ΔT (°F)						
	-27	-18	-9	0	9	18	27
	Final pressure (psi)						
5	4.7	4.8	4.9	5.0	5.1	5.2	5.3
10	9.5	9.7	9.8	10.0	10.2	10.3	10.5
15	14.2	14.5	14.7	15.0	15.3	15.5	15.8
20	19.0	19.3	19.7	20.0	20.3	20.7	21.0
25	23.7	24.1	24.6	25.0	25.4	25.9	26.3
30	28.4	29.0	29.5	30.0	30.5	31.0	31.6
35	33.2	33.8	34.4	35.0	35.6	36.2	36.8
40	37.9	38.6	39.3	40.0	40.7	41.4	42.1
45	42.7	43.4	44.2	45.0	45.8	46.6	47.3
50	47.4	48.3	49.1	50.0	50.9	51.7	52.6
55	52.1	53.1	54.0	55.0	56.0	56.9	57.9
60	56.9	57.9	59.0	60.	61.0	62.1	63.1
65	61.6	62.7	63.9	65.0	66.1	67.3	68.4
70	66.4	67.6	68.8	70.0	71.2	72.4	73.6
75	71.1	72.4	73.7	75.0	76.3	77.6	78.9
80	75.8	77.2	78.6	80.0	81.4	82.8	84.2
85	80.6	82.0	83.5	85.0	86.5	88.0	89.4
90	85.3	86.9	88.4	90.0	91.6	93.1	94.7
95	90.1	91.7	93.4	95.0	96.6	98.3	99.9
100	94.8	96.5	98.3	100.0	101.7	103.5	105.2



The following diagram shows the pressure change ΔP (psi) in the system, considering an initial pressure P_0 and according to various temperature changes ΔT ($^{\circ}F$).



Note: the procedure described above is a quick test procedure carried out under a so-called low pressure. This testing procedure could rarely not allow detection of anomalies caused by non-perfectly welds e.g. pasted welds, excessive offset or pipe that has not reached its correct position inside the fitting.

In case the pressure test had a negative result due to a leak at a fitting detected through soapy water or a suitable leak detection gas, the test shall be interrupted and the fitting shall be removed and replaced with a new one.





Problem solving in case of leak at any welded assembly

Considering that the electrofusion welding process is an optimal welding process (as it is based on molecular fusion between the materials that creates the assembly), possible leaks of the welded parts can occur only for the following reasons:

- The welding process was interrupted. Therefore, it was not completed correctly (the welding unit would have displayed an error on the screen).

Or:

- The pipes and fittings were not scraped and cleaned correctly. In this case, the material may not have fused together properly.

Since it is not possible to determine defective welding solely through a visual examination, we recommend:

- Re-welding the fitting one further time.
- Repeating the pressure test once welded and cooled.

Guidelines for system maintenance

The following guidelines shall be explained to the installer during their training:

- If a leak or anomaly is detected in any part of the system (by inspecting the sumps or through the leak monitoring system), the problem must be resolved by the maintenance person immediately.
- If the piping system is damaged or there is a leak, the manufacturer or distributor should be contacted for further advice.

The service station operator should be advised accordingly.

CAUTION:

Ignoring or disabling any monitoring system alarm may cause future damage.



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