



Service report

Integrity testing

Run Safer, Run Smarter, Run Better



Alfa Laval heat exchanger integrity testing service report





Service Report

Integrity Testing

Run Safer, Run smarter, Run Better



1 Method of the integrity test

The Alfa Laval integrity test uses a hydrogen and nitrogen mix (forming gas). This gas makes it possible to detect emerging plate faults that can lead to internal leaks and the mixing of both liquids. Moreover, external leaks can also be detected as the result of a faulty gasket.

1.1 Description of the method

All lines are disconnected from the heat exchanger, so it can drain. The remaining liquid will be forced out with compressed air.

One side is pressurised with the forming gas, while the other side is connected to the integrity test unit, so there will be a permanent flow of compressed air through this side.

During the test, the pressure of the forming gas will be increased in 3 steps, namely to 1, 3 and 5 bar. The detector of the integrity test unit will take a sample during each step.

The levels of forming gas measured in the compressed air flow are analysed to assess the integrity of the plate pack.

During the test, we will also check whether the pressure of the forming gas remains the same and does not drop sharply. Additionally, we will fill both circuits with forming gas and perform a scan of the gaskets with a portable sensor to identify any defects, as these could result in external leaks.

1.2 Analysis of the measurements

The results, analyses and recommendations will be presented for each section separately.

The numbering of the section starts with a section closest to the fixed frame plate. The section with the highest number is the section touching the movable pressure plate.

Depending on the increase of the ppms as a function of the pressure of the forming gas, there may be indications of the nature of the actual or potential internal leak.



Service Report

Integrity Testing

Run Safer, Run smarter, Run Better



2 Integrity test results

2.1 Cold block cooler



There are 279 plates in the cold block cooler. The actual installation size (after tightening) is 934 - 935mm.

Forming gas was introduced on S4 and T4. Compressed air was introduced on S1 and T1. From 3 bar upwards, the forming gas levels in the compressed air circuit start rising (see the chart below).

A 'sniffer' (sensor) was used all around the plate pack. No external leaks were found.

The sniffer was positioned on the compressed air outlet after the line had been disconnected. This resulted in a measurement of approximately 900 ppm of forming gas.



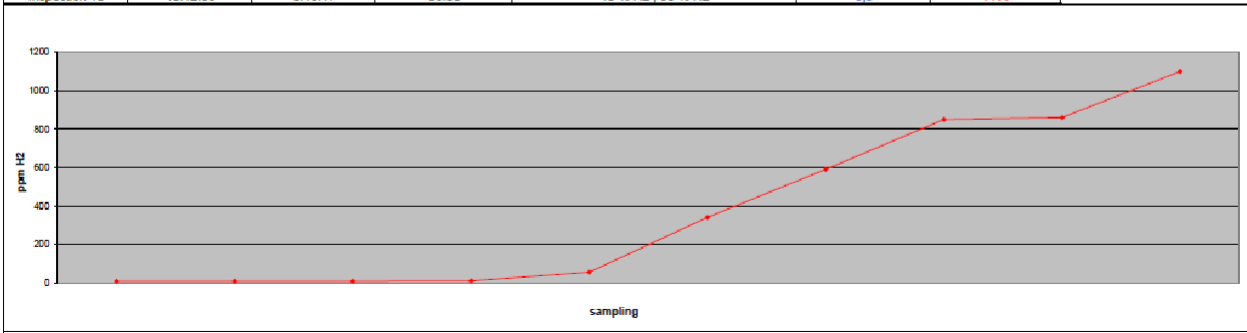
Service Report

Integrity Testing

Run Safer, Run smarter, Run Better



Date	Time	Time Elap.	Circulation Time	Test Gas	Unsteril circle	Steril circle
2022-12-14	hh:mm:ss	[h]mm:ss	mm:ss	in % H2 and N2	Tracer gas (bar)	ppm H2
Inspection 1 (M)	09:57:49	0:00:13	00:11	10 % H2 ; 90 % N2	1,0	7
Inspection 2 (M)	10:00:13	0:02:38	02:20	10 % H2 ; 90 % N2	1,0	7
Inspection 3	10:00:37	0:03:02	00:20	10 % H2 ; 90 % N2	1,0	7
Inspection 4 (M)	10:02:38	0:05:03	01:57	10 % H2 ; 90 % N2	3,0	9
Inspection 5	10:03:42	0:06:06	00:58	10 % H2 ; 90 % N2	3,0	54
Inspection 6 (M)	10:05:35		01:50	10 % H2 ; 90 % N2	5,0	340
Inspection 7	10:06:45	0:09:09	01:06	10 % H2 ; 90 % N2	5,0	590
Inspection 8 (M)	10:09:14	0:11:38	02:25	10 % H2 ; 90 % N2	5,0	850
Inspection 9	10:09:49	0:12:13	00:31	10 % H2 ; 90 % N2	5,0	860
Inspection 10	10:12:53	0:15:17	03:00	10 % H2 ; 90 % N2	5,0	1100



End conclusion: this plate pack has sustained damage to its plates that can lead to internal leakage. A leak trail can be seen in the middle of the plate pack (see the second picture above). This is probably at the level of the baffles. A pressure surge at the level of these baffles may be the cause of this damage.



Service Report

Integrity Testing

Run Safer, Run smarter, Run Better

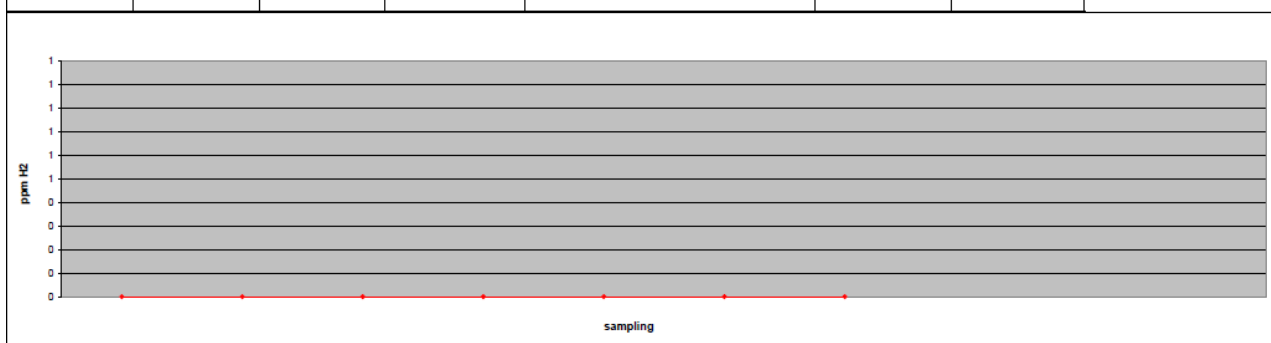


2.2 Pasteurizer



In the 3rd section, forming gas was introduced on the glycol side T4 and T3. Compressed air was applied to the beer side. No forming gas was detected in the compressed air circuit. A 'sniffer' (sensor) was used all around this section. No external leaks were found.

Date	Time	Time Elap.	Circulation Time	Test Gas	Unsteril circle	Steril circle
2022-12-14	hh:mm:ss	[h]:mm:ss	mm:ss	in % H2 and N2	Tracer gas (bar)	ppm H2
Inspection 1 (M)	13:26:02	0:00:05	00:04	10 % H2 ; 90 % N2	1,0	0
Inspection 2 (M)	13:27:07	0:01:10		10 % H2 ; 90 % N2	1,0	0
Inspection 3	13:28:59	0:03:02	01:47	10 % H2 ; 90 % N2	1,0	0
Inspection 4 (M)	13:32:12	0:02:11	02:09	10 % H2 ; 90 % N2	3,0	0
Inspection 5	13:33:03	0:03:02	00:46	10 % H2 ; 90 % N2	3,0	0
Inspection 6 (M)	13:35:23	0:05:22	02:16	10 % H2 ; 90 % N2	5,0	0
Inspection 7	13:36:07	0:06:06	00:40	10 % H2 ; 90 % N2	5,0	0



In the 2nd section, forming gas was applied to the beer side and compressed air on the beer side S4. No forming gas was detected in the compressed air circuit. A 'sniffer' (sensor) was used all around this section. No external leaks were found.



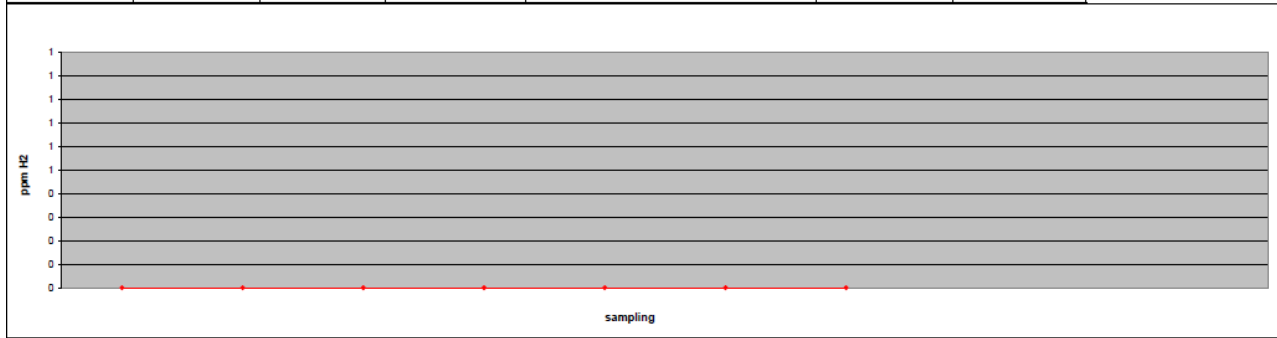
Service Report

Integrity Testing

Run Safer, Run smarter, Run Better

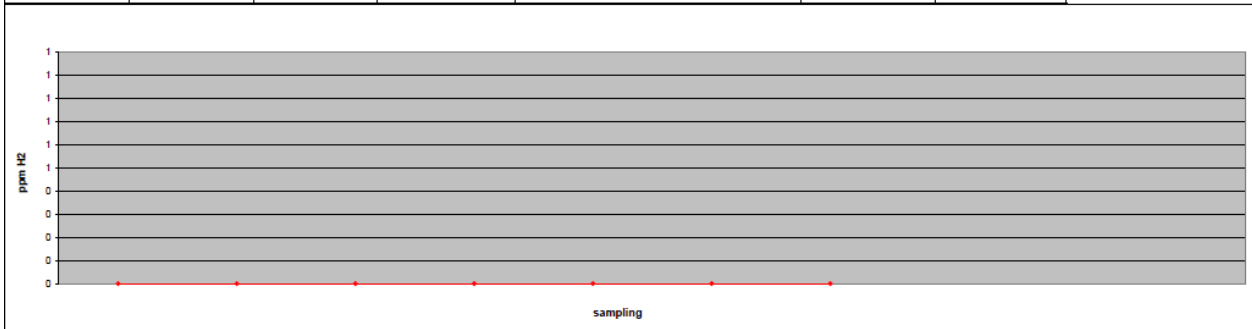


Date	Time	Time Elap.	Circulation Time	Test Gas	Unsteril circle	Steril circle
2022-12-14	hh:mm:ss	[h]:mm:ss	mm:ss	in % H2 and N2	Tracer gas (bar)	ppm H2
Inspection 1 (M)	13:47:52	0:00:04	00:02	10 % H2 ; 90 % N2	1,0	0
Inspection 2 (M)	13:49:23	0:01:35	01:27	10 % H2 ; 90 % N2	1,0	0
Inspection 3	13:50:49	0:03:02	01:22	10 % H2 ; 90 % N2	1,0	0
Inspection 4 (M)	13:53:28	0:05:40	02:34	10 % H2 ; 90 % N2	3,0	0
Inspection 5	13:53:53	0:06:05	00:21	10 % H2 ; 90 % N2	3,0	0
Inspection 6 (M)	13:55:17	0:07:30	01:20	10 % H2 ; 90 % N2	5,0	0
Inspection 7	13:56:57	0:09:09	01:35	10 % H2 ; 90 % N2	5,0	0



In the 1st section, forming gas was applied to S1-S2 and compressed air on the beer side S4. No forming gas was detected in the compressed air circuit. A 'sniffer' (sensor) was used all around this section. No external leaks were found.

Date	Time	Time Elap.	Circulation Time	Test Gas	Unsteril circle	Steril circle
2022-12-14	hh:mm:ss	[h]:mm:ss	mm:ss	in % H2 and N2	Tracer gas (bar)	ppm H2
Inspection 1 (M)	14:10:15	0:00:06	00:04	10 % H2 ; 90 % N2	1,0	0
Inspection 2 (M)	14:11:20	0:01:10	01:00	10 % H2 ; 90 % N2	1,0	0
Inspection 3	14:13:11	0:03:01	01:47	10 % H2 ; 90 % N2	3,0	0
Inspection 4 (M)	14:14:40	0:04:30	01:25	10 % H2 ; 90 % N2	3,0	0
Inspection 5	14:16:15	0:06:05	01:31	10 % H2 ; 90 % N2	3,0	0
Inspection 6 (M)	14:17:56	0:07:47	01:38	10 % H2 ; 90 % N2	5,0	0
Inspection 7	14:19:19	0:09:09	01:18	10 % H2 ; 90 % N2	5,0	0



End conclusion: this plate pack is free from damage to its plates that can lead to internal leakage.