

File issue: 001	TEST SHEETS R110	
	CNG EQUIPMENT	
Report number: 123775	Filters	Page: TM01/00


Annex 4C: Filters

Key to Test Sheets:	YES = YES	NA = Not Applicable	NT = Not Tested	NO = NO	Example:	YES-NA-NT-NO
Notes: When filling in Test Sheets, answers are crossed out which are not applicable for that clause.						

	Definition: Filter means a protective screen which removes foreign describes from the gas steam	
2.1	The CNG filter shall be so designed to operate at temperatures as specified in 50	See below
2.2	The CNG filter shall be classified with regard to the maximum working pressure (see paragraph 2 of this regulation)	See below
2.2.1	Class 0: the CNG filter shall be so designed to withstand a pressure of 1.5 times the working pressure (Mpa)	YES-NA-NT-NO
2.2.2	Class 1 and Class 2: The CNG filter shall be so designed to withstand a pressure twice the working pressure	YES-NA-NT-NO
2.2.3	Class 3: The CNG filter shall be so designed to withstand a pressure twice the relief pressure of the pressure relief valve on which it is subject	YES-NA-NT-NO
2.3	The material used in the CNG filter which are in contact with CNG when operating shall be compatible with this gas (see annex 5D)	See below
2.4	The component has to comply with the test procedures for Class components according to the scheme in figure 1-1 of paragraph 2 of this regulation	See below
5A	Overpressure or strength	YES-NA-NT-NO
5B	External leakage	YES-NA-NT-NO
5C	Internal leakage	YES-NA-NT-NO
5D	CNG compatibility ^a	YES-NA-NT-NO
5 ^E	Corrosion resistance	YES-NA-NT-NO
5F	Resistance to dry heat ^a	YES-NA-NT-NO
5G	Ozone aging ^a	YES-NA-NT-NO
5H	Temperature cycle	YES-NA-NT-NO
5L	Durability test	YES-NA-NT-NO
5N	Vibration resistance	YES-NA-NT-NO
5O	Operating temperatures	YES-NA-NT-NO

^a These test are not done, while the rubber parts are already tested see declaration sheet.

Job Reference: 123775	Initials: <i>Dykhpu</i>
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File Issue: 001	RESULT SHEET R67-01	
	LPG EQUIPMENT R67-01 revision 2: 29 march 2006	
Report Number: 123775	LPG Filter unit	Page: TM02/00

Annex 5: LPG FILTER UNIT

Key to Test Sheets:	YES = YES	NA = Not Applicable	NT = Not Tested	NO = NO	Example:	YES-NA-NT-NO
Notes: When filling in Test Sheets, answers are crossed out which are not applicable for that clause.						

	Annex 5 LPG Filter unit	
2	Component classification : Class 1, 2 or 2A	YES-NA-NT-NO
3	Classification pressure 3.000 kPa	YES-NA-NT-NO
	450 kPa	YES-NA-NT-NO
	120 kPa	YES-NA-NT-NO
4	Design temperatures: -20 °C to 120 °C	YES-NA-NT-NO
5	General design rules: Not used	YES-NA-NT-NO
6.1	The component, Class 1 meets the applicable test procedures:	
	- Over pressure test Annex 15, par. 4	YES-NA-NT-NO
	- External leakage Annex 15, par. 5	YES-NA-NT-NO
	- High temperature Annex 15, par. 6	YES-NA-NT-NO
	- Low temperature Annex 15, par. 7	YES-NA-NT-NO
	- LPG compatibility Annex 15, par. 11	YES-NA-NT-NO
	- Corrosion resistance Annex 15, par. 12	YES-NA-NT-NO
	- Resistance to dry heat Annex 15, par. 13 TNO Results	YES-NA-NT-NO
	- Ozone ageing Annex 15, par. 14 TNO Results	YES-NA-NT-NO
- Creep Annex 15, par. 15	YES-NA-NT-NO	
- Temperature cycle Annex 15, par. 16	YES-NA-NT-NO	
6.2	The component, Class 2 and / or 2A meets the applicable test procedures:	
	- Over pressure test Annex 15, par. 4	YES-NA-NT-NO
	- External leakage Annex 15, par. 5 See result sheet RM02/00	YES-NA-NT-NO
	- High temperature Annex 15, par. 6 See result sheet RM05/00	YES-NA-NT-NO
	- Low temperature Annex 15, par. 7 See result sheet RM05/00	YES-NA-NT-NO
	- LPG compatibility Annex 15, par. 11	YES-NA-NT-NO
- Corrosion resistance Annex 15, par. 12 See result sheet 01/00	YES-NA-NT-NO	

Job Reference:123775		Initials: <i>DJKNPA</i>
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File Issue: 003	RESULT SHEET R110	GASTEC ▲
	CNG EQUIPMENT	
Report Number: 123775	CORROSION TESTS (Salt spray)	Page RM01/00

Product:	Filter Type 97
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Tested in accordance with:			
Approval requirement:	Regulation 110		
Annex:	5E		
Article:	1		
Task instructions*:	ISO 9227		
Testing Equipment (when no accuracy is specified the Gastec standard applies)		Gastec no.	Calibrated (✓)
Salt spray equipment			Operation OK (✓)
Stopwatch		111324	✓
Thermometer			
Test Conditions			
Safety precautions:-			
		Complies (✓)	N.A. (✓)
- Before testing the sample is cleaned and dried at ambient temperatures < 40 °C		✓	
- All connections and openings are closed		✓	
- During testing the sodium chloride concentration is 50+5gr/l		✓	
- The average rate of collection of solution is checked (1-2ml/h/80cm ²)		✓	
- After testing the sample is cleaned and dried at ambient temperatures < 40 °C		✓	

Test results	Requirement	Sample no.: C070241	Sample no.:
Date and time starting the test	Timing aspects to be monitored	10-04-07	
Date and time stopping the test	Timing aspects to be monitored	16-04-07	
Salt spray testing time	144 h	✓	
Ambient temperature during testing	35±2°C	✓	
Store time at room temperature	0,5 -1h	✓	
Test to be performed after the endurance test are:			
Hydrostatic strength	According to 15.4	See page RM03/00	See page RM
External leakage at ambient, low and high temp	According to 15.5, 15.6 and 15.7	See page RM 02/00	See page RM

Conclusion			
Requirement		Complies (✓)	N.A. (✓)
Samples meet requirement		✓	
Remarks:			

Job Reference: 123775		Initials: 
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File Issue: 003	RESULT SHEET R110 CNG EQUIPMENT	GASTEC
Report Number: 123775	EXTERNAL LEAKAGE TEST including high and low temperature	Page: RM 02/00

Product:	Filter Type 97
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Tested in accordance with:			
Approval requirement:	Regulation 110		
Annex:	5B		
Testing Equipment (when no accuracy is specified the Gastec standard applies)	Gastec no.	Calibrated(✓)	Operation OK(✓)
Oven	102885	✓	✓
Cooler	109817	✓	✓
Pressure gauge	100868	✓	✓
Leakage gauge			
Stopwatch	111324	✓	✓
Test Conditions			
<i>Safety precautions:</i>			
- safety rules for high temperature, Gastec reference HT1			
- safety rules for high pressures, Gastec reference HP1			
- safety rules for use of gas cylinders, reference CP 16-3			
		Complies (✓)	N.A. (✓)
- The sample has conditioned for 8 hours (at least) at the test temperature;		✓	
- The sample is slowly pressurised after the 8 hours of conditioning at the test temperature;		✓	
- The test sample is submerged in the test fluid for at least 60 sec; preferred is 900 sec;		✓	
- When air bubble(s) are detected after 60 sec, leakage is considered to be > 15 cc/h.			✓


Test Results	Requirement	sample no.: C080732					
Test temperature		room temperature		85°C / 120°C *		-20°C / -40°C *	
Moment of test *	Corrosion / durability / Vibration / cycle test	before	after	Before	after	before	After
Classification of component *	0 4 2 3	2		2		2	
Test pressure	1-6 x wp	2-4 wp	2-3 wp	2-3 wp	9 bar	1xwp= 4.5 bar	1xwp= 4.5 bar
External leakage	< 15cc/h	✓		✓		✓	
Test date	To be monitored	15-10-08		24-10-08		16-10-08	

Conclusion		
Requirement	Complies(✓)	N.A. (✓)
Sample meets requirement	✓	
Remarks:		
The temperature is updated from -20°C to -40°C.		

- Cross out which is not applicable
- Wp = working pressure =
- Wp= 4.5 bar



Job Reference: 124540	Initials: <u> </u>
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File Issue: 003	RESULT SHEETS R110 CNG EQUIPMENT OVERPRESSURE TEST	
Report Number: 123775		Page: RM03/00

Product:	Filter Type 97
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Tested in accordance with:			
Approval requirement:	Regulation 110		
Annex:	5A		
Testing Equipment (when no accuracy is specified the Gastec standard applies)		Gastec no.	Calibrated (✓)
Hydraulic pressure equipment		109917	✓
Pressure gauge, when tested pneumatically		100666	✓
Stopwatch			
Test Conditions			
<i>Safety precautions:</i>			
- safety rules for high pressures Gastec reference HP1			
- safety rules for use of gas cylinders, reference CP16-3.			
		Complies (✓)	N.A. (✓)
- Test is to be performed before and after the durability test;			
- The samples are filled with water and slowly pressurised;			
- The samples surface shows no visible cracks as a result of this test;			
- Retest a new sample with a pressure gauge with accuracy +5% if samples have failed.			

Test Results	Requirement				sample no.: C070142		sample no.:		sample no.:	
	Before/after Durability test				before	After	before	after	before	after
Classification of component	0	1	2	3		2				
Test pressure (kPa)	1.5 x wp	2 x wp	2 x wp	2 x wp		9 bar				
Test time	> 1min					✓				
Rupture	No					✓				
Permanent distortion	No					✓				
Test dated	To be monitored					17-04-07				

Conclusion		
Requirement	Complies (✓)	N.A. (✓)
Samples meet requirement	✓	
Remarks:		

Wp = working pressure = 450 Kpa

Job Reference: 123775	Initials: <i>Djehpa</i>
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File Issue: 003	RESULT SHEET R110	
	CNG EQUIPMENT	
Report Number: 123775	VIBRATION RESISTANCE TEST	Page RM04/00

Product:	Filter Type 97
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Tested in accordance with:			
Approval requirement:	Regulation 110		
Annex:	5N		
Testing Equipment (when no accuracy is specified the Gastec standard applies)	Gastec no.	Calibrated (✓)	Operation OK (✓)
Resonance equipment	000589	✓	
Stroboscope (check 17 Hz with stroboscope)	111162	✓	
Test Conditions			
Safety precautions:-			
		Complies (✓)	N.A. (✓)
Component shall be vibrated for 2 hours at 17Hz with amplitude 1.5 mm			
Resonance test are carried out along each of three orthogonal axes			

Test results		Sample no.:C070141	Sample no.:
External leakage test annex 5B (additional)		see RM02/00	see RM
Internal leakage test annex 5C		see RM NA	see RM
Visual inspection after test	no mechanical failures	✓	
Test date	to be monitored	19-04-07	

Conclusion		
Requirement	Complies (✓)	N.A. (✓)
Samples meets requirement	✓	
Remarks:		
Stroboscope available from calibration group		

Job Reference:123775		Initials: <i>Dylcha</i>
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File Issue: 002	RESULT SHEET R110	GASTEC ▲
	CNG EQUIPMENT	
Report Number: 123775	OPERATION TEMPERATURES	Page: RM05/00

Tested in accordance with:	
Approval requirement	Regulation 110
Annex/Clause	4H/2.5

Test equipment used <small>(When no accuracy is specified, the Gastec standard applies)</small>	Gastec no.	Calibrated (✓)	Operation OK (✓)
Oven	480	✓	✓
Vreezer	109817	✓	✓

Test Conditions	
Ambient temperature	20.5°C
Ambient pressure	1004mbar

TEST RESULTS

Filter is tested at High temperature (120°C) ambient temperature (20, 5°C) and at low temperature -20°C.

In all temperature situations there were no non-compliance found.

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Conclusion		
Samples meet requirement	Complies (✓)	NA (✓)
Remarks:	✓	

Job Reference: 123775	Initials: <i>Dylhpa</i>
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File issue: 003	RESULT SHEETS R110 CNG EQUIPMENT OVERPRESSURE TEST	GASTEC
Report Number: 123775		Page: RM 01/00

Product:	Filter unit 97
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Tested in accordance with:			
Approval requirement:	Regulation 110		
Annex:	5A		
Testing Equipment <small>(when no accuracy is specified the Gastec standard applies)</small>		Gastec no.	Calibrated (✓) Operation OK (✓)
Hydraulic pressure equipment		111322	
Pressure gauge, when tested pneumatically		100866	✓ ✓
Stopwatch		111324	✓ ✓
Test Conditions			
Safety precautions:			
- safety rules for high pressures Gastec reference HP1			
- safety rules for use of gas cylinders, reference CP16-3.			
		Complies (✓)	N.A. (✓)
- Test is to be performed before and after the durability test;		✓	
- The samples are filled with water and slowly pressurised;		✓	
- The samples surface shows no visible cracks as a result of this test;		✓	
- Retest a new sample with a pressure gauge with accuracy ±5%, if samples have failed			✓

Test Results	Requirement				sample no.: C080735		sample no.:		sample no.:	
	Before/after Durability test				before	After	before	after	before	after
Moment of test	0	1	2	3						
Classification of component	0	1	2	3	2					
Test pressure (kPa)	1.5 x wp	2 x wp	2 x wp	2 x wp	9 bar					
Test time	≥ 3 min				✓					
Rupture	No				✓					
Permanent distortion	No				✓					
Test dated	To be monitored				15-10-2008					

Conclusion		
Requirement	Complies (✓)	N.A. (✓)
Samples meet requirement	✓	
Remarks:		

Wp = working pressure



Job Reference: 124540	Initials: <u>ERS</u>
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File Issue: 003	RESULT SHEET R67-01	GASTEC ▲
	LPG EQUIPMENT R67-01 revision 2: 29 march 2006	
Report Number: 123775	HYDROSTATIC STRENGTH	Page: RM06/00

Product:	Filter Type 97
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Tested in accordance with:			
Approval requirement:	Regulation 67-01		
Annex:	15		
Article:	4		
Testing Equipment <i>(when no accuracy is specified the Gastec standard applies)</i>		Gastec no.	Calibrated (✓)
Hydraulic pressure equipment		109917	✓
Pressure gauge, when tested pneumatically		100866	✓
Stopwatch		111324	✓
Test Conditions			
<i>Safety precautions:</i>			
- safety rules for high pressures Gastec reference HP1			
- safety rules for use of gas cylinders, reference CP16-3.			
		Complies (✓)	N.A. (✓)
- Test is to be performed before and after the corrosion test:			
- The samples are filled with water and slowly pressurised.			
- The samples surface shows no visible cracks as a result of this test.			
- Retest a new sample with a pressure gauge with accuracy +5% if samples have failed			

Test Results	Requirement				sample no.: C070142		sample no.:		Sample no.:	
	1	2	2A	3	before	after	before	after	Before	after
Moment of test	Before/after Corrosion test									
Classification of component*	1	2	2A	3		2				
Test pressure (kPa)*	6750	1015	270	6750		1015				
Test time	≥ 10 min					✓				
Rupture	No					✓				
Permanent distortion	No					✓				
Test dated	To be monitored					17-04-07				

Conclusion		
Requirement	Complies (✓)	N.A. (✓)
Samples meet requirement	✓	
Remarks:		

Job Reference: 123775	Initials: Dykhra
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