

**THE NETHERLANDS  
(N E D E R L A N D)****COMMUNICATION**

Concerning <sup>(1)</sup>:

- approval granted
- ~~approval extended~~
- ~~approval refused~~
- ~~approval withdrawn~~
- ~~production definitely discontinued~~

of a type of LPG equipment pursuant to Regulation number 67.

**Approval number: E4-67R-010213**

**Extension number: 00**

*Approval mark:*

1. LPG equipment considered <sup>(1)</sup>:
  - ~~Container including the configuration of accessories fitted to the container, as laid down in Appendix 1 to this annex.~~
  - ~~80% stop valve~~
  - ~~Level indicator~~
  - ~~Pressure relief valve (discharge valve)~~
  - ~~Pressure relief device~~
  - ~~Remotely controlled service valve with excess flow valve~~
  - ~~Multi valve, including the following accessories:~~
    - ~~Gas tight housing~~
    - ~~Power supply bushing (pump/actuators)~~
    - ~~Fuel pump~~
    - ~~Vaporiser/pressure regulator~~
    - ~~Shut off valve~~
    - ~~Non return valve~~
    - ~~Gas tube pressure relief valve~~
    - ~~Service coupling~~
    - ~~Flexible hose~~
    - ~~Remote filling unit~~
  - ~~Gas injection device or injector~~
  - ~~Fuel rail~~
  - ~~Gas dosage unit~~
  - ~~Gas mixing piece~~
  - ~~Electronic control unit~~
  - ~~Pressure/temperature sensor~~
  - ~~LPG filter unit~~



2. Trade name or mark : Injector type H2000
3. Manufacturer's name and address : HANA engineering  
194-52 Bujeon B/D Anyang 7 Dong  
Anyang City, Gyanggi-do  
Republic of Korea
4. If applicable, name and address of manufacturer's representative : XLR8 Engineering  
Veemweg 5  
3773 MT Barneveld  
The Netherlands
5. Submitted for approval on : September 2008
6. Technical service responsible for conducting approval tests : Kiwa Gastec Certification B.V.  
P.O.Box 137  
7300AC Apeldoorn  
The Netherlands
7. Date or report issued by that service : November 2008
8. Number of report issued by that service : 124479
9. Approval : granted/~~refused/extended/withdrawn~~<sup>(1)</sup>
10. Reason(s) of extension (if applicable) :
11. Place : Zoetermeer
12. Date : 17-DEC-2008
13. Signature :    
**A.M. Boekestein**
14. The documents filed with the application or extension of approval can be obtained upon request.

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<sup>(1)</sup> Strike out what does not apply.



**1 HEADING SHEETS (report contents)**

**2 SUMMARY SHEETS**

**3 IDENTIFICATION SHEETS**

**4 DECLARATION SHEETS**

**5 TEST SHEETS**

**6 RESULT SHEETS**

**7 DRAWING AND TECHNICAL DESCRIPTION SHEETS**

**8 CORRESPONDENCE SHEETS**

**9 GASTEC CERTIFICATION BV FILES (if applicable, included in GASTEC CERTIFICATION BV report only)**

**10 UPDATES (if applicable)**

November 2008

# LPG Test Report

**LPG Components**  
**Type injector H2000**  
XLR8 Engineering  
Barneveld  
The Netherlands  
Report number: 124479

**CERTIFICATION**



File Issue: 011	<b>HEADING SHEETS</b>	
Report Number: 124479	LPG Components	Page: HS 1/00

**Report contents:**

<u>Sheet</u>	<u>Chapter</u>	<u>Code</u>	<u># Pages</u>
Heading Sheets	1	HS	2
Summary Sheets	2	SS	1
E4-67R-010213 Certificate + Identification Sheets	3	IS	2
Declaration Sheets	4	DS	1
Test Sheets: Regulation 67-01	5	TM	1
Result Sheets: Identification of EUT	6	RID	1
Regulation 67-01	6	RM	8
Drawing and Technical Description Sheets	7	DR	3
Correspondence Sheets	8	CS	1
GASTEC Certification BV Files	9	GF	2
(if applicable, included in GASTEC Certification BV report only)			
Updates (if applicable as identified in the Report History Sheets)	10		

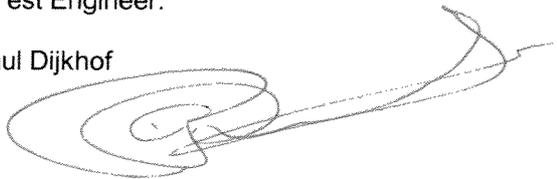
Note: The revision number of each page of this report is identified in the right heading of the page by means of the last 2 digits in the page number (e.g. HS 1/00, Heading Sheet page 1, revision 00).

**Report history:**

Date:	Description:	Report No:	Job Ref:
28-11-2008	New (initial report)	124479	124479
Any modification and/or extension made to this report shall be recorded in a Report History Sheet and be inserted as a first page when opening this report. This sheet shall detail the modification and/or extension applicable to this initial report and shall clearly state where these details can be found. A copy of this sheet shall also be provided to the applicant/manufacturer, in order to keep the reports identical.			

Signed by Test Engineer:

Name: Paul Dijkhof



Date: November 2008

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File Issue: 011	<b>HEADING SHEETS</b>	
Report Number: 124479	LPG Components	Page: HS 2/00

Responsible Test House: GASTEC Certification BV  
Address: Wilmersdorf 50  
7327 AC Apeldoorn  
P.O. Box 137  
7300 AC Apeldoorn  
The Netherlands  
Telephone: + 31 555 393 393  
Facsimile: + 31 555 393 685  
E-mail: [certification@gastec.nl](mailto:certification@gastec.nl)

Name of the Applicant: XLR8 Engineering  
Address: Veemweg 5  
3773 MT, Barneveld  
The Netherlands

Name of the Manufacturer: Hana Engineering  
Address: 194-52 Bujeon B/D Anyang 7 Dong  
Anyang City, Gyunggi-do  
Republic of Korea

Test report of the examination of the:

<b>LPG Components</b>
<b>Type injector H2000</b>

Tested and examined to:

Regulation 67-01      Revision 2, 29 March 2006  
Uniform provisions concerning:  
I. Approval of specific equipment of motor vehicles using liquefied petroleum gases in their propulsion system.

Including  
Revision 2 correction 1  
Revision 2 amendment 1  
Revision 2 amendment 2

Job Reference: 124479	Initials: 	28- 11-08
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File Issue: 011	<b>SUMMARY SHEETS</b>	
Report Number: 124479	LPG Components	Page: SS 1/00

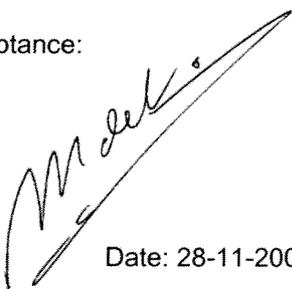
The LPG Component, Type injector H2000 made by Hana Engineering, meet(s) the requirements of:

Regulation 67-01      Revision 2, 29 March 2006  
Uniform provisions concerning:  
I.      Approval of specific equipment of motor vehicles using liquefied petroleum gases in their propulsion system.

Including  
Revision 2 Correction 1  
Revision 2 Amendment 1  
Revision 2 Amendment 2

See the Identification Sheets for all available types.

Signed in Acceptance:



Meine de Vries

Date: 28-11-2008

Project Manager Automotive Systems.  
GASTEC Certification BV

Notes:

The described test results are only valid for the tested materials and objects

Job Reference: 124479		Initials: 	28-11-08
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File Issue: 011	<b>IDENTIFICATION SHEETS</b>	
Report Number: 124479	LPG Components	Page: IS 1/00

Type break down (including specifications):

Injector type H2000 (E4-67R-010213)

Brandname: HANA Engineering  
XLR8

Working pressure: 3.0 +/- 0.5 bar

Temperature range: -20 °C up to 120 °C

Job Reference: 124479		Initials: <small>28-11-08</small>
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File Issue: 011	<b>DECLARATION SHEETS</b>	
Report Number: 124479	LPG Components	Page: DS 1/00

**Manufacturer's declaration(s):**

**Declaration title**

Declaration sheet rubber material  
 Declaration sheet product classification  
 Declaration sheet compliance with general design rules

**Date**

NA

File Issue: 001	<b>RESULT SHEET R67-01 LPG EQUIPMENT</b>	
Report Number: 124479	<b>Gas injection device or injector</b>	Page: TM01/00

<b>Annex 11: GAS INJECTION DEVICE, OR GAS MIXING PIECES, OR INJECTORS AND THE FUEL RAIL</b>
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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 11/1 Gas injection device or injector	
1.2	Component classification : Class 2 Component classification : Class 2A	YES-NA-NT-NO YES-NA-NT-NO
1.3	Classification pressure 450 kPa Classification pressure 3.000 kPa	YES-NA-NT-NO YES-NA-NT-NO
1.4	Design temperatures -20 °C to 120 °C	YES-NA-NT-NO
1.5	General design rules -meets paragraph 6.15.2 -meets paragraph 6.15.2.1 -meets paragraph 6.15.3.1 -meets paragraph 6.15.4.1	YES-NA-NT-NO YES-NA-NT-NO YES-NA-NT-NO YES-NA-NT-NO
1.6	The component meet the applicable test procedures: - Over pressure test Annex 15, par. 4 - External leakage Annex 15, par. 5 - High temperature Annex 15, par. 6 - Low temperature Annex 15, par. 7 - LPG compatibility Annex 15, par. 11 - Corrosion resistance Annex 15, par. 12	YES-NA-NT-NO YES-NA-NT-NO YES-NA-NT-NO YES-NA-NT-NO YES-NA-NT-NO YES-NA-NT-NO



File Issue: 003	<b>RESULT SHEET R67-01</b> <b>LPG EQUIPMENT R67-01 revision 2</b>	
Report Number: 124479	<b>HYDROSTATIC STRENGTH</b>	Page: RM 01/00

<b>Product:</b>	<b>Gas Injector H2000</b>
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<b>Tested in accordance with:</b>			
Approval requirement:	Regulation 67-01		
Annex:	15		
Article:	4		
<b>Testing Equipment</b> (when no accuracy is specified the Gastec standard applies)		<b>Gastec no.</b>	<b>Calibrated (✓)</b>
Hydraulic pressure equipment			
Pressure gauge, when tested pneumatically		100666	✓
Stopwatch		111324	✓
<b>Test Conditions</b>			
<i>Safety precautions:</i>			
- safety rules for high pressures Gastec reference HP1			
- safety rules for use of gas cylinders,, reference CP16-3.			
		<b>Complies (✓)</b>	<b>N.A. (✓)</b>
- 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.: C080654		sample no.:		Sample no.:	
	Before/after Corrosion test				before	after	before	after	Before	after
Classification of component*	4	2	2A	3	2A	2A				
Test pressure (kPa) *	6750	1015	270	6750	270 Kpa	270 Kpa				
Test time	≥ 10 min				✓	✓				
Rupture	No				✓	✓				
Permanent distortion	No				✓	✓				
Test dated	To be monitored				26-09-2008	13-10-2008				

<b>Conclusion</b>		
<b>Requirement</b>	<b>Complies (✓)</b>	<b>N.A. (✓)</b>
<b>Samples meet requirement</b>	✓	
<b>Remarks:</b>		

Job Reference: 124479	Initials: EB 
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File Issue: 004	<b>RESULT SHEET R67-01</b> <b>LPG EQUIPMENT R67-01 revision 2: 29 march 2006</b>	
Report Number: 124479	<b>CORROSION TEST (Salt spray)</b>	Page RM 02/00

<b>Product:</b>	<b>Gas Injector H2000</b>
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<b>Tested in accordance with:</b>			
Approval requirement:	Regulation 67-01		
clause:	15		
Article:	12.1		
Task instructions*:	ISO 9227		
<b>Testing Equipment</b> <small>(when no accuracy is specified the Gastec standard applies)</small>	<b>Gastec no.</b>	<b>Calibrated (✓)</b>	<b>Operation OK (✓)</b>
Salt spray equipment	110930	✓	✓
<b>Test Conditions</b>			
<i>Safety precautions:-</i>			
		<b>Complies (✓)</b>	<b>N.A. (✓)</b>
- Before testing the sample is cleaned and dried at ambient temperatures < 40 °C		✓	
- All connections and openings are closed		✓	
- The saline solution shall consist of 5% sodium chloride and 95% distilled water by weight		✓	
- The temperature of the test room is measured at 35°C ±2°C		✓	
- The adjustment of nozzle is settled at 1.5 cm <sup>3</sup> /h ±0.5cm <sup>3</sup> /h		✓	
- The received salt solution has been checked every 24 h or 48 h		✓	
- After testing the sample is cleaned		✓	

<b>Test results</b>	<b>Requirement</b>	<b>Sample no.: C080654</b>	<b>Sample no.:</b>
Date and time starting the test	Timing aspects to be monitored	30-09-2008	
Date and time stopping the test	Timing aspects to be monitored	06-10-2008	
Salt spray testing time	144 h	✓	
Ambient temperature during testing	Between 33 and 37°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 RM 01/00	See page RM .....
External leakage at ambient, low and high temp	According to 15.5, 15.6 and 15.7	See page RM 03/00	See page RM .....

<b>Conclusion</b>		
<b>Requirement</b>	<b>Complies (✓)</b>	<b>N.A. (✓)</b>
<b>Samples meet requirement</b>	✓	
<b>Remarks:</b>		

Job Reference: 124479	Initials: EB 
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File Issue: 003	<b>RESULT SHEET R67-01</b> <b>LPG EQUIPMENT R67-01 revision 2</b>	
Report Number: 124479	<b>EXTERNAL LEAKTIGHTNESS</b> <b>including high and low temperature</b>	Page: RM 03/00

<b>Product:</b>	<b>Gas Injector H2000</b>
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<b>Tested in accordance with:</b>			
Approval requirement:	Regulation 67-01		
Annex:	15		
Article:	5, 6, 7		
<b>Testing Equipment</b> <i>(when no accuracy is specified the Gastec standard applies)</i>		<b>Gastec no.</b>	<b>Calibrated (✓)</b>
Oven		102988	✓
Cooler		109817	✓
Pressure gauge		100666	✓
Leakage gauge			
Stopwatch		111324	✓
<b>Test Conditions</b>			
<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 CP16-3			
		<b>Complies (✓)</b>	<b>N.A. (✓)</b>
- 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 bumble(s) are detected after 60 sec, leakage is considered to be > 15 cc/h.			✓

<b>Test Results</b>	Requirement				sample no.: C080654					
Test temperature					room temperature		65°C / 120°C *		-20°C	
Moment of test *	Corrosion / creep / endurance / cycle test				before	after	before	after	before	after
Classification of component *	4	2	2A	3	2A	2A	2A	2A	2A	2A
Test pressure (kPa) *	4500	675	180	6750	180 Kpa	180 Kpa	180 Kpa	180 Kpa	180 Kpa	180 Kpa
External leakage	≤ 15cc/h				✓	✓	✓	✓	✓	✓
Test date	To be monitored				25-09-2008	13-10-2008	26-09-2008	13-10-2008	26-09-2008	14-10-2008

<b>Conclusion</b>		
<b>Requirement</b>	<b>Complies (✓)</b>	<b>N.A. (✓)</b>
<b>Samples meet requirement</b>	✓	
<b>Remarks:</b> After the endurance test, leakage testing is only required at room temperature.		

\* Cross out which is not applicable

Job Reference: 124479	Initials: EB 
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File Issue: 003	<b>RESULT SHEET R67-01</b> <b>LPG EQUIPMENT R67-01 revision 2: 29 march 2006</b>	
Report Number: 124479	<b>LPG COMPATIBILITY FOR SYNTHETIC MATERIALS,</b> <b>according to ISO 1817</b>	Page: RM04/00

<b>Product:</b>	<b>Rubber compound XLR8</b>
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<b>Tested in accordance with:</b>			
Approval requirement:	Regulation 67-01		
Annex:	15		
Article:	11		
Task instructions*:	ISO 1817		
<b>Testing Equipment</b> (when no accuracy is specified the Gastec standard applies)	<b>Gastec no.</b>	<b>Calibrated (✓)</b>	<b>Operation OK (✓)</b>
Balance	101489	✓	✓
Oven	102886	✓	✓
<b>Test Conditions</b>			
<i>Safety precautions: No open fire and no smoking</i>			
		<b>Complies (✓)</b>	<b>N.A. (✓)</b>
- After each test zero point of the balance is checked			
- When the test sample is provided with inlayers, these inlayers shall not affect the weight of the test sample.			

Test results	Before Immersion		After immersion 72h in N-pentane		Change in volume ≤ ± 20%	After storage for 48 h at 40°C	Weight loss: max. decrease of 5%	
	Above water	Under water	Above water	Under water				
FKM Ø7.5x Ø1.5	1	2,58849	2,2021		2,19154	-0,48	2,5844	-0,16
	2	2,585	2,20955		2,20541	-0,19	2,58489	0,00
	3	2,58433	2,13753		2,13913	0,07	2,58433	0,00
FKM Ø11.8x Ø2.4	1	0,43946	0,19869		0,19754	-0,58	0,43928	-0,04
	2	0,38382	0,17518		0,17366	-0,87	0,38376	-0,02
	3	0,35364	0,16037		0,15999	-0,24	0,35343	-0,06
FKM Ø8.8x Ø1.9	1	0,18652	0,08527		0,0852	-0,08	0,1865	-0,01
	2	0,17946	0,0816		0,0818	0,25	0,17943	-0,02
	3	0,14321	0,06635		0,06504	-1,97	0,14326	0,03
FKM Ø6.8x Ø2	1	0,16626	0,07542		0,07535	-0,09	0,1663	0,02
	2	0,16692	0,07658		0,07658	0,00	0,16696	0,02
	3	0,12723	0,05806		0,05788	-0,31	0,1273	0,06
FKM	1	0,09353	0,04213		0,04247	0,81	0,09355	0,02
	2	0,09675	0,04415		0,04354	-1,38	0,09677	0,02
	3	0,0805	0,03734		0,0364	-2,52	0,0805	0,00
Test date	24-09-08	24-09-08		26-09-08	✓	29-09-08	✓	

<b>Conclusion</b>		
<b>Requirement</b>	<b>Complies (✓)</b>	<b>N.A. (✓)</b>
<b>Samples meet requirement</b>	✓	
<b>Remarks:</b>		

Job Reference: 124479	Initials: EB 
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# EXAMINATION REPORT

Vulcanized rubber seals used in pipes and fittings  
for the transport of gas and hydrocarbon fluids

## REPORT NUMBER

KL 5527

## AUTHORISATION

H. Pauw, Co-ordinator Laboratory for Material Testing



## DEPARTMENT

Laboratory for Material Testing

## Certification and Inspections

Groningehaven 7  
Postbus 1072  
3430 BB Nieuwegein  
Netherlands  
Telephone +31 30 606 95 11  
Telefax +31 30 606 11 65

**kiwa GASTEC**

28 NOV 2008 12 44 79

**Certification**

This report may only be copied as a complete set. The examination results relate exclusively to the samples offered.

# Vulcanized rubber seals used in pipes and fittings for the transport of gas and hydrocarbon fluids

Manufacturer: Kiwa Gastec

Place of production: -

Reference number: 124479

According to standard: CNG 110

**kiwa GASTEC**

28 NOV 2003 124479

**Certification**

1. **Order**

By order of Kiwa Gastec Certification in Apeldoorn, the sample mentioned below was tested by the Laboratory for Material Testing for determination of physical and mechanical properties according to CNG 110.

2. **General**

The sample was received on 29-09-2008 and registered with number KL 5527. The test was started on 30-09-2008 and was carried out by Mr. H. Pauw.

3. **Sample description**

Number/type of samples : 15 rubber O-rings  
Nominal size  
(diameter x thickness) : 11.8 x 2.4 mm  
Colour : black  
Marking : none  
Date of production : week 35

4. **Test conditions**

The tests were carried out at a temperature of  $23 \pm 2^\circ\text{C}$  and a relative humidity of  $50 \pm 5\%$ .

5. **Apparatus**

Tensile-pressure machine, cooling-heating equipment, ozone equipment and measuring equipment.

6. **Preservation of the sample**

In case of failure the sample will be kept for 3 months.

**kiwa GASTEC**

28 NOV 2008 124479

**Certification**

## 7. Test results

Physical and mechanical properties

Properties	Test method	Units	Requirements	Test results
Tensile strength	ISO 37 type B	MPa	-	11.9
Elongation at break	ISO 37 type B	%	-	149
<b>Changes after heat ageing</b> 7x 24 h. at 85°C	NEN-ISO 188			
Tensile strength	ISO 37	%	≤ 25	-6
Elongation at break	ISO 37	%	+ 30/-10	-4
<b>Resistance to ozone</b>	ISO 1431-1	-	no cracking	no cracking

**kiwa GASTEC**

28 NOV 2008 17 44 79

**Certification**

File Issue: 011	<b>DRAWING AND TECHNICAL DESCRIPTION SHEETS</b>	
Report Number: 124479	LPG Components	Page: DR 1/00

**Drawings and Technical Descriptions:**

<u>Description</u>	<u># Pages</u>	<u>Date</u>
Photo Sheets	1	
Gas Injector H2000	1	05-Feb-08

File Issue: 011	<b>DRAWING AND TECHNICAL DESCRIPTION SHEETS</b>	<b>GASTE C</b>
Report Number: 124479	LPG Components	Page: DR 2/00

**Injector Type H2000**



