



GRAND-DUCHÉ DE LUXEMBOURG

Ministère du Développement durable
et des Infrastructures
Département des Transports

L-2938 Luxembourg

SOCIÉTÉ NATIONALE DE
CERTIFICATION ET D'HOMOLOGATION

s.à r.l.

Registre de Commerce: B 27180

L-5201 Sandweiler



Référence: E13*67R00*67R01*0370*00

Annexes: - Rapport technique
- Fiche de renseignements du constructeur

Sandweiler, le 16 avril 2013

Communication concernant ¹⁾:

Communication concerning ¹⁾:



- **la délivrance d'une homologation**
approval granted
- **l'extension d'homologation**
approval extended
- **le refus d'homologation**
approval refused
- **le retrait d'homologation**
approval withdrawn
- **l'arrêt définitif de la production**
production definitely discontinued

d'un type d'équipement GPL en application du Règlement N° 67
of a type of LPG equipment pursuant to regulation N° 67

Numéro d'homologation:

Approval number:

E13*67R00*67R01*0370*00

Marque d'homologation:

Approval mark:



67R-010370 CLASS 1

1.

Equipement GPL ¹⁾:

LPG equipment considered ¹⁾:

Réservoir:

Container:

not applicable

Accessoires fixés au réservoir:

Accessories fitted to the container:

- 80 % stop valve
- level indicator
- pressure relief valve (discharge valve)
- pressure relief device
- remotely controlled service valve with excess flow valve

Bloc multivannes, y compris les accessoires suivants:

Multivalve, including the following accessories:

- gas tight housing
- power supply bushing (pump/actuators)
- fuel pump
- vaporizer/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
- multi component

2. Marque de fabrique ou de commerce:

Trade name or mark:

ZEC, RAIL

Type:

Type:

GAS5A???????RA

Versions:

Versions:

Version 1: 3/16" – GAS5A201XX000RA
 Version 2: 1/4" – GAS5A301XX000RA
 Version 3: 5/16" – GAS5A401XX000RA
 Version 4: 3/8" – GAS5A501XX000RA
 Version 5: 3/16" – GAS5AP201XX000RA
 Version 6: 1/4" – GAS5AP301XX000RA
 Version 7: 3/16" – GAS5AP2101XX0RA
 Version 8: 1/4" – GAS5AP3101XX0RA

3. Nom et adresse du fabricant:

Manufacturer's name and address:

ZEC S.p.A.
 Strada Lungolorno 11
 I-43052 Colorno (PR)

4. Le cas échéant, nom et adresse du mandataire du fabricant:

If applicable, name and address of manufacturer's representative:

not applicable

5. Equipement présenté à l'homologation le:

Submitted for approval on:

16.04. – 27.05.2008, 03.03. – 22.03.2010, 19.03.2013

6. Autorité déléguée:

Assigned authority:

Société Nationale de Certification et d'Homologation
 L-5201 Sandweiler

Service technique chargé des essais d'homologation:

Technical service responsible for conducting approval tests:

Luxcontrol SA
 B.P. 349
 L-4004 Esch-sur-Alzette

7. Date du procès-verbal délivré par ce service:

Date of report issued by that service:

11.04.2013

8. Numéro du procès-verbal:

Number of report issued by that service:

LCA 54 0696 001 13

9. L'homologation est:

Approval:

granted

10. **Raisons de l'extension (éventuellement):**
Reason(s) for extension (if applicable): not applicable
11. **Lieu:**
Place: Sandweiler
12. **Date:**
Date: 16 avril 2013
13. **Signature:**
Signature:

Pour le Département des Transports



Marco FELTES
Inspecteur Principal 1^{er} en rang

Pour la SNCH



Claude LIESCH
Directeur



14. **Des copies soumis dans le dossier d'homologation ou d'extension de l'homologation peuvent être obtenues sur demande.**
The documents filed with the application or extension of approval can be obtained upon request.

see: INDEX to TYPE-APPROVAL REPORT

APPENDICE 1 (réservoirs uniquement)
APPENDIX 1 (containers only)

1. Caractéristiques du réservoir de base (config. 00)
Container characteristics from the parent container (configuration 00)

- a) Marque de fabrique ou de commerce:**
a) Trade name or mark: not applicable
- b) Forme:**
b) Shape: not applicable
- c) Matériau:**
c) Material: not applicable
- d) Ouvertures:**
d) Openings: not applicable
- e) Epaisseur de la paroi:**
e) Wall thickness: not applicable
- f) Diamètre (réservoir cylindrique):**
f) Diameter (cylindrical container): not applicable
- g) Hauteur (forme de réservoir spéciale):**
g) Height (special container shape): not applicable
- h) Surface externe:**
h) External surface: not applicable
- i) Configuration des accessoires fixés au réservoir (voir tableau 1):**
i) Configuration of accessories fitted to container (see table 1):

Tableau 1:
Table 1:

N° N°	Accessoires Item	Type Type	N° d'homologation Approval N°	N° d'extension Extension N°
a)	Limiteur de remplissage à 80%: 80% stop valve:	-	-	-
b)	Jauge: Level indicator:	-	-	-
c)	Soupape de surpression: Pressure relieve valve:	-	-	-
d)	Vanne d'isolement avec limiteur de débit: Remotely controlled service valve with excess valve:	-	-	-
e)	Pompe à GPL: Fuel pump:	-	-	-
f)	Bloc multivannes: Multi-valve:	-	-	-
g)	Enceinte étanche: Gas-tight housing:	-	-	-
h)	Raccord électrique d'alimentation: Power supply bushing:	-	-	-
i)	Soupape antiretour: Non return valve:	-	-	-
j)	Dispositif de surpression: Pressure relief device:	-	-	-

2. Liste des réservoirs de la même famille (les listes des réservoirs de la même famille indiquent le diamètre, la capacité, la surface externe et la (les) configuration(s) possible(s) des accessoires fixés au réservoir):

List of container family (The lists of the container family indicate the diameter, capacity, external surface and the possible configuration(s) of the accessories fitted to the container):

Tableau 2:

Table 2:

N° N°	Type Type	Diamètre/hauteur Diameter/height [mm]	Capacité Capacity [l]	Surface externe External surface [cm ²]	Configuration des accessoires Configuration of accessories [codes] ¹
-	-	-	-	-	-
-	-	-	-	-	-

3. Listes des configurations possibles des accessoires fixés au réservoir (indiquer la liste des accessoires possibles, qui diffèrent de la configuration essayée (code 00) et qui peuvent être fixés au type de réservoir en question. Pour tous les accessoires, préciser le type, le numéro d'homologation et le numéro d'extension, en indiquant pour chacun son propre code de configuration):

Lists of the possible configurations of accessories fitted to the container (Specify a list of the possible accessories, which differ from the tested configuration of accessories (code 00) and which may be fitted to the type of container. Specify for all accessories, type, approval number and extension number, indicating its own configuration code):

Tableau 3:

Table 3:

N° N°	Accessoires Accessories	Type Type	N° d'homologation Approval N°	N° d'extension Extension N°	Configuration des accessoires [code] Configuration of accessories [code]
a)	-	-	-	-	-

¹⁾ **Biffer les mentions inutiles.**
Strike out what does not apply.



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Sandweiler, le 16 avril 2013

INDEX DU DOSSIER D'HOMOLOGATION INDEX TO TYPE-APPROVAL REPORT

Numéro d'homologation:

Approval number:

E13*67R00*67R01*0370*00

Révision:

Revision:

00

Marque de fabrique ou de commerce:

Trade name or mark:

ZEC, RAIL

Type:

Type:

GAS5A????????RA

- 1. Procès-verbal d'essai:**
Test report: N° LCA 54 0696 001 13
- Technical report: Page(s) 1 to 9;
- Index: Annex A - Page(s) 1.
- 2. Dossier du constructeur:**
Report of the manufacturer: N° 0696 001 13
- Manufacturer's information document: Page(s) 1.
- 3. Autres documents annexés:**
Other documents annexed: not applicable
- 4. Date de délivrance de l'homologation initiale:**
Date of issue of initial type approval: 16.04.2013
- 5. Date de la dernière délivrance de pages révisées:**
Date of last issue of revised pages: not applicable
- 6. Date de la dernière délivrance d'une homologation révisée:**
Date of last extension: not applicable

TECHNICAL REPORT

No.: LCA 54 0696 001 13

Inspection concerning the

Specific equipment of motor vehicles using liquefied petroleum gases in their propulsion system

performed according to

ECE – Regulation No. 67

Type: **GAS5A????????RA**
Manufacturer: **ZEC s.p.a.**
Strada Lungolorno 11
43052 Colorno (PR) Italy

Extension -- to ECE Type Approval no.: not applicable

Index:

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2. Inspections and their results	Page 3
3. Evaluation of test results	Page 8
4. Statement of compliance	Page 9
Annex (beginning with an index)	

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1. General

1.1. Test Provisions

The inspection was carried out according to the requirements of ECE-Regulation No. 67 including Supplement 10 to the 01 series of amendments, which entered into force on July 26, 2012.

1.2. Information concerning the vehicle type and the requested approval

The statements below apply to the previous ECE type-approval as referred to on page 1.

1.2.1. [] Numbering according to the communication concerning the approval of ECE-R67

[1.] LPG equipment considered:

Flexible hoses

- **type: GAS5A????????RA**

Versions / internal diameter – reference codes:

1: 3/16” - GAS5A201XX000RA

2: 1/4” - GAS5A301XX000RA

3: 5/16” - GAS5A401XX000RA

4: 3/8” - GAS5A501XX000RA

5: 3/16” - GAS5AP201XX00RA

6: 1/4” - GAS5AP301XX00RA

7: 3/16” - GAS5AP2101XX0RA

8: 1/4” - GAS5AP3101XX0RA

[2.] Trade name or mark:

ZEC, RAIL

[3.] Manufacturer's name and address:

ZEC S.p.A.

Strada Lungolorno 11

43052 Colorno (PR) Italy

[4.] If applicable, name and address of manufacturer's representative:

Not applicable

[5.] Submitted for approval on: **16.4.08 - 27.5.08 ; 3-22.03.10; 19.03.13**



[10.] Reason(s) of extension:

Not applicable

2. Inspections and their results

2.1. Version of the tested equipment

The following variants have been used for testing (if not stated in part 1.2.1. of this report):

All versions

2.2. Inspection items

	Location of test:	Date of receipt of test item:	Date of test:	Inspector
Main Report	CSI – v.le Lombardia, 20 I-20021 Bollate (MI) See item [3.]	15.4.2008 02.03.2010 19.03.2013	16.4.08 - 27.5.08 3-22.3.2010 19.03.2013	D. Durazzi D. Durazzi

2.2.1. General

The marking requirements according to item 4.1. and 4.2. of Part I of the Regulation are fulfilled.

Every material of the equipment in contact with LPG is compatible with it.

Electromagnetic compatibility requirements according to Regulation R10.02 or equivalent are not applicable.

The device has parts of class 1.



2.2.2. Inspections: (according to Annex 8; Class 1 device – high pressure synthetic hose)

Tests	Test results	Line item
General specifications	The hose can withstand a maximum operating pressure of 3000 kPa and temperatures between –40°C and +125°C	Annex 8, par. 3.1
Hose construction	Requirements are fulfilled for tube and cover. The interlayers are protected against corrosion. There are no pores, holes or strange elements.	Annex 8, par. 3.2
Specification and tests for the lining	Material: polyamide elastomer. Requirements for tensile strength, elongation, resistance to n-pentane and ageing are fulfilled (see item 2.2.2.1 of this report)	Annex 8, par. 3.3
Specification and test methods for the cover	Material: Polyurethane elastomer or Poliamid PA12. Requirements for tensile strength, elongation, resistance to n-hexane, to ageing and ozone are fulfilled (see item 2.2.2.2. of this report)	Annex 8, par. 3.4
Specification for uncoupled hose	Requirements for gas-tightness, permeability, resistance to low temperature, high temperature, bend test, leakage test and minimum burst pressure are fulfilled (see item 2.2.2.3. of this report)	Annex 8, par. 3.5
Couplings	not applicable	Annex 8, par. 3.6
Assembly of hose and couplings	not applicable	Annex 8, par. 3.7
Gas-tightness	not applicable	Annex 8, par. 3.7.2
Markings	Requirements fulfilled	Annex 8, par. 3.8.



2.2.2.1. Specifications and tests for the lining (Annex 8, § 3.3)

2.2.2.1.1. Tensile strength and elongation at break (Annex 8, § 3.3.1.1)

All tests according to ISO 37:2005

	Measured	Required	Unit
Tensile strength	40,8	≥ 20	MPa
Elongation at break	307	≥ 200	%

2.2.2.1.2. Resistance to n-pentane (Annex 8, § 3.3.1.2)

All tests according to ISO 1817:2005

	Measured	Required	Unit
Change to tensile strength	+1,0	≥-25 & ≤25	%
Change to elongation at break	+0,7	≥-30 & ≤30	%
Change to volume	+0,4	≥-20 & ≤20	%
Change to mass (*)	-0,2	≥ -5	%

(*) after storage in air with a temperature of 40°C for 48 hours

2.2.2.1.3. Resistance to ageing (Annex 8, § 3.3.1.3)

All tests according to ISO 188:1998

	Measured	Required	Unit
Change to tensile strength	+4,4	≥-35 & ≤35	%
Change to elongation at break	-12,7	≥-30 & ≤10	%

2.2.2.2. Specifications and test method for the cover (Annex 8, § 3.4)

2.2.2.2.1. Tensile strength and elongation at break (Annex 8, § 3.4.1.1)

All tests according to ISO 37:2005

Polyurethane	Measured	Required	Unit
Tensile strength	62,1	≥20	MPa
Elongation at break	1005	≥250	%

Polyamide PA12	Measured	Required	Unit
Tensile strength	44,3	≥20	MPa
Elongation at break	352	≥250	%

2.2.2.2.2. Resistance to n-hexane (Annex 8, § 3.4.1.2)

All tests according to ISO 1817:2005

Polyurethane	Measured	Required	Unit
Change to tensile strength	- 4,5	>-35 & <35	%
Change to elongation at break	+4,6	>-35 & <35	%
Change to volume	+2,5	>-30 & <30	%

Polyamide PA12	Measured	Required	Unit
Change to tensile strength	- 2,3	>-35 & <35	%
Change to elongation at break	- 0,2	>-35 & <35	%
Change to volume	+1,1	>-30 & <30	%



2.2.2.2.3. Resistance to ageing (Annex 8, § 3.4.1.3)

All tests according to ISO 188:1998

Polyurethane	Measured	Required	Unit
Change to tensile strength	-6,1	>-25 & <25	%
Change to elongation at break	+8,6	>-30 & <+10	%

Polyamide PA12	Measured	Required	Unit
Change to tensile strength	+2,3	>-25 & <25	%
Change to elongation at break	+4,9	>-30 & <+10	%

2.2.2.2.4. Resistance to ozone (Annex 8, § 3.4.2)

All tests according to ISO 1431/1: No cracking appeared.

2.2.2.3. Specification for uncoupled hose (Annex 8, § 3.5)

2.2.2.3.1. Gas-tightness, permeability (Annex 8, § 3.5.1)

All tests according to ISO 4080:1996

With an internal test pressure of 450 kPa, the leakage through the wall is less than 95 cm³ of vapour per metre of hose per 24 hours.

2.2.2.3.2. Resistance at low temperature (Annex 8, § 3.5.2)

All tests according to ISO 4672-1978 method B: No cracking or rupture appeared.

2.2.2.3.3. Resistance at high temperature (Annex 8, § 3.5.3)

A piece of hose of at least 0.5 m was pressurized at 3000 kPa during 24 hours at +125°C , and then pressurised at 6750 kPa during 10 mn: No leakage occurred during both operations.

2.2.2.3.4. Bending test (Annex 8, § 3.5.4)

After having undergone the bending test, the hose withstood the test pressure of 6750 kPa without any leakage.

2.2.2.3.5. Hydraulic test pressure and determination of the minimum burst pressure (Annex 8, § 3.5.5)

All tests according to ISO 1402:

During the leakage test, all the hoses resisted the test pressure for ten minutes without leaking.

The hoses underwent burst tests with the following results:

Samples	Measured	Required	Unit
GAS5A20100000RA (ver.1)	85 500	>10 000	kPa
GAS5A30100000RA (ver.2)	63 900	>10 000	kPa
GAS5A50100000RA (ver.4)	50 500	>10 000	kPa
GAS5AP30100000RA (ver.6)	34 400	>10 000	kPa

2.2.2.4. Couplings (Annex 8, § 3.6)

Not applicable, hose to be installed without couplings

...



2.2.2.5. Assembly of hose and couplings (Annex 8, § 3.7)

Not applicable, hose to be installed without couplings

2.3. Remarks

Inspection results are only applicable to items, which have been tested.

2.4. Test facilities

Calibration of measuring and test equipment used to carry out the inspections is in accordance with the EEC-Directive and/or ECE-Regulation stated in 1.1. of this report and with ISO 17025.

Inspectors stated under 2.2. of this report were in charge of performing and/or evaluating the tests.



3. Evaluation of test results

3.1. Variants and equipment covered

The tests carried out cover the following variations as far as these are relevant for the gas device:

- hose diameters as stated in the information document
- optional polyamide cover protection as stated in the information document

3.2. Remarks

3.2.1. Main report:

not applicable



4. **Statement of compliance**

The inspections items and measurements carried out have shown the compliance of the vehicle type described in this report and the attached Annex with the requirements of ECE-Regulation No. 67 including Supplement 10 to the 01 series of amendments, which entered into force on July 26, 2012.

Esch-sur-Alzette, April 11, 2013

Luxcontrol s.a.
Service Homologation-automobile

David Durazzi
Ingénieur-Inspecteur

Mauro Moscardelli
Ingénieur-Inspecteur

Annex


ZEC S.p.A. THERMOPLASTIC HOSES

COLORNO (PR) ITALY Tel.0521/816631

 COMPANY WITH QUALITY MANAGEMENT
 SYSTEM CERTIFIED BY DNV
 = ISO 9001:2008 =

TUBI TERMOPLASTICI SERIE GPL-67R
THERMOPLASTIC HOSES LPG-67R SERIES


Marcatura Branding	GAS5A201XX000RA 3/16" LPG 67R-01 0306 CLASS 1 mese/anno lotto MADE IN ITALY
	GAS5A301XX000RA 1/4" LPG 67R-01 0306 CLASS 1 mese/anno lotto MADE IN ITALY
	GAS5A401XX000RA 5/16" LPG 67R-01 0306 CLASS 1 mese/anno lotto MADE IN ITALY
	GAS5A501XX000RA 3/8" LPG 67R-01 0306 CLASS 1 mese/anno lotto MADE IN ITALY
	GAS5AP201XX00RA 3/16" LPG 67R-01 0306 CLASS 1 mese/anno lotto MADE IN ITALY
	GAS5AP301XX00RA 1/4" LPG 67R-01 0306 CLASS 1 mese/anno lotto MADE IN ITALY
	GAS5AP2101XX0RA 3/16" LPG 67R-01 0306 CLASS 1 mese/anno lotto MADE IN ITALY
	GAS5AP3101XX0RA 1/4" LPG 67R-01 0306 CLASS 1 mese/anno lotto MADE IN ITALY

CARATTERISTICHE TECNICHE DEI TUBI CON RINFORZO TESSILE SERIE GPL-67R
TECHNICAL FEATURES OF LPG-67R SERIES HOSES WITH TEXTILE REINFORCEMENT

CODICE REFERENCE	Ø INT. I.D. in.	Ø INT. I.D. mm	Ø EST. O.D. mm	MIN. PRESS. SCOPPIO MIN. BURST PRESSURE bar	PRESSIONE COLLAUDO TEST PRESSURE bar	MAX. PRESS. ESERCIZIO MAX WORK. PRESSURE bar	RAGGIO CURV. MIN. MIN. BEND RADIUS mm	PESO WEIGHT g/m
GAS5A201XX000RA	3/16"	4.8	9.2	120	60	30	45	56
GAS5A301XX000RA	1/4"	6.4	10.8	120	60	30	60	65
GAS5A401XX000RA	5/16"	8.0	13.0	120	60	30	75	94
GAS5A501XX000RA	3/8"	9.5	14.8	120	60	30	90	115
GAS5AP201XX00RA	3/16"	4.8	8.0	120	60	30	45	36
GAS5AP301XX00RA	1/4"	6.4	9.8	120	60	30	60	46
* GAS5AP2101XX0RA	3/16"	4.8	8.0	120	60	30	45	34
* GAS5AP3101XX0RA	1/4"	6.4	9.8	120	60	30	60	43

Marcatura e Codifica - Colori rivestimento:
 Sostituire le due "XX" del codice con le seguenti cifre
**00 (NERO), 02 (AZZURRO), 03 (BLU SCURO),
 05 (ROSSO), 09 (VERDE).**

Branding and coding - Covering colors:
 Substitute the two "XX" in the code with the following
 numbers: **00 (BLACK), 02 (BLUE), 03 (DARK BLUE),
 05 (RED), 09 (GREEN).**

Caratteristiche tecnico-costruttive:
 Anima interna in POLIAMMIDE, rinforzo con singola
 treccia in FILATO TESSILE e rivestimento esterno in
 POLIURETANO antiabrasione, micro perforato nei
 seguenti colori: azzurro, nero, verde, blu scuro.

* Rivestimento esterno in POLIAMMIDE micro perforato
 nei seguenti colori: azzurro, nero, verde, blu scuro.

Technical-constructive features:
 Internal core in POLYAMIDE, reinforcement with a
 TEXTILE FIBER and external covering in anti-abrasion
 POLYURETHANE, micro perforated in the following
 colors: blue, black, green, dark blue.

* External covering in POLYAMIDE micro perforated in
 the following colors: blue, black, green, dark blue.

Materie prime:
 POLIAMMIDE PA12
 FILATO POLIESTERE
 POLIURETANO POLIESTERE
 * POLIAMMIDE

Raw materials:
 POLYAMIDE PA12
 POLYESTER FIBER BRAID
 POLYESTER POLYURETHANE
 * POLYAMIDE

Applicazioni:
 Le tubazioni della serie GPL-67R sono state create per
 conduzione di GPL a media pressione.

Application:
 LPG-67R series hoses have been created for LPG
 conveying at medium pressure.

Temperature di utilizzo:
 Da -40°C a +125°C.

Utilization temperature:
 From -40°C to +125°C.

Pressioni d'esercizio:
 Rapporto di sicurezza 1:4

Working pressure:
 Safety ratio 1:4