



Capillary Hoses - FR5 Series

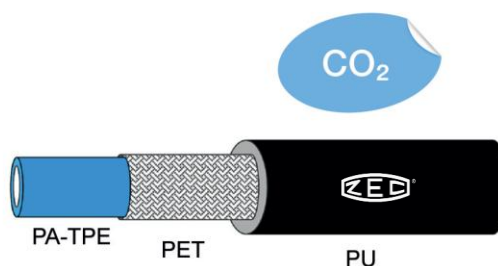
ZEC Freon FR5 thermoplastic hose is used in refrigeration systems for both the fixed plants, and the automotive¹ industry.

The intense research on new materials has allowed to develop a product that can substitute traditional copper piping, offering the advantage of flexibility and ease assembly, while maintaining excellent strength and low permeability to refrigerant gases (including CO₂).

1) Service stations for the recharge of refrigerant gas and the maintenance of A/C systems.

Technical features

- ZEC Freon FR5 thermoplastic hoses represent an innovative alternative to the traditional copper tubing for applications in refrigeration plants and automotive industry. Flexibility, light weight, vibration damping and ease assembly are the main features of these thermoplastic hoses.
- The research in the field of plastics has produced a particular alloy of polyamide (PA) and thermoplastic elastomers (TPE). This innovative material combines the excellent mechanical properties and low gas permeability of polyamides, with the high flexibility of elastomers, without having recourse to plasticizing additives.
- Despite of its low density, the elastomerized polyamide provides an excellent barrier to refrigerant gases (R-134a, R-404a, R-407c, R-410a, R-507, R-600a, R-744, HFO-1234yf) and an excellent chemical resistance to lubricating oils, typically mixed with the refrigerant (e.g. PAG oils, mainly used in automotive industry, or POE oils, spread in fixed installations).
- "F-Gas" directives (2006/40/EC and 2006/842/CE) require the use of refrigerants with low environmental impact (GWP <150, Global Warming Potential). Carbon dioxide used as refrigerant (R-744) has a GWP = 1, it is non-flammable, has low toxicity, is readily available and low cost. However, CO₂ requires pressures about 10 times higher than a conventional refrigerant gas. ZEC Freon FR5 thermoplastic hoses (DN2, DN4 and DN6) have been developed to work with CO₂, providing a working pressure up to 120 bar, with a safety ratio of 1:5.
- Inside core of ZEC Freon FR5 hoses is made of elastomerized polyamide. Reinforcing braid in high tenacity polyester yarn (PET) and micro-perforated cover in antiabrasion polyurethane (PU) provide hose with a high resistance to pressure and surface abrasion, ensuring performances in accordance with EN 1736:2008 standard.
- Working temperature of ZEC Freon FR5 hoses is in the range -45°C to +130°C. Furthermore, the directives REACH (2006/1907/EC) and RoHS 2 (2011/65/EU) are met.



REFRIGERATION



DATA SHEET - FR5 HOSES

| HOSE TYPE | CODE | OUTSIDE DIAM. | INSIDE DIAM. | CORE MATERIAL | BRAID TYPE | COVER MATERIAL | BURST PRESSURE @ 23°C | WORKING PRESSURE | MIN. BEND RADIUS | WEIGHT |
|-----------|-------------|---------------------|---------------------|-------------------------|--|---------------------------|-----------------------|---------------------|------------------|------------------------|
| DN2 | FR557210100 | 6.0 mm 0.236 in | 2.1 mm (1/12) in | Elastomerized polyamide | Reinforcement braid in polyester fiber | Antiabrasion polyurethane | 600 bar 8702 psi | 120 bar 1740 psi | 15 mm 0.59 in | 28 g/m 0.019 lbs/ft |
| DN4 | FR510100 | 8.2 mm 0.323 in | 4.0 mm (5/32) in | | | | 600 bar 8702 psi | 120 bar 1740 psi | 30 mm 1.18 in | 43 g/m 0.029 lbs/ft |
| DN6 | FR530100 | 11.9 mm 0.468 in | 6.4 mm (1/4) in | | | | 600 bar 8702 psi | 120 bar 1740 psi | 75 mm 2.95 in | 86 g/m 0.058 lbs/ft |

PERMEABILITY TEST (EN 1736:2008)

| REFRIGERANT GAS | PERMEABILITY PER YEAR PER METER OF HOSE [g / yr / m] | | | | HOSE SIZE |
|-----------------|---|--------------------|---------------------|--------------------|-----------|
| | TEMPERATURE @ 32°C | | TEMPERATURE @ 100°C | | |
| | PRESSURE @ 13 bar | LEAKAGE RATE CLASS | PRESSURE @ 60 bar | LEAKAGE RATE CLASS | |
| R-134a | 0.066 | CLASS 2 | 0.789 | CLASS 2 | DN2 |
| | 0.443 | CLASS 2 | 0.447 | CLASS 1 | DN4 |
| | 0.447 | CLASS 2 | 0.351 | CLASS 1 | DN6 |
| R-404a | 0.064 | CLASS 2 | 0.769 | CLASS 2 | DN2 |
| | 0.432 | CLASS 2 | 0.436 | CLASS 1 | DN4 |
| | 0.436 | CLASS 2 | 0.342 | CLASS 1 | DN6 |
| R-407c | 0.060 | CLASS 2 | 0.714 | CLASS 2 | DN2 |
| | 0.401 | CLASS 2 | 0.405 | CLASS 1 | DN4 |
| | 0.405 | CLASS 2 | 0.317 | CLASS 1 | DN6 |
| R-410a | 0.056 | CLASS 2 | 0.667 | CLASS 1 | DN2 |
| | 0.374 | CLASS 2 | 0.378 | CLASS 1 | DN4 |
| | 0.378 | CLASS 2 | 0.296 | CLASS 1 | DN6 |
| R-600a | 0.049 | CLASS 2 | 0.588 | CLASS 1 | DN2 |
| | 0.330 | CLASS 2 | 0.333 | CLASS 1 | DN4 |
| | 0.333 | CLASS 2 | 0.261 | CLASS 1 | DN6 |

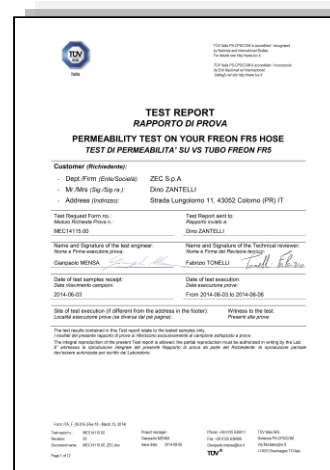
Gas permeability on assemblies have been tested and verified by

TÜV SÜD Italia

according to: EN1736:2008 Standard

Test report n.: MEC14115.00

Issue date: 2014-08-06



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Fittings and Packaging



ZEC S.p.A. THERMOPLASTIC HOSES - Colorno (PR) ITALY

HOSE REELS AND COLORS

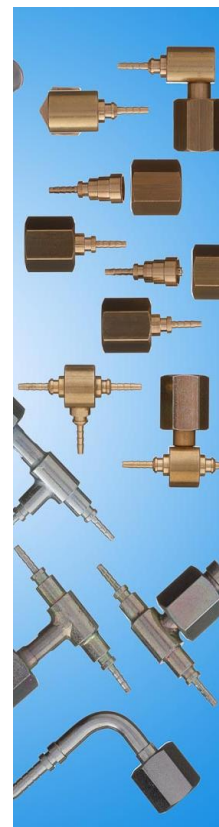
| HOSE TYPE | ORDERING CODE | LENGTH [m] | COLOR |
|-----------|----------------|------------|-------|
| DN2 | FR557210100R10 | 10 | BLACK |
| | FR557210100R50 | 50 | |
| | FR557210109R10 | 10 | GREEN |
| | FR557210109R50 | 50 | |
| DN4 | FR510100R10 | 10 | BLACK |
| | FR510100R50 | 50 | |
| | FR510109R10 | 10 | GREEN |
| | FR510109R50 | 50 | |
| DN6 | FR530100R10 | 10 | BLACK |
| | FR530100R50 | 50 | |
| | FR530109R10 | 10 | GREEN |
| | FR530109R50 | 50 | |



FITTINGS – FERRULES – ACCESSORIES

| ITEMS | PACK TYPE | PIECES |
|--|-------------|--------|
| DN2 STRAIGHT - 90° - T2 - T3 | KC-PACK | 50 |
| | KA-PACK | 10 |
| DN4 STRAIGHT - 90° - T2 - T3 (1/4", 3/8") | KC-PACK | 50 |
| | KA-PACK | 10 |
| DN6 STRAIGHT - 90° (1/4", 3/8") | KC-PACK | 50 |
| | KA-PACK | 10 |
| DN2 - Restrictor | VFR5DN2KC | 50 |
| DN2 - Copper ring 1/4 | GCCU14FR5KC | 50 |
| DN2 - Cap 1/4 | TAPPOPE14KC | 50 |
| CUTTING TOOL | PZP1 | 1 |
| CUTTING BLADES | LMP1KC | 2 |
| MANUAL CRIMPING TOOL DN2 | PZFR5DN2 | 1 |
| MANUAL CRIMPING TOOL DN4 | PZFR5DN4 | 1 |

"KA" and "KC" packs include Fitting – Nut – Ferrule as a minimum standard.
We invite you to contact ZEC (www.zecspa.com) for more details.



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ZEC S.p.A.

Via Lungolorno 11 – 43052 Colorno (PR) – Italy

VAT: IT01720400348 – REA: PR - 173914

Tel.: (+39) 0521 816631 – Fax: (+39) 0521 816772 – Email: info@zecspa.com – Web: www.zecspa.com

**COMPANY WITH QUALITY MANAGEMENT
SYSTEM CERTIFIED BY DNV**

= ISO 9001:2008 =

Rev. 1 - 27/03/15



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