

INDUSTRIAL HOSES - air-conditioning

General information about refrigerants

Refrigerant is a substance engaged in a process of heat exchange in refrigeration systems. The refrigerant absorbs heat by evaporation at low temperature and low pressure, then it gives up heat when vapour is condensed at the respectively higher temperature and pressure. A refrigerant can be made of a single substance or a combination of two or more substances.

There are numerous substances that can be employed as refrigerants: natural substances (ammonia, water, carbon dioxide), flammable gases and their mixtures (propane, butane) and synthetic media - hydrocarbons, where atoms of hydrogen were substituted by chlorine, fluoride or bromine obtaining non-flammable, low-boiling substances commonly known as "Freons". Refrigerants are usually defined with a number preceded by a letter R: R12, R22, R134a. Due to environmental concerns (ozone depletion) the application of some refrigerants is limited and prohibited of the others - in new or refilled equipment (e.g. R12, R22, R502).

- R12** - formerly the most popular refrigerant, used in household refrigerators, replaced with R134a.
R22, R502 - used in large refrigerating equipment, now being replaced with recently designed blends such as R402A, R404A, R407, R507.
R134a - the most common refrigerant at the moment, especially in car air-conditioning.

A refrigerant is usually called with the brand name of its manufacturer e.g.: Suva HP62, Suva MP52, Forane134a, Reclin 404A etc.

Apart from refrigerants, there are lubricants also used in installations. The impact of lubricants on the material of hoses and sealing have to be taken into account. Common lubricants: mineral oils, ester oil, polyalkylene glycol (PAG).



FR 5

- Internal layer:** Polyamide (PA) + thermoplastic elastomer (TPE) (from 1/12" to 1/4")
 Polyamide (from 5/16" to 1")
Reinforcement: Polyester braid
External layer: Pin-pricked polyurethane, resistant to abrasion
Working temp.: From -45°C up to +130°C

Lightweight, flexible hose designed for commercial refrigeration systems (alternative to copper pipes) and automotive air-conditioning (filling and testing). Particularly recommended for Freons (R22, R134a, R404a, R407c, R410a, R507), POE and PAG compressor oils. The hose in sizes from 1/12" to 1/4" can be also used to transfer CO₂ (R-744) - when CO₂ is used as a refrigerant, pressure must be up to 10 times higher than when regular Freons are used. Assembly - use ZC-FR type fittings.

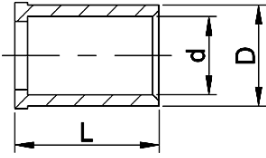
code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/100 m]
ZC-FR5-02	2.1	6	120	600	15	2.80
ZC-FR5-04	4	8.2	120	600	30	4.30

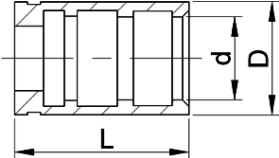
Assembly - use Z type fittings (IT-46).

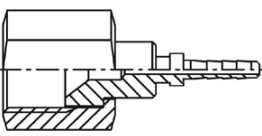
code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/100 m]
ZC-FR5-05	4.8	10.1	120	600	50	6.90
ZC-FR5-06	6.4	11.9	120	600	75	8.60
ZC-FR5-08	8.1	14.2	60	300	89	12.00
ZC-FR5-10	9.7	15.6	60	300	100	13.40
ZC-FR5-13	12.9	19.3	60	300	125	18.00
ZC-FR5-16	16	22.3	45	225	165	20.90
ZC-FR5-19	19.2	25.3	45	225	250	25.70
ZC-FR5-25	25.4	32.3	45	225	300	34.40

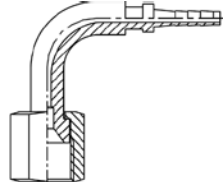
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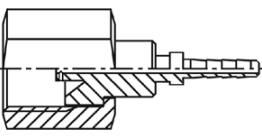
Fittings for ZC-FR5-02 (1/12") and ZC-FR5-04 (5/32") hoses

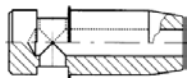
Ferrule for 1/12" hose (aluminium)			
			
code	L [mm]	d [mm]	D [mm]
ZC-FR-015	11.5	6.2	8

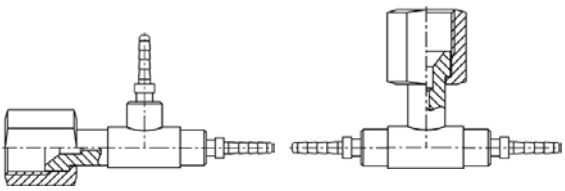
Ferrule for 5/32" hose (aluminium)			
			
code	L [mm]	d [mm]	D [mm]
ZC-FR-025	18	8.6	11.2

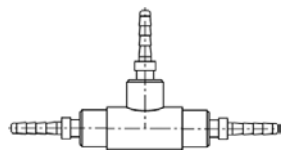
UNF female thread, SAE type, 45° cone, (1/12 - brass, 5/32 - steel)		
		
code	thread [inch]	hose I.D. [inch]
ZC-FR101-04-015	7/16-20 UNF (1/4 SAE)	1/12
ZC-FR101-04-025	7/16-20 UNF (1/4 SAE)	5/32
ZC-FR101-06-025	5/8-18 UNF (3/8 SAE)	5/32

UNF female thread, SAE type, 45° cone, (1/12 - brass, 5/32 - steel)		
		
code	thread [inch]	hose I.D. [inch]
ZC-FR102-04-015	7/16-20 UNF (1/4 SAE)	1/12
ZC-FR102-04-025	7/16-20 UNF (1/4 SAE)	5/32
ZC-FR102-06-025	5/8-18 UNF (3/8 SAE)	5/32

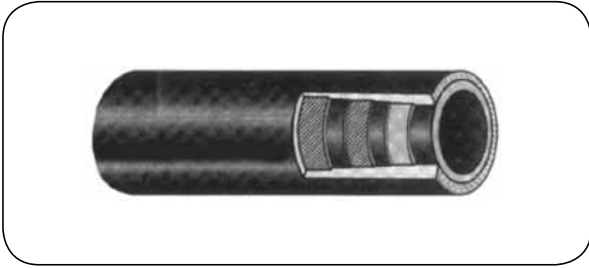
UNF fem. thread, SAE type, 45° cone, with throttle (brass)		
		
code	thread [inch]	hose I.D. [inch]
ZC-FR103-04-015	7/16-20 UNF (1/4 SAE)	1/12

Throttle for FR103 type fitting (brass)	
	
code	thread [inch]
ZC-FR103-D	7/16-20 UNF (1/4 SAE)

Tee-adapter, UNF female thread, SAE type, 45° cone, (brass)		
		
code	thread [inch]	hose I.D. [inch]
ZC-FR105-015	7/16-20 UNF (1/4 SAE)	1/12
ZC-FR106-015	7/16-20 UNF (1/4 SAE)	1/12

Tee-connector (brass)	
	
code	hose I.D. [inch]
ZC-FR104-015	1/12

INDUSTRIAL HOSES - air-conditioning



3055, 3060

Internal layer: Synthetic rubber (CR), nylon layer (PA), synthetic rubber (NBR)
Reinforcement: Double textile braid (3060 - single)
External layer: Pin-pricked synthetic rubber (3055 - EPDM, 3060 - IIR)
Working temp.: From -35°C up to +125°C

The top grade hose designed for automotive and commercial refrigeration systems, air-conditioning systems operating with the use of Freon R 12, R 134a, Suva MP 52, R 22, and such lubricants as mineral oils, esters, PAG. External layer resistant to oil, abrasion and weather conditions. The hose type 3060 has an extremely small outside diameter that provides increased flexibility and lower weight (LW).

Standards - 3055 - SAE J51b AII/SAE J2064, 3060 - GM:SD2-254, FORD: WHSM 96D25, CHRYSLER:PF6318. Assembly - use fittings for air-conditioning - BU (IT-43, IT-44, IT-73).

type	code	I.D. [inch]	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]
3055	BU-3055-08	5/16	7.9	18.3	24	121	102
	BU-3055-10	13/32	10.3	22.4	24	121	114
	BU-3055-13	1/2	12.7	24.6	24	121	127
	BU-3055-16	5/8	15.9	27.7	17	86	165
3060 (LW)	BU-3060-08	5/16	7.9 ÷ 8.6	14.2 ÷ 15.2	34.5	172	51
	BU-3060-10	13/32	10.2 ÷ 11.2	16.8 ÷ 17.8	34.5	172	64
	BU-3060-13	1/2	12.5 ÷ 13.5	18.9 ÷ 19.9	34.5	121	76
	BU-3060-16	5/8	15.6 ÷ 16.6	23.1 ÷ 24.1	34.5	121	102



3056

Internal layer: Synthetic rubber IIR (CR for 3/16")
Reinforcement: Single steel braid
External layer: Pin-pricked synthetic rubber (CSM)
Working temp.: From -40°C up to +125°C

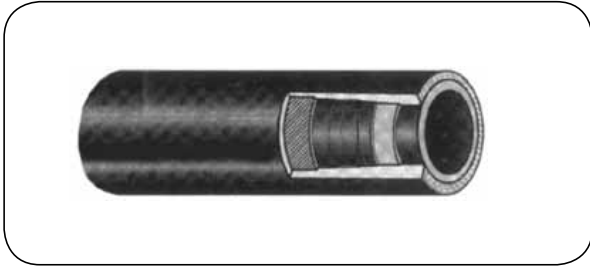
The top grade hose designed for automotive (especially trucks and buses) and commercial refrigeration systems, air-conditioning systems operating with the use of Freon R134a and such lubricants as mineral oils, esters, PAG. External layer resistant to oil, abrasion and weather conditions.

Standards - SAE J2064 type B (SAE 100R5 dimensions).

Assembly - use fittings for air-conditioning - BU.

code	I.D. [inch]	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]
BU-3056-05	3/16	4.8	13.1	35	137	85
BU-3056-22	7/8	22.2	31.4	35	137	155
BU-3056-28	1.1/8	28.6	38.1	35	137	190

INDUSTRIAL HOSES - air-conditioning



3090

Internal layer: Synthetic rubber (CR) with a nylon (PA) interlayer
Reinforcement: Single textile braid
External layer: Pin-pricked synthetic rubber (CIIR)
Working temp.: From -40°C up to +135°C

The top grade hose designed for automotive and commercial refrigeration systems, air-conditioning systems operating with the use of R134a (also R12, Suva MP52, R22, HFO1234yf) and such lubricants as mineral oils, esters, PAG. External layer resistant to abrasion and weather conditions.

Assembly - use fittings for air-conditioning BU-54... (BURGACLIP system, IT-73) or BU-53... (IT-43, IT-44).

code	I.D. [inch]	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]
BU-3090-08	5/16	7.9÷8.6	14.2÷15.2	35	172	51
BU-3090-10	13/32	10.2÷11.2	16.8÷17.8	35	172	64
BU-3090-13	1/2	12.5÷13.5	18.9÷19.9	35	121	76
BU-3090-16	5/8	15.6÷16.6	23.1÷24.1	35	121	102
BU-3090-19	3/4	18.9÷19.9	28.1÷29.1	35	121	250
BU-3090-22	7/8	22	31	35	121	-

Air-conditioning fittings assembly

Thermoplastic hoses designed for air-conditioning applications (e.g. FR5) are usually used with standard hydraulic fittings (Z type) and matching crimp ferrules.

Rubber hoses designed for air-conditioning require specially designed fittings in aluminium or steel: reusable, crimp or for assembly with the use of special clips (fast assembly system).

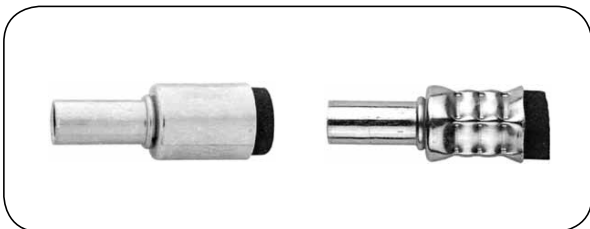


Reusable fittings

Assembly of a fitting is performed by screwing the fitting together with a ferrule that was fitted on the hose. An advantage of this solution is a lack of need to use tools - useful in the field conditions.

Fast assembly system

Special design of a fitting tail and a clip enables fast and easy assembly using only assembly pliers.



Crimp fittings

A crimp fitting for air-conditioning has an integrated ferrule. The crimping process is performed by crimping pliers, crimping machines designed for air-conditioning or by standard FINN-POWER crimping machines (with special die sets).



Hose assembly repair

If a hose assembly failed but its fittings are not damaged, it can be easily repaired by brazing the fittings to nipples and assembling then once again on the new hose.