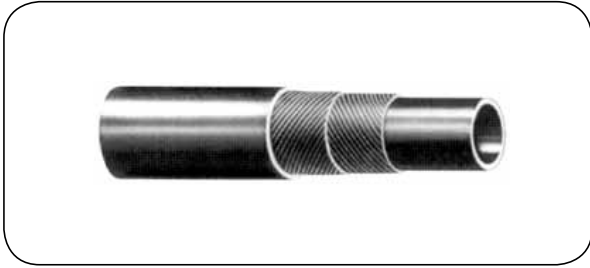


INDUSTRIAL HOSES - technical gas

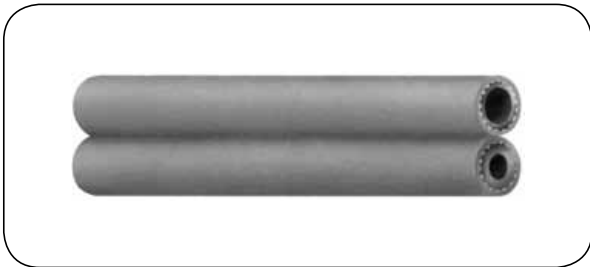


ACETYLEN EN 559 / ISO 3821

Internal layer: Black SBR/NR compound
Reinforcement: Two textile braids
External layer: Red, ribbed SBR/NR compound
Working temp.: From -30°C up to +70°C

Flexible welding hose for acetylene. Resistant to weather conditions and kinking. Manufactured according to ISO 3821 standard. Not suitable for fuel-based and oil-based gases or LPG.

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bending radius [mm]	weight [kg/m]	standard length [m]
PR-ACETYLEN-559-05	5	11	20	50	0.13	50
PR-ACETYLEN-559-06	6.3	13.3	20	63	0.15	50
PR-ACETYLEN-559-08	8	16	20	80	0.18	50
PR-ACETYLEN-559-09	9	16	20	90	0.19	50
PR-ACETYLEN-559-10	10	18	20	100	0.21	50
PR-ACETYLEN-559-13	13	23	20	130	0.42	50
PR-ACETYLEN-559-16	16	26	20	160	0.51	50
PR-ACETYLEN-559-19	19	31	20	190	0.68	50
PR-ACETYLEN-559-25	25	36	20	250	0.82	50



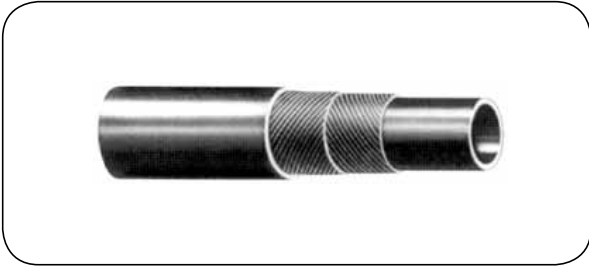
TWIN

Internal layer: Black synthetic rubber
Reinforcement: Polyester braid
External layer: Synthetic rubber
 - red (for acetylene)
 - blue (for oxygen)

Twin welding hose according ISO 3821 standards.

code	I.D. [mm]	wall thickness [mm]	colour	working pressure [bar]	bursting pressure [bar]	standard length [m]
BG-TWIN-05-05	5 5	2.75 2.75	blue red	20	60	50
BG-TWIN-06-06	6 6	3.5 3.5	blue red	20	60	50
BG-TWIN-08-08	8 8	3.5 3.5	blue red	20	60	50
BG-TWIN-06-09	6 9	5 3.5	blue red	20	60	50
BG-TWIN-09-09	9 9	3.5 3.5	blue red	20	60	50

INDUSTRIAL HOSES - technical gas



OXYGEN EN 559 / ISO 3821

Internal layer: Black SBR/NR rubber
Reinforcement: Two textile braids
External layer: Blue, ribbed SBR/NR rubber
Working temp.: From -30°C up to +70°C

Flexible welding hose for oxygen. Resistant to weather conditions and kinking. Manufactured according to ISO 3821 standard. Not suitable for fuel-based and oil-based gases or LPG.

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bending radius [mm]	weight [kg/m]	standard length [m]
PR-OXYGEN-559-05	5	11	20	50	0.13	50
PR-OXYGEN-559-06	6.3	13.3	20	63	0.15	50
PR-OXYGEN-559-08	8	16	20	80	0.18	50
PR-OXYGEN-559-09	9	16	20	90	0.19	50
PR-OXYGEN-559-10	10	18	20	100	0.21	50
PR-OXYGEN-559-13	13	23	20	130	0.42	50
PR-OXYGEN-559-16	16	26	20	160	0.51	50
PR-OXYGEN-559-19	19	31	20	190	0.68	50
PR-OXYGEN-559-25	25	36	20	250	0.87	50



OXYGEN / FV

Internal layer: Black CR rubber
Reinforcement: Textile braid, fibreglass reinforcement
External layer: Yellow or blue CR rubber
Working temp.: From -20°C up to +70°C

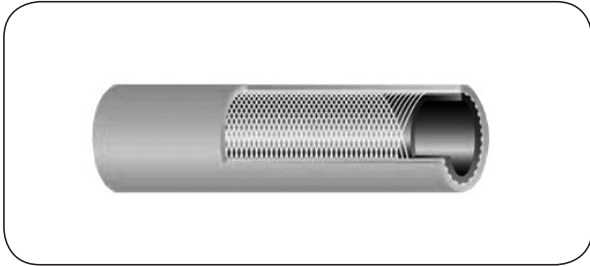
Hose designed for oxygen blowing lances used in metallurgical industry.

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	standard length [m]
IV-OXYGEN-FV-13	13	27	25	75	120
IV-OXYGEN-FV-16	16	30	25	75	120
IV-OXYGEN-FV-19	19	33	25	75	120
IV-OXYGEN-FV-25	25	41	25	75	120
IV-OXYGEN-FV-32	32	50	25	75	120
IV-OXYGEN-FV-38	38	57	25	75	120
IV-OXYGEN-FV-51	51	70	25	75	120

Code example:

- hose with yellow external layer: IV-OXYGEN-FV-13Y
- hose with blue external layer: IV-OXYGEN-FV-13BL

INDUSTRIAL HOSES - technical gas



GWPB

Internal layer: Black NBR rubber
Reinforcement: Two textile braids
External layer: Orange EPDM/SBR rubber
Working temp.: From -30°C up to +70°C

Flexible hose for liquefied petroleum gas (LPG) and natural gas. Fulfils ISO 3821 standards.

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]	standard length [m]
SP-GWPB-04	4	11	20	60	30	0.12	50
SP-GWPB-05	5	12	20	60	40	0.14	50
SP-GWPB-06	6.3	13.3	20	60	50	0.16	50
SP-GWPB-08	8	15	20	60	60	0.18	50
SP-GWPB-09	9	16	20	60	70	0.19	50
SP-GWPB-10	10	17	20	60	75	0.20	50
SP-GWPB-12	12.5	19.5	20	60	95	0.25	50
SP-GWPB-16	16	23.4	20	60	120	0.31	50
SP-GWPB-19	19	29.6	20	60	140	0.55	40
SP-GWPB-20	20	30.6	20	60	150	0.58	40
SP-GWPB-25	25	35.6	20	60	190	0.69	40
SP-GWPB-32	31.5	44.1	20	60	240	1.12	40
SP-GWPB-35	35	48.2	20	60	260	1.28	20
SP-GWPB-38	38	51.4	20	60	280	1.40	20
SP-GWPB-40	40	53.4	20	60	300	1.46	20
SP-GWPB-45	45	58.6	20	60	340	1.64	20
SP-GWPB-50	50	63.6	20	60	375	1.80	20



GPL CORD EN 1762:2003®

Internal layer: Black synthetic rubber
Reinforcement: Synthetic braid
External layer: Black, pin pricked synthetic rubber
Working temp.: From -30°C up to +100°C

Flexible delivery hose designed to transfer liquefied petroleum gas - LPG (liquid and gas state) and natural gas. External layer resistant to ozone and weather conditions. Antistatic ($R < 10^6 \Omega/m$). The hose features copper wires to ensure electrical conductivity. Manufactured according to EN 1762:2003/D standard.

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]	standard length [m]
IV-GPL-CORD-M-013	13	24	25	100	100	0.39	60
IV-GPL-CORD-M-016	16	29	25	100	125	0.48	60
IV-GPL-CORD-M-019	19	32	25	100	160	0.55	60
IV-GPL-CORD-M-025	25	38	25	100	200	0.77	60
IV-GPL-CORD-M-032	32	46	25	100	250	1.04	60
IV-GPL-CORD-M-038	38	54	25	100	320	1.32	60
IV-GPL-CORD-M-045	45	62	25	100	400	1.61	60
IV-GPL-CORD-M-050	50	67	25	100	400	1.76	60
IV-GPL-CORD-M-065	65	83	25	100	550	2.44	60
IV-GPL-CORD-M-075	75	93	25	100	650	2.76	60
IV-GPL-CORD-M-100	102	124	25	100	800	-	60

Hoses for high pressure gases

High pressure gases are transferred under pressure above 140 bar and therefore demand special types of flexible hoses. The most common applications of such usage are: filling up and emptying of gas tanks and cylinders, industrial installations, medical and laboratory installations. Typical gases used are: oxygen, nitrogen, hydrogen, helium, argon, carbon dioxide, acetylene and many other gases, including mixtures.

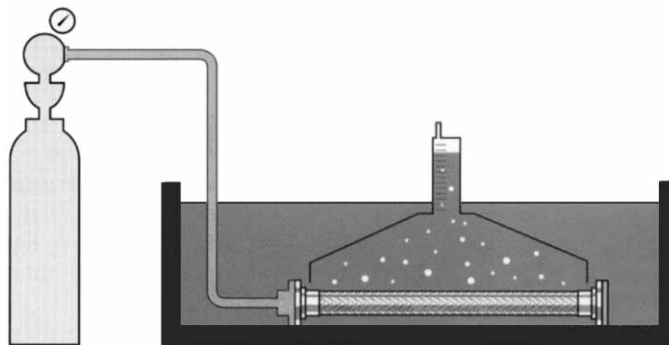
Hoses used for high pressure gas transfer:

- rubber hydraulic hoses,
- thermoplastic hoses,
- PTFE hoses,
- steel hoses,
- UHP SPIR STAR® hoses.

Before choosing a hose for high pressure gas transfer application, we need to consider the following issues:

Permeation through the hose wall

High pressure gases exhibit a tendency to permeate - to pass through the hose walls. A phenomenon of gas permeation is highly complex and depends on such factors as: medium and its molecular structure, velocity and a type of flow (laminar or turbulent), temperature, thickness of a hose wall, its material and structure; particularly the degree of porosity of a hose material. In order to measure the precise rate of permeation, test procedures must be carried out under the actual or simulated working conditions.



The rate of permeation is higher when the particles of gases are small (helium, hydrogen) and when the hose wall is thin and with porosity. For those reasons:

- an external layer of rubber or thermoplastic hoses used for gases should be pin pricked to avoid accumulation of gas under the external layer,
- special PTFE hoses should be used for high pressure gases (HPG). Their permeability is lower because PTFE is processed in a special way,
- when dangerous gases are conveyed, consideration should be given to the issue of gas accumulation in a confined area around the hose,
- some gases or by-products of their reaction with e.g. moisture can damage the braid of the hose, its fittings or other parts of equipment.

Working pressure

According to ISO7751 standard a safety factor (ratio of working pressure to burst pressure) for gases should be 4:1. Testing pressure should be twice as high as the working pressure.

Working temperature

Gas expansion often causes a sudden temperature drop beyond regular working conditions. Take that process into account when choosing the material of the hose and fittings. It is generally recommended to use stainless steel fittings and brass nuts.

Cleanliness and degreasing

If a hose is used for oxygen, its cleanliness and degreasing becomes crucial to avoid fire or explosion. Hose assemblies for oxygen must be degreased using special procedure.

INDUSTRIAL HOSES - technical gas

Electrostatic properties

Pure, single phase gases (gas without droplets of fluid or solid contaminants) usually do not require special, antistatic PTFE or thermoplastic material. Multiphase media (gas with fluid or solid contaminants) must not be transferred by PTFE or thermoplastic hoses because of a risk of electrostatic charges. Antistatic PTFE (with carbon additives) is not suitable for high pressure gases due to increased micro porosity of this material.

Flow velocity and pressure pulsation

Appropriate construction of an installation should eliminate pressure pulsation. If a rise of pressure caused by pulsation occurs it must not exceed maximum working pressure. Flow velocity in corrugated steel hose assemblies should not exceed 30 m/sec - a turbulent flow can cause vibrations and damage the hose.

Safety warning

High dynamics of a gas expansion process may contribute to a crack or tearing of a hose fitting. It causes potential risk of damage and harm to people, equipment and installation. To prevent such danger it is recommended to use e.g. steel wires fitted to the hose as a safety measure.

Thermoplastic hoses for high pressure gases

The external layer of thermoplastic hoses must be pin-pricked (see chapter: HIGH PRESSURE, section - thermoplastic hoses). Confirm the medium being transferred to application. Use 4:1 safety factor.

SPIR STAR hoses for high pressure gases

The external layer of SPIR STAR® hoses must be pin-pricked (see chapter: HIGH PRESSURE - UHP equipment, section - SPIR STAR® hoses). Confirm the medium being transferred to application. Use 6:1 safety factor.



INDUSTRIAL HOSES - technical gas

PTFE hoses for high pressure gases



HWDB / HPG

Material: Smooth PTFE
Reinforcement: Double AISI 304 steel wire braid
Working temp.: From -70°C up to +260°C

SMOOTHBORE PTFE hose version. A heavy wall made of the uniquely processed PTFE (reduced micro porosity) and a double steel wire braid of the hose make it suitable for high pressure gas applications. Assembly: use fittings and ferrules from AF-TL series.

For temperatures above +130°C reduce the maximum working pressure given in the tables by 0.75% for each 1°C of temperature rise above +130°C.

Example: at +170°C maximum working pressure for AF-HWDB-HPG-06 hose:
 $225 \text{ bar} - (170^\circ\text{C} - 130^\circ\text{C}) \times 0.75 = 225 \text{ bar} - 30\% = 157.5 \text{ bar}.$

code	DN	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
AF-HWDB-HPG-06	6	6 ÷ 6.5	10.6 ÷ 10.9	225	900	26	0.18
AF-HWDB-HPG-08	8	7.5 ÷ 8	12.1 ÷ 12.6	217	870	35	0.21
AF-HWDB-HPG-10	10	9.1 ÷ 9.6	13.9 ÷ 14.3	180	720	50	0.24



HWDB / HPG / HI

Material: Smooth PTFE
Reinforcement: Aramid braid + 304 steel wire braid
External layer: Micro perforated Hytrel
Working temp.: From -50°C up to +70°C

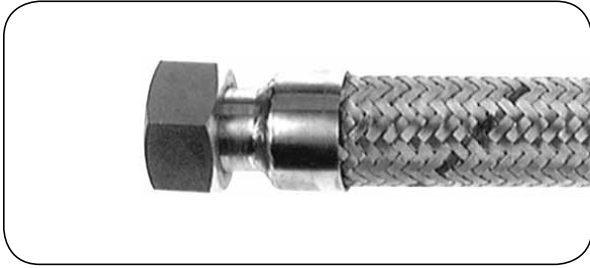
Special version of SMOOTHBORE PTFE hose designed for high pressure applications. A heavy wall made from the uniquely PTFE (reduced micro porosity), a double braid (aramid and steel braid) and an external Hytrel layer make it suitable for high pressure gas applications. The external Hytrel layer is available in several colour versions (black, red, green, blue) to distinguish hoses used for different types of gases.

Assembly: use fittings and ferrules from AF-TL series.

code	DN	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
AF-HWDB-HPG-HI-06	6	6 ÷ 6.3	12 ÷ 12.4	300	1200	30	0.19

INDUSTRIAL HOSES - technical gas

Steel hoses for high pressure gases

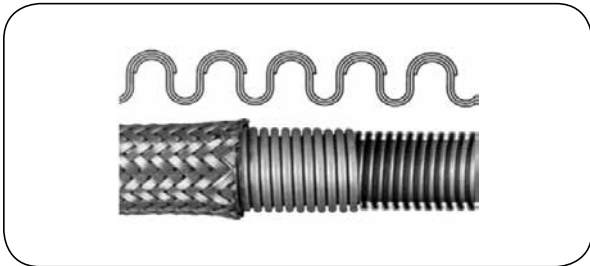


HP / THP / THP 300

Internal layer: Corrugated AISI3 16L steel hose
Reinforcement: Single (HP) or double (THP, THP300) AISI 304 steel braid
Working temp.: From -270°C up to +800°C

Special, high pressure steel hose meets the requirements of EN ISO 10380 class 1 standard. This heavy wall hose is manufactured using hydroforming technology to achieve parallel, close pitch construction. Available with fittings for steel hoses on request. If used at high temperatures, working pressure given in the tables must be reduced by temperature correction factor according to EN ISO 10380 standard. THP300 version for gas transfer from a cylinder, qualified by CTE Air Liquide up to 250 bar. Safety factor 4:1.

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	min. bending radius [mm]	
					static	dynamic
HP (single braid)						
TB-HP-006	6	11.4	180	720	25	110
TB-HP-010	10	17.8	145	580	38	150
TB-HP-012	12	20.2	140	560	45	165
THP (double braid)						
TB-THP-006	6	13	255	1020	25	110
TB-THP-010	10	19.4	195	780	38	150
TB-THP-012	12	21.8	185	740	45	165
THP 300 (double braid)						
TB-THP300-006	6.2	13.3	300	1200	25	140



DUO UHP

Internal layer: Corrugated AISI 316L steel hose
Reinforcement: Double AISI 304 steel braid
Working temp.: From -196°C up to +600°C

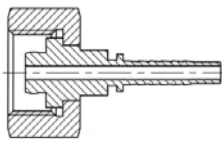
Double-layer, helically corrugated hose intended for ultra high pressure application. A third layer on top of corrugations is special designed and applied using an electric resistance welding method in order to achieve top resistance to high pressure and vibration, yet to maintain excellent flexibility. Designed and made in accordance with EN ISO 10380 class 1 standard. Perfectly suitable for such applications as gas cylinder filling, connecting installation with gas cylinders or bottles, absorbing vibration and for any other applications in heavy duty operating conditions.

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	min. bending radius [mm]	
					static	dynamic
TB-DUOUHP-05	5.2	12.6	395	1580	20	100
TB-DUOUHP-06	6.3	13.7	350	1400	25	140

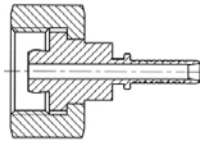
INDUSTRIAL HOSES - technical gas

Fittings for high pressure gas hoses

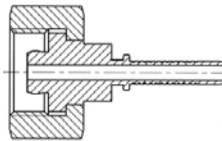
High pressure gas hoses can be used with many types of fittings in different shapes. Most of those fittings are adjusted to be connected to the valves of gas cylinders. The types of couplings of gas cylinder valves are listed in PN-81/M-69229 and DIN477-1. The standards specify the types of couplings (sizes, threads) and indicate the application with the particular type of gas. The size and shape of a tail end fitting depends on the size and type of the hose (rubber hydraulic, thermoplastic, PTFE, steel, SPIR STAR®). Material of the fittings must be resistant to the corrosive effect of gases, while some other materials must not be used (e.g. copper and copper alloys for acetylene and ammonia). Usually a fitting made of AISI 304 stainless steel with a brass nut are applicable. Other types of couplings according to the customer's specification or standards are also available e.g. elbows, but also those made of other materials e.g. zinc-plated carbon steel, AISI 316 stainless steel.



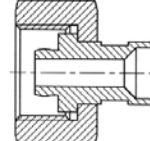
TI-ZBW170
TI-ZWW170



AF-HBW170
AF-HWW170



AF-TLBW170
AF-TLWW170



TB-SBW170
TB-SWW170

hose type	code			
	DN6 (1/4")	DN8 (5/16")	DN10 (3/8")	DN12 (1/2")
G-3/4" (3/4"-BSP) female thread, connection according to PN-81/M69229 (DIN477-1 No. 9) Material: fitting - AISI 304 steel, nut - brass, application: oxygen, carbogen.				
thermoplastic, hydraulic	TI-ZBW170-12-04-SS-MO	TI-ZBW170-12-05-SS-MO	TI-ZBW170-12-06-SS-MO	TI-ZBW170-12-08-SS-MO
PTFE HPG HI	-	-	-	-
PTFE HPG	AF-TLBW170-12-04-SS-MO	AF-TLBW170-12-05-SS-MO	AF-TLBW170-12-06-SS-MO	-
steel	TB-SBW170-12-04-SS-MO	-	TB-SBW170-16-06-SS-MO	TB-SBW170-12-08-SS-MO
Whitworth W21.8x1/14" female thread, connection according to PN-81/M-69229 (DIN477-1 No. 6) Material: fitting - AISI 304 steel, nut - brass, application: ammonia, argon, carbon dioxide, helium and many other.				
thermoplastic, hydraulic	TI-ZWW170-21-04-SS-MO	TI-ZWW170-21-05-SS-MO	TI-ZWW170-21-06-SS-MO	TI-ZWW170-21-08SS-MO TI-ZWW270-21-08-SS-MO
PTFE HPG HI	AF-HWW170-21-04-SS-MO	-	-	-
PTFE HPG	AF-TLWW170-21-04-SS-MO	AF-TLWW170-21-05-SS-MO	AF-TLWW170-21-06-SS-MO	-
steel	TB-SWW170-21-04-SS-MO	-	-	-
Whitworth W21.8x1/14" (left) female thread, connection according to PN-81/M-69229 (DIN477-1 No. 1) Material: fitting - AISI 304 steel, nut - brass, application - hydrogen, methane, other flammable gases.				
thermoplastic, hydraulic	TI-ZWW170-21L-04-SS-MO	TI-ZWW170-21L-05-SS-MO	TI-ZWW170-21L-06-SS-MO	-
PTFE HPG HI	AF-HWW170-21L-04-SS-MO AF-HWW270-21L-04-SS-MO	-	-	-
PTFE HPG	AF-TLWW170-21L-04-SS-MO	AF-TLWW170-21L-05-SS-MO	AF-TLWW170-21L-06-SS-MO	-
steel	TB-SWW170-21L-04-SS-MO	-	TB-SWW170-21L-06-SS-MO	-
Whitworth W24.32x1/14" female thread, connection according to PN-81/M-69229 (DIN477-1 No. 10) Material: fitting - AISI 304 steel, nut - brass, application - nitrogen.				
thermoplastic, hydraulic	TI-ZWW170-24-04-SS-MO	-	TI-ZWW170-24-06-SS-MO	TI-ZWW170-24-08-SS-MO
PTFE HPG HI	AF-HWW270-24-04-SS-MO	-	TI-HWW270-24-06-SS-MO	-
PTFE HPG	AF-TLWW170-24-04-SS-MO AF-TLWW270-24-04-SS-MO	AF-TLWW170-24-05-SS-MO AF-TLWW370-24-05-SS-MO	AF-TLWW170-24-06-SS-MO	-
steel	TB-SWW-170-24-04-SS-MO	-	-	-