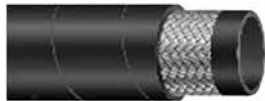


HIGH PRESSURE - hoses

Hydraulic rubber hoses

Rubber hydraulic hoses are used in high pressure hydraulic systems for control and power supply. They are designed to transfer hydraulic oil primarily (hydraulic fluid compliant with ISO 6743-4, apart from HFD R, HFD S and HFD T fire-resistant fluids). For other applications (e.g. for compressed gases) always contact Technical Department of TUBES INTERNATIONAL®. For water, water-based fluids and air, the maximum working temperature is +70°C. For air over 17 bar, the external layer of the hose should be pinpricked and have additional protection.

Typical hydraulic rubber hoses can be classified into three different construction types:



Hoses with textile braid
(one or two)



Hoses with compacted
steel wire braids
(one, two or three)



Hoses with steel wire spirals
(four or six)

Hydraulic rubber hoses are manufactured in imperial size with standardized inside diameter.

The most popular standards setting the requirements for hoses are: European standards - EN, international ISO and American SAE. The symbol of the standard and the most important data (diameter, working pressure and production date) are marked on the hose. Additionally, there may be a specific name on the hose that is given by a producer or customer.



hose name

standard

inside
diameter

working
pressure

production date

Table for initial hydraulic hose selection

Maximum working pressure [bar]
1 bar = 0.1 MPa

hose type				working pressure [bar]										
				3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"	1"	1.1/4"	1.1/2"	2"
code TUBES	standards			DN										
	European	international	American	5	6	8	10	12	16	20	25	32	38	51
HW-2TE	EN 854 2TE	ISO 4079-1 2TE	-	80	75	68	63	58	50	45	40	-	-	-
HW-3TE	EN 854 3TE	ISO 4079-1 3TE	-	160	145	130	110	93	80	70	55	-	-	-
HW-1SN	EN 853 1SN	ISO 1436-1SN	SAE 100 R1AT	250	225	215	180	160	130	105	88	63	50	40
HW-1SC	EN 857 1SC	ISO 11237-1 1SC	-	-	225	215	180	160	130	105	88	-	-	-
HW-2SN	EN 853 2SN	ISO 1436-2SN	SAE 100 R2AT	415	400	350	330	275	250	215	165	125	90	80
HW-2SC	EN 857 2SC	ISO 11237-1 2SC	-	-	400	350	330	275	250	215	165	-	-	-
HW-4SP	EN 856 4SP	ISO 3862-1 4SP	-	-	450	-	445	415	350	350	280	210	185	165
HW-4SH	EN 856 4SH	ISO 3862-1 4SH	-	-	-	-	-	-	-	420	380	325	290	250
HW-R12	EN 856 R12	ISO 3862-1 R12	SAE 100 R12	-	-	-	-	-	-	280	280	280	280	280
HW-R13	EN 856 R13	ISO 3862-1 R13	SAE 100 R13	-	-	-	-	-	-	345	345	345	345	345
HW-R15	-	ISO 3862-1 R15	SAE 100 R15	-	-	-	-	-	-	420	420	420	420	-

Apart from regular hydraulic rubber hoses manufactured according to the standards above, there are also hoses that exceed these standards (see next page).

HIGH PRESSURE - hoses

Superior flexibility

Hydraulic hoses with minimum bend radius smaller than standard are much more flexible.

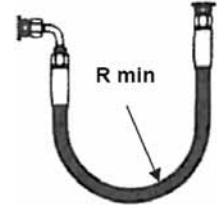
Example:



HW-2SN-10P - min. bend radius $R = 125$ mm
(meets the requirements of EN 853 2SN)



HW-2SC-10P - min. bend radius $R = 65$ mm
(exceeds the requirements of EN 857 2SC)



Superior pressure parameters

The maximum working pressure of some hydraulic hoses exceeds standard requirements. The hoses can be easily used for applications with the same safety factor without need to change the diameter (e.g. for smaller one) or change hose type (from double braid to hose with steel wire spirals).

Example:



HW-2SC-12P - maximum working pressure 275 bar
(COMPACT hose meets the requirements of EN 857 2SC)



HW-2SC/BE/K-12P - maximum working pressure 325 bar
(COMPACT hose exceeds the requirements of EN 857 2SC)

Superior temperature parameters

There is a defined working temperature range for each hydraulic hose type. For hoses with textile braids (2TE, 3TE), steel wire braids (1SC, 2SC, 1SN, 2SN), and for some groups of hoses with steel wire spiral (4SP, 4SH), the working temperature ranges from -40°C up to $+100^{\circ}\text{C}$ (with peaks up to $+125^{\circ}\text{C}$). For hoses with steel wire spirals, constant pressure independent of diameter (R12, R13, R15), the temperature ranges from -40°C up to $+121^{\circ}\text{C}$ (with peaks up to $+125^{\circ}\text{C}$).

The working temperature of a hydraulic system may be higher than the one above. Then the use of standard hoses is not recommended. If the maximum working temperature of the hydraulic rubber hose is exceeded, the rubber hardens so its flexibility is limited. What is more, the assembly is no longer tight and leaks start to occur at the hose ends, where the fittings are. In such cases, the hoses with a superior temperature range should be used.

Example:



HW-.../HT is a group of hoses with a temperature range extended to $+135^{\circ}\text{C}$
(with peaks up to $+150^{\circ}\text{C}$) at maximum ambient temperature around $+100^{\circ}\text{C}$.

Superior abrasion resistance

Hydraulic rubber hoses manufactured according to the regular standards have limited abrasion resistance of the external layer. Abrasion tests are carried out according to EN ISO 6945 standard. It defines the weight loss of a hose sample after a number of cycles of longitudinally applied load (e.g. the maximum weight loss for hoses of 1SN and 2SN type is 0.5 g after 2.000 cycles of longitudinal load of 25 ± 0.5 N).

In order to increase the abrasion resistance of hoses, manufacturers apply an additional layer (e.g. UHMWPE Ultra-High Molecular Weight Polyethylene - cross-linked PE). Then, there is no need for adding any extra protection covers (e.g. spirals).

HIGH PRESSURE - hoses


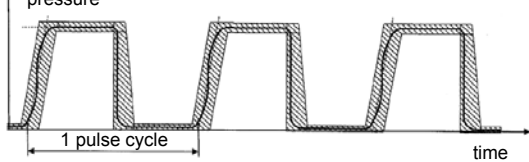
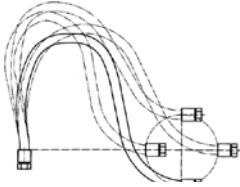
Superior service life

When hydraulic rubber hoses operate under actual service conditions, their service life depends on many factors of which the crucial ones are:

- fatigue strength of a flexible hose assembly under variable internal pressure, bending as well as internal and external temperature changes,
- aging resistance (natural loss of mechanical properties of hose material),
- resistance to external impact.

The fatigue strength of a hose assembly can be estimated through hydraulic tests with the use of pulsating pressure with or without cyclic bending. Specific requirements for the tests are described in standards (ISO 6803, ISO 6802, ISO 8032). The standards determine the required pulsating pressure endurance defined as the number of pulsating pressure cycles (impulses). Frequency of pulsating pressure is quite high (around 1 Hz), testing pressure rises from 100% to 133% of the maximum working pressure and temperature during test is elevated (+100°C).

Note that the obtained results are not fully reliable in terms of service life under actual operating conditions of the hose. However they help to determine whether the hose meets or even exceeds the relevant standard requirements and allow to compare the hose parameters of different producers.

actual service life of hydraulic hose	service life of hydraulic hose during the tests described above
	<p data-bbox="1066 891 1262 913">pressure impulses</p>  <p data-bbox="1082 1182 1230 1205">hose bending</p> 
years (months) of operation until breakdown	thousands of cycles (bends) until breakdown

Examples:

The EN 853 standard requires the hose of 2SN type to withstand the minimum of 200,000 impulse cycles at pulsating pressure which amounts to 133% of the maximum working pressure.



HW-2SN-...P hoses
Confirmed service life of 400,000 impulse cycles.

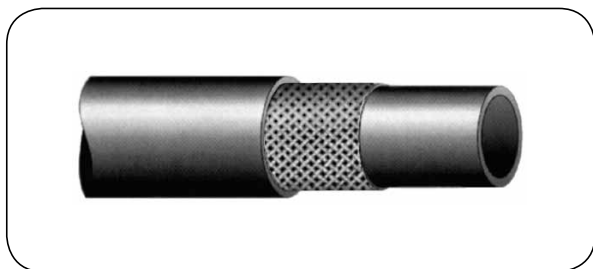
The EN 857 standard requires the hose of 4SH type to withstand the minimum of 400,000 impulse cycles at pulsating pressure which amounts to 133% of the maximum working pressure.



HW-4SH-...P hoses
Confirmed service life of 1,000,000 impulse cycles.

HIGH PRESSURE - hoses

Hydraulic rubber hoses



HW-2TE (HW-2TE-EC045)

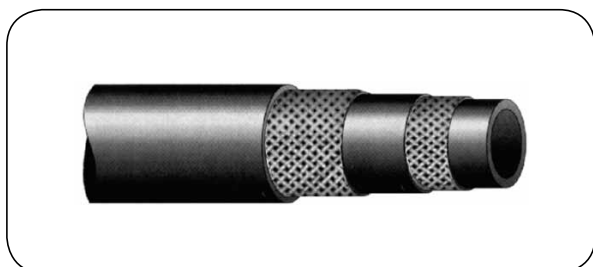
Internal layer: Black synthetic rubber
Reinforcement: One textile braid
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C

Characteristics: General purpose hydraulic hose. Designed for low pressure installations. It is highly flexible and lightweight. EC045 version meets the requirements of EN45545-2 standard.

Standards: EN 854 2TE. EN45545-2 (concerns hoses with HW-2TE-EC045 code)

Assembly: Use Z type fittings - non-skived (IT-50).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-2TE-05	4.8	11.8	80	320	25	0.11
HW-2TE-06	6.4	13.4	75	300	40	0.14
HW-2TE-08	8	14.9	68	270	50	0.17
HW-2TE-10	9.5	16.5	63	252	60	0.19
HW-2TE-13	12.7	19.7	58	232	70	0.24
HW-2TE-16	16	23.9	50	200	90	0.33
HW-2TE-19	19	27	45	180	110	0.38
HW-2TE-25	25.4	34.4	40	160	150	0.57



HW-3TE

Internal layer: Black synthetic rubber
Reinforcement: Two textile braid
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C

Characteristics: General purpose hydraulic hose. Designed for low pressure installations. It is highly flexible and lightweight.

Standards: EN 854 3TE.

Assembly: Use Z type fittings - non-skived (IT-84).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-3TE-06	6.4	14.4	145	580	45	0.19
HW-3TE-08	8	16.9	130	520	55	0.25
HW-3TE-10	9.5	18.5	110	440	70	0.27
HW-3TE-13	12.7	21.7	93	372	85	0.34
HW-3TE-16	16	25.9	80	320	105	0.47
HW-3TE-19	19	29	70	280	130	0.54
HW-3TE-25	25.4	35.9	55	220	150	0.68

HIGH PRESSURE - hoses

Hydraulic rubber hoses



HW-1SN

Internal layer: Black synthetic rubber
Reinforcement: One steel wire braid
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +125°C)

Characteristics: General purpose hydraulic hose.
Standards: EN 853-1SN, ISO 1436-1SN/R1AT, SAE 100R1AT.
Assembly: Use Z and S type fittings - non-skived (IT-4, IT-37).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-1SN-05	4.8	11.6	250	1000	90	0.20
HW-1SN-06	6.4	13.3	225	900	100	0.23
HW-1SN-08	8	14.9	215	850	115	0.27
HW-1SN-10	9.5	17.3	180	720	130	0.34
HW-1SN-13	12.7	20.4	160	640	180	0.41
HW-1SN-16	16	23.5	130	520	200	0.51
HW-1SN-19	19	27.5	105	420	240	0.63
HW-1SN-25	25.4	35.4	88	350	300	0.95
HW-1SN-32	31.8	43.4	63	250	420	1.25
HW-1SN-38	38.1	50.1	50	200	500	1.59
HW-1SN-51	50.8	63.6	40	160	630	2.15



PERFORMER 1SN

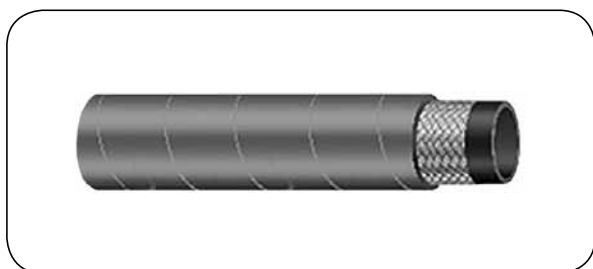
Internal layer: Black synthetic rubber
Reinforcement: One steel wire braid
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +120°C)

Characteristics: General purpose hydraulic hose with service life exceeding the standard.
 Service life: 300,000 impulse cycles min.
Standards: EN 853-1SN, ISO 1436-1SN, SAE 100R1S-AT.
Assembly: Use Z and S type fittings - non-skived (IT-4, IT-37).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-1SN-05P	4.8	11.5	250	1000	90	0.18
HW-1SN-06P	6.4	13.2	225	900	100	0.23
HW-1SN-08P	7.9	15	215	850	115	0.27
HW-1SN-10P	9.5	17.3	180	720	125	0.35
HW-1SN-13P	12.7	20.6	160	640	180	0.41
HW-1SN-16P	15.9	23.9	130	520	205	0.52
HW-1SN-19P	19	27.6	105	420	240	0.64
HW-1SN-25P	25.4	35.3	90	360	300	1.00
HW-1SN-32P	31.8	43.2	63	252	420	1.28
HW-1SN-38P	38.1	50.7	50	200	500	1.65
HW-1SN-51P	50.8	64.2	40	160	630	2.29

HIGH PRESSURE - hoses

Hydraulic rubber hoses (high temperature version)



ULTIMATE 1SN/HT

Internal layer: Black synthetic rubber
Reinforcement: One steel wire braid
External layer: Blue synthetic rubber
Working temp.: From -50°C up to +135°C
 (with peaks up to +150°C)

Characteristics: Hydraulic hose with wider working temperature range than required by the standard.

Standards: EN 853-1SN, ISO 1436-1SN, SAE 100R1-AT.

Assembly: Use Z and S type fittings - non-skived (IT-4, IT-37).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-1SN-HT-06S	6.4	13.2	225	900	100	0.24
HW-1SN-HT-08S	8	14.8	215	850	115	0.28
HW-1SN-HT-10S	9.5	17.2	180	720	130	0.36
HW-1SN-HT-13S	12.7	20.4	160	640	180	0.45
HW-1SN-HT-16S	16	23.5	130	520	200	0.55
HW-1SN-HT-19S	19	27.5	105	420	240	0.64
HW-1SN-HT-25S	25.4	35.4	88	350	300	0.96
HW-1SN-HT-32S	31.8	43.5	63	250	420	1.36
HW-1SN-HT-38S	38.1	50	50	200	500	1.54
HW-1SN-HT-51S	50.8	63.6	40	160	630	2.09



THERMAL 1SN/HT

Internal layer: Black synthetic rubber
Reinforcement: One steel wire braid
External layer: Blue synthetic rubber
Working temp.: From -40°C up to +135°C
 (with peaks up to +150°C)

Characteristics: Hydraulic hose with wider working temperature range than required by the standard. Service life: 300,000 impulse cycles min.

Standards: EN 853-1SN, ISO 1436-1SN, SAE 100R1S-AT.

Assembly: Use Z and S type fittings - non-skived (IT-4, IT-37).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-1SN-HT-06P	6.4	13.2	225	900	100	0.23
HW-1SN-HT-08P	7.9	15	215	860	115	0.28
HW-1SN-HT-10P	9.5	17.3	180	720	125	0.36
HW-1SN-HT-13P	12.7	20.6	160	640	180	0.42
HW-1SN-HT-16P	15.9	23.9	130	520	205	0.53
HW-1SN-HT-19P	19	27.6	105	420	240	0.65
HW-1SN-HT-25P	25.4	35.3	88	360	300	1.01
HW-1SN-HT-32P	31.8	43.2	63	252	420	1.29
HW-1SN-HT-38P	38.1	50.7	50	200	500	1.66
HW-1SN-HT-51P	50.8	64.2	40	160	630	2.32

HIGH PRESSURE - hoses

Hydraulic rubber hoses (compact version)



HW-1SC (HW-1SC-EC112)

Internal layer: Black synthetic rubber
Reinforcement: One steel wire braid
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +121°C)

Characteristics: General purpose hydraulic hose with reduced outside diameter and weight and thus increased flexibility. EC112 version meets the requirements of EN45545-2 standard.

Standards: EN 857-1SC, SAE 100R1 AT, EN45545-2 (concerns hoses with HW-1SC-EC112 code).

Assembly: Use Z type fittings - non-skived (IT-21).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-1SC-06	6.4	12.4	225	900	50	0.20
HW-1SC-08	8	14	215	860	55	0.22
HW-1SC-10	9.5	15.6	180	720	65	0.23
HW-1SC-13	12.7	18.7	160	640	90	0.35
HW-1SC-16	16	21.5	130	520	100	0.40
HW-1SC-19	19	25	105	420	120	0.48
HW-1SC-25	25.4	33.4	88	352	150	0.73



PROKOMP 1SC

Internal layer: Black synthetic rubber
Reinforcement: One steel wire braid
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +120°C)

Characteristics: General purpose hydraulic hose with reduced outside diameter and weight and thus increased flexibility (COMPACT type). Service life: 300,000 impulse cycles min.

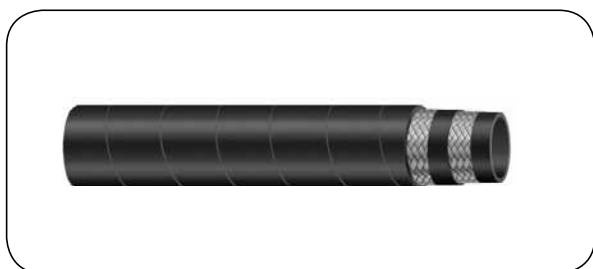
Standards: EN 857-1SC, ISO 11237-1.

Assembly: Use Z type fittings - non-skived (IT-21).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-1SC-06P	6.4	12.5	225	900	50	0.19
HW-1SC-08P	7.9	13.5	215	860	55	0.21
HW-1SC-10P	9.5	15.7	180	720	60	0.26
HW-1SC-13P	12.7	19	160	640	70	0.33
HW-1SC-16P	15.9	22.4	130	520	90	0.41
HW-1SC-19P	19	25.8	105	420	100	0.52
HW-1SC-25P	25.4	33.5	90	360	160	0.73

HIGH PRESSURE - hoses

Hydraulic rubber hoses



HW-2SN

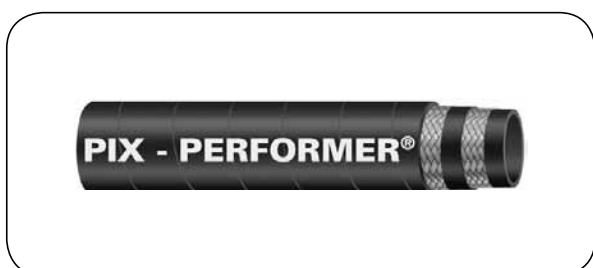
Internal layer: Black synthetic rubber
Reinforcement: Two steel wire braids
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +125°C)

Characteristics: General purpose hydraulic hose.

Standards: EN 853-2SN, ISO 1436-1 2SN/R2AT, SAE100 R2AT.

Assembly: Use Z and S type fittings - non-skived (IT-5, IT-37).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-2SN-05	4.8	13.4	415	1650	90	0.31
HW-2SN-06	6.4	14.9	400	1600	100	0.37
HW-2SN-08	8	16.5	350	1400	115	0.41
HW-2SN-10	9.5	18.9	330	1320	130	0.51
HW-2SN-13	12.7	22	275	1100	180	0.63
HW-2SN-16	16	25.2	250	1000	200	0.76
HW-2SN-19	19	29.1	215	850	240	0.96
HW-2SN-25	25.4	37.7	165	650	300	1.39
HW-2SN-32	31.8	47.8	125	500	420	1.99
HW-2SN-38	38.1	54.1	90	360	500	2.35
HW-2SN-51	50.8	66.9	80	320	630	3.08



PERFORMER 2SN

Internal layer: Black synthetic rubber
Reinforcement: Two steel wire braids
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +120°C)

Characteristics: General purpose hydraulic hose with service life exceeding the standard.

Service life: 400,000 impulse cycles min.

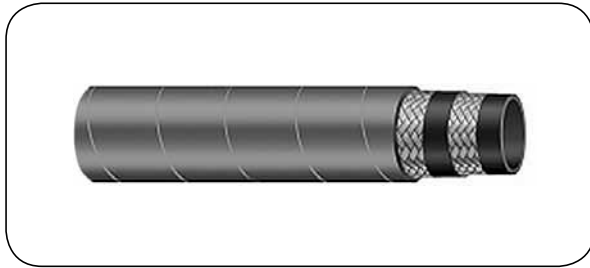
Standards: EN 853-2SN, ISO 1436-2SN, SAE 100R2S-AT.

Assembly: Use Z and S type fittings - non-skived (IT-5, IT-37).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-2SN-05P	4.8	12.8	450	1800	90	0.30
HW-2SN-06P	6.4	14.9	400	1600	100	0.40
HW-2SN-08P	7.9	16.7	350	1400	115	0.46
HW-2SN-10P	9.5	19.1	330	1320	125	0.55
HW-2SN-13P	12.7	22.1	275	1100	180	0.64
HW-2SN-16P	15.9	25.3	250	1000	205	0.78
HW-2SN-19P	19	29.6	215	860	240	0.97
HW-2SN-25P	25.4	37.7	165	660	300	1.42
HW-2SN-32P	31.8	47.7	125	500	420	2.12
HW-2SN-38P	38.1	54	90	360	500	2.55
HW-2SN-51P	50.8	67.5	80	320	630	3.20

HIGH PRESSURE - hoses

Hydraulic rubber hoses (high temperature version)



ULTIMATE 2SN/HT

Internal layer: Black synthetic rubber
Reinforcement: Two steel wire braids
External layer: Blue synthetic rubber
Working temp.: From -50°C up to +135°C
 (with peaks up to +150°C)

Characteristics: Hydraulic hose with wider working temperature range than required by the standard.

Standards: EN 853-2SN, ISO 1436-2SN, SAE 100R2-AT.

Assembly: Use Z and S type fittings - non-skived (IT-5, IT-37).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-2SN-HT-06S	6.4	15	400	1600	100	0.40
HW-2SN-HT-08S	8	16.5	350	1400	115	0.47
HW-2SN-HT-10S	9.5	18.9	330	1320	130	0.58
HW-2SN-HT-13S	12.7	22.2	275	1100	180	0.68
HW-2SN-HT-16S	16	25.2	250	1000	205	0.80
HW-2SN-HT-19S	19	29.2	215	850	240	0.99
HW-2SN-HT-25S	25.4	37.2	165	650	300	1.38
HW-2SN-HT-32S	31.8	47.3	125	500	420	2.04
HW-2SN-HT-38S	38.1	53.7	90	360	500	2.28
HW-2SN-HT-51S	50.8	66.7	78	310	630	2.97



THERMAL 2SN/HT

Internal layer: Black synthetic rubber
Reinforcement: Two steel wire braids
External layer: Blue synthetic rubber
Working temp.: From -40°C up to +135°C
 (with peaks up to +150°C)

Characteristics: Hydraulic hose with wider working temperature range than required by the standard. Service life: 400,000 impulse cycles min.

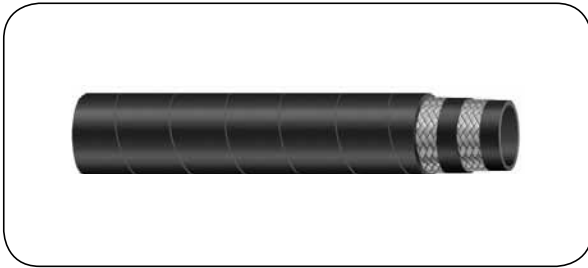
Standards: EN 853-2SN, ISO 1436-2SN, SAE 100R2S-AT.

Assembly: Use Z and S type fittings - non-skived (IT-5, IT-37).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-2SN-HT-06P	6.4	14.9	400	1600	100	0.41
HW-2SN-HT-08P	7.9	16.7	350	1400	115	0.48
HW-2SN-HT-10P	9.5	19.1	330	1320	125	0.56
HW-2SN-HT-13P	12.7	22.1	275	1100	180	0.65
HW-2SN-HT-16P	15.9	25.3	250	1000	205	0.79
HW-2SN-HT-19P	19	29.6	215	860	240	0.99
HW-2SN-HT-25P	25.4	37.7	165	660	300	1.44
HW-2SN-HT-32P	31.8	47.7	125	500	420	2.14
HW-2SN-HT-38P	38.1	54	90	360	500	2.58
HW-2SN-HT-51P	50.8	67.5	80	320	630	3.24

HIGH PRESSURE - hoses

Hydraulic rubber hoses (compact version)



HW-2SC

Internal layer: Black synthetic rubber
Reinforcement: Two steel wire braids
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +125°C)

Characteristics: General purpose hydraulic hose with reduced outside diameter and weight and thus increased flexibility.

Standards: EN 857-2SC, SAE 100R16, SAE 100R2AT.

Assembly: Use Z type fittings - non-skived (IT-22).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-2SC-06	6.4	13.4	400	1600	75	0.30
HW-2SC-08	8	15	350	1400	85	0.35
HW-2SC-10	9.5	17.4	330	1320	90	0.42
HW-2SC-13	12.7	20.6	275	1100	130	0.54
HW-2SC-16	16	23.7	250	1000	170	0.63
HW-2SC-19	19	27.7	215	860	200	0.80
HW-2SC-25	25.4	35.6	165	660	250	1.17



PROKOMP 2SC

Internal layer: Black synthetic rubber
Reinforcement: Two steel wire braids
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +120°C)

Characteristics: General purpose hydraulic hose with reduced outside diameter and weight and thus increased flexibility (COMPACT type). Service life: 400,000 impulse cycles.

Standards: EN 857-2SC, SAE 100R16, ISO 11237-1.

Assembly: Use Z type fittings - non-skived (IT-22).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-2SC-06P	6.4	13.5	400	1600	50	0.31
HW-2SC-08P	7.9	15	350	1400	55	0.35
HW-2SC-10P	9.5	17.1	330	1320	65	0.42
HW-2SC-13P	12.7	20.5	275	1100	80	0.52
HW-2SC-16P	15.9	23.5	250	1000	90	0.62
HW-2SC-19P	19	27.5	215	860	120	0.86
HW-2SC-25P	25.4	35.5	165	660	150	1.11

HIGH PRESSURE - hoses

Hydraulic rubber hoses (compact version)



BASTION 2SC

Internal layer: Black synthetic rubber
Reinforcement: Two steel wire braids
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +125°C)

Characteristics: General purpose hydraulic hose with reduced outside diameter and weight and thus increased flexibility (COMPACT type). Designed for heavy duty applications. Superior resistance to impulse pressure. The external layer, made of special rubber compound, is antistatic, highly resistant to flame (exceeds MSHA requirements), ozone, weather, abrasion and UV radiation. Certified by MSHA.

Standards: Exceeds EN 857-2SC, SAE 100R 16S, ISO 11237-1.

Assembly: Contact Technical Department of TUBES INTERNATIONAL®.

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-2SC-BN-06P	6.4	12.8	400	1850	45	0.26
HW-2SC-BN-08P	7.9	15	350	1700	55	0.32
HW-2SC-BN-10P	9.5	16.6	330	1500	65	0.39
HW-2SC-BN-13P	12.7	20.1	275	1220	80	0.50
HW-2SC-BN-16P	15.9	23.5	250	1050	90	0.64
HW-2SC-BN-19P	19	27.6	245	980	120	0.80
HW-2SC-BN-25P	25.4	35.4	210	840	150	1.14



BRUTE/K 2SC

Internal layer: Black synthetic rubber
Reinforcement: Two steel wire braids
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +120°C)

Characteristics: General purpose hydraulic hose with reduced outside diameter and weight and thus increased flexibility (COMPACT type). Higher working pressure compared to standard 2SC hydraulic hoses. Service life: 300,000 impulse cycles

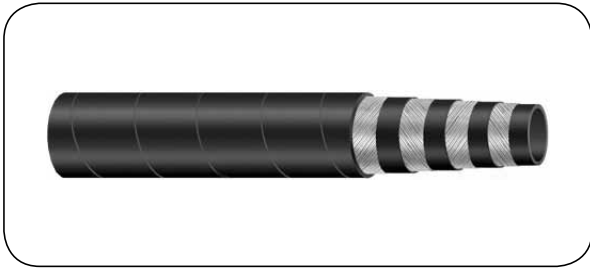
Standards: Exceeds EN 857-2SC.

Assembly: Contact Technical Department of TUBES INTERNATIONAL®.

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-2SC-BE-K-06P	6.4	13.5	450	1800	50	0.31
HW-2SC-BE-K-08P	7.9	15.7	420	1680	65	0.36
HW-2SC-BE-K-10P	9.5	17.1	380	1520	80	0.44
HW-2SC-BE-K-13P	12.7	20.9	325	1300	90	0.55
HW-2SC-BE-K-16P	15.9	25.1	290	1160	120	0.60
HW-2SC-BE-K-19P	19	27.9	280	1120	120	0.86

HIGH PRESSURE - hoses

Hydraulic rubber hoses (multispiral)



HW-4SP

Internal layer: Black synthetic rubber
Reinforcement: Four steel wire spirals
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +125°C)

Characteristics: General purpose hydraulic hose.

Standards: EN 856 4SP, ISO 3862-1 4SP.

Assembly: Use Z type fittings, M and Z type ferrules - external skiving (IT-9, IT-31).
 Acceptable use of N type fittings - non-skived (IT-82).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-4SP-06	6.4	17.8	450	1800	150	0.62
HW-4SP-10	9.5	21.4	445	1780	180	0.85
HW-4SP-13	12.7	24.6	415	1660	230	0.93
HW-4SP-16	16	28.5	350	1400	250	1.15
HW-4SP-19	19	32.1	350	1400	300	1.55
HW-4SP-25	25.4	39.7	280	1120	340	2.03
HW-4SP-32	31.8	50.8	210	840	460	3.17
HW-4SP-38	38.1	57.1	185	760	560	3.66
HW-4SP-51	50.8	70.6	165	660	660	5.14



HI-PULSE 4SP

Internal layer: Black synthetic rubber
Reinforcement: Four steel wire spirals
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +120°C)

Characteristics: General purpose hydraulic hose. Service life longer than required by the standard: 1,000,000 impulse cycles. The external layer is flame resistant, MSHA approved.

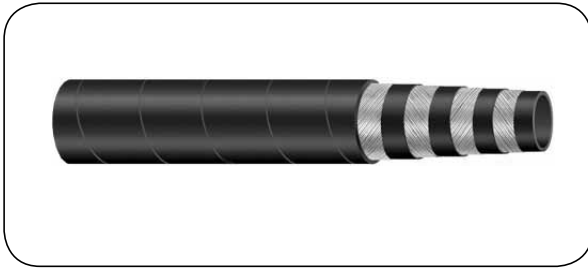
Standards: EN 856 4SP, ISO 3862-1 4SP.

Assembly: Use Z type fittings, M and Z type ferrules - external skiving (IT-9, IT-31).
 Acceptable use of N type fittings - non-skived.

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-4SP-10P	9.5	21.4	460	1840	180	0.75
HW-4SP-13P	12.7	24	430	1720	230	0.90
HW-4SP-16P	15.9	27.6	350	1400	250	1.09
HW-4SP-19P	19	32.1	350	1400	300	1.51
HW-4SP-25P	25.4	38.7	320	1280	340	2.09
HW-4SP-32P	31.8	49.8	210	840	460	3.10
HW-4SP-38P	38.1	57.3	190	760	560	3.61
HW-4SP-51P	50.8	71.1	180	720	660	5.03

HIGH PRESSURE - hoses

Hydraulic rubber hoses (multispiral)



HW-4SH

Internal layer: Black synthetic rubber
Reinforcement: Four steel wire spirals
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +125°C)

Characteristics: General purpose hydraulic hose.

Standards: EN 856 4SH, ISO 3862-1 4SH.

Assembly: Use IL type fittings - external and internal skiving (IT-34).
 Acceptable use of Z type fittings and M type ferrules - external skiving (IT-11).
 Acceptable use of N type fittings - non-skived (IT-82).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-4SH-19	19	32.2	420	1680	280	1.55
HW-4SH-25	25.4	38.7	380	1520	340	2.09
HW-4SH-32	31.8	45.5	325	1300	460	2.57
HW-4SH-38	38.1	53.5	290	1160	560	3.44
HW-4SH-51	50.8	68.1	250	1000	700	4.90



HI-PULSE 4SH

Internal layer: Black synthetic rubber
Reinforcement: Four steel wire spirals
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +120°C)

Characteristics: General purpose hydraulic hose. Service life longer than required by the standard: 1,000,000 impulse cycles. The external layer is flame resistant, MSHA approved.

Standards: EN 856 4SH, ISO 3862-1 4SH.

Assembly: Use IL type fittings - external and internal skiving (IT-34).
 Acceptable use of N type fittings - non-skived (IT-82).
 Acceptable use of Z type fittings and M type ferrules - external skiving (IT-11).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-4SH-19P	19	32.1	420	1680	280	1.51
HW-4SH-25P	25.4	38.7	390	1560	340	2.09
HW-4SH-32P	31.8	45.5	350	1400	460	3.10
HW-4SH-38P	38.1	52.5	290	1160	560	3.61
HW-4SH-51P	50.8	67.5	250	1000	700	5.03

HIGH PRESSURE - hoses

Hydraulic rubber hoses (multispiral)



IMPETUS R13

Internal layer: Black synthetic rubber
Reinforcement: Four steel wire spirals
 (six for DN 32 ÷ DN 51)
External layer: Black synthetic rubber
Working temp.: From -40°C up to +121°C
 (with peaks up to +125°C)

Characteristics: General purpose hydraulic hose. Service life longer than required by the standard: 1,000,000 impulse cycles. The external layer is flame resistant, MSHA approved.

Standards: EN 856 R13, ISO 3862-1 R13, SAE 100R13.

Assembly: Use IL type fittings - external and internal skiving (IT-51).
 Acceptable use of N type fittings - non-skived (IT-82).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-R13-19P	19	32.1	350	1400	240	1.51
HW-R13-25P	25.4	38.7	350	1400	300	2.11
HW-R13-32P	31.8	49.8	350	1400	420	3.58
HW-R13-38P	38.1	57.3	350	1400	500	4.91
HW-R13-51P	50.8	71.1	350	1400	600	6.89



HW-R13-XFGT

Internal layer: Black synthetic rubber
Reinforcement: Four steel wire spirals
 (six for DN 32 ÷ DN 51)
External layer: Black synthetic rubber
Working temp.: From -40°C up to +121°C
 (with peaks up to +125°C)

Characteristics: General purpose hydraulic hose with increased flexibility (50% better bending radius than stated by the standard). Service life longer than required by the standard, approved at 1.000.000 impulse cycles. The external layer is flame resistant (MSHA).

Standards: EN 856 R13, ISO 3862-1 R13, SAE 100R13.

Assembly: Use IL type fittings - external and internal skiving (IT-51).
 Acceptable use of N type fittings - non-skived (IT-82).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-R13-XFGT-19	19	30.1	380	1520	120	1.20
HW-R13-XFGT 25	25.4	37.4	350	1400	150	1.80
HW-R13-XFGT 32	31.8	44.8	350	1400	280	2.40
HW-R13-XFGT 38	38.1	57.3	350	1400	300	4.60

HIGH PRESSURE - hoses

Hydraulic rubber hoses with increased parameters



IMPETUS R15

Internal layer: Black synthetic rubber
Reinforcement: Four steel wire spirals (six for DN 32 ÷ DN 51)
External layer: Black synthetic rubber
Working temp.: From -40°C up to +121°C (with peaks up to +125°C)

Characteristics: General purpose hydraulic hose. 1,000,000 impulse cycles. The external layer is flame resistant, MSHA approved. Service life longer than required by the standard,

Standards: EN 856 R15, ISO 3862-1 R15, SAE 100R15.

Assembly: Use IL type fittings - external and internal skiving (IT-52).
 Acceptable use of N type fittings - non-skived (IT-82).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-R15-19P	19	32	420	1680	270	1.56
HW-R15-25P	25.4	39	420	1680	300	2.04
HW-R15-32P	31.8	50	420	1680	420	3.63
HW-R15-38P	38.1	58	420	1680	500	4.81
HW-R15-51P	50.8	72	420	1680	600	6.94



HW-R15-XFGT

Internal layer: Black synthetic rubber
Reinforcement: Four steel wire spirals (six for DN 32 ÷ DN 51)
External layer: Black synthetic rubber
Working temp.: From -40°C up to +121°C (with peaks up to +125°C)

Characteristics: General purpose hydraulic hose with increased flexibility (50% better bending radius than stated by the standard). Service life longer than required by the standard, approved at 1,000,000 impulse cycles. The external layer is flame resistant (MSHA).

Standards: EN 856 R15, ISO 3862-1 R15, SAE 100R15.

Assembly: Use IL type fittings - external and internal skiving (IT-52).
 Acceptable use of N type fittings - non-skived (IT-82).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-R15-XFGT-19	19	30.6	420	1680	120	1.50
HW-R15-XFGT-25	25.4	37.8	420	1680	165	2.00
HW-R15-XFGT-32	31.8	49.3	420	1680	300	3.55
HW-R15-XFGT-38	38.1	57.0	420	1680	350	4.65

HIGH PRESSURE - hoses

Hydraulic rubber hoses (mining)

Hydraulic rubber hoses designed for mine application must meet safety standards regarding the risk of dust explosion or fire (methane, coal dust explosion) in underground coal mines.

Hoses designed for mining should be sufficiently:

- anti-electrostatic (prevention of explosion and ignition)
- fire-resistant (prevention of ignition, explosion and spreading of fire)
- non-toxic thermal decomposition products

Apart from the above safety issues, there may also be a requirement for the increased abrasion resistance of the external rubber layer.

There are institutions in each country that confirm, through certificates, approvals and permits, the fulfilment of safety requirements for mining. Among others, the certificates given by or according to:

- WUG, KOMAG and other accredited units (Poland),
- DSK (LOBA) (Germany),
- MakNII (Ukraine),
- GOST-R (Russia),
- MSHA - Mine Safety and Health Administration (USA),
- FRAS - Fire Resistant Anti Static, Flame Retardant Anti Static (Australia).

The requirements for hoses used in mining are dissimilar in different countries as they refer to distinct standards, methods and tests criteria, e.g. fire resistance. The requirements of Polish mining supervision are the most stringent. The hoses approved for mine application are usually permanently marked with: name of an institution (standard) and approval (certificate) number that allows the use of the hose for a particular purpose.

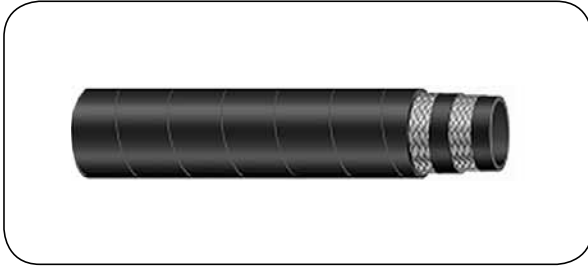


We assemble and supply hydraulic hoses with STECKO fittings approved for use in mines and zones with the potential hazard of methane and/or coal dust explosion.

Attention! STECKO mining type fittings - see HIGH PRESSURE chapter, section - fittings.

HIGH PRESSURE - hoses

Hydraulic rubber hoses (mining)



HW-2ST/G

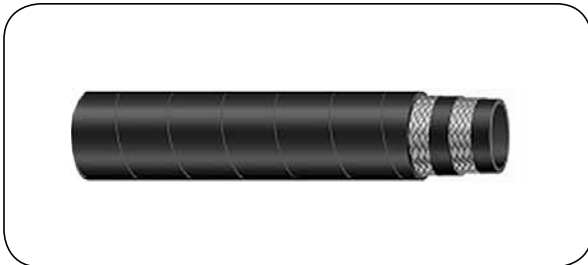
Internal layer: Black synthetic rubber
Reinforcement: Two steel wire braids
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +120°C)

Characteristics: Hydraulic hose with an enlarged outside diameter designed for application in the mining industry. The external layer is antistatic, non-toxic and flame resistant. The hose meets all safety requirements and thus is approved for use in potentially explosive atmospheres.

Standards: EN853-2ST.

Assembly: Contact Technical Department of TUBES INTERNATIONAL®.

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-2ST-G-08	7.9	19.1	350	1400	115	0.48
HW-2ST-G-10	9.5	21.4	330	1320	130	0.64
HW-2ST-G-13	12.7	24.6	275	1100	180	0.72
HW-2ST-G-19	19	31.8	215	860	240	1.07
HW-2ST-G-25	25.4	39.7	165	660	300	1.56
HW-2ST-G-32	31.8	50.8	125	500	420	2.20



HW-2SN/G

Internal layer: Black synthetic rubber
Reinforcement: Two steel wire braids
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +120°C)

Characteristics: Hydraulic hose designed for application in the mining industry. The external layer is antistatic, non-toxic and flame resistant. The hose meets all safety requirements and thus is approved for use in potentially explosive atmospheres.

Standards: EN853-2SN.

Assembly: Use Z and S type fittings - non-skived (IT-5, IT-37).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-2SN-G-06	6.4	14.7	400	1600	100	0.36
HW-2SN-G-08	7.9	16.3	350	1400	115	0.41
HW-2SN-G-10	9.5	18.7	330	1320	130	0.51
HW-2SN-G-13	12.7	21.8	275	1100	180	0.67
HW-2SN-G-16	15.9	25	250	1000	200	0.79
HW-2SN-G-19	19	29	215	860	240	1.01
HW-2SN-G-25	25.4	36.8	165	660	300	1.46
HW-2SN-G-32	31.8	47	125	500	420	2.04
HW-2SN-G-38	31.8	53.4	90	360	500	2.20

HIGH PRESSURE - hoses

Hydraulic rubber hoses (mining)



HW-4SP/G

Internal layer: Black synthetic rubber
Reinforcement: Four steel wire spirals
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +120°C)

Characteristics: Hydraulic hose designed for application in the mining industry. The external layer is antistatic, non-toxic and flame resistant. The hose meets all safety requirements and thus is approved for use in potentially explosive atmospheres.

Standards: EN856 4 SP, ISO 3862-1 4SP.

Assembly: Use Z type fittings, M and Z type ferrules - external skiving (IT-9, IT-31).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-4SP-G-06	6.4	17.8	450	1800	150	0.64
HW-4SP-G-10	9.5	21.4	445	1780	180	0.68
HW-4SP-G-13	12.7	24.6	415	1660	230	0.88
HW-4SP-G-16	16	28.5	350	1400	250	1.15
HW-4SP-G-19	19	32.1	350	1400	300	1.55
HW-4SP-G-25	25.4	39.7	280	1120	340	2.06
HW-4SP-G-32	31.8	50.8	210	840	460	3.11



HW-4SH/G

Internal layer: Black synthetic rubber
Reinforcement: Four steel wire spirals
External layer: Black synthetic rubber
Working temp.: From -40°C up to +100°C
 (with peaks up to +120°C)

Characteristics: Hydraulic hose designed for application in the mining industry. The external layer is antistatic, non-toxic and flame resistant. The hose meets all safety requirements and thus is approved for use in potentially explosive atmospheres.

Standards: EN856 4 SH, ISO 3862-1 4SH.

Assembly: Use IL type fittings - external and internal skiving (IT-34).
 Acceptable use of N type fittings - non-skived (IT-82).

code	I.D. [mm]	O.D. [mm]	working pressure [bar]	bursting pressure [bar]	bending radius [mm]	weight [kg/m]
HW-4SH-G-19	19	32.2	420	1680	280	1.56
HW-4SH-G-25	25.4	38.7	380	1520	340	2.08
HW-4SH-G-32	31.8	45.5	350	1400	460	2.51