



**MANUFACTURER OF
EXPANSION JOINTS AND HOSES**
Flexible solutions for your pipe system

Expansion joints and hoses

Corrugated expansion joints | Lens expansion joints | Rubber expansion joints | Fabric expansion joints | Special expansion joints and plant engineering | Hoses





Hoses

HKS offers a wide range of hoses made of a variety of materials and connecting parts. HKS hoses can be used in a variety of areas, e.g. for bottling, filling or conveying various media (e.g. compressed air, steam, water, aggressive media, etc.) or as vibration dampers for cooling and air conditioning systems. HKS also develops special solutions and offers hoses with special connectors.

Areas of application for hoses

- › Connection between stationary and moving units
- › Absorption of lifting movements
- › Absorption of heat expansions
- › Compensation of parallel pipe offset

Hose types

- › Stainless steel hoses (1.4541/1.4404 with braid made of 1.4301/1.4404)
- › Fuel hoses made of corrugated Teflon® with braid and fire protection hose
- › Hydraulic hoses
- › Elastomer hoses (NBR, CR, EPDM)
- › PTFE hoses

Connection parts

- › Flanges
- › Welding ends
- › Screwed pipe connections
- › Threaded nipples
- › Pipe nuts
- › Couplings
- › Special connectors on request

Nominal diameters: DN 6 bis DN 300
Operating temperature: up to 600 °C
Pressure stage: PN 1 to PN 250

Corrugated metal hoses

Design and function

Stainless steel hoses are made from thin-walled stainless steel pipes with length-wise welds. Special tools are used to mould hydraulics convolutions into the pipes which achieves the desired movability and pressure resistance of the hoses. Steel hoses are used for conveying liquids and gases as flexible connecting elements in pressure and vacuum lines, absorbing movement, vibrations and heat expansions.

Metal hoses have single-layer walls and can be equipped with single or double braid to increase pressure resistance: The braid prevents the hose from expanding, absorbs tensile forces and also serves as a protective hose.

Braid and hose can be made from different **materials**. Depending on the application and the media, the hose can be made of the materials 1.4541 or 1.4404 and the braid made of material 1.4301 or 1.4404 and, depending on the pressure load, can be used at an operating temperature from -270 °C to max. 600 °C (see table for de-rating factors). The materials have a very high resistance to water, steam and thermo oil. A detailed resistance table can be found in the general technical appendix.

As a standard, the hoses are available in **Nominal diameters** from 6 mm to 300 mm, where the Nominal diameter of a hose is the same as the internal diameter. The permitted operating pressure is be-

tween 0.25 bar and 250 bar depending on operating temperature and Nominal diameter.

The **length** can be freely selected by the customer. The hose ends can be welded with all standardised connections. Custom connections are also available.



Application options for interlocked metal hoses

HKS hoses are used in the following areas, among others: Cooling and air conditioning systems, exhaust plants, vacuum and high pressure technology,

heat exchanger devices, food and drink industry, heat exchanger installations, landfill operations, chemistry plants, pharma industry, cleaning technology,

vehicle technology, medical technology, solar engineering, air/space travel, research and development.



Stainless steel hose in a combined heat and power plant with 90° bend and swivel flanges



Stainless steel hose in a combined heat and power plant with 90° bend with swivel flanges on one side and welding ends at the other side.



Stainless steel hose in a combined heat and power plant with swivel flanges



Stainless steel hose for starter air for installation in ship motors



Stainless steel hose with DILO connection for installation in ships motors.

Test certifications and documentation

As a rule, all hoses are subjected to a pressure and leakage test before shipping. Hoses which are not subject to the Pressure Equipment Directive are

tested with a test pressure $PT = 1.5 \times PN$. On request, test certificates to EN 10204:2005 – 01 can be issued.



Interlocked metal hoses

Derating factors: to determine the permitted operating pressure at increased operating temperatures

Temperatures in °C	Temperature derating factor C_t			
	1.4301	1.4541	1.4571	1.4404
20	1.00	1.00	1.00	1.00
50	0.88	0.92	0.90	0.88
100	0.73	0.83	0.81	0.74
150	0.66	0.78	0.76	0.67
200	0.60	0.74	0.73	0.62
250	0.56	0.71	0.69	0.58
300	0.52	0.67	0.65	0.54
350	0.50	0.64	0.63	0.52
400	0.48	0.62	0.61	0.50
450	0.47	0.61	0.59	0.48
500	0.46	0.60	0.59	0.47
550	0.42	0.59	0.58	0.47
600	only for depressurised use			

Diameter: see table DN 6 to DN 250

Operating pressure: UH vacuum to PN 100

Operating temperature: max. 550 °C

Materials:

Steel hose

Mat.no. 1.4541

Mat.no. 1.4404

Mat.no. 1.4571 on request

Braid

Mat.no. 1.4301

Mat.no. 1.4404

$$P(T) = PN \times C_t$$

Example: DN40, operating temperature 300 °C, derating factors C_t (take into account lowest value of hose or braid) for 1.4301 = 0.52, nominal pressure PN 25

$$P(T) = 25 \times 0.52 = 13.00 \text{ bar}$$

INTERLOCKED METAL HOSE normal corrugation

Type B

Nominal diameter		Nominal pressure stage	Permitted static operating pressure at 20 °C		Permitted test pressure at 20 °C		Bursting pressure at 20 °C		Minimum bending radius				External diameter		Weight	
									Dynamic load		Static load					
DN		PN	PS		PT		-		R _{min,dyn}		R _{min,stat}		D _e		G	
mm	in	bar	bar	psig	bar	psig	bar	psig	mm	in	mm	in	mm	in	kg/m	lbs/ft
Interlocked METAL HOSE type B · SO without braid																
6	1/4	10	10	145	15	220	40	580	100	4	15	0.6	13	0.5	0.17	0.11
10	3/8	10	10	145	15	220	40	580	125	5	25	1	16.5	0.7	0.24	0.16
12	1/2	2.5	5	75	7.5	110	20	290	125	5	30	1.2	21	0.9	0.31	0.21
16	5/8	2.5	5	75	7	105	20	290	150	6	40	1.6	26.5	1.0	0.35	0.23
20	3/4	2.5	4	60	6	90	16	230	150	6	50	2	28.5	1.1	0.37	0.25
25	1	2.5	4	60	6	90	16	230	175	7	63	2.5	36	1.4	0.48	0.32
32	1 1/4	2.5	3	43	4.5	65	12	170	200	8	80	3.2	43.5	1.7	0.65	0.45
40	1 1/2	1	2	29	3	43	8	120	250	10	100	4	53	2.1	0.85	0.57
50	2	1	1	14	1.5	22	4	60	350	14	125	5	67.5	2.7	1.25	0.84
65	2 1/2	1	1	14	1.5	22	4	60	500	20	163	6.5	81.5	3.2	1.55	1.0
80	3	1	1	14	1.5	22	4	60	525	21	200	7.9	96	3.8	1.8	1.2
100	4	0.5	0.7	10	1.1	16	3	43	625	25	250	9.9	124	4.9	2.4	1.6
125	5	0.5	0.7	10	1.1	16	3	43	750	30	313	12.4	154	6.1	3.9	2.6
150	6	0.5	0.5	7	0.75	11	2	29	900	36	375	14.8	178	7.0	4.5	3.1
200	8	-	0.3	4	0.45	6	1.2	17	1020	40	500	19.7	234	9.2	6.0	4.0
250	10	-	0.25	3	0.36	5	1	14	1220	48	625	24.7	286	11.3	7.5	5.0
Interlocked METAL HOSE type B · SE with single braid																
6	1/4	100	140	2030	210	3045	560	8120	100	4	18	0.8	15	0.6	0.28	0.19
10	3/8	100	100	1450	150	2175	400	5800	125	5	30	1.2	18	0.7	0.39	0.26
12	1/2	63	90	1305	135	1960	360	5220	125	5	36	1.5	23	0.9	0.50	0.34
16	5/8	63	65	940	97	1410	260	3770	150	6	48	1.9	28	1.1	0.55	0.37
20	3/4	50	55	800	83	1200	220	3200	150	6	60	2.4	31.5	1.2	0.62	0.42
25	1	40	48	700	72	1050	192	2780	175	7	75	3	37.5	1.5	0.80	0.53
32	1 1/4	25	38	550	57	825	152	2200	200	8	96	3.8	47	1.9	1.2	0.78
40	1 1/2	25	34	490	51	740	136	1970	250	10	120	4.8	56.5	2.2	1.5	1.1
50	2	25	31	450	46	670	124	1800	350	14	150	6	71	2.8	2.1	1.4
65	2 1/2	20	27	387	40	581	107	1548	508	20	203	8	84.6	3.3	2.8	1.9
80	3	20	22	316	33	474	87	1264	559	22	229	9	98.6	3.9	3.0	2.0
90	3 1/2	20	20	297	31	445	82	1188	610	24	254	10	113	4.5	3.9	2.6
100	4	16	16	232	24	348	64	927	686	27	330	13	127	5.0	4.0	2.7
125	5	10	13	191	20	286	53	764	787	31	457	18	153	6.0	5.6	3.8
150	6	10	11	165	17	247	46	660	914	36	483	19	180	7.1	7.1	4.8
200	8	16	16	234	24	350	64	934	1016	40	508	20	233	9.2	14.1	9.4
250	10	16	16	230	24	344	63	918	1270	50	635	25	288	11.3	19.2	12.9
300	12	10	11	161	17	241	44	643	1524	60	762	30	340	13.4	22.1	14.8
Interlocked METAL HOSE type B · SZ with double braid																
6	1/4	250	250	3625	375	5440	1000	14500	100	4	21	0.9	17.5	0.7	0.40	0.27
10	3/8	160	180	2610	270	3915	720	10440	125	5	35	1.4	20.5	0.8	0.56	0.38
12	1/2	160	160	2320	240	3480	640	9280	125	5	42	1.7	25.5	1.0	0.71	0.48
16	5/8	100	120	1740	180	2610	480	6960	150	6	56	2.3	30	1.2	0.75	0.50
20	3/4	63	93	1350	140	2030	372	5400	150	6	70	2.8	34.5	1.4	0.90	0.60

INTERLOCKED METAL HOSE normal corrugation

Type B

Nominal diameter		Nominal pressure stage	Permitted static operating pressure at 20 °C		Permitted test pressure at 20 °C		Bursting pressure at 20 °C		Minimum bending radius				External diameter		Weight	
									Dynamic load		Static load					
DN		PN	PS		PT		-		R _{min,dyn}		R _{min,stat}		D _a		G	
mm	in	bar	bar	psig	bar	psig	bar	psig	mm	in	mm	in	mm	in	kg/m	lbs/ft
25	1	63	77	1120	115	1670	308	4470	175	7	88	3.5	40.5	1.6	1.1	0.75
32	1 1/4	50	62	900	93	1350	248	3600	200	8	112	4.5	51	2.0	1.7	1.2
40	1 1/2	40	46	670	69	1000	184	2670	250	10	140	5.6	60	2.4	2.2	1.5
50	2	40	43	625	64	930	172	2500	350	14	175	6.9	75	3.0	3.1	2.1
65	2 1/2	40	43	619	64	929	171	2477	508	20	203	8	87	3.4	3.8	2.6
80	3	25	35	506	52	758	139	2022	559	22	229	9	101	4.0	4.2	2.8
90	3 1/2	25	33	475	49	712	131	1900	610	24	254	10	116	4.6	5.4	3.6
100	4	25	26	371	38	557	102	1485	686	27	330	13	130	5.1	5.5	3.7
125	5	16	21	306	32	458	84	1222	787	31	457	18	156	6.2	7.4	5.0
150	6	16	18	264	27	396	73	1056	914	36	483	19	186	7.3	9.0	6.0
200	8	25	26	374	39	561	103	1495	1016	40	508	20	236	9.3	19.9	13.4
250	10	25	25	367	38	551	101	1469	1270	50	635	25	291	11.5	28.3	19.0
300	12	16	18	257	27	386	71	1029	1524	60	762	30	343	13.5	30.7	20.6

Example type B:

SE 100 / 010 / B / B - 1000

Type DN PN Connections Length

Hose connection types:

B	Swivel flange	S	Custom-made flange	DAGA	Rotating external thread
F	Fixed flange	K	Customer part	DIGA	Rotating internal thread
V	Welding neck flange	AGA	Fixed external thread	ÜFD	Pipe nut, flat seal
R	Weld end	IGA	Fixed internal thread	ÜKD	Pipe nut, conical seal

DN	Nominal diameter (inner diameter)
PN	Nominal pressure stage acc. to EN 1333
PS	Permitted operating pressure at 20 °C (SF4 with 4-fold bursting pressure resistance)
PT	Permitted test pressure at 20 °C
R_{min,dyn}	Minimum bending radius for cyclic loading (If the installation instructions according to ISO 10380 are observed, an average service life of 5·10 ⁴ load exchanges, but at least 4·10 ⁴ load exchanges can be expected. Higher operating temperatures and corrosion influences decrease the service life and/or increase the minimum bending radius.)
R_{min,stat}	Minimum bending radius for static load (e.g. compensating pipe offset)
D_a	External diameter of the hose
G	Hose weight per meter with/without braid (deviation +/- 10 %)

Design: The table values shown refer to 20 °C design temperature with a standard Material combination 1.4541/1.4301 (hose/braid material). For other materials and operating temperatures, operating pressure and movement absorption have to be adapted with factors or requested separately.

INTERLOCKED METAL HOSE tight corrugation/highly flexible **Type C**

Nominal diameter		Nominal pressure stage	Permitted static operating pressure at 20 °C		Permitted test pressure at 20 °C		Bursting pressure at 20 °C		Minimum bending radius				External diameter		Weight	
									Dynamic load		Static load					
DN		PN	PS		PT		-		R _{min,dyn}		R _{min,stat}		D _e		G	
mm	in	bar	bar	psig	bar	psig	bar	psig	mm	in	mm	in	mm	in	kg/m	lbs/ft
Interlocked METAL HOSE type C · SO without braid																
6	1/4	10	10	145	15	220	40	580	75	3	15	0.6	13	0.50	0.22	0.15
10	3/8	10	10	145	15	220	40	580	90	3.5	25	1.0	16.5	0.65	0.33	0.22
12	1/2	2.5	5	75	7.5	110	20	290	100	4	30	1.2	21	0.85	0.40	0.27
20	3/4	2.5	4	60	6	90	16	230	115	4.5	50	2.0	28.5	1.1	0.50	0.34
25	1	2.5	4	60	6	90	16	230	125	5	63	2.5	36	1.4	0.65	0.44
32	1 1/4	2.5	3	43	4.5	65	12	170	150	6	80	3.2	43.5	1.7	0.90	0.60
40	1 1/2	1	2	29	3	43	8	120	200	8	100	4.0	53	2.1	1.1	0.74
50	2	1	1	14	1.5	22	4	60	275	11	125	5.0	67.5	2.7	1.6	1.1
65	2 1/2	1	1	14	1.5	22	4	60	350	14	163	6.5	81.5	3.2	1.9	1.3
80	3	1	1	14	1.5	22	4	60	400	16	200	7.9	96	3.8	2.3	1.5
100	4	0.5	0.7	10	1.1	16	3	43	500	20	250	9.9	124	4.9	3.1	2.1
125	5	0.5	0.7	10	1.1	16	3	43	660	26	313	12.4	154	6.1	5.0	3.4
150	6	0.5	0.5	7	0.75	11	2	29	760	30	375	14.8	178	7.0	5.8	3.9
Interlocked METAL HOSE type C · SE with single braid																
6	1/4	160	160	2320	240	3080	640	9280	75	3	17	0.7	15	0.60	0.33	0.22
10	3/8	100	138	2000	207	3000	552	8000	90	3.5	28	1.2	18	0.71	0.48	0.32
12	1/2	100	103	1500	154	2230	412	5980	100	4	33	1.3	23	0.90	0.60	0.40
20	3/4	50	62	900	93	1350	248	3600	115	4.5	55	2.2	31.5	1.2	0.75	0.50
25	1	50	52	750	78	1130	208	3020	125	5	69	2.8	37.5	1.5	0.95	0.65
32	1 1/4	40	42	610	63	910	168	2400	150	6	88	3.5	47	1.9	1.4	0.94
40	1 1/2	25	38	550	57	830	152	2200	200	8	110	4.4	56.5	2.2	1.8	1.2
50	2	25	34	490	51	740	136	1970	275	11	125	5.0	71	2.8	2.5	1.6
65	2 1/2	25	31	450	46	670	124	1800	350	14	163	6.5	86.5	3.4	3.0	2.0
80	3	25	27	390	40	580	108	1570	400	16	200	7.9	100	4.0	3.6	2.4
100	4	16	17	250	25	360	68	990	500	20	250	9.9	130	5.1	4.8	3.2
125	5	16	16	230	24	350	64	920	660	26	313	12.4	159	6.3	7.5	5.0
150	6	10	10	145	15	220	40	580	760	30	375	14.8	183	7.2	9.1	6.1
Interlocked METAL HOSE type C · SZ with double braid																
6	1/4	250	275	3990	412	5970	1100	15950	75	3	18	0.8	17.5	0.68	0.45	0.30
10	3/8	160	220	3190	330	4790	880	12760	90	3.5	30	1.2	20.5	0.81	0.65	0.44
12	1/2	160	176	2550	264	3830	704	10200	100	4	36	1.5	25.5	1.0	0.80	0.54
20	3/4	100	110	1600	165	2400	440	6400	115	4.5	60	2.4	34.5	1.4	1.0	0.67
25	1	63	90	1350	135	1960	360	5220	125	5	75	3.0	40.5	1.6	1.3	0.84
32	1 1/4	63	69	1000	103	1500	276	4000	150	6	96	3.8	51	2.0	2.0	1.3
40	1 1/2	50	52	750	78	1130	208	3000	200	8	120	4.8	60	2.4	2.5	1.6
50	2	40	48	700	72	1050	192	2780	275	11	138	5.5	75	3.0	3.4	2.3
65	2 1/2	40	41	595	61	890	164	2380	350	14	179	7.1	91	3.6	4.2	2.8
80	3	25	38	550	57	830	152	2200	400	16	200	7.9	105	4.1	5.0	3.4
100	4	20	20	290	30	440	80	1160	500	20	250	9.9	136	5.4	6.7	4.5
125	5	16	19	280	28	410	76	1100	660	26	313	12.4	165	6.5	10.2	6.8
150	6	10	15	220	22	320	60	870	760	30	375	14.8	188	7.4	12.7	8.5

Example type C:

SE	0050 / 016 / B / DAGA - 500
Type	DN PN Connections Length

Hose connection types:

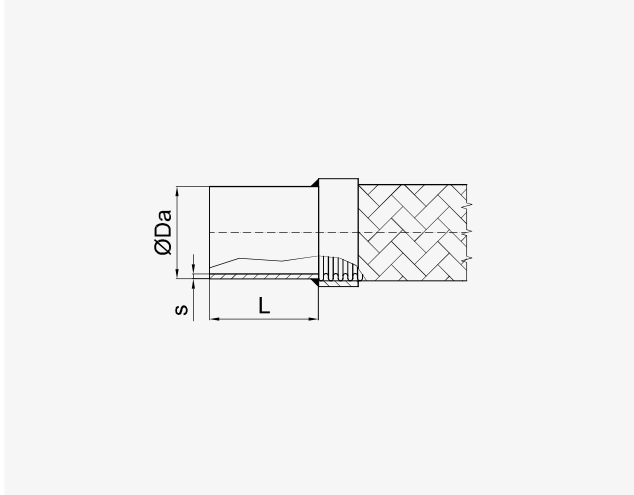
B	Swivel flange	S	Custom-made flange	DAGA	Rotating external thread
F	Fixed flange	K	Customer part	DIGA	Rotating internal thread
V	Welding neck flange	AGA	Fixed external thread	ÜFD	Pipe nut, flat seal
R	Weld end	IGA	Fixed internal thread	ÜKD	Pipe nut, conical seal

DN	Nominal diameter (inner diameter)
PN	Nominal pressure stage acc. to EN 1333
PS	Permitted operating pressure at 20 °C (SF4 with 4-fold bursting pressure resistance)
PT	Permitted test pressure at 20 °C
R_{min,dyn}	Minimum bending radius for cyclic loading (If the installation instructions according to ISO 10380 are observed, an average service life of 5·10 ⁴ load exchanges, but at least 4·10 ⁴ load exchanges can be expected. Higher operating temperatures and corrosion influences decrease the service life and/or increase the minimum bending radius.)
R_{min,stat}	Minimum bending radius for static load (e.g. compensating pipe offset)
D_a	External diameter of the hose
G	Hose weight per meter with/without braid (deviation +/- 10 %)

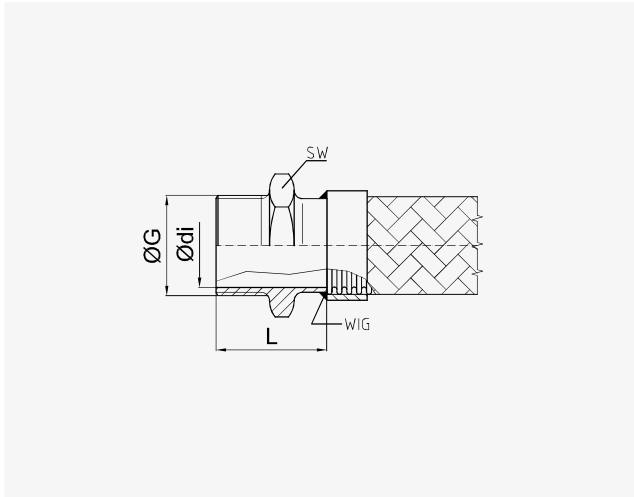
Design: The table values shown refer to 20 °C design temperature with a standard Material combination 1.4541/1.4301 (hose/braid material).
For other materials and operating temperatures, operating pressure and movement absorption have to be adapted with factors or requested separately.

Hose connection types: Hose and thread nipples

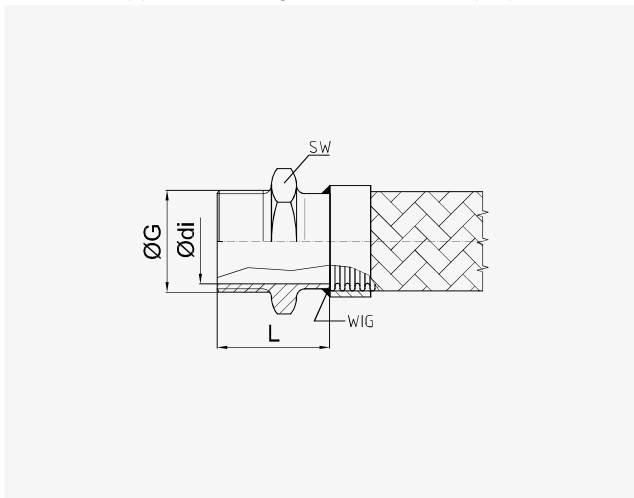
Welding end R



Threaded nipple with hexagon DIN 2990 **AGA**

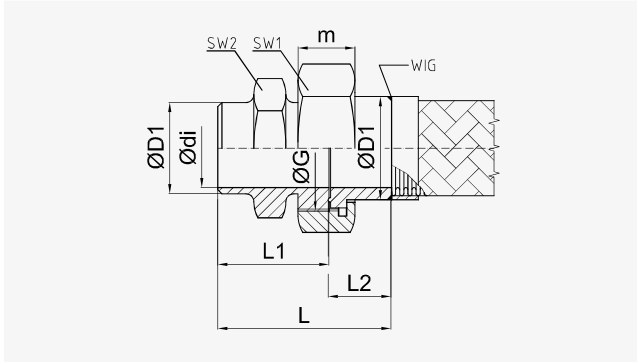


Threaded nipple with hexagon DIN 2950-280 (N8) **AGA**

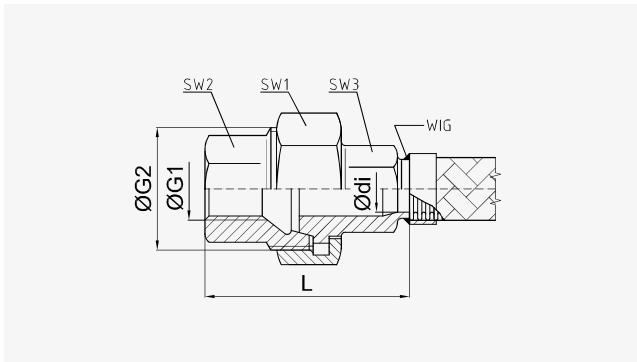


Hose connection types: Screw fittings

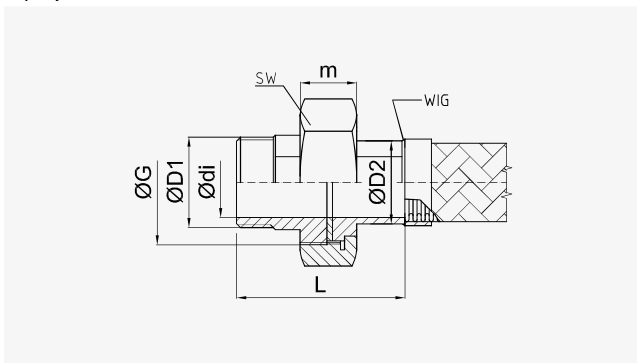
Welding pipe joint from supplier **DILO**



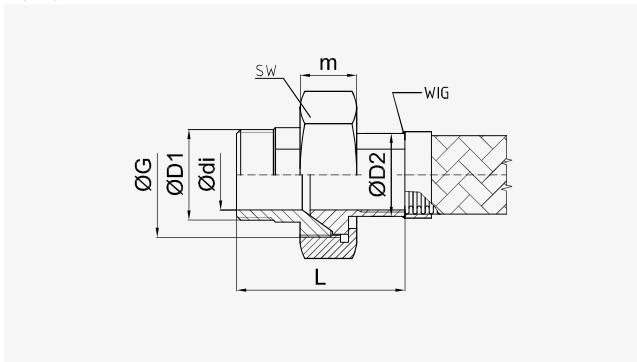
Pipe joint conical sealing **DIGA**



Pipe joint with flat seal **DAGA**

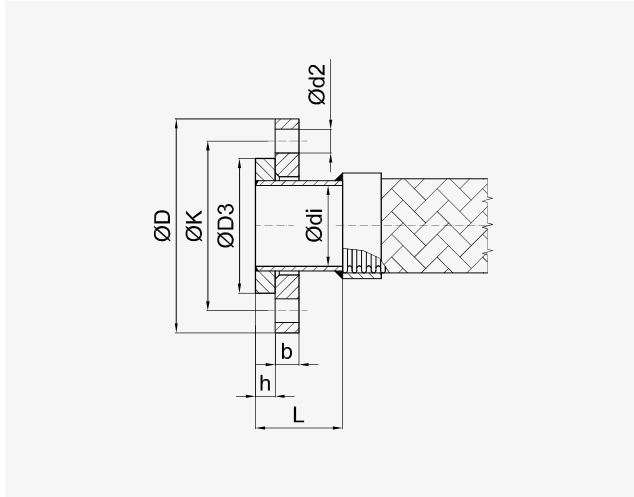


Pipe joint with conical seal **DAGA**

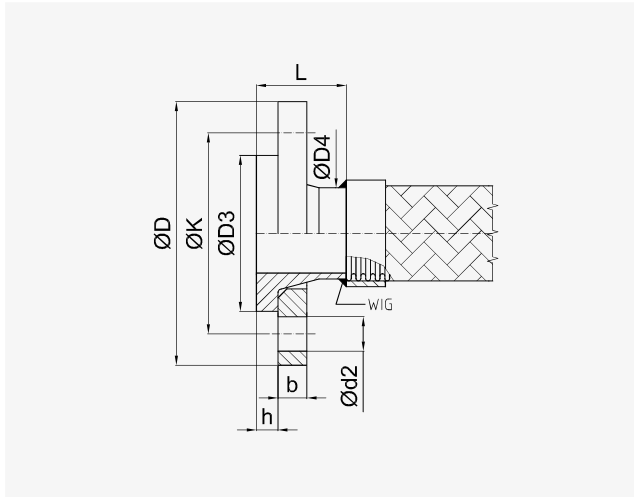


Hose connection types: Flanges

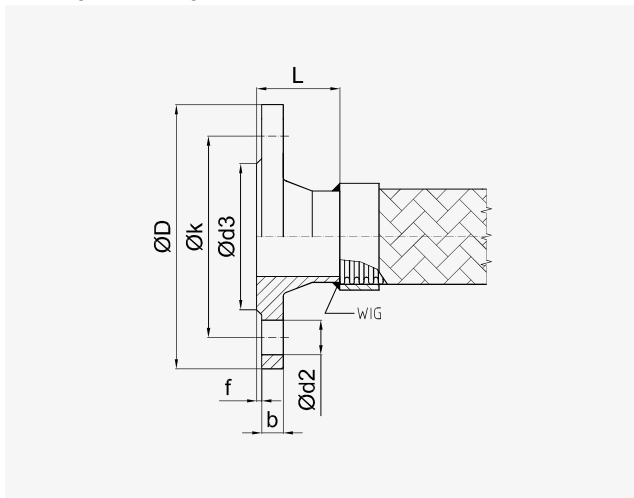
Swivel flange PN 40 with flange **B**



Swivel flange PN 10 with collar or flange **B**



Welding neck flange PN 16 **V**



Hose connection types: Flanges

Hose connection with rectangular flange **S**

