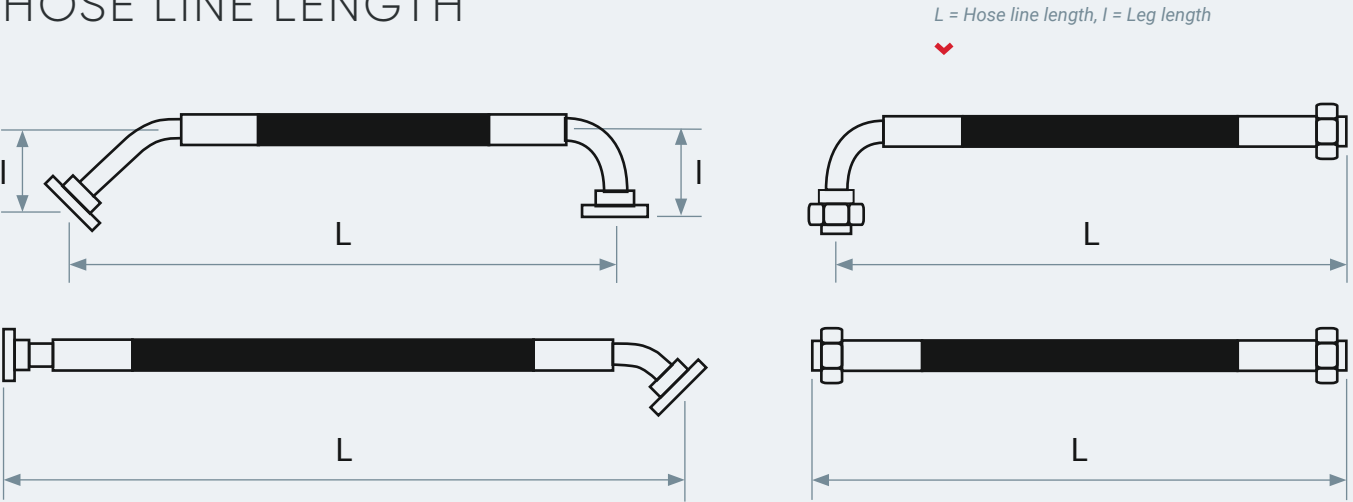


DETERMINATION OF HOSE LINE LENGTH



HOSE SHORTENING DUE TO PRESSURE
NUMERICAL VALUES Z₂ FOR CALCULATION

Hose type	DN-independent
1 SN/1SC	0.04
2 SN/2SC	0.04
4 SP/4SH	0.04
SAE 100 R12, R13, R15	0.02
KP600 / KP700 (ISO 18752)	0.04
TAF/TBF	0.01
NY100	0.04
NY700 / NY800 (R7 / R8)	0.03

Numerical values Z₂ correspond to the maximum shortening when the permitted working pressure is reached.

HOSE LINE LENGTH
(DIN 20066)

L = l_k × [1 + (Z₁ + Z₂)] [mm]
L = Hose line length taking into account essential sagging [mm]
l_k = Design dimension [mm]:
Dimension between fixed connectors and connectors directly opposite (sealing head, threaded pin, flange collar)
Z₁ = Numerical value for essential axial flexibility, e.g., 5% = 0.05
Z₂ = Numerical value for change in length, e.g. 2% = 0.02 for shortening

EXAMPLE OF CALCULATION – DETERMINING HOSE LINE LENGTH

Length of hose line = Design dimension × [1 + (0.05 + 0.02)]

Axial flexibility Value dependent on hose type

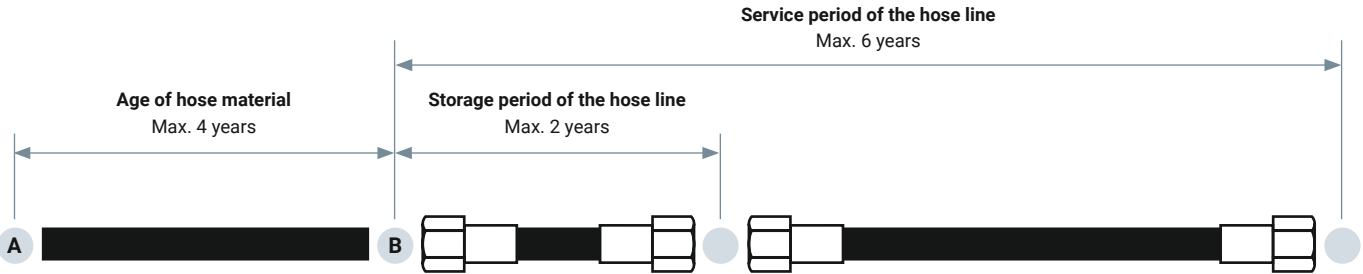
EXAMPLE VALUES USED

Length of hose line = 2500 × [1 + (0.05 + 0.02)] = 2500 × [1 + 0.07] = 2500 × 1.07 = **2675 mm**

VISUAL INSPECTIONS
OF HOSE LINES

A = Hose material production date
B = Hose line production date

RECOMMENDED STORAGE AND SERVICE PERIODS (DIN 20066, CLAUSE 14.2.2)



REPLACING HOSE LINES
(DIN 20066, CLAUSE 14.3)

Hose lines must be replaced if they fulfil the following criteria as determined by a visual inspection

- Damage to the outer layer down to the inlay
- Brittleness of outer layer due to crack formation
- Change in the natural shape of the hose
- Hose fitting damaged or deformed
- Hose becoming detached from the fitting
- Fitting tightness and function impaired by corrosion
- Non-compliance with installation requirements
- Maximum period of storage or service is exceeded (Check labels. Hose lines must not be painted over. Violation of identification requirement! DGVV Rule 113-020 (formerly: BGR 237))
- Leaks
- A repair of the hose line involving the continued use of the installed hose and/or fitting (integration area) is not permitted.

CRITERIA FOR SELECTING A HOSE

- Resistance to fluids due to loads from "inside" and "outside"
- Temperature resistance to the medium and the environment
- Pressure resistance and absorption of "external" force
- Change in length and diameter
- Minimum bending radius
- Weight
- Abrasion characteristics
- Availability through standardisation and state of the art
- Approvals

STORAGE OF HOSE LINES / HOSE MATERIAL
(EN ISO 8331 / ISO 2230)

- Store in a dry, cool and low-dust environment (relative humidity for elastomeric hose lines < 70% and thermoplastic hose lines < 65%)
- Do not expose to direct sunlight or UV radiation
- Shield from heat sources (storage temperature +15 °C to 25 °C)
- Do not store together with solvents, fuels or lubricants
- Store horizontally and under no strain
- Protect against ozone

RISK ANALYSIS
(DIN EN ISO 4413:2011-04)

- No danger to the energy supply (routing hydraulic hose lines and electricity supply lines together is questionable)
- Requirements imposed by installation site, transport, maintenance
- Design adequate to sustain specified pressures
- Temperature limit values not exceeded
- Prevention of leaks
- Service and inspection capabilities
- Check of mechanical movement
- Contact protection for hot surfaces
- Reliability of components

GOOD TO KNOW

HANSA/FLEX

GOOD TO KNOW
HOSE TECHNOLOGY – COMPACT GUIDE

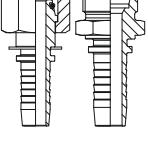
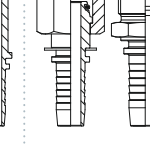
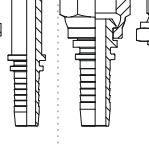
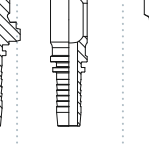
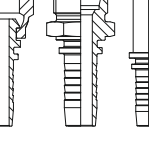
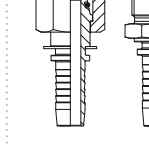
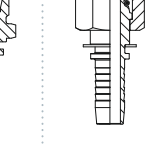
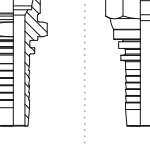
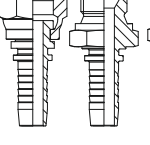
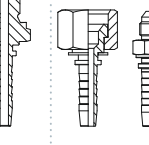
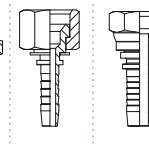
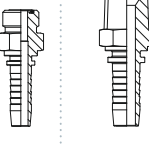
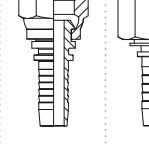
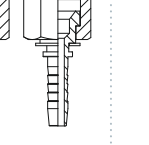
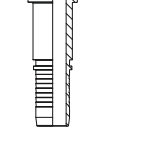


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MEASUREMENT METHODOLOGY FOR FREQUENTLY OCCURRING HOSE FITTINGS

Hose size			Light series metric			Heavy series metric			Fine thread metric			Banjo			French metric (pipe in inches)			French metric (metric pipe light)			French metric (metric pipe heavy)			Imperial BSPPP				US				NPTF/ NPT		NPSM		Japanese		Flange connectors SAE		Hose size									
																												Sealing cone 74° = JIC (2 x 37°)		UN(F) ORFS flat sealing													Reference dimension		60°		60°		
																																																	
Nom. Ø	SIZE	INCH	SW	AOL DKL AFL	HL	FL	SW	AOS DKS AFS	HS	FS	A	HM AM Flat sealing	B	BR Inches for banjo screw	SW	AF	HF	FF	SW	AFLF	HLF	Pipe	SW	AFSF	HSF	Pipe	AB	AR DRF Flat sealing	HB	HR AGF Flat sealing	AJ	HJ	ASA	AJF	HJOF	HN Tapered external thread	AN Cylindrical internal thread	ALI metric	ARI In inches	SF Ø	SF6 Ø	SF9 Ø	SFK Ø Komatsu	Nom. Ø	SIZE	INCH			
3	2	1/8					17	12.5	14 × 1.5	6		10 × 1	8.1														8.5	1/8–28 ▲		9.7															3	2	1/8		
4 (5)	3	3/16	14	10.5	12 × 1.5	6	19	14.5	16 × 1.5	8			10.1																1/8–27 9.7																4 (5)	3	3/16		
6	4	1/4	17	12.5	14 × 1.5	8	22	16.5	18 × 1.5	10		14 × 1.5	12.1	1/4 13.2													11.4	1/4–19 ▲		13.1	7/16–20 10.0 ▲ 11.1			9/16–18 13.0 ▲ 14.3	1/4–18 13.1	1/4–18 11.4	12.5	1/4–19 11.4								6	4	1/4	
8	5	5/16	19	14.5	16 × 1.5	10	24	18.5	20 × 1.5	12		16 × 1.5	14.1																1/2–20 11.6 ▲ 12.7									14.5								8	5	5/16	
10	6	3/8	22	16.5	18 × 1.5	12	27	20.5	22 × 1.5	14*		18 × 1.5	16.1	3/8 16.7	24	18.5	20 × 1.5	13.25									14.9	3/8–19 ▲		16.6	9/16–18 13.0 ▲ 14.3	5/8–18 14.7	11/16–16 15.4 ▲ 17.4	3/8–18 16.3	3/8–18 15.1	16.5	3/8–19 14.9								10	6	3/8		
13 (12)	8	1/2	27	20.5	22 × 1.5	15	30	22.5	24 × 1.5	16		22 × 1.5	18.1	1/2 21.0	30	22.5	24 × 1.5	16.75									18.6	1/2–14 ▲		20.9	3/4–16 17.6 ▲ 19			13/16–16 18.6 ▲ 20.5	1/2–14 20.2	1/2–14 18.6	20.5	1/2–14 18.6	30.2	31.8		34	13 (12)	8	1/2				
16	10	5/8	32	24.5	26 × 1.5	18	36	27.9	30 × 2	20		26 × 1.5	22.1	5/8 23.0	36	28.5	30 × 1.5	21.25	32	25.5	27 × 1.5	18	32	25.5	27 × 1.5	20	20.6	5/8–14 ▲		22.9	7/8–14 20.5 ▲ 22.2			1–14 23.1 ▲ 25.3				22.5							34	16	10	5/8	
20 (19)	12	3/4	36	27.9	30 × 2	22	41 46	33.9	36 × 2	25	28.5	30 × 1.5	26.1	3/4 26.5	46	34.6	36 × 1.5	26.75	36	28.5	30 × 1.5	22	41	31.5	33 × 1.5	25	24.1	3/4–14 ▲		26.4	1 ¹ / ₁₆ –12 24.7 ▲ 26.9			1 ³ / ₁₆ –12 27.5 ▲ 30.1	3/4–14 25.5	3/4–14 24.1	28.5	3/4–14 24.1	38.0	41.3	41.3		20 (19)	12	3/4				
25	16	1	41	33.9	36 × 2	28	50	39.9	42 × 2	30	36.5	38 × 1.5	30.1	1 33.3	55	43.0	45 × 1.5	33.5	46	34.5	36 × 1.5	28	46	37.5	39 × 1.5	30	30.3	1–11 ▲		33.2	1 ⁵ / ₁₆ –12 31.2 ▲ 33.3		33.8	1 ⁷ / ₁₆ –12 33.8 ▲ 36.4	1–11 1/2 32.2	1–11 1/2 30.2	31.5	1–11 30.3	44.5	47.6	47.6		25	16	1				
32 (31)	20	1 1/4	50	42.9	45 × 2	35	60	49.9	52 × 2	38	43	45 × 1.5															39	1 1/4–11 ▲		41.9	1 ⁵ / ₈ –12 39.2 ▲ 41.2		44.2	1 ¹¹ / ₁₆ –12 40.2 ▲ 42.8	1 1/4–11 1/2 41		34.5	1 1/4–11 39.3	50.8	54	54		32 (31)	20	1 1/4				
40 (38)	24	1 1/2	60	49.9	52 × 2	42					50.5	52 × 1.5															44.8	1 1/2–11 ▲		47.8	1 ⁷ / ₈ –12 45.4 ▲ 47.6		48.1	2–12 48.1 ▲ 50.7		40.5	1 1/2–11 44.8	60.3	63.5	63.5		40 (38)	24	1 1/2					
50 (51)	32	2									62.9	65 × 2																	2–11 ▲		59.6	2 ¹ / ₂ –12 61.5 ▲ 63.5												50 (51)	32	2			
60	38	2 3/8									75.9	78 × 2																																60	40	2 3/8			
76	48	3																																													76	48	3

Note: Pipe fittings FS, FL and FF are not standardised and must not be used for new designs!

Measuring tapered threads: External diameter = 1st thread turn;
Internal diameter = largest thread turn

Key to abbreviations: L = light series, S = heavy series, SW = width across flats (guideline value, supplier-independent), A = hose connector, internal thread, H = hose connector, external thread

** Pipe diameter 14 not standardised, subject to changes*

DIMENSIONS FOR HOSE IDENTIFICATION

DN	5	6	8	10	12	16	19	25	31	38	51	60	63	76	90	102	114	127	152	178	203	254
Inch	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	2 3/8	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	10

COMPARISON

DIN and HANSA-FLEX designators for hose connectors

DIN 20066	A	C	D	E	N	P	R	S
HANSA-FLEX	AFL	A	HL	HS	AOL	AOS	SF	SF6

CHARACTERISTICS FOR SF CONNECTORS:

SF	=	Shoulder height 6.7–9.5 mm
SF6	=	Shoulder height 8.8–12.6 mm
SF9	=	Shoulder height 14.6 mm
SFK	=	Shoulder height 8.1 mm

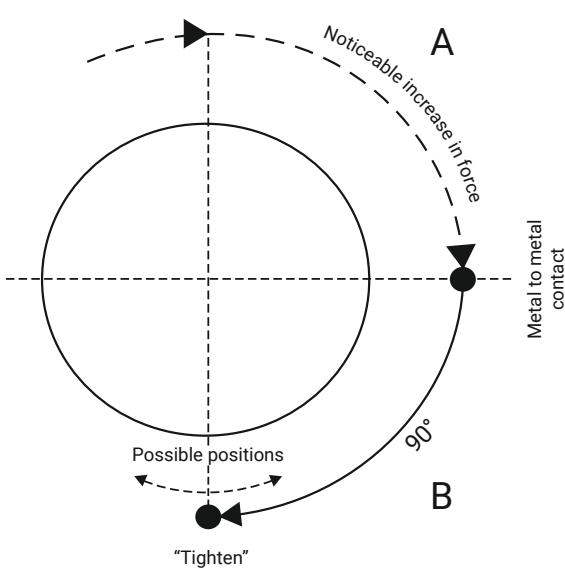
ASSEMBLY, OFFSET ANGLE AND TECHNICAL CONVERSIONS

RELIABLE TRAVEL-DEPENDENT ASSEMBLY OF HOSE LINE FITTINGS – INSTEAD OF UNRELIABLE TORQUE VALUES

A: Manual assembly with termination when force increases noticeably (elastomer seal, metallic seal), e.g.: prestressing effect of the O-ring is overcome

B: Elastomer seal (e.g.: AOL [DKOL] / AOS [DKOS]):
Tighten 90° (1/4 turn)
Metallic seal (e.g.: AJ [DKJ] / AB [DKR]):
Tighten 90° (1/4 turn)
ORFS system (e.g.: AJF): Tighten 30° to 40°

All values shown are for guidance only.



WORKING PRESSURE TO DIN 20066

If hose and fitting have different working pressures (permitted working pressure of the hose and nominal pressure of the hose fitting) only the lower pressure may be applied to the hose line.

CONVERSION

Size:

(US) is a measured value.

Unit 1 SIZE = 1/16 inch

e.g size 8 = $8 \times \frac{1}{16} = \frac{8}{16} = \frac{1}{2}$ inch.

Pressure:

1 psi	→	0.06865 bar	1 bar	→	0.1 MPa
1 bar	→	14.5035 psi	1 kPa	→	0.01bar
1 MPa	→	10 bar	1 bar	→	100 kPa

Length/diameter:

1 inch $\longrightarrow$ 25.4 mm
1 mm $\longrightarrow$ 0.03934 inch

MEASUREMENT OF V- AND K-ANGLES FOR 2 ELBOW FITTINGS

