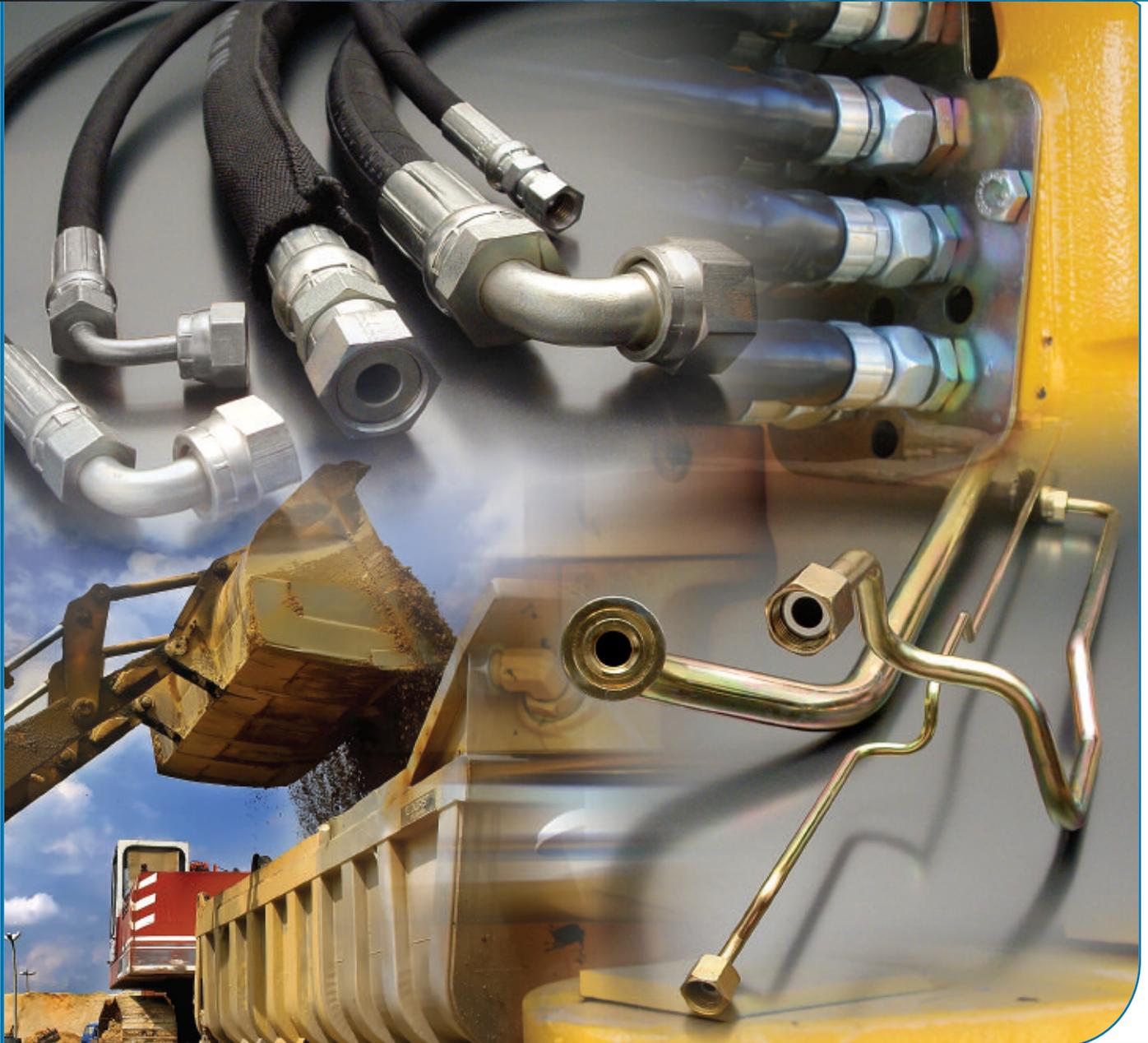


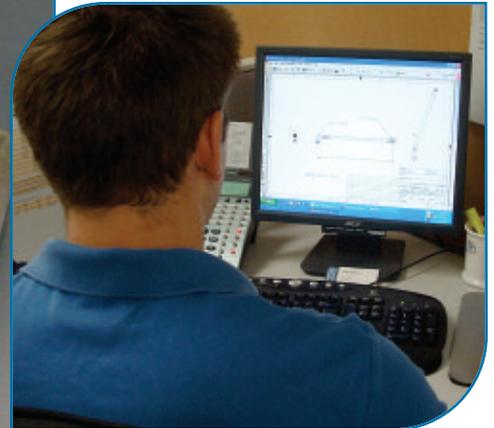
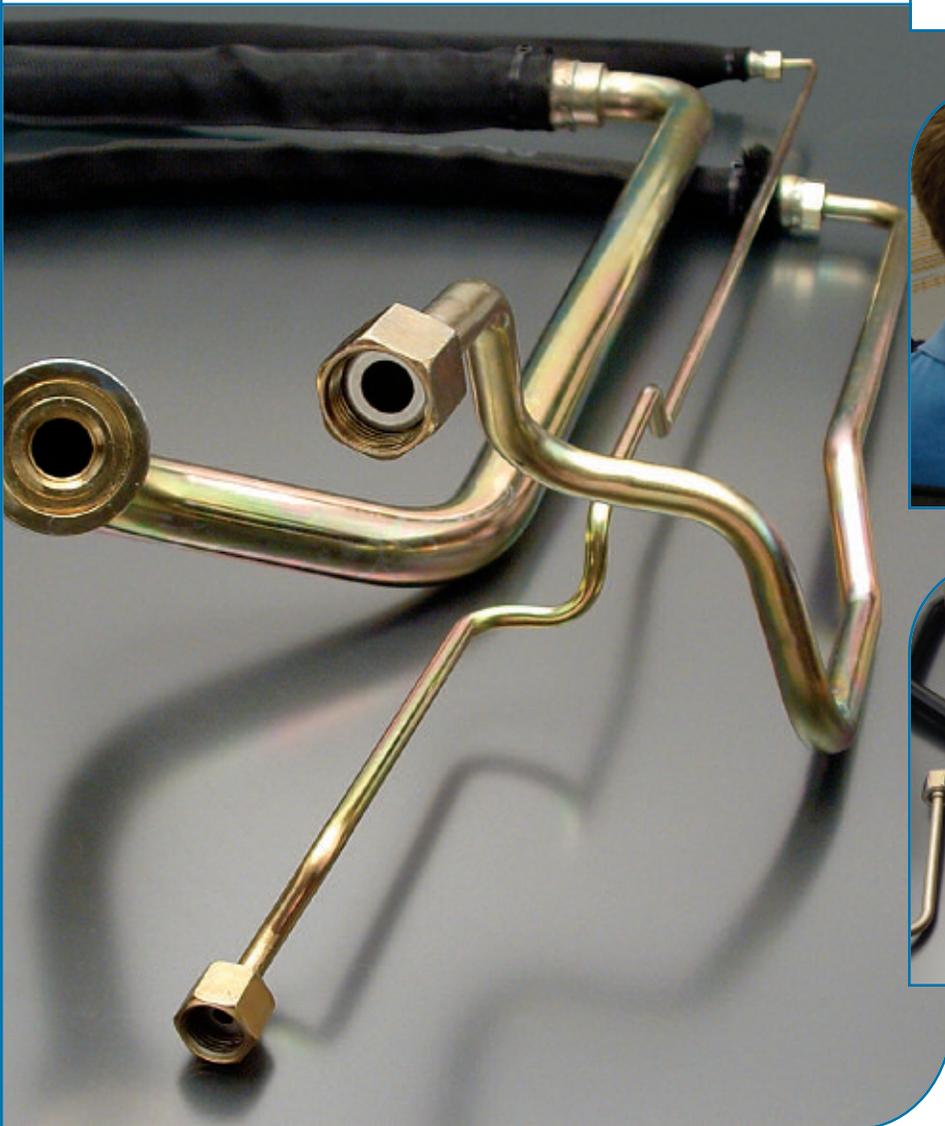
HYDRAULIC HOSE SOLUTIONS

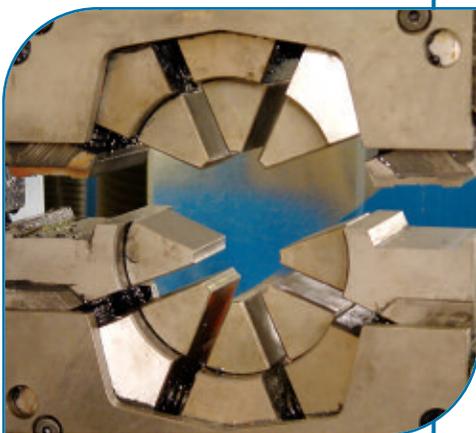


BOXER[®]
INDIA

Custom Designed Assemblies

At Boxer India, we work closely with our customers to develop the best products for their specific applications. Our sales, engineering, and production staff are trained and experienced at designing hose assemblies. They will work closely with you to select the right components for your application. From identifying the appropriate hose material to choosing the correct fitting configurations, Boxer India has the tools and experience to help you make the best selections.



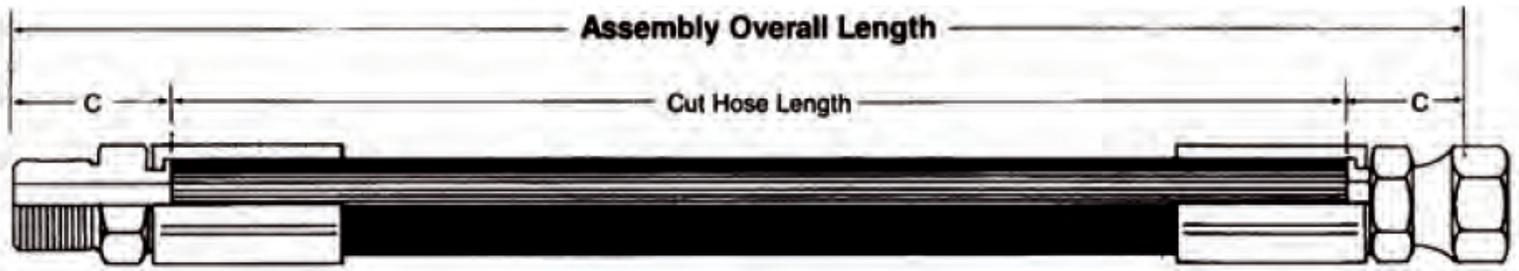


Quality Hose Assemblies

Building quality products at competitive price was our mission statement when Boxer India was founded. Over the last three decades our focus on this goal has only intensified. Today, Boxer is proud to be certified as an ISO company; However, Boxer India insistence on building quality products doesn't end with this achievement. Our entire staff plays an important role in continuing to look for areas to improve our quality system so our customers can be assured that they receive quality products today and into the future.

HOSE GUIDELINES

HOW TO DETERMINE CORRECT ASSEMBLY LENGTH

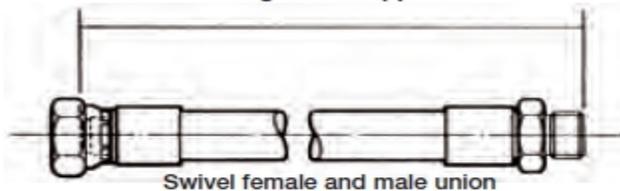


For most assemblies, the correct assembly length may be determined by direct measurement of the equipment or a drawing. Minimum bend radii as shown in the hose specification tables should be observed. Assemblies are measured to the end of the seal.

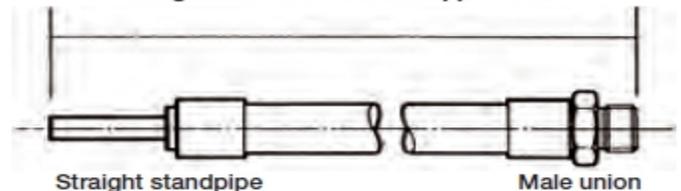
To determine the length of hose needed in making assemblies with permanent or reusable couplings, subtract Dimension "C" (Cut off factor) for each coupling from the required overall assembly length. Dimension "C" may be found in the coupling specification tables.

HOW TO MEASURE ASSEMBLIES

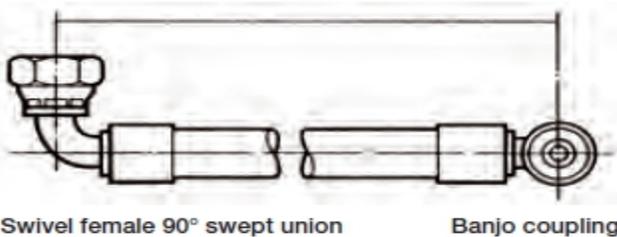
Length over nipples



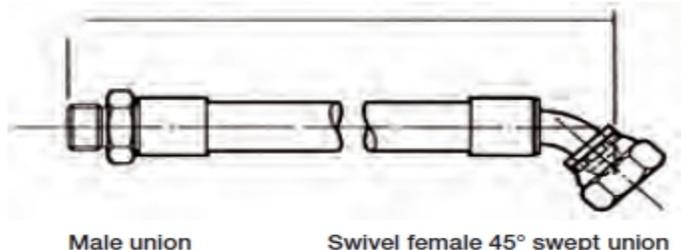
Length between S.P. and nipple ends



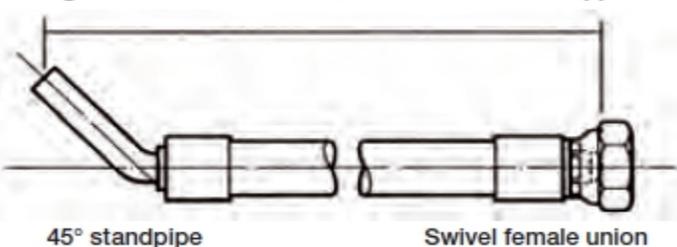
Length between centre lines of angle and banjo



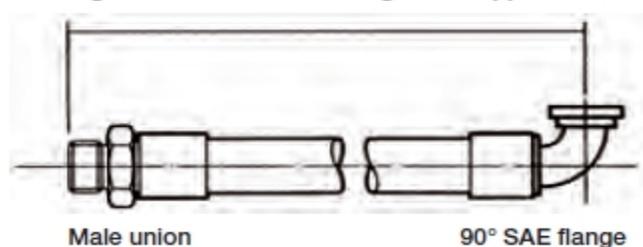
Length between male nipple and centre of female nipple



Length between centre lines of S.P. and end of nipple



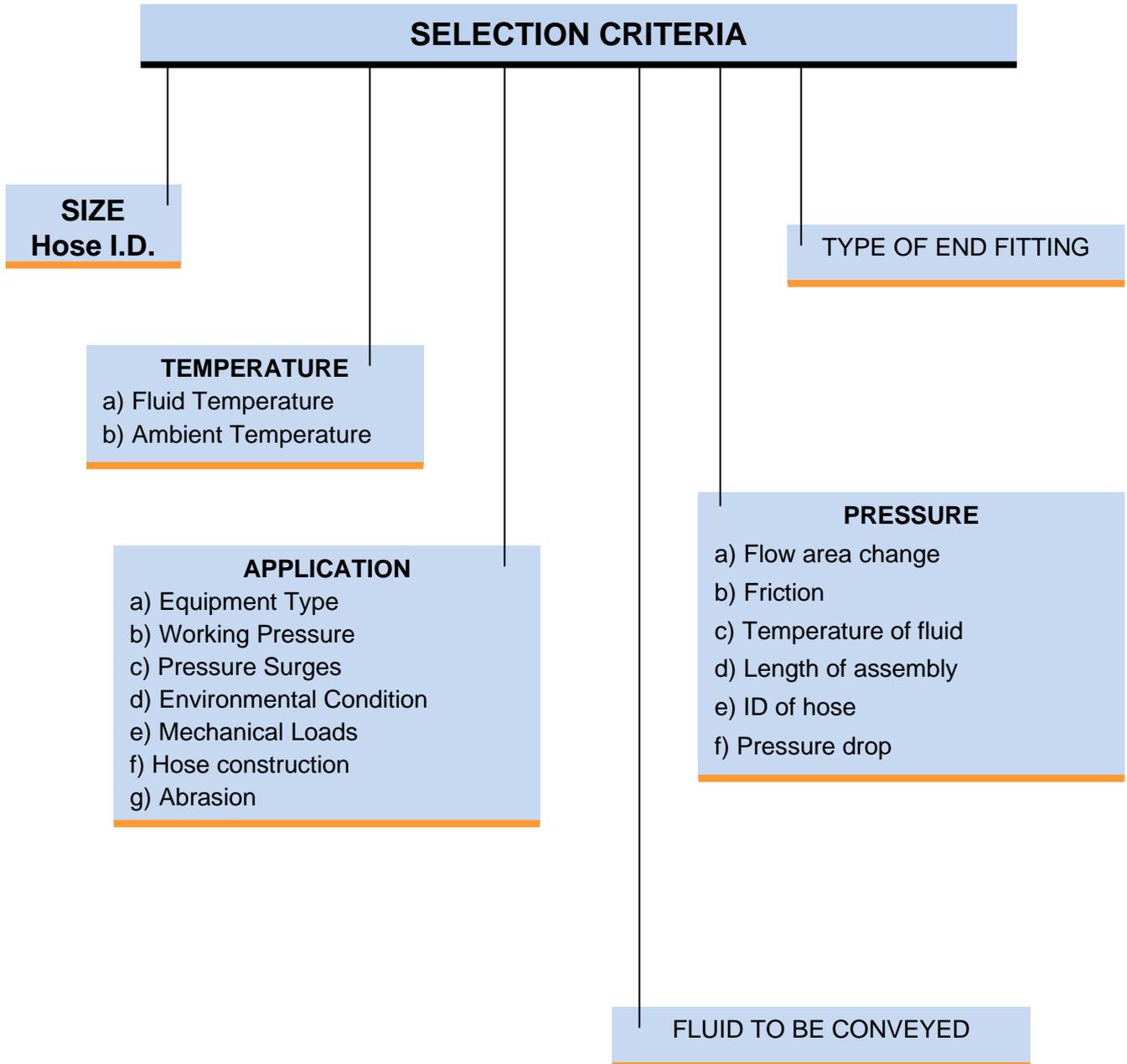
Length between centre of angle and nipple end



Remember that hydraulic hose under pressure will elongate up to 2% of its length or contract up to 4% depending on pressure, type and size. Sufficient allowance should be made to permit such changes in length.



HOSE SELECTION



HOSE SELECTION CRITERIA

SIZE

The Inside Diameter of the hose must be adequate to keep pressure loss to a minimum and avoid damage to the hose arising as a result of heat generation or excessive turbulence.

Hose Outside Diameter can be a critical factor when hose routing clamps are used or hoses are routed through bulkheads.

Check individual hose, specification tables for O.D.s

TEMPERATURE

Both fluid and ambient temperature must be considered while selecting a replacement assembly. The hose selected must be capable to withstand minimum and maximum temperature of the system. While selecting a hose for its maximum temperature care should be taken that temperature stated is not, an intermittent value.

APPLICATION

Determine where or how the replacement hose or assembly is to be used.

a) Equipment Type: Most often only a duplicate of the original hose will have to be made. Make sure all the requirements of the application are fulfilled.

b) Working Pressure: Check individual hose specification tables for working pressure. The working pressure or operating pressure is one fourth the hose minimum burst pressure.

c) Pressure Surges: In hydraulic systems, where pressure surges are severe, increase the safety factor when selecting the proper hose (safety factor working / burst = 1/5).

Conversely, in systems where pressure surges are slight or non existent, the normal safety factor must be chosen.

d) Environmental Conditions: Care must be taken to ensure that the hose and fittings are either compatible with or protected from the environment to which they are exposed. Environmental conditions including but not limited to ultraviolet light, heat, ozone, moisture, water, salt water, chemicals and air pollutants can cause degradation and premature failure and therefore must be considered.

e) Mechanical Load: External forces can significantly reduce hose life. Mechanical loads which must be considered include excessive flexing, twist, kinking, tensile or side loads, bend radius and vibration. Use of swivel type fittings or adaptors may be required to ensure no twist is put into the hose. Unusual applications may require special testing prior to hose selection.

f) Hose Construction: Various applications may require different hose construction.

For construction please check individual hose specifications.

g) Abrasion: While a hose is designed with a reasonable level of abrasion resistance, care must be taken to protect the hose from excessive abrasion which can result in erosion, snagging and cutting of the hose cover. Exposure of the reinforcement will significantly accelerate hose failure.

FLUID TO BE CONVEYED

Hose selection must assure compatibility of the hose tube, cover, reinforcement and fittings with the fluid use. For compatibility refer fluid compatibility chart page, no. 4 to 6

PRESSURE

The system pressure should not exceed the mentioned working pressures. Pressure spikes greater than the mentioned working pressure will shorten hose life. It is not recommended to use hoses on such applications.

Pressure Drop: When pressurised media is flowing through the hose, there is a certain amount of pressure difference between intake and outlet points, this pressure difference is known as Pressure Drop. This is due to gradual decrease in the pressure of the media along the length. This aspect shall be considered while designing a hose.

TYPE OF END FITTING

Care must be taken to ensure proper compatibility exists between the hose and the end fittings. Check individual end fitting specification table.

DETERMINATION OF NOMINAL DIAMETER

Nomogram for determination of nominal diameter

The nomogram can be used as an aid to select the nominal diameters of hose and pipe assemblies.

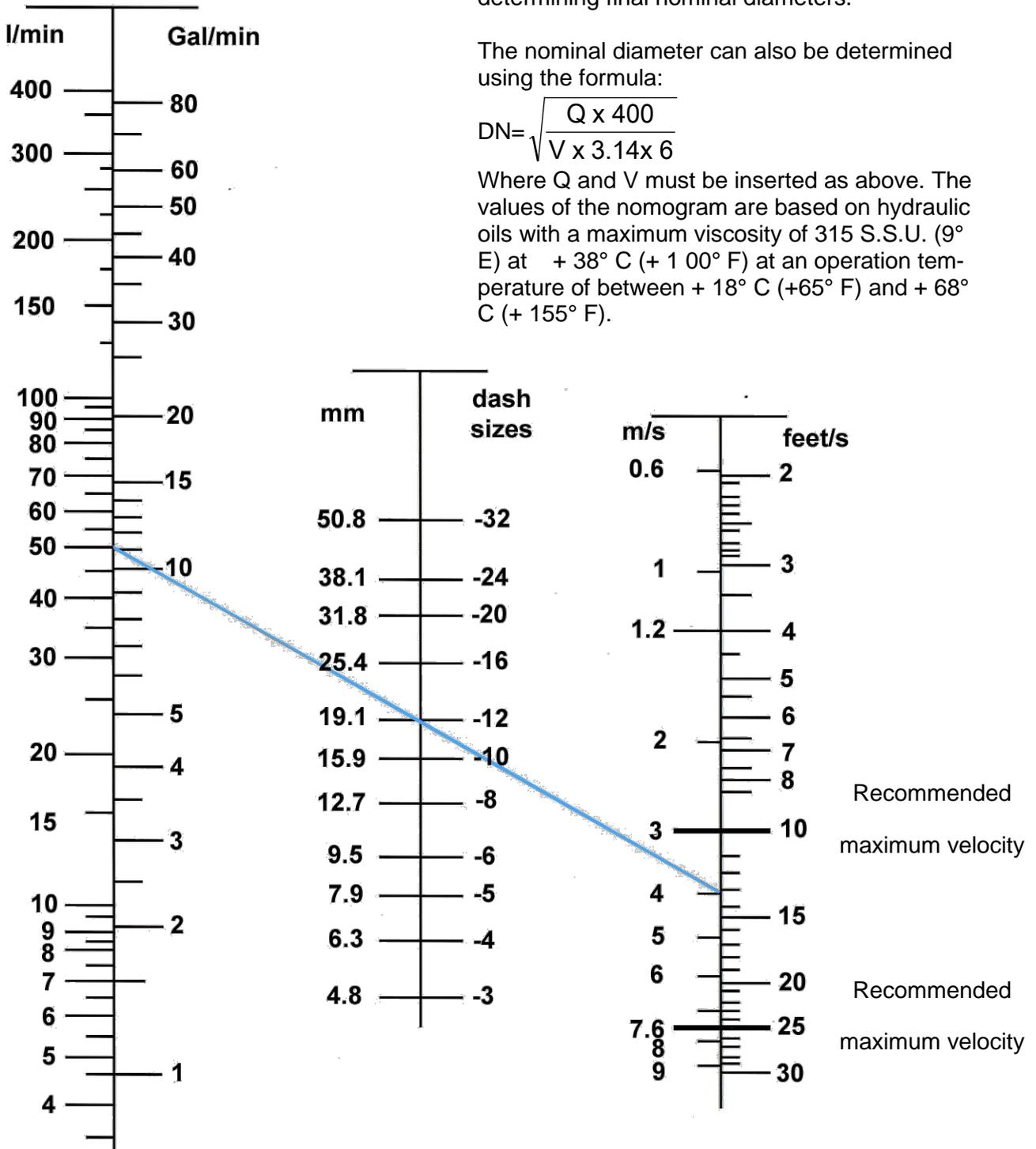
Example

Rate of flow $Q=50$ l/min (left-hand scale), chosen speed $V=\text{approx. } 4\text{m/sec.}$ (right-hand scale). The point of intersection on the middle scale gives a nominal diameter of 19.1 mm. Other parameters of the installation, such as length of hose assemblies, number of valves, viscosity of the oil and maximum permissible pressure loss, must be taken into account when determining final nominal diameters.

The nominal diameter can also be determined using the formula:

$$DN = \sqrt{\frac{Q \times 400}{V \times 3.14 \times 6}}$$

Where Q and V must be inserted as above. The values of the nomogram are based on hydraulic oils with a maximum viscosity of 315 S.S.U. (9° E) at +38° C (+100° F) at an operation temperature of between +18° C (+65° F) and +68° C (+155° F).



Hydraulic Hoses

1SN – ONE WIRE BRAID HOSE

Medium Pressure Hydraulic Lines

REF. SPECIFICATION

EN 853 / 1SN
EXCEEDS SAE J517 100R1 TYPE AT
ISO 1436

CONSTRUCTION

Tube: oil resistant synthetic rubber.
Reinforcement: One high tensile steel wire braid.
Cover: abrasion and weather resistant synthetic rubber.

TEMPERATURE RANGE

Continuous service: – 40°C to + 100°C, Intermittent service: +125°C.
Air: Max. + 75°C. Water: Max. + 85°C

APPLICATION

Medium pressure service with high temperature petroleum base hydraulic fluids, hot oil, grease, lubricant and crude oils, air and water.

For air or gas application above 17 bar (250 psi) the cover should be pin-pricked.



Part Number	Hose dash size	Hose I.D		HOSE O/D mm	Working Pressure		Burst Pressure		Min. Bend Radius mm	Wight Kg/m
		Inch	mm		Bar	Psi	Bar	Psi		
1SN-03	03	$\frac{3}{16}$	4.8	11.8	250	3625	1000	14500	90	0.18
1SN-04	04	$\frac{1}{4}$	6.4	13.4	225	3263	900	13050	100	0.23
1SN-05	05	$\frac{5}{16}$	7.9	15.0	215	3118	850	12325	115	0.27
1SN-06	06	$\frac{3}{8}$	9.5	17.4	180	2610	720	10440	130	0.34
1SN-08	08	$\frac{1}{2}$	12.7	20.6	160	2320	640	9280	180	0.42
1SN-10	10	$\frac{5}{8}$	16.0	23.7	130	1885	520	7540	200	0.48
1SN-12	12	$\frac{3}{4}$	19.0	27.7	105	1523	420	6090	240	0.60
1SN-16	16	1	25.4	35.6	88	1276	350	5075	300	0.90
1SN-20	20	1 $\frac{1}{4}$	31.8	43.5	63	914	250	3625	420	1.20
1SN-24	24	1 $\frac{1}{2}$	38.1	50.6	50	725	200	2900	500	1.47
1SN-32	32	2	50.8	64.0	40	580	160	2320	630	1.97
1SN-40	40	2 $\frac{1}{2}$	63.5	76.5	40	580	160	2320	760	2.60
1SN-48	48	3	72.6	88.5	35	508	140	2030	900	2.74

2SN – TWO WIRE BRAIDS HOSE

High Pressure Hydraulic Lines

REF. SPECIFICATION

EN 853 / 2SN
EXCEEDS SAE J517 100R2 TYPE
AT
ISO 1436

CONSTRUCTION

Tube: oil resistant synthetic rubber.
Reinforcement: Two high tensile steel wire braids.
Cover: abrasion and weather resistant synthetic rubber.

TEMPERATURE RANGE

Continuous service: – 40°C to + 100°C, Intermittent service: +125°C.
Air: Max. + 75°C. Water: Max. + 85°C



Part Number	Hose dash size	Hose I.D		Hose O/D mm	Working Pressure		Burst Pressure		Min. Bend Radius mm	Wight Kg/m
		Inch	mm		Bar	Psi	Bar	Psi		
2SN-03	03	$\frac{3}{16}$	4.8	13.4	415	6018	1650	23925	90	0.29
2SN-04	04	$\frac{1}{4}$	6.4	15.0	400	5800	1600	23200	100	0.40
2SN-05	05	$\frac{5}{16}$	7.9	16.6	350	5075	1400	20300	115	0.45
2SN-06	06	$\frac{3}{8}$	9.5	19.0	330	4785	1320	19140	130	0.56
2SN-08	08	$\frac{1}{2}$	12.7	22.2	275	3988	1110	15950	180	0.66
2SN-10	10	$\frac{5}{8}$	16.0	25.4	250	3625	1000	14500	205	0.79
2SN-12	12	$\frac{3}{4}$	19.0	29.3	215	3118	850	12325	240	0.93
2SN-16	16	1	25.4	38.1	165	2393	650	9425	300	1.39
2SN-20	20	1 $\frac{1}{4}$	31.8	48.3	125	1813	500	7250	420	2.04
2SN-24	24	1 $\frac{1}{2}$	38.1	54.6	90	1305	360	5220	500	2.27
2SN-32	32	2	50.8	67.0	78	1131	310	4500	630	2.87
2SN-40	40	2 $\frac{1}{2}$	63.5	79.3	75	1090	300	4350	760	3.78
2SN-48	48	3	76.2	91.3	50	725	200	2900	900	4.00

4SP – FOUR WIRE SPIRALS HOSE

Very High Pressure Power Lines

REF. SPECIFICATION

EN 856 / 4SP
EXCEEDS SAE J517 100R9R
ISO 3862

CONSTRUCTION

Tube: oil resistant synthetic rubber.
Reinforcement:
Four layers of spiraled high tensile steel wire over fabric layer.
Cover: abrasion and weather resistant synthetic rubber.

TEMPERATURE RANGE

Continuous service: – 40°C to + 100°C, Intermittent service: +125°C.
Air: Max. + 75°C. Water: Max. + 85°C

APPLICATION

Very high-pressure and high-impulse service with petroleum base hydraulic fluids.
Designed for hydrostatic transmissions and other sever operating conditions.



Part Number	Hose dash size	Hose I.D		Hose O/D	Working Pressure		Burst Pressure		Min. Bend Radius	Wight
		Inch	mm		mm	Bar	Psi	Bar		
4SP-04	04	¼	6.4	17.7	450	6525	1800	26100	150	0.61
4SP-06	06	⅜	9.5	21.3	445	6453	1780	25810	180	0.85
4SP-08	08	½	12.7	24.4	415	6018	1660	24070	230	0.95
4SP-10	10	⅝	16.0	28.0	350	5075	1400	20300	250	1.14
4SP-12	12	¾	19.0	32.0	350	5075	1400	20300	300	1.49
4SP-16	16	1	25.4	39.2	280	4060	1120	16240	340	2.06
4SP-20	20	1¼	31.8	50.0	210	3045	840	12180	460	3.22
4SP-24	24	1½	38.1	57.0	185	2683	740	10730	560	3.74
4SP-32	32	2	50.8	69.8	175	2538	700	10150	660	4.50

4SH – FOUR WIRE SPIRALS HOSE

Very High Pressure Power Lines

REF. SPECIFICATION

EN 856 / 4SH
ISO 3862

CONSTRUCTION

Tube: oil resistant synthetic rubber.
Reinforcement:
Four layers of spiraled high tensile steel wire over fabric layer.
Cover: abrasion and weather resistant synthetic rubber.

TEMPERATURE RANGE

Continuous service: – 40°C to + 100°C, Intermittent service: +125°C.

APPLICATION

Very high-pressure and high-impulse service with petroleum base hydraulic fluids.
Designed for hydrostatic transmissions and other sever operating conditions



Part Number	Hose dash size	Hose I.D		Hose O/D	Working Pressure		Burst Pressure		Min. Bend Radius	Wight
		Inch	mm		Bar	Psi	Bar	Psi		
4SH-10	10	5/8	16.0	28.5	420	6090	1680	24360	280	1.33
4SH-12	12	3/4	19.0	32.2	420	6090	1680	24360	280	1.53
4SH-16	16	1	25.4	38.4	380	5510	1520	22040	340	2.14
4SH-20	20	1 1/4	31.8	45.2	325	4713	1300	18850	460	2.50
4SH-24	24	1 1/2	38.1	53.5	290	4205	1160	16820	560	3.40
4SH-32	32	2	50.8	68.0	250	3625	1000	14500	700	4.70

R13 – SIX WIRE SPIRALS HOSE

Heavy Duty Power Lines

REF. SPECIFICATION

SAE 100 R13

CONSTRUCTION

Tube: oil resistant synthetic rubber.

Reinforcement: six layers of spiraled high tensile steel wire

Cover: abrasion and weather resistant synthetic rubber.

TEMPERATURE RANGE

Continuous service: – 40°C to + 121°C.

APPLICATION

Ultra high pressure and high-impulse hydraulic applications.

Designed for heavy duty power lines, hydrostatic transmissions.



Part Number	Hose dash size	Hose I.D		HOSE O/D mm	Working Pressure		Burst Pressure		Min. Bend Radius mm	Wight Kg/m
		Inch	mm		Bar	Psi	Bar	Psi		
R13-12	12	¾	19.0	31.7	350	5000	1400	20000	267	1.50
R13-16	16	1	25.4	38.5	350	5000	1400	20000	267	2.01
R13-20	20	1¼	31.8	49.6	350	5000	1400	20000	330	3.50
R13-24	24	1½	38.1	57.1	350	5000	1400	20000	445	4.47

R15 – SIX WIRE SPIRALS HOSE

Heavy Duty Power Lines

REF. SPECIFICATION

SAE 100 R15

CONSTRUCTION

Tube: oil resistant synthetic rubber.

Reinforcement:

Six layers of spiraled high tensile steel wire

Cover: abrasion and weather resistant synthetic rubber.

TEMPERATURE RANGE

Continuous service: – 40°C to + 121°C.

APPLICATION

Ultra high pressure and high-impulse hydraulic applications.

Designed for heavy duty power lines, hydrostatic transmissions.



Part Number	Hose dash size	Hose I.D		HOSE O/D mm	Working Pressure		Burst Pressure		Min. Bend Radius mm	Wight Kg/m
		Inch	mm		Bar	Psi	Bar	Psi		
R15-12	12	¾	19.0	36.1	420	6000	1655	24000	267	1.50
R15-16	16	1	25.4	42.9	420	6000	1655	24000	267	2.10
R15-20	20	1¼	31.8	51.5	420	6000	1655	24000	330	3.60
R15-24	24	1½	38.1	58.2	420	6000	1655	24000	445	5.10

R5 – ONE WIRE BRAID, ONE TEXTILE BRAID HOSE

Medium Pressure Lines

REF. SPECIFICATION

SAE J 517 100 R5
ISO 1307

CONSTRUCTION

Tube: oil resistant synthetic rubber.
Reinforcement: One textile braid, one high tensile steel wire braid .
Cover: Braided cotton impregnated with weather resistant synthetic rubber.

TEMPERATURE RANGE

Continuous service: – 40°C to + 100°C, intermittent +125°C.

APPLICATION

For medium pressure hydraulic oil lines, truck air brake and truck engine.
Suitable for carrying air, fuels, naphtha, gasoline and lubricants.



Part Number	Hose dash size	Hose I.D		HOSE O/D mm	Working Pressure		Burst Pressure		Min. Bend Radius mm	Wight Kg/m
		Inch	mm		Bar	Psi	Bar	Psi		
R5-03	03	$\frac{3}{16}$	4.8	13.2	207	3002	828	12006	76	0.25
R5-04	04	$\frac{1}{4}$	6.4	14.8	207	3002	828	12006	86	0.28
R5-05	05	$\frac{5}{16}$	7.9	17.2	155	2248	620	8990	102	0.35
R5-06	06	$\frac{13}{32}$	10.3	19.5	138	2001	552	8004	117	0.41
R5-08	08	$\frac{1}{2}$	12.7	23.4	121	1755	484	7018	140	0.55
R5-10	10	$\frac{5}{8}$	15.9	27.4	103	1494	412	5974	165	0.69
R5-14	14	$\frac{7}{8}$	22.2	31.4	55	798	220	3190	187	0.76
R5-18	18	$1\frac{1}{8}$	28.6	38.1	43	624	172	2494	229	0.97
R5-22	22	$1\frac{3}{8}$	34.9	44.5	34	493	136	1972	267	1.10
R5-29	29	$1\frac{13}{16}$	46.0	56.4	24	348	96	1392	337	1.32
R5-38	38	$2\frac{3}{8}$	60.3	73.0	24	348	96	1392	610	2.00

EN – 854 R3 – TWO TEXTILE BRAIDS HOSE

REF. SPECIFICATION

EN 854 / TYPE R3
SAE J516 100 R3
ISO 4079

CONSTRUCTION

Tube: oil resistant synthetic rubber.
Reinforcement: 2 high tensile synthetic textile braids.
Cover: abrasion and weather resistant synthetic rubber.

TEMPERATURE RANGE

– 40°C to + 100°C for Air max. + 70°C intermittent +125°C.

APPLICATION

For hydraulic control lines, discharge under pressure of hydraulic fluids, suitable for carrying fuels, naphtha gasoline and lubricants.



Part Number	Hose dash size	Hose I.D		HOSE O/D mm	Working Pressure		Burst Pressure		Min. Bend Radius mm	Wight Kg/m
		Inch	mm		Bar	Psi	Bar	Psi		
R3-03	03	$\frac{3}{16}$	4.8	12.7	103	1494	412	5974	80	0.15
R3-04	04	$\frac{1}{4}$	6.4	14.3	86	1247	344	4988	80	0.18
R3-05	05	$\frac{5}{16}$	7.9	17.5	83	1204	332	4814	100	0.26
R3-06	06	$\frac{3}{8}$	9.5	19.1	78	1131	312	4524	100	0.30
R3-08	08	$\frac{1}{2}$	12.7	23.8	69	1000	276	4002	125	0.43
R3-10	10	$\frac{5}{8}$	15.9	27.0	60	870	240	3480	140	0.49
R3-12	12	$\frac{3}{4}$	19.0	31.8	52	754	208	3016	150	0.69
R3-16	16	1	25.4	38.1	39	566	156	2262	205	0.84
R3-20	20	1 $\frac{1}{4}$	31.8	44.5	26	377	104	1508	255	0.98

Application

- Refineries
- Power Plants
- Steel Plants
- Nuclear Installation
- Fertilizer Industry
- Pharmaceutical Industry
- Cryogenic Service
- Chemical Industry
- Boilers
- Paper Plants
- Lubrication Systems
- Automotive Industry
- Steam, Hot Water, Pneumatic Service
- Vacuum Systems
- Air Conditioning & Refrigeration
- Ports and ship Yard
- Defence Organization
- Piping
- Vibration Absorption
- Railways

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