



Hose Usage Guide

Best Practice

Pipeline Products for all Industries

1. Making The Right Choices

hydraulic hose assemblies are used to transmit force by means of oil pressure and consist of flexible hydraulic hoses to which fittings are attached at either end to ensure safe, interlocking connections.

the correct choice of hose assembly components is influenced by many factors, in particular the dynamic working pressure, resistance to the media being transmitted and operating temperatures – both ambient and the media.

Follow the instructions...

often legal and other regulations need careful consideration where hydraulic hose assemblies are used, and the manufacturer should be informed about them when you make your enquiry. In some cases, observing the instructions for installation will determine the potential service life of a hydraulic hose assembly.

2. Determination Of Hose Dimensions

the required inside diameter of a hose assembly is determined by the projected working pressure and the proposed rate of flow.

Never undersize hoses...

Undersized hose assemblies result in a high flow rate of the medium. the ensuing turbulence causes considerable loss of pressure, noise and increased temperatures. this can be detrimental to the entire system.

If undersize valve connections suggest smaller hose diameters, we recommend the use of suitable adapters which then cause only local constrictions in the system.

3. Dynamic Working Pressure Is Decisive

In practice hydraulic hose assemblies are subjected to dynamic loading. A hose assembly must therefore be designed for operation at the maximum permissible working pressure specified for the respective hose type and size.

Safety factor 4 : 1

the working pressure of a hydraulic hose assembly is normally a quarter of the theoretical or specified bursting pressure. this safety factor of 4:1 conforms to SAE, DIN and EN-regulations.

Dynamic operating pressures...

is the most frequently operating condition in hydraulic systems. Pure static load is the absolute exception and therefore the Static Working Pressure has been eliminated from the standards.

Consider peak pressures...

a hose with a higher pressure rating than the actual working pressure of the installation should be selected for systems in which sudden peak pressures occur.



4. Bursting Pressure Must Never Be Reached

the values specified for bursting pressure are minimum values. they apply only to unused hose assemblies.

the bursting pressure of a hose or a hose assembly must therefore remain a purely theoretical value for the user. In view of the safety requirements imposed on any installation, this value must never be reached – or even approached – in practice.

It is incorrect to assume that comparable hoses of different manufactures have longer service life under the same operating conditions the higher the rating for bursting pressure is. Designers should therefore take dynamic pressure values into consideration!

5. Monitoring High Pressure Gas Systems

high pressure gas systems are extremely dangerous and require extra care and regular inspection.

hose assemblies used in gas systems have to be suitably protected against mechanical damage and chemical and environmental influences.

the hoses of such installations should also be connected in such a way that they cannot whip in the event of a defect occurring.

Perforation of outside cover...

the outside cover of a hose assembly used for the conveyance of gaseous media must be perforated.

6. Pressure Testing As A Safety Check

hose assemblies are statically tested by the manufacturer at suitable test pressures; neither leaks nor failure must occur.

7. Temperature Affects Service Life

the operating temperatures given for hoses are the maximum temperatures of the medium. Ambient temperatures must also be taken into consideration (see below).

Continuous operation at high temperatures can adversely affect the service life of the hose and the reliable retention of end fitting integrity.

temperature resistance depends on medium

hose assemblies cannot be used for any medium over the specified temperature range.
In case of doubt please ask!

hoses assemblies will have a considerably longer service life if they are not continually used at the limits of their working pressure, bend radius and temperature of medium and environment.



8. Check Chemical Resistance

the chemical resistance of the rubber lining is an important factor to consider when making a hose assembly selection. Consideration should be given to the concentration and duration of exposure to the medium.

In principle the rubber lining is resistant to hydraulic liquids of a mineral or synthetic oil base, to glycol water mixtures and oil water emulsion but not resistant to phosphate ester based liquids (hFD).

[See table of chemical resistance...](#)

Further details of the resistance of hoses to various other media can be found in the table of chemical resistance.

however, this table should be regarded only as a guideline for the chemical resistance of our hoses. Please consult us in case of doubt, or if there is a possibility of the medium coming into contact with the outside cover.

9. Allow For Changes In Length

Every hose is subject to certain changes in length under working pressure.

the standards specify that these values can vary between -4% and $+2\%$ at maximum working pressure.

this change in length must be taken into consideration in each case when calculating the nominal length of a hose assembly with fittings.

10. Observe Minimum Bend Radius

the specified minimum bend radius apply to stationary hose assemblies at maximum working pressure.

the service life of a hose assembly is impaired if bends of less than the recommended minimum bend radius are used. Working pressure should be reduced in such cases.



Our supplied manufacturing resources enable us to offer the following high level service

11. Impulse Test Measures Performance

the impulse test is the most severe test for a hose assembly, reproducing practical operating conditions very closely.

our manufacturing quality assurance department therefore continually takes samples and subjects them to impulse test quality in production runs.

this test is carried out as follows: the hose assembly under test is given the minimum bend radius specified by the standard and subjected to an alternating load varying between a flushing pressure of approx. 10 bar and a pressure equal to 125% or 133% of its dynamic working pressure.

testing up to 400.000 load cycles...

Depending on the type of hose, the sample is expected to withstand at least 150.000, 200.000 or 400.000 load cycles under these conditions.

Special designs such as 2 SN-k, SPC-2 and SPC-3 are further impulse tested up to 1 million cycles.

Full details of test methods and quality requirements, such as chemical and physical tests, media resistance, ageing characteristics, etc. can be found in the SAE J 343, EN 853 to 857 and ISO 1436 standards.

Application And Customer Specific Dynamic And Pressure Testing

We also undertake a full range of customer specific pressure testing programmes to ensure fitness of purpose in all types of enhanced requirement applications.



WARNING

Damaged hoses can cause accidents and personal injury

Damaged hydraulic hose assemblies always cause unexpected expense, however they can also they can also lead to severe accident and personal injury, even death. Many such accidents can be avoided if sufficient attention is paid to the early detection of damage.

Conditions for safe operation

- Choice of a suitable hose assembly for the required working pressure, conditions of operation and nominal diameter.
- operating range in accordance with relevant standards or other regulations
- Professional installation, correct and careful routing
- Immediate replacement of visibly damaged hose assemblies

Main causes of damage

- Mechanical damage
- too much bending
- Extreme tension
- Above-average twisting
- Severe compression
- Unsuitable medium

Possible consequences of damage

- Damage to outer cover down to steel wire reinforcement – may result in corrosion of wire reinforcement
- Deformation or embrittlement of outer cover
- Damage or deformation of hose fittings
- Possibility of bursting

Regular checks for early detection of damage

- Perfect condition of outer cover of hose – no cracks, bubbles, deformation, wear or kinking
- Proper attachment of fittings
- Proper routing – avoid extreme kinking, too much tension, violent twisting
- Check for leakage

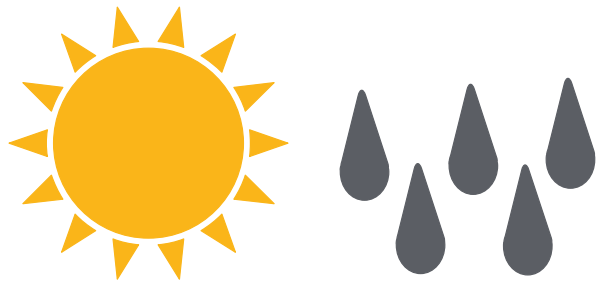
Procedure for replacement of hoses

- Ensure there is no system flow/pressure
- Check suitability of replacement hose
- Install replacement hose
- Restore operating pressure
- Check for leaks





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12. Correct Storage Extends Service Life

the store room should be cool (up to +20°C) dry (rel. humidity max. 65%) and protected from sunlight. Exposure to ozone and Uv radiation will shorten the service life of a hose.

the oldest hoses or assemblies in stock should always be used first.

For further details see DIN 7716.

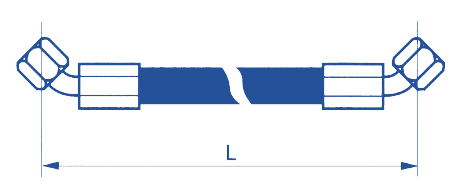
13. Conditions Of Sale And Guarantee

See our general Conditions of Sale - copies available on request.



Calculating The Length Of Hose Assemblies

typical Measurement reference points for hose assemblies



Line of sight when calculating angle settings*



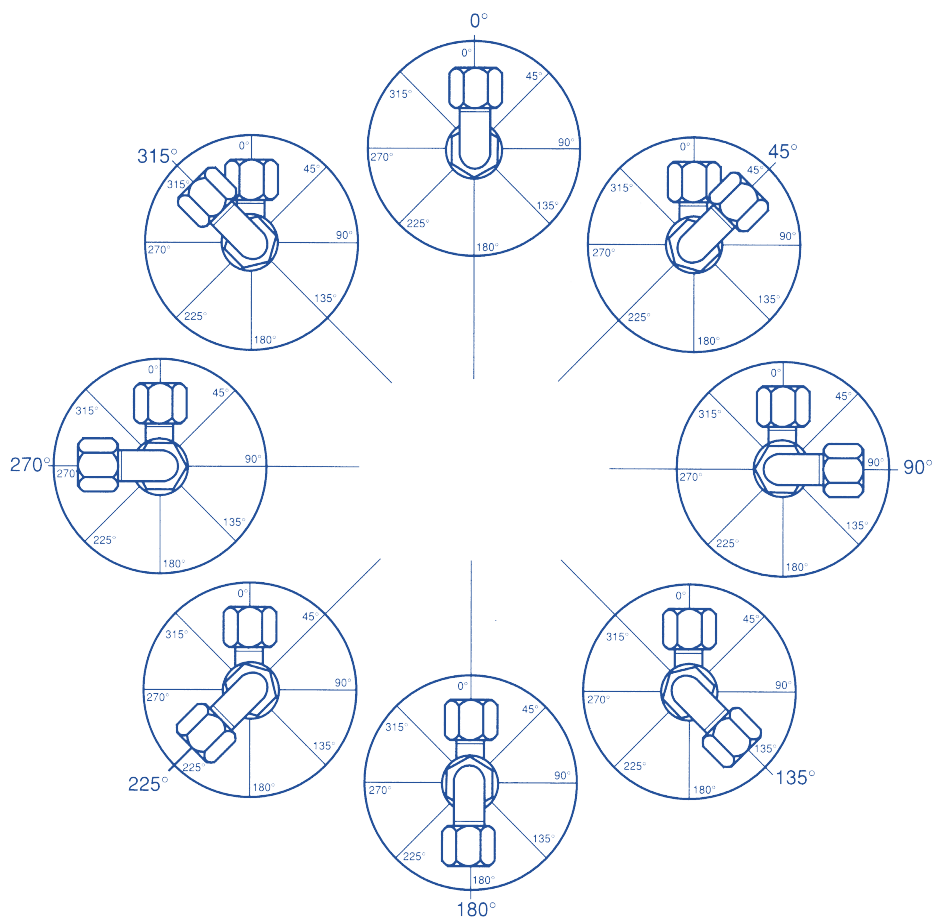
* See next page



Calculating The Angle Settings

the angle settings of hose assemblies with elbow fittings at either end needs to be very carefully determined. Use the following instructions and illustration guidelines to ensure accurate measurement.

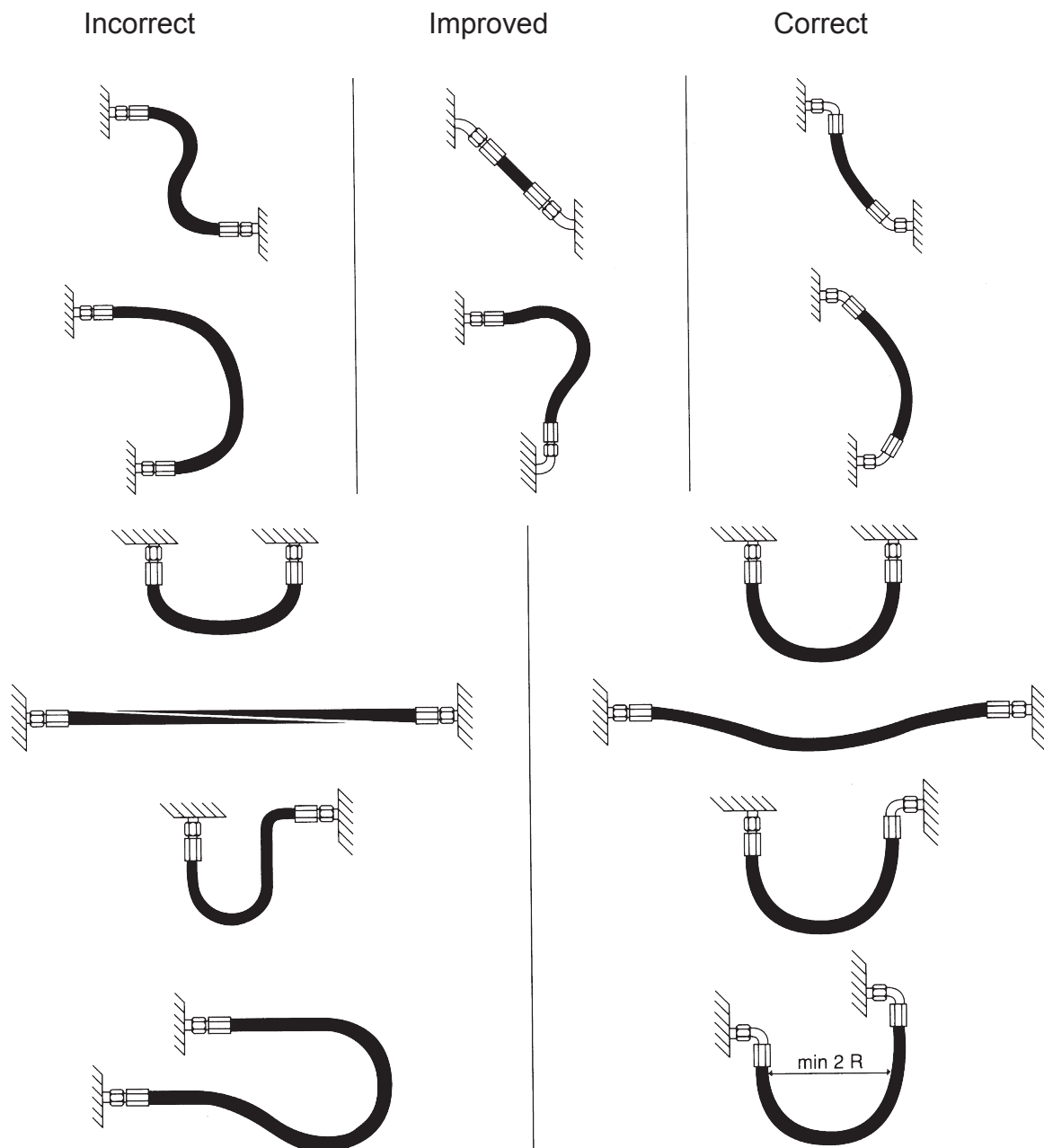
- Look along the hose assembly, with the rear fitting away from the body and pointing upwards.
- Now specify how many degrees the front fitting is rotated in a clockwise direction.
- Acceptable tolerance +/- 3°.





Correct Installation Increases The Service Life Of Hose Assemblies

1. Under pressure, alterations of + 2 % to – 4 % can occur in the length of hose assemblies.
hoses should therefore be installed with slack or curves.
2. hose assemblies should never be installed twisted (no torsion).
3. hose assemblies should not be bent excessively – use elbow fittings instead!
4. Note minimum bend radius!
5. If vertical displacement occurs, allow for amount of travel.
6. Protect from external damage (use protective spirals).





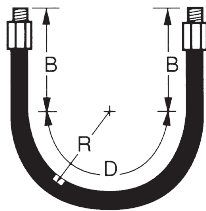
I Ongoing Tolerance Of Installed Hose Assemblies

(DIN 20066)

Length	tolerance		
	Up to Ø25	Ø25 - Ø50	Ø50 - Ø100
Up to 630	+ 7mm - 3mm	+ 12mm - 4mm	
630 - 1250	+ 12mm - 4mm	+ 20mm - 6mm	
1250 - 2500	+ 20mm - 6mm	+ 25mm - 6mm	+ 25mm - 6mm
2500 - 8000		+ 1.5% - 0.5%	
over 8000		+ 3% - 1%	

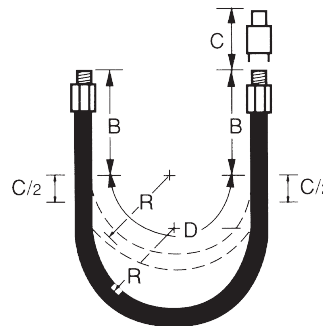
Calculating The Hose Length

The service life of hose assemblies can be increased by proper measurement and installation. Please follow the following instructions.



overall length
 $L = 2b + 3.14R$

R = Minimum bend radius



overall length
 $L = 2b + 3.14R + C$

Additional length C should be allowed for if vertical movement takes place

Depending on the hose diameter, the following table gives the minimum length for at the end of the fittings of a hose assembly.

B, that should be allowed

DN Ø	6	8	10	12	16	20	25	32	40
B (mm)	90	100	110	120	130	140	160	180	200