

## SERIES SP22

### HEAVY DUTY HIGH PRESSURE WIRE BRAID HOSE

- TUBE: black oil resistant synthetic rubber
- REINFORCEMENT: 2 wire braids
- COVER: black oil resistant synthetic rubber
- TEMPERATURE: -40°C to +100°C, intermittent use up to 125°C
- The hose is dimensionally to SAE 100 R2A



HOSE REFERENCE	NOMINAL BORE DIAMETER		MEAN DIAMETER OVER WIRE		MEAN DIAMETER OVER COVER		WORKING PRESSURE		MINIMUM BURST PRESSURE		MINIMUM BEND RADIUS		WEIGHT
	in	mm	in	mm	in	mm	psi	bar	psi	bar	in	mm	kg/m
SP2206	3/8	9.5	0.657	16.7	0.843	21.4	5000	345	20000	1380	5.0	127	.70
SP2208	1/2	13	0.780	19.8	0.969	24.6	5000	310	20000	1240	6.0	152	.95
SP2210	5/8	16	0.906	23.0	1.094	27.8	4000	276	16000	1104	7.5	190	1.11
SP2212	3/4	19	1.063	27.0	1.250	31.8	3750	258	15000	1032	9.0	229	1.38
SP2216	1	25	1.374	34.9	1.563	39.7	3000	207	12000	827	12.0	305	1.93
SP2220	1 1/4	32	1.748	44.4	2.000	50.8	2250	155	9000	620	15.0	381	2.80

PLEASE SEE FOLLOWING PAGES FOR FURTHER DETAILS



# SELECTION, INSTALLATION AND MAINTENANCE OF HOSE AND HOSE ASSEMBLIES - SAE J1273

**SCOPE** Hose (also includes hose assemblies) has a finite life and there are a number of factors which will reduce its life. This recommended practice is intended as a guide to assist system designers and/or users in the selection, installation, and maintenance of hose. The designers and users must make a systematic review of each application and then select, install, and maintain the hose to fulfil the requirements of the application. The following are general guidelines and are not necessarily a complete list  
**WARNING: IMPROPER SELECTION, INSTALLATION, OR MAINTENANCE MAY RESULT IN PREMATURE FAILURES, BODILY INJURY OR PROPERTY DAMAGE**

**SELECTION** The following is a list of factors which must be considered before final hose selection can be made:

**PRESSURE** After determining the system pressure, hose selection must be made so that the recommended maximum operating pressure is equal to or greater than the system pressure. Surge pressures higher than the maximum operating pressure will shorten hose life and must be taken into account by the hydraulic designer.

**SUCTION** Hoses used for suction applications must be selected to insure the hose will withstand the negative pressure of the system.

**TEMPERATURE** Care must be taken to insure that fluid and ambient temperatures, both static and transient, do not exceed the limitations of the hose. Special care must be taken when routing near hot manifolds.

**FLUID COMPATIBILITY** Hose selection must assure compatibility of the hose tube, cover, and fittings with the fluid used. Additional caution must be observed in hose selection for gaseous applications.

**SIZE** Transmission of power by means of pressurised fluid varies with pressure and rate of flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage to the hose due to heat generation or excessive turbulence.

**ROUTING** Attention must be given to optimum routing to minimise inherent problems.

**ENVIRONMENT** Care must be taken to insure that the hose and fittings are either compatible with or protected from the environment to which they are exposed. Environmental conditions such as ultraviolet light, ozone, salt water, chemicals, and air pollutants can cause degradation and premature failure and, therefore, must be considered.

**MECHANICAL LOADS** 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 insure no twist is put into the hose. Unusual applications may require special testing prior to hose selection.

**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.

**PROPER END FITTING** Care must be taken to insure proper compatibility exists between the hose and coupling selected based on the manufacturer's recommendations substantiated by testing to industry standards such as SAE J517d (November, 1976).

**LENGTH** When establishing proper hose length, motion absorption, hose length changes due to pressure, as well as hose and machine tolerances must be considered.

**SPECIFICATIONS AND STANDARDS** When selecting hose, government, industry, and manufacturers' specifications and recommendations must be reviewed as applicable.

**HOSE CLEANLINESS** Hose components vary in cleanliness levels. Care must be taken to insure that the assemblies selected have an adequate level of cleanliness for the application.

**ELECTRICAL CONDUCTIVITY** Certain applications require that hose be non-conductive to prevent electrical current flow. Other applications require the hose sufficiently conductive to drain off static electricity. Hose and fittings must be chosen with these needs in mind.

**INSTALLATION** After selection of proper hose, the following factors must be considered by the installer;

**PRE-INSTALLATION INSPECTION** Prior to installation, a careful examination of the hose must be performed. All components must be checked for correct style, size and length. In addition, the hose must be examined for cleanliness, I.D. obstructions, blisters, loose cover, or any other visible defects

**FOLLOW MANUFACTURER'S ASSEMBLY INSTRUCTIONS**

**MINIMUM BEND RADIUS** Installation at less than minimum bend radius may significantly reduce hose life. Particular attention must be given to preclude sharp bending at the hose/fitting juncture.

**TWIST ANGLE AND ORIENTATION** Hose installations must be such that relative motion of machine components produces bending of the hose rather than twisting.

**SECUREMENT** In many applications, it may be necessary to restrain, protect, or guide the hose to protect it from damage by unnecessary flexing, pressure surges, and contact with other mechanical components. Care must be taken to insure such restraints do not introduce additional stress or wear points

**PROPER CONNECTION OF PORTS** Proper physical installation of the hose requires a correctly installed port connection while insuring that no twist or torque is put into the hose.

**AVOID EXTERNAL DAMAGE** Proper installation is not complete without insuring that tensile loads, side loads, kinking, flattening, potential abrasion, thread damage or damage to sealing surfaces are corrected or eliminated.

**SYSTEM CHECK OUT** After completing the installation, all air entrapment must be eliminated and the system pressurised to the maximum system pressure and checked for proper function and freedom from leaks. NOTE: Avoid potential hazardous areas while testing.

**MAINTENANCE** Even with proper selection and installation, hose life may be significantly reduced without a continuing maintenance program. Frequency should be determined by the severity of the application and risk potential. A maintenance program should include the following as a minimum:

**HOSE STORAGE** Hose products in storage can be affected adversely by temperature, humidity, ozone, sunlight, oils, solvents, corrosive liquids and fumes, insects, rodents, and radioactive materials. Storage areas should be relatively cool and dark and free of dust, dirt, dampness and mildew

## VISUAL INSPECTION

Any of the following conditions requires replacement of the hose;

- (a) Leaks at fitting or in hose. (leaking fluid is a fire hazard).
- (b) Damaged, cut, or abraded cover; (any reinforcement exposed).
- (c) Kinked, crushed, flattened, or twisted hose.
- (d) Hard, stiff, heat cracked, or charred hose.
- (e) Blistered, soft, degraded, or loose cover
- (f) Cracked, damaged, or badly corroded fittings.
- (g) Fitting slippage on hose.

## VISUAL INSPECTION

The following items must be tightened, repaired, or replaced as required;

- (a) Leaking port conditions.
- (b) Clamps guards, shields.
- (c) Remove excessive dirt build up.
- (d) System fluid level, fluid type, and air entrapment.

**FUNCTIONAL TEST** Operate the system at maximum operating pressure and check for possible malfunctions and freedom from leaks.  
NOTE Avoid potential hazardous areas while testing.

**REPLACEMENT INTERVALS** Specific replacement intervals must be considered based on previous service life, government or industry recommendations, or when failures could result in unacceptable down time damage or injury risk.

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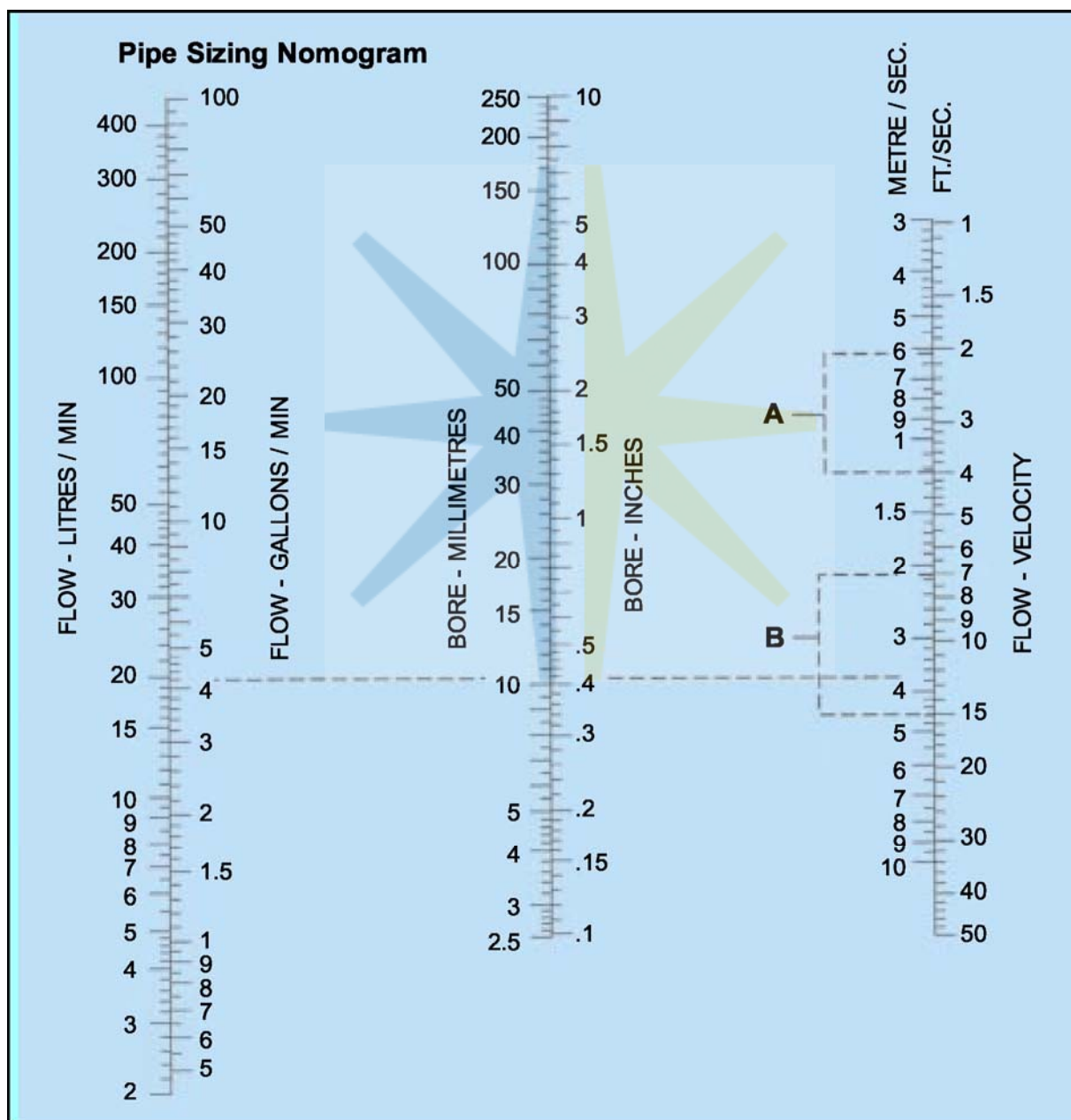


## FLOW VELOCITY

One of the critical areas in the selection of hose for any application is the relationship between flow rate and flow velocity.

High flow velocities cause excessive frictional heat and turbulence which results in the premature failure of the hose or hose assembly.

Use of this nomogram will aid the selection of hose with the current bore size.



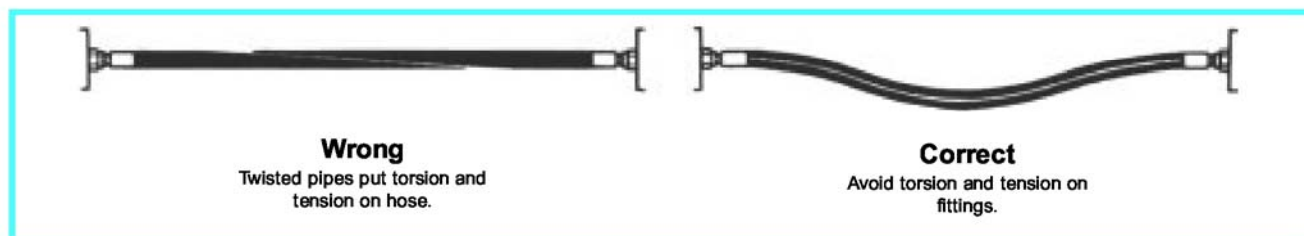
**NOTE** Flow velocities in range A recommended for return lines. Flow velocities in range B recommended for delivery lines.

**EXAMPLE** To find pipe bore size consistent with a flow rate of 4.2 gallons per minute and flow velocity 12ft. per second, connect flow rate to flow velocity and read bore on centre scale.  
Answer: 0.415 inches.

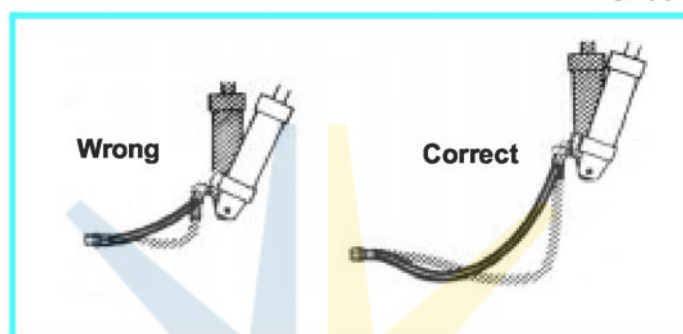


## INSTALLATION OF HOSE ASSEMBLIES

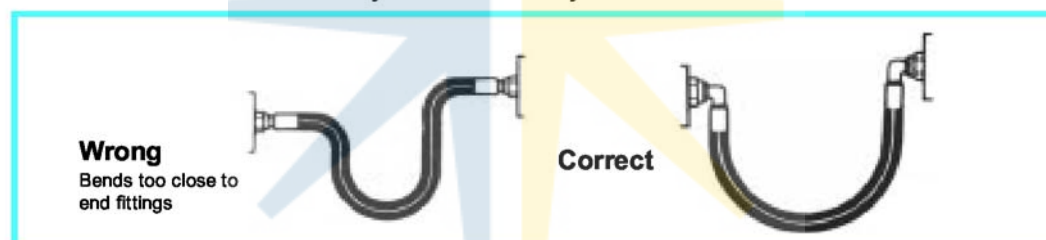
1. Ensure hose is not twisted and allowance is made for shortening of the hose in length.



2. Reduce risk of damage by abrasion by use of clamps or external protection.
3. Provide sufficient hose to allow for movement of flexing applications.



4. Never distort hydraulic hose beyond its minimum bend radius.



## MATERIAL COMPATIBILITY

Hydraulic hoses are designed for use with petroleum base and water base hydraulic fluids and the materials used in the construction of the hose are selected for their compatibility with these fluids.

It is essential that the advice of the supplier of the hose or assembly is sought when the hose is required to be used with any other material.

## SAFETY FACTORS

To ensure adequate safety margins when using hydraulic hose and hose assemblies. The ratio of minimum burst pressure to design working pressure should be selected where appropriate from the following table which is taken from International Standard (ISO) 7751 : Rubber and plastics hoses and hose assemblies - Ratios of proof and burst pressure to design working pressure.

Type of service (for guidance only)	Ratio of proof pressure to design working pressure	Ratio of minimum burst pressure to design working pressure
Irregular heavy service (shock loads) Textile and wire reinforced hoses for hydraulic use	2,0	4,0
For use with gaseous media	2,5	5,0
For use with media which at working pressure change into a gaseous state	3,15	6,3