

DESIGN CONSIDERATIONS

In designing hose, it is customary to develop a design ratio, which is a ratio between the minimum burst and the maximum working pressure.

Burst test data is compiled and the minimum value is established by accepted statistical techniques. This is done as a check on theoretical calculations, based on the strength of reinforcing materials and on the characteristics of the method of fabrication.

Minimum burst values are used as one factor in the establishment of a reasonable and safe maximum working pressure.

MAXIMUM WORKING PRESSURE IS ONE OF THE ESSENTIAL OPERATING CHARACTERISTICS THAT A HOSE USER MUST KNOW AND RESPECT TO ASSURE SATISFACTORY SERVICE AND OPTIMUM LIFE.

It should be noted that design ratios are dependent on more than the minimum burst. The hose technologist must anticipate natural decay in strength of reinforcing materials, and the accelerated decay induced by the anticipated environments in which the hose will be used and the dynamic situations that a hose might likely encounter in service.

Including all considerations, the following recommended design ratios are given for newly manufactured hose:

1. Water Hose up to 150 psi WP: 3:1
2. Hose for all other liquids, solid materials suspended in liquids or air, and water hose over 150 psi WP: 4:1
3. Hose for compressed air and other gases: 4:1
4. Hose for liquid media that immediately changes into gas under standard atmospheric conditions: 5:1
5. Steam Hose: 10:1

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HOSE AND COUPLING SELECTION GUIDE

GENERAL

A number of hose specifications have been developed for specific applications in industrial, agricultural or public service. These specifications are based on successful performance of the hose in the field as reported by consumers, manufacturers and governmental agencies.

These may be used as procurement specifications or performance standards when the application agrees with the scope of the hose specification. The RMA has published a number of hose specifications which are recommended for use.

Often, additional or new requirements may be imposed on hose because of the severity of service conditions, a change in service conditions, a change in the materials handled or in the method of handling, or the development of new uses or procedures. Hose specifications must then be prepared with the supplier and be based on all conditions affecting the expected service and performance of the hose. Generally, a hose manufacturer may have types of hose or can devise new ones which may meet other requirements than those covered by published standards.

For best performance, a hose should be selected to meet the service conditions under which it is to be used. Before deciding on size, type, and quality of hose, complete information on the actual service requirements should be examined.

SERVICE CONSIDERATIONS FOR HOSE IN CRITICAL APPLICATIONS

Hose is often used in locations and/or to convey materials where property damage or human injury could occur if the hose and/or associate fittings failed while in service.

The user must insure that the service conditions are known to himself and to the hose supplier. The improper use of hose or the use of a hose for service applications for which it was not designed may result in serious consequences.

Some examples of improper uses of hoses include the following: water hose should not be used for chemicals or solvents; low pressure hose should not be used for high pressure service; only steam hose should be used for steam service; hose for conveying mild chemicals should not be used for strong or concentrated acids which require special types of hose. Temperatures in or around the hose should be known so as not to exceed supplier's recommendations, etc.

INFORMATION NEEDED

Hose Dimensions

- (a) I.D.
- (b) O.D.
- (c) Length (state whether overall length or length excluding couplings)
- (d) Tolerance limitations (if normal RMA tolerances cannot be used)

Types of Service

- (a) Material to be conveyed through hose
 1. Chemical name
 2. Concentration
 3. Temperature extremes (low and high)
 4. Solids, description and size
- (b) Working pressure (including surge)
- (c) Suction or vacuum requirements
- (d) Velocity
- (e) Flow Rate

Operating Conditions

- (a) Intermittent or continuous service
- (b) Indoor and outdoor use
- (c) Movement and geometry of use
- (d) Flexibility – Minimum bend radius
- (e) External conditions
 1. Abrasion
 2. Oil (Specify type)
 3. Solvents (Specify type)
 4. Acid (Specify type and concentration)
 5. Temperature Range
 - Normal
 - Highest
 - Lowest
 6. Ozone