Bellows

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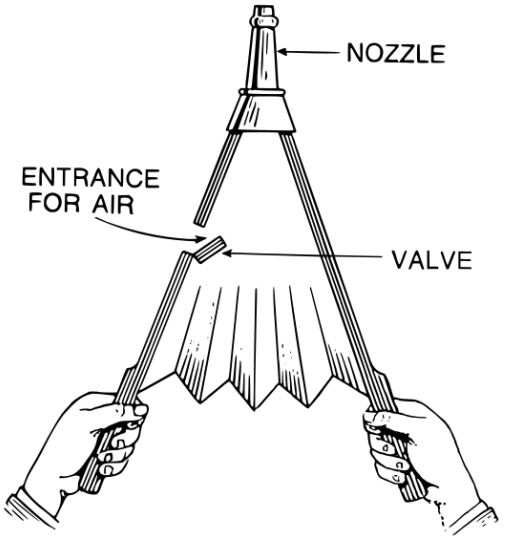
Introduction:

1. A bellows is a device for delivering pressurized air in a controlled quantity to a controlled location.
2. This instrument is consisting of an air chamber with flexible sides or end, a means of compressing it, an inlet valve, and a constricted outlet that is used to create a stream of air, as for producing a draught for a fire or for sounding organ pipes.
3. Metal bellows is a flexible corrugated element used as an expansion joint, pump or means of transmitting axial motion.
4. The most common type of bellows used by blacksmiths for delivering air to the forge.
5. Bellows are widely used on articulated buses and trams, to cover the joint where the vehicle bends.
6. The Han Dynasty Chinese mechanical engineer Du Shi is credited with being the first to apply hydraulic power, through a waterwheel, to operate bellows in metallurgy. His invention was used to operate piston bellows of blast furnaces in order to forge cast iron.



http://en.wikipedia.org/wiki/Metal_bellows

7. Metal bellows are elastic vessels that can be compressed when pressure is applied to the outside of the vessel, or extended under vacuum.

Types:

1. There are two main types of metal bellows - formed and welded.
2. Formed bellows are produced by a variety of processes, including cold forming (rolling), electroforming and hydroforming.
3. Welded bellows (also called edge-welded, or diaphragm bellows) are manufactured by welding a number of individually formed diaphragms to each other.
4. Hydroformed and rolled bellows are limited to metals with high plastic elongation characteristics whereas welded bellows may be fabricated from a wider variety of standard and exotic alloys, such as stainless steel and titanium, as well as other high-strength, corrosion-resistant materials.

http://www.bellowstech.com/wp-content/uploads/2011/02/BellowsTech-Catalog.pdf
http://www.americanboa.com/expansion_joints.htm#products

Application:

Edge welded bellows which are related to the vacuum industry, some of the applications are,

1.Valve stem seal – The bellows is used to seal a shaft hermetically while allowing axial shaft movement.
2.Feedthrough – The bellows acts as a flexible seal, allowing movement of a tool within a sealed environment. Linear and angular motion for “wobble stick” applications is available.
3.Rotary feedthrough – The bellows are used within a bearing housing to translate rotation from an input shaft to a co-linear output shaft while sealing hermetically, eliminating the need for a dynamic seal.
4.Torque coupling – The bellows are used for precise transmission of rotary motion.
5.Expansion joint – The bellows allows for the expansion or contraction between two fixed bodies while maintaining a hermetic seal.
6.Actuator – The bellows acts as a piston converting pressure to linear motion eliminating the need for a dynamic seal.
7.Vibration damper – The bellows are used to isolate vibration from one end of the bellow to the other while sealing hermetically.

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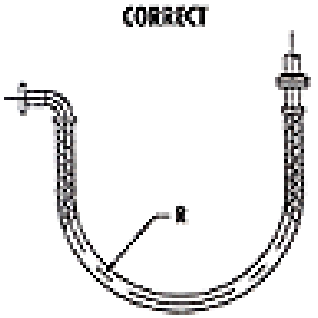
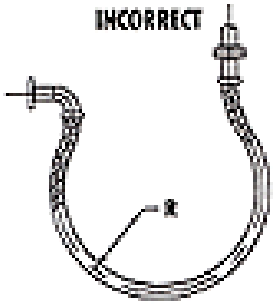
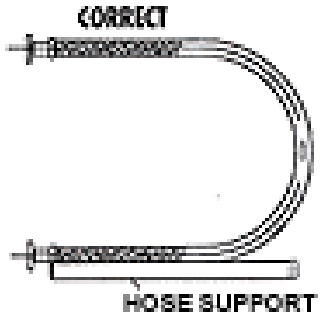
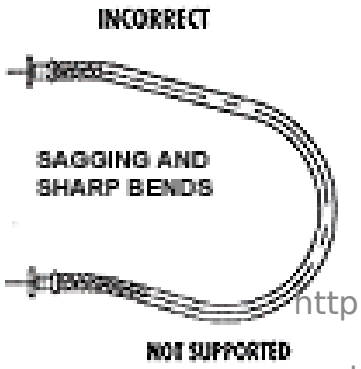
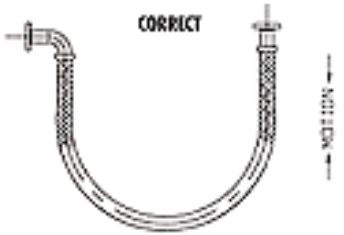
Proper handling procedure:

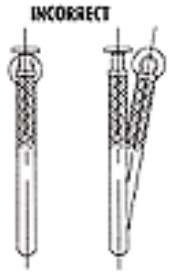


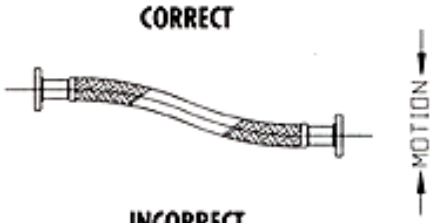


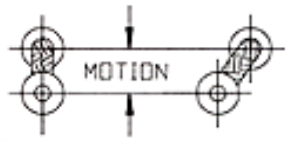


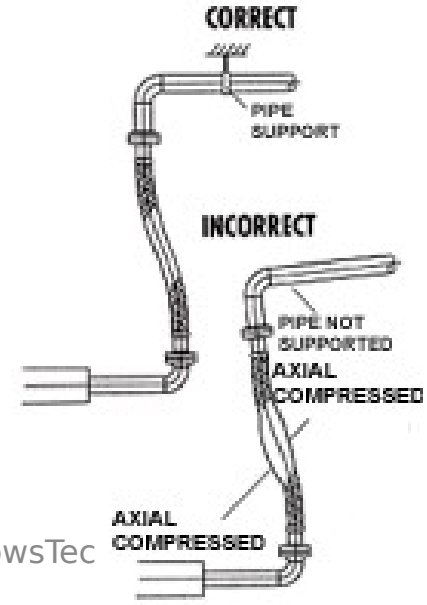












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Thank you