

## COMPARISON BETWEEN TYPES OF VALVES

	BELLOW SEALED VALVES	PISTON VALVES VALVES	CONVENTIONAL VALVES
<b>Primary Stem Seal</b>	Metallic Bellow	Piston ring	Gland Packing
<b>Secondary Stem Seal</b>	Gland Packing	None	None
<b>Stem Leakage</b>	Not Possible. Metallic Bellows are designed to last several thousand cycles	Occurs as soon as the rings(which are made of gasket material) wear out.	Very common. Due to the design conditions, gland leakage occurs within a few cycles, no matter which make valve or what quality of gland packing
<b>Packing Replacement</b>	Not applicable	Rings need to be changed frequently	Needs to be replaced very often
<b>Replacement Cost</b>	Not applicable	Very high.	High
<b>Media Loss</b>	Zero Loss. As the isolation is by metallic bellows, leakage (even in ppm) is not possible	Large in case of leaks	Considerable amount through gland leakages. Normally large amount when leakage remains unattended.
<b>Equipment Down time</b>	Nil	Very high for replacing rings	Very high for replacing gland packing.
<b>Maintenance Cost</b>	Nil	High as rings need to be changed at least once in six months	Very high. Gland packing needs to be replaced / repacked often. This cost along with equipment down time, man hours spent etc. is very high.
<b>Valve life</b>	High-in years	Low.	Very Low - in Months. Due to leakage through gland, certain parts erode, making the valve irreparable after some months. Valve needs to be replaced
<b>Safety</b>	Very safe for most of media	Can be used only for limited media like low pressure steam, hot water etc.	Highly unsafe especially when the media is hazardous and poisonous.
<b>Cost</b>	Comparatively higher initially but lowest total cost of ownership (TCO) over the years of use.	High compared to the benefits viz a viz problems	Initially low but very high after some years if cost of packing, downtime, man-hours spent, number of valves replaced etc are taken into account