



Selection Criteria for the Type of Automation

Criteria	Pneumatic	Hydraulic	Hydropneumatic
Cost	Lowest	High	Low
Clamping force	Light - 2 to 3 kN max. Higher forces if no space constraints	Medium and heavy - above 5 kN	Medium and heavy -From 5 kN to 100 kN
Clamping cylinder size	Bulky for even medium clamping force (Op.Pr. 5 bar)	Compact (For SPM Op.Pr. 30 to 70 bar)	Most Compact for heavy forces (Op.Pr. 150 to 200 bar)
Clamping stroke	Wide range - from short to very long	Wide range - from short to very long	Short stroke - 50 mm max
Clamping speed	Very fast	Fast	Fast
Impact while clamping	Present	Not present	Not present
Reliability	Low - as can be overpowered due to the compressibility of air	Most safe - due to the check valve and incompressibility of oil	Safe - as factor of safety for force selection can be more
Sequencing	Possible	Possible	Difficult
Piping & circuit	Complicated	Complicated	Simple
Oil heating problem	Not applicable	Present	Not present
Return stroke, speed and power	Fast due to double acting cylinder, but with low power	Fast, with power and positive due to double acting cylinder	Sluggish due to spring return cylinder
No. of clamping points	No limit	No limit	Limited, 3 to 5 per intensifier
Other Applications	Material handling, Valve actuation, Door movement	Feed cylinders, Cutting, Hole punching, Deep drawing, Earth moving equipment	Pressing, Assembly, Rivetting, Crimping, Cutting

* Hydropneumatic automation referred above is with hydropneumatic intensifier. Hydropneumatic pump is not considered.