

## ELEMENTS TO CONSIDER FOR THE CHOICE OF A PNEUMATIC TUBING

Pneumatic tubing are used to transport fluids in automation processes. They allow the connection of the air preparation systems (FRL), valves and cylinders. Pneumatic tubing are generally preferred to rigid pipes.

Polyurethane, nylon, polyethylene, PVC and PTFE tubing are the most commonly used in compressed air systems.

Knowledge of the characteristics, benefits and limitations of each compound is essential in the selection process.

Here are some basic factors to consider when selecting the tubing that best suited for the application.

The selection guide on the next page represents all the tubing models offered by **TOPRING** and their degree of performance in relation to different criteria.

### WORKING PRESSURE

The working pressure is usually the first criteria to consider. It is established from the burst pressure at a normal temperature of about 20 °C to which a safety factor is added. The tubing's maximum working pressure corresponds to the safe pressure rate which takes into account all operating criteria.

The nylon, nylon.polyurethane and PTFE tubings offer the highest working pressures.

### CONDITIONS OF THE WORKING ENVIRONMENT

Some chemicals may have an adverse effect on the tubing (swelling, deterioration, etc.). Consideration should be given to the type of fluid that will flow through the tubing and those that will be in contact with the tubing.

Other factors may affect the performance and deterioration of the tube: varying temperatures, mixed chemicals and changing environmental conditions.

The nylon, nylon.polyurethane and PTFE tubings offer excellent resistance to chemicals and ultraviolet rays.

### FLEXIBILITY AND KINK RESISTANCE

Due to their type of material, some tubing may be more flexible than others. For systems requiring low bending radius or repetitive movements, tubings with high flexibility will be preferred (e.g. polyurethane or nylon.polyurethane).

For fixed jobs where movement is reduced or requiring high working pressure, choose a more rigid tube (e.g. nylon).

### AIRFLOW

The airflow rate corresponds to the volume of compressed air conveyed to the compressed air mechanism. Generally, it is recommended to use a tubing that will provide a higher flow rate than the components of the circuit (regulators, valves, cylinders, etc.).

The type of connection used will also influence the airflow rate: barb fittings are installed inside the tubing and reduce the flow rate while the push-to-connect fittings clamp the outside of the tubing and offer no flow restriction. Therefore a smaller diameter tubing can be used with push-to-connect fittings, resulting in space and money saving.

### WORKING TEMPERATURE

Temperature range for which a particular tubing can effectively be used. When considering temperature, it should be remembered that the higher the temperature, the lower the burst (and working) pressure. Since "working pressures" are calculated at ambient temperature, that figure will be reduced significantly as the temperature approaches the high end of the working temperature range.












### THE TYPE OF FITTINGS USED

There are three types of fittings used with tubing: push-to-connect fittings, compression fittings and barb fittings. The selected tubing must be compatible with the type of fitting chosen.

The unit of measurement specified for pneumatic tubings is the outside diameter because they are used with push-to-connect fittings.

The tubings are available in imperial sizes (in) and metric (mm) and the fitting should be the same size.

## REFERENCE CHART OF ACTUAL DIAMETER SIZE

TUBING DIAMETER									
 IN	1/8	5/32	/	1/4	5/16	3/8	/	1/2	/
 MM	/	4	6	/	8	/	10	12	/

PNEUMATIC TUBINGS AND HOSES SELECTION GUIDE



TUBING COMPARISON	SERIES 32 Nylon 12	SERIES 33 Nylon.PU LongLife™	SERIES 34 Polyethylene (LLDPE)	SERIES 34 Polyethylene (LDPE)	SERIES 35 Polyurethane (PU)	SERIES 37 Fluoropolymer (PTFE)	SERIES 38 Clear PVC	SERIES 38 Reinforced PVC with polyester yarn	SERIES 38 Reinforced PVC with steel wire
MAXIMUM WORKING PRESSURE	★★★★	★★★★	★★	★★	★★	★★★★	★	★★	★★
WORKING TEMPERATURE	★★★	★★★★	★★	★	★★★	★★★★★	★	★	★
RESISTANCE TO									
Abrasion	★★★	★★★	★★	★★	★★★★	★★★	★	★	★
Kinking	★	★		★	★★★	★	★★	★★	★★
Moisture	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★	★★★
Ultraviolet Rays	★★★	★★★	★	★	★★	★★★	★	★	★
CRITERIA									
Compliances	RoHS	RoHS	RoHS-FDA	RoHS	RoHS	RoHS - FDA	NSF - FDA - RoHS	NSF - FDA - RoHS	NSF - FDA - RoHS
Flexibility	★★★	★★★	★★★	★★★	★★★★	★★★	★★★	★★★	★★★
Cost	\$\$\$	\$	\$	\$	\$	\$\$\$	\$	\$	\$