

## COMPRESSED AIR INFORMATION FOR TORCH USE

### Definitions:

Air Compressor - A device that converts power (usually from an electric motor, a diesel engine or a gasoline engine) into kinetic energy by compressing and pressurizing air, which, on command, can be released in quick bursts. There are numerous methods of air compression, divided into either positive-displacement or negative-displacement types.

Air Filter - Cleans compressed air, removing rust, scale, moisture and other contaminants.

Water Separator - Separates water droplets that exit the compressor usually using centrifugal forces.

Coalescing Filter - A steady state process whereby aerosols are caused to agglomerate (come together) into even larger droplets as they pass through the filter element's fiber matrix, eventually becoming large enough to be gravitationally drained away

Desiccant Air Dryer -Unit that uses a substance, such as calcium oxide or silica gel, that has a high affinity for water and is used as a drying agent.

Refrigerated Air Dryer - A device for removing water vapor from compressed air. Compressed air dryers are commonly found in a wide range of industrial and commercial facilities. The process of air compression concentrates atmospheric contaminants, including water vapor.

Air Regulator -A valve for regulating the pressure of flowing gas or liquid to maintain a predetermined pressure.

Compressed air for torch use requires necessary system components for safe, dependable operation. When compressed air is injected into the fuel stream using the compressed air manifold, the air/fuel mixture travels through the normal fuel passages in the torch. For this reason care must be taken when preparing the compressed air to be injected into the torch. The compressed air must be clean and dry before it is introduced to the torches compressed air system. Failure to provide clean, dry air may result in clogged jets, valve leaks, poor flame types due to moisture and oil infiltration, and voiding the factory warranty.

### *TWO OPTIONS FOR COMPRESSED AIR - TANKED AIR OR AIR COMPRESSOR*

#### *TANKED AIR*

Tanked air simply requires a tank, regulator and hose. The compressed air in the tank has been filtered, dried and compressed so there is no need for anything other equipment in the system. The benefit is a simpler system without filters or dryer maintenance and initial cost. The drawback is the same as all other tanked gasses, tanks run out, tanks are heavy and they are a constant expense.

## *AIR COMPRESSORS*

Air compressors come in many sizes, styles, configurations, manufacturers and quality. A basic compressor will suffice for most torch use keeping the following ideas in mind. Oil filled or oil free compressors are widely available. An oil filled compressor will generally give a longer life span, run quieter, cost more up front, require oil changes and require more frequent coalescing filter changes. An oil free compressor will generally be more affordable, require little maintenance, operate slightly louder, extend coalescing filter life, and have a shorter overall life span. Both oil filled and oil free compressors will work equally well as long a complete system is well maintained.

Air compressors are usually defined by horsepower (HP) rating and storage tank size (Gallons). The HP will usually correspond to a rated supply of compressed air at a rated PSI (pounds per square inch of pressure) for most consumer grade compressors. For example, a 5hp compressor will provide about 16 CFM (cubic feet per minute) at 40 PSI. (Keep in mind the HP does not completely define the output of the compressor, but the compressor industry defines it this way.) Storage tanks will have a direct effect on how often the compressor will run and for how long. When a compressor is run, it will fill the tank to its max stated pressure and then shut off. As air is used from the tank, the pressure will drop below a given number (usually 80-100 PSI) the compressor will run and refill the tank. The smaller the storage tank, the more often the compressor will run for a short period of time. The larger the storage tank, the less often the compressor will run but it will be for a long period of time. Usually a larger storage tank is desired for minimizing noise and disruption. When selecting a compressor for torch use, the largest torches we build that use compressed air will consume less than 1 CFM of air. This means that almost any air compressor will work for compressed air injection.

## *FILTERING AIR*

Air exiting the compressor can be contaminated with dirt, rust, scale and oil from the compressor and the associated pipes and hoses. The first defense for long compressor life and clean air is to keep the intake air filter clean at all times. An inexpensive air filter / water separator can add life to the filters downstream and are a great way to pre-filter the air before the filter dryer. The air filter / water separator will remove large particles of dirt and remove water droplets from the air, but it will not remove moisture, fine dirt or oil from the air. This requires a coalescing filter to remove small dirt particles and oil from the compressed air. Normally this filter will last about a year if the other filters in the system are well maintained. The coalescing filter should be replaced once a year at minimum and more often if harsh conditions exist.

## *DRYING AIR*

Compressed air that has been filtered to be dirt and oil free, will then need to be dried to insure that there is no moisture present. There are two commonly used ways to dry compressed air.

The first is to use a refrigerated dryer that modifies the dew point of the compressed air to remove moisture from the air. This method works very well, is low maintenance and requires very little electricity to operate. The cost of this system is much higher initially but has a lower cost of operation.

The second way to dry compressed air is to use a desiccant dryer to remove the moisture. This unit passes the air through desiccant that absorbs moisture and traps it inside. The desiccant can hold a certain amount of moisture and then needs to be regenerated or replaced. Desiccant can be dried in an oven, cooled and returned to service many times before it needs to be replaced. The number of times desiccant can be reused depends on how clean the desiccant is kept. Generally oil absorption limits the lifespan of desiccant which is why the coalescing filter is necessary. Desiccant is generally inexpensive to replace, the unit does not require electricity to operate, is silent and portable.

For torch use, the desiccant dryer is the more economical choice for most glass workers. Due to the low flow rate required for torches, the desiccant dryer will last longer than other compressed air operations. The unit is easy to plumb into the compressed air line and does not require electricity to operate.

### *REGULATORS*

A regulator is required for using compressed air with torches. The regulator maintains constant pressure as the compressor cycles between 80 and 120 PSI. Also, the air pressure required is 60 PSI or lower so that the air option is easy to adjust with the valves on the torch. The regulator should be placed *after* the filters and dryer because the pressure needs to be maintained for optimal results. If there are two regulators in the system, full pressure should be maintained through the filtering and drying and then adjusted down for the torch.