

# Lubricating Air Equipment With In-Line Oilers

## Properties of Compressed Air

Air costs a lot of money to compress and condition. Unlike hydraulic fluids, it is compressible. Unlike electro-mechanical systems, it has a lack of positive speed control. Compressed air has poor lubricity. It is difficult to calculate the exact performance of compressed air in a system. Yet, in spite of all these failings, air is the most widely used industrial power system.

### Air Equipment Needs Clean Dry Air

Air would follow the laws of perfect gasses except that it is contaminated with moisture, oil, chemical vapors, dirt particles, and active bacteria. Some systems can tolerate more of these contaminants than others. Construction air tools can tolerate a lot of liquid without harm. Dry clean air is required for air tools. Pure, dry and clean air is needed for instrumentation and breathing apparatus. In winter, low temperatures can cause equipment to freeze up as the entrained moisture in the compressed air condenses and changes into ice.

### The Air Piping System Creates Problems

Air at standard temperature and pressure contains gasses, moisture, over a billion dirt particles, other contaminants. It takes about 10 cubic feet of such air to make one cubic foot of air at 150 PSI. The cubic foot of compressed air contains 10 times the amount of contaminants plus the compressor oil and corrosive oil decomposition products from the high heat generated during compression. Some of these contaminants flow out with the condensate water and the rest spreads throughout the air distribution system. In the metal pipework, machinery and instruments the residual contaminants cause rust, corrosion, and abrasion.

### Plastic Pipe for Compressed Air is Unaffected

The best air pipes are made from a special ultra-high pressure ABS plastic air pipes manufactured by Durapipe in Norton Canes, England which is the only company in the world making this kind of pipe high pressure when joined there is absolutely no leaks in the systems. ABS can never corrode or spall or rust and is usually specified where pure, clean dry air is needed or where the system is to remain in place for many years. Regardless of the type of the pipework use all air lines should be sloped about 1 inch/1 foot to enable water and other condensates to run down into sludge and water separators which are located at convenient spots for maintenance.

### The Need for Conditioned Air

Mist, oily, dirt laden air is no longer acceptable in plant air systems. Each newly designed highly efficient component is expected to operate with drier and cleaner air and with proper lubrication. All exhausted air must be safely breathable. In woodworking plants oily air intolerable. In food plants contaminated air is forbidden.

### The Exhaust Air is Often Overlooked

Piping adds to the problem if mill scale drops off into the air stream. Compressors generate oil fumes, poorly tended desiccant dryers send debris down stream and air flow lubricators can exhaust oily air into the breathing air inside the plant.

### The Air Distribution System Creates Water Droplets

As the air travels through the system it passes through valves and actuators where it adiabatically expands and cools. Air pipes run overhead in the hot ceiling areas and then across cold windows or cold machines or through buildings or under concrete driveways.

All these temperature changes condense moisture. Sending brust or slugs water through the equipment as it is operated.

#### Filters Trap the Dirt

Contamination in air usually ranges from 5 to 50 microns in particle size. These size particles can be trapped by the appropriately rated fillters. Vapors of water and oil are not particles, and are not stopped by filters. Vapors will not do any harm so long as they remain in vapor form. Cooling will cause saturated air to condense its vapors into liquids and that is when the damage is caused.

#### Aerosois Present a Different Problem

Aerosols are liquids or shoulds or solids suspended in a gas. They include fumes, fogs, mists, sprays, and other particles small enough to stay suspended. The sizes of aerosols are classified:

Fumes - 0.001 to 0.1 mi crons

Fogs - 1 to 50 microns

Mists - 50 to 500

Sprays - 500 and larger microns

Most of these large particles, both soild and liquid, can be removed by coalescer condense the droplets baffles and special shapes in the filter housing which cause the compressed air to change direction.

#### Caolescers Condense the Droplets

Extremely small liquid droplets can be induced to coalesce, or agglomerate, by using special coalescing filters. As the droplets increase in size, they drain into a bowl and are emptied. Caolescers are very efficient because they do not lose performance in any way. They are used in line in front of sensitive air control systems, air bearings and pneumatic instruments. Caolescers are also fitted at the exhaust ports of cylinders to remove the oil mist before the air is exhausted to the atmosphere.

#### The Unique NEUTEK EXTRACTOR/DRYER

The all-in-one patented EXTRACTOR/DRYER is the first new compressed air conditioning equipment to be introduced in the past 60 years and has iron several "Best New Product Introduced" awards. It is in use around the world and applies 3 principles in its patented effect.

- In the 1 st chamber water, chemical vapors and dirt particles are coalesced.
- In the 2 nd chamber the condensate is continuously and automatically ejected to the drain.
- In the 3 rd chamber any remaining droplets are absorbed and converted to harmless vapors.

These units are usually located just in front of air equipment so that the air is used before it has had any residual vapors have a chance to recondense into harmful liquid droplets.

#### Lubricating air equipment

Clean dry air is mandated by governmental regulations. To meet these demands, new lubricators were designed to get lubrication to the friction points while preventing excess oil from being exhausted to the atmosphere.

#### Old Style "Oils Mist" Lubricators are Ineffective

Mist lubrication, injected directly into the compressed air line, is probably the most widely used method of oiling cylinders, valves and air motors. It is also the most ineffestive and contributes most to high levels of oil in the exhaust air.

#### Oil is Effective Only in Liquid Form

There is no formula for the ideal air/oil ratio but studies indicate that one drop of oil should be used for each 20 cubic feet of air when oiling air tools. Unfortunately, most lubricator designs blow mist into the air stream. The mists of oil do no lubrication at all. The mists must first deposit themselves as a liquid at the point of friction. When oil mist is put into a transparent pipe leading to an air tool, the tool speed remains the same. The oil mist, however, gradually coats the inside of the tube and migrates toward the tool. When the visible liquid oil reaches the air tool, the speed will increase, not before. It is the liquid oil blown along the tube which oils the air motor not the mists of oil put into the airstream

#### The NEUTEK Pneuguard Lubricator

Pneuguard Lubricator are in-line devices which are mounted as close as possible to the working tool. They deliver a precise and adjustable flow of liquid oil to tools. The lubricant reservoir is transparent so the operator can see when there is oil in the lubricator. A flow sensor controls the injection rate based on air demand and prevents loss of lubricant when tools stop and start or when the tool is not in use but still pressurized.

#### Oil Only Flows When the Tool is Used

When the tool is running, a preset amount of liquid lubricant is forced into the inside of the air tube leading to the tool. A venture sensor creates oil flow when the airstream is dynamic and stops oil flow when the air flow is static. A spring loaded ball check valve insure that liquid oil only flows out into the pipe when air is moving. The check valve allows the Pneuguard Lubricator to work in any position.

#### Visual Indication When Empty

When the oil has been emptied a visual indicator shows up as a bright white color indicating the need to add more oil. The smaller Pneuguard Lubricators hold about 1 ounce of oil are mounted on the tool and can be filled while the system is pressurized (A check valve prevents the lubricant from being forced back out the fill port). The amount of lubricant flow is adjusted by turning a small set screw. No lubricant flows when the tool is not use even though the system may be under pressure. Larger Pneuguard Lubricators hold up to 1 pint of oil and mount in-line near the point of use. A family of sizes fit every lubrication need without wasting oil or excessively contaminating the exhaust air.

#### HOW the Unit Works

The air passes through the first stage coalescing filter which causes moisture to form larger droplets. The velocity of the air slows as it enters the Extactor Chamber, allowing moisture, oil and particles to be removed through the drain valve. The second stage removes any remaining moisture, oil and contaminants. Exhaust air is clean and free of harmful oil and water.