TECHNI/TIPS

A Publication of the Lubrication Engineers Technical Department

LEADERS IN LUBRICANTS NUMBER 55

AIR TOOLS

Air or pneumatic tools are high-speed mechanisms having a variety of precision parts. There are two objectives for air tools - one is portability and the other is the extent to which the air tool takes the place of manual labor by doing a job better, and faster.

The basic principle of air power is the use of energy resulting from expanding air. This air power may subject the working end of the tool to pounding, constant pressure, rotation or a combination of these, depending on the type of tool. There are two basic types of air powered tools; those which result in reciprocating motion such as jackhammers, tampers and rock drills, and those which result in rotary motion such as wrenches, grinders and similar small tools.

Reciprocating tools which develop impact action at the working end require pistons, valves and cylinders. They are just like a steam engine. The expansion of air in the cylinder acts on the piston to drive it against the head of the working tool. The number of strokes or impacts per minute vary depending upon the type of tool and the work to be done. A modern rock drill strikes approximately 1,600 to 2,200 blows per minute.

In rotary tools, the air expands against vanes set lengthwise in slots along a rotor or against the blades of an impeller attached to the main shaft. In the impeller type, ball hearings carry the shaft and are the only parts which require lubrication. In a rotary vane tool, the vane slots on the rotor, as well as the supporting ball bearings must be lubricated. In this type of tool, the speed depends upon the pressure of the air. If further speed control is necessary, the tool may have gears working off the rotor shaft.

Heavy-duty rock drills and other tools are lubricated by an air line oiler or from an oil reservoir in the tool itself. These high-speed mechanisms must be continuously lubricated. Sticking vanes and bearings or gear failures could rapidly lead to other mechanical difficulties. The air line oiler puts oil in the air. The oil is picked up by the airsteam, atomized and distributed over the internal parts to keep them well protected with a film of oil. This film must be constantly renewed because the air carries off oil as it exhausts from the tool.

The air line oiler should be placed close to the air intake of the tool for two reasons. First, after the oil is atomized, it tends to drop out of the carrying air. So, the closer it is to the tool, the more oil will get into the tool. Second, the air line oiler is visible to the operator and is a good reminder that he must refill it regularly. An easy way of checking whether there is still oil in the lubricator is to hold a piece of white paper close to the tool exhaust. If droplets of oil are deposited on the paper, the tool is getting oil in the air. Some air line oilers are designed so that the air shuts off when the oil is used up.

Ball bearings which are located or housed separately from the air driven parts are generally grease lubricated by a pressure gun. The frequency of such relubrication depends on how the bearings are contained and sealed. Some tools use prepacked ball bearings, and they may need greasing only about once a year unless the tool is used continuously.

Pneumatic tools are very often used under wet conditions. They may have to operate on air with a high moisture content. The lubricant should be designed to control conditions. It should emulsify with water and cling to the metal parts in order to form a protective oil film, which will prevent rusting when the tool is not in use.

Many air powered tools are exposed to a great deal of dust and dirt. Careless handling may also allow dirt to get into the tool.

Many tools are equipped with air filters to keep contaminates from getting into the tool. Many also have strainers in the inlet pipe to keep out particles of rubber from the gaskets or air hose or flakes of rust from the aftercooler or piping. Regardless of their location, both the air filters and the strainers should be cleaned regularly in order to keep the tool operating at top efficiency.

The air system should be checked regularly so the joints are tight from the compressor to the tool. This insures that air pressure will be delivered to the tools with little pressure drop due to line loss. Reduced pressure will greatly reduce the efficiency of the tool. The leaking air will cost money and also waste valuable air compressor capacity.

Proper care of the air system between the compressor and the tool to prevent loss of production should include:

- **Blowing out the air line before attaching the tool.**
- **This gets ride of accumulated water, dust and debris.**
- **Using large diameter sir lines as short as possible to avoid pressure loss.**
- **Remove restricted connections which reduce air flow.**
- **The check valve to the tool should be free and clean.**
- **Use high quality hose designed with a lining to resist oil and heat.**
- **Inspect air lines regularly.**
- **Cool the air if possible. An aftercooler device installed at the compressor helps remove oil, moisture and heat from the compressed air.**

Even with excellent care and the very best lubricants, air tools should be dismantled and cleaned on a regular basis. Cleaning can be best done by using a solvent. Ordinarily, these will wash out any gummy residue and other dirt. Where grease is used, the bearings should be washed and dried carefully before relubricating.

Small impact tools can be cleaned by submerging the whole tool in the cleaner for a few hours and then blowing them out thoroughly with clean air. Large tools may require complete disassembly when cleaning is necessary. If the tool has been laid up for any length of time, the parts should be soaked in solvent. After reassembly and before using, the tools should be blown out and thoroughly lubricated.

TROUBLE SHOOTING GUIDE

SITUATION	CAUSED BY	REMEDY
Sluggish Operation	Low air pressure	Check air lines for leaks or obstructions. Check filters and strainers.
Sluggish Operation	Gummy lubricant and other deposits	Clean tool, blow out and relubricate. Check suitability of lubricant.
Uneven Operation	Stuck vanes	Free sticking parts and relubricate. Replace parts if necessary.
Noisy Operation	Worn parts	Replace worn parts. Do not install new parts in badly worn sections of the tool.

LE'S MONOLEC ROCK DRILL LUBRICANT - These products are engineered especially for pneumatic equipment. They protect equipment against high speeds and shock loads. Anti-rust characteristics keep clearances open and tools in use. These lubricants contain MONOLEC, LE's exclusive wear-reducing additive and a secondary anti-wear, extreme pressure additive which prevents galling and welding even under heavy-duty service.

Generally, LE's 6303 MONOLEC Rock Drill Lubricant should be used regularly for most heavy-duty tools. In extremely cold weather, LE's 6301 MONOLEC Rock Drill Lubricant may be used. In extremely hot weather, LE's 6305 MONOLEC Rock Drill Lubricant may be used. A few manufacturers recommend the latter. Use the lighter grade for all small handheld tools such as impact wrenches, grinders and similar small tools.

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