Developing an efficient air distribution system for pneumatic fastening tools doesn’t just happen. It takes careful planning, sound installation and good maintenance if you expect to get high performance from your air-powered nailers and staplers. Here are ten tips for getting the most from your compressed air system.

1. Determine the right compressor size. The compressor is the starting point of a pneumatic system. Nothing can compensate for a compressor that is too small or poorly maintained. A general rule of thumb is that for each horsepower, the compressor will produce 4 CFM (cubic feet per minute) of air. CFM requirements of pneumatic fastening tools vary, depending on frequency of use and the level of air pressure needed to drive a fastener. CFM requirements for specific tools may be obtained from the tool manufacturers. Compressor suppliers can assist in determining the type of compressor best suited to the contractor’s needs.

2. Make sure the main air distribution line is large enough. The main air line should be big enough so that air pressure at the point of use will be at least 90 percent of initial pressure at the compressor (or other air storage tank along the system).

The main line should be pitched downward 1/16 in. per foot in the direction of air flow. Where possible, the air system should be (Continued on Page 30)
COMPRESSED AIR:

(Continued from Page 17) arranged in a continuous loop through the plant, rather than in a straight line that ends at a particular point. A loop system allows for the shutdown of one section of the system without disturbing the rest of the system.

The chart below shows some recommended pipe diameters based on two variables—length of pipe and volume of air. Generally speaking, pipe diameter requirements increase in proportion to length of run and volume. Just like a pipe carrying liquid, a pipe carrying compressed air is limited in capacity by its diameter. The larger the diameter, the larger the capacity. The diameter must also increase with distance because friction and condensed moisture within the pipe somewhat restrict the flow of air along the system.

3. Provide supplemental air storage along long air lines. Long distribution lines should have air storage tanks located at the far ends or at points of occasional heavy use. Many peak demands for compressed air are instantaneous or relatively short. Storage capacities near such points will avoid an excessive drop in air pressure.

4. Keep branch line outlets at the top of the main line. Branch line outlets at the top of the main line will prevent carryover of condensed moisture to the tool. Diameter of branch lines should be at least ½ in. Frequent outlets help conserve air pressure by allowing for shorter hose lengths to the tools.

5. Extend water legs at the bottom of each branch line. The water leg allows for accumulation of condensed moisture, which helps keep the air as clean as possible. Any additional low point in the main line where moisture can accumulate should also have a water leg. The water leg should be equipped with a filter to allow automatic drainage. If this is not possible, the water leg should be drained daily.

6. Provide cut-off valves at each branch line and throughout the system. Cut-off valves should be located periodically along the main line of a loop system to permit shutdown of the line in one area while not effecting the whole system. The end of each branch line

<table>
<thead>
<tr>
<th>VOLUME OF AIR (CFM)</th>
<th>LENGTH OF RUN (FT.)</th>
<th>NOMINAL PIPE DIAMETER (IN.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-50</td>
<td>50-700</td>
<td>1/8</td>
</tr>
<tr>
<td>80-150</td>
<td>200-500</td>
<td>1/4</td>
</tr>
<tr>
<td>150-300</td>
<td>500-1000</td>
<td>1/2</td>
</tr>
<tr>
<td>200-500</td>
<td>1000-2000</td>
<td>3/4</td>
</tr>
<tr>
<td>250-500</td>
<td>2500-5000</td>
<td>1</td>
</tr>
<tr>
<td>300-1000</td>
<td>5000-10000</td>
<td>1-1/2</td>
</tr>
</tbody>
</table>

Drain daily unless fitted with an automatic drain.
also requires a cut-off valve, located ahead of the filter-regulator-lubricator assembly to facilitate easy servicing of the unit.

7. Install filter-regulator-lubricator on all branch lines. Air-operated tools and equipment require clean, dry air for top performance, low maintenance and long service. The dirt, grit and pipe scale generally present in air lines can cause severe abrasive wear in the tools. Potentially corrosive moisture also present in air lines poses another threat to pneumatic tools. A filter-regulator-lubricator unit installed on all branch lines as close as possible to the pneumatic tool, will protect the tool from abrasive, moisture-laden particles that may be in the air system. Very large capacity systems also may require a special filter-dryer.

Filter, regulator and lubricator should all have a standard National Pipe Thread port size of at least 3/8 in. to allow ample air flow to the tools. The filter should have a 50-micron or finer element which should be cleaned with soap and water at least once every six months. More frequent cleanings are needed in unusually dirty environments.

The air regulator should allow pressure to be regulated from 0 to 125 psi. In using pneumatic fastening tools, always use the minimum possible air pressure. Excessive pressure may damage the tool—and it wastes air.

8. Use proper oil in lubricator. The lubricator should be of the type designed for a low or changing air flow. It should be kept filled with proper oil. When ambient temperature is above 15°F, use an SAE 10 Non-Detergent oil or follow manufacturer recommendations. Below 15°F, use Lubriplate #0 oil. Substitute lubricants have excellent lubricating qualities but may be incompatible with the rubber compounds used in “0” rings and other rubber parts.

9. Keep air hose length to a minimum. The air hoses from branch lines to tools should be short to prevent excessive pressure drops. Air line hose should be a minimum of 5/16 in. diameter for hoses up to 25 ft long, 3/8 in. for hoses 25 to 50 ft, and 1/2 in. for hoses 50 to 200 ft. Openings of quick-disconnect fittings should be as large as possible to permit maximum air flow through them:

10. Follow regular maintenance program. Regular maintenance of the compressor is a necessity. Keep the crankcase filled with oil recommended by the manufacturer, or a heavy duty motor oil (SAE 30 for ambient temperatures above 15°F, SAE 10 below 15°F).

It's important to check the entire system regularly. Make sure the fittings are tight and free of leaks. Drain the water legs, filter and air lines daily, unless this drainage is automatic. Blow out air lines, especially in winter, to prevent freezing. Make sure the oil lubricator is working properly and has adequate supply of oil.