

Automotive re-manufacturer

Piston compressors are still the most common type of compressor found in the automotive service industry that includes gas stations, general service, quick lube shops, tire stores, fleet maintenance facilities, dealer fixed operations, and collision repair. For most of these facilities, the relatively low air demand and quality needed make the piston a cost effective choice. Collision repair shops, however, typically use much more compressed air and have higher air quality needs than other automotive service businesses. In these respects, collision repair is similar to manufacturing. In fact, many modern body shops might be more accurately referred to as automotive re-manufacturers.

These days, many body shop owners are finding out they have similar compressed air needs to larger industrial facilities and that rotary compressors offer significant operational benefits. Rotary screw compressors provide an extremely reliable supply of clean, dry compressed air. This may not be as critical for general repair, but collision repair stands apart because the end product is directly affected by air quality. When deciding between rotary and piston compressors, it is important to consider duty cycle, performance, energy efficiency, air quality, maintenance, and installation costs.



FIGURE 1: Collision repair shops are unique in the automotive service industry because they often need larger volumes of higher quality air for body work (shown here) and applying high quality automotive finishes.

Duty Cycle and Flow

An important difference between piston and rotary compressors is their duty cycle. Duty cycle is the percentage of time a compressor may operate without the risk of overheating and causing excessive wear. A piston compressor may provide adequate flow for a short period, but its allowable duty cycle must be considered. Most small piston compressors have an allowable duty cycle of 60-70%. For this reason, piston compressors are usually oversized to allow the compressor to periodically shut down and cool off because of the relatively high operating temperatures. Even with adequate air storage this can cause capacity problems during peak operating hours. Further, if the shop expands or business increases, lack of air capacity can become even more of an issue.

Rotary screw compressors have a 100% allowable duty cycle and operate continuously if the need arises. This is possible because rotary compressors are fluid cooled. The fluid performs four important functions:

- Lubricates the bearings in the pump
- Removes contaminants from the air
- Forms a non-wearing seal between rotors and casing
- Removes the heat generated by compression as part of a thermostatically controlled fluid circuit.

Heat and Moisture

All of these benefits are important, but this last point is very relevant to the body shop. Piston compressors operate at internal temperatures of 300°F - 400°F, while a rotary screw compressor runs at much lower internal temperatures (between 170°F and 200°F). Just as hot summer air holds more humidity, hotter compressed air can hold more moisture and requires additional components to dry and clean it. A rule of thumb is that every 20 degree (F) increase in temperature doubles air's ability to hold moisture.