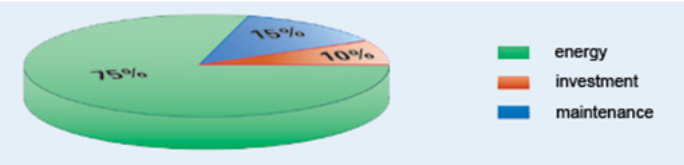
Compressed Air

Introduction

A quality paint job begins with quality air. A true statement. The question is: How many shops can actually say that they have quality air? The answer is: not many!

Compressed air as the second source of energy after electricity, requires a close understanding of the characteristics of compressed air to optimize its production for use.

Optimizing productivity while reducing operation costs is the common goal shared by nearly every manufacturing plant. Compressed air is considered the phantom utility, it cannot be bought, you must produce it. The initial capital cost of a compressed air system is minor compared to the operational cost.



The pie chart above illustrates the typical cost breakdown for an average compressed air system (compressor, pipe system, and operating costs) over a 10 year period.

Since the mandated use of HVLP spray guns, the demand for large volumes of high quality air has risen dramatically. If you combine this with hot, humid summer temperatures, you have the potential for lots of problems when refinishing a vehicle. This will become even more critical as we transition to waterborne paints in the near future.

We already know that we must pay close attention to each shop's air supply to ensure that it can supply the volume required to achieve acceptable results. From horse power to plumbing sizes to airhose size and couplers, all can have an effect on product performance. But…what about temperature and humidity?

What is relative humidity?

The percentage of relative humidity is the relation between: the quantity of water vapor present in a volume of air the quantity of water corresponding to the saturation of this same volume of air (saturation causing condensation of excess water vapor) The maximum quantity of water which can be absorbed in a volume of air increases with temperature.

Let's take a look at how humidity and temperature changes can affect compressed air.

All air in the atmosphere contains some water vapor (relative humidity). Changes in relative humidity and temperature will have an effect on water forming in shop air lines and the storage tank.

How it happens….

Air is compressed; the increased pressure turns the water vapor in the air into a liquid (condensation).

This relation is used within the compressor: constant air volume is pumped from the compressor chamber, and the volume decreases. This decrease causes an increase in both the pressure and the temperature of the air.

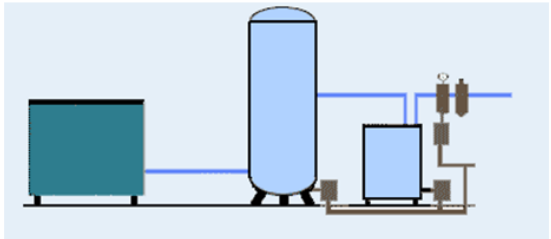
Also, it's temperature increases during the compression process, as does the ability to hold more water vapor, which can condense in the airline.

Compressed air production

Compressed air can be produced by two processes:

- Dynamic compression (conversion of the air velocity into pressure): radial and axial compression.
- Displacement compression (reduction of the air volume): reciprocating compressors (piston type) and rotary compressors (screw type).

The necessary elements of compressed air



The compressor