

Pneumatics

Compressed air systems are generally used to provide controlled motion using cylinder actuators for linear motion and rotary actuators rotary motion.. Typical uses of compressed air drives include..

Power tools

Valve Operators

Positioning cylinders

Hammer drills.

Paint Spray Guns

Air driven Hoists

Air Motors

Packaging systems

Pick and Place units

Air lift pads

Air Conveyor systems

Fluid agitation systems

Impact wrenches

The main disadvantage of pneumatic actuators compared with electrical and hydraulic actuators is that the motive fluid (air) is compressible and hence accurate speed control and position control is difficult and often requires ancillary systems..

The advantages of pneumatic systems are

The low cost of the components

The ease of design and implementation

The huge range of available components

The use of air limits the force/torque that can be generated providing a safety feature

Compressed Air system Components

Operating Conditions.

Normal compressed air systems operate at a pressure of approximately 7 barg...
The compressor would need to be rated for some margin above the e.g. 10-12 barg.
The equipment would be rated for use at pressures 4 barg to 6 barg

A compressed air systems generally includes the following components..

Air compressor..

This is either electric driven or driven by an internal combustion engine.. The compressor output has to be balanced with the demand and can be operated on a variable displacement basis or, more normally, it is operated intermittently under pressure control..

Air Receiver..

This is a vessel so sized that the pressure is maintained within set limits as the flow to the users varies.

Air Preparation

On a large system there may be a main air treatment system on the main header and a individual air treatment system for each group of users. An air treatment system will include an Filter, Lubricator, Isolation Valve, and Pressure Regulator (with gauge) as a minimum

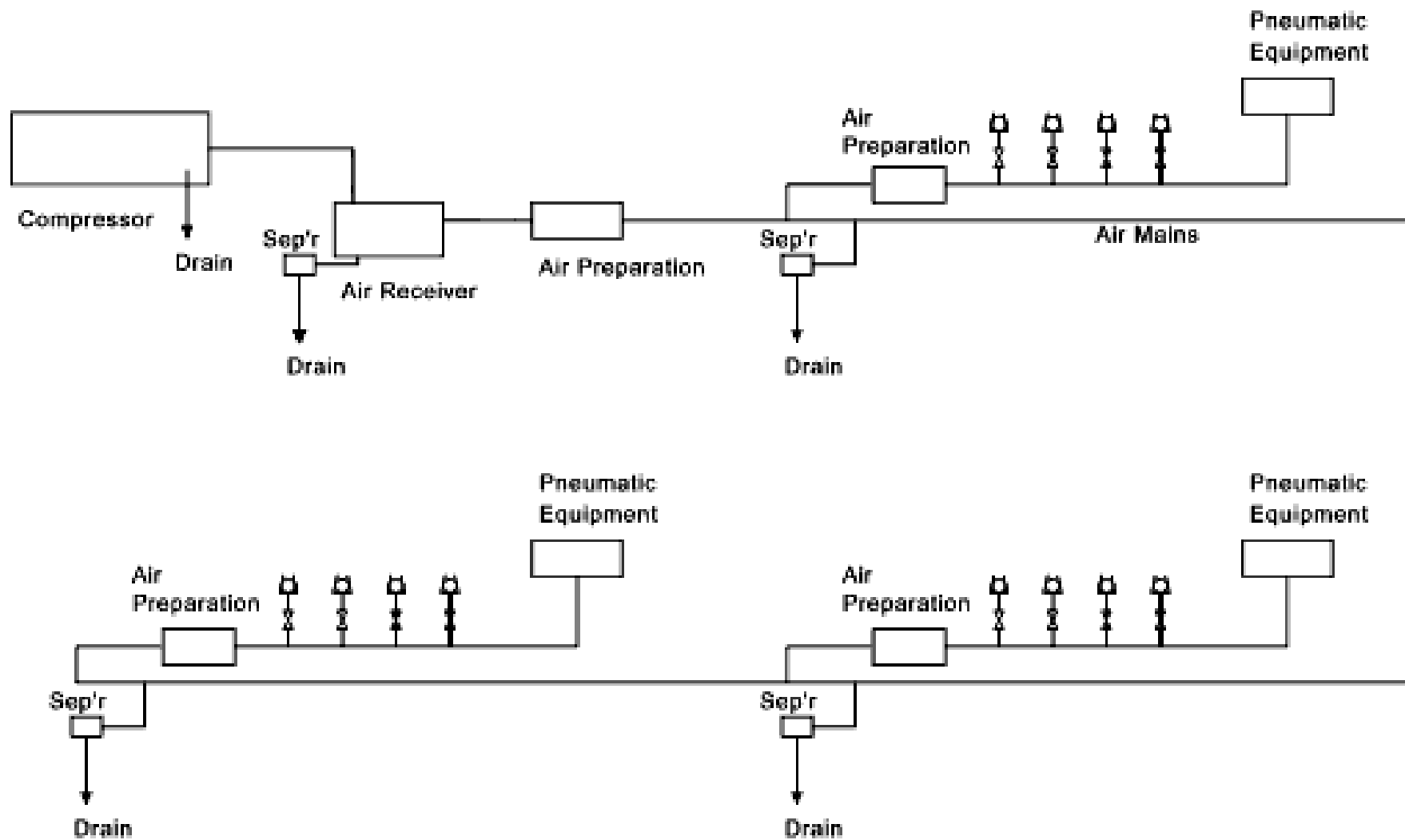
Air piping system

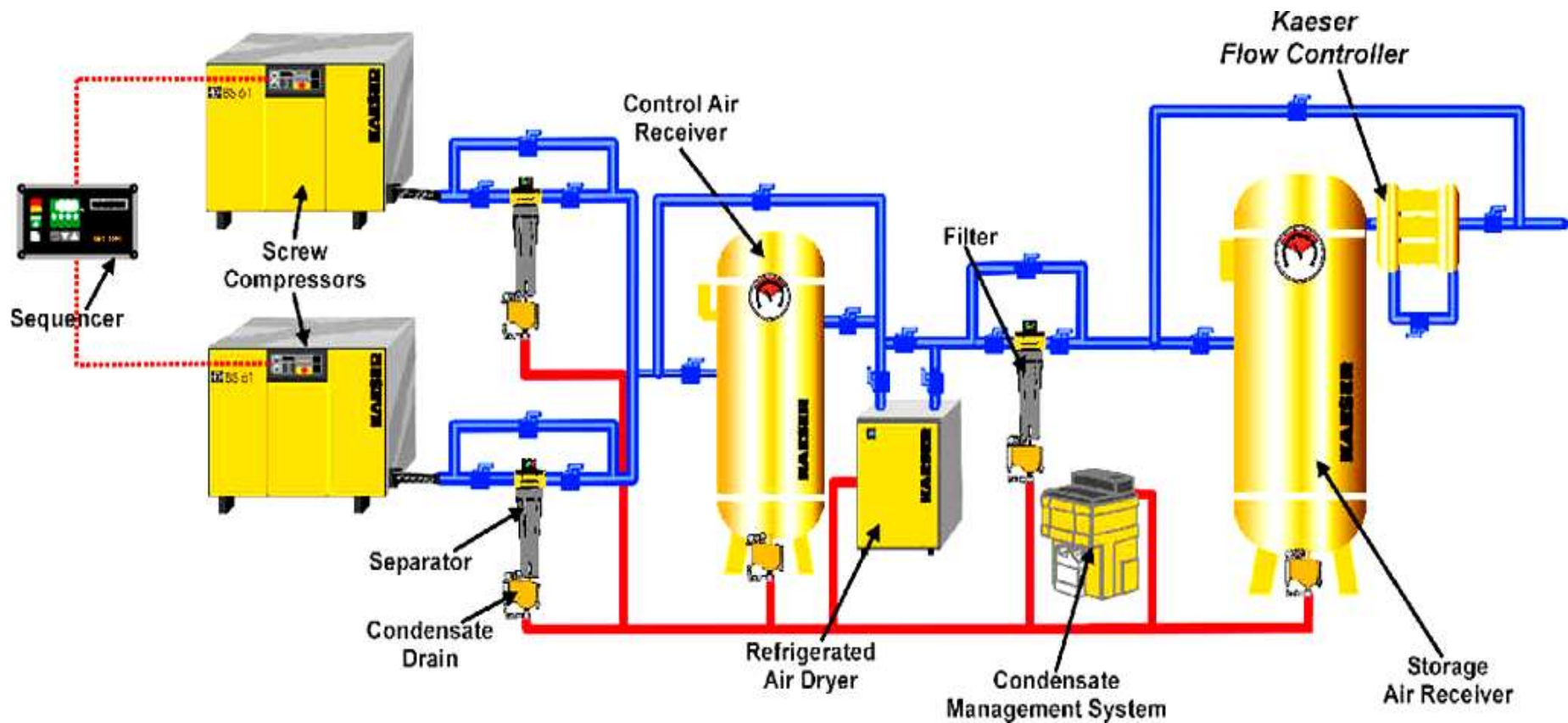
On normal systems the main air pipes will be suitably rated steel /galvanized iron /Wrought iron piping.

The local piping to users will be copper and plastic piping can be used for small bore connections.

The piping should include the necessary slopes down to separators for removing any moisture in the compressed air supply which forms in the piping over time.

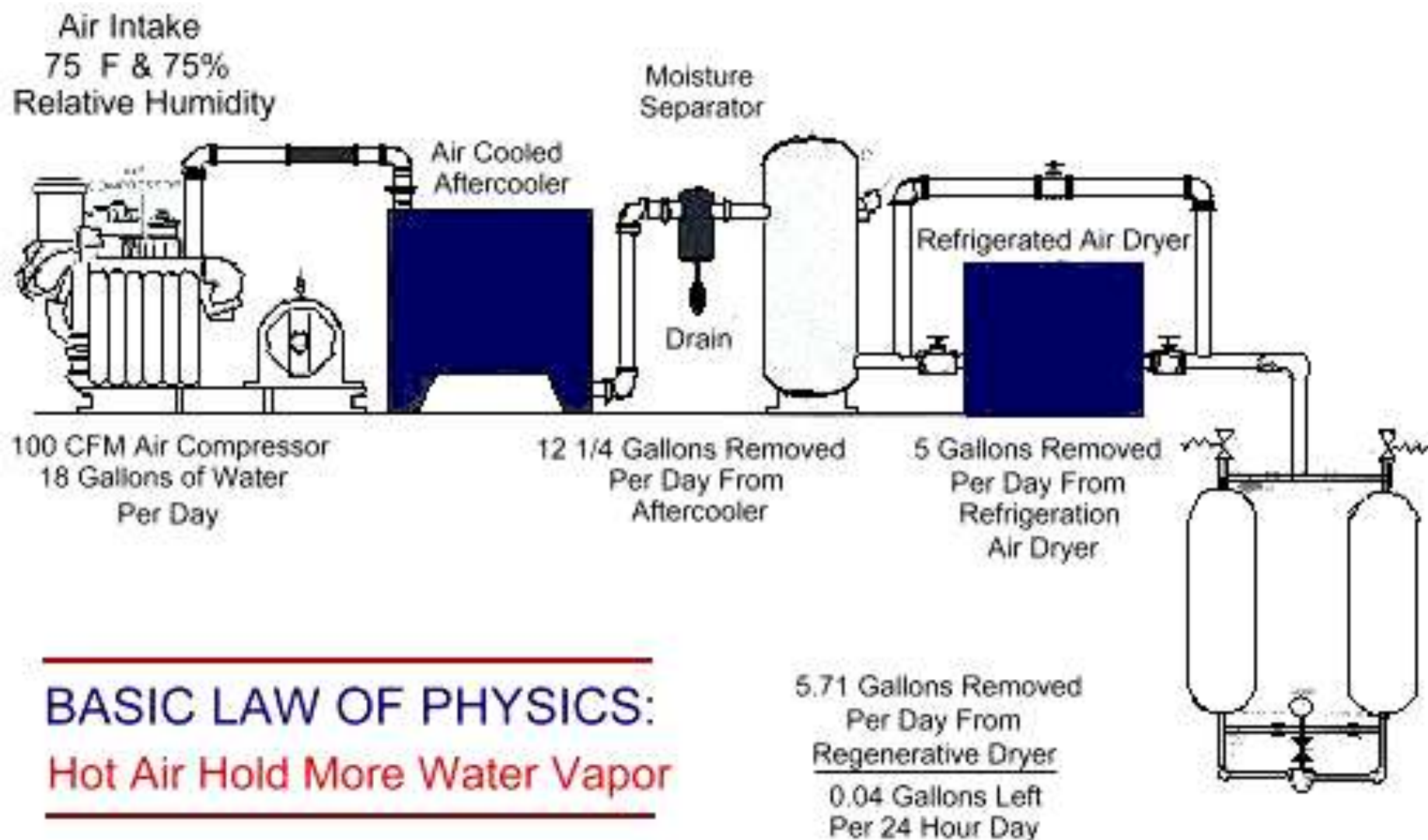
The velocity of air within the air supply header should be limited to about 15m/s.





Problems caused by water in compressed air:

- Washing of required lubrication.
- Maintenance and wear increases.
- Air equipment sluggish.
- Promotes rust.
- Promotes paint spotting.
- Air line freeze.
- Shortens air tool life.

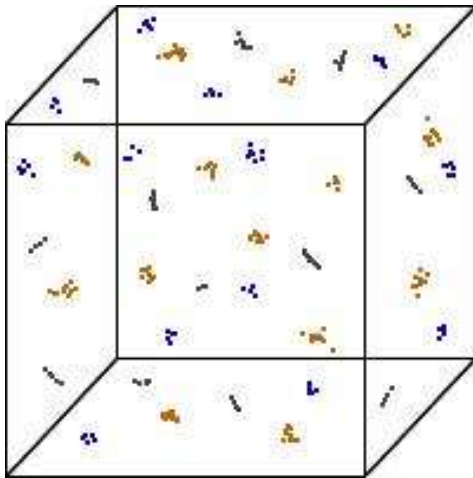


BASIC LAW OF PHYSICS:
Hot Air Hold More Water Vapor

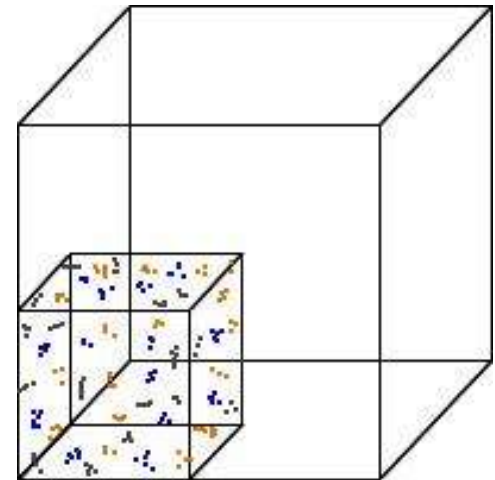
One Cubic Foot of Air Contains:

Water Vapour, Dust & Dirt, Odours & Vapours

The volume of air has changed, but the amount of water vapour, dust, dirt & odours has not changed. It is more concentrated!



Atmospheric air contains impurities that must be removed.



When compressed to 100 PSIG it becomes 1/8 its previous size.