

SELECTING A WORKSHOP AIR COMPRESSOR



Thorite
AIR · FLUID · POWER · PERFORMANCE

SELECTING A WORKSHOP AIR COMPRESSOR

Many thanks to Wilkinson Star Ltd for supplying this information.

Displacement (Volume)

This term is used to decide the theoretical volume of a compressor, ie the swept volume of a cylinder multiplied by the number of compressions in a minute and expressed in cubic feet per minute (CFM). This figure should not be used in calculating the size of compressor required, as it bears no relationship to the free air figure that you may require.

Free Air Delivered

This measurement is the volume of air taken in to a compressor and therefore describes more accurately the volume of air available for use. Expressed as CFM/FAD at a given pressure.

Remember: Displacement is the theory and CFM/FAD is the actual volume available.

Pressure

This is the way force, ie power, in the compressed air system is expressed and is measured in either pounds per square inch (psi) or bar.

Pressure is important because to have too low a pressure would cause the equipment not to work correctly, too high a pressure would at best rapidly wear out the equipment, at worst it could make the equipment lethal.

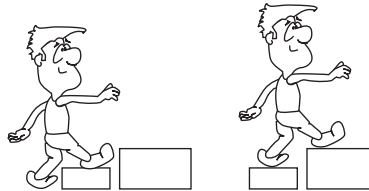
Single Stage Compressors

One or more cylinders producing the final pressure in one compression.
Normal maximum pressure 150 psi. g.



Two Stage Compressors

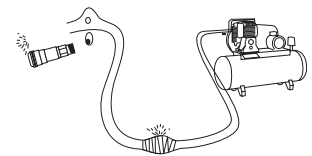
First Stage:
Air is compressed to approximately 30 psi. g. cooled then compressed to final pressure in the second stage.
Normal maximum pressure 200 psi. g.
Note:
Two stage provides more air for less energy.



Cost of Air Leaks

Hissing Sid is at work in most companies you visit. Hissing Sid is a length of air hose which has become the family 'air' loom, it must be, because this hose is costing its owner a small fortune and yet to suggest replacement would be a cardinal sin. So what does Hissing Sid cost to run ???

| Air Leak Size | CFM lost | Energy |
|---------------|----------|--------|
| 0.75mm dia. | 1.6 | 300W |



Power Supply

Single Phase

Standard supply for domestic and light industry 220/240 volts.

| | |
|----------------------|---|
| 5 Amp light circuit | Not suitable for equipment Max |
| 13 Amp ring main | 2.5 hp std compressor Max 3.0 hp for LC compressors Max 3.5 hp compressor |
| 45 Amp cooker/shower | |

Main Benefit of Single Phase

Excellent second-hand resale value

Three Phase

Main electrical supply to industry.

380/440 Volts Any size of compressor

Main Benefit of Three Phase

Approx 2/3 cost saving over single phase
Stable supply
Longer motor life

Guide To Compressed Air

Air Equipment Consumption Guide

| Tools | FAD/CFM | Pressure PSI.G |
|--------------------------|---------|----------------|
| 3/8" Impact Wrench | 2-3 | 70-90 |
| 1/2" Impact Wrench | 4-6 | 70-90 |
| 3/4" Impact Wrench | 9 | 70-90 |
| 1" Impact Wrench | 14 | 70-90 |
| 3/8" Ratchet Wrench | 2-5 | 70-90 |
| 1/2" Ratchet Wrench | 2-5 | 70-90 |
| 3/8" Drill | 5 | 70-90 |
| 1/2" Drill | 12 | 70-90 |
| DA Sander (top quality) | 10 | 70-90 |
| DA Sander (econ. model) | 20 | 70-90 |
| 7" Sander/Polisher | 25 | 70-90 |
| Zip/Impact Cutter | 4-5 | 70-90 |
| Cutters Shears | 4-8 | 70-90 |
| 4" Angle Grinder | 18-25 | 70-90 |
| 7" Angle Grinder | 25-35 | 70-90 |
| Tyre Inflator | 2-4 | 150-230 |
| Tyre Changer (manual) | 4 | 150 |
| Tyre Changer (auto) | 6 | 150 |
| Sand Blast Cabinet | 10-50 | 50-100 |
| Sand Blast Hand Gun | 8-12 | 100 |
| Spray Guns: | | |
| Airbrush | 0.25 | 30 |
| Miniature | 4-7 | 20-50 |
| Low pressure | 1.5-4 | 20-40 |
| Standard | 7.14 | 50-60 |
| HVLP | 14-20 | 70-90 |
| HA/GEO/9000 series LVLP | 7-9.5 | 28-36 |
| Air Fed Mask | 5-6 | 20-40 |
| Oil Pump | 1.5 | 100-150 |
| Grease Pump | 4.5 | 100-150 |
| Air Water Wash | 10 | 150 |
| Car Wash | 1.5-5 | 70-100 |
| Blow Gun (safety nozzle) | 3 | 100 |
| Spark Plug Cleaner | 3 | 100 |
| Underseal Gun | 4 | 100 |
| Rivet Gun | 1.5-3 | 70-90 |
| 2 Ton Air/Hydraulic Lift | 5-8 | 130-150 |
| Brake Tester | 3-7 | 75-100 |
| Plasma Cutter | 6-8 | 60-100 |

Note: The figures in the Air Equipment Consumption Table are only a guide, for additional information please phone our help desk.

Choosing the Right Compressor

Three-phase compressors are more efficient producers of compressed air than single-phase equivalent units, so where a three-phase supply is available the best option is the three-phase compressor.

Single-phase compressors up to 2.5 hp can operate from a 240V 13 Amp power supply, with the exception of the new 3 hp Low Current models. 3.0 hp and above must operate from a 240V 30 Amp supply. Wherever possible choose a larger compressor than you require at present to allow for expansion. Compressors with cast iron cylinders running slow, offer a much extended service life.

1) Bodyshop - using the air equipment consumption guide, add all the equipment consumptions together and divide by two, the resulting figure is the minimum free air you require.

2) Workshop - using the air equipment consumption guide, add all the equipment consumptions together and divide by three, the resulting figure is the minimum free air you require.

Note: For calculation purposes always use free air delivered figures.

Compressor Size Guide

A) Ask Questions

- 1 What is the air to be used for?
- 2 What is the maximum pressure required? (see consumption guide)
- 3 What electricity supply is available? (single/three phase)
- 4 What size compressor is currently in use? (see quick calculation guide below)
- 5 How well does existing compressor cope?
- 6 What are the future plans for additional staff and equipment?

B) Complete Following List

- 1 Number of tools and type
- 2 Number of users
- 3 Air consumption of largest tool/equipment using air
- 4 Complete Survey Form
- 5 Select Compressor from Catalogue (use only free air figures)

Note: Quick guide to CFM/FAD output (approx) of existing compressor
 Multiply motor hp by 3.3 = output in CFM / FAD
 Multiply motor kW by 4.5 = output in CFM / FAD
 Multiply motor kW by 2.1 = output in L/sec / FAD

Correct Hose Selection

An air tool needs the following:

- A) Correct size of compressor to ensure sufficient air available.
- B) Correct size of air hose to ensure minimal pressure drop and air flow
- C) Correct pressure at tool (see chart)
- D) Correct type of lubricant (**NOT** engine oil)
- E) **CLEAN DRY AIR!!!**
(use filters, regulator, dryer and lubricant)

Recommended Air Hose Sizes

| Hose | Uses | Max Flow CFM |
|-------|---|--------------|
| 1/4" | Tyre Inflators / Airbrush | 5 |
| 5/16" | Std Spray Guns / 3/8" Drill / Ratchet Wrench | 15 |
| 3/8" | HVLP/LVLP Spray Guns / 1/2" & 3/4" Wrenches / Sanders | 25 |
| 1/2" | 1" Impact Wrenches | 50 |

Note: Always keep hose length as short as practical. eg. 1/2" impact wrench with 20 metres of 1/4" bore hose will develop less than 40% of its available power!!