



## TECHNICAL AIDS SIZING AN AIR TANK

### Air Receiver Capacity in Cubic Feet of Free Air at Various Pressures

Capacities at other pressures are exactly in proportion. Example: at 200 lbs. pressure the capacity of a given size tank is exactly double the capacity at 100 lbs. pressure.

Capacity		Pressures (in pounds)					
Gals.	Cu. Ft.	75	100	125	150	200	250
30	4	20.5	27.3	34.2	41	54.7	68.3
60	8	41	54.7	68.2	82	109.4	136.7
80	10.7	54.7	73	91.2	109.4	146	182.4
120	16.1	82	109.3	136.2	164	218.7	273.3
200	26.8	136.7	182.2	227.8	273.4	364.5	455.6
240	32.2	164	218.7	273.4	328	437.4	546.7
400	53.6	273.4	364.5	455.6	546.7	729	911.2
660	88.4	451	601.4	751.7	902.1	1202.8	1503.4
1060	142	724.4	965.9	1207.3	1448.8	1931.7	2414.5
1600	214.4	1093.4	1457.9	1822.4	2186.9	2915.8	3644.8
2560	343	1749	2333	2916	3499	4665	5832

#### Conversion Guide

$$\text{Cu. Ft.} = \text{Gallons} \times .134$$

$$\text{Gallons} = \frac{\text{Cu. Ft.}}{.134}$$

### Useful Formulas

A) Constant Speed Operation:  $\text{Tank Size (ft}^3) = \frac{\text{Compressor Flow (CFM)}}{7}$

B) Typical Sizing Formula:  $V_r = \frac{14.7t(Q_r - Q_c)}{P_{max} - P_{min}}$

C)  $7.48 \text{ Gallons} = 1 \text{ ft}^3 \text{ Volume}$

D)  $14.5 \text{ psi} = 1 \text{ Bar}$  E)  $35 \text{ CFM} = \frac{1 \text{ Meter}^3}{\text{Min.}}$

F) Pump Up Time: Example - 5hp compressor on and 80 gallon tank, pumping from 0-100psig.

$$\frac{80 \text{ Gallon Tank}}{7.5 \text{ gal./ft}^3} * 100 \text{ psig} - 0 \text{ psig} = \frac{1066.67}{14.7 \text{ (ATM pressure)} * 18 \text{ (unit CFM)}} = 4 \text{ Min.}$$

Where:  $t$  = time (min) that receiver can supply required amount of air  
 $Q_r$  = consumption rate of pneumatic system (cfm)  
 $Q_c$  = output flow rate of compressor (cfm)  
 $P_{max}$  = Maximum pressure level in receiver (psi)  
 $P_{min}$  = Minimum pressure level in receiver (psi)  
 $V_r$  = Receiver Size (ft<sup>3</sup>)

Nominal Capacity		Horz. Vert.	No Slots	NEMA Frame Sizes								
Gals.	Cu. Ft.			56	56H	143T	145T	182T	184T	213T	215T	254T
10	1.34	H	X									
15	2.01	H	X									
20	2.67	H	X									
30	4.01	H&V		X	X	X	X					
60	8.02	H&V					X	X	X	X		
80	10.70	V					X	X	X	X		
80	10.70	H							X	X	X	X
120	16.04	H&V							X	X	X	X
200	26.74	H	X									
240	32.09	H	X									