STEP ONE: SELECT PIPE SIZE.

Four factors need to be taken into consideration when selecting pipe sizes for compressed air reticulation.

-Flow required   **-Pressure**   **-Distance**   **-Future Expansion**

A pipe size should be selected using the chart that allows for maximum compressor output Free Air Delivery (F.A.D.) at the required operating pressure and allow an additional margin for long distance and future expansion.

In practice we recommend a minimum reserve margin of 30%. Larger pipe provides reserve capacity for peak demands.

PRESSURE/FLOW TABLE   Maximum recommended air flow for each pipe size.

PRESSURE		AIR 20		AIR 25		AIR 32		AIR 40		AIR 50		AIR 63		AIR 90		AIR 110		AIR 160		PRESSURE	
BAR	PSI	l/sec	cfm	l/sec	cfm	l/sec	cfm	l/sec	cfm	l/sec	cfm	l/sec	cfm	l/sec	cfm	l/sec	cfm	l/sec	cfm	BAR	PSI
3	43.5	7	15	14	30	28	59	48	101	88	186	174	370	475	1006	781	1654	2195	4652	3	43.5
4	58	10	21	20	42	39	83	67	141	122	259	243	515	661	1401	1087	2303	3056	6476	4	58
5	72.5	13	28	26	55	50	107	86	182	158	335	314	665	855	1811	1405	2977	3950	8371	5	72.5
6	87	16	34	32	68	62	132	106	225	195	413	387	820	1054	2233	1732	3671	4872	10323	6	87
7	102	19	41	38	81	74	157	127	268	233	494	462	980	1258	2667	2068	4383	5816	12326	7	102
7.5	109	21	44	41	87	80	170	137	291	252	534	500	1060	1362	2887	2239	4745	6297	13343	7.5	109
8	116	22	47	44	94	87	184	148	313	272	576	539	1142	1467	3109	2412	5111	6782	14372	8	116
10	145	29	61	57	122	112	237	191	405	351	744	697	1476	1896	4019	3117	6606	8766	18576	10	145
13	189	39	83	78	164	151	321	258	547	475	1006	942	1996	2564	5434	4215	8933	11853	25118	13	189

The flow values allow for a pressure drop of 4% of applied pressure over 30 metres of pipe. If a maximum pressure drop of 2% is desired, figures listed above should be de-rated by approximately 20%-30%.

The above table is calculated using values derived from Mueller's formula for gaseous flows.

CONVERSION FACTORS

PRESSURE
1 psi = 0.069bar
1 kpa = 0.145psi
1 bar = 100kpa
1 bar = 14.5psi
1 kg/cm^2 = 1 bar

FLOW
1 cfm = 0.4719 L/sec
1 l/sec = 2.119 cfm
1 m^3/min = 35.3147 cfm
1 m^3/min = 16.67 L/sec

Approximate compressor output calculation:
1kw x 1.35 = HP x 4 =CFM for Screw compressors.
For Piston compressors some manufacturers quote displacement which needs to be derated by 0.75 to calculate F.A.D. (Free Air Delivery).
Size of receivers shall be calculated as 10 times the flow in l/s optimum or 6 times the flow in l/s minimum.

STEP TWO: SELECT FITTINGS.

Select the fitting style most suitable to your requirements. Three ranges are presented. Note that a combination is often used.

Socket Fusion Weld Fittings
(See P8-9) are joined quickly and easily using a welding tool (see P25) and results in a fully fused joint of highest integrity which is leak free, tamper proof and visually pleasing.

Compression "O" Ring Fittings
(See P10-11) are joined quickly and easily by hand (see P24) and offer the advantage of being removable and reusable.

Electro Fusion Weld Fittings
(See P12) are assembled by hand and an electric current is applied via an Electro Fusion Welder (see P25). These fittings enable one or more joints to be assembled and aligned or adjusted prior to welding. This makes the installation of large bore pipework extremely quick and simple plus giving the advantage of a fully welded system.
Also included in this range are "Under-pressure air saddles" which are designed for under pressure connections thus eliminating the need to shut down plant and equipment for new connections. They are particularly useful in large plants with 24 hour operations.

STEP THREE: SELECT OUTLET REQUIREMENTS

Select outlet filtration, regulation, lubrication requirements (see P21), and quick couplings, hoses, etc. (P19 & 20) to suit your requirements.