CURTIS AIR COMPRESSORS
AIR DISTRIBUTION PIPING

SELECTION OF PIPE SIZE

Careful consideration should be given in selecting the pipe size of any compressed air distribution system. Pipe sized too shall created excessive pressure losses which can greatly reduce the operating deficiency and productivity of air powered equipment.

Use the accompanying tables as a guide in selecting the proper size pipe from the receiver. A piping schematic should be made showing all pipe fittings converted to their equivalent in pipe length (See Table 2) and added to the length of the straight run of pipe required. Pipe sizes, as selected from Table 1, should produce no more than 3 psig pressure drop for an 80 psig system and even less for higher pressure systems.

Since the material costs in piping are low compared to installation or replacement cost, it is wise to select pipe of an adequate size. If there is any doubt that a pipe size may create a pressure drop, use the next largest size. Remember that an oversize pipe compensates for possible scale build-up and provides for future expansion of the overall air system.

ELIMINATION OF CONDENSATION

Condensation in the piping system is a problem in all but the driest climates. This occurs because the water absorption capacity of compressed air is less than that of free air at the same temperature. As compressed air in the line cools, the water vapor condenses. This is best taken care of at the compressor or receiver by installing an aftercooler and moisture separator with an automatic drain trap. In addition, the main lines of the piping system should be sloped toward water traps or water legs connected to the bottom of the main, or sloped toward the receiver. Any additional condensate will then collect in these traps and may be drained off manually or by automatic devices at periodic intervals.

AIR RECEIVER LOCATION

In general, a receiver should be placed close to the compressor between the compressor and the pipe distribution system to eliminate or dampen the pulsations of airflow form the compressor. On large systems it is advisable to locate another receiver on the far end of the system to help equalize pressures and take care of instantaneous demands. The discharge line from the compressor to the receiver should be as short as possible and sized to the compressor outlet. It should never be installed so condensate is allowed to flow back into the compressor.

TAKE-OFF LINES

Take-off lines to tool stations or equipment should always come off the top of the pipeline, this will prevent carry=-over of condensed moisture from reaching the tools or equipment. It is important that take-off lines be located at points where the shortest possible flexible hose can be used. After major take-off pints, or at division points of the main line, the point may be reduced in sizes – as determined by the decreased volume of air flowing in each pipe. This same principle can be applied to a closed circuit or loop system where the air actually has two or more pipes it can flow through to reach a given point.

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TABLE No. 1

PIPE SIZE SELECTION FOR COMPRESSED AIR LINES								
FREE AIR C.F.M	EQUIVALENT LENGTH OF PIPE LINES IN FEET							
	25	50	75	100	150	200	250	300
1	½	½	½	½	½	½	½	½
2	½	½	½	½	½	½	½	½
3	½	½	½	½	½	½	½	½
5	½	½	½	½	½	½	½	½
10	½	½	½	¾	¾	¾	¾	¾
15	½	¾	¾	¾	¾	¾	¾	¾
20	¾	¾	¾	¾	¾	¾	¾	¾
25	¾	¾	¾	¾	¾	1	1	1
30	¾	¾	¾	¾	1	1	1	1
35	¾	¾	1	1	1	1	1	1
40	¾	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1
60	1	1	1	1	1-1/4	1-1/4	1-1/4	1-1/4
70	1	1	1	1	1-1/4	1-1/4	1-1/4	1-1/4
80	1-1/4	1-1/4	1-1/4	1-1/4	1-1/2	1-1/2	1-1/2	1-1/2
100	1-1/4	1-1/4	1-1/4	1-1/4	1-1/2	1-1/2	1-1/2	1-1/2
125	1-1/4	1-1/4	1-1/4	1-1/4	1-1/2	1-1/2	1-1/2	1-1/2
150	1-1/4	1-1/4	1-1/4	1-1/4	1-1/2	1-1/2	1-1/2	1-1/2
175	1-1/2	1-1/2	1-1/2	1-1/2	2	2	2	2
200	1-1/2	1-1/2	1-1/2	1-1/2	2	2	2	2
225	1-1/2	1-1/2	1-1/2	1-1/2	2	2	2	2
250	2	2	2	2	2	2	2	2
275	2	2	2	2	2	2	2-1/2	2-1/2
300	2	2	2	2	2	2	2-1/2	2-1/2
350	2	2	2	2	2-1/2	2-1/2	2-1/2	2-1/2
400	2	2	2	2	2-1/2	2-1/2	2-1/2	2-1/2
450	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	3	3
500	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	3	3
550	2-1/2	2-1/2	2-1/2	2-1/2	3	3	3	3
600	2-1/2	2-1/2	2-1/2	2-1/2	3	3	3	3
750	2-1/2	2-1/2	2-1/2	3	3	3	3	4
1000	3	3	3	3	3	3	4	4

Check all piping and fittings regularly to avoid “Leaks” in the system.

TABLE No. 2

EQUIVALENT LENGTH OF PIPE (FT.) for PIPE FITTINGS					
PIPE SIZE	LONG RAD, ELL OR RUN OF TEE	STD. ELL OR RUN OF REDUCED TEE	TEE THRU SIDE OUTLET	GLOBE VALVE	GATE VALVE
½	.62	1.55	3.10	17.3	.36
¾	.82	2.06	4.12	22.9	.48
1	1.05	2.62	5.24	29.1	.61
1-1/4	1.38	3.45	6.90	38.3	.81
1-1/2	1.61	4.02	8.04	44.7	.94
2	2.07	5.17	10.3	57.4	1.21
2-1/2	2.47	6.16	12.3	68.5	1.44
3	3.07	6.16	15.3	85.2	1.79
4	4.03	7.67	20.2	112.0	2.35