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TEC-15
Pipe Air Flow

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Pipe Air Flow

The following pages contain 6 sets of curves for schedule 40 pipe that can be used to help select the appropriate pipe size for pneumatic systems, or given a system, allow system performance to be estimated.

Generally accepted practice for sizing piping for pneumatic systems is to use a pressure drop of 10% of gage for nominal pipe sizes up to and including 1/2", and 5% of gage for nominal pipe sizes of 3/4" and larger. The following curves allow the use of these guidelines for selecting piping sizes and include other pressure drop percentages for evaluating existing systems. Generally, curves of this type are shown only for 100 feet pipe lengths, but theoretic calculations show the curves for 10 feet are also valid.

Below is a listing of the charts involved with their identification:

Pipe Size Range	**Pressure Drop** (Percentage of Inlet Gage Pressure)					
1/8" - 1/2"	5	10	15	5	10	15
3/4" - 3"	2.5	5	7.5	2.5	5	7.5
Pipe Length (Feet)	100	100	100	10	10	10
Chart	A	B	C	D	E	F

Generally accepted practice.

Perhaps the best way to explain the use of these curves is by example.

Example 1

Given a system with desired airflow of 700 SCFM and a supply pressure of 60 PSIG and a header length of 100 feet, what size pipe should be used? The generally accepted practice of 10% pressure drop for pipes up to 1/2" and 5% for 3/4" and larger should be used.

The above table indicates, Chart B should be used (Step 1). Along the bottom horizontal axis locate the 60 PSIG vertical line (Step 2). On the left vertical axis locate the 700 SCFM horizontal line (Step 3). Follow both of these lines to the point of intersection. This occurs between the sloping lines for the 2" and 2-1/2" pipes. The larger pipe size (2-1/2") should be selected (Step 4). Further evaluation of this chart shows that for the conditions given, the pipe will flow over 800 SCFM at 60 PSIG inlet and 3 PSI (5%) pressure drop. (The intersection of the 60 PSIG primary pressure line and the 2-1/2" pipe size line).

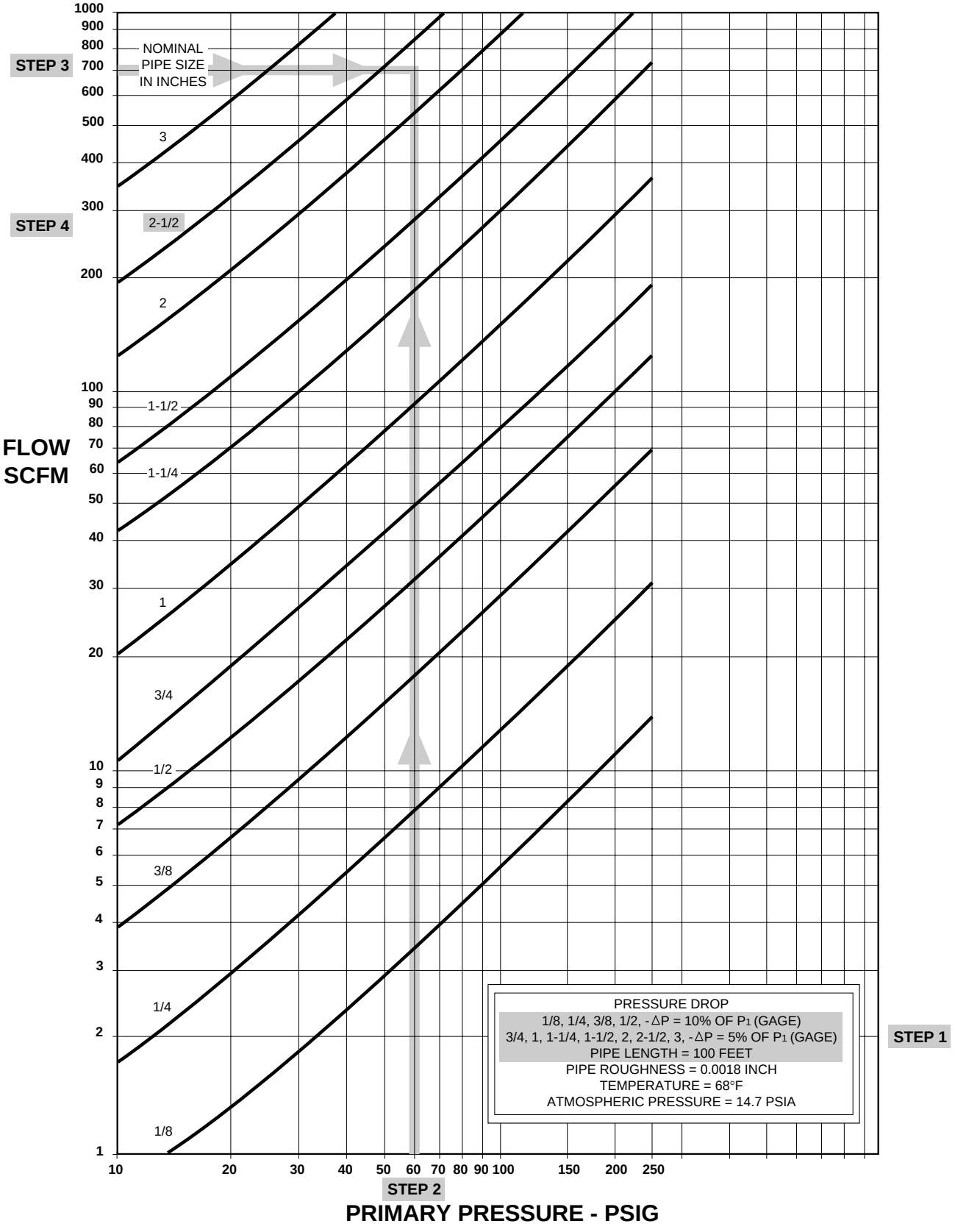
Further uses of the curves would be to compare the size pipe required at the other sets of pressure drops for 100 feet of pipe length. Using Chart A shows that if a more conservative pressure drop were used, the pipe size would increase to 3". Using Chart C shows that if a more aggressive pressure drop were allowed, perhaps a 2" pipe could be used.

Using the curves for 10 feet of pipe length, it can be seen because of the shorter length, much smaller pipe diameters could be used than if the length were at 100 feet.

These curves should only be used as general guidelines for selecting piping systems. Also, these curves are based on using schedule 40 steel pipe. Different types of plumbing with different internal roughness will have different results. If more detailed or precise information is required, the system should be designed by a competent professional.

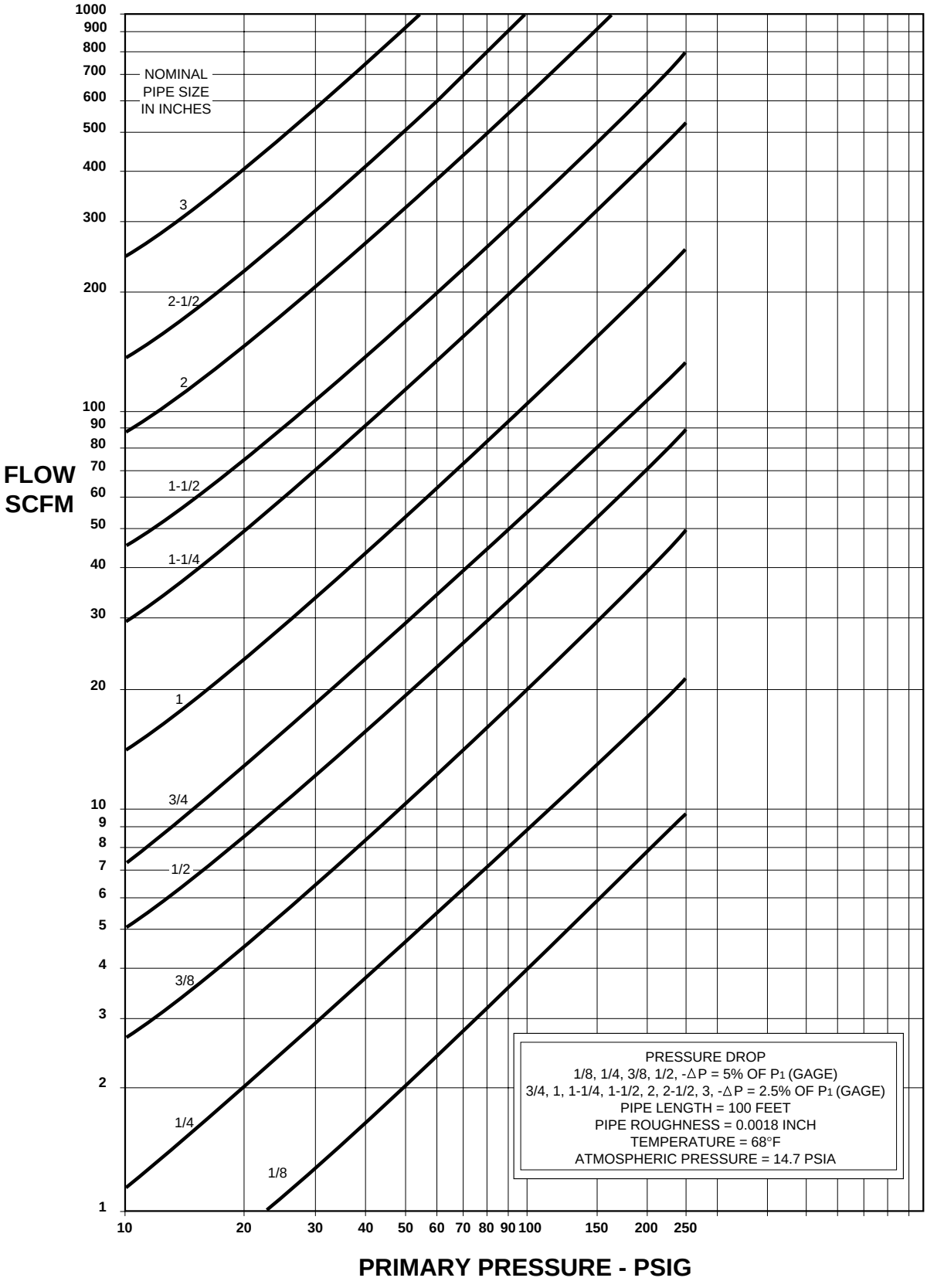
Flow of Air Through a Pipe

Chart B (Example)



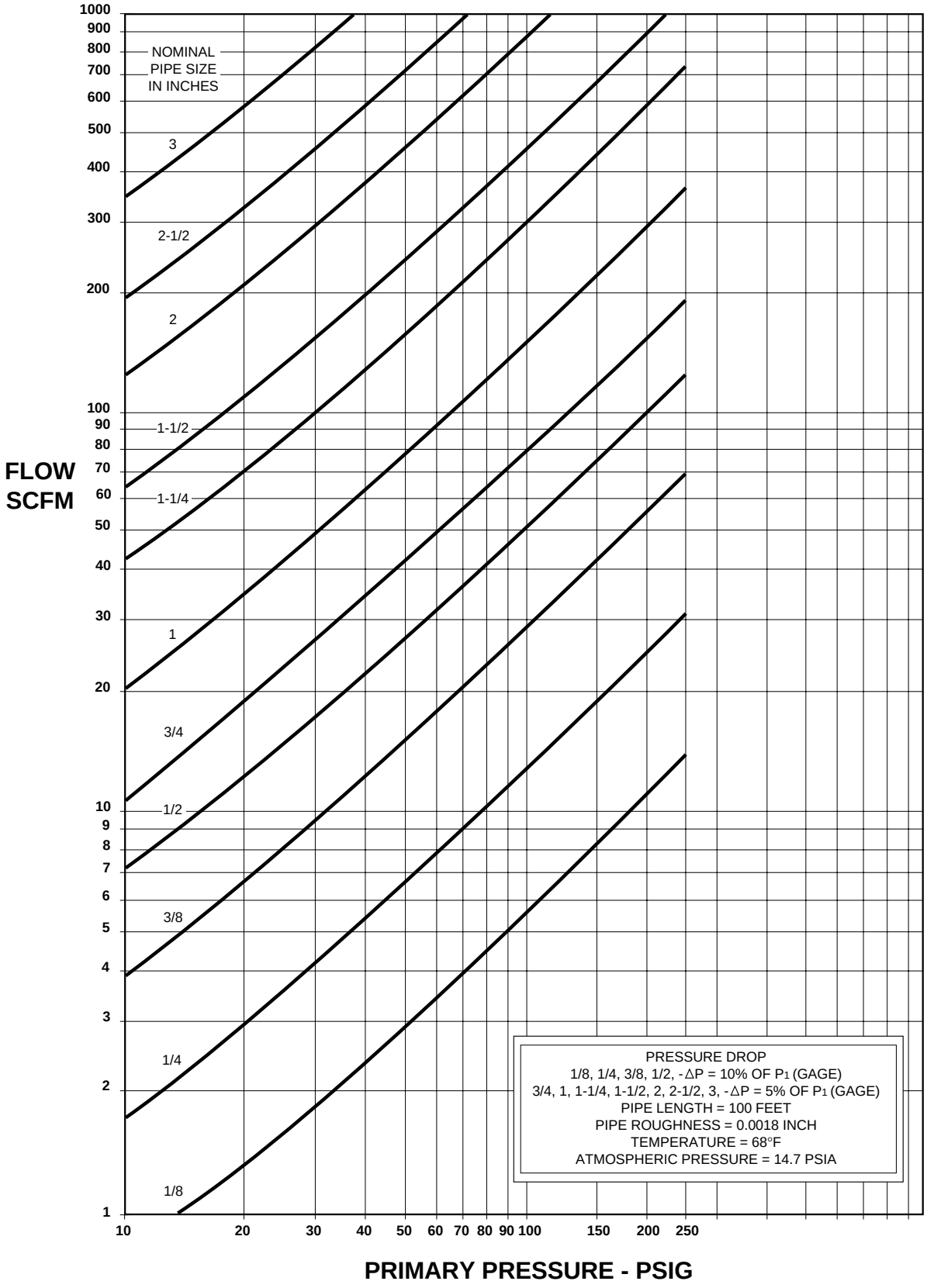
Flow of Air Through a Pipe

Chart A



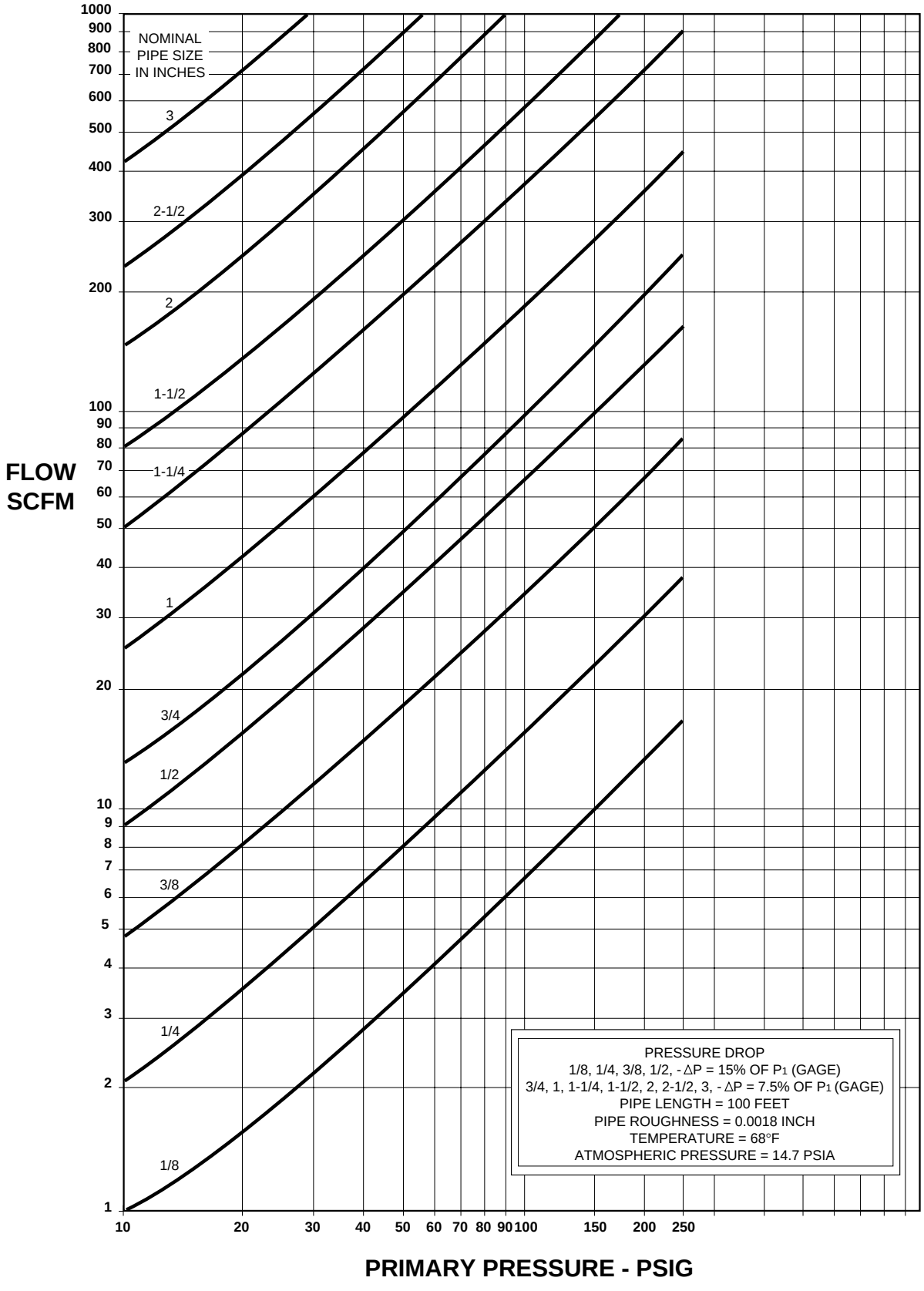
Flow of Air Through a Pipe

Chart B



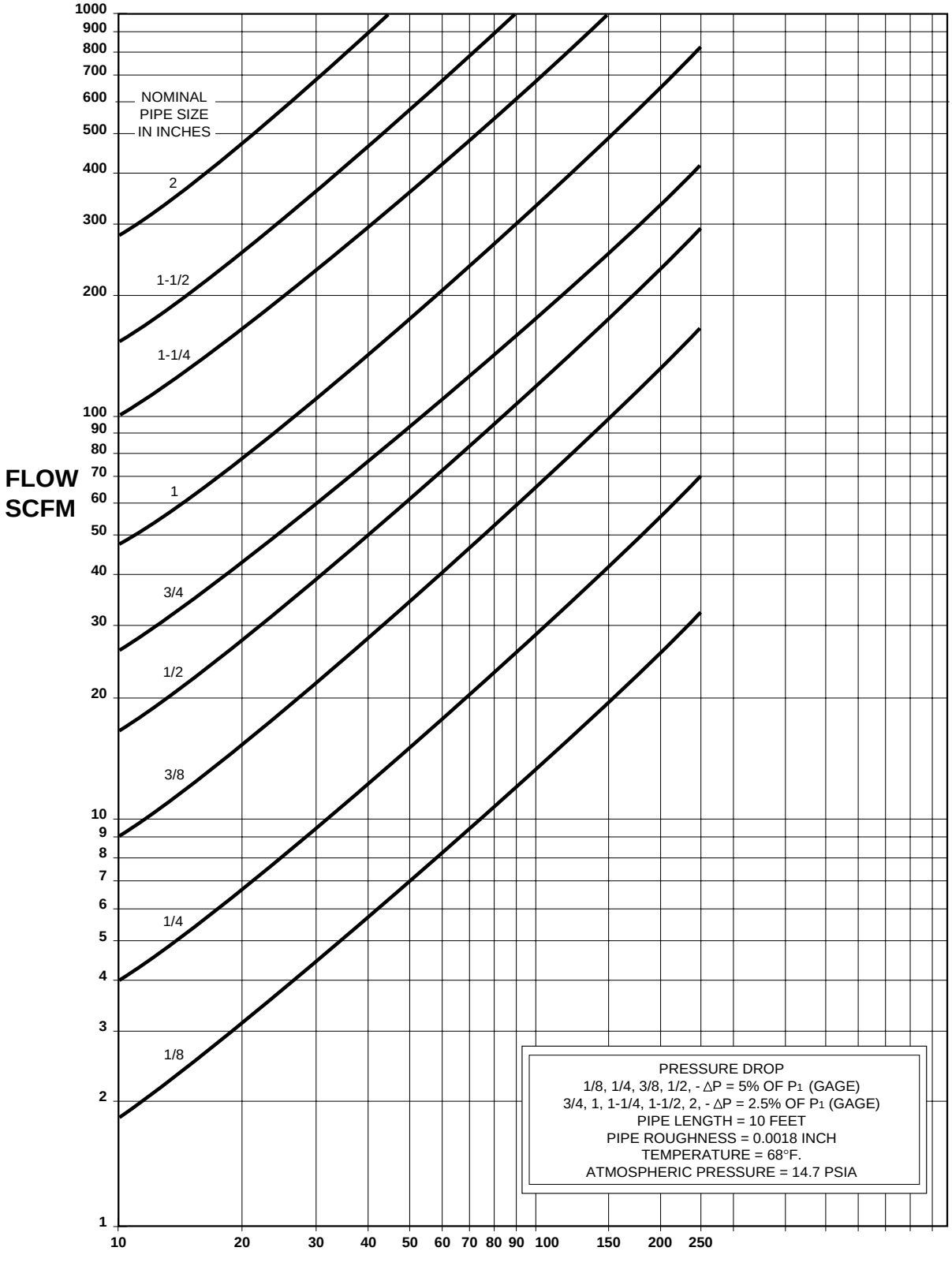
Flow of Air Through a Pipe

Chart C



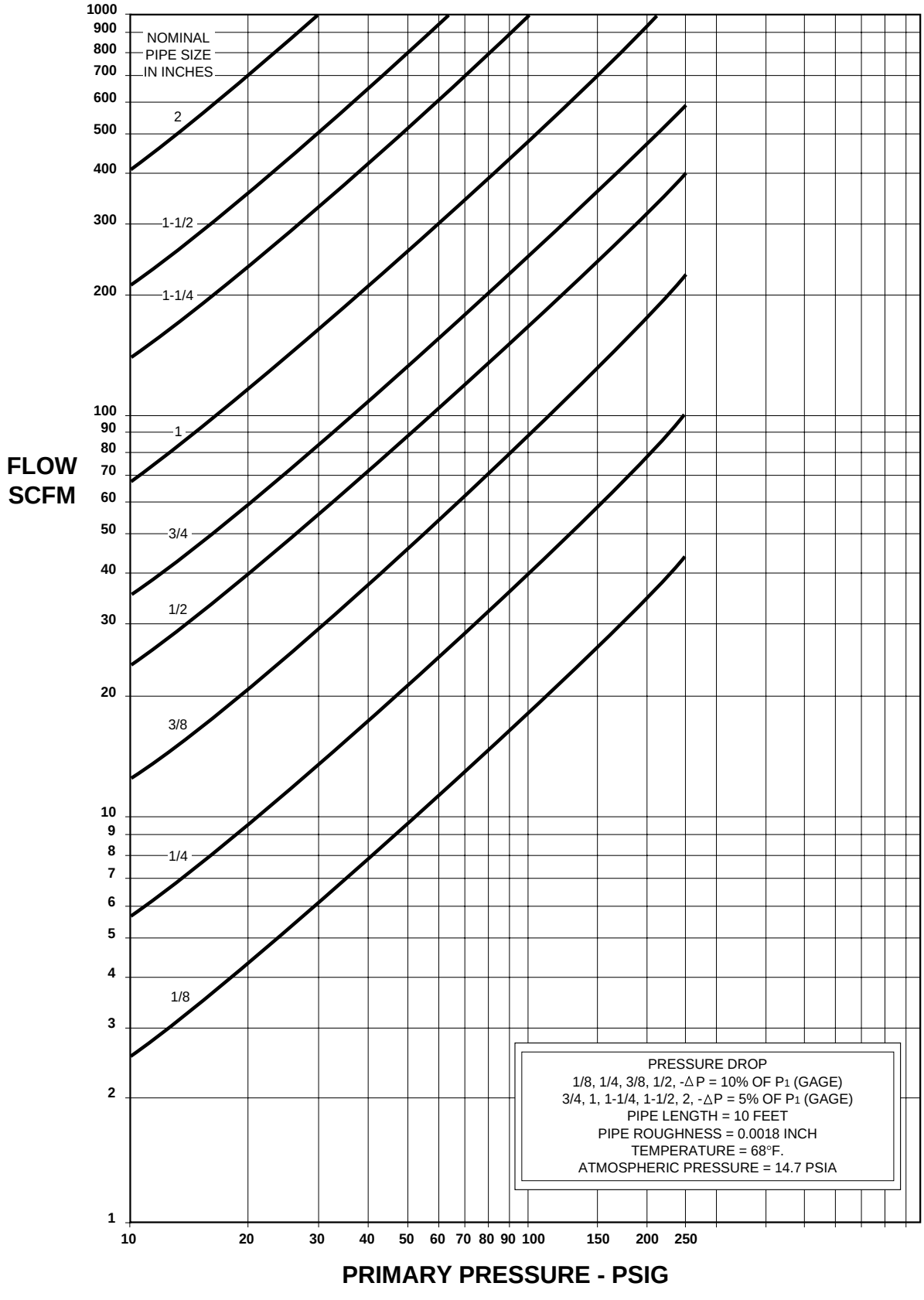
Flow of Air Through a Pipe

Chart D



Flow of Air Through a Pipe

Chart E



Flow of Air Through a Pipe

Chart F