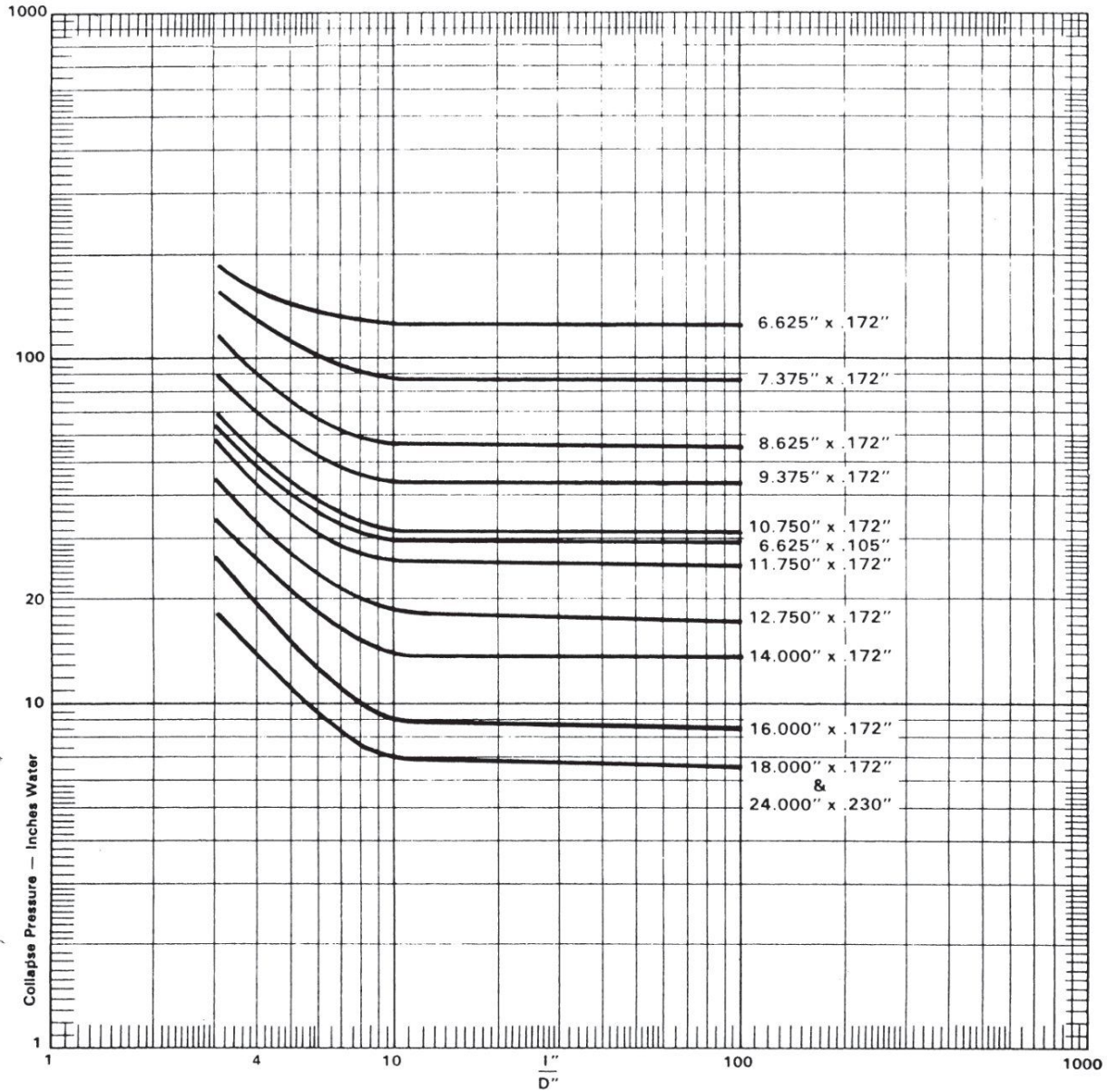


Collapse Pressure - PVC Duct

Graph I: Calculated Collapse Pressures with Safety Factor of 5, FABCO Type I Grade I PVC Seamless Duct (minimum wall) @ 70-75° F vs Length of Span/Nominal O.D.



The Sheet Metal & Air Conditioning Contractors' National Association (SMACNA) sponsored a physical testing program on both rectangular and round Type I Grade I PVC fabricated duct, as well as a theoretical analysis of the test work. Equations were developed for collapse pressures of varying I/D ratios (I = distance between reinforcing stiffeners (inches) and D = OD (inches)) as well as for collapse of a very long tube. Round duct sizes ranged from 18" O.D. to 48" O.D. with wall thicknesses of .137" to .282". Test values correlated within a 10% range.

Fabco ran actual collapse tests on 4 sizes of extruded seamless duct from 6" through 12" with I/D ratios exceeding 10 which confirmed the values calculated

from the very long tube equation. (Note: Collapse values for all sizes with ratios exceeding 10 approach values for a very long tube).

This graph can be utilized to determine reinforcement spacing distance for higher negative pressures than shown in the SMACNA publication(1) for the sizes and minimum wall thicknesses shown.

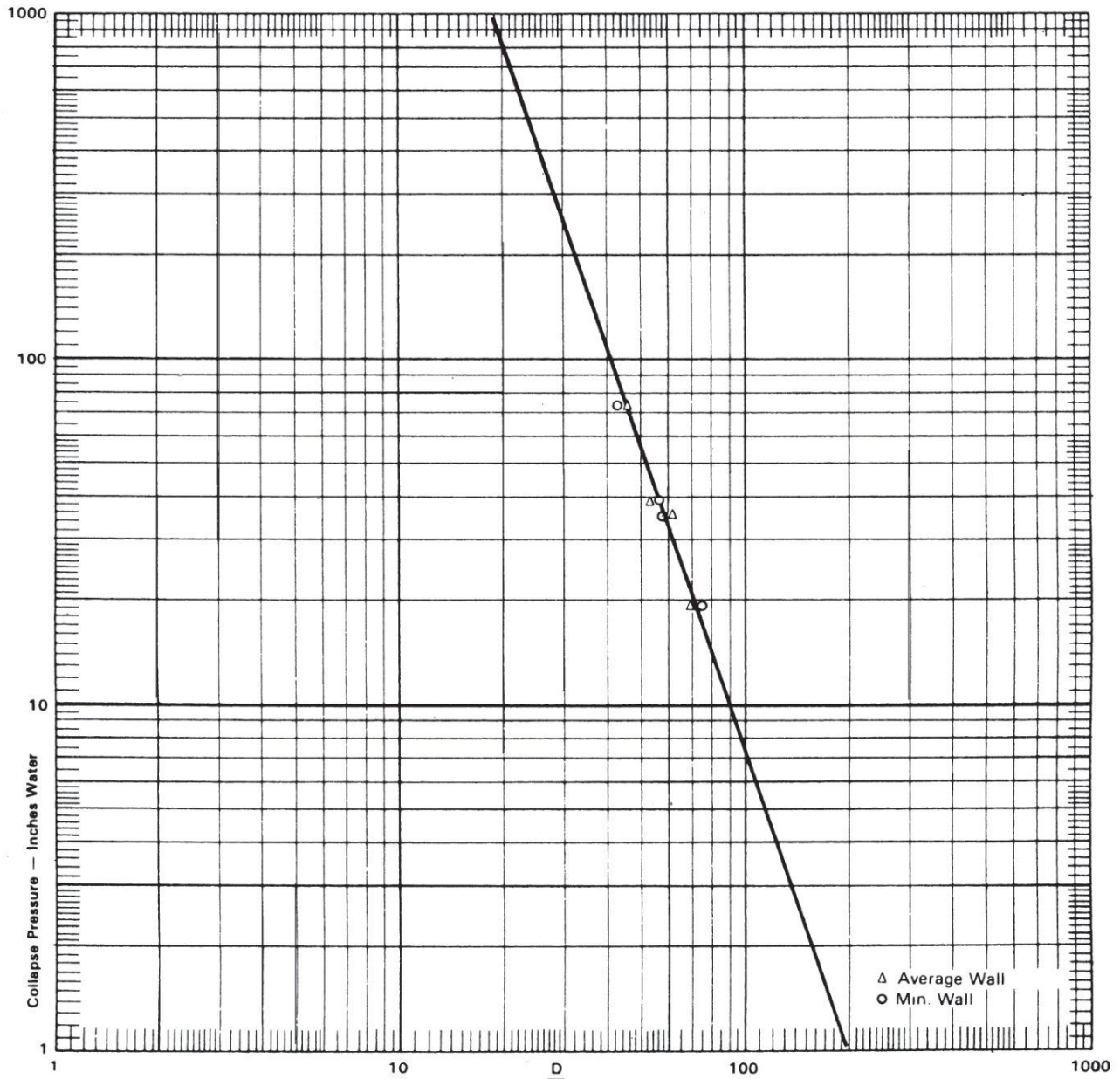
Example: 16" duct at 20" water I/D = 4

I = 16 x 4 = 64" between reinforcing stiffeners.

(1) Thermoplastic Duct (PVC) Construction Manual, SMACNA

PVC Duct Collapse Pressure

Graph II: Calculated Collapse Pressure with Safety Factory of 5, FABCO Type I Grade I PVC Seamless Duct @ 70–75°F vs Nominal O.D./Wall



This calculated collapse pressure graph with a safety factor of 5 for Type I Grade PVC duct has been experimentally confirmed for D/I ratios from 44-170. The 5-1 safety factor is believed to be sufficient for reasonable out of roundness due to storage and handling. Use of this graph for lower D/I ratios of Type I Grade I PVC pressure pipe should provide collapse pressures of greater than a 5-1 safety factor, since out of roundness will be appreciably less due to heavier walls of pipe produced under ASTM standards 1785 and 2241.

Use of minimum wall thicknesses as shown in Fabco's Specification for Duct and the ASTM Standards mentioned above are recommended when utilizing this graph for operating temperatures of 70° - 75° and below. Values of collapse pressures above 407" of water exceed a complete vacuum and should be considered as external collapse pressure. Conversion to PSI collapse pressure can be obtained by multiplying the inches of water by .0361; inches of water to inches of mercury by .07369.

ENGINEERING INFORMATION

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