# Question on Example 10-1

Source: Page 169, ASPE *Plumbing Engineering Design Handbook*, Vol 2, and Web page: <http://aspe.org/sites/default/files/webfm/ContinuingEd/PSD_CEU_194Dec12.pdf>

Example 10-1

Calculate the velocity of 100 scfm (47.2 sL/s) through a 2-inch (50-DN) pipe with a pressure of 20 inches of mercury (67.7 kPa).

Find the equivalent absolute pressure of **20 inches of mercury** (67.7 kPa). Using Table 10-7, read 9.92 inches of mercury abs (33.57 kPa abs). (Comment #1: 9.92 inHg absolute is right) Convert 100 scfm (47.2 sL/s) to acfm (aL/s) at a pressure of **9.92 inches of mercury abs** (33.57 kPa abs) by using Table 10-3. Opposite 10 inches of mercury (33.9 kPa) is 1.5. Thus,

100 scfm x 1.5 = 150 acfm (70.8 aL/s). (Comment #2: Column 1 in Table 10-3 is gage pressure, not absolute. 20 inHg should be used, and the Factor should be 3 instead of 1.5. )

Refer to Table 10-6 to obtain C. This table has been developed from the flow characteristics of air in Schedule 40 pipe. Opposite 2-inch (50-millimeter) pipe is 42.92.

Solving for velocity, V = 150 acfm x 42.92 = **6,438 fps** (1,962 meters per second).

(Comment #3: It is fpm, not fps. According to my calculation, 100 scfm equals to 301 acfm at 68 ℉ and 20 inHg, or 9.92 inHg absolute, or 33.59 kPa, or 4.88 psia. The velocity is 12927 fpm, or 215.45 fps in a 2” Sch 40 steel pipe. If use 9.92 inHg, i.e., 20 inHg absolute and 68℉, the factor in Table 10-3 is 1.5, or acfm = 150, velocity is 107 fps, or 6418 fpm. If 60℉ is used the number will be smaller: 147 acfm and 105 fps, or 6320 fpm)

(Comment #4 - Conclusion: The correct answer to the question for 20 inHg is: 100 scfm equals to 300 acfm and the velocity is 300 x 42.92 = 12876 fpm, or 214.6 fps.)