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= 12 ft

The pipe fittings in the line include one exit, one 45° elbow (long radius), one 90° elbow (long radius), and one entrance.

Table 1 shows the results calculated by the program.

The second example finds the pressure drop and outlet mach number for natural gas flowing through ¾-in., Sch. 160 pipe, under the following conditions:

W = 8,000 lb/hr, specific gravity = 0.655, P_1 = 1,124.7 psia, T = 100.0° F., M_w = 19.0, μ = 0.01 cp, d = 0.614 in., and L_{st} = 23 ft

Results for this calculation are shown in Table 2.

The third example sizes the flare manifold with relief valve loads for natural gas at flow conditions shown in Fig. 2. Table 3 gives the results of this calculation.

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Editor's note: OGJ subscribers may obtain a free copy of the complete operating program on diskette by sending a blank, 5 1/4 in. 360 K, DS, DD, floppy diskette, formatted to MS DOS, and a self addressed, postage paid or stamped return disketted mailer to Refining/Petrochemical Editor, Oil & Gas Journal, P.O. Box 1941, Houston, Tex., U.S.A. 77251.

Foreign subscribers send the diskette and return mailer without return postage to the same address. This offer will expire Mar. 30, 1990.

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Ways to control amine unit foaming offered

C.R. Pauley
Pauley Gas Conditioning
Chattanooga, Tenn.

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Pall Well Technology Corp.
East Hills, N.Y.

The physical and chemical mechanisms that cause foaming must be understood before practical solutions may be selected.

Foaming in amine plants increases operating costs and reduces treating capacity. When foaming becomes severe, amine is often carried over into downstream treating equipment.

It is commonly held that liquid hydrocarbons and iron sulfide cause foaming and that foaming can be solved by treatment with chemical additives or activated carbon filtration.[1,2] Unfortunately, most antifoam additives are surface active and are removed by activated carbon. More often, after a brief improvement the problem becomes worse.

Because pure amines do not form stable foams, one or more components must be present in the treating solution before a persistent foam will be formed.[3] Possible contaminants include not only liquid hydrocarbons and iron sulfide, but also well-treating fluids, amine-degradation products, and other finely divided solids.

Formation, stability. Foam is the result of mechanical incorporation of gas into a liquid. The liquid film sur-