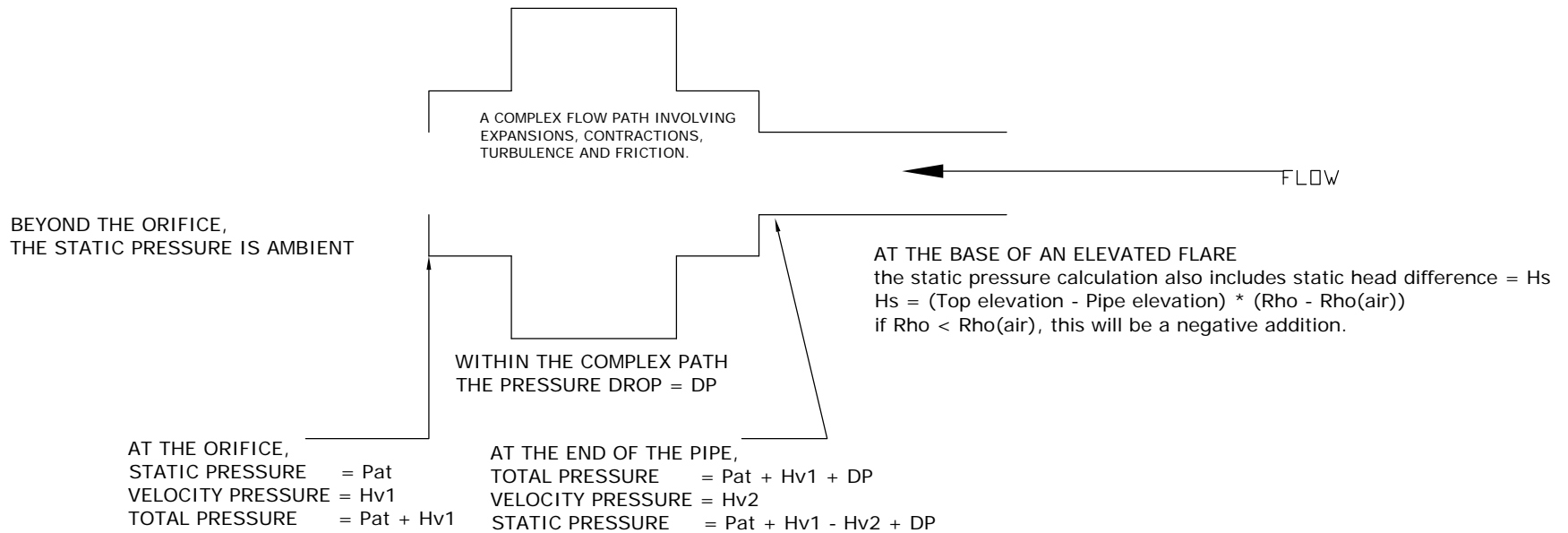




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BERNOULLI'S THEOREM FOR FLOW AT ANY POINT WITHIN A FLARE SYSTEM

VELOCITY PRESSURE = $H_v = \frac{\rho \cdot V^2}{2g} = \frac{W^2}{\rho \cdot 39.69 \cdot d^4}$
 TOTAL PRESSURE = ATMOSPHERIC PRESSURE + ACCUMULATED PRESSURE LOSSES
 [Total pressure also includes Physical head difference - ignored in the example]
 STATIC PRESSURE = $P_{abs} = \text{TOTAL PRESSURE} - \text{LOCAL VELOCITY PRESSURE}$
 The STATIC Pressure is the pressure which will record on a gauge attached to the pipe.
 where $\rho = \text{density} = \text{lb/cu.ft} = \frac{\text{Mol wt} \cdot P_{abs}}{1545.4 \cdot T \text{ degR}}$
 $V = \text{fps}$
 $W = \text{lb/sec}$
 $d = \text{pipe diameter} - \text{ft}$
 $g = \text{gravitational constant} - \text{fps}^2$



If the orifice experiences choked flow (= sonic velocity) the static pressure behind the orifice will be "critical" and greater than atmospheric.

Depending on the values of H_{v1} , H_{v2} and DP ,

- it is possible for the static pressure in the pipe to be sub-atmospheric;
- it is possible for the static pressure in the pipe to be greatly above atmospheric;

Low static pressure and high velocity may cause the pipe to "choke" at sonic velocity;
 High static pressure and low velocity may protect the pipe from "choking" at sonic velocity.