Hydraulic Performance

FLOW VELOCITY & FLOW RATE

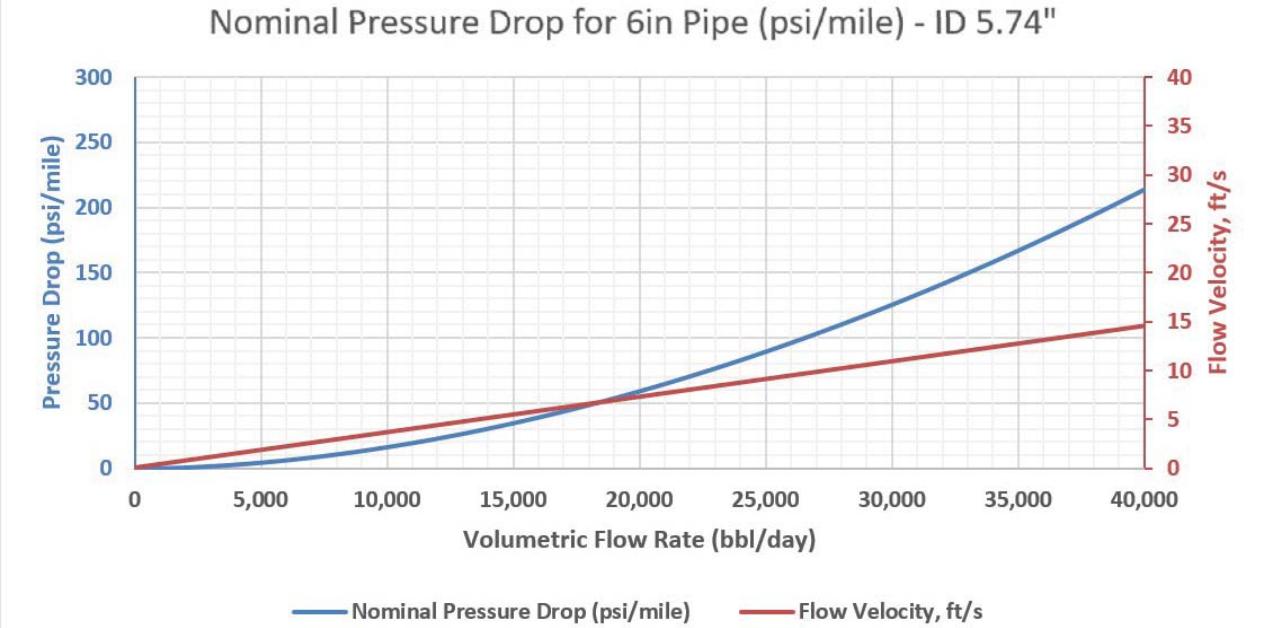
The smooth polyethylene inner layer of CORE Liner provides excellent flow characteristics with minimal friction loss. The maximum flow velocity and the maximum flow rate for a particular pipeline will depend on the level of friction loss that can be tolerated and on the likelihood and impact of potential water hammer events. Erosion is typically not a limiting factor for flow velocity in polyethylene lined pipelines in liquid service. As a guideline, the industry commonly uses a typical maximum flow velocity of 13 ft/s, resulting in the following flow rates and friction losses in water service:

			Max. Friction loss, psi			
Size	Max. Flow Rate	Max. Friction loss	2	4	8	10
in	bbl/day	psi/mile	miles	miles	miles	miles
6	35,950	176	352	704	1408	1760
8	61,700	128	256	512	1024	1280
Twin 8	123,410	128	256	512	1024	1280
10	97,030	99	198	396	792	990
12	134,920	81	162	324	648	810

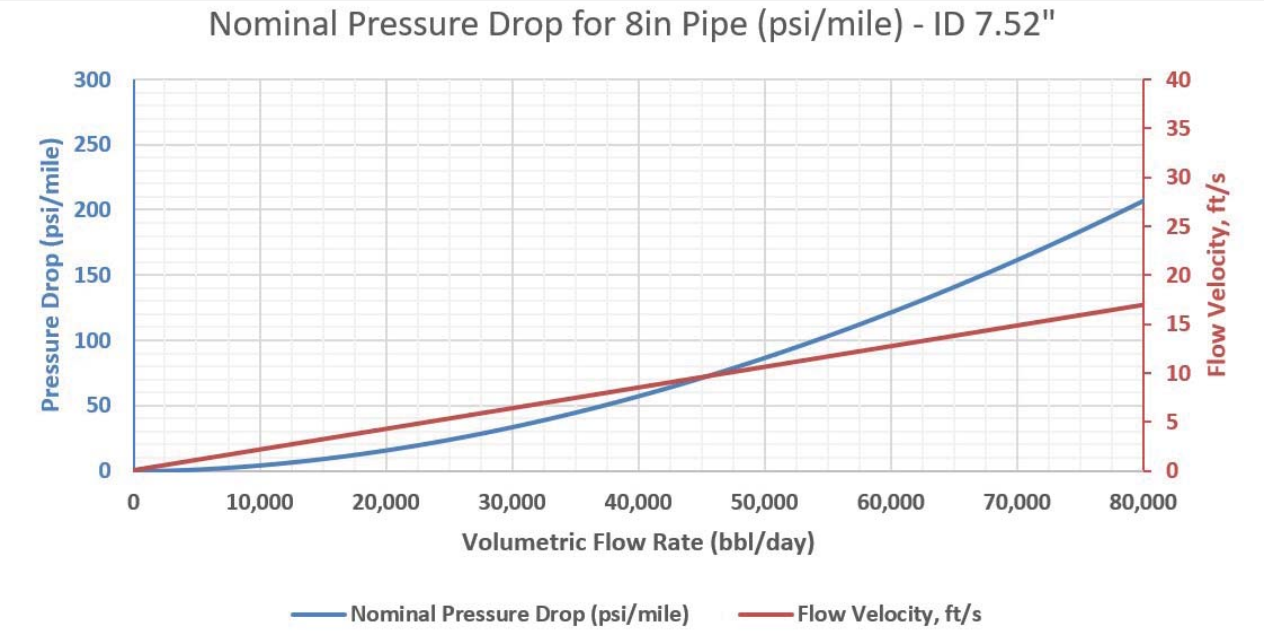
The below charts reflect the expected friction loss in a CORE Liner pipeline for a variety of flow rates. Currently, the 6" and 8" product sizes are commercially available. The 10" and 12" are under development.

Hydraulic Performance

FRICTION LOSS FOR 6" CORE LINER IN WATER SERVICE

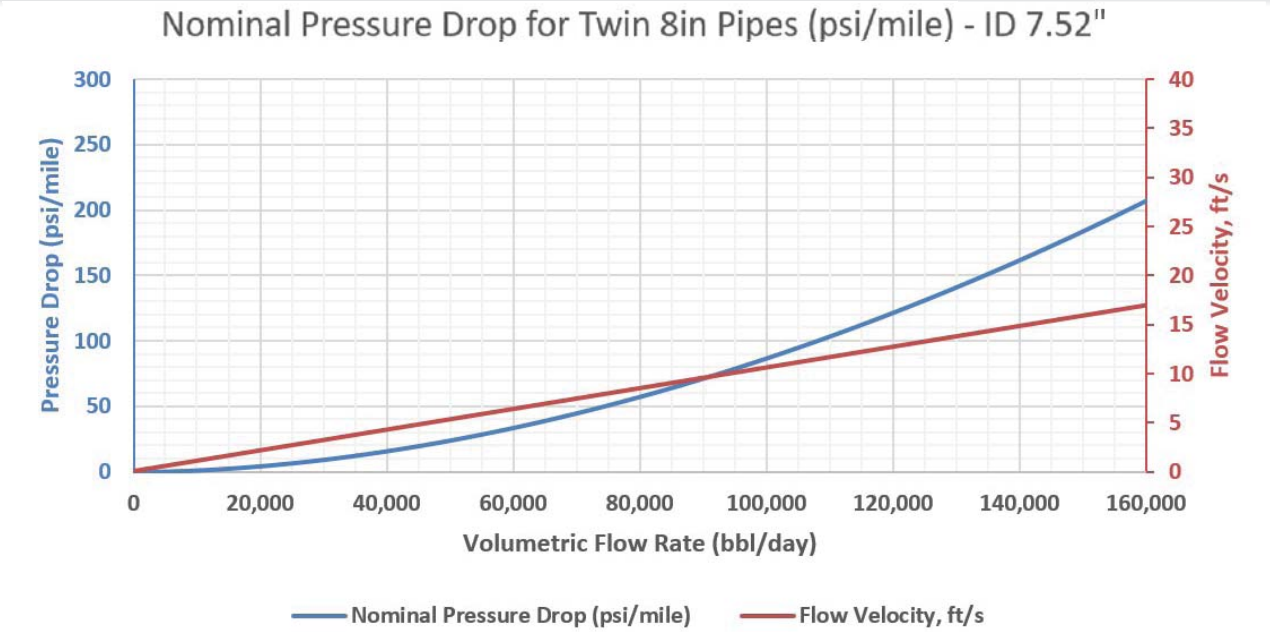


FRICTION LOSS FOR 8" CORE LINER IN WATER SERVICE

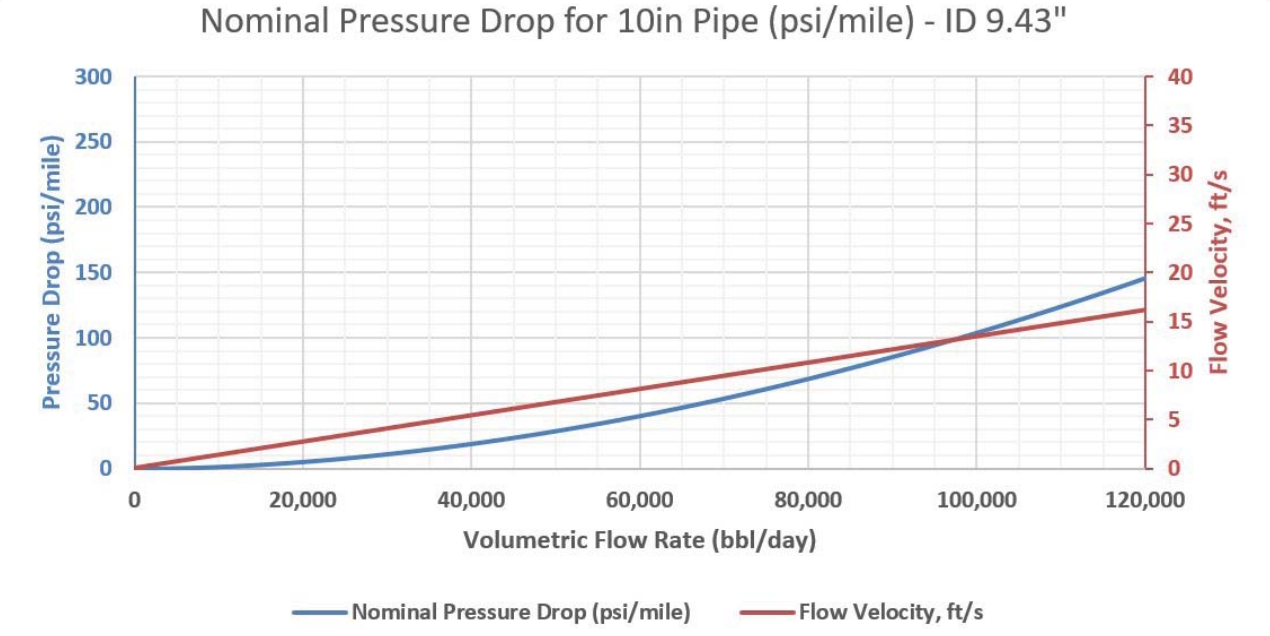


Hydraulic Performance

FRICTION LOSS FOR TWIN 8” CORE LINER IN WATER SERVICE

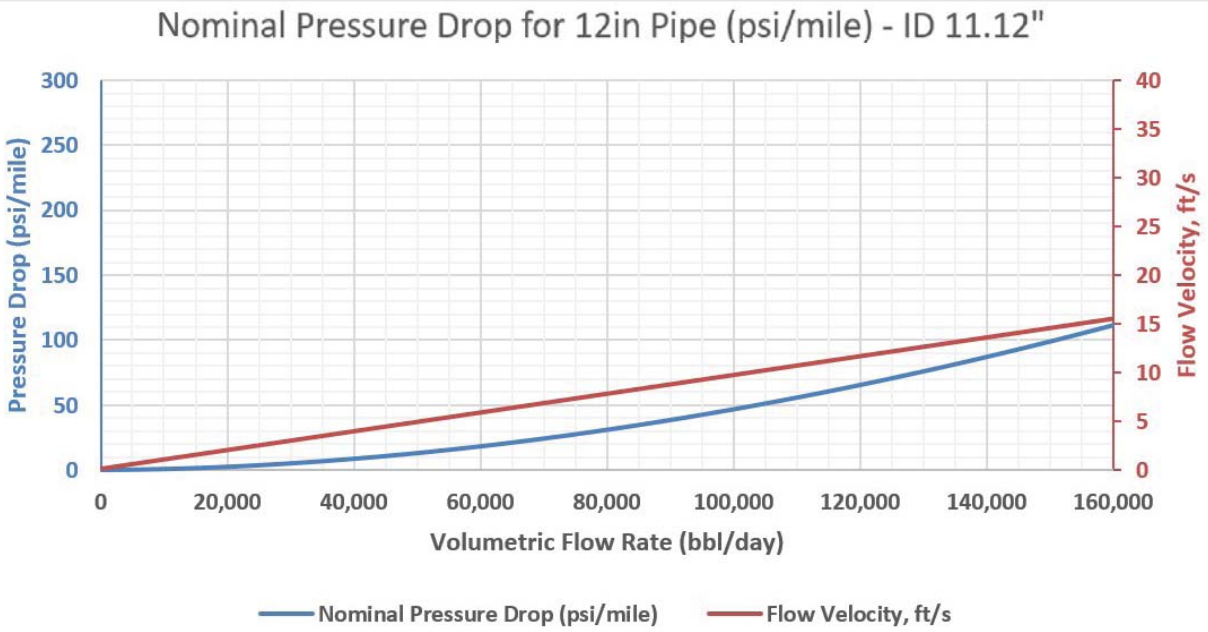


FRICTION LOSS FOR 10” CORE LINER IN WATER SERVICE (Product Under Development)



Hydraulic Performance

FRICTION LOSS FOR 12" CORE LINER IN WATER SERVICE (Product Under Development)



FLOW COEFFICIENTS

Hazen-Williams	150
Darcy-Weisbach Surface Roughness	0.000005 ft
Manning	0.009