



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 4 m/s, resulting in the following flow rates and friction losses in water service:

Size	Max. Flow Rate	Max. Friction loss	Friction loss, psi			
			2	5	10	15
in	m ³ /day	psi/km	km	km	km	km
6	5,770	112	224	560	1120	1680
8	9,900	81	162	405	810	1215
Twin 8	19,800	81	162	405	810	1215
10	15,570	63	126	315	630	945
12	21,650	52	104	260	520	780

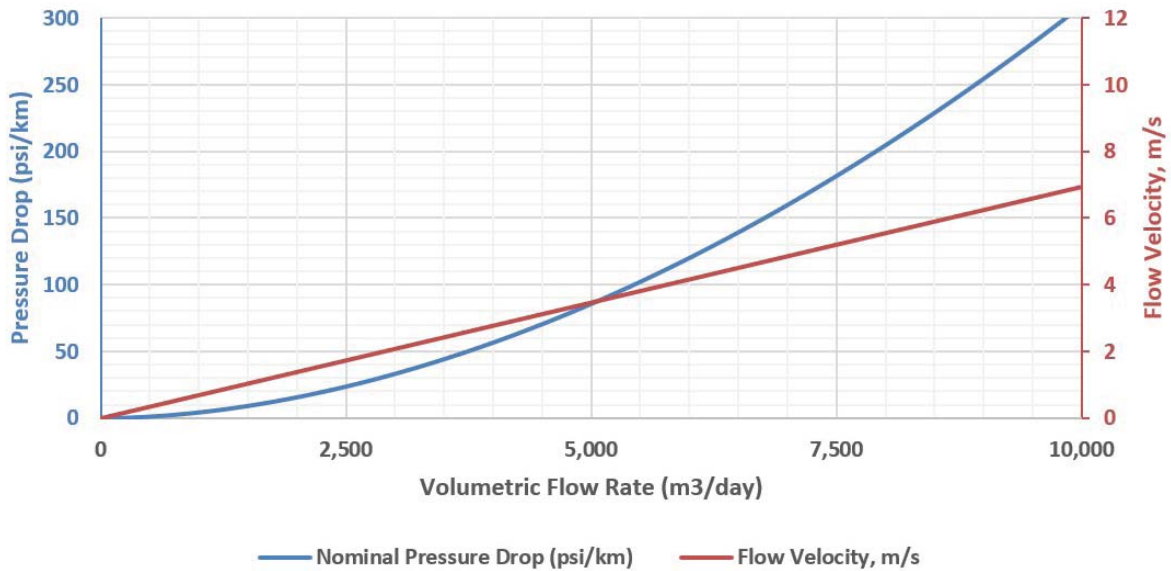
The below charts reflect the expected friction loss in a CORE Liner® pipeline for a variety of flow rates. Currently, the 6" and 8" product sizes are commercially available. The 10" and 12" are under development.



Hydraulic Performance

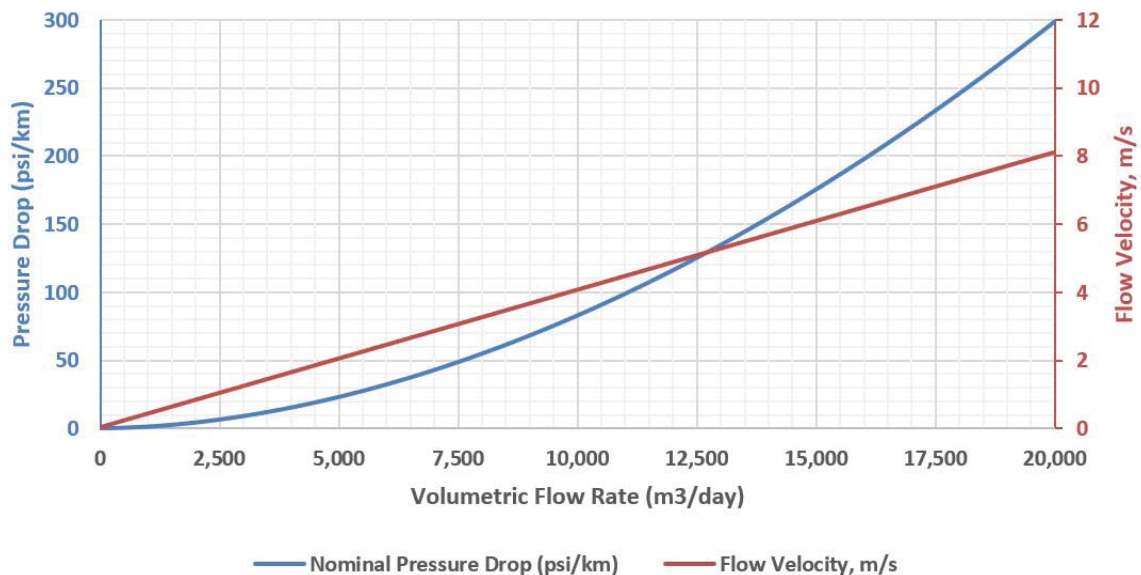
FRICION LOSS FOR 6" CORE LINER® IN WATER SERVICE

Nominal Pressure Drop for 6in Pipe (psi/km) - ID 146 mm



FRICION LOSS FOR 8" CORE LINER® IN WATER SERVICE

Nominal Pressure Drop for 8in Pipe (psi/km) - ID 191 mm

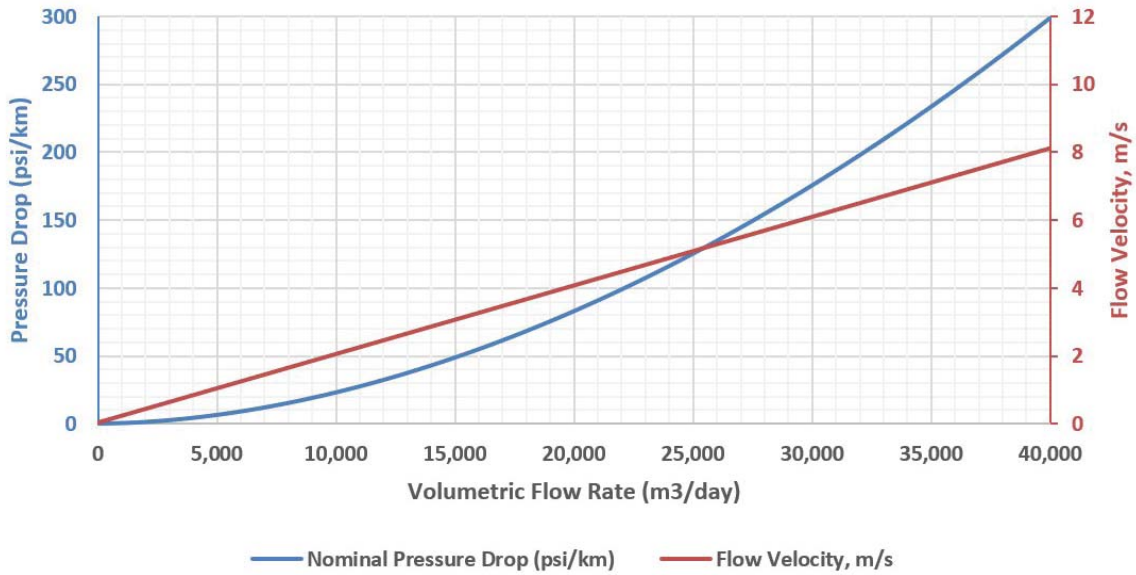




Hydraulic Performance

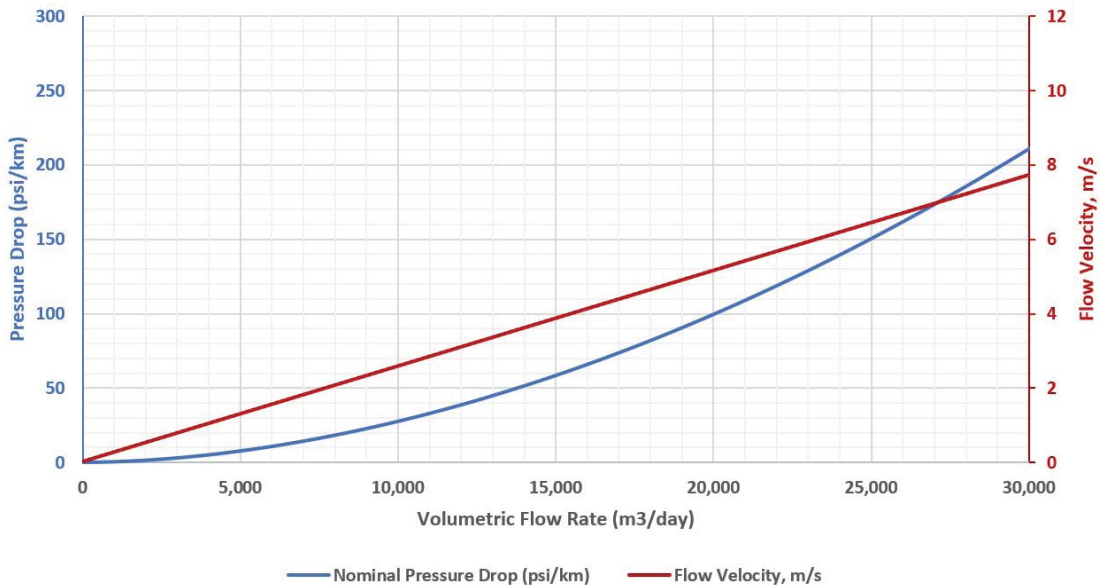
FRICION LOSS FOR TWIN 8" CORE LINER® IN WATER SERVICE

Nominal Pressure Drop for Twin 8in Pipes (psi/km) - ID 191 mm



FRICION LOSS FOR 10" CORE LINER® IN WATER SERVICE (Product Under Development)

Nominal Pressure Drop for 10in Pipe (psi/km) - ID 240 mm

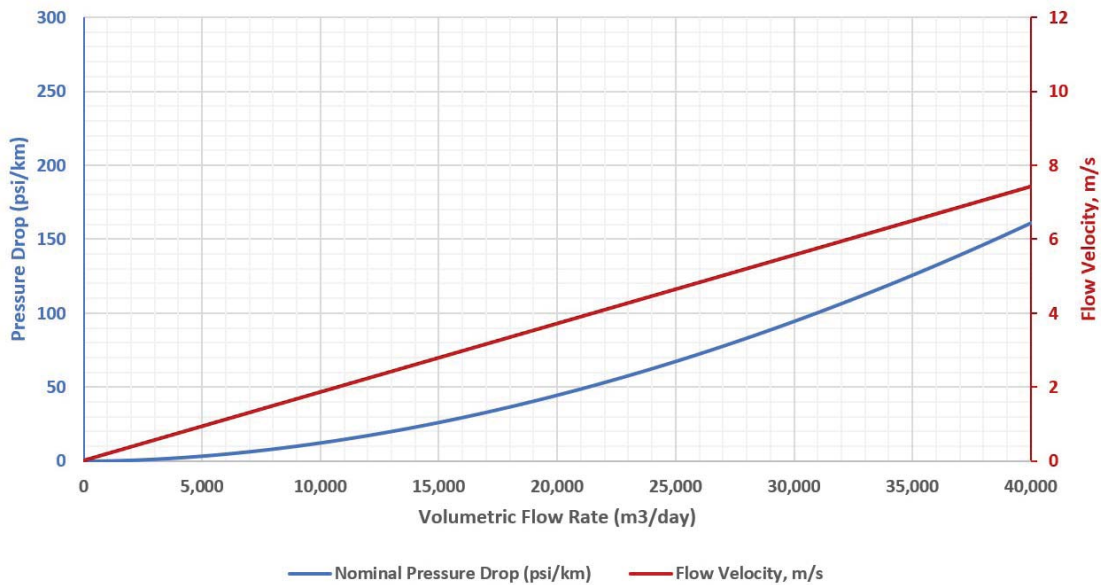




Hydraulic Performance

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

Nominal Pressure Drop for 12in Pipe (psi/km) - ID 282 mm



FLOW COEFFICIENTS

Hazen-Williams	150
Darcy-Weisbach Surface Roughness	0.0015 mm or 0.000005 ft
Manning	0.009