

HOSE - IN - HOSE TRANSFER LINE

Background

Columbia Energy & Environmental Services (Columbia Energy) has developed and tested a nuclear grade hose-in-hose system as a safe, cost-effective, and proven alternative to steel piping for above-ground waste transfers.




Columbia Energy has qualified the design of its hose-in-hose product through rigorous testing performed under its NQA-1 quality assurance program. Each lot of hose material and all finished hose-in-hose assemblies are tested before delivery to ensure they will meet and exceed client performance requirements. Testing results are detailed below.



Advantages

Advantages of the hose-in-hose product include:

- ▶ Performance pre-verified by testing
- ▶ Quicker to install and remove, **minimizing worker exposure** and reducing labor costs
- ▶ Internally expanded fittings allow **full-flow** and reduce material hold-up
- ▶ Continuous hose lengths of up to 380 feet
- ▶ Easy routing due to material flexibility
- ▶ Performance equivalent to ASME B31 piping
- ▶ Options to interface with client fittings (NPT, flange, Code 61, Chem-Joint, etc.)
- ▶ **Compatible** with radiological materials and hazardous chemicals (EPDM and EPR)
- ▶ **Less expensive** than steel pipe to procure, install, and maintain
- ▶ Options for heat tracing available
- ▶ Superior seismic properties
- ▶ Superior erosion performance.

Test	Performance		
	2-in. Primary Hose	4-in. Encasement Hose	
<input checked="" type="checkbox"/> Vacuum	2-in. Hg		
<input checked="" type="checkbox"/> Tensile	7,060 – 7,280 lb	13,995 – 14,280 lb	
<input checked="" type="checkbox"/> Cyclical High and Low Temperature, High Pressure			
High Temperature			310 cycles at 174.3 – 184.3 °F for 15 min
High Pressure			310 cycles at 427.9 – 571.1 psig for 1 min
Low Temperature			310 cycles at 49.1 – 50.3 °F for 15 min
High Pressure			310 cycles at 427.6 – 527.6 psig for 1 min
<input checked="" type="checkbox"/> Steady High Temperature and High Pressure			
High Temperature			170 – 180 °F for 14 hours
High Pressure	650 – 700 psig for 12 hours		

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Test	Performance	
	2-in. Primary Hose	4-in. Encasement Hose
<input checked="" type="checkbox"/> Burst	2,662 – 2,836 psig	1,248 – 1,328 psig
<input checked="" type="checkbox"/> Vehicle Crush	40 cycles with 54,320-lb vehicle	
Crush	2,297 – 2,325 psig	1,031 – 1,102 psig
Pressure		
<input checked="" type="checkbox"/> Crane Outrigger Crush	20 cycles 90,000-lb crane outrigger	
Crush	2,618 – 2,724 psig	1,059 – 1,296 psig
Pressure		
<input checked="" type="checkbox"/> Shear	20 cycles 10-ft by 4-ft by 2-in. steel plate	
Shear	TBD	
Pressure		



Crane Outrigger Crush Test



Vehicle Crush Test



Shear Test



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Columbia Energy is a woman-owned full-service engineering company licensed in Washington and Idaho with an audited ASME NQA-1 program that offers a diverse range of products and services, including engineering & design; drafting; environmental & regulatory consulting; technology development & deployment; waste process & groundwater modeling; and IT consulting. Products include a mobile evaporator, low-level waste solidification process, laboratory management system, and hose-in-hose solution. Columbia Energy has a reputation for safely delivering project solutions on time and to budget.

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