

10 Inline Entrainment Separators

Inline Centrifugal Entrainment Separators for Steam, Air, and Other Gases:

Penn Inline Separators create a centrifugal spinning action that separates out liquid entrainment droplets in steam, air, or other gases. Each are Inline type designed to fit in existing piping.

The most efficient type is our **"T" type** design. The downward tangential inlet directs the flow to the outside walls of the vessel creating a low pressure vortex area that the clean flow follows to the centrally located outlet. Our PuC cone provides additional centrifugal force necessary to wring out the smaller droplets. The cone also provides a space where entrainment droplets fall harmlessly from the stream minimizing re-entrainment. The open flow design keeps pressure loss low.

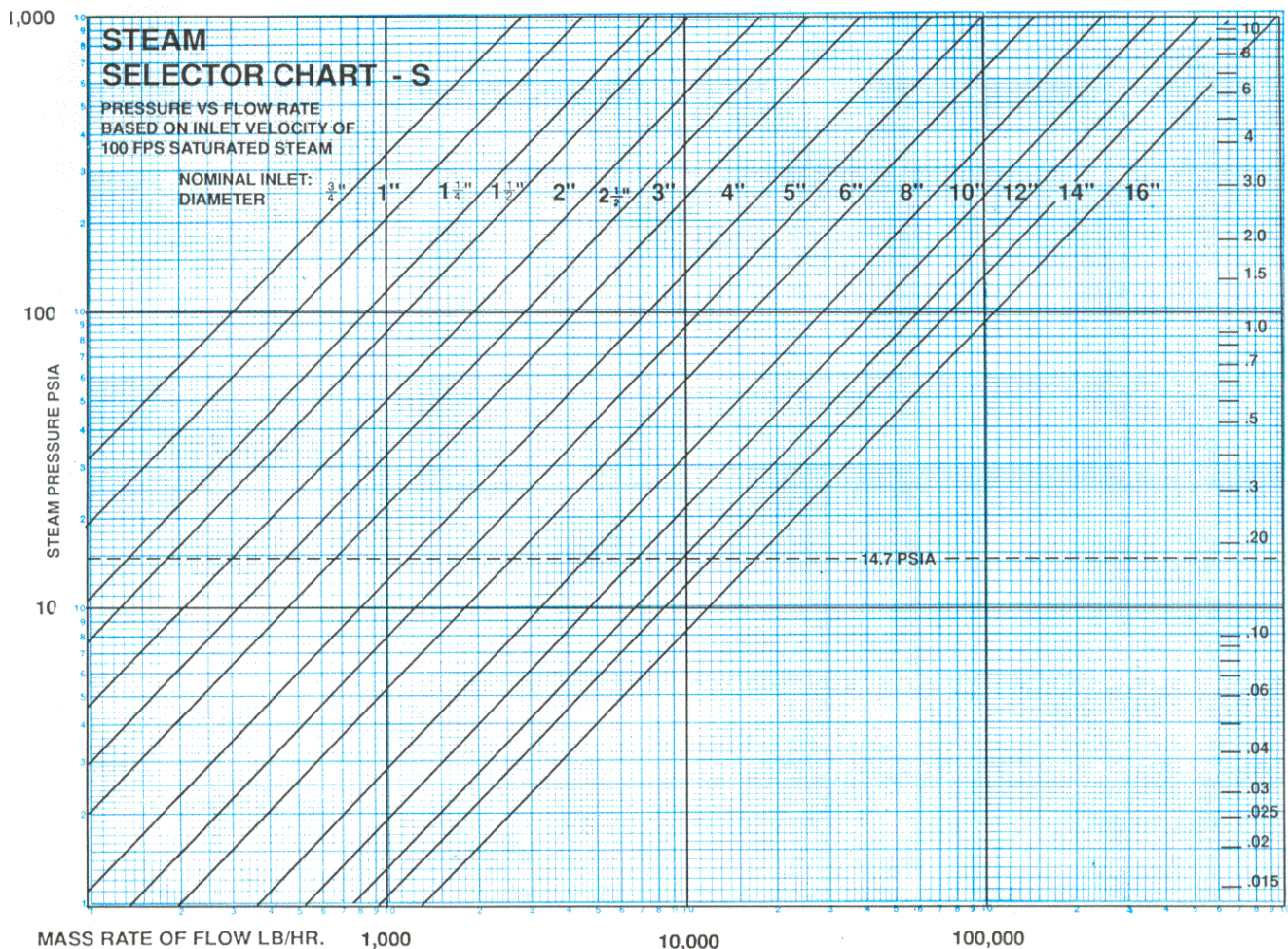


Our other Inline design is a **"straight thru"** that uses a helical baffle to create the centrifugal separation. The body of the separator follows the line requiring less space for installation. These separator are available in horizontal, upflow, or downflow models. All Penn centrifugal separators are designed and stamped ASME code in threaded, 150# flanged or 300# flanged. Special pressures are also available.



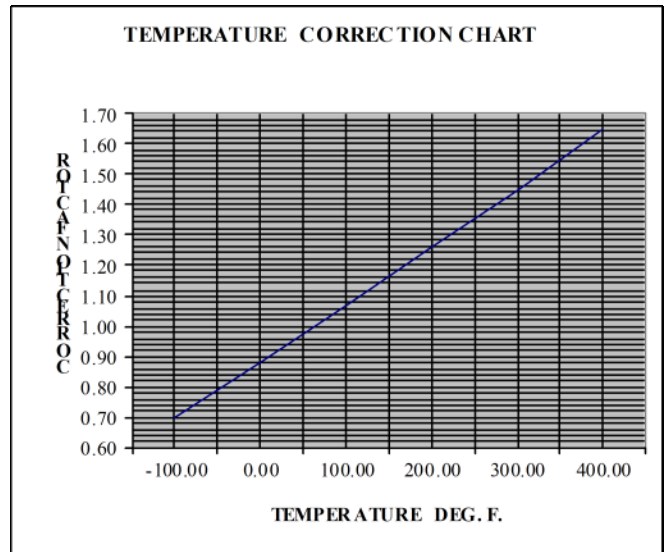
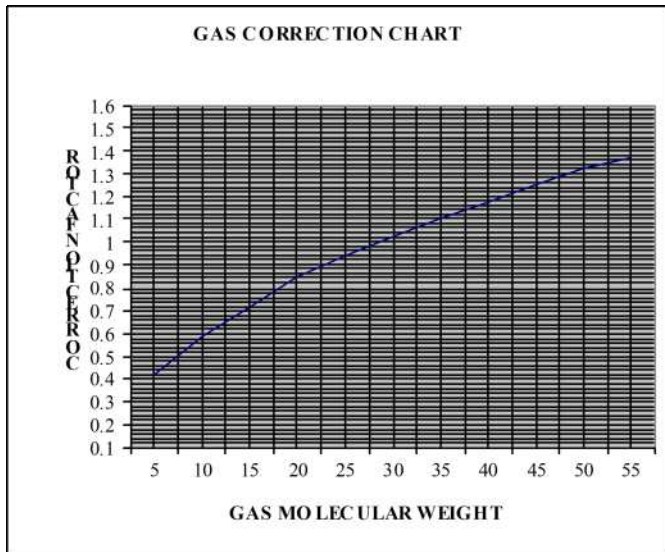
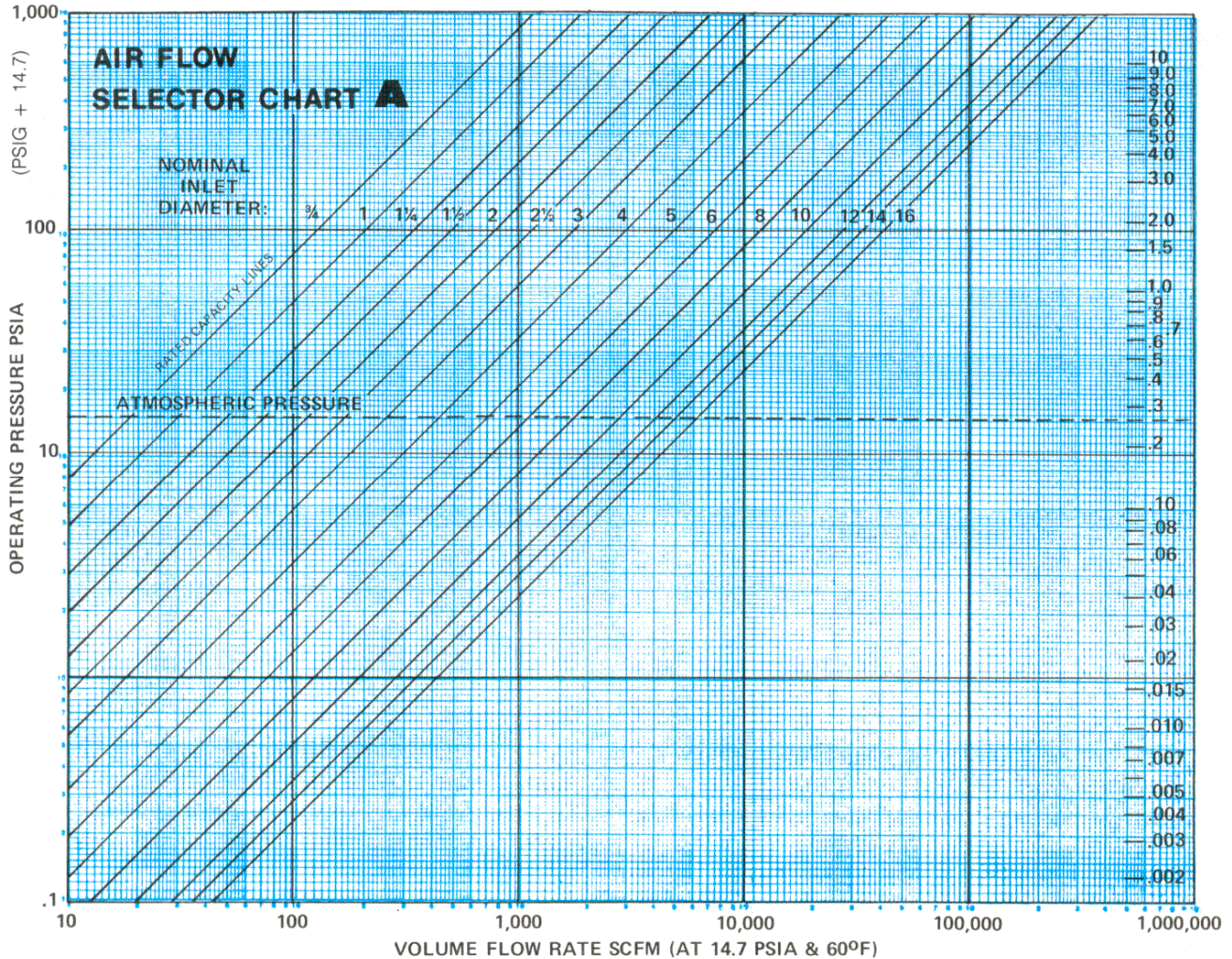
Steam Selector Charts Inline Entrainment Separators:

Sizing is very important in selecting a separator that will provide full efficiency. To select a size find the flow rate in lbs./hr. across the bottom of the selector chart and follow this flow up until it intersects with the operating pressure on the left side of the chart. Where the flow and pressure meet shows a recommended size. Follow the operating pressure line to the right side of the chart to get the pressure drop. Over-sizing should not be considered because efficiency drops off as velocity decreases.

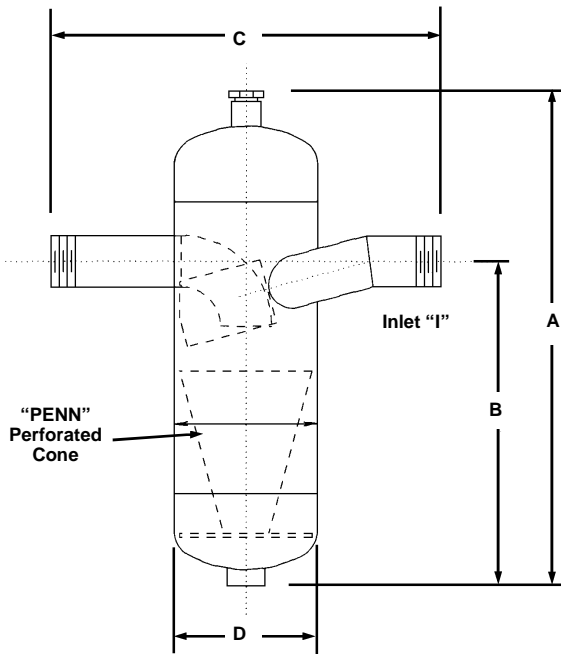


Air and Other Gases Selector Chart Inline Entrainment Separators:

Sizing is very important in selecting a separator that will provide full efficiency. To select a size for air find the SCFM flow rate across the bottom of the selector chart and follow this flow up until it intersects with the operating pressure on the left side of the chart. Where the flow and pressure meet shows a recommended size. Follow the operating pressure line to the right side of the chart to get the pressure drop. The selector chart for air can also be used for selecting separators for other types of gases. The gas flow rate in SCFM can be corrected by using the gas and temperature correction charts below. Over sizing should not be considered because efficiency drops off as velocity decreases.



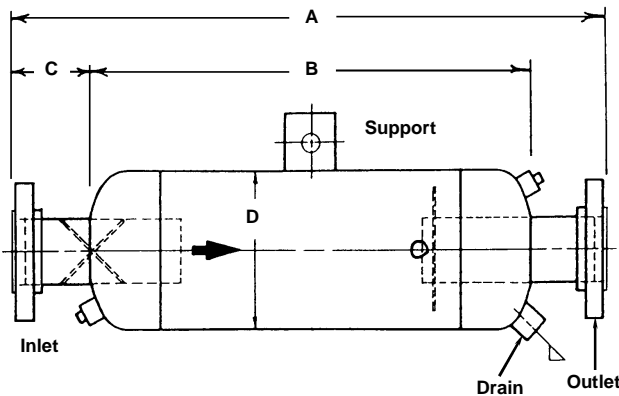
Dimensions Inline Entrainment Separators:



DIMENSIONS CHART "T" TYPE INLINES

MODEL NO.	"A"	"B"	"C"	"D"	"I & O"	"DR"
IS .75-3	11"	7.5"	12"	3.5"	0.75"	.75"
IS 1-4	15"	10"	14"	4.5"	1"	.75"
IS 1.25-5	17.5"	12.5"	15"	5.5"	1.25"	.75"
IS 1.5-6	21.25"	15"	15"	6.5"	1.5"	.75"
IS 2-6	21.25"	15"	18"	6.5"	2"	1"
IS 2.5-8	28"	20"	20"	8.5"	2.5"	1"
IS 3-10	32.75"	24"	21"	10.5"	3"	2"
IS 4-12	38.75"	29"	25"	12.75"	4"	2"
IS 5-16	46.125"	34.875"	32"	16"	5"	2"
ISO 6-18	50"	37.75"	34"	18"	6"	2"
ISO 8-24	65.625"	51"	46"	24"	8"	2"
ISO 10-30	83.5"	63.75"	50"	30"	10"	3"
ISO 12-36	97.5"	76.5"	66"	36"	12"	3"
ISO 14-42	117"	89"	74"	42"	14"	3"
ISO 16-48	128"	102"	78"	48"	16"	3"

DIMENSIONS "STRAIGHT THRU" INLINE SEPARATORS



MODEL NO.	"A"	"B"	"C"	"D"	"I & O"	"DR"
ISH/D/U 2-6	32"	24.5"	3.75"	6.625"	2"	.75"
ISH/D/U 2.5-8	32"	24.5"	3.75"	8.625"	2.5"	.75"
ISH/D/U 3-8	32"	24.5"	3.75"	8.625"	3"	1"
ISH/D/U 4-10	36"	28"	4"	10.75"	4"	1.5"
ISH/D/U 5-12	38"	30"	4"	12.75"	5"	2"
ISH/D/U 6-12	40"	32"	4"	12.75"	6"	2"
ISH/D/U 8-16	48"	40"	4"	16"	8"	2"
ISH/D/U 10-20	60"	48"	6"	20"	10"	2"
ISH/D/U 12-24	74"	60"	6"	24"	12"	3"
ISH/D/U 14-30	90"	78"	6"	30"	14"	3"
ISH/D/U 16-30	100"	88"	6"	30"	16"	3"
ISH/D/U 18-36	108"	92"	8"	36"	18"	3"
ISH/D/U 20-36	120"	104"	8"	36"	20"	3"

Suggested Specifications Inline Entrainment Separators:

Furnish and install as shown on plans a Centrifugal Entrainment Separator either a (Model IS ___ - ___ "T" Type Separator for a horizontal line with a Penn Cone for maximum efficiency) or (a "Straight Thru" Separator Model No. ___ - ___ with PHB helical baffles model ISH for Horizontal, ISU Up-flow, or ISD Down-flow). Either should be properly sized for a (steam flow rate _____ #/hr.) Or (Air or other gas _____ SCFM at a operating pressure of _____ psig.

Separators are to be constructed to ASME Code sec. VIII Div. 1 for a maximum operating pressure of (150 psig at 450°F using 150# flanged inlet & outlet connections), (250 psig at 450°F with 300# flanged inlet and outlet connections) , or (600 psig at 500°F. on 2" and smaller threaded inlet and outlet) . Other pressure and temperature ratings can be specially provided. Coupling connections (NPT) threaded would be supplied for the entrainment drain and inspection ports. The exterior would include a shop primer finish. Central hanger supports are provided on larger units.

Optional accessories could include a (trap) suitably sized to allow constant drainage of the separated liquid entrainment and or a (level gauge) to show a liquid build up.