

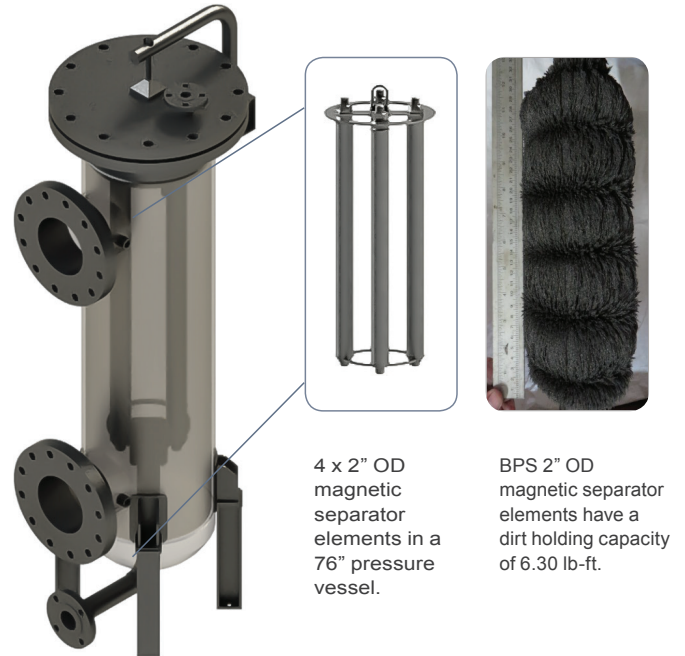
PRODUCT TECHNICAL SPECIFICATIONS



Introduction

Black Powder Solutions' (BPS) Magnetic Separator Systems are inline, full-flow systems for removal of ferrous and non-ferrous contamination (Black Powder™) from fluid and gas systems.

These systems employ a magnetic array within an engineered pressure vessel that maximizes dwell time and particulate removal capability with minimal pressure drop (~0 psi ΔP in a clean system). Each system is engineered to achieve 95%+ efficiency in removing Black Powder™ contamination by accounting for design parameters such as flow rate, pressure, temperature, viscosity, medium and others. BPS Magnetic Separator Systems have the option of manual and semi-automatic cleaning systems, require a bare minimum of consumables, require no fuel or power (manual cleaning) and have a 15+ year operating life.



Application:

These modular systems are available for various applications in hydrocarbon liquids and gases; including applications in field separation, gas gathering and compression, gas processing, crude oil tank farms, underground storage, pipelines, fractionation, refining, finished product storage and handling, water process systems, and water process systems.

SPECIFICATIONS			
Material	304 SS, 316 SS, Duplex, Carbon Steel, exotic alloys		
Engineering Certification	ASME, U-Stamp, CRN, PED, CE, other as requested		
Configuration	Single, duplex, offset, inline ports, other as requested		

Inlet / Outlet Size	Low	1" (Equivalent)
	High	72" (Equivalent)

Vent / Drain Size	Low	1" (Equivalent)
	High	12" (Equivalent)

Operating Data for a Single Magnetic Separator Unit*

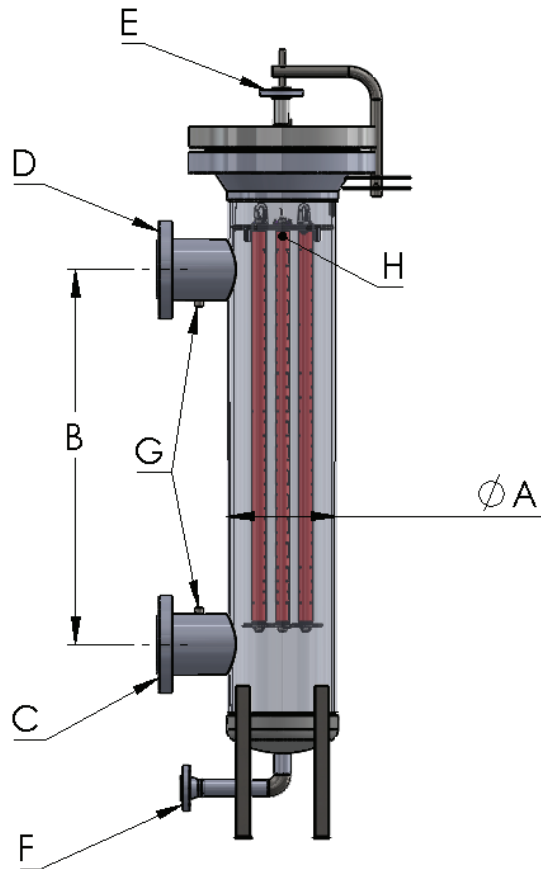
	Liquid	Gas
Flow Rate*	≤ 200,000 bopd	≤ 300 mmscfd

Design Pressure	Low	≤ ANSI 150
	High	≤ ANSI 2500

Design Temperature	Low	Cryogenic Service
	Upper Temp. Limit	< 600 °F (Magnetic Element Array)

*Duplex magnetic separator systems are available to accommodate higher flow rates.

PRODUCT TECHNICAL SPECIFICATIONS



Common Dimensions

NO.	DIAMETER (A) ("OD)	PORT OFFSET (B) ("OD)		INLET PORT (C) ("OD)		OUTLET PORT (D) ("OD)		VENT (E) ("OD)		DRAIN (F) ("OD)		DP PORTS (G) ("OD)		# OF ELEMENTS (H) ("OD)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	5	24	48	1/2	4	1/2	4	1/4	1	3/4	2	1/4	1/4	1	1
2	8	24	60	1/2	6	1/2	6	1/4	1	3/4	2	1/4	1/2	3	3
3	10	24	60	1	8	1/2	8	1/4	1 1/2	1	2	1/4	1/2	3	3
4	12	24	72	2	10	2	10	1/2	2	1	2	1/2	1/2	4	4
5	16	72	24	2	14	2	14	3/4	2	2	3	1/2	1/2	4	7
6	24	72	24	4	20	4	20	3/4	2	2	3	1/2	1/2	7	14
7	30	72	24	4	24	4	24	1	2	3	4	1/2	1/2	14	14
8	36	72	24	6	30	6	36	1	2	4	4	1/2	1/2	33	33
9	40	72	24	6	30	6	36	1	2	4	4	1/2	1/2	33	33

*Other vessel configurations are available depending on application parameters.

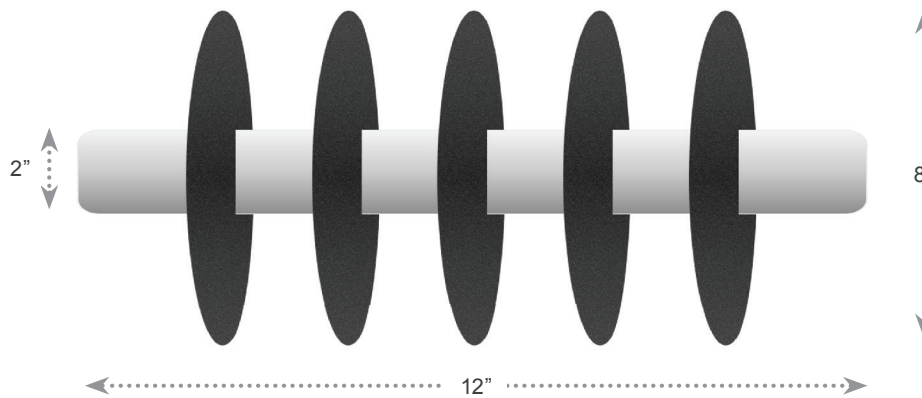
PRODUCT TECHNICAL SPECIFICATIONS



Magnetic Separator Elements

Magnetic separator elements are constructed with a patented radial magnetic field configuration that offers high loading capacity of particulate ranging from sub-micron to 500+ microns in size. The magnetic separator elements capture non-ferrous contamination through static charge, entrapment of ferrous particulate and other mechanical processes.

Element Diameter	Element Length	Radial Fields	Radial-field Diameter	Holding Strength	Magnetic Surface Area	Liquids Holding Capacity	Gases Holding Capacity
2"	12"	5	8"	740 lb-lft	420.9 in ²	14 lb-ft	6.30 lb-ft



Magnetic Exposure

STATIC FIELDS EXPOSED BPS MAGNETIC SEPARATOR ELEMENT		
Distance from Magnetic Separator Element	Magnetic Field Strength	
	Tesla	Gauss
25 mm	88.4 mT	884.0 G
100 mm	3.5 mT	34.6 G
250 mm	0.5 mT	4.6 G
500 mm	0.15 mT	1.5 G
1 m	0.1 mT	1.0 G

STATIC FIELDS ENCLOSED BPS MAGNETIC SEPARATOR ELEMENT		
Distance from Magnetic Separator Element	Magnetic Field Strength	
	Tesla	Gauss
25 mm	4.1 mT	41.0 G
100 mm	0.13 mT	1.3 G
250 mm	0 mT	0 G
500 mm	0 mT	0 G
1 m	0 mT	0 G

*The tesla (mT) is a unit of measurement of the strength of the magnetic field. It is a derived unit of the International System of Units, the modern form of the metric system. One tesla is equal to one weber per square meter.

*The gauss (G) is the cgs unit of measurement of a magnetic field B, which is also known as the "magnetic flux density" or the "magnetic induction". This unit is named after German mathematician and physicist Carl Friedrich Gauss.