SPXFLOW

The APV Cavitator

APV®

SPX FLOW, Inc. (NYSE:FLOW) is a leading manufacturer of innovative flow technologies, many of which help define the industry standard in the market segments they serve. From its headquarters in Charlotte, North Carolina, it operates a sales and support network, centers of manufacturing excellence, and advanced engineering facilities, throughout the world. Its cutting-edge flow components and process equipment portfolio includes a wide range of pumps, valves, heat exchangers, mixers, homogenizers, separators, filters, UHT, and drying technology that meet many application needs. Its expert engineering capability also makes it a premium supplier of customized solutions and complete, turn-key packages to meet the most exacting of installation demands.

Incorporating many leading brands, SPX FLOW has a long history of serving the food and beverage, power and energy, and industrial market sectors. Its designs and engineered solutions help customers drive efficiency and productivity, increase quality and reliability, and meet the latest regulatory demands. In-depth understanding of applications and processes, state-of-the-art Innovation Centers, and advanced pilot/testing technology further assist in optimizing processes and reducing timescales to reliably meet production targets.

To learn more about SPX FLOW capabilities, its latest technology innovations and complete service offerings, please visit www.spxflow.com.

The Innovative APV Cavitator

STANDARD DESIGN

- 4 models / rotor sizes: 8", 12", 14" and 16" (200, 305, 355 , 406 mm)
- Close-coupled design
- All parts in contact with the products are made of stainless steel AISI 316L / DIN 1.4404
- Rotor with 4, 3 or 2 rows of holes
- Housing for 2 radial clearances
- Sanitary 3-A design for CIP cleaning
- Single or double mechanical shaft seal. (Same as the APV W+ pump seals)
- Seal material in SiC / Carbon or SiC / SiC
- Elastomer material in EPDM or FPM (FKM, Fluoroelastomer), FDA quality
- Motor is totally enclosed in IEC or NEMA norm
- Adjustable stainless steel legs or brackets for skid mounting
- Stainless steel motor shroud (European version only)
- Inlet / outlet fittings in accordance with required standards: ISO, DIN, etc.
- Capacity: Flow rate up to 5,283 gph (20.000 l/h). Based on application.

PRODUCT FEATURES AND BENEFITS

This advanced technology can be used for a multitude of sanitary applications ranging from scale free heating to microscopic mixing.

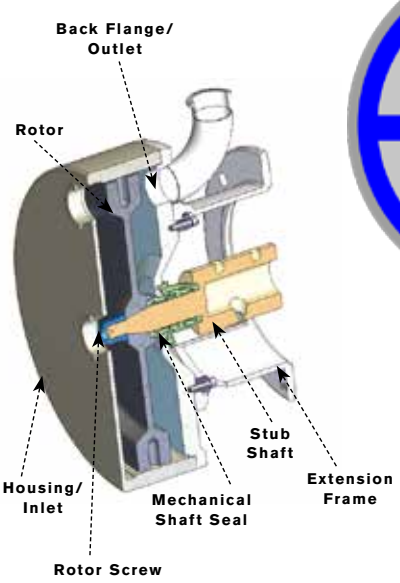
- Scale-free thermal processing of heat-sensitive and high fouling products
- Improved yield with less off-spec product
- Expanded capacity for existing processes, by increasing runtimes before fouling or by reducing mixing time
- Improved quality for heat-sensitive products damaged by conventional heat exchangers
- Easy retrofitting for existing operations
- Improved process efficiencies compared to conventional technologies (savings in time, operating costs, …)
- Enhanced product quality, yield, and/or raw material savings compared to conventional, less-effective mixing devices
- Elimination or reduction of process downtime from maintenance requirements
- Smaller footprint than traditional technology
- Efficient liquid heating without performance loss over time due to fouling
- Produces homogeneous gel, gum or polymer hydration at the proper viscosity without "fish eyes" or other unhydrated powder
- Makes high quality emulsions at the desired particle size

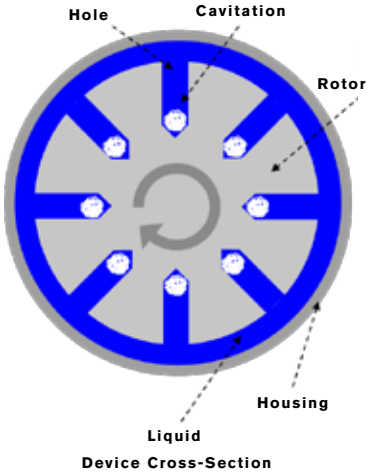
THEORY OF OPERATION

The heart of the technology is a specialized rotor with holes. The spinning action generates hydrodynamic cavitation within the holes away from the metal surfaces. The sites for cavitation are controlled, therefore there is no damage to the metal from cavitation shockwaves. As a liquid passes through the APV Cavitator, it is subjected to controlled cavitation. Microscopic cavitation bubbles are produced, and as they collapse, shockwaves are given off into the liquid which can emulsify and prevent scaling. During heating, temperature is created uniformly throughout the entire liquid without any heat transfer surfaces. There are no hot or cold spots.




- The cavitation shock-waves generate high shear
- The internal liquid friction generates heating
- Increased number of holes result in increased cavitation efficiency





Device Cross-Section

PARTICLE SIZE REDUCTION

This is an example of particle size reduction in a recombined milk sample exposed to controlled cavitation compared to a reference sample.

Before

After

ROTOR OPTIONS:

The Cavitator can be supplied with multiple rotor cavity configurations of 2, 3, or 4 rows of holes in line. The desired level of dispersion and specificity of the application will determine which option provides the optimal result.



Typical product applications

The APV Cavitator is used for scale-free heating and micro-scopic mixing & dispersion. A very wide range of application and opportunities exist in the Dairy, Food & Beverage and Personal Care Industries Including:

- **Scale-Free Heating/Pasteurization** for heat sensitive products like egg products and high protein dairy products /ingredients and puddings.

- **Mixing, Dispersion & Homogenization** for enhanced process efficiency and quality of a wide range of products

- **Emulsification** for mayonnaise, dressing, sauces, recombined milk and dairy products as well as meat emulsions (pet food, etc.)

- **Hydration** for dairy, food, and ingredient powders to enhance efficiency and speed of hydration

- **Aeration** for viscous gums and liquids with small or large volumes of gas

OPTIONAL SKIDDED SYSTEMS:

The APV Cavitator can be delivered as a skidded system equipped with:

- Frequency inverter for speed control
- Manual back pressure valve
- Monitoring Equipment (Cavitator inlet and outlet)
  - PT100 transmitters, display on control unit
  - Manometers
- Flow meter (magnetic or propeller type)
- Gas nozzle to inject gas into the product
- Optional feed pump - centrifugal or positive displacement
- Sample valves at Cavitator inlet and outlet
- Skids can be rented for customer trials from the SPX FLOW Innovation Center. The Innovation Center can also carry out product trials.

IEC

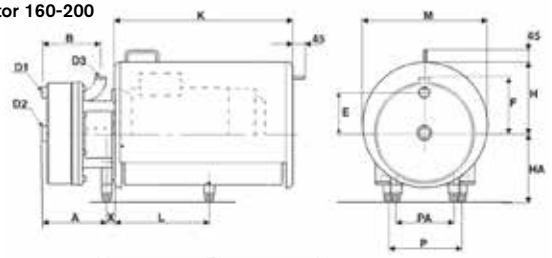
	Models / Rotor Sizes			
	8”/200	12”/305	14”/355	16”/406
B	168	200	194	206
D1	16	38	38	51
D2	16	51*	51*	51
D3	16	38	38	51
E	98	141	166	185
F	123	194	224	251

		IEC Motor Size (kW)				
		5,5-7,5	11-18, 5	22	30-37	45-75
Size:		132	160	180	200	225
12” 14” 16”	A		235	235	235	
8” 12” 14” 16”	AA	224	282	282	282	282
	X		46	46	46	179
	H	193	255	277	372	405
	HA		305	305	305	305
	K	482	588	688	848	921
ALL	L		318	362	463	286
	M	360	450	480	580	700
	P		254	279	318	356
	PA		222	222	222	

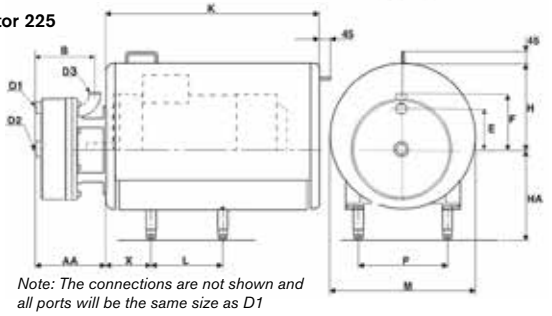
Adjustable Feet (only for 12”, 14” and 16”)

*** Add on a reduction fitting from ø 51 to ø 38**

Motor 160-200



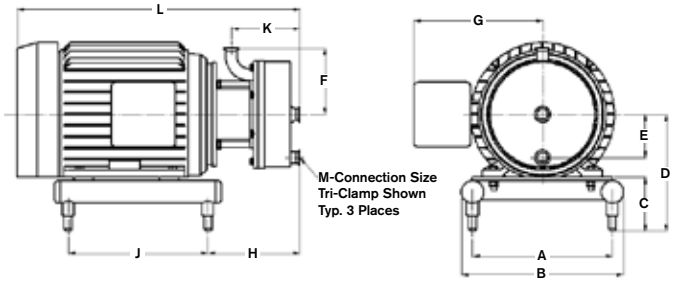
Motor 225



Note: The connections are not shown and all ports will be the same size as D1

NEMA

	Sizes (mm/in.) and Model Number							
	8” #215TC	12” #284TSC	12” #326TSC	14” #326TSC	14” #365TSC	16” #326TSC	16” #365TSC	16” #405TSC
A	215.9 (8.50”)	457.2 (18.00”)	457.2 (18.00”)	457.2 (18.00”)	533.4 (21.00”)	257.2 (18.00”)	533.4 (21.00”)	533.4 (21.00”)
B	254 (10.00”)	530.4 (20.88”)	530.4 (20.88”)	530.4 (20.88 ”)	606.5 (23.88”)	530.4 (20.88”)	606.5 (23.88”)	606.5 (23.88”)
C	82.9 (3.26”)	177.8 (7.00”)	177.8 (7.00”)	177.8 (7.00”)	177.8 (7.00”)	177.8 (7.00”)	177.8 (7.00”)	177.8 (7.00”)
D	216.3 (8.51”)	355.6 (14.00”)	381 (15.00”)	381 (15.00”)	406.4 (16.00”)	381 (15.00”)	406.4 (16.00”)	431.8 (17.00”)
E	98.1 (3.86”)	141.1 (5.56”)	141.1 (5.56”)	166.1 (6.54”)	166.1 (6.54”)	185.3 (7.29”)	185.2 (7.29”)	185.2 (7.29”)
F	136.1 (5.36”)	217.4 (8.56”)	217.4 (8.56”)	247.4 (9.74”)	247.4 (9.74”)	290.8 (11.45”)	290.8 (11.45”)	290.8 (11.45”)
G	204.5 (8.05”)	323.9 (12.75”)	358.8 (15.19”)	385.8 (15.19”)	459.2 (18.08”)	385.8 (15.19”)	459.2 (18.08”)	490.5 (19.31”)
H	227.8 (8.97”)	269.4 (10.61”)	307.5 (12.11”)	312.4 (12.30”)	341.1 (13.43”)	312.4 (12.30”)	341.1 (13.43”)	385.3 (15.17”)
J	352.6 (13.88”)	457.2 (18.00”)	457.2 (18.00”)	457.2 (18.00”)	257.2 (18.00”)	457.2 (18.00”)	457.2 (18.00”)	457.2 (18.00”)
K	181.1 (7.13”)	224.3 (8.83”)	224.3 (8.83”)	217.6 (8.57”)	217.7 (8.57”)	246.2 (9.69”)	246.2 (9.69”)	246.2 (9.69”)
L	711 (27.99”)	876.2 (34.50”)	917.9 (36.14”)	922.8 (36.33”)	917.2 (36.11”)	922.8 (36.33”)	917.2 (36.11”)	1082.3 (42.61”)
M	19.5 (.75”)	38.1 (1.50”)	38.1 (1.50”)	38.1 (1.50”)	38.1 (1.50”)	50.8 (2.00”)	50.8 (2.00”)	50.8 (2.00”)



Based in Charlotte, North Carolina, SPX FLOW, Inc. (NYSE: FLOW) is a multi-industry manufacturing leader. For more information, please visit www.spxflow.com

SPX FLOW 611 Sugar Creek Road Delavan, WI 53115
P: (262) 728-1900 or (800) 252-5200 F: (262) 728-4904 or (800) 252-5012 E: answers.us@spxflow.com

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