

Blown Film Extrusion

Market Application Publication



Background:

Blown film extrusion is used to make a variety of plastic films for the packaging industry. A tube of molten thermoplastic is extruded then inflated to many times its initial diameter, forming a thin tubular film. Extruded film is used for a variety of critical packaging applications, including freezer foods, produce, laminating film, barrier film, custom shrink film and form, and fill and seal. Blown film extrusion eliminates some of the problems associated with conventional methods, including varying thickness at the edges. Screw carbonization and frequent dye cleaning, caused by oxygen in the feed throat hopper, are issues with blown film extrusion that can be improved or eliminated by using a nitrogen purge.



Features and Benefits:

- Improves operation – minimize costly down time for cleaning or replacement of screw.
- Save money by eliminating expensive gas cylinders & dewars.
- Do away with dangerous and problematic nitrogen bottle transport, storage and change-out issues.
- Easy to install and operate: pipe in compressed air, pipe out nitrogen
- Price of nitrogen is constant. Supplier nitrogen is subject to price increases, rental agreements, hazmat fees, delivery surcharges, local & state taxes, etc. A nitrogen generator offers long term price stability.
- Very little maintenance or monitoring required once system is up and running. Simple and straightforward operation.
- Proven technology with numerous references available. Over 50,000 successful generator installations.

Application:

Oxygen in the feed throat hopper is a major issue for blown film extruders, as it causes carbonization on the screw and dyes. Unexpected downtime for cleanings can be two weeks or longer. Improved uptime by minimizing the number of cleanings, is a goal of every extruder. Utilizing a clean, dry stream of nitrogen to purge at the feed throat can provide improved uptime. Extruder manufacturers realize the benefits of a nitrogen purge, and often recommend nitrogen in their installations. A Parker Hannifin nitrogen generator,

which separates nitrogen and oxygen from a compressed air supply, can often be the most cost effective way to supply this nitrogen

Case Study:

Numerous blown film extruders in North America are using the Parker Hannifin nitrogen generator to improve their uptime and improve times between screw and dye cleanings. Membrane nitrogen generators have provided an attractive payback, and easily meet the flow and purity (~99%) requirements for this application. A

single nitrogen generator can often meet the requirements of several blown film extruders, making them a cost effective solution for single or multiple extrusion lines. Since the generators supply a continuous nitrogen supply, operators no longer have to monitor nitrogen volumes and change tanks in the middle of runs, which can result in upset conditions. As extruders pursue a goal of 100% uptime, a Parker Hannifin nitrogen generator will continue to be a key component in that quest.

HFX Series Flow Rates and Pressure Correction

Flow Rates (SCFH) @ 100 psig @ 68°F						Pressure Correction Factors (at Indicated Operating Pressure (PSIG))						
Model	95	96	97	98	99	58	73	87	101	116	130	145
HFX-1	40	33	26	16	11	.52	.65	.86	1	1.15	1.35	1.44
HFX-3	148	120	95	70	42	.54	.68	.85	1	1.14	1.3	1.43
HFX-5	279	229	176	131	76	.52	.65	.85	1	1.14	1.34	1.43
HFX-7	452	360	283	209	120	.53	.66	.86	1	1.1	1.3	1.4
HFX-9	752	600	452	330	201	.44	.65	.85	1	1.1	1.3	1.4
HFX-11	1201	992	780	572	248	.44	.65	.85	1	1.2	1.4	1.6

Principal Specifications - HFX Series Membrane Nitrogen Generators

Model Number	HFX-1, HFXO-1	HFX-3, HFXO-3	HFX-5, HFXO-5	HFX-7, HFXO-7, HFX-9, HFXO-9, HFX-11, HFXO-11
Atmospheric Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes	Yes
Particles > 0.01 micron	None	None	None	None
Suspended Liquids	None	None	None	None
Min/Max Operating Press.(1)	60 psig/145 psig	60 psig/145 psig	60 psig/145 psig	60 psig/145 psig
Max. Press. Drop (at 95% N ₂ , 125 psig)	10 psig	10 psig	10 psig	10 psig
Recommended Ambient Operating Temperature	77°F (25°C)	77°F (25°C)	77°F (25°C)	77°F (25°C)
Min/Max Inlet Air Temp.	40°F/122°F (2°C/50°C)	40°F/122°F (2°C/50°C)	40°F/122°F (2°C/50°C)	40°F/122°F (2°C/50°C)
Recommended Inlet Air Temperature	77°F (25°C)	77°F (25°C)	77°F (25°C)	77°F (25°C)
Electrical Requirements (2)	None (2)	None (2)	None (2)	None (2)
Dimensions	12.8" w x 7.5" d x 16.3" h (32cm x 19.1cm x 41cm)	16" w x 16" d x 50" h (41cm x 25cm x 91cm)	16" w x 16" d x 50" h (41cm x 25cm x 91cm)	24" w x 20" d x 69" h (61cm x 51cm x 175cm)
Shipping Wt.	38 lbs. (17.3 kg)	75 lbs. (34 kg)	106 lbs. (114 kg)	250 lbs. (114 kg)

Notes:

1 Maximum operating pressure in Europe is 8 barg.

2 No electrical power required unless used with an electrical accessory, e.g., an oxygen analyzer.

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