

GE
Energy

AltairLibrapulse™

Filtration System



Landbased Protection



imagination at work

Introduction

Turbine air inlet filtration systems operating in very dusty environments, such as deserts, can be overwhelmed by the high levels of contaminants. This can result in filters operating with high pressure loss, needing constant and high levels of maintenance or, in extreme cases, allowing particulate to pass through the system.

The AltairLibrapulse inlet filtration system is a high efficiency, self-cleaning air filtration unit ideally suited to high dust-load environments.

The system's integral self-cleaning function means that the filtration unit can operate in high-dust conditions for long periods of time without the need for filter changes and general maintenance. Filter-cleaning takes place during normal turbine operation as only 5-10% of the filters are cleaned at any one time.

Optimized filtration performance

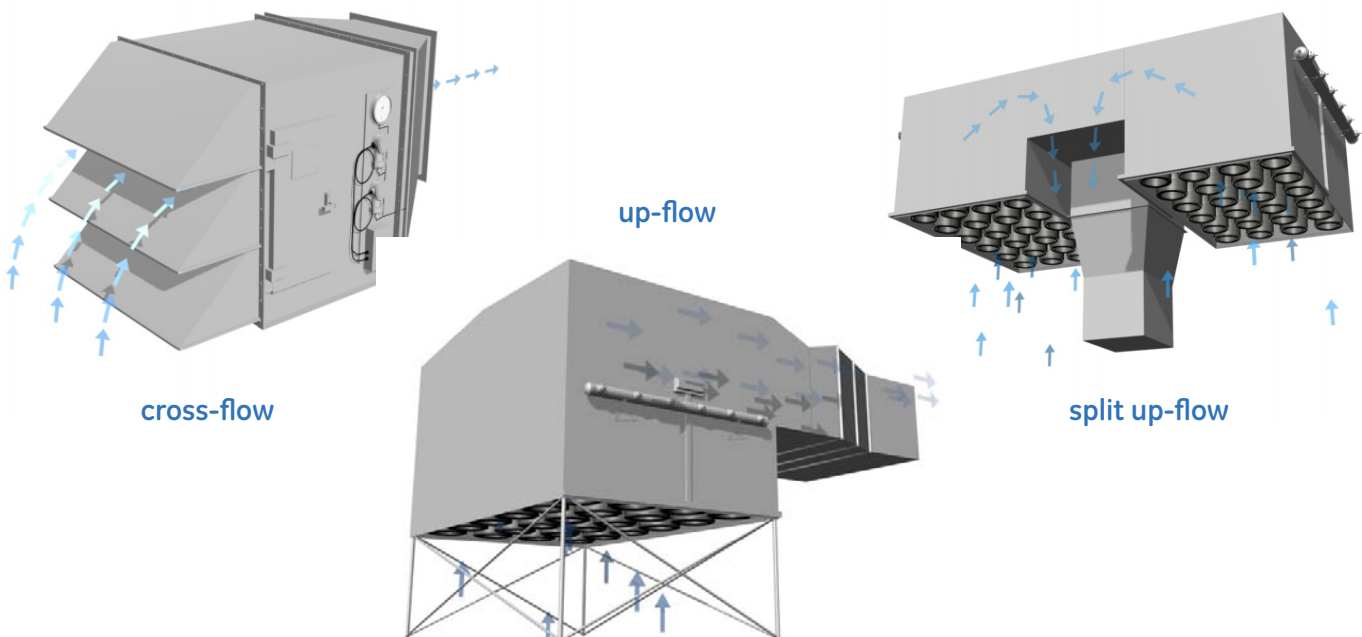
Advanced filtration and materials technology have been utilized to create a variety of high efficiency filters ranging from F7 to F9 (ISO EN779). Each filter has been optimized to hold the maximum amount of dust while minimizing both



clean and in-service pressure loss. This results in longer periods between filter change-out and increased power availability for the protected turbine. The quick-release design of the elements reduces maintenance time.

Flexible Design

One of the system's key benefits is its adaptability. A variety of configurations including 'cross-flow', 'up-flow' and 'split up-flow' is available to enable optimum use of available plant space.



Key Benefits

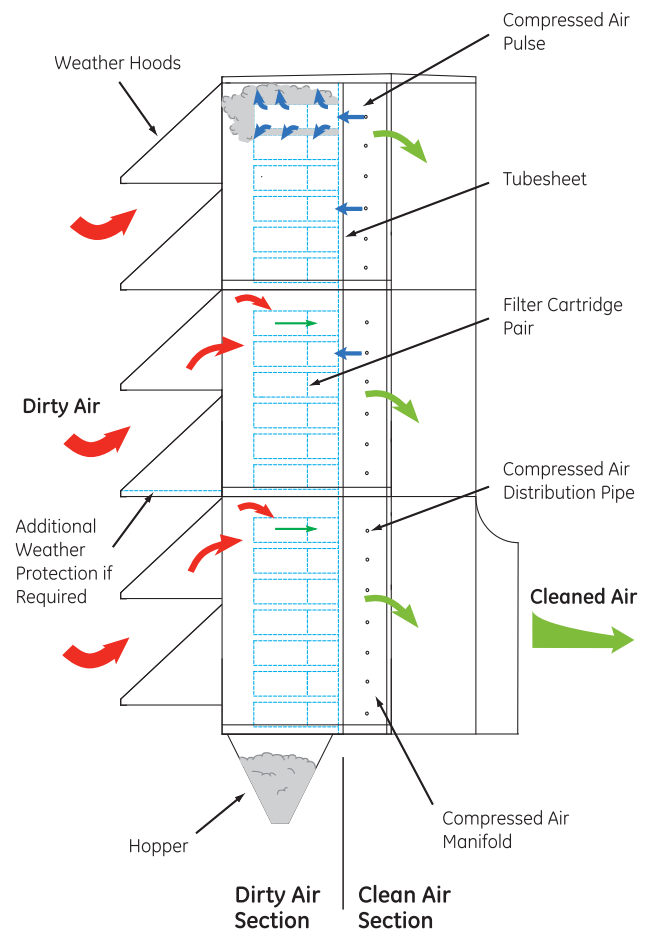
- Self-cleaning system helps provide continuous turbine protection - even in severe conditions such as dust storms
- Low and stable pressure loss - even when subjected to high dust loads - helps enable optimum turbine performance
- Variety of system arrangements, e.g. cross-flow, up-flow, gives flexibility in turbine/site layouts
- Range of filter elements compliant with recognized industry specifications suits a wide variety of applications
- Quick-release filter elements reduce maintenance time during change-outs

How the System Works

Dust-laden air enters the filter unit through 90° weather hoods, which remove snow, sleet, rain etc. Within the filter house, cylindrical or conical filter elements are arranged horizontally against a tubesheet. Air flows from the outside of these elements to the inside and through the tubesheet into the clean air plenum. Contaminants are unable to penetrate the elements' filter media and become trapped on the surface forming a 'cake'. At a predetermined setting (DP or time-controlled), the self-cleaning system is automatically activated.

The cleaning takes place with the turbine running. Around 10% of the elements are cleaned at one time to avoid disruption to the turbine's airflow. Cleaning is performed by injecting compressed air into the filter elements in the opposite direction to the normal airflow. The injected pulse of air is further enhanced by the entrainment of surrounding air from the plenum. This combined airflow creates a shockwave through the filter elements to dislodge the surface cake.


Particulate pulsed off the filters is normally sufficiently agglomerated to escape re-entrainment, which is further reduced by the general downward flow of air within the housing. The cleaning sequence continues until either the pressure loss has reduced to a pre-determined level or a set number of cycles has occurred.



AltairLibrapulse Filter Elements

A range of pulse-jet filter elements is available in a variety of configurations and sizes, including single cylindrical, double cylindrical and double cylindrical/conical. The LP elements are also available in two media mixes - fully synthetic and a synthetic/cellulose blend. Although designed primarily for the AltairLibrapulse filtration system, LP filter elements are also suitable for use in other filtration systems.



Filter Type	Product Name	Performance
High efficiency filter		LP9 Very high efficiency, particularly suited to environments with high levels of sub-micron particulate. Available in a variety of configurations.
		LP8 High performance filtration with minimal premium in terms of pressure loss.
		LP7 Increased level of efficiency particularly for smaller contaminants. LP7 performance allows for a longer interval between compressor washings.

Performance Data

	LP7	LP8	LP9
Initial pressure loss (typical)	0.71 IN WG 18 mmH ₂ O	0.78 IN WG 20 mmH ₂ O	0.78 IN WG 20 mmH ₂ O
Gravimetric efficiency vs ASHRAE	99%	>99%	>99%
Average Dust Spot Efficiency	80%	94%	97%
Filter Class EN779	F7	F8	F9

All data are shown for indication purposes and are subject to change without notice.

For more information on Altair systems contact your GE Energy sales representative at +44 (0) 1420 541 188 (UK) / +1 502 499 2151 (US) or visit us on the web at ge-energy.com/airquality.

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