



REFERENCE

viledon®

GTS CARTRIDGE SETS FOR COASTAL POWER STATION IN SAUDI ARABIA

The project involved upgrading the air intake filters of a combined cycle power station located in coastal Saudi Arabia. This facility is one of the world's largest desalination & power plants and has 12 GE 7FA gas turbines, all running at base load in a combined cycle configuration with steam turbines.

The situation

The site is located in a challenging coastal environment with filters having to cope with year-round humidity as well as high levels of dust from the desert and nearby petrochemical & refinery facilities.

OEM filters were initially installed on all 12 turbines leaving the turbine operators disappointed with the results:

- Competitor filters only offered efficiency at F8 filter class and the inadequate filter efficiency causes substantial fouling on turbine blades.
- Due to this buildup of fine dust, each turbine suffered **serious power output losses** of 10 MW or more. ($\approx 6\%$ of output) between offline washes.
- Filter lifetime of 24 to 30 months was too short to meet the major outage intervals of 3 years.
- The 80% cellulose/20% synthetic media of the OEM filters was unable to cope with the humidity, particularly in the autumn and winter seasons.

The Viledon® solution

Installation of Viledon® 100% synthetic GTS cartridge sets (conical/cylindrical).

- By virtue of higher filtration efficiency, Viledon® GTS filters reduced dust ingress and fouling into the turbine by an estimated 45%*.
- As a direct result of higher filtration efficiency, **turbine output degradation was reduced by > 50%** to about 5 MW between offline washes.
- At the same time Viledon® GTS cartridges reached a service life > 3 years, thus meeting the site's planned outage schedules.
- With the Viledon® GTS's 100% synthetic media, stable pressure drop is achieved even during fog – ambient humidity and fog is no more a concern for the operators.
- Over a period of 2.5 years, the turbines at the site were sequentially upgraded from competitor to Viledon® GTS filters and all 12 turbines are now running on GTS filters.



GTS cartridges in cylindrical and conical design



Installation of Viledon® GTS cartridges

e.FFECT
electronic Freudenberg Filter
Efficiency Calculation Tool

* Average power loss to dust ingress calculated using Freudenberg's proprietary e.FFECT software. More info available.

You can find detailed information at

www.freudenberg-filter.com >
World of Industrial > Services and
Engineering > Filter efficiency
calculation

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Customer benefits

- Extended lifetime of cartridges. From 24 to 30 months with competitor filters, the operators now achieve 36 months or more and are able to **reliably meet major outage intervals**.
- Higher output and therefore, sales revenue generated especially in peak summer months due to significantly lower fouling and turbine output degradation.
- Improved and stable pressure drop values despite dusty, humid and coastal conditions.
- Viledon® GTS cartridge sets are ideally suited for the local conditions; optimized pulse-jet cleaning cleaning.



Initial situation: huge dust accumulation on filter house floor as a direct result of very high ambient dust concentrations

| KEY DATA | |
|----------------------------------|--|
| Location | Coastal Saudi Arabia, Middle East |
| Gas turbines | GE 7FA (12 units), 165 MW |
| Intake air flow rate per unit | 1,311,636 m³/h (2,484 m³/h per filter set) |
| Intake air system/filters fitted | 2-stage filter system 1 st stage: prefilter glassfiber mats placed horizontally in weather hoods 2 nd stage: 528 sets of GTS 324-445 cartridges (cylindrical/conical, 660 mm height) of filter class ISO ePM1 75% (to ISO 16890 standard) or F9 (to EN779:2012 standard) |



Installed Viledon® GTS cartridges after 20,000 hours in operation

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Freudenberg Filtration Technologies SE & Co. KG

69465 Weinheim, Germany

Phone +49 (0) 6201 80-6264 | Fax +49 (0) 6201 88-6299

viledon@freudenberg-filter.com | www.freudenberg-filter.com