



## REFERENCE

viledon®

### ADDING AN EFFECTIVE WATER REMOVAL SECTION TO THE AIR INTAKE SYSTEM AT A PETROCHEMICAL PLANT IN CHINA

#### Introduction

A Chinese petrochemical plant, located in Jiaying with east-Asian monsoon climate, wanted to upgrade their gas turbine type Siemens SGT 700 for higher power output.

#### Initial situation

- Especially in summer period when the ambient air temperature can reach 35°C (97°F) the power output was considered as being too low. Therefore the user decided to cool the intake air for increasing the mass flow and regaining power.
- The air intake cooling however caused considerable condensation of water after the heat exchangers.

As a consequence the first and second stage filters became continuously saturated with water.

- The customer experienced high pressure drops and a carry-through of detrimental substances down to the turbine.
- Erosion caused by water droplets led to severe damages to the turbine.

#### Viledon® solution

- Based on the Siemens recommendations to remove the water droplets, Freudenberg & Vilene Filter China advised an upgrade of the filter system by adding highly efficient coalescer prefilters type F 45 R.

- This upgrade comprised an extension of the air intake system.
- The coalescing prefilters F 45 R were installed in front of the pocket filters type T 90 PRE. They could be mounted in the same filter frames as the T 90 PRE filters so that space constraints were taken into consideration.
- The new filtration system consists of 72 pieces F 45 R, 72 pieces T 90 PRE and 60 pieces MX H 10 cassette filters.



Viledon® Compact pocket filter F 45 R

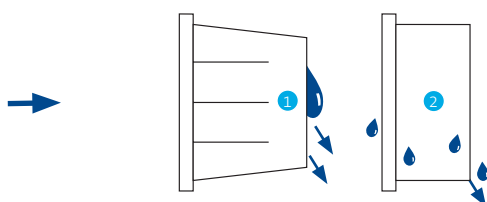
Viledon® Compact pocket filter T 90 PRE



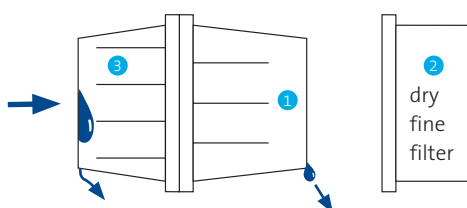
Viledon® MX H 10 cassette filter

#### WATER PATHWAYS IN COMPARISON

**Old filtration concept**  
with water cascading;  
subsequent contamination unavoidable after prolonged operation.



**New filtration concept**  
with front of filter  
drainage effect and  
avoidance of contamination.



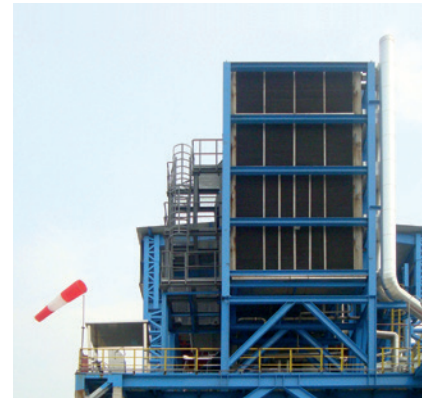
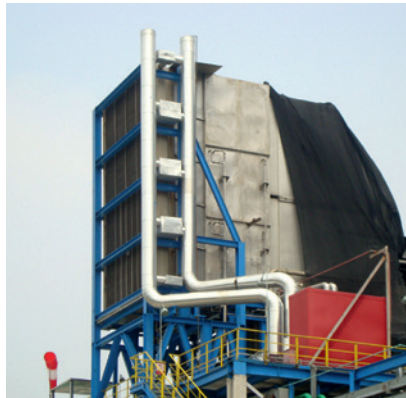
- ① = T 90 PRE
- ② = MX H 10
- ③ = F 45 R



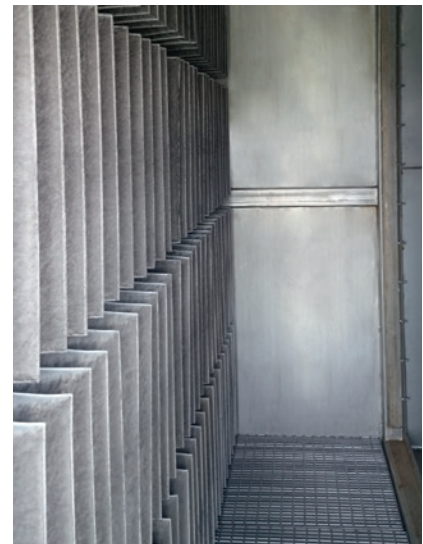
Pocket filter F 45 R with water-repellent properties for excellent coalescing

### Benefits for the user

- Since May 2016 the condensation section runs trouble-free with the new filtration system.
- The F45R pocket filters stop condensed moisture droplets from passing to the second filter stage and consequently protect the gas turbine from condensed water damage.
- The gas turbine operates almost normally for >5 months with no shutdown during hot and humid summertime.
- The inlet air temperature of the condensation section could be lowered by approx. 9 °C resulting in economic benefits.
- The customer is very satisfied with the new 3-stage filtration concept which ensures reliable and clean operation of the gas turbines's compressor section.



KEY DATA	
Location	Jiaxing, China
Gas turbine	Siemens SGT 700
Intake air flow rate per unit	286,237 m³/h (with package ventilation)
Intake air system/filters fitted	<p>3-stage filter system: 60 filters for combustion air + 12 filters for package ventilation</p> <p>1<sup>st</sup> stage: 72 F 45 R pocket filters</p> <p>2<sup>nd</sup> stage: 72 T90PRE pocket filters, filter class M6 to EN 779:2012, ISO ePM10 75 % to ISO 16890</p> <p>3<sup>rd</sup> stage: 60 MX H 10 cassette filters, filter class E10 to EN 1822:2009, ISO ePM1 95 % to ISO 16890</p>



Installed F45 R reverse pocket filters

This document provides non-binding information. Freudenberg Filtration Technologies SE & Co. KG cannot accept any liability for the completeness and correctness of the statements made. Liability and warranty questions shall be governed solely by the provisions of the delivery relationships involved.