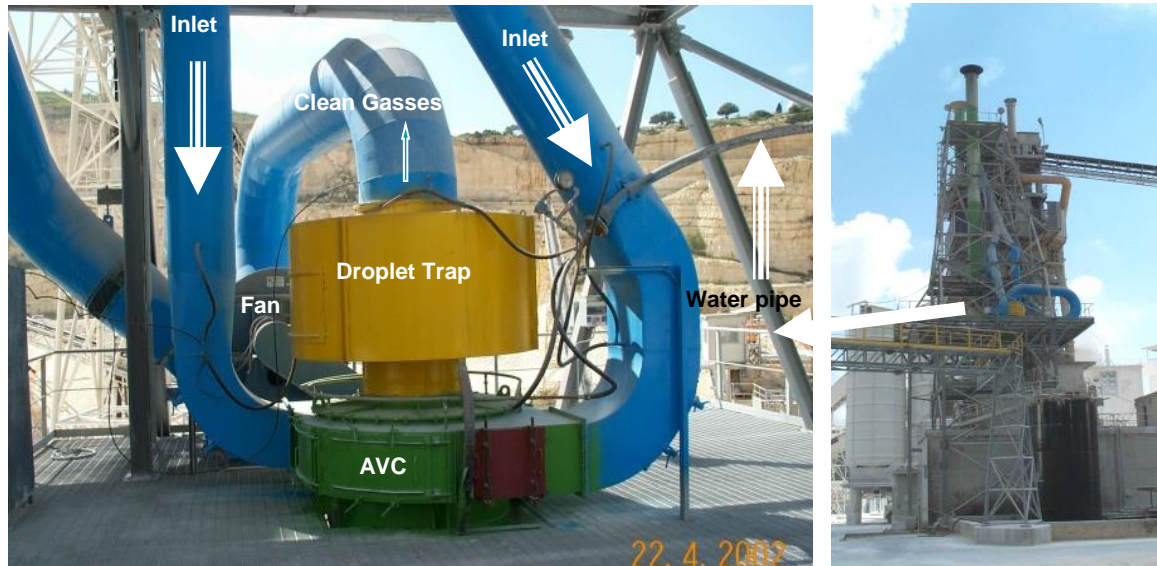


Case study

I: Advance Vortex Chamber (AVC) implementation in Shfeya-Lime industries



Introduction:	SHFEYA-Lime producing industries was established in 1933 and produces lime products for a variety of industrial uses.
Environmental Restrictions:	SHFEYA-Lime main plant is located on a major highway in proximity to both urban and agricultural areas. Therefore, the plant was forced to comply with air pollution restriction.
Background	<p>In order to meet the new environment regulations of the Ministry of Environment and to control emissions from the vertical shaft-kiln and from the Hydrate-Lime Plant a few options were evaluated. The company evaluated solutions that balanced environment treatment cost and overall benefits. In addition and due to the material, physical and chemical properties of both systems, hard sediments build up on the chambers and pipe walls and jamming them frequently – causing maintenance costs and production losses. The company mandated that the new systems resolve these problems as well.</p> <p>For the shaft-kiln, a standard bag filter option was evaluated and for the Hydrate Lime Plant, several complicated solutions were evaluated.</p> <p>The designers required filter solutions that:</p> <ol style="list-style-type: none"> 1) Filter kiln-dust in a system in-which 26% of the kiln dust had sub-micron distribution and 60% up to 10 micron, where gases temperature vary between 140°C and 180°C. Humidity in stack 7%. Flow rate vary from 15000- 35000 Nm³/h. 2) Filter Hydrate-Lime plant in a separate system in-which 70% of the particles are under 20 micron and 48% water in the vapor. Flow rate vary from 5000-7000Nm³/h.

<p>Program Description</p>	<ul style="list-style-type: none"> • Due to the dust composition attributes, Wet-Vortex Cleaning Technology was chosen for implementation. • The water used in the Vortex chamber were pumped from a settling pool which was used for stone washing and for another scrubbing process in the facility. • We discovered that the injected water were 'dirty' and included a significant amount of solid-particles. • As a solution for this problem, 2 Hydro-Vortex Cleaning systems were installed near the setting pool to clean the water from the fine particles. • The Hydro-Vortex systems enabled reuse of the water where the clean water returns to the settling pool and the mud is removed from the system.
<p>Results</p>	<ul style="list-style-type: none"> • Wet-Vortex Cleaning has dramatically reduced the emission of kiln-dust particles from 1100mg/Nm³ to less than 14 mg/Nm³ - an improvement of 98.72% from the previous system • Wet-Vortex Cleaning has dramatically reduced the emission of the Hydrate-Lime Plant from 4000 mg/Nm³ to less then 120 mg/Nm³ - an improvement of 97% from the previous system. Second degree system reduced the emission from 120mg/Nm³ to 20mg/Nm³. The 'captured' Hydrate-Lime was returned for recycling. • Before installing the Hydro-Vortex Cleaning installation for cleaning the water from the setting-pool, the sediments were pumped out and for viscosity reduction -expensive fresh water was added to the system. Now there is no need for fresh water. • During a year of operation, no hard sediments were built up on the chamber and pipe walls. Maintenance cost and production losses were dramatically decreased.
<p>Sampling and Testing</p>	<ul style="list-style-type: none"> • By certified company under ISO 17025 according to USEPA. Parameters as per EPA method 1-4.Sampling device-APEX STACK SAMPLER
<p>Environmental Benefits</p>	<ul style="list-style-type: none"> • Dramatic reduction of particles emission of more then 97% . • The 'captured' Hydrate-Lime was recycled. • Significant reduction of fresh water needs (they actually closed the tap).
<p>Operational Benefits</p>	<ul style="list-style-type: none"> • Cleaning cost saving. • Dramatically cost saving due to fresh water saving. • No blocking in water recycling systems. • No operational shutdowns due to filter/chamber replacements.
<p>Economic Benefits</p>	<ul style="list-style-type: none"> • Investment in Vortex systems cost 40% less then competitors' offer • Wet-Vortex Cleaning solutions generated 80% saving in maintenance costs. • Hydro-Vortex Cleaning solutions saved 15% of plant's total fresh water consumption. • Raw material saving based on lime recycling in the Hydrate-Lime Plant
<p>Summery</p>	<ul style="list-style-type: none"> • Using WET Vortex Cleaning System with Hydro Vortex is a good example of an "end to end " solution. • A combination of an efficient, inexpensive solution of cleaning gases while using recycling water.