Optiguide ltd.

Cooling System For Gas Turbine

Company History

- Established in 1997 in the Technology Incubator of the Technion – Israel Institute of Technology.
- Founded by Igor Zlochin, R&D Director. Haim Kizman, General Manager.
- Company shares are held by founders, employees and investors.
- Initial sales in 1998.
- Main Applications: Gas Turbines, Post Harvest, Clean Rooms.

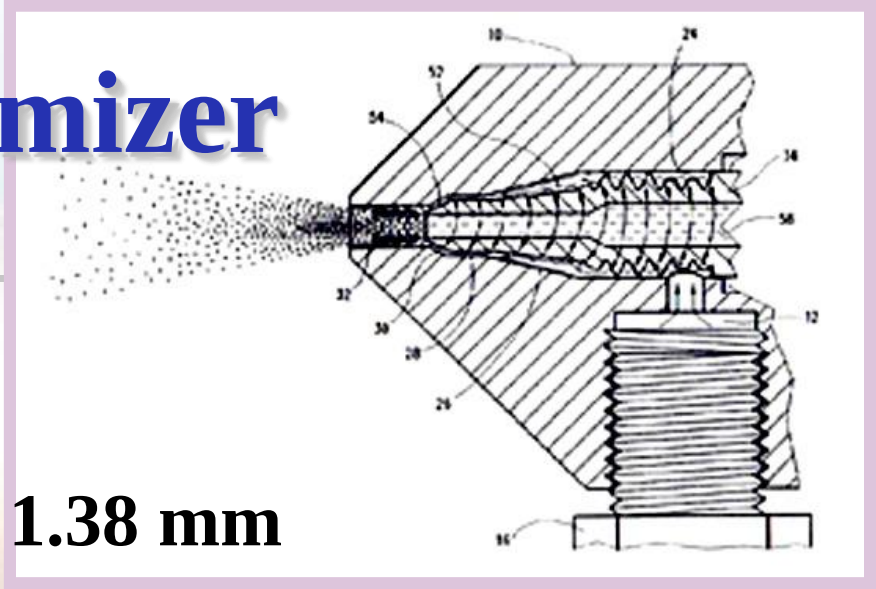
Post Harvest Applications

- Controlled humidity for cold storage for fruits and vegetables.
- Adding humidity by dry fog without wetting the produce.
- Increasing produce quality and shelf life.
- Reducing weight losses during storage period

Optiguide Atomizer

- Low pressure air assist nozzle
- Micro-Droplets provide “dry fog”
- Up to 98% RH without wetness
- Large orifice prevents clogging
- Very low maintenance
- Complete automatic operation
- Operates at – 0º C
- Simple piping and fittings

Optiguide Atomizer



- The water outlet orifice 1.38 mm
- Water is drawn by means of a Venturi principle
- Very small droplet size
- Working air pressure 6 bars

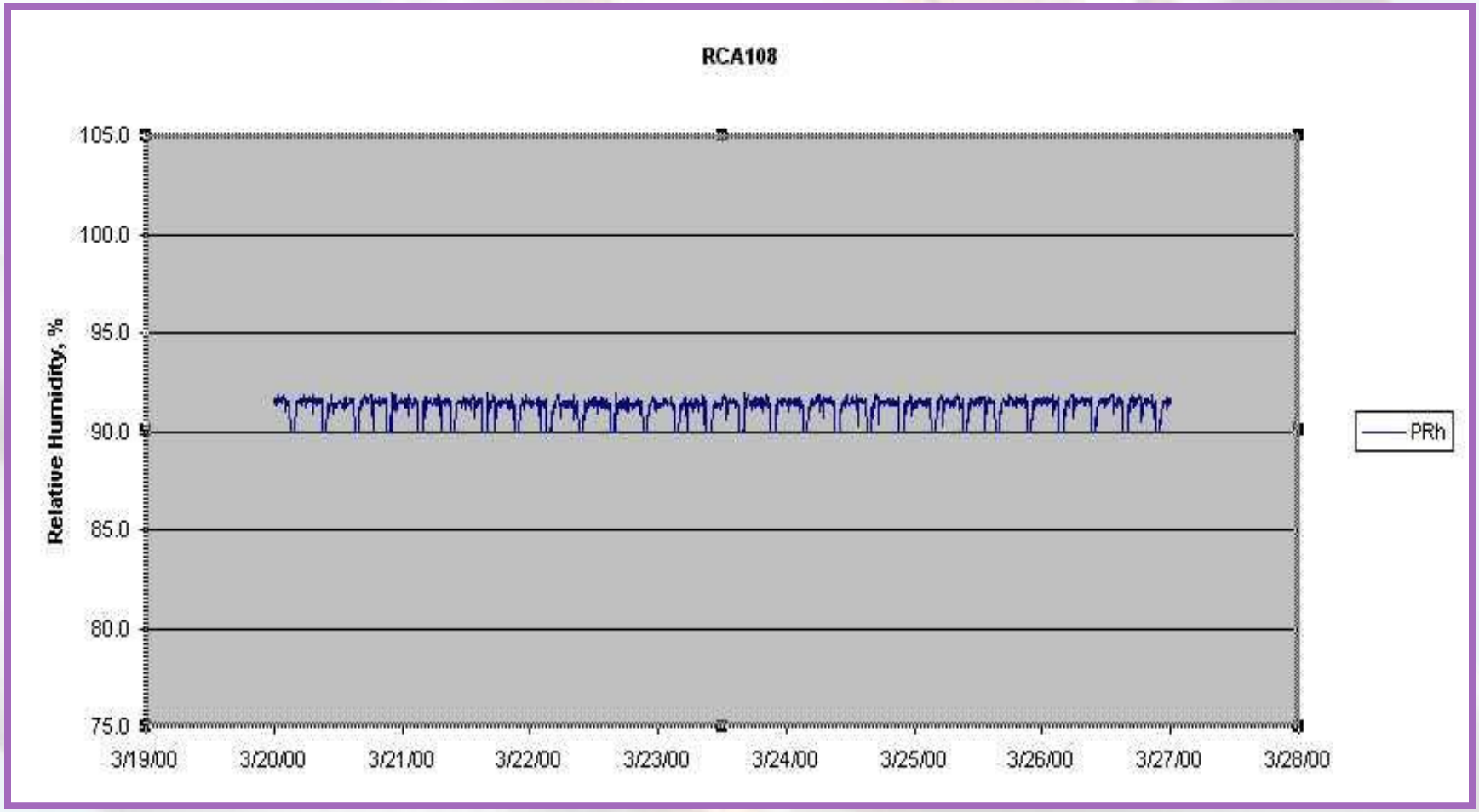
Distance from the nozzle (mm)	Water Pressure (bar)	Air Pressure (bar)	D10 (microns)	D32 (microns)	D90 (microns)
100	**0**	**6**	**2.72**	**5.16**	**28.65**
100	**-0.1**	**7**	**2.13**	**4.19**	**21.4**

The droplet size distribution has been measured using a laser diffraction system

Optiguide's RH Sensor

- Reliable control up to 98% RH.
- Operates where other RH meters become saturated and fail.
- Unique optic technology insures accuracy.
- Self-cleaning and self-calibrating daily.
- Full remote computer capability for operation and data logging.

Full Data Logging on PC as Graph of Chart



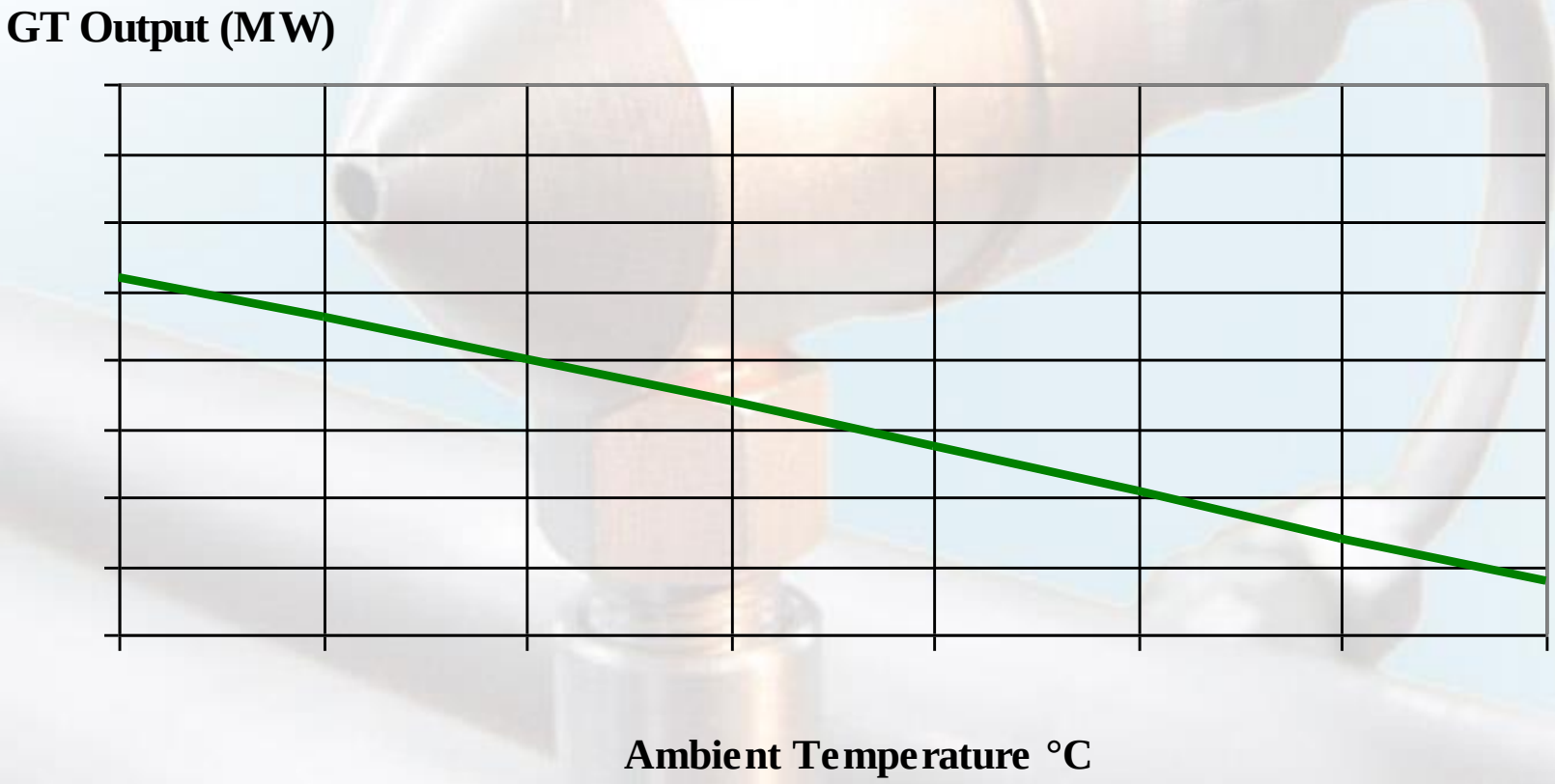
Optiguide's Wetness Sensor

- **Direct measurement and control of state of wetness at various stations within the air inlet duct.**
- **The possibility of compressor blades damage by relatively large water droplets(greater than 20 microns) is prevented.**
- **Operating conditions: -5°C…125°C.**

GT Pre-Cooling

- GT performance is strongly affected by ambient temperature. High temperature decreases power output, due to reduce of inlet air mass flow rate.
- 1°C rise in ambient air temperature decreases the GT output by 0.5%…0.9%.
- One of the cheapest and effective way to recover the GT output loss is evaporative air-cooling of GT inlet.
- GT power output can be increased by more than 10% by inlet air-cooling.

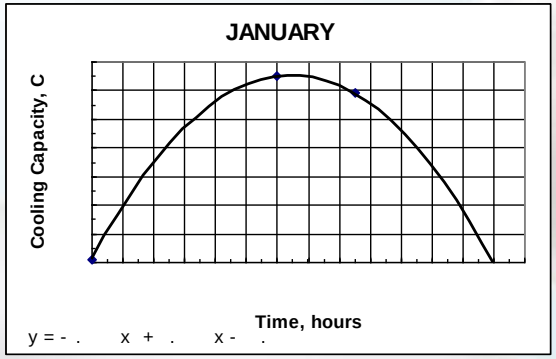
Ambient Temperature Effects - Typical Heavy-Duty GT Output

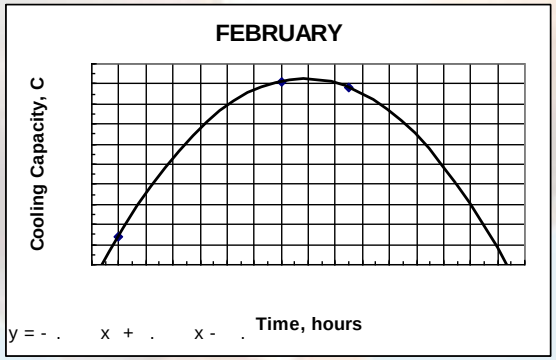


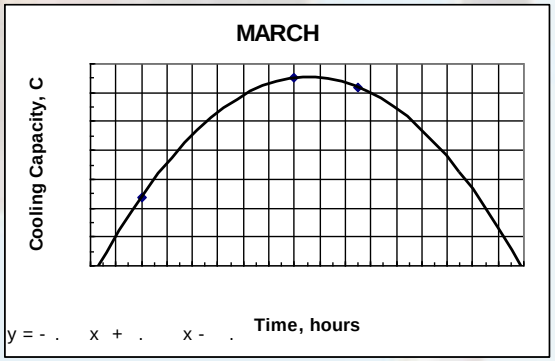
Cooling System Performance Chart

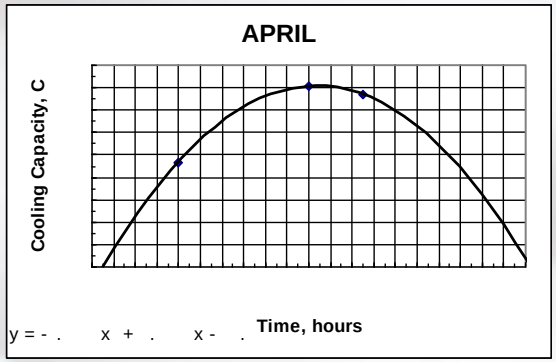
Month		January	February	March	April	May	June
RH, % at							
	:						
Ta, °C at		.	.	.		.	.
		.	.	.		.	.
	:	.	.	.	.	.	.
T wet= f(Ta, RH), °C at		.	.	.	.	.	.
		.	.	.	.		.
	:	.	.		.	.	.
Evaporative Cooling Potential, °C (T - daily avr)		.	.	.	.	.	.
		.	.		.	.	.
	.	.	.	.	.	.	.
Daily Cooling Capacity, °C		.		.	.	.	
Daily Fogg Operating Time, hours				.	.	.	.
Max Available Daily Energy Increase, MWh		.	.	.	.	.	.
Max Available Monthly Energy Increase, MWh		.	.	.	.	.	.
Capacity Factor / = .							
Available Annual Energy Increase, MWh							
Max Accumulated Daily Water Massflow, ton		.	.	.	.	.	.
Max Accumulated Monthly Water Massflow, ton		.	.	.	.	.	.
Annual Fogging Water Massflow, ton							

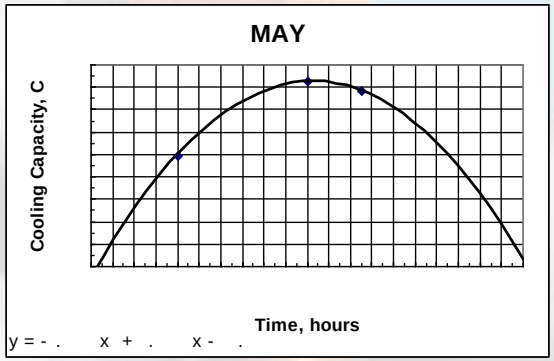
Cooling System Performance Chart

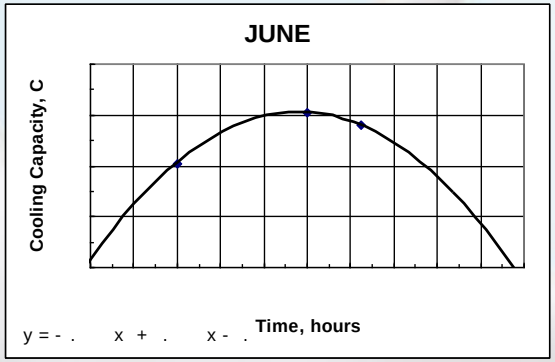








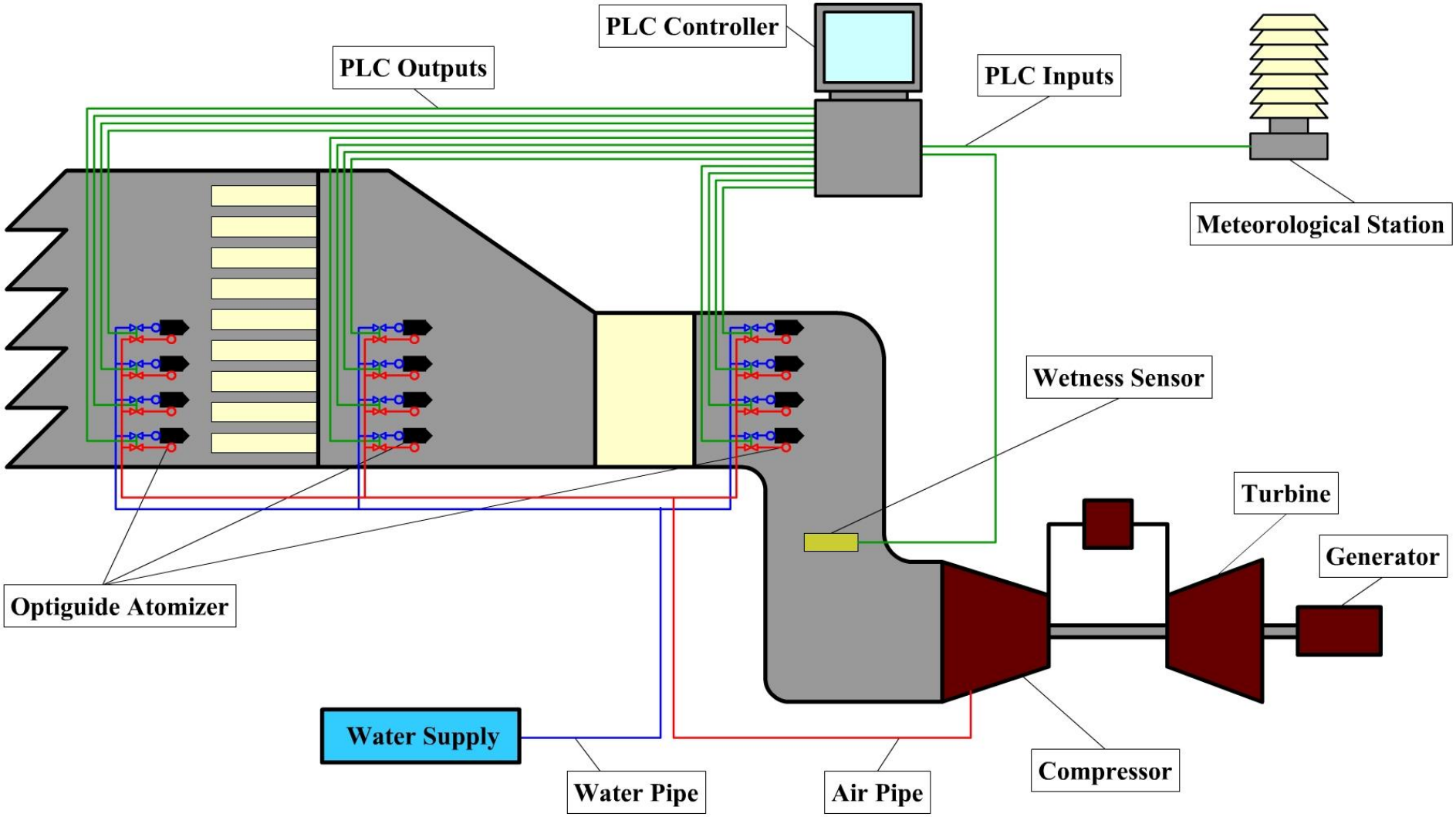




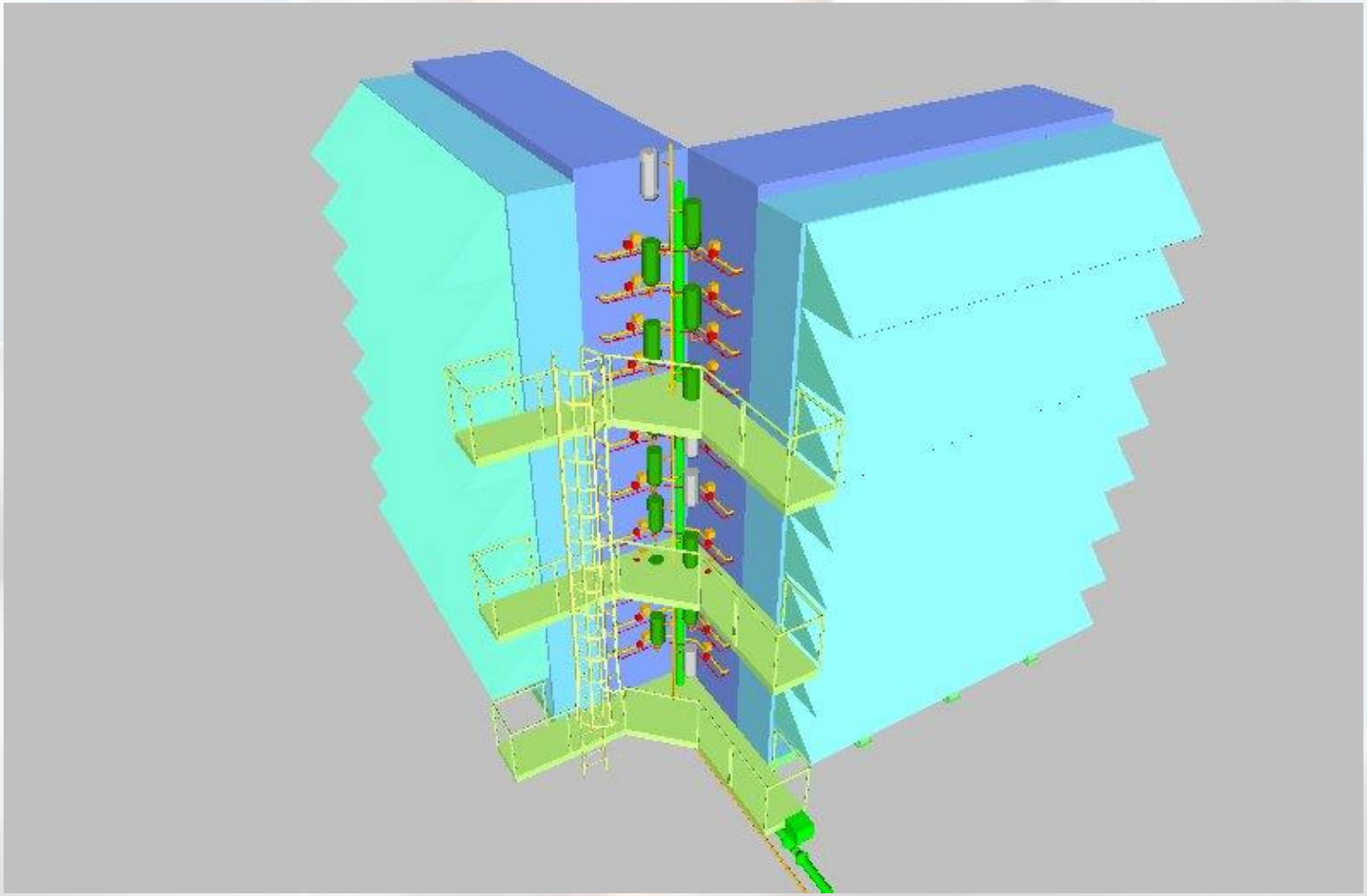
Optiguide Advantages in GT Power Augmentation

- Small droplet size. Cost effective power increase, heat rate improve and NOx emission reduce.
- On-line wetness control at compressor inlet. Closed loop control.
- Low pressure water system.
- Fine tuning flexibility.
- No skids required. Installation time 1-2 days.
- Low investment and O&M costs.
- Payback period is less then 1 year.
- Field tested by IEC.

Optiguide Air Cooling System Typical Layout Scheme



System Layout



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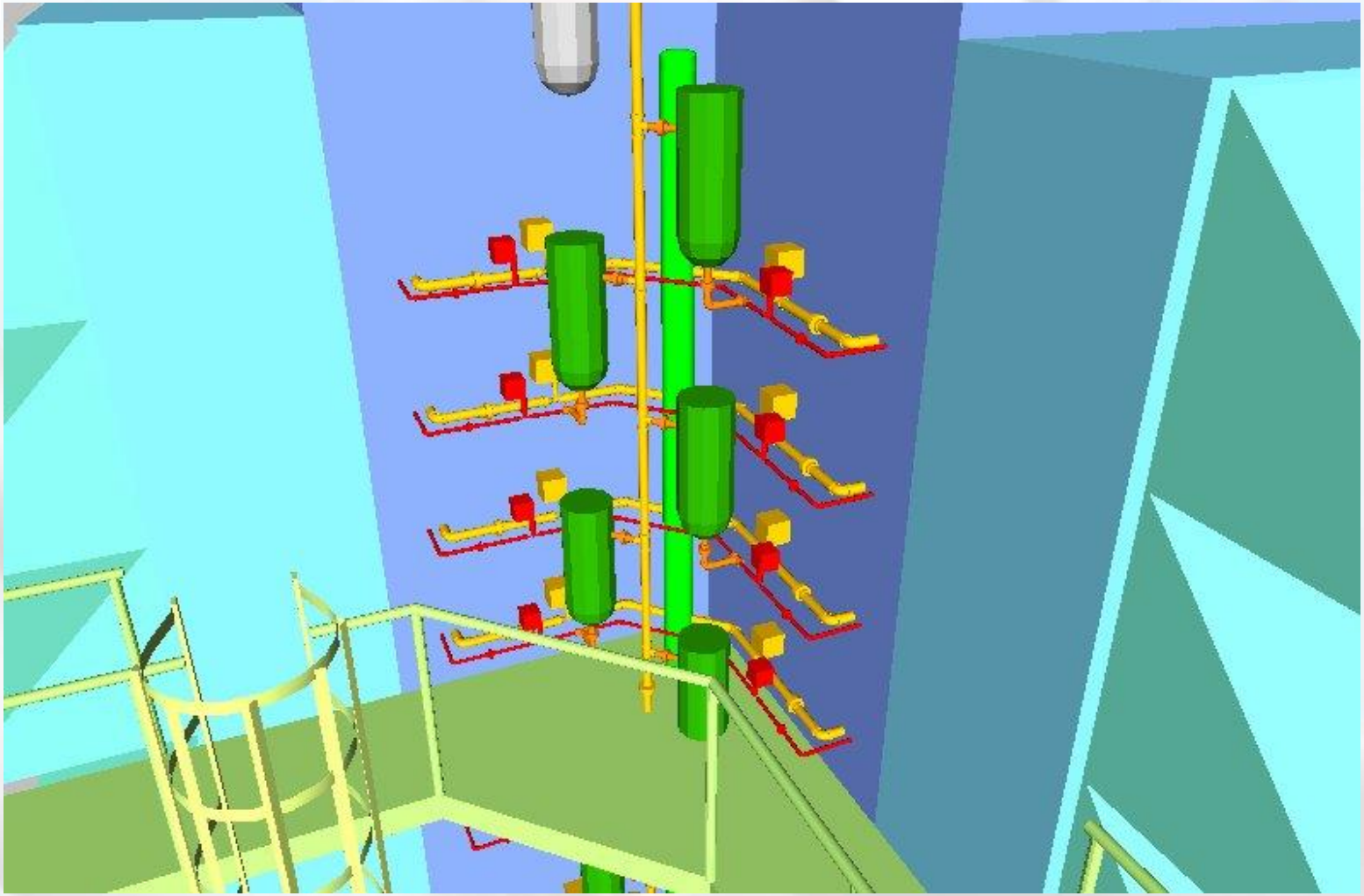

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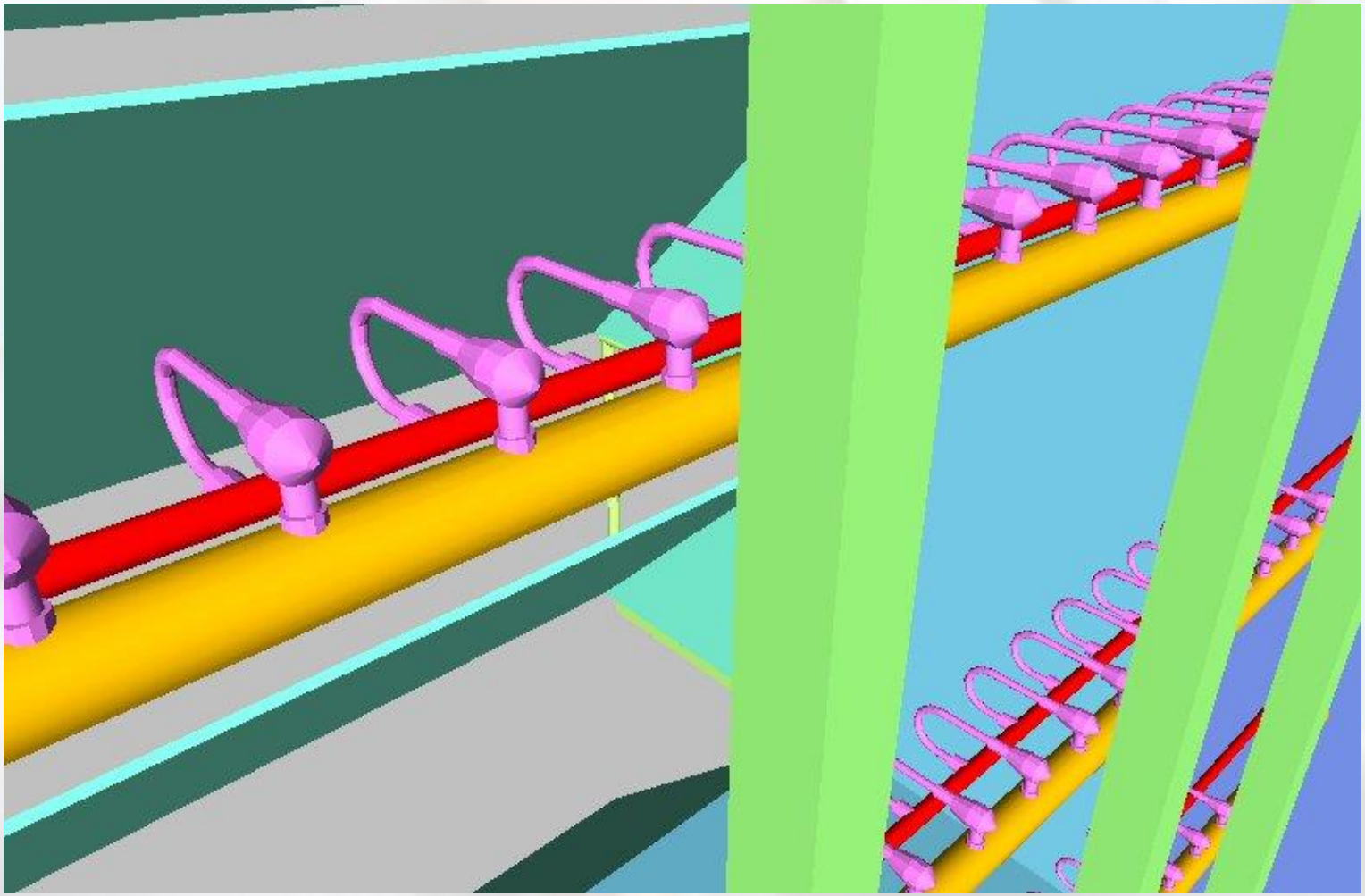

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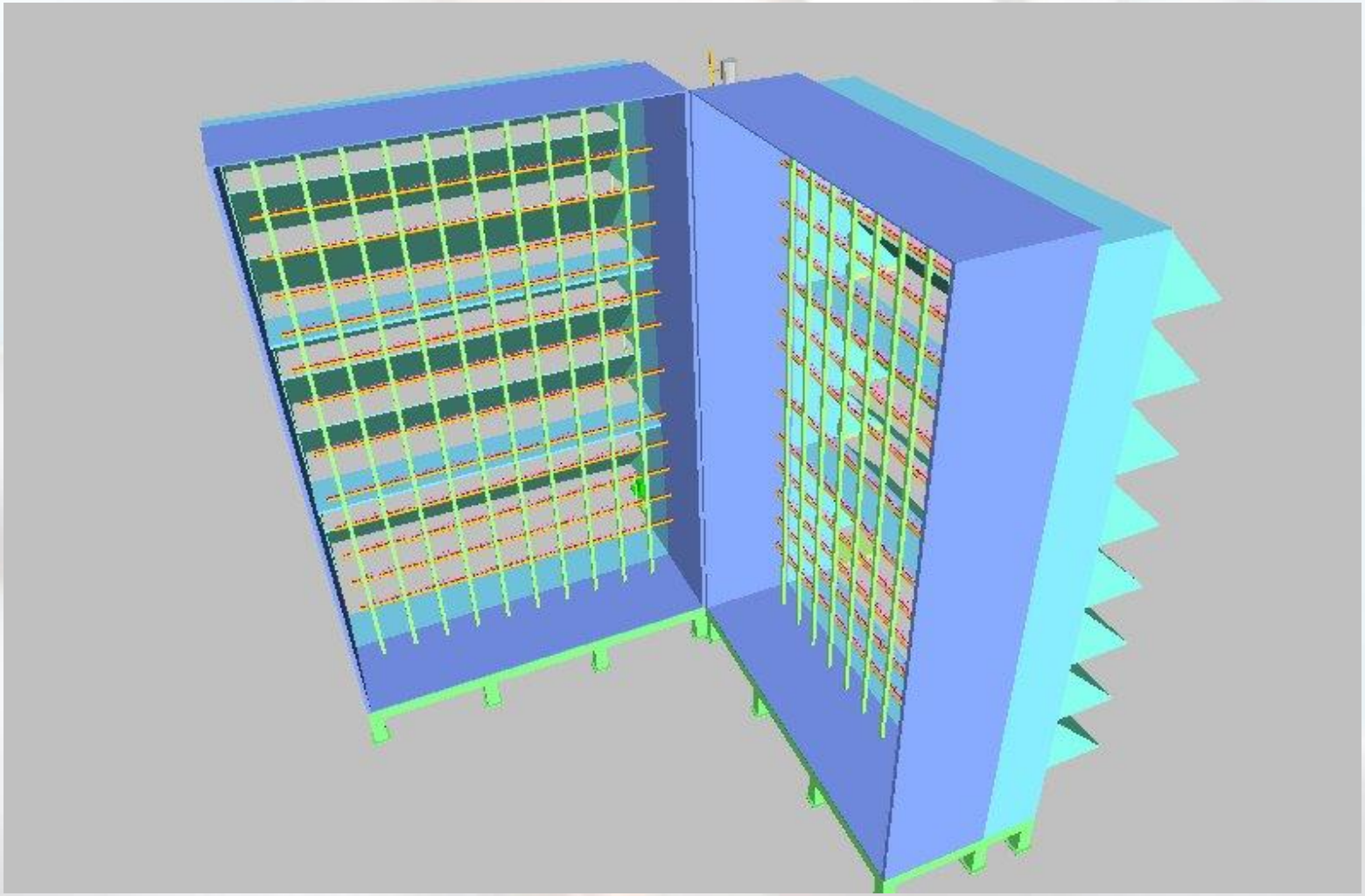

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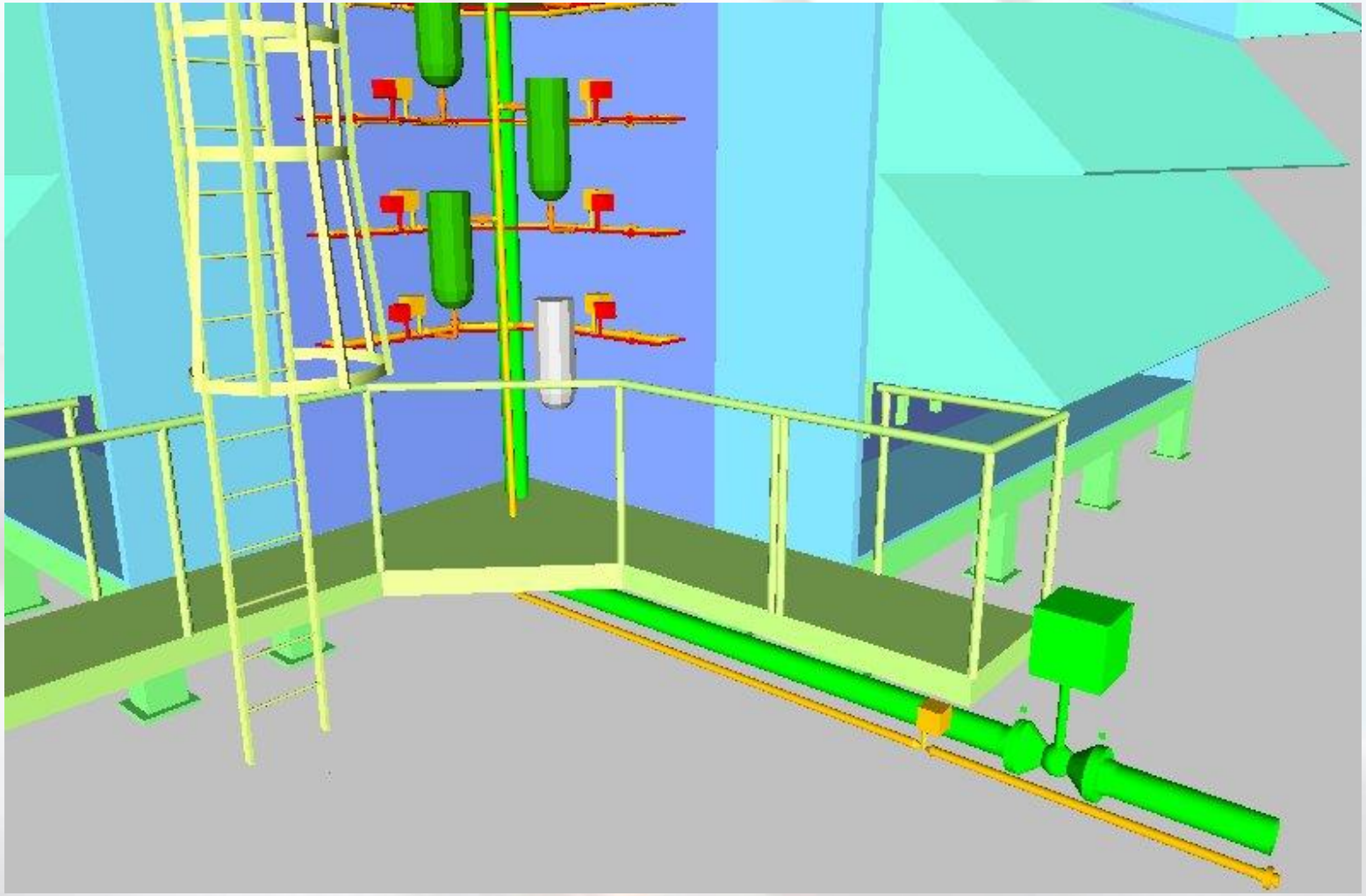

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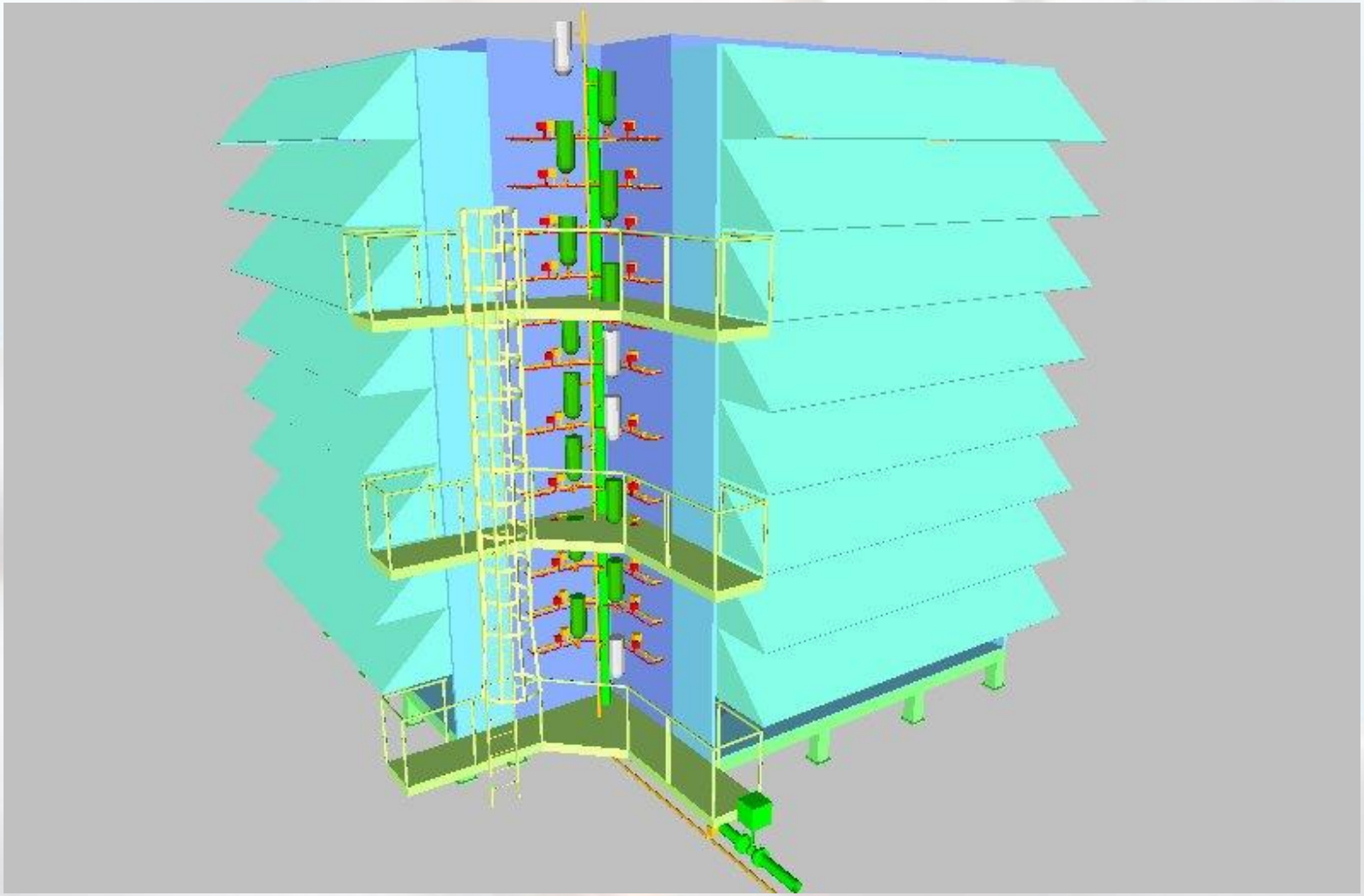
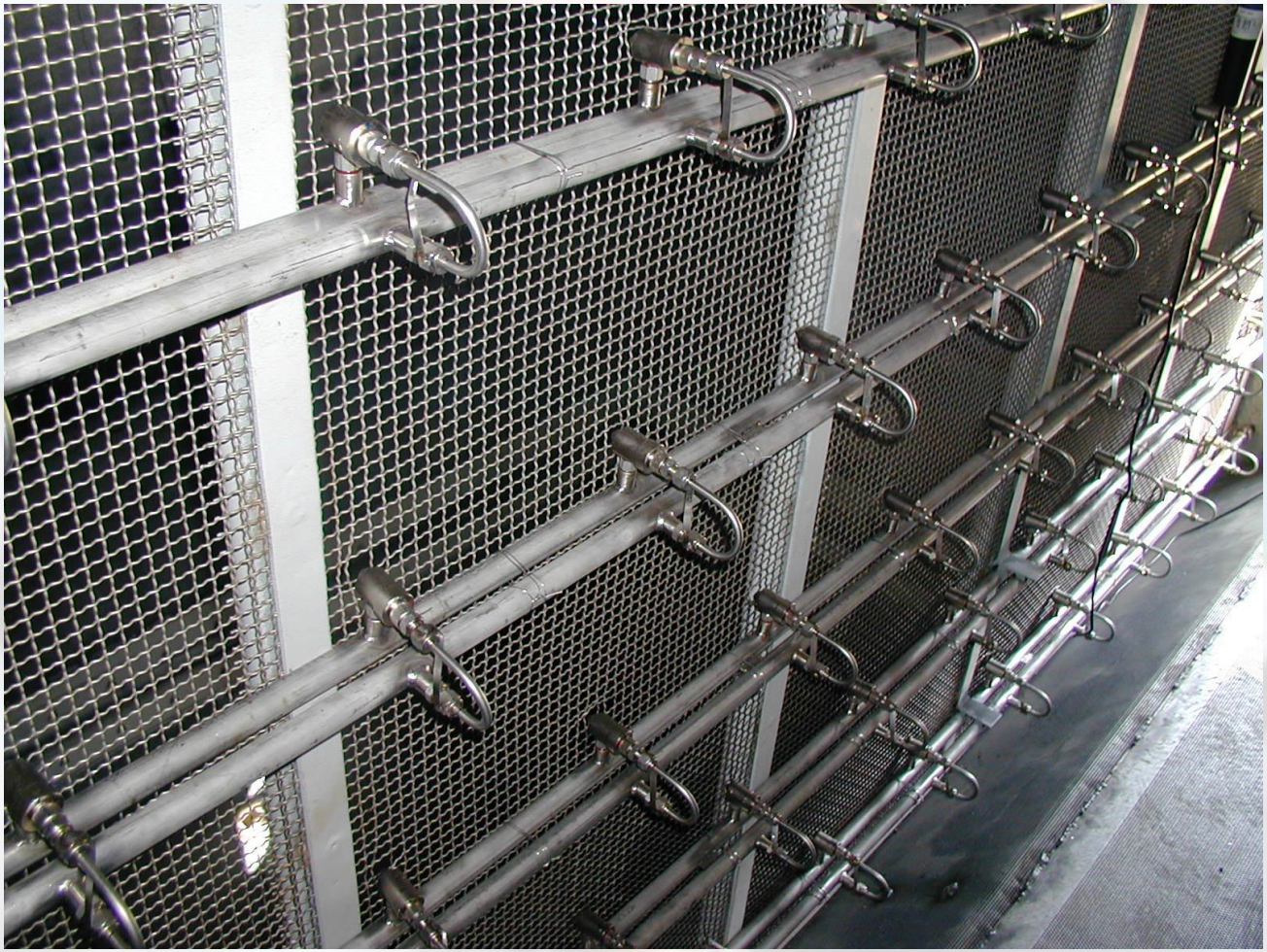


Inlet Section



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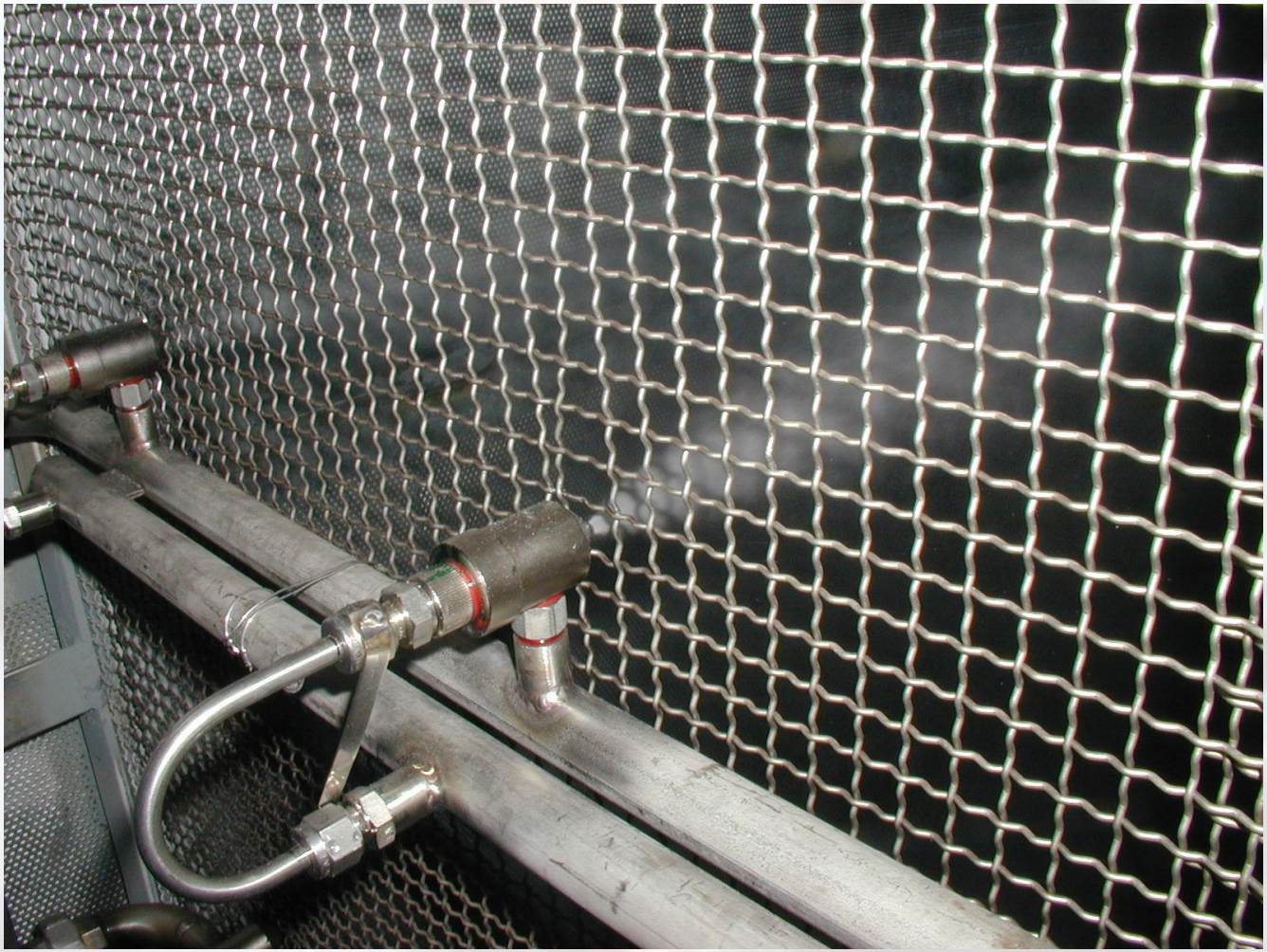

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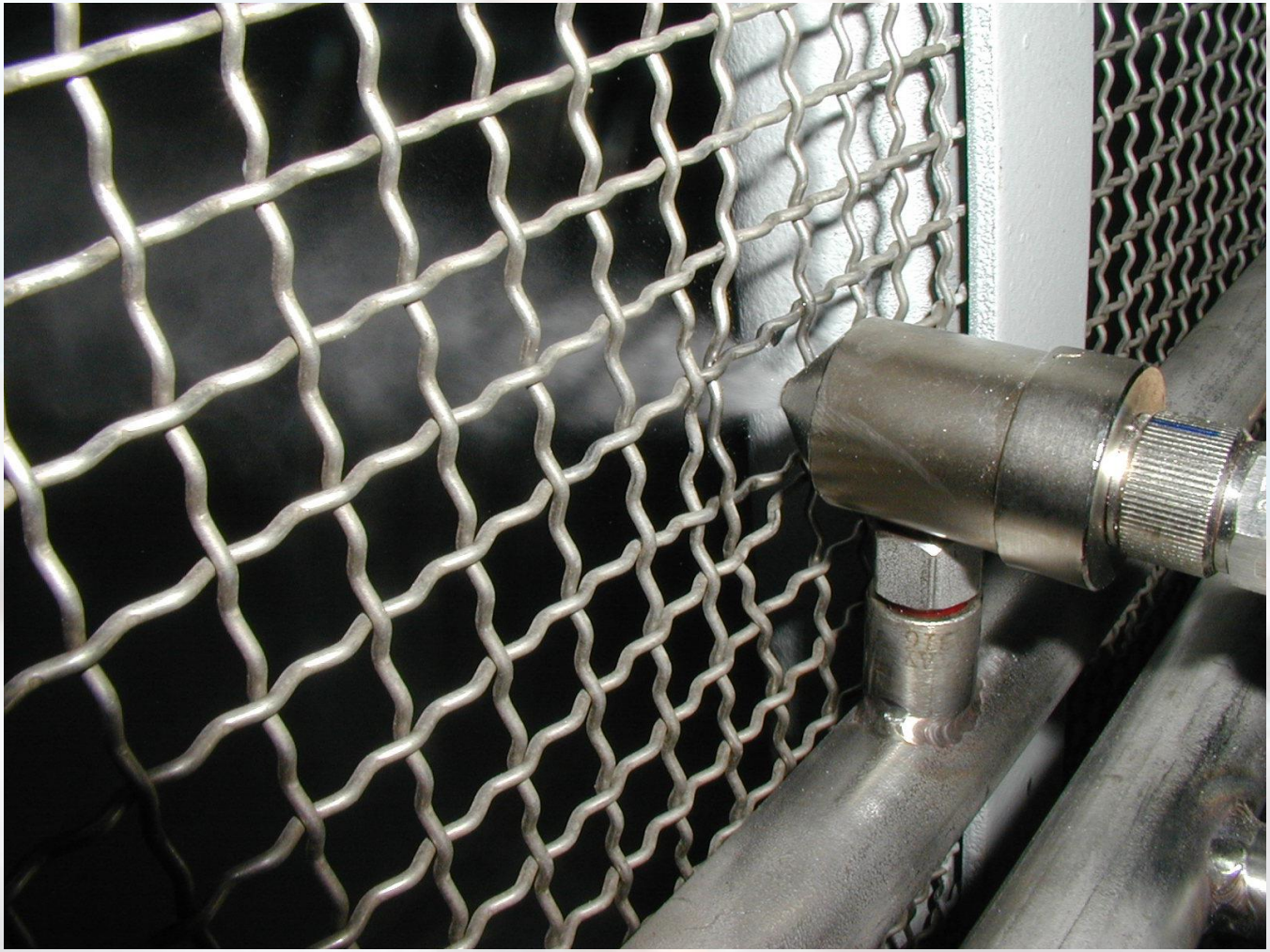

Inlet Section

Filter Section

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