Examples of installation

	Industry	Application	Gas volume (Nm^3/hr)	Gas temperature (in degrees C) at Inlet --> Outlet	Scope of supply
(1)	Steel	Converter flue-gas cooling	210,000	530 --> 200	Spray nozzles, Valve stands, Control boxes
(2)	Steel	Converter flue-gas cooling	480,000	600 --> 490	Spray nozzles, Valve stands, Control boxes
(3)	Steel	Cooling of flue gas from molten iron pretreatment	150,000	700 --> 200	Spray nozzles, Valve stands, Control boxes
(4)	Steel	Cooling of melting furnace flue-gas	100,000	600 --> 400	Spray nozzles, Valve stands, Control boxes
(5)	Steel	Cooling of melting furnace flue-gas	120,000	400 --> 200	Complete set of gas cooling tower
(6)	Cement	Stabilizer	163,000	340 --> 130	Spray nozzles
(7)	Cement	Cyclone	157,500	870 --> 800	Spray nozzles, Valve stands
(8)	Industrial waste incinerator	Flue gas cooling	45,000	950 --> 200	Complete set of gas cooling tower

(5)
Gas volume: 120,000 m^3N/hr
Inlet temperature: 400 deg. C
Outlet temperature: 200 deg. C

Installed in March 2011 with tower, spray nozzles, automated dust discharger, control box, and valve stand.

(8)
Gas volume: 45,000 m^3N/hr
Inlet temperature: 950 deg. C
Outlet temperature: 200 deg. C

Installed in October 2012 with tower, spray nozzles, manual dust discharger, control box, and valve stand.

For details or inquiries please feel free to contact a sales office or mail us at overseas@kirinoikeuchi.co.jp.

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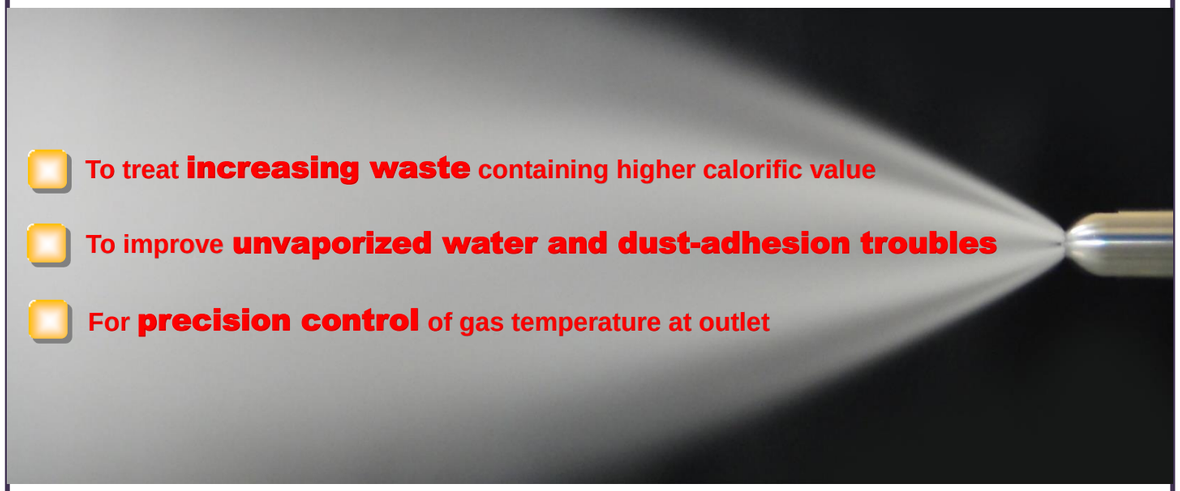
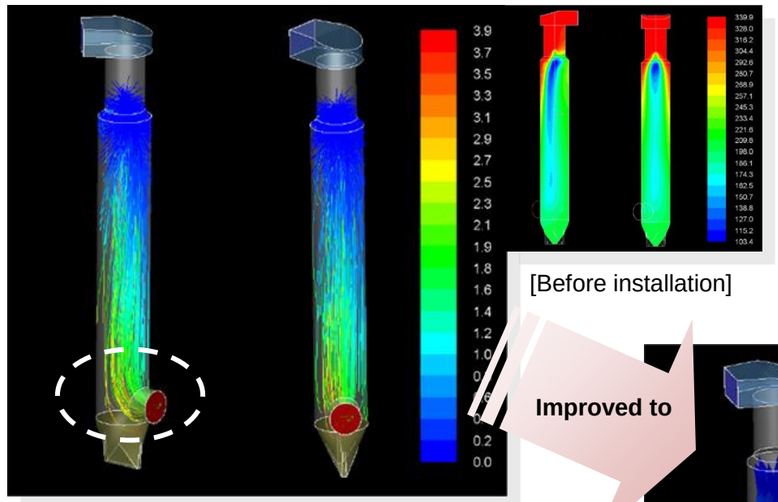
Flue Gas Cooling System

Offered by IKEUCHI, "The Fog Engineers"



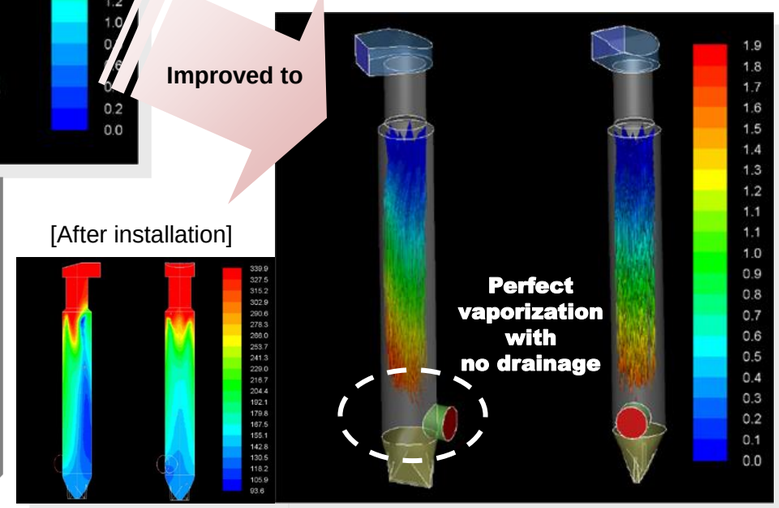
- To treat **increasing waste** containing higher calorific value
- To improve **unvaporized water and dust-adhesion troubles**
- For **precision control** of gas temperature at outlet



[Before installation]

Improved to

[After installation]



Example of an improvement on the existing gas cooling tower
by computational fluid dynamics (CFD) and analysis of nozzles.

Flue gas volume: 163,000 m^3N/hr
Gas temperature
at inlet: 340 degrees C
at outlet: 130 degrees C

Spray nozzles for rectification installed in January 2010.

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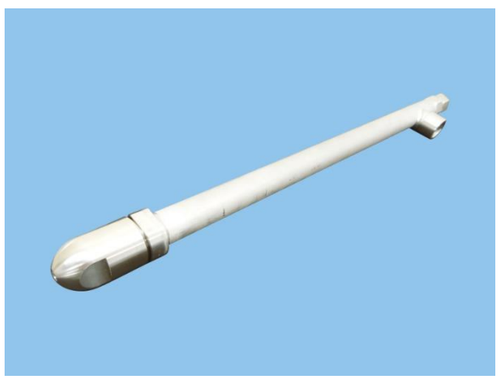
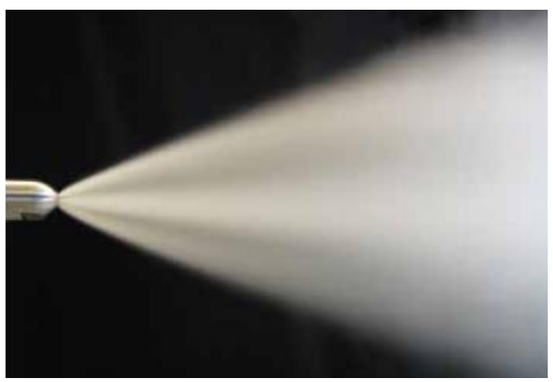
H. IKEUCHI & CO., LTD.

Optimization

Water droplets sprayed inside a gas cooling tower are required to perfectly vaporize without wetting the interior wall. Based on its many years of experience and proven results, IKEUCHI, “The Fog Engineers”, offers the optimal spray nozzles and nozzle layout for each site, meeting requirements for spray flow rate, spray droplet size, and spray angle.

Fine fog nozzles / GSIM II series

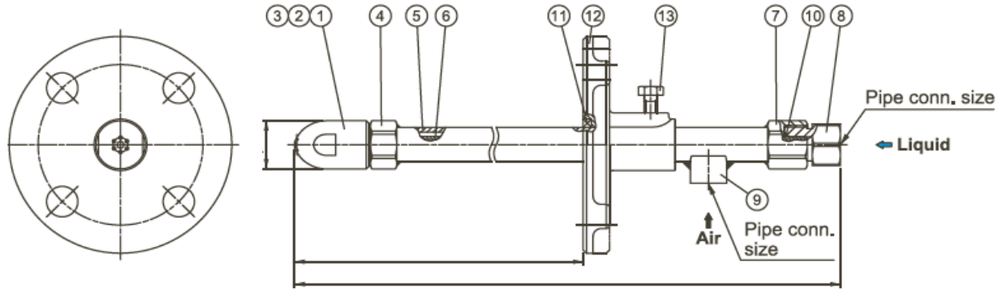




- GSIMII series nozzle produce **a large volume of fine atomization with a low consumption of compressed air**, having very low air-water ratios.
- Pneumatic spray nozzle with spray capacity of 30–1,000 L/hr.
- Energy-saving design—mean droplet diameter of 50 μm and a maximum droplet diameter of 150 μm[*1] at an **air-water ratio of 130**.
- Large turn-down ratio.
- Available in spray angles of 60° and 20°, in six spray capacity types—12 variety in total.
- **Easy maintenance** with simple structure and compact body.

*1) Droplet diameter measured by laser Doppler method

■Drawing



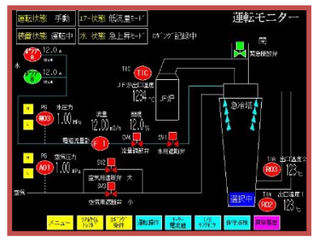
■Components and materials

No.	Components	Standard materials
①	Nozzle tip	S316L
②	Nozzle core	S316L
③	Whirler	S316L equivalent
④	Nozzle adaptor	S316L
⑤	Outer pipe (for air)	S316L
⑥	Inner pipe (for liquid)	S304

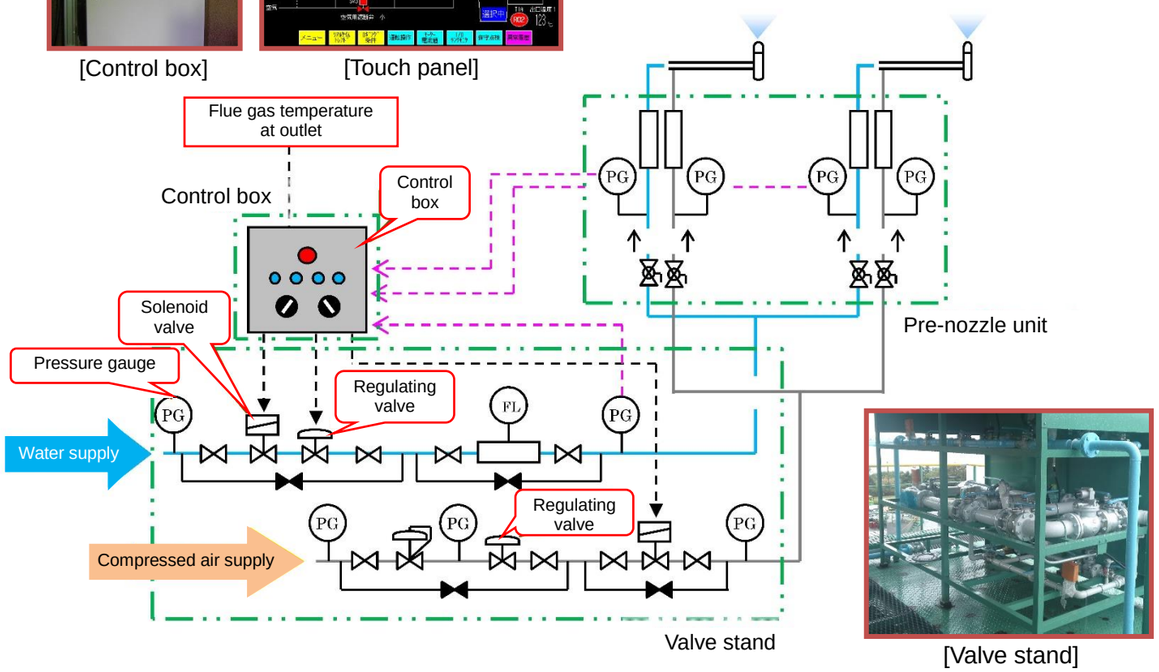
No.	Components	Standard materials
⑦	Joint	S304
⑧	Liquid socket	S304
⑨	Air socket	S304
⑩	O-ring	FKM
⑪	Packing	Metal wire reinforced AES wool
⑫	Flange	SCS13 (S304)
⑬	Bolt	S304

Example of a spray control flow

[Control box]



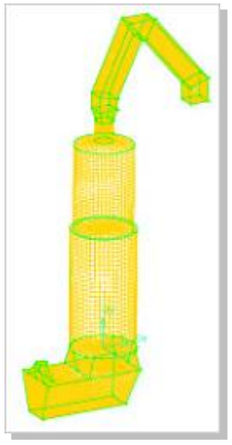
[Touch panel]



[Valve stand]

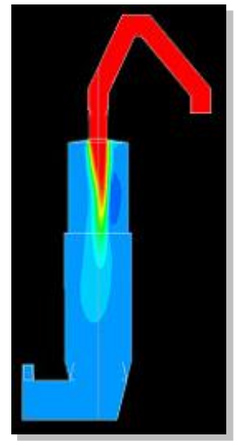
Optimal spray nozzle layout

A wide range of conditions depending on a site must be considered when it comes to gas cooling.
If one hopes to properly model cooling mechanisms in all of these conditions, high-precision nozzle mechanism modeling alone is not enough. In addition to accurate reproduction of factors such as shape of gas cooling tower and gas conditions, IKEUCHI runs the simulations including actual phenomena as shown below to propose a spray nozzle layout matching the needs of each site.



[Surface mesh]

[Water droplets trajectory]



[Temp. distribution]

Example of an improvement on the newly-built gas cooling tower by simulating the shift of gas flow profile caused by the inlet duct.

Flue gas volume 4,300 m^{3}N/hr
Gas temperature
at inlet: 600 degrees C
at outlet: 160 degrees C