

Lechler (India) Private Limited
Thane(W) - 400604, India

Date : 15, Jun 2019

To,
BTIT Engineering
Kolkata

Kind Attn: Mr. Indranil Ray

Your inquiry no: Requirement of spray nozzles system for Mist cooling unit.

Offer reference : Email dt 20th May 2019.

Lechler offer no.: **E-75-090-19-00**

Dear Sir,

Many thanks for your enquiry and further discussions about this project requirements, based on that we have prepare our best techno-commercial proposal for this typical application and submit our offer for your review and further proceedings.

Background: This is a typical cooling application with following operating data as the basis for nozzle selection and customer interest to achieve 100% RH of the flue gas.

Input data	Diameter of duct	6,770	m
	Width of duct	12	m
	Depth of duct	3	m
	System pressure	1	bar(a)
	Volume flow rate of wet gas at standard conditions	1099799	m ³ N/h
	Volume flow rate of gas at actual conditions	1677370	m ³ /h
	Velocity of gas	12,94	m/s
	Amount of dust	0	g/m ³ N
	H ₂ O fraction	7,2	% mass.
	CO ₂ fraction	21,0	% mass.
	O ₂ fraction	3,5	% mass.
	N ₂ fraction	68,3	% mass.
	Inlet temperature of gas	138	°C
	Target temperature of gas	58,2	°C

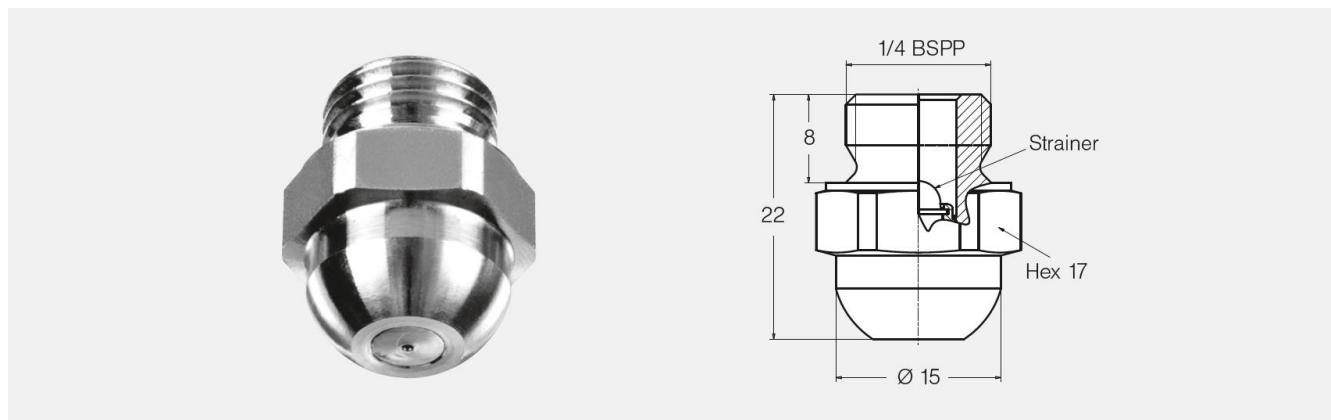
- ▀ Estimated water flow rate is approx. 75 to 85 m³/hr at maximum and normal operating could be approx. 55 m³/hr at 10 bar (g) at nozzle.
- ▀ Expected SMD of the droplets at this operating conditions shall be approx. 75µm ±10%.
- ▀ Area (flue gas path) to be covered with spray arrangement: 3 x 12 meters

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Based on detailed discussions, we are offering spray nozzles along with spray header only, rest of the system to control the flow and pressure of water at the spray header inlet shall be by customer.

Pos. 1: Axial Flow hollow Cone Spray Nozzles

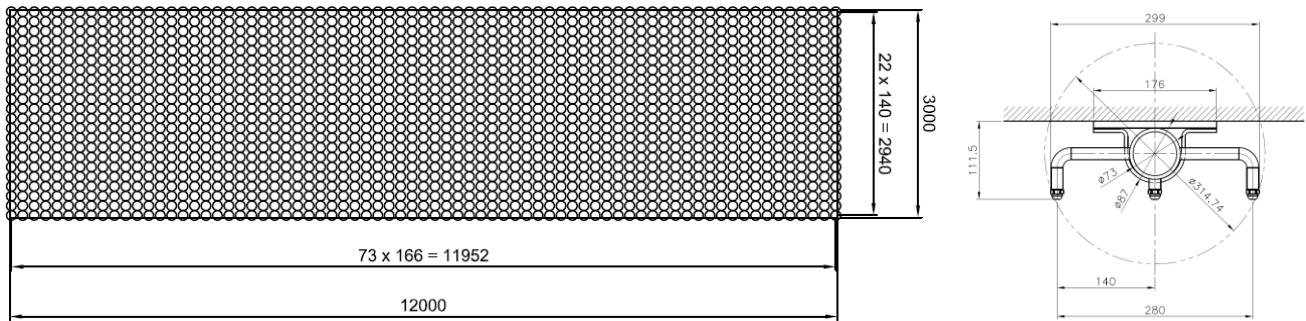
Lechler model	: 220.285.1Y.AC.00.0
Flowrate	: 0.78 LPM @ 20 bar
Spray angle	: 80°
MOC	: SS316L (1Y)
Quantity	: 1600 nos. (refer sketch)
Total flowrate	: 1248 LPM (52.80 m ³ /hr)
Pump Capacity	: Recommended flow of 87m ³ /hr @ 300 meter head max. (By customer).



Spray nozzle and general dimensions for reference only.

Pos. 2: Spray Headers

8 nos. of spray headers each of length 12 meter approx. having 3 rows of spray nozzles installed as shown below.



Typical Spray header with nozzle arrangement only for reference.

Spray headers position and final design depending upon available space to be decided during detail engineering stage after PO.

MOC: SS317 LMN
Quantity: 8 Nos.

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Price Schedule:

Package price for supply of above positions 1 & 2 with Nozzles in **SS316L (1Y)** and headers in material **SS317 LMN** shall be: **INR 62,50,000/-** (On-Ex works basis).

Commissioning Assistance:

Lechler shall depute mechanical engineer on payable basis at **INR 12,000/-** per engineer for 8 hours per day. Local accommodation, food and transportation to be arranged by customer at free of cost. To and fro air fare by economy class shall be reimbursed at actuals from Mumbai to nearest airport. We envisage maximum 2 days of job at site.

Scope of Work by Others (Customer):

- Inlet water flow of 75 to 90m³/hr at 20 bar (g) pressure adjustable up to 10 bar (g) at Lechler spray header inlet.
- Control of water flow rate, pump with VFD and Filter before the pump.
- Inter connecting piping in the field if any, supporting and mounting arrangement of spray headers inside MCU.
- Erection and Installation of spray headers with nozzles at site.

Guarantee:

- Lechler guarantee performance parameters of spray nozzles typically Water flow rate at given operating pressure, Spray angle, Droplet size & Spray distribution. Tolerance of 10% because of series manufacturing must be considered.

Recommended water quality:

- content of chlorides: max. 60 mg/l
- content of corrosive components: max. 450 mg/l (as long as suitable for mild and stainless steel)
- pH-value: 6 - 8
- Solids: Smaller than approx. 25% of the narrowest cross section of the Nozzle - max. 250mm
- Proportion of solids: Less than approx. 30 mg/l
- Hardness of Water: 100 mg CaO/l = 179 mg CaCO₃/l

Commercial terms & Conditions

1. **Validity of offer** : 60 days.
2. **Delivery** : **8-10 weeks after receipt of order**
3. **Price Basis** : Ex-works Thane
4. **Freight** : To your Account.
5. **Packing** : 2% extra (as per Lechler standard)
6. **Insurance** : By customer.



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7. Payment terms:

- a) 20 % of PO value as advance along with P.O.
- b) 80 % + 100% taxes & duties against proforma invoice before dispatch.

8. GST applicable : 18%.

9. HSN Code : 84.24.20.00

We hope that our offer will meet your requirements and would be glad to book your order.
In case there are any questions please do not hesitate to contact us.

Best regards

For Lechler India Pvt. Ltd.

Soumitra Mukherjee

Mohan Nirudi