



**PRODUCT STANDARD  
STEAM TURBINE ENGINEERING**

ST 45001

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SUPERSEDES INVENTORY No.

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PURCHASE SPECIFICATION FOR SPRAY NOZZLE

- 1.0 SCOPE: This Specification deals with the Design, manufacture and supply of water spray nozzles used in turbine Systems.
- 2.0 FUNCTION: These Spray Nozzle perform the task to spray condensate in hot steam to bring down steam temperature. For effective cooling the Spray Nozzle must produce very fine water particles, so that they can easily evaporate & mix with steam. These are used in Low Pressure Turbine Exhaust hood Spray System & flash box spray system.
- 3.0 DESIGN : The source of water is condensate pump & spray nozzle must be designed to withstand the maximum inlet pressure indicated in relevent table (1 or 2). The spray nozzle should be capable to spray water quantity at a given differential pressure as indicated in relevent table (1 or 2). Bore size given in the table are only for reference and supplier can offer alternate size depending on his design. However, it shall be subject to BHEL/BHEL's customer's approval.

Material of the spray nozzle and its parts shall be suitable to withstand a temperature of 450°C and must have good erosion and corrosion resistance. The material indicated in the table are only for reference. Supplier can offer

.... 2/-

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		QAX	K. Singh	26.2.85	WORKED	A. B. GUPTA	20.2.85
		DEPTT	NAME	SIGN. & DATE	CHECKED	K. C. SACHAN	10.2.85
INVENTORY NO.	Revision: 01 <b>REAFFIRMED</b>				Approved:		
					<b>ENGG. DEV. MANAGER</b>		ST
					Prepared STE	Issued STE ( TL ) HARDWAR	Date 20.2.85
P-5557	Date: 28.03.05						



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alternate material which shall be subjected to BHEL/  
BHEL's customer's approval.

4.0 DOCUMENTS4.1 Documents allongwith Offer

Supplier shall submit the offer allongwith cross-sectional drawing of spray nozzle, bill of material and information on the test conducted to establish the following:-

- (i) Flow vs. Pressure characteristics.
- (ii) Particle size achieved.
- (iii) Spray cone angle.
- (iv) Length of throw.

In case test were not conducted by him but got done elsewhere, the name of test lab shall be given allongwith the certificate of lab.

4.2 Documents after Placement of Order:

Supplier shall submit 10 copies of document mentioned in clause 4.1 after incorporating BHEL comments.

5.0 QUALITY PLAN: Supplier shall submit Quality Plan to be followed during manufacturing of nozzle. This shall be approved by Purchaser/owner.

6.0 INSPECTION & CERTIFICATES:

6.1 Supplier shall give compliance certificate stating that product supplied confirms to the agreement made in the order.

6.2 Each nozzle shall be subjected to hydraulic test at 1.5 times the maximum inlet pressure mentioned in the table.

6.3 PERFORMANCE TEST:

BHEL/BHEL's customer may ask to conduct test on a

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sample nozzle to prove the compliance of the nozzles with respect to information submitted alongwith offer and shall have the right to witness the test. However, a separate price may be quoted for such a test.

7.0 WHEREVER Standards have been mentioned, the latest issue & amendment shall apply.

8.0 GUARANTEE: The supplier shall guarantee trouble free operation of the equipment for a period of 2 years after installation and commissioning or <sup>for</sup> a period of 3 years from the day of despatch of equipment whichever is earlier.

If during erection/commissioning and operation at site any defect in any component is detected, purchaser's/owner's site representative shall prepare the assessment report and a copy of same shall be forwarded to the supplier. The supplier shall replace/rectify the concerned items free of charge. The supplier, if he so desires may depute his representative to site at his own cost otherwise the report of purchaser's/owner's site representative shall be binding on the supplier.

9.0 CONSERVATION/PACKING: The component shall be conserved so as to last for one year after despatch.

Packing shall be seaworthy and such that any external damage to the component during transit is eliminated.

10. GENERAL: If there is any deviation from this specification in offer, the same should be clearly spelled out clause-wise by supplier.

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TABLE-1

	Type A (Flash Box)	Type B (LP Exh.)
Bore mm	6.5	3.2
Capacity	34 lit/mt.	6.52 lit/mt.
Pressure drop across nozzle	4 kg/cm <sup>2</sup>	8 kg/cm <sup>2</sup>
Spray cone angle at tip.	90°	70°
Maximum Inlet pr.	20 kg/cm <sup>2</sup>	20 kg/cm <sup>2</sup>
Thread connection	R ½ "	R ¼ "
Material	X10CrNiTi189	X10CrNiTi189

TABLE-2

	Type A (Flash Box)	Type B (LP Exhaust)
Bore mm	5.5	4.8
Capacity	22.4 lit/min	15.60 lit/min
Pressure Drop Across Nozzle kg/cm	4	9
Spray Cone Angle of Tip	90°	70°
Maximum Inlet Pr. kg/cm <sup>2</sup>	45	45
Thread Connection	R ½ "	R ¼ "
Material	X10CrNiTi189	X10CrNiTi 189

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**SPRAY NOZZLES**  
LIST OF DOCUMENTS AND DRAWINGS

4-13109-SN000

Page 1 of 1

SUPERSEDES  
INVENTORY**A. SCOPE OF THE DOCUMENT:**

This document lists down the specification and technical data to be followed for executing the order of spray nozzles.

Current requirement is of spray nozzles with following characteristics

Capacity l/min)	78
Sprayed fluid	Condensate at 60°C (density=0. 98 g/cc)
Pressure Drop Across nozzle	8kg/cm <sup>2</sup>
Spray Cone angle of tip	90
Maximum Design pressure(bar)	50
Operating temperature	450°C
Thread Connection	R3/4"
Material	X10CrNiTi189 or equivalent
Bore (Not Binding)	8.5mm

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This requirement shall supersede the requirement mentioned in ST45001. *[That is Table 1 & Table 2 of ST45001]*

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INVENTORY

			NAME	SIGNATURE & DATE
			WORKED BY	UTKARSH
			CHECKED BY	A.JAIN
AGREED DEPTT.	NAME	DATE & SIGNATURE	APPROVED BY	R.PANJA

*Utkarsh*

*Utkarsh 10/2/15*  
*A.Jain 10/2/15*  
*R.Panja 10/2/15*

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			CHECKED BY	A.JAIN	<i>A.Jain</i> 10/2/15
AGREED DEPTT.	NAME	DATE & SIGNATURE	APPROVED BY	R.PANJA	<i>R.Panja</i> 10/2/15