<u>uițiu</u>

DATE

જ

SIGN

SUPERSEDES INVENTORY NO.

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the insterest of the company

COPYREGHT AND CONFIDENTIAL

# PRODUCT STANDARD STEAM TURBINE ENGINEERING

ST 45001

PAGE 1 OF 4

#### PURCHASE SPECIFICATION FOR SPRAY NOZZLE

- 1.0 SCOPS: 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 errosion and corrosion resistance. The material indicated in the table are only for reference. Supplier can offer

									2/-	
Ξ	5/85							NAME	SIGN. 8	& DATE
DATE	5	ш					DRAWN			
જ	-2-	쀪	TSX	S Kumaar	2	3.4.85	WORKED	A.B.GUPTA	alym	20.2.89
SIGN	5/	AG	QAX	K. Singh	Junk	26.286	CHECKED	K.C. SACHAN	1	an20.2.85
SI	9	`	DEPTT	NAME	SIGN.	& DATE	SUPERVISED	S.S.KULKARNI		Marine
NO.	57		evision : 01		- '-	I	Approved :	Hundle a C	4155	ST
INVENTORY	555	REA	FFIRMED			. [	ENGG.	DEV. MANAC	ER	8-20
EN	',	D	ate :28.03.05				Prepared	Issued	Da	te
ž	0		38.05.05				STE	STE ( TL ) HARDWAR	505	:85

		ronw.			
DATE	HHH	PRODUCT STANDARD ST 45 001			
જ		STEAM TURBINE ENGINEERING PAGE 2 OF 4			
SIGN	alternate material which shall be subjected to I				
No.	I	BHEL's customer's approval.			
RSED	4.0	DOCUMENTS			
SUPERSEDES INVENTORY NO.	4.1	Occuments allongwith Offer			
		Supplier shall submit the offer alongwith cross-			
ITED.	:	sectional drawing of spray nozzle, bill of material and			
S LIM	·	information on the test conducted to establish the			
RICAL rest of	1	following:-			
AND CONFIDENTIAL property of BHARAT HEAVY ELECTRICALS LIMITED, in any way detrimental to the insterest of the company.	. (	(i) Flow vg. Pressure characteristics.			
TIAL EAVY to the	(	(ii) Particle size achieved.			
DEN RAT H	(	(iii) Spray cone angle.			
CONFIDENTIAL of BHARAT HEAVY ay detrimental to th		(iv) Length of throw.			
ID C arty of y way		In case test were not conducted by him but got			
T AND s property r in any v	;	done elsewhere, the name of test lab shall be given			
t is the		alongwith the certificate of lab.			
COPYRIGHT ocument is the party or indirectly is	4.2	Occuments ofter Placement of Order:			
C this do directl		Supplier shall submit 10 copies of document			
pesu o	, r	mentioned in clause 4.1 after incorporating BHEL comments.			
COPYRIGHT The information on this document is the It must not be used directly or indirectly	5.0	QUALITY PLAN: Supplier shall submit Quality Plan to be			
The in		followed during manufacturing of nozzle. This shall be			
	:	approved by Purchaser/owner.			
	6.0	INSPECTION & CERTIFICATES:			
	6.1	Supplier shall give compliance certificate stating			
E ,		that product supplied confirms to the agreement made in			
& DATE /5/85		the order.			
z	6.2	6.2 Each nozzle shall be subjected to hydraulic test at 1.5 times the maximum inlet pressure mentioned in the table.  6.3 PERFORM ANCE TEST:			
S 48	•				
No.	6.3				
INVENTORY NO.	~	BHEL/BHEL's customer may ask to conduct test on a			
INVER P. S	Rev.	WORKED BY A. B. GUPTA OLIMIN 20.2.85			
		CHECKED BY K.C. SACHAN leachan 20.2.85			

				никм				
DATE	nthu	PRODUCT STANDARD		ST 45001				
શ્ર		STEAM TURBINE ENGINEERIN	NG	PAGE 3 OF 4				
SIGN	, sat	nple nozzle to prove the complia	nce of th	ne nozzles with				
S o	respect to information submitted alongwith offer and shall							
INVENTORY NO.	ha	r, a separate						
INVENTORY NO	pr	rice may be quoted for such a test.						
	7.0 WH	REVER Standards have been mention	oned, the	e latest issue &				
ONFIDENTIAL BHARAT HEAVY ELECTRICALS LIMITED, defrimental to the insterest of the company.	amendment shall apply.							
the cor	8.0 GUARANTEE: The supplier shall guarantee trouble free							
IICALS	operation of the equipment for a period of 2 years after							
LECTR	installation and commissioning or a period of 3 years from							
CIAL AVY E	the day of despatch of equipment whichever is earlier.							
CONFIDENTIA of BHARAT HEAVY sy definmental to ti	If during erection/commissioning and operation at							
NFI BHAR detrim	si	site any defect in any component is detected, purchaser's/						
Try of	o₩	owner's site representative shall prepares the assessment						
COPYRIGHT AND COPMENT is the property of not be used directly or indirectly in any way	re	port and a copy of same shall be	forward	ed to the				
COPYRIGHT locument is the fly or indirectly	ອນ	supplier. The supplier shall replace/rectify the concerned						
PYR ument or ind	it	ems free of charge. The supplier	, if he	so desires may				
CC irectiv	đe	pute his representative to site	at his o	wn cost otherwis				
ta on the	th	the report of purchaser's/owner's site representative shall be binding on the supplier.  CONSERVATION/PACKING: The component shall be conserved so						
or be	sh							
The info	9.0 <u>CO</u>							
Ē=	as	to last for one year after desp	atch.					
		Packing shall be seaworthy	and such	that any				
	external damage to the component during transit is							
<i>m</i> ,	e]	iminated.						
& DATE	10. GENERAL: If there is any deviation from this specific							
8 -	in offer, the same should be clearly spelled out clause-							
Sign Sign	· wi	se by supplier.						
9								
7 S S								
VENT	Rev.	WORKED BY A B GU	Pra Olyp	Mh 20.2.85				
Σ Q'	01	CHECKED BY K.C. SAC		an 20·2·85				

SIGN & DATE SUPERSEDES INVENTORY No. The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the insterest of the company. COPYRIGHT AND CONFIDENTIAL SIGN & DATE 28/5/1

INVENTORY NO.



## PRODUCT STANDARD

#### STEAM TURBINE ENGINEERING

ST45001

PAGE 4 OF 4

### 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	4 kg/cm <sup>2</sup>	8 kg/cm <sup>2</sup>
Spray cone angle at tip.	900	70°
Maximum Inlet pr.	20 kg/cm <sup>2</sup>	20 kg/cm <sup>2</sup>
Thread connection	R ½ "	1 R ‡"
Material	XloCrNiTi189	X10CrNiTil89

#### TABLE-2

	Type 4 (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	900	70 <sup>d</sup>
Maximum Inlet Pr. kg/cm <sup>2</sup>	45	45
Thread Connection	R ≟"	R in
Material	X10CrNiTi189	XloCrNiTi 189

Rev. O1. WORKED BY A.B. GUPTA CHECKED BY K.C. SACHAN Backan. 20.2.85