Bharat Heavy Electricals Limited
Piping Centre Chennai-17

Specification Number	Rev.no.	Sheet Number
PC: TSP: BARH: SNUBBER	00	1 of 3

TECHNICAL SPECIFICATION FOR HYDRAULIC SNUBBERS

NTPC BARH SUPER THERMAL POWER PROJECT

STAGE I (3 x 660 MW)-UNIT NOS. 1, 2 &3

CONTENTS

00	17.07.2015	Fresh Issue	Sd/-	Sd/-	Sd/-
			S.KAVITA	S.KAVITA	C SARAVANAN
Rev	Date	Alteration	Prepared	Checked	Approved (Mech.)

I. General Requirements

The Snubbers shall be mounted in between a piping system and the supporting structure. The purpose is to protect the piping/components against Dynamic movements arising from sudden changes in steam flow, safety valve reactions, earthquake etc.
The snubber shall allow free movement of the piping with minimum frictional resistance when subjected to non-dynamic movements such as thermal expansion and contraction.
The snubber shall limit motion, when the component is subjected to dynamic or impulse loads. The snubber shall be “locked up” and form a rigid connection when the piping is subjected to dynamic/seismic motion thereby protecting the piping by limiting their relative displacement. The Snubbers shall be of double acting type so that it can lock the motion of component and resist inertial forces of highly oscillatory nature, in both directions along longitudinal axis of the snubber.

II. Technical requirements

a) Stroke Length

The Snubber stroke length shall be decided based on the thermal movement of the pipe as given in the data sheet with a cushion of 25 mm on the either side.

The arrangement should permit swiveling motion not less than 6deg in all directions.

b) Mechanical

End Connection: Each end of the snubber shall be provided with self-aligning bearing. One end of the snubber shall be connected to the pipe clamp and the other end to a weld on bracket attached to the supporting structure. The weld on bracket are to be supplied by the snubber supplier.

Materials & construction

Materials & construction shall conform to be as per MSS 58, 69, 89 and 90.

III. Specific requirements/Data

a) Application: For pipe support
b) The Snubbers may be of hydraulic type.
c) The distance between the structural member and the pipe to be supported as indicated in the data sheet.
d) Recommended spares list to be furnished by supplier.
e) Supplier to furnish reference list, relevant catalogues and maintenance procedures.
f) For hydraulic snubber, the recommended Indian equivalent oil. If not, furnish the quantity of oil to be stocked as spare along with price particulars.

g) Filling instruction of oil to the shock absorber.
h) For data sheet refer Annexure-A.
i) Clamp Type is Yoke Restraint type Clamp. Refer Drawing no:4-00-301-40763 for details.

IV. Scope of Supply

a) The length 'L' indicated in the data sheet is the actual length required based on arrangement in cold condition.
b) The supplier has to select the shock absorber type, extension tube and weld on bracket assembly.
c) Dimension "A" and "E" are to be selected by the supplier.
d) Snubber with necessary accessories as required.
e) Weld on brackets with pins etc.
f) Yoke type restraint clamps as per datasheets.
g) Painting of the supplied equipment.
h) Any special tools as required for erection and maintenance.
i) Commissioning/recommended spares.

V. Documents to be submitted along with the offer:

a) Dimensional drawings of the snubber and weld on bracket(s)
b) Details of materials for the above
c) Quality plan
d) Reference list, relevant catalogues and maintenance procedures..
e) Recommended spares list.
f) Detailed equipment specification

VI. Documents to be submitted along with supply of material

a) Detailed dimensional drawings of the snubber and weld on bracket.
b) Details of materials for the above.
c) Quality plan.
d) Recommended spares list.
e) Special tools (if any).
a. Erection instructions.
b. Technical Data sheets.
c. Maintenance instructions.

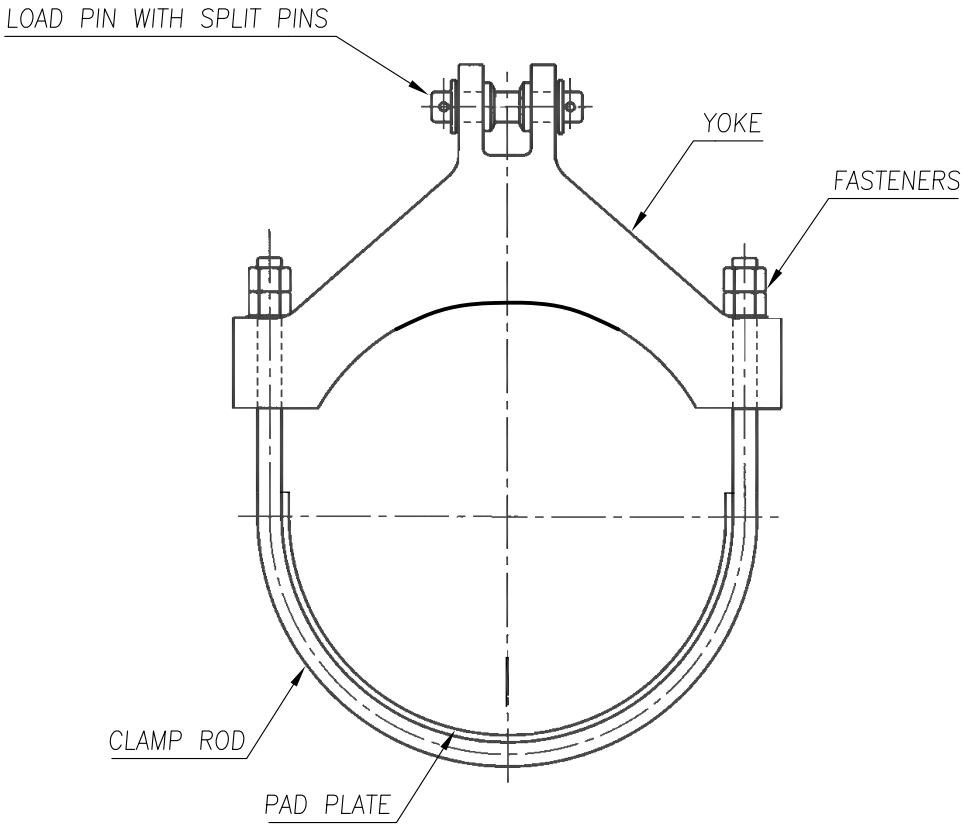
PIPING CENTRE

SKETCH OF YOKE RESTRAINT CLAMP

PROJECT : BARH STPP STAGE-1 (3x660 MW)

CUSTOMER : NTPC

CUST No. : 7285, 7286 & 7287



NOTES :-

1. VENDOR SHALL BE RESPONSIBLE FOR THE DESIGN OF CLAMP FOR THE DESIGN PARAMETERS SPECIFIED IN THE DATA SHEET.
2. DESIGN CALCULATION SHALL BE SUBMITTED FOR APPROVAL.
3. MATERIAL SELECTION SHALL BE AS PER BELOW TABLE OR ITS EQUIVALENT:

SL. NO.	ITEM	CS CLAMP	AS CLAMP
1.	CLAMP BODY	ASTM A36	ASTM A387 Grade 22 Class 2
2.	CLAMP BOLTS	ASTM A307 Grade B	ASTM A193 Grade B16
3.	U-BOLT	ASTM A36	ASTM A182 Grade F12 Class 2
4.	NUTS	ASTM A563 Grade A	ASTM A194 Grade 4
5.	PIN	ASTM A193 Grade B7	ASTM A193 Grade B7
6.	SPACERS(CLAMP)	ASTM A106 Grade B	ASTM A335 Grade P12
7.	SPACERS(PIN)	AISI 1213	AISI 1213

4. ALL SHARP CORNERS ARE TO BE ROUNDED OFF.
5. CLAMP SHALL BE SUPPLIED IN ASSEMBLED CONDITION WITH FASTENERS PROPERLY TIGHTENED.
6. HIGH TEMPERATURE PAINT FINISH IS REQUIRED.

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Size A4

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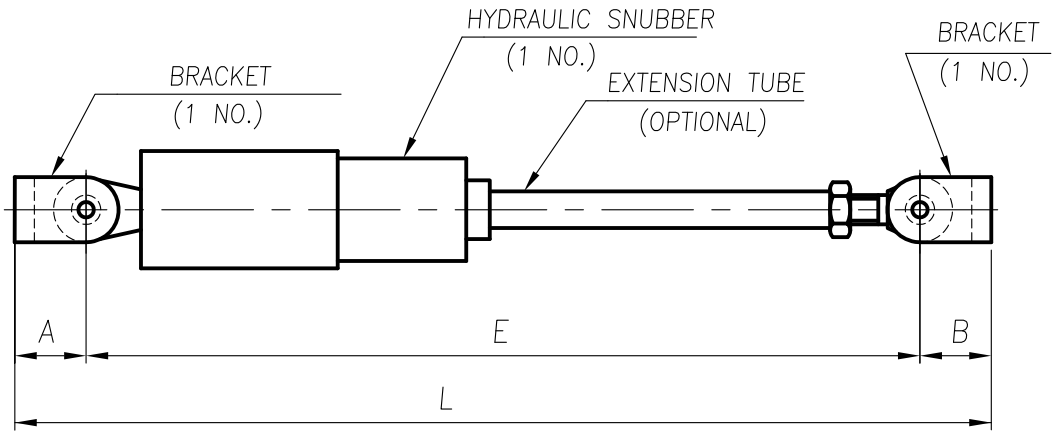
DATA SHEET FOR HYDRAULIC SNUBBER

PROJECT : BARH STPP STAGE–1 (3x660 MW)

CUSTOMER : NTPC

CUST No. : 7285, 7286 & 7287



NOTES :–

1. REFER TECHNICAL SPECIFICATION ENCLOSED HEREWITH.
2. SCOPE OF EACH SNUBBER ASSEMBLY INCLUDES HYDRAULIC SNUBBER(WITH OR WITHOUT EXTENSION TUBE) & BRACKET ASSEMBLIES.
3. STROKE LENGTHS INDICATED IN THE BELOW TABLE ARE INCLUSIVE OF CUSHION OF 25mm ON EITHER SIDE, AS SPECIFIED IN THE TECHNICAL SPECIFICATION.
4. L_{max} & L_{min} CAN BE VARIED BASED ON SELECTED STROKE LENGTH. EXCESS STROKE LENGTH OF SELECTED SNUBBER MAY BE ADDED TO L_{max} IN CASE OF EXPANSION & SUBTRACTED FROM L_{min} IN CASE OF COMPRESSION FOR DERIVING FINAL L_{max} & L_{min}.
5. DIMENSIONS A,B & E SHALL BE FIXED BY VENDOR WITH REF TO SELECTED L_{max} & L_{min} AND STROKE LENGTH.

SL No.	TAG No.	DESIGN LOAD ± KN	MINIMUM STROKE LENGTH IN mm	L_{max} IN mm	L_{min} IN mm	REMARKS
01	LBA12BQ011–A	230	265 (EXPANSION)	2310	2045	
02	LBA12BQ011–B	230	265 (EXPANSION)	2650	2385	
03	LBA21BQ020	495	190 (EXPANSION)	5505	5315	
04	LBA21BQ021	495	225 (COMPRESSION)	3780	3555	
05	LBA21BQ022	194	195 (COMPRESSION)	3140	2945	
06	LBA32BQ049–A	152	200 (EXPANSION)	2015	1815	
07	LBA32BQ049–B	145	165 (COMPRESSION)	2035	1870	

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SNUBBER

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DATA SHEET FOR HYDRAULIC SNUBBER

PROJECT : BARH STPP STAGE–1 (3x660 MW)

CUSTOMER : NTPC

CUST No. : 7285, 7286 & 7287

SL No.	TAG No.	DESIGN LOAD ± KN	MINIMUM STROKE LENGTH IN mm	L_{max} IN mm	L_{min} IN mm	REMARKS
08	LBA12BQ061	66	210 (EXPANSION)	1335	1125	
09	LBA11BQ069	65	215 (EXPANSION)	1340	1125	
10	LBA41BQ084	160	100 (COMPRESSION)	1695	1595	
11	LBA32BQ102	170	135 (COMPRESSION)	2220	2085	
12	LBA44BQ105	44	140 (EXPANSION)	1120	980	
13	LBA44BQ106	45	105 (EXPANSION)	1055	950	
14	LBA41BQ107	48	140 (EXPANSION)	1085	945	
15	LBC11BQ005–A	60	110 (COMPRESSION)	1845	1735	
16	LBC11BQ005–B	60	80 (EXPANSION)	1870	1790	
17	LBC11BQ008	40	110 (EXPANSION)	2985	2875	
18	LBC21BQ015	105	110 (COMPRESSION)	2055	1945	
19	LBC21BQ017	245	245 (COMPRESSION)	5685	5440	
20	LBC32BQ028	47	130 (EXPANSION)	1265	1135	
21	LBC32BQ042	53	280 (COMPRESSION)	1180	900	
22	LBC12BQ043–A	105	115 (EXPANSION)	1890	1775	
23	LBC12BQ043–B	105	110 (COMPRESSION)	1825	1715	
24	LBC12BQ045	78	120 (COMPRESSION)	1055	935	
25	LBC31BQ049	48	145 (EXPANSION)	1280	1135	
26	LBC31BQ065	178	80 (COMPRESSION)	1920	1840	
27	LBC32BQ073	175	80 (COMPRESSION)	1920	1840	
28	LBC31BQ090	52	275 (COMPRESSION)	1180	905	

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DATA SHEET FOR HYDRAULIC SNUBBER

PROJECT : BARH STPP STAGE–1 (3x660 MW)

CUSTOMER : NTPC

CUST No. : 7285, 7286 & 7287

SL No.	TAG No.	DESIGN LOAD ± KN	MINIMUM STROKE LENGTH IN mm	L_{max} IN mm	L_{min} IN mm	REMARKS
29	LBB11BQ005	105	140 (EXPANSION)	2810	2670	
30	LBB11BQ021	120	240 (COMPRESSION)	3265	3025	
31	LBB12BQ023	112	200 (EXPANSION)	2455	2255	
32	LBB12BQ036	85	245 (COMPRESSION)	3265	3020	
33	LBB21BQ039	170	305 (EXPANSION)	2925	2620	
34	LBB21BQ040	135	165 (COMPRESSION)	3560	3395	
35	LBB32BQ060	95	165 (EXPANSION)	2200	2035	
36	LBB21BQ073	142	100 (COMPRESSION)	2705	2605	
37	LBB12BQ075	80	265 (EXPANSION)	4975	4710	
38	LBB11BQ076	95	230 (EXPANSION)	2425	2195	
39	LBB11BQ081	105	120 (COMPRESSION)	1670	1550	
40	LBB11BQ100	25	150 (EXPANSION)	1625	1475	
41	LBA51BQ096–A	65	150 (EXPANSION)	1625	1475	
42	LBA51BQ096–B	65	150 (EXPANSION)	1625	1475	
43	LBA52BQ110–A	25	180 (EXPANSION)	1655	1475	
44	LBA52BQ110–B	25	180 (EXPANSION)	1655	1475	
45	LBA52BQ111–A	25	180 (EXPANSION)	1655	1475	
46	LBA52BQ111–B	25	180 (EXPANSION)	1655	1475	

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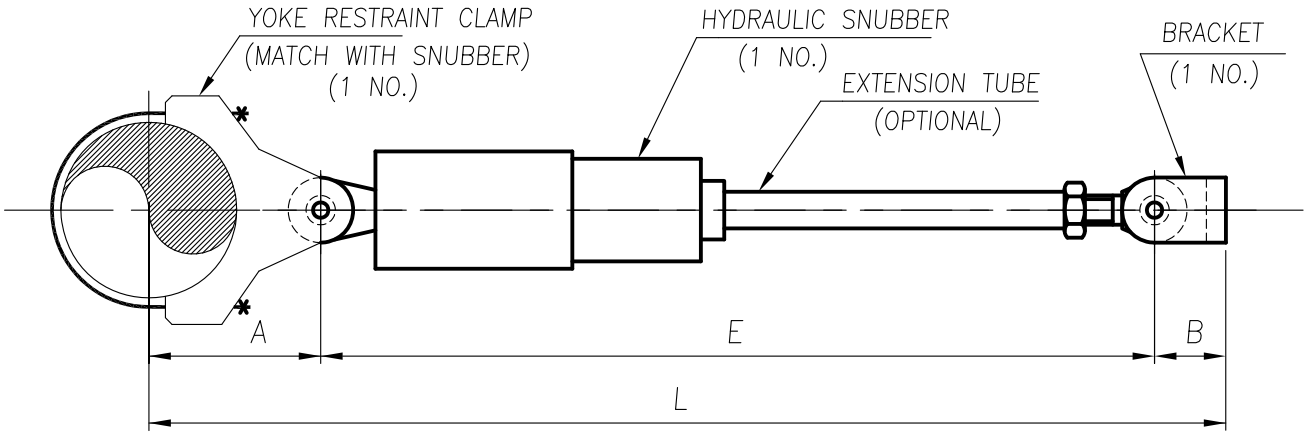
DATA SHEET FOR HYDRAULIC SNUBBER ASSEMBLY

PROJECT : BARH STPP STAGE–1 (3x660 MW)

CUSTOMER : NTPC

CUST No. : 7285, 7286 & 7287



NOTES :–

1. REFER TECHNICAL SPECIFICATION ENCLOSED HEREWITH.
2. SCOPE OF EACH SNUBBER ASSEMBLY INCLUDES HYDRAULIC SNUBBER(WITH OR WITHOUT EXTENSION TUBE), BRACKET ASSEMBLY & YOKE RESTRAINT CLAMP MATCHING WITH SNUBBER.
3. STROKE LENGTHS INDICATED IN THE BELOW TABLE ARE INCLUSIVE OF CUSHION OF 25mm ON EITHER SIDE, AS SPECIFIED IN THE TECHNICAL SPECIFICATION.
4. L_{max} & L_{min} CAN BE VARIED BASED ON SELECTED STROKE LENGTH. EXCESS STROKE LENGTH OF SELECTED SNUBBER MAY BE ADDED TO L_{max} IN CASE OF EXPANSION & SUBTRACTED FROM L_{min} IN CASE OF COMPRESSION FOR DERIVING FINAL L_{max} & L_{min}.
5. DIMENSIONS A,B & E SHALL BE FIXED BY VENDOR WITH REF TO SELECTED L_{max} & L_{min} AND STROKE LENGTH.
6. WIDTH OF DESIGNED YOKE RESTRAINT CLAMPS SHALL BE LESS THAN 200mm FOR THE SPECIFIED LOAD.

SL No.	TAG No. / PIPE SIZE	DESIGN LOAD ± KN	MINIMUM STROKE LENGTH IN mm	L_{max} IN mm	L_{min} IN mm	Max CLAMP ID IN mm	A (Min) IN mm	PIPE CLAMP MATERIAL	DESIGN TEMP IN °C
01	LBA12BQ010 / ID345X64.09	140	160 (COMPRESSION)	3025	2865	495	650	ALLOY STEEL	546
02	LBA21BQ015 / ID448X82.11	260	135 (EXPANSION)	4350	4215	632	700	ALLOY STEEL	546
03	LBA21BQ018 / ID448X82.11	150	330 (COMPRESSION)	2475	2145	632	700	ALLOY STEEL	546
04	LBA21BQ028 / ID448X82.11	230	425 (COMPRESSION)	2525	2100	632	700	ALLOY STEEL	546
05	LBA21BQ029 / ID448X82.11	153	235 (COMPRESSION)	2525	2290	632	700	ALLOY STEEL	546
06	LBA31BQ034 / ID345X64.09	152	210 (EXPANSION)	2585	2375	495	650	ALLOY STEEL	546
07	LBA11BQ048 / ID345X64.09	130	165 (COMPRESSION)	3025	2860	495	650	ALLOY STEEL	546
08	LBA31BQ100 / ID345X64.09	75	195 (EXPANSION)	2660	2465	495	650	ALLOY STEEL	546
09	LBA32BQ104 / ID345X64.09	112	120 (COMPRESSION)	2975	2855	495	650	ALLOY STEEL	546

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PIPING CENTRE

DATA SHEET FOR HYDRAULIC SNUBBER

PROJECT : BARH STPP STAGE–1 (3x660 MW)

CUSTOMER : NTPC

CUST No. : 7285, 7286 & 7287

SL No.	TAG No. / PIPE SIZE	DESIGN LOAD ± KN	MINIMUM STROKE LENGTH IN mm	L_{max} IN mm	L_{min} IN mm	Max CLAMP ID IN mm	A (Min) IN mm	PIPE CLAMP MATERIAL	DESIGN TEMP IN °C
10	LBC11BQ003 / ID622X17.89	40	90 (COMPRESSION)	1775	1685	675	560	CARBON STEEL	331
11	LBC11BQ004 / ID622X17.89	65	120 (EXPANSION)	3745	3625	675	560	CARBON STEEL	331
12	LBC11BQ010 / ID622X17.89	95	160 (EXPANSION)	2285	2125	675	560	CARBON STEEL	331
13	LBC32BQ033 / ID622X17.89	73	270 (EXPANSION)	2840	2570	675	560	CARBON STEEL	331
14	LBC32BQ037 / ID622X17.89	73	335 (EXPANSION)	2185	1850	675	560	CARBON STEEL	331
15	LBC12BQ041 / ID622X17.89	31	75 (COMPRESSION)	1775	1700	675	560	CARBON STEEL	331
16	LBC31BQ054 / ID622X17.89	72	270 (EXPANSION)	3090	2820	675	560	CARBON STEEL	331
17	LBC31BQ058 / ID622X17.89	72	335 (EXPANSION)	2185	1850	675	560	CARBON STEEL	331
18	LBC21BQ085 / ID863X24.09	93	180 (COMPRESSION)	4085	3905	930	690	CARBON STEEL	331
19	LBC32BQ086 / ID622X17.89	77	165 (EXPANSION)	1945	1780	675	560	CARBON STEEL	331
20	LBC32BQ087 / ID622X17.89	73	150 (EXPANSION)	2420	2270	675	560	CARBON STEEL	331
21	LBC31BQ088 / ID622X17.89	75	170 (EXPANSION)	1950	1780	675	560	CARBON STEEL	331
22	LBC31BQ089 / ID622X17.89	70	140 (EXPANSION)	2410	2270	675	560	CARBON STEEL	331
23	LBB11BQ007 / ID660X24.78	120	365 (COMPRESSION)	2645	2280	726	775	ALLOY STEEL	574
24	LBB11BQ011 / ID660X24.78	120	420 (EXPANSION)	4240	3820	726	775	ALLOY STEEL	574
24	LBB11BQ012 / ID660X24.78	250	420 (EXPANSION)	5505	5085	726	775	ALLOY STEEL	574
26	LBB11BQ015 / ID660X24.78	150	120 (COMPRESSION)	6200	6080	726	775	ALLOY STEEL	574
27	LBB11BQ019 / ID660X24.78	150	185 (COMPRESSION)	4705	4520	726	775	ALLOY STEEL	574
28	LBB12BQ028 / ID660X24.78	86	230 (COMPRESSION)	3385	3155	726	775	ALLOY STEEL	574
29	LBB12BQ029 / ID660X24.78	82	245 (COMPRESSION)	3870	3625	726	775	ALLOY STEEL	574
30	LBB12BQ030 / ID660X24.78	212	325 (EXPANSION)	5380	5055	726	775	ALLOY STEEL	574

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DATA SHEET FOR HYDRAULIC SNUBBER

PROJECT : BARH STPP STAGE–1 (3x660 MW)

CUSTOMER : NTPC

CUST No. : 7285, 7286 & 7287

SL No.	TAG No. / PIPE SIZE	DESIGN LOAD ± KN	MINIMUM STROKE LENGTH IN mm	L_{max} IN mm	L_{min} IN mm	Max CLAMP ID IN mm	A (Min) IN mm	PIPE CLAMP MATERIAL	DESIGN TEMP IN °C
31	LBB31BQ045 / ID660X24.78	95	265 (EXPANSION)	2295	2030	726	775	ALLOY STEEL	574
32	LBB11BQ072 / ID660X24.78	118	250 (EXPANSION)	2840	2590	726	775	ALLOY STEEL	574
33	LBB12BQ074 / ID660X24.78	55	155 (COMPRESSION)	2725	2570	726	775	ALLOY STEEL	574
34	LBB11BQ077 / ID609X22.84	95	225 (EXPANSION)	4900	4675	674	735	ALLOY STEEL	574
35	LBB11BQ078 / ID609X22.84	48	150 (COMPRESSION)	2725	2575	674	735	ALLOY STEEL	574
36	LBB11BQ082 / OD406.4	52	170 (COMPRESSION)	2790	2620	420	610	ALLOY STEEL	574
37	LBB11BQ084 / ID375X13.72	22	140 (EXPANSION)	1915	1775	415	600	ALLOY STEEL	574
38	LBB11BQ086 / ID375X13.72	22	215 (COMPRESSION)	1970	1755	415	600	ALLOY STEEL	574
39	LBB12BQ088 / ID609X22.84	55	140 (COMPRESSION)	2725	2585	674	735	ALLOY STEEL	574
40	LBB12BQ091 / OD508	55	200 (COMPRESSION)	2805	2605	520	660	ALLOY STEEL	574
41	LBB12BQ093 / ID375X13.72	25	205 (EXPANSION)	1980	1775	415	600	ALLOY STEEL	574
42	LBB12BQ095 / ID375X13.72	28	95 (EXPANSION)	1790	1775	415	600	ALLOY STEEL	574
43	LBB12BQ096 / ID660X24.78	105	245 (EXPANSION)	4050	3805	726	775	ALLOY STEEL	574
44	LBB12BQ034 / ID660X24.78	100	300 (COMPRESSION)	4405	4105	726	775	ALLOY STEEL	574
45	LBB11BQ099 / OD88.9	25	130 (EXPANSION)	1605	1475	100	340	ALLOY STEEL	574
46	LBB11BQ114 / OD219.1	25	140 (EXPANSION)	1615	1475	230	490	ALLOY STEEL	574
47	LBB11BQ122 / ID375X13.72	25	150 (EXPANSION)	1625	1475	415	600	ALLOY STEEL	574
48	LBB12BQ108 / OD88.9	25	140 (EXPANSION)	1615	1475	100	340	ALLOY STEEL	574
49	LBB12BQ125 / ID375X13.72	25	200 (EXPANSION)	1675	1475	415	600	ALLOY STEEL	574
50	LBB12BQ127 / OD219.1	25	150 (EXPANSION)	1625	1475	230	490	ALLOY STEEL	574
51	LBB12BQ134 / OD88.9	25	120 (EXPANSION)	1595	1475	100	340	ALLOY STEEL	574

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SNUBBER

PIPING CENTRE

DATA SHEET FOR HYDRAULIC SNUBBER

PROJECT : BARH STPP STAGE–1 (3x660 MW)

CUSTOMER : NTPC

CUST No. : 7285, 7286 & 7287

SL No.	TAG No. / PIPE SIZE	DESIGN LOAD ± KN	MINIMUM STROKE LENGTH IN mm	L_{max} IN mm	L_{min} IN mm	Max CLAMP ID IN mm	A (Min) IN mm	PIPE CLAMP MATERIAL	DESIGN TEMP IN °C
52	LBA51BQ093 / ID231.2X43.39	25	200 (EXPANSION)	1675	1475	335	450	ALLOY STEEL	546
53	LBA51BQ095 / ID231.2X43.39	50	200 (EXPANSION)	1675	1475	335	450	ALLOY STEEL	546
54	LBB52BQ099 / ID231.2X43.39	25	230 (EXPANSION)	1705	1475	335	450	ALLOY STEEL	546
55	LBB52BQ108 / ID231.2X43.39	25	160 (EXPANSION)	1635	1475	335	450	ALLOY STEEL	546
56	LBC41BQ091 / OD610	25	110 (EXPANSION)	1585	1475	630	535	ALLOY STEEL	331
57	LBC42BQ093 / OD610	45	170 (EXPANSION)	1645	1475	630	535	ALLOY STEEL	331
58	LBB51BQ144 / ID609X22.84	25	120 (EXPANSION)	1595	1475	674	670	ALLOY STEEL	574

PREPARED	APPROVED	DATE	DRG. No.	REV.
SOURAV	M.MANO	01.07.2015	4–00–301–40762 SHEET 04 OF 04	00

SNUBBER

BHARAT HEAVY ELECTRICALS LTD
PIPING CENTRE, CHENNAI – 17
QUALITY ASSURANCE & CONTROL DEPT.

STANDARD QUALITY PLAN FOR SNUBBERS

QP NO : QPG 84
REV.NO : 00
DATE : 18.02.2014

S.No	COMPONENT & OPERATIONS	CHARACTRISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY				REMARKS
									D*	P	V	W	H	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.0	**Raw Material**													
1.1	Plates,bars,pipes, Forgings,springs, roller bearings, screws, nuts and other purchases parts	Material Conditions	Major	Visual and dimensional	100%	Purchase order and material standards		Inward inspection records & MTC	✓	3	2	-	-	MTC = Mill Certificate
1.2		Chemical Analysis Mechanical Properties	Major	Verification of MTC	100%	Purchase order and material standards			✓	3	2	-	-	
2.0	**Inprocess Inspection**													
2.1	Surfaces after flame cutting, bending and/or mechanical machining	Surface Condition	Major	Visual and dimensional	100%	Drawings and Manufacturers inspection procedures		Inspection Report	✓	3	2	--	--	
2.2	Welders & Welding Qualification	WPS&PQR	Major	Verification	100%	ASME Section-IX Welding Standards for the different		Inspection Report	✓	3	2	--	--	
2.3	Welding	Quality of Weld	Major	Visual and dimensional of weld seam	100%	Manufacturer's Drawings		Inspection Report	✓	3	2	--	--	
2.4	NDE for Load Bearing welds	MPI	Major	MPI	100%	Manufacture's Procedure and as per ASME Section-V		MPI Report	✓	3	2	--	--	
2.5	Assembled supports	Quality of Assembly	Major	Execution of supports with visual and dimension check	100%	Manufacturer's Drawings		Inspection Report	✓	3	2	--	--	
3.0	**Tests**													
3.1	Load Testing	Load Check test	Major	Load check test	100%	Manufacturer's Drawings		Inspection Report	✓	3	2	--	--	
3.2	Completed Shock Absorber	Caliberation & Performance	Critical	Calibration Function control including load test, visual and dimensional check	100%	As per Manufacturers Calibration Procedure		Calibration chart & Test diagrams	✓	3	2	--	--	* All Calibration Reports shall be sent for Approval before despatch

LEGEND:
1-Customer, 2-BHEL/BHEL Nominated Agency, 3-BHEL Vendor, 4-Subvendor
P-Perform, V-Verification / Review, W-Witness, H-Hold
* RECORDS, INDENTIFIED WITH "TICK" (∨) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.

PREPARED BY
M.MANOJ PANDI , ENGR/QA
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APPROVED BY
M.S. MURALIDHARAN , MGR / QA

BHARAT HEAVY ELECTRICALS LTD PIPING CENTRE, CHENNAI – 17 QUALITY ASSURANCE & CONTROL DEPT.	STANDARD QUALITY PLAN FOR SNUBBERS	QP NO : QPG 84 REV.NO : 00 DATE : 18.02.2014

S.No	COMPONENT & OPERATIONS	CHARACTRISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY					REMARKS
									D*	P	V	W	H	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
4.0	**Final Inspection**													
4.1	Completed Shock absorber	Size, Overall dimension & Travel	Major	Visual and Measurement	100%	As per Drawing		Dimensional Report	✓	3	2	--	--	
4.2	Painting	Visual , DFT	Major	Coating thickness check	100%	Manufacturer's Procedure		Inspection Report	✓	3	2	--	--	
4.3	Identification & Marking	Verification	Major	Visual	100%	Specification, Approved Drg.& Data Sheet / P.O.		Inspection Report	--	3	2	--	--	
4.4	Packing	Transit worthy	Major	Visual	100%	Manufacturer's Procedure		Inspection Report	--	3	2	--	--	
4.5	Inspection clearance	Document control and release for dispatch	Major	Verification	100%	All Documents as per this QP		Final IR	✓	3	2	--	--	

LEGEND:
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