BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPALLI-620 014

DUCTS / PE (BOILERS)

Item Code: 48NMJ

BHADRADRI (CUST.No.2485 to 2488)
(4x270 MW)

SPECIFICATION
FOR
NON METALLIC EXPANSION JOINTS
(FLUE GAS DUCT)

REVISION HISTORY

REV. NO.	PAGE	REVISION HISTORY	DATE	PRPD	CHED	APPD
00	All	Original Release	23.01.2020	ROSHAN	HSP	MRS

CONTENTS

Clause No.	DESCRIPTION
1.0	**SCOPE OF WORK** This specification is for the supply of non-metallic expansion joints which are to be used in the air and flue gas duct systems of coal fired steam generators.
1.1	**SCOPE OF WORK INCLUDES THE FOLLOWING** The specification covers the requirement for the A) Design B) Manufacture C) Testing D) Packing for shipment & delivery E) Supervision for installation (Offer for this portion to be separately brought out) Non-metallic expansion joints are to be used in the air and flue gas duct work of the coal fired steam generators. NMEJ shall be suitable for the most adverse operating condition of the duct system. The method of execution for the above scope of work is as follows. i) Steel frame and fabric components are to be despatched separately to site. ii) Steel frames of beyond transportable size can be sent in split condition and assembled at site. iii) These steel frames and fabric components and canopy are to be fully assembled at site on ground. iv) Matching duct to be checked and ensured for alignment by the vendor prior to installation of NMEJ in the ducting system. Vendor to prepare joint protocol with site. v) Installation / erection of NMEJ in ducting system to be supervised by the vendor. vi) Vendor approval condition of the Customer (enclosed with enquiry) is to be fully complied with. vii) Vendor to avoid neck offset design.

2.0 SCOPE OF SUPPLY: -

The extent of supply includes the following of the NMEJ assembly.

2.1 FABRIC:

a) Different layers of coated, insulating, sealing, supporting, fabric/other materials. Following are minimum requirement layer for different locations. Vendor to furnish the basis for selection of basic type of expansion joints and thickness of each layer.

FLUE GAS:

1) INNER / SUPPORT LAYER : Texturised glass cloth suitably treated to prevent dust accumulation.
2) INSULATING LAYER : Insulation mattress to provide thermal barrier
3) GAS SEAL MEMBRANE : PTFE Film
4) OUTER LAYER : Flouro elastomer/ Flouro plastic coated on texturised glass

b) Edge reinforcement / flange gasket is to be used on the multi layered flexible element to protect it from thermal degradation by the hot metal flanges and backup bars.

c) Joining materials and tools necessary for joining different layers at site

d) All glass fabric are to be of texturised and graphite treated.

e) All the fabric / bolster components other than insulating / glass felt mattress and wire mesh shall be imported from vendor' s principal.

f) Supplier should substantiate with relevant back up information on how the materials selected will meet the functional requirements and other design requirements specified in the specification including chemical / corrosion and abrasion resistance.

g) Calculation for the selection of fabric width for each tag no is to be submitted along with the offer. Additional allowances considered for fabric width selection apart from thermal movement values to be clearly brought out in the calculations.

h) Temperature gradients shall be calculated using the maximum ambient value. Max outside temperature of the outermost layer is to be limited to 47.2 deg C.

	i) Temperature drop calculations with graphs and K-value for each fabric material have to be provided.
2.2	**BOLSTER:** Cavity pillow / Bolster is to be provided to fill the cavity between flexible elements and metal liner or baffle to prevent accumulation of particulate matter. Refer clause no 4.4.4 of specification and data sheets. For suggested arrangement refer **SK-NMEJ-002.** Design guidelines for arriving bolster depth and width has to be provided.
2.3	**STEEL PARTS** a) All steel parts from inlet flange to outlet flange, with internal supports b) Liner plates are to be provided for all hot air and flue gas expansion joints. c) All fasteners, Backup bars etc. for connecting the fabric with steel parts. d) All necessary transport clamps / frames lifting lugs for shipment. **CANOPY** e) Since the NMEJ is installed in the course of erection of ducting system fabric portion of the expansion joint may get damaged. To protect it from falling object or weld spatter, suitable external protection cover (CANOPY) shall be supplied. f) Note: Fasteners for fit-up of the NMEJ assembly frame with duct Flange is in BHEL scope. The extent of supply stated here in is not necessarily exhaustive and shall not relieve the vendor from his responsibility to provide goods and service necessary to satisfy the performance criteria and guarantee specified. I. NMEJ corners are to be fully covered by canopy. II. The canopy fixing clamps (Ear lug) shall be an integral part of the canopy plate. No tack welding of canopy joint is permitted over the fabric assy. III. The drg. showing the arrangement of canopy is to be submitted for approval.
2.4	**ELIGIBILITY** a) Vendor / his principal should have experience in supplying NMEJs for at least two coal fired power stations of capacity 270 MW or more where the design and material chosen for this contract is working satisfactorily for more than 20,000 operating hours. This is w.r.t

	pressure temp size operating conditions and dust burden as called for in the enclosed data sheets. b) Vendor should submit performance certificate from these two coal fired power stations. c) Vendor to establish that the design offered is same as that of the reference contracts by submitting drawing and data of the same. This should confirm the design arrangement of bolster selection and material data for all the layers of the composite fabric and bolster.
3.0	**SERVICE CONDITION:** Separate expansion joint data sheets are given in annexure. NMEJ shall be suitable for the adverse operating condition of the duct work.
4.0	**DESIGN REQUIREMENTS:**
4.1	**GENERAL** a) NMEJs shall generally be multi-layer construction designed to accommodate the thermal movements complete with additional internal insulation and / or insulation bolster and flow liners as required to suit the service conditions. b) For each fabric layer of the combination, vendor has to clearly specify its description, composition, thickness and physical and chemical properties. TYPICAL DATA sheet is enclosed **(SK-1254-NMEJ-001/00 ,SK-1254-NMEJ-002/00 & SK-1254-NMEJ-003/00)** and all the relevant data for each layer to be filled in and submitted along with the offer. This will be subjected to scrutiny by the owner and improvement commented are to be accommodated by the vendor during technical evaluations. c) Proposed field splices and their locations to be clearly indicated in the offer. d) There shall be no leakage through the joint into or from the atmosphere. e) Expansion joints shall have adequate mating surfaces for attachment to the duct work. **COLD PRESET: -** f) Cold pre-set in connecting duct system is not envisaged. Hence vendor to design the NMEJ for the design movement without cold pre-set.
4.2	**FRAME -** a) Material of frame shall be same / equivalent as the duct and minimum thickness shall be same as that of duct. b) Composite section of the frame on each side of the fabric joint shall be sized to withstand at least 50% greater than the maximum pressure condition stated in the specification.

	c) For bigger size frame internal strut pipe can be used. Vendor to indicate the internal strut arrangement in the proposal drgs. Frame should be a bent construction with minimum welding. Thickness of clamping bar and frame flange is minimum 10 mm to be maintained. d) Clamping arrangement to retain the compressed breech opening to be provided externally. drawing of typical clamping arrangement to be submitted for approval and this typical drg to be referred in the G.A. drg.
4.3	**FABRIC** Due consideration shall be given for the following in selection of the gas seal membrane, insulating layers, insulation retainer and encasement layer etc. a) Functional requirement. b) Temperature capability. c) Chemical resistance Vendor to furnish justification for the selection of the materials, its properties, and its adequacy for the intended purpose/service conditions. Vendor should furnish the design factors taken in to consideration while designing these Expansion joints. These should include provisions taken for adverse operating conditions like over stretching etc. Vendor to furnish the basis for fabric width arrived at. **Tolerance on matching Duct:** Vendor to Engineer the NMEJ to take care of the following tolerance on matching Ducts. Axial +/- 20 mm Lateral +/- 10mm Floating sleeve angle overlap to be at least 50 mm (min) in cold condition, to take care of variations in breech opening tolerance etc., For other cases the length of flow liner shall be selected to completely cover the Bolsters in cold condition. For standard elastomers properties and temperature limitation as given in the "TECHNICAL HAND BOOK FOR DUCTING SYSTEM NMEJ " of "FLUID SEALING ASSOCIATION " shall apply.
4.4	**ACCESSORIES:**
4.4.1	**FLOW LINERS:** Minimum thickness of liners wherever provided shall be of duct plate

	thickness. Integral or welded type can be provided. They shall not interfere with the movement of the joint.
4.4.2	**FASTENERS**: All fasteners shall be cadmium coated
4.4.3	**BACK UP BARS:** a) The minimum size of the back up bar shall be 50 mm x 10 mm thick b) The back up bar and flange are to be match drilled. c) Slotted holes are not permitted. in the back up bar d) All sharp edges that may come in contact with the flexible element should be ground smooth or rounded off to prevent damage to the flexible element. e) Minimum bolt size M12 and pitch 100 mm is to be provided. f) Use torque wrench for tightening the fasteners with fabric
4.4.4	**CAVITY PILLOW /BOLSTER**: - a) Expansion joints shall be designed with suitable cavity PILLOW/BOLSTER to avoid ash /dust accumulation in both hot and flue gas ducts. b) They are to be fabricated from suitable insulation mattress of density $64^{kg}/_{m^3}$ and wrapped in fabric and S.S fine wire mesh of 0.5 mm thick. 16 mesh and shall be provided with ears or tabs that fasten under the belt to hold the pillow in place. c) The arrangement of bolster shall be as per the sketch **SK-NMEJ-002**, enclosed. d) The design of the wire mesh shall be such that, it should retain its shape and occupy the space between the flanges. e) Vendor has to provide K- value for the selected bolster material.
4.5	The non-metallic shall be made of asbestos free materials. Fabric compensators shall be suitable for most adverse operating conditions of the duct work and shall not support the duct work.
4.6	The basic material for NMEJs are to be selected as per FSA or any other equivalent National / International stds which shall be clearly specified in the offer. The copy of such standard shall be given upon order of NMEJs.
4.7	The fabrics shall be tested as per suitable IS/ASTM/DIN or other international standards. Composite fabrics without bolster shall be tested for temperature withstand ability and permeability. The outer cover shall preferably be elastomer coated for better corrosion

	and abrasion resistance and weather ability. Vendor has to provide fabric selection standards and testing standards.
4.8	Supplier shall furnish design calculations along with the offer for service temperature of expansion joint for review and approval by BHEL.
4.9	Temperature gradient curve across the fabric shall be submitted along with the offer. Calculations for the predicted temperature drop curves for various layers are to be provided.
4.10	The 'K' value (Thermal conductivity) of each and every fabric shall be furnished.
4.11	The corrosion resistance barrier shall be free from pin holes, needled glass mats of 10mm thickness with mechanical bonding shall be used.
4.12	The fabric material used in the flue gas system from air heater outlet shall be suitably selected to resist low temp corrosion.
4.13	Ash load is to be considered for the design of some of the expn. joints as mentioned in the data sheet. The liner plates are to be suitably stiffened to take care of the ash load.
4.14	Wherever required as mentioned in data sheets, the expansion joints shall be designed with suitable insulation pillow/bolsters to avoid of dust accumulation between the fabric and liner plate.
4.15	Type of fabric used, width and length of each fabric used for each tag nos are to be provided along with offer. Stitching or stapling of multilayer fabric is acceptable.
4.16	Torque values and sequence of tightening of bolts to connect the fabric with frame and frame to duct flange is to be provided with the offer.
4.17	Packing procedure, packing drawing and max. outside dimension of the packing for each tag nos. are to be provided along with the offer.
4.18	Transport to site is in vendor' s scope. In case of any damage during transport, it should be rectified/ replaced within 15 days at vendor's cost.
4.19	Dust barrier is to be provided for all gas duct expn joints
4.20	Field splices of the non metallic expn joint shall be at the point of minimum

	stress in the erected position. For suggested arrangement refer SK-NMEJ-003 The Flange fitup hole dimensions to be maintained as given in **SK-NMEJ -003**
4.21	Minimum life of the expn joint shall not be less than 20000 hours of operation from the date of commissioning.
4.22	**CAUTION**: Deviation report is to be provided along with the offer. Without this, the offer will not be considered for technical evaluation
4.23	Considering the specific site conditions, it may become necessary to resort to insitu erection of few NMEJs. All necessary Scaffolding for INSITU installation will be provided by BHEL.
5.0	**QUALITY ASSURANCE AND TESTING**
5.1	Vendor shall generate and submit for approval a quality plan with stage inspection of frame, bolster, fabrics and complete trial assy of NMEJs. that sets out the quality control activities, which shall be carried out as a minimum to verify conformance with specified requirement.
5.2	Vendor should provide sample test data demonstrating the ability of the selected expansion joint composite fabric materials with out bolster to with stand the max temp required as specified in this specification.
5.3	The data should include temperature at the inside and outside surface of each layer of the fabric and the ambient external temperature.
5.4	The fabric materials shall be tested for a minimum of 4 hours after steady state condition is achieved. At the end of the test the fabric materials shall be checked for visual damages if any. Damage in fabric materials is not acceptable. Further the tested samples shall again be tested for tensile and elongation. The achieved tensile and elongation values shall be within 80% of the original tensile and elongation value of the fabric materials.
5.5	Followings are tests to be performed on the fabric. a) Flex -durability test b) Temperature withstand ability test – (To be done for the max

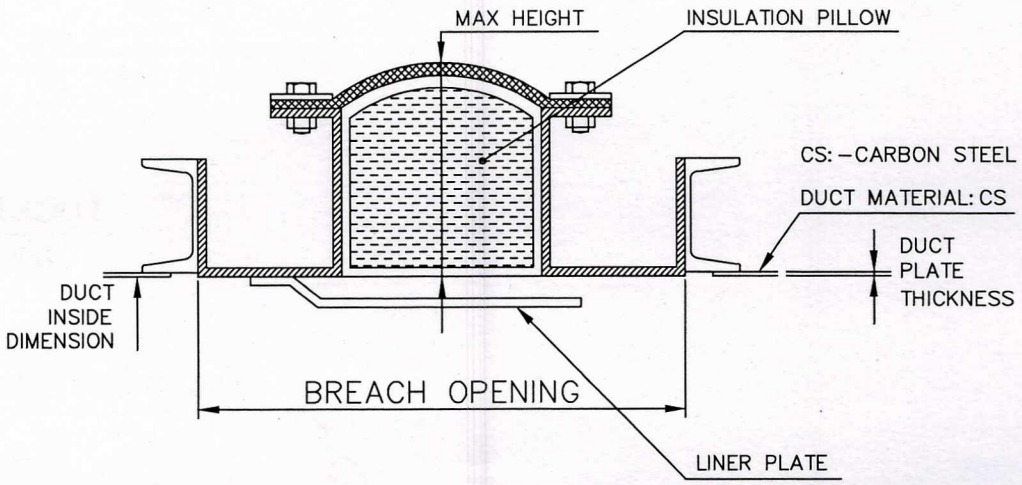
	temperature specified on the fabric combination with out bolster.) c) Permeability test d) Pin - hole test e) Tensile test (before & after pressure and temperature withstand ability test) f) Joint - efficiency test. All tests shall be made at the vendor' s works and necessary infrastructure shall be available with vendor. All tests shall be witnessed by BHEL Engg / QA. Detailed test procedures to be submitted along with the typical quality plan during offer stage itself.
6.0	**PACKING, PAINTING AND SHIPPING**
6.1	Supplier shall submit packaging details to BHEL along with the offer for approval. Generally, the packing provided should prevent mechanical damages as caused by stacking, bumping, dropping or dragging. Fabric parts to be provided with water proof packing to avoid damages during transit and storage . Bolster & Fabric (Tag number wise) to be packed and despatched separately. It should not clubbed with other Tag Nos.
6.2	**Marking and painting:** Before shipment, all parts of the equipment shall be thoroughly cleaned of all mill scale, rust, grease, and other foreign matter. All external metal surfaces shall be given shop coat of paint as detailed below. a) Surface preparation & Surface profile: SSPC-SP3/Power Tool Cleaning b) Primary Coat: Two coats of Heat Resistant Aluminium Paint to IS-13183 Gr.II/ DFT 20 microns per coat
6.3	Each joint shall be provided with indelible marking of with a permanently attached name plate giving the manufacturer's name, joint serial number and model or style designation
6.4	Piece marking is required for field installation; the joints shall be clearly marked accordingly.
6.5	Each joint shall be clearly and permanently marked showing "GAS SIDE " and "OUTSIDE " facing.
6.6	Metallic flow direction indicator shall be affixed in all the expansion joints.

6.7	**SHIPPING REQUIREMENT** a) vendor shall adequately crate, block anchor and protect equipment as required to prevent damage during shipment. All containers shall be clearly labelled with handling instruction and sling position Equipment shall be shipped fully assembled unless dismantling is necessary for shipping or installation reasons. b) All containers and all pieces shipped individually shall be clearly labelled with the following information: i. Vendor's name ii. Destination iii. Case, Tag and piece numbers iv. Shipping Weights and dimension v. Storage requirement
6.8	**SHIPPING LIMITATIONS:** Width = 3500 mm Length = 13000 mm Height = 3000 mm Weight = 20000 Kgs The above are normal shipping limitations. To minimise field assembly this can be extended case to case after mutual agreement.
7.0	**GUARANTEE:**
7.1	The offered fabric expansion joint shall be guaranteed for a period of 18 months from the date of dispatch or 12 months from the date of commissioning whichever is earlier.
7.2	During this time, they shall with stand from corrosion acid attack and erosion from grits entrained in the stream. They shall also be proof against premature failure from fatigue due to excessive flutter caused by pressure pulsations from the fans.
7.3	In the event of guarantee invocation, the supplier shall be responsible for complete replacement of the failed joint or part thereof including the cost of labour, lifting equipment and the necessary scaffolding.
8.0	**O&M:** 5 copies of operation & maintenance manual, detailing the following shall be supplied. a) General arrangement. drawing with part /material list b) storage instructions c) Installation instructions d) Repair procedures including on line maintenance procedures.

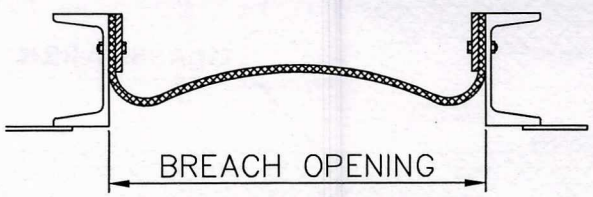
	e) Any special operating instructions. f) Copies of approved drawings for each Tag Number g) Typical installation arrangement details for adjoining ducts. h) One copy of typical O&M manual is to be supplied along with Offer for evaluation.
9.0	**DOCUMENT SUBMISSION** Following documents / information shall be furnished with the offer. 1. Complete and sufficient information shall be furnished to technically evaluate the offer against specification requirements. Incomplete / insufficient information / details are liable for rejection. 2. Confirmation of scope of work, design basic with description and applicable codes and standards. 3. Samples of the fabric combination and wire mesh are to be submitted along with the offer. Offers will not be considered with out samples. 4. Point wise confirmation / comments on the specification. 5. Deviation report. 6. Filled up data sheet containing material a. Designation b. Description c. Weight d. Thickness e. Tensile strength Warp f. Tensile strength Wept g. Elongation Warp h. Elongation Wept. i. Temperature 7. Separate General arrangement drawing for each tag nos of NMEJ detailing a. Elevation, plan and side view with necessary dimensions. b. Inlet and outlet side frame / flange details c. Type and arrangement of fabric belt d. Flow liner details e. Cavity pillow details f. split up details of frame and belt in case Expansion joint is shipped in number of parts. g. All part / material list. h. Transport clamp frame details. i. Total weight of each joint j. Break up weight details for steel, fabric portions. 8. List of recommended spares for commissioning /maintenance / emergency (including joining kits). 9. Typical Quality plan and O&M manual. 10. Proposed delivery schedules.

	11. Vendor to furnish the no of man days required for installation of each tag no of NMEJs as per the scope given in clause no 1.1 and it's rate. 12. Guarantee
10.0	**SPECIAL REQUIREMENTS** Expansion joints in the following locations are subject to high lateral movements. **TAG. NO** **LOCATION** **SIZE** 1) 414-A SCR INLET 6200X3200 2) 414-B ECO BY PASS 6200X600 3) 414-C SCR OUTLET 6600X2200 Special design requirement may be necessary and if two expansion joints in series are used, the space in between them will be subjected to ash load as specified. Proper support / load transfer arrangements shall be provided to take care of this additional load. Proper technical details are to be furnished in these cases to satisfy the functional requirement
11.0	**GENERAL DATA** A) TYPE OF FUEL : COAL B) INSTALLATION : OUTDOOR C) DUCT CORNER : SQUARE D) DUCT INSULATION : EXTERNAL E) AMBIENT MIN : 7.8°C F) AMBIENT MAX : 47.2°C G) DEW POINT FOR COAL : 55 ° C
12.0	**ANNEXURES** 001-NMEJ ARRANGEMENT (**SK-NMEJ-001**)—1PAGE 002-BOLSTER (**SK-NMEJ-002**) ----1 PAGE 003-SPLIT FRAME (**SK-NMEJ-003**) ----1 PAGE 004-EXPANSIOJN JOINT DATA SHEET **SK-1254-NMEJ-001/00** 005-EXPANSION JOINT DATA SHEET **SK-1254-NMEJ-002/00** 006-EXPANSION JOINT DATA SHEET **SK-1254-NMEJ-003/00** 007-FLNAGE DETAIL - **SK-1254-NMEJ-004/00** 008-DUCT SCHEME- **SK-1254-NMEJ-005/00**

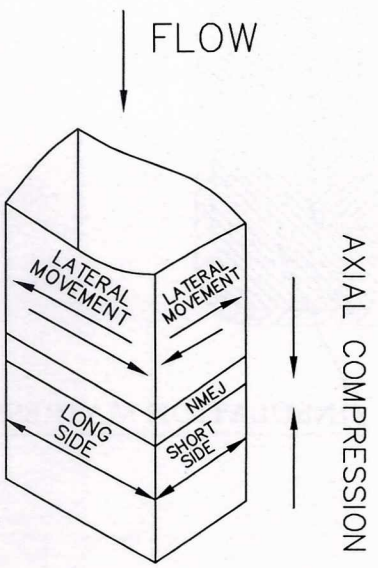
TYPICAL ARRANGEMENT OF NMEJ



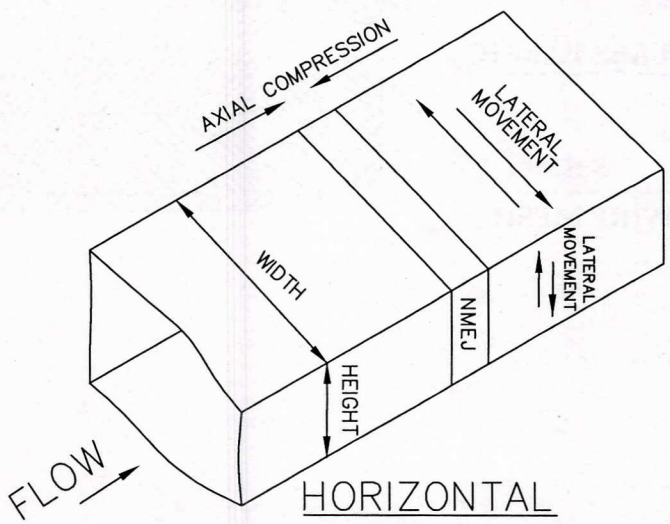
FLAT BELT TYPE



FLANGE BELT TYPE



VERTICAL DUCT

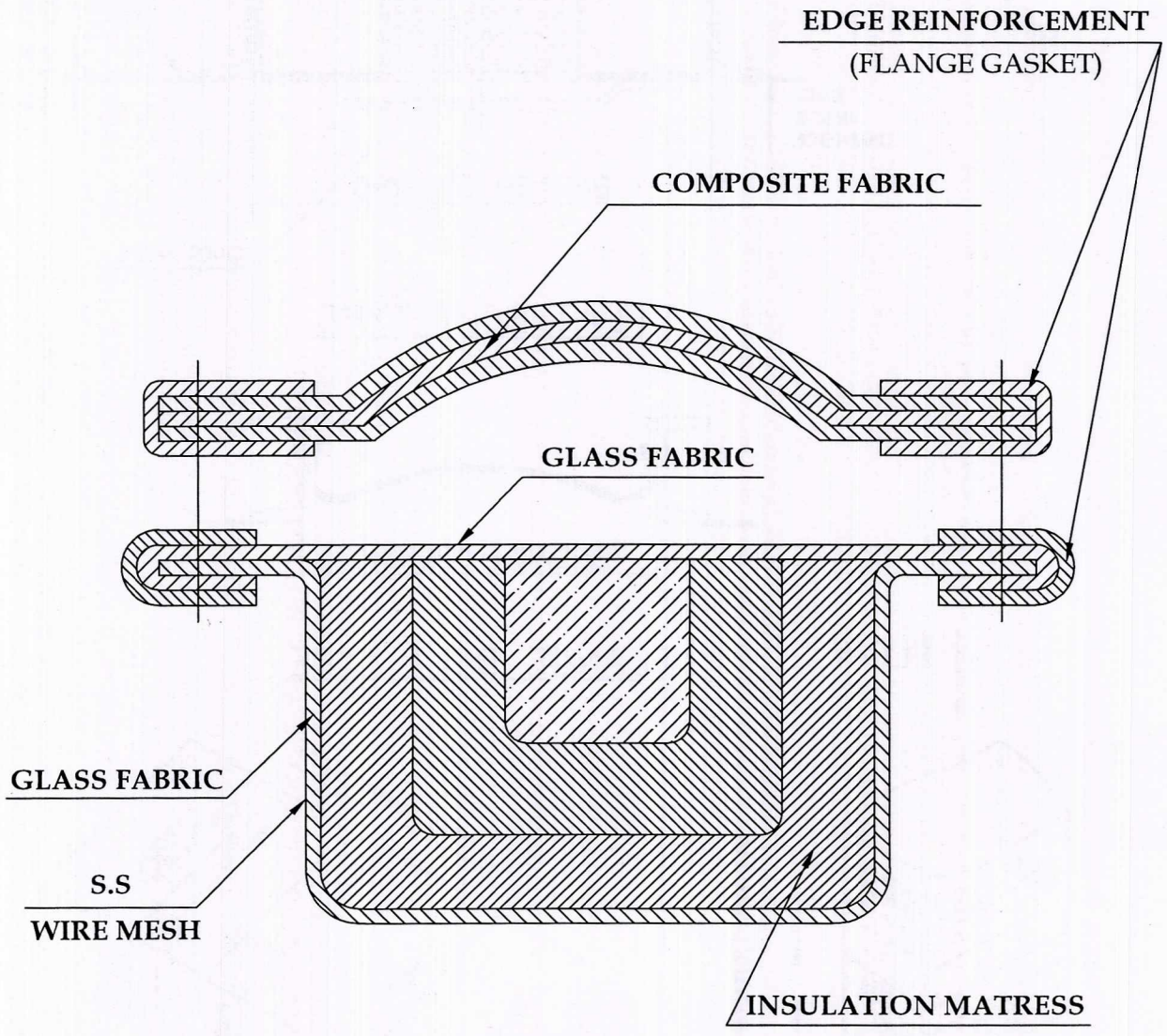


HORIZONTAL DUCT

THIS DRAWING IS TO BE READ ALONG WITH EXPANSION JOINT DATA SHEETS

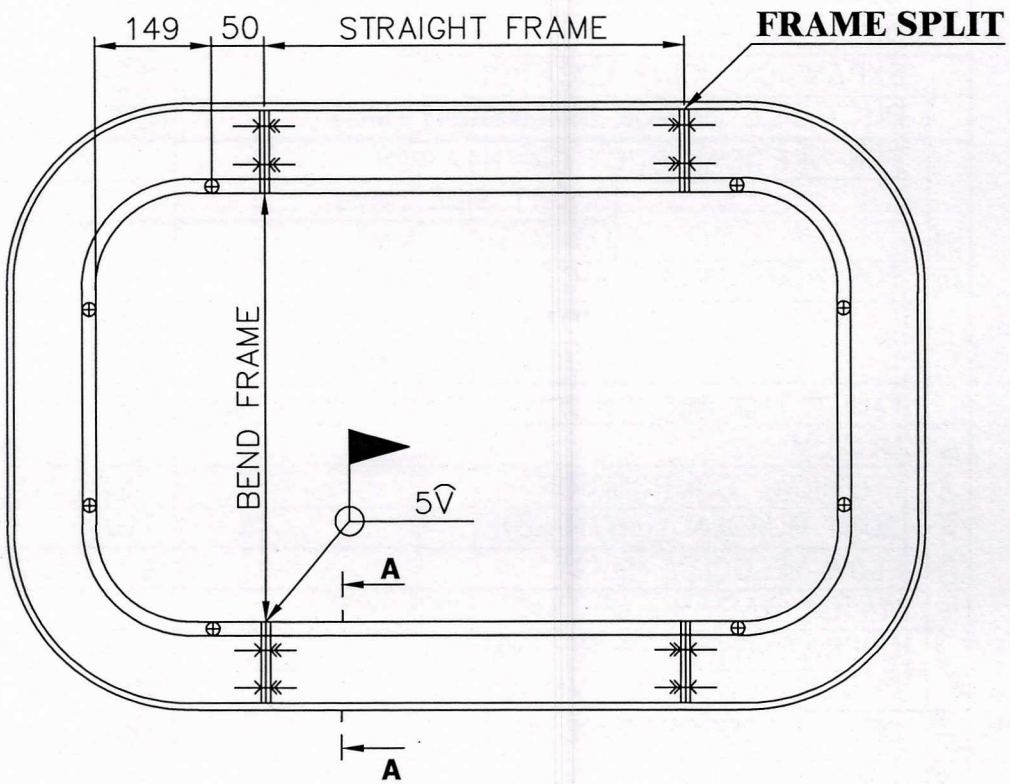
PRE.	ROSHAN		DRG. NO. SK–NMEJ–001	REV
CHD & APPD	MRS			

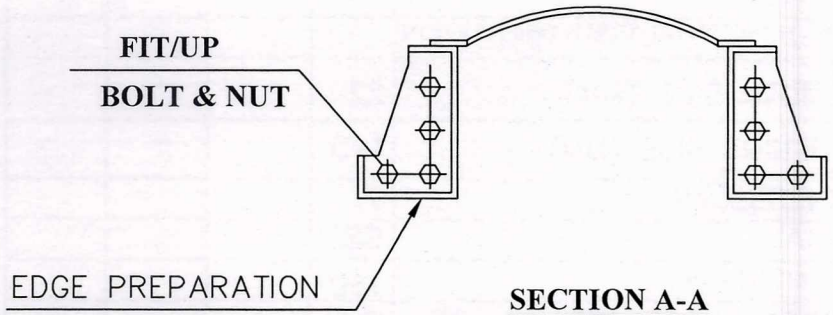
SUGGESTED ARRANGEMENT OF BOLSTER



PRE.	ROSHAN		DRG. NO. SK–NMEJ–002	REV
CHD & APPD	MRS			

SUGGESTED ARRANGEMENT OF SPLIT FRAME NMEJ





SECTION A-A

PRE.	ROSHAN		DRG. NO. SK–NMEJ–003	REV
CHD & APPD	MRS			

EXPANSION JOINT DATA SHEET

	EXPANSION JOINT TAG NUMBER		414A			
	QUANTITY REQUIRED PER BOILER		2			
	DUCT SYSTEM		SCR INLET			
	EXPANSION JOINT LOCATION		NEAR ECO HOPP			
	DUCT SIZE (INSIDE DIMENSION) (MM)		6200X 3200			
SIZE	FOR VERTICAL DUCT ORIENTATION					
		SHORT SIDE (MM)				
		LONG SIDE (MM)				
	FOR HORIZONTAL DUCT ORIENTATION					
		WIDTH SIDE (MM)	6200			
		HEIGHT SIDE (MM)	3200			
	FACE TO FACE DIMENSION OF NMJ(BREACH OPENING) (MM)		700			
FLOW MEDIUM	MEDIUM		ASH LADEN GAS			
	CHEMICAL COMPOSITION		SO2/SO3			
	DUST BURDEN (gm/Nm3)		110			
	FLOW VELOCITY (M/S)		16			
	WATER WASHING OF DUCT (YES/NO)		NO			
PRESSURE	OPERATING PRESSURE (MMWC)		−124			
	DESIGN PRESSURE (MMWC)		+660 −641			
TEMP	DESIGN TEMPERATURE IN C		348			
ASH	ASH LOAD TO BE CONSIDERED IN MT		19		−	−
MOVEMENT	AXIAL COMPRESSION (MM)		100			
	LATERAL MOVEMENT FOR VERTICAL DUCT ORIENTATION					
		SHORT SIDE (MM)	−	−		
		LONG SIDE (MM)	−	−		
	LATERAL MOVEMEMT FOR HORIZONTAL DUCT ORIENTATION					
		WIDTH SIDE (MM)	22		−	−
		HEIGHT SIDE (MM)	145		−	−
DUCT	DUCT PLATE THICKNESS (MM)		7			
	DUCT PLATE MATERIAL		CS			
	DUCT INSULATION THICKNESS		160			
	FLANGE DRILLING DETAILS REF. NO..		FL1			
	INTERNAL FLOW PLATE (LINER) ATTACHMENT		YES			
	INSULATION PILLOW REQUIRED (BOLSTER) YES/NO		YES			
	SPECIAL REQUIREMENTS/REMARKS/NOTES		−	−	−	−

SK−1254−NMEJ−001/00

EXPANSION JOINT DATA SHEET

	EXPANSION JOINT TAG NUMBER		414B			
	QUANTITY REQUIRED PER BOILER		2			
	DUCT SYSTEM		ECO BY PASS			
	EXPANSION JOINT LOCATION		BY PASS TAPPING			
SIZE	DUCT SIZE (INSIDE DIMENSION) (MM)		6200 X 600			
	FOR VERTICAL DUCT ORIENTATION					
		SHORT SIDE (MM)				
		LONG SIDE (MM)				
	FOR HORIZONTAL DUCT ORIENTATION					
		WIDTH SIDE (MM)	6200			
		HEIGHT SIDE (MM)	600			
	FACE TO FACE DIMENSION OF NMJ(BREACH OPENING) (MM)		1000			
FLOW MEDIUM	MEDIUM		ASH LADEN GAS			
	CHEMICAL COMPOSITION		SO2/SO3			
	DUST BURDEN (gm/Nm3)		110			
	FLOW VELOCITY (M/S)		16			
	WATER WASHING OF DUCT (YES/NO)		NO			
PRESSURE	OPERATING PRESSURE (MMWC)		−124			
	DESIGN PRESSURE (MMWC)		+660 −641			
TEMP	DESIGN TEMPERATURE IN C		427			
ASH	ASH LOAD TO BE CONSIDERED IN MT		5			
MOVEMENT	AXIAL COMPRESSION (MM)		113			
	LATERAL MOVEMENT FOR VERTICAL DUCT ORIENTATION					
		SHORT SIDE (MM)	−			
		LONG SIDE (MM)	−			
	LATERAL MOVEMEMT FOR HORIZONTAL DUCT ORIENTATION					
		WIDTH SIDE (MM)	20			
		HEIGHT SIDE (MM)	100			
DUCT	DUCT PLATE THICKNESS (MM)		7			
	DUCT PLATE MATERIAL		SA387Gr12			
	DUCT INSULATION THICKNESS		240			
	FLANGE DRILLING DETAILS REF. NO..		FL2			
	INTERNAL FLOW PLATE (LINER) ATTACHMENT		YES			
	INSULATION PILLOW REQUIRED (BOLSTER) YES/NO		YES			
	SPECIAL REQUIREMENTS/REMARKS/NOTES		−	−	−	

SK−1254−NMEJ−002/00

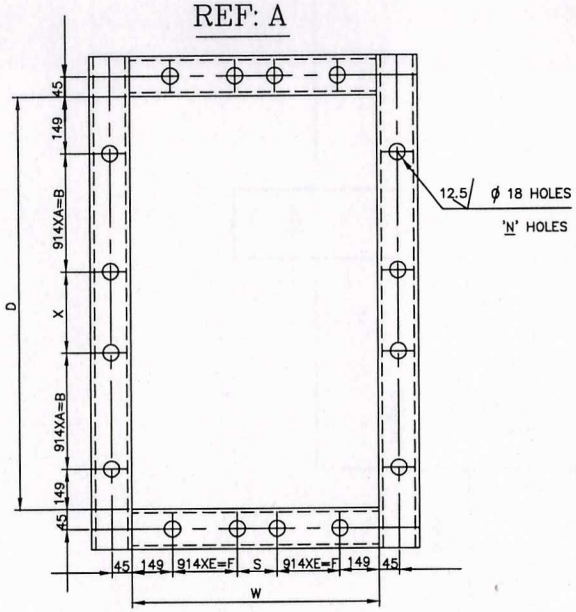
EXPANSION JOINT DATA SHEET

	EXPANSION JOINT TAG NUMBER		414C			
	QUANTITY REQUIRED PER BOILER		2			
	DUCT SYSTEM		SCR OUTLET			
	EXPANSION JOINT LOCATION		AH INLET			
SIZE	DUCT SIZE (INSIDE DIMENSION) (MM)		6600 X 2200			
	FOR VERTICAL DUCT ORIENTATION					
		SHORT SIDE (MM)				
		LONG SIDE (MM)				
	FOR HORIZONTAL DUCT ORIENTATION					
		WIDTH SIDE (MM)	6600			
		HEIGHT SIDE (MM)	2200			
	FACE TO FACE DIMENSION OF NMJ(BREACH OPENING) (MM)		700			
FLOW MEDIUM	MEDIUM		ASH LADEN GAS			
	CHEMICAL COMPOSITION		SO2/SO3			
	DUST BURDEN (gm/Nm3)		110			
	FLOW VELOCITY (M/S)		16			
	WATER WASHING OF DUCT (YES/NO)		NO			
PRESSURE	OPERATING PRESSURE (MMWC)		−290			
	DESIGN PRESSURE (MMWC)		+660 −617			
TEMP	DESIGN TEMPERATURE IN C		348			
ASH	ASH LOAD TO BE CONSIDERED IN MT		5			
MOVEMENT	AXIAL COMPRESSION (MM)		100			
	LATERAL MOVEMENT FOR VERTICAL DUCT ORIENTATION					
		SHORT SIDE (MM)	−			
		LONG SIDE (MM)	−			
	LATERAL MOVEMEMT FOR HORIZONTAL DUCT ORIENTATION					
		WIDTH SIDE (MM)	22			
		HEIGHT SIDE (MM)	10			
DUCT	DUCT PLATE THICKNESS (MM)		7			
	DUCT PLATE MATERIAL		CS			
	DUCT INSULATION THICKNESS		160			
	FLANGE DRILLING DETAILS REF. NO..		FL3			
	INTERNAL FLOW PLATE (LINER) ATTACHMENT		YES			
	INSULATION PILLOW REQUIRED (BOLSTER) YES/NO		YES			
	SPECIAL REQUIREMENTS/REMARKS/NOTES		−	−	−	

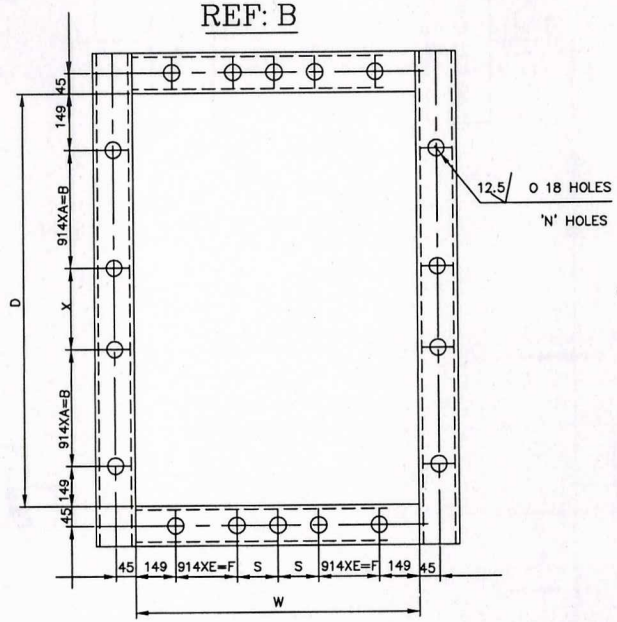
SK−1254−NMEJ−003/00

DRAWING NO: SK-1257-NMEJ-004

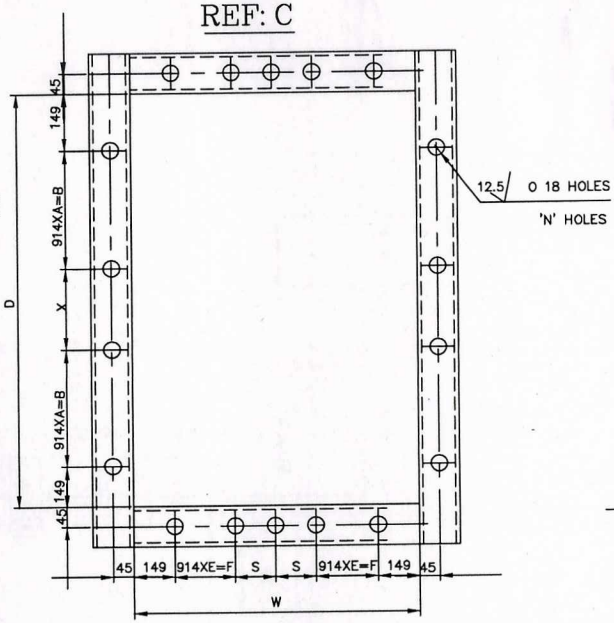
REF: A



REF: B



REF: C



FLANGE NO.	REF	D	X	A	B	W	S	E	F	N
FL1	REF. A	6214	432	3	2742	3214	544	1	914	26
FL2	REF. B	6214	432	3	2742	614	316	0	0	20
FL3	REF. C	6614	832	3	2742	2214	958	0	0	22

REV	DATE	ALTERED :
01		CHD & APPD:
ZONE		

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: BHADRADRI 4X270 MW,1254 to 1257

355-055

Bharat Heavy Electricals Ltd
UNIT: HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI – 620014

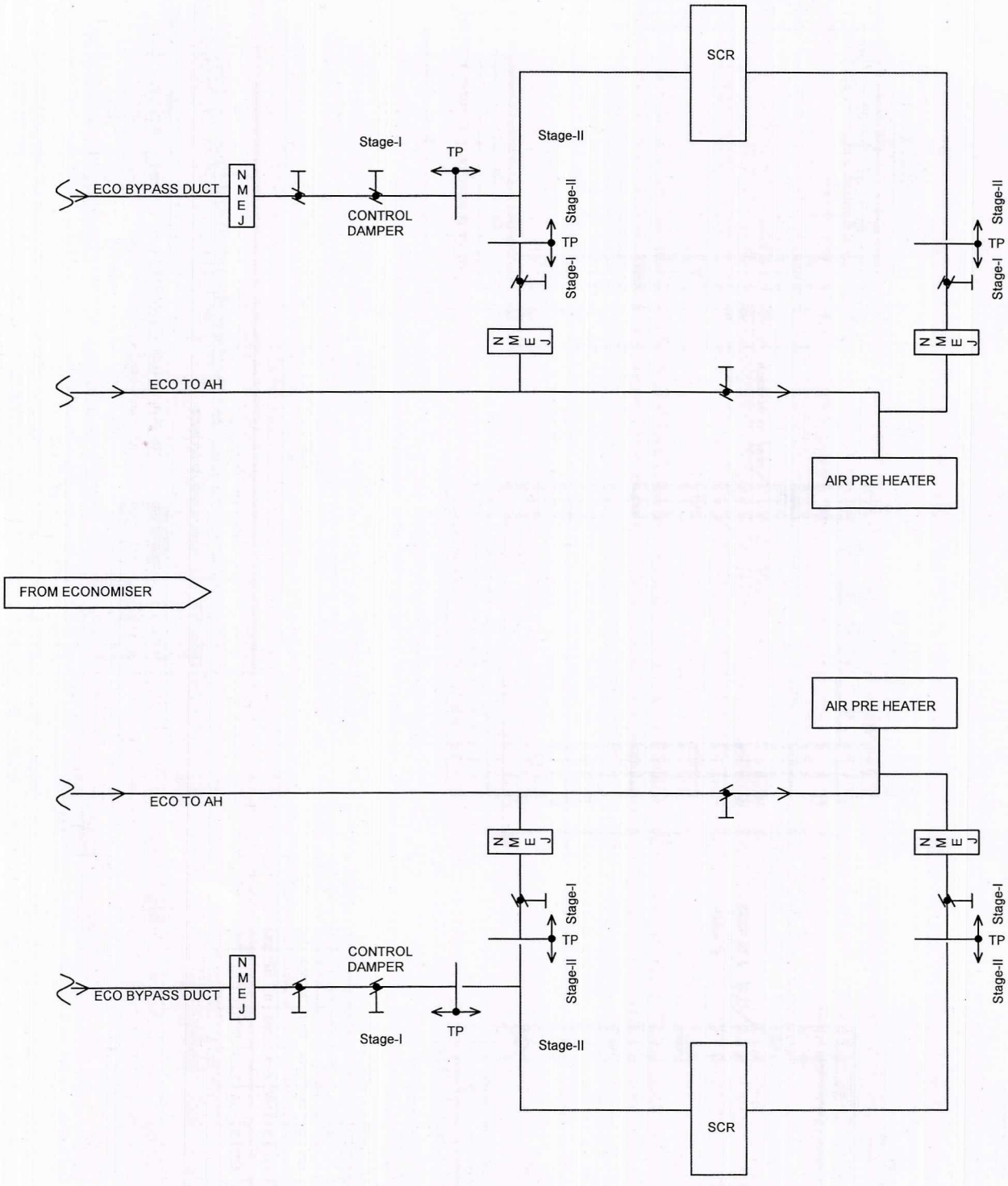
	NAME	SIGNATURE	DATE
DRN	ROSHAN		15.12.19
CHD	HSP		16.12.19
APPD	MRS		16.12.19

DEPT / CODE	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE	WEIGHT (Kg)	REF TO ASSY / OLD DWG

TITLE: FLANGE DETAIL

DRAWING NO : SK-1254-NMEJ-004

REV: 00



NMEJ - NON METALLIC EXPANSION JOINT

CUST NO 1254 to 1257 , BHADRADRI 4X270MW

SKETCH NO. SK-1254-NMEJ-005