RESTRICTED

STANDARD CELL

QUALITY MONITORING INSTRUCTIONS
FOR

INSPECTION OF EXHAUST MANIFOLD
DRG NO SB 20-18-00-4

ENGINE FACTORY AVADI
AVADI CHENNAI 600 054

RESTRICTED

QUALITY MONITORING INSTRUCTIONS

NO: EFA/RDS/SC/QMI/UTD-20/15/EX.MANIFOLD

FOR

EXHAUST MANIFOLD

OF

UTD- 20 ENGINE

PAGES :

Issue : 01
Rev : 01

Engine Factory Avadi

Avadi, Chennai - 600 054

CKD & APPROVED BY	PREPARED BY
WM/RDS	JWM/RDS

RECORD OF AMENDMENTS

Amendment no & date	Amended by	Date of insertion	Initials
Revision 01	STD. CELL		

EFA/RDS			
MONITORING INSTRUCTIONS FOR INSPECTION		ISSUE NO 01	
		REV 01	
		DATE OF ISSUE	
EXHAUST MANIFOLD	EFA/RDS/SC/QMI/UTD-20/15 /EX. MAN		
DRAWING NO	SB 20-18-00-4		
END USE	UTD - 20 ENGINES		
Quality mounting instructions for inspection would comprises of the following during the inspection of Pilot and bulk.			
S NO	TYPE OF TEST	SAMPLE SIZE	
		PILOT	BULK
1.	Visual inspection	100%	100%
2.	Dimensional check	100%	10%
3.	Material Check	1 Set	1 Set PER LOT
4.	Pressure test	100%	100%
5.	Fitment/performance trials	1 Set	--

VISUAL INSPECTION

Sampling

Pilot - 100%

Bulk - 100%

1. The finished exhaust – manifold shall be examined for standard of workmanship with particular reference to the following:

a) Projection of surface `A' over surface` b' in the Drg. No. Cb 20-18-201 and Cb 20-18-202 are not permitted.

b) Gasket faces shall be free from dents, notches and scratches (Drg. No Cb 20-18-215).

c) Lock washer after stamping shall be straight and plain without dents (Drg. No 353-15)

d) Aluminum metallization as mentioned in the Drg.

2. The following aspects may also be examined on 100% of pilot samples and random samples from each batch of bulk by dismantling the exhaust manifold.

a) The stainless steel pipe shall be press fitted as far as it would go. The bolt shall be tightened with load.

b) Gasket and rings are coated on both sides with a mixture of varnish КО 815 to GOST 11066-74 and powder ЛАЛ -1 or ЛАЛ-2 to GOST 5494-71 in the ratio of 9:1 (Ref Tech. Condition 3 on Drg. No Cb 20-18-201 and Cb 20-18-202).

c) Quality of weld seam on stainless steel pipe shall be checked visually and shall meet the requirement as per GOST 3242-79

d) The internal surface of exhaust manifold casting LH and RH (20-18-211 and 20-18-212) shall be clean and free from any surface irregularities.

DIEMTIONAL CHECK

Sampling Plan:

Pilot - 100%

Bulk - As per IS 2500 Part I Inspection level IV AQL 1.5%

3. Check for all drawing dimensions and technical conditions as per relevant drawings. The values observed shall be recorded and the same shall conform to the values specified in the drawings.

4. The dimensional check during pilot and bulk stages should be done as per sampling plan mentioned above. However, 100% of pilot and bulk samples shall be checked for mounting hole location/centre distances on a suitable mounting fixture specially made for the purpose. The mounting surface should be checked for trueness/evenness. The unevenness of mounting face shall not exceed 0.1 mm.

5. The firm should ensure 100% of GASKET (Cb 20-18-215) is measured for thickness under static load of 490 ± 49N (50±5 Kg) during routine production inspection. The gaskets shall be segregated and identified in to 4 groups based on thickness as mentioned in the drawings. A record to this effect is maintained and submitted to the inspector for his perusal and cross check on random sample.

PRESSURE TEST

Sampling Plan:

Pilot	-	100 %
Bulk	-	100% by manufacturer
	-	10% by Inspector

6. The manufacturer shall carry out pressure test on 100% of pilot and bulk stores and maintain record to this effect. The inspector shall however, check 100% of pilot and 10% of random bulk.

7. Exhaust manifold casting to Drg. No 20-18-211 and 20-18-212 shall be tested for hydraulic pressure with water at temperature 70^0 to 80^0 C and pressure at 3.5± 0.5 Kg f/CM^2 for 3 minutes. Leakage of water shall not be permitted.

MATERIAL CHECK

Sampling Plan:

Pilot - One Sample

Bulk - One per production batch*

*** Remark**

The manufacturer is advised to tender the components, where destructive testing is involved in sizable production batch to avoid repetitive testing.

8. Material check on various components should cover the following:

a) Chemical properties
b) Mechanical properties
c) Hardness test

9. Exhaust manifolds (LH & RH) casting requirements shall conform to technical requirements TTY П 310-7/66 and Accuracy Clause III of GOST 1855-55.

10. The firms should supply sufficient number of test bar and raw material for all components to the inspecting officer for carrying out material check alongwith Pilot and Bulk samples. The material should strictly conform to the specifications mentioned in the relevant drawing. The manufacturer should also produce the test certificate/result of the material check carried out by them to the inspecting Officer along-with the test bar/raw material.

11. Material conforming to original specifications should be used in the manufacture of various components of exhaust manifold assembly. A list of material for various components is enclosed at Appendix `A' for ready reference.

HARDNESS TEST

12. The firm should ensure that Hardness is checked on the following components before taking up for assembly and record to this effect be maintained and shall be available to the inspecting officer on demand.

ITEM		HARDNESS RANGE	SAMPLING
(a)	Exhaust Manifold LH & RH	HB 197-255	100%
(b)	Cover	HB 197-255	100%
(c)	Bolt M 10 X 20	209 to 241 BHN	Random

13. The inspecting Officer should however check hardness at random to ensure adherence to the specifications.

FITMENT AND PERFORMANCE

Sampling Plan:

Pilot - One sample each LH & RH

14. Qty One pilot sample each of Exhaust Manifold Assy RH and LH will be tried for fitment on a UTD- 20 engine and performance of the same will be observed for a minimum run of 10 hours and observe for leakages.

PILOT SAMPLES

15. The manufacturer should submit three Nos. each of exhaust manifold RH &LH as pilot samples to the inspecting officer for inspection and approval. On successful completion of inspection one set of assembly will be retained with the inspecting officer as a reference sample. The balance 2 acceptable sets of samples should be sent to USER for further tests and approval alongwith details of dimensional check and material test carried out by the inspecting officer, indicating the specified and observed values. However, the pilot samples shall be considered acceptable only after the successful completion of fitment/performance test by EFA.

BULK

16. Bulk production clearance will be accorded to the firm on written approval of pilot samples from GM/EFA/Inspecting Officer. Bulk stores will be inspected and cleared as per this QMI and should conform to the approved pilot sample/design drawings.

PACKING, PRESERVATION AND IDENTIFICATION

17. The accepted Exhaust manifold should bear a suitable identification (name) plate on the exhaust manifold (Cb 20-18-00-4) with the following details.

a) Production Serial No (suitably coated with month and year of production).

b) Name of the manufacturer/symbol.

c) Part No 20-18-211 (RH MANIFOLD) and 20-18-212 (LH MANIFOLD) shall be cast on respective individual casting of RH and LH Exhaust Manifold.

d) Ink – stamp part No and thickness group on each Gasket.

18. The external surface of the accepted exhaust manifold shall be metalized spraying aluminum. The coating thickness shall be 150 to 200 microns. The mating surface and bolt holes shall be protected from metallization. .

19. Nut M 10 (20-51-10) shall be copper plated to a thickness of 6 microns.

20. Gaskets shall be packed in sets of 3 pieces belonging to same group and placed in ploythene bags.

21. The individual Assy should be securely packed in wooden boxes. The packing cases may be marked with the following details:-

(a) Part No and Nomenclature.

(b) S/O No and date

(c) Name of the supplier

(d) No off (Qty) per box.

1) **APPENDIX `A'**

EXHAUST MANIFOLD

CODE – 18 ENGINE UTD – 20

MATERIAL SPECIFICATION

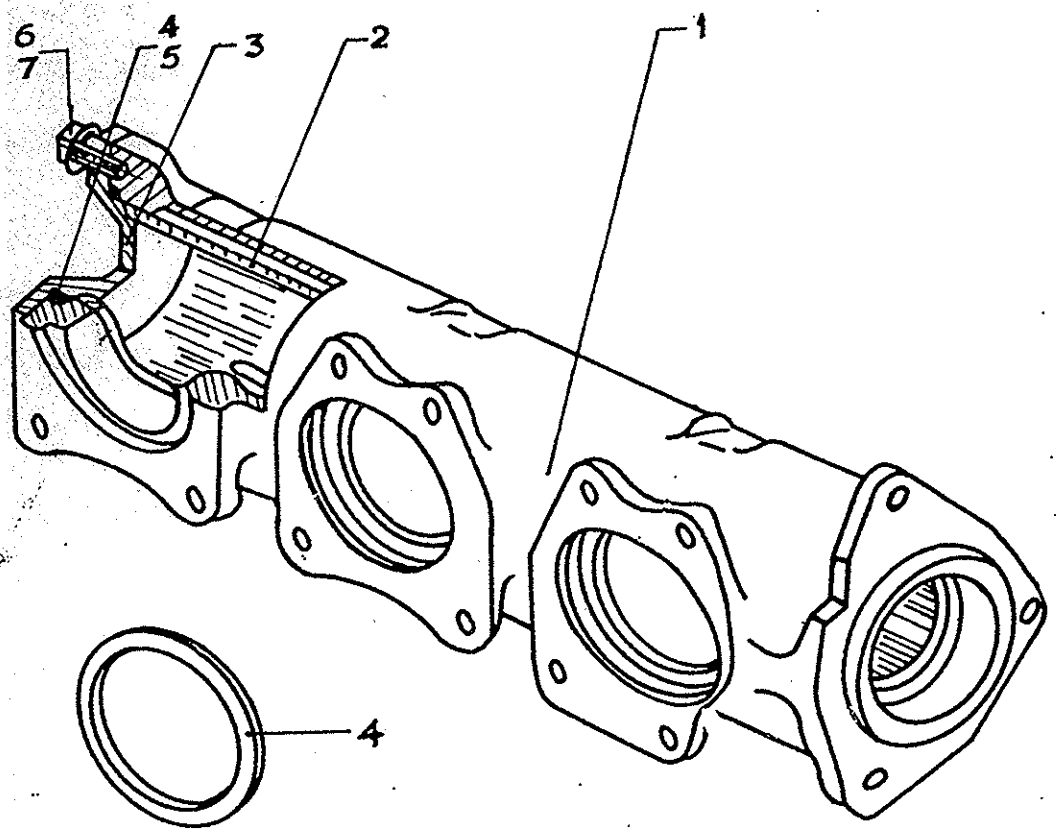
Sl. No.	Drg. No	Nomenclature	Material specification
1.	20-18-209	Cover	12 Х18НГП ГОСТ 2176-77
2.	20-18-210	Cover	12 Х18НГП ГОСТ 2176-77
3.	20-18-211	RH Exhaust Manifold	ТТ УЛ 310-7/66
4.	20-18-212	LH Exhaust Manifold	ТТ УЛ 310-7/66
5.	20-18-213	Manifold Pipe	70 Х 3-12 Х 18 Н10 ГОСТ 9941-72
6.	20-18-216	Gasket	КА Л 2 ,5 ГОСТ 2850-80
7.	20-18-2140	Shell	МО 25М3 ГОСТ 1173-77
8.	20-18-241	Ring	SRIP MØ 0.25 M3 ГОСТ 1173-77
9.	20-56-10	Bolt M 10 X 20	20 Х 13 ГОСТ 5632-72
10.	20-51-10	Nut M – 10	5Н6Н Х 8086 GOST 5927-70
11.	353-15	LOCK Washer	STRIP 08 M-2-1 ГОСТ503-71

Standard and specification referred.

2) varnish КО 815 to GOST 11066-74
3) powder ЛАЛ -1 or ЛАЛ-2 to GOST 5494-71
4) ТТУ П 310-7/66 and Accuracy Clause III of GOST 1855-55.
5) GOST 3242-79 (welding)

SKETCH 'P'

(10)



EXHAUST MANIFOLD
(20-18-00-4)

1. EXHAUST MANIFOLD BODY
2. PIPE MANIFOLD
3. COVER
4. GASKET
5. RING
6. BOLT M10 x 20
7. LOCKING WASHER - 11