भारत सरकार

रेल मंत्रालय

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

एल्को डीजल इंजनो में प्रयोग हेतु उच्च दबाव इन्जेक्टर के लिये विशिष्टिका

Specification for High Pressure Injectors

for ALCO Diesel Engines

विशिष्टि संख्या – चा.श. 0.08.00.92

दिसम्बर – 2009

(संशोधन 00)

Specification No. MP.0.08.00.92
December - 2009
(Revision 00)

अनुसंधान अभिकल्प एवं मानक संगठन

मानक नगर, लखनऊ - 226011

RESEARCH DESIGNS AND STANDARDS ORGANISATION

MANAKNAGAR LUCKNOW-226011

Specification for High pressure injector for ALCo Locomotives

(Spec^{n} No. – MP.0.08.00.92 (Rev. 00) Dec 2009)

1. INTRODUCTION:

The existing injectors that are being used on ALCo locomotives in Indian Railways are designed to withstand injector end pressure upto 1050 bar. These injectors are suitable upto 3100 HP ALCo locomotives. Due to this reason, IR is facing injector failures especially the nozzle failure on higher horsepower locomotives. Therefore a dearth need is being felt for high pressure injectors that can withstand above 1050 bar injector end pressure and can be fitted on higher horsepower (3300 hp and above) ALCo locomotives.

This is a specification for introduction of the high pressure injector that can withstand upto 1300 bar injector end pressure to be used on ALCO 251-B 'V' 16-Cylinder diesel engines used on locomotives.

2. TECHNICAL REQUIREMENTS:

2.1 The supplied high pressure injector shall withstand upto 1280 bar of injector end pressure. Elliptical design of nozzle pressure chamber shall be preferred to that of spherical design.

2.2 The supplied high pressure injector shall be retrofitted in the fuel injection system of ALCo locomotives. This implies that the high pressure injector shall have the dimensions as to be fitted in the existing cooling sleeve to DLW Part No. 10240184 and Drg No. 22C – 71073 – 2 (Drg enclosed). The supplier shall demonstrate the performance of the injector including suitability for 1280 bar pressure, on a test bench at his premises. Sixteen prototype injectors shall be supplied only after this test is cleared by RDSO.

2.3 The outer dimensions of the nozzle shall have the same dimensions of the existing nozzle to DLW Part No. 10050036 and Drg No. 23C – 74073 (Drg enclosed). The nozzle shall have hole dia. of 0.35 mm, spray angle 157°, tip angle 90° and 9 nos. of holes.

2.4 Creditability: While development order can be placed on vendors who have credible experience in the field of medium speed diesel traction engine fuel injection equipment, bulk order shall be placed only on a manufacturer who has experience of developing / supplying fuel injection equipment for ALCo design traction engines.

3. FIELD TRIAL:

3.1 The offered injectors shall be fitted on one locomotive and the locomotive will be subjected to load box test and all relevant parameters like Gross Horse Power (GHP), Specific Fuel Consumption (SFC) & Peak Firing Pressure (PFP) measured and evaluated.

3.2 After successful clearance of load box test, two locomotive sets shall be put under field trial of 3 months. Balance fitment shall be done after clearance of RDSO.

4. WARRANTY:

The supplier shall provide a warranty for the satisfactory performance of injector for a period of 2 years from the date of commissioning. Any damage or unsatisfactory performance due to design or manufacturing inadequacies noticed during the above period shall be rectified or injector parts be replaced by the supplier free of cost. The replaced injector parts shall also be covered under warranty for the balance period of warranty of the original injector.

6. PACKING:

The individual injector and its spare parts shall have the packing of a good quality material that can prevent dust & moisture (vacuum/capsule type packing is preferred). The outer cover of the packing shall have in such a manner that can prevent any damage of the parts during transportation, handling & storage.

7. MARKING:

Each of the injector body and the nozzle assembly shall be clearly and legibly marked with some codification that shall have unique identity of the supplier and manufacturing month and year. The interpretation of the codification mark shall be brought out in light to the Indian Railways.

8. QUALITY ASSURANCE PLAN (QAP):

A quality assurance plan (QAP) that outlines the suppliers' quality assurance in order to obtain a quality product at the time of regular production shall be submitted to RDSO for approval. The QAP shall be prepared on the lines as indicated in ISO: 9001:2000.

9. APPROVAL:

The final approval of the injector for regular application shall be given by RDSO after successful conclusion of field trials. The approval for unrestricted application would be given after an adequate number of units have given satisfactory performance in the field.

10. LITERATURE AND MAINTENANCE INSTRUCTIONS:

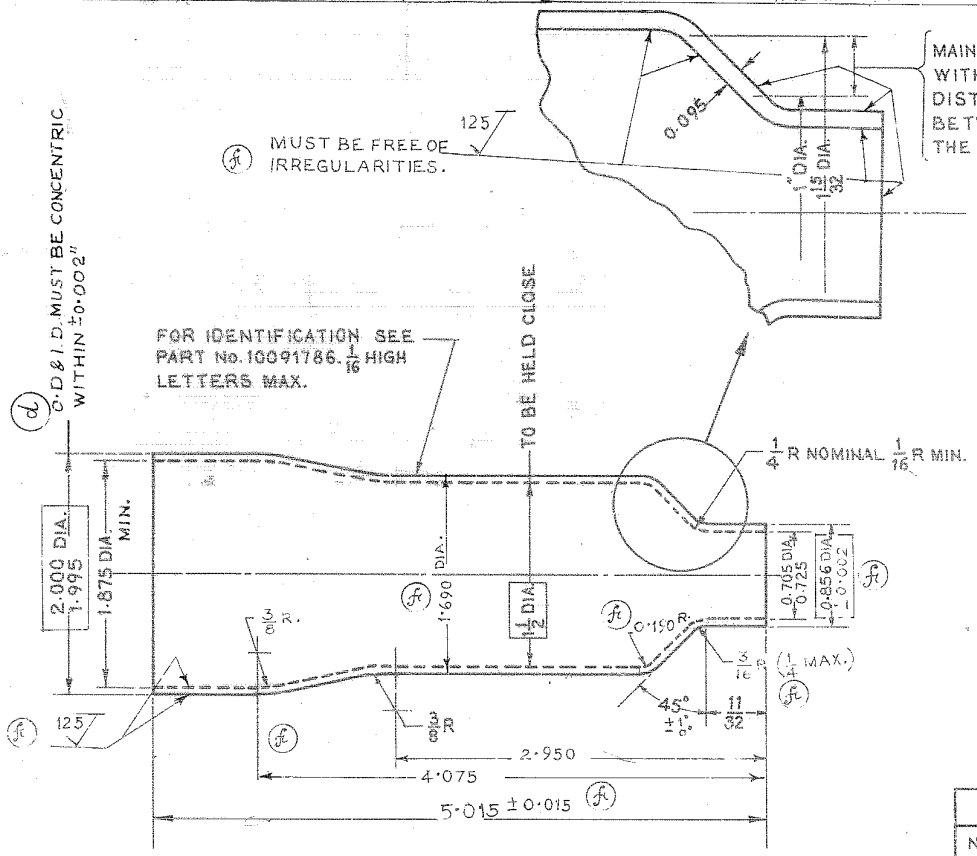
The supplier shall supply sufficient copies of operating instructions, maintenance manual with methods of overhauling/servicing and calibration/ testing of injector assembly, and drawings of the injector assembly as well as its parts.

DESIGN BASED ON DWG. IF IN DOUBT - ASK.

(g) ASSY. PT. NO. 10040250 AND 10040195 WAS 10010099. — 12.7.89

(f) DIM. 2·950, 4·075, AND 1·690 DIA. ADDED. DIM. 7/8 & 1 1/8 DELETED. DIM. 5·015 ± 0·015 WAS 4 3/32, DIM. 0·856 ± 0·002 WAS 0·859 / 0·854. ∠45° +1° −0° WAS 45°, 125 AND NOTE ADDED, Rb 84 WAS Rb 80, 0·190 R. WAS 3/16 R AND (2-CYL.) ADDED. AS PER G.E. DRG. — 12.7.89 SME/D

ALT. No.	ALTERATION	INITIAL
(a)	RETRACED	
(b)	1 1/2 I.D. WAS 1 1/2 O.D. (CORRECTION) (NO NOTICE)	16.9.89
(c)	SPEC. D 62071 WAS G 2521 AS PER C10'S LETTER NO. RI/P-88 DT. 11-10-89 (NO NOTICE)	17-11-89
(d)	ADDED CONCENTRICITY NOTE	12-12-88
(e)	PACKING CONDITION ADDED.	16/1/90 SME/D



(c)

NOTE :-

1. ALL SLEEVES SUBJECT TO ZYGLO INSPECTION, AS PER SPEC. 31 PD 5657.
2. AFTER FORMING ANNEAL AT 1950° F FOR 15 MINUTES QUENCH IN COLD WATER.
3. (f) HARDNESS Rb 84 MAX.
4. DESCALE BY MILL SAND BLAST.
5. BREAK EDGES.
6. (b) MATERIAL SIZE 1 1/2 I.D. X 0·095 WALL THK.
7. (f) DIAMETERS MARKED ⌀ TO BE CONCENTRIC WITHIN 0·006 T.I.R.

(e) **PACKING CONDITION :-**

PUT IN POLY BAG AND SEAL AT ENDS THEN PACK IN CARTON.

No. OFF			DESCRIPTION	ITEM	PART No.
				SUPERSEDED BY	
	24		10040250, 10040195		
	6	-	10010087	SUPERSEDES	
	-	16	10040250, 10040195	ALT. 'HDDD'	

ST. STEEL TUBE D 62071

MATERIAL — SPECIFICATION

A.D.E. — D.E.

	26.2.89	SDO
	16.2.89	CHD
		DRN
	12-12-88	TRD

12-CYL. VEE ENGINE
6 CYL. INLINE ENGINE
16 CYL. VEE ENGINE

SLEEVE

(NOZZEL COOLING IN CYL. HEAD)

SCALE :-

DIESEL LOCOMOTIVE WORKS
VARANASI

PART No. 10240184

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED.
IF TOLERANCES NOT STATED FRACTIONAL MACHINING DIMENSIONS ALLOW ± 0·010.
DO NOT SCALE THE PRINT.

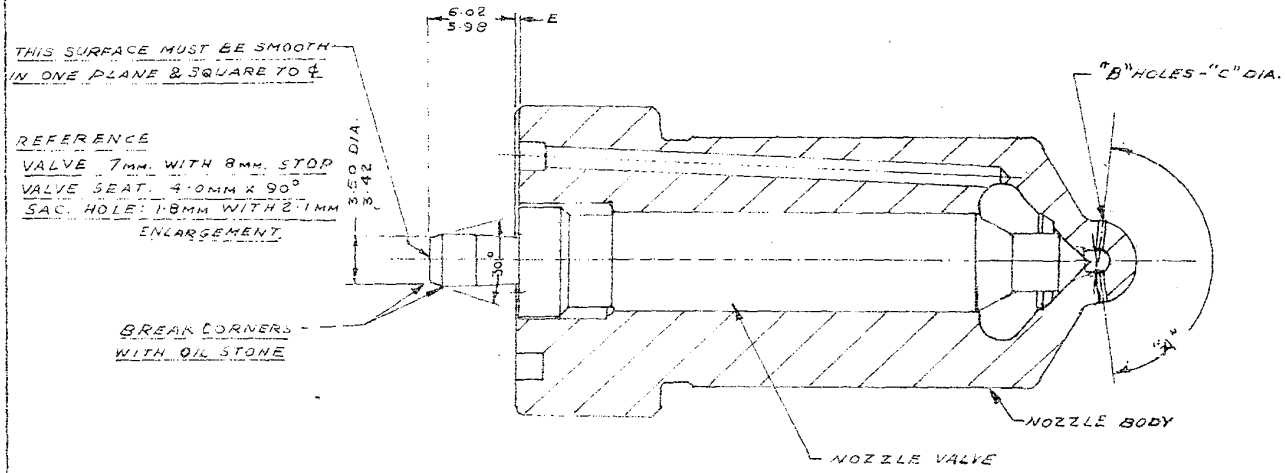
ISSUING AUTHORITY S.D.O/RECORDS

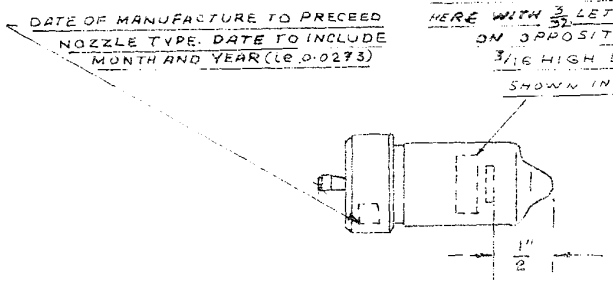
THIRD ANGLE PROJECTION

22C71073-2

TABLE 'D'	PART NO.	'C' DIA HOLES	'B' (NO. OF HOLES)	'A' (SPRAY ANGLE)	'E' LIFT
251 B	10050036	0·350 m.m.	9	157°	0·30 / 0·25
251 D	10050711	0·375 m.m	9	157°	0·35 / 0·30

ALT. NO.	ALTERATIONS	INITIAL
(a)	RETRACED	





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UNLESS OTHERWISE NOTED
IF TOLERANCES NOT STATED FRACTIONAL
MACHINING DIMENSIONS ALLOW ± 0·010
DO NOT SCALE THE PRINT

NO. OFF	DESCRIPTION	ITEM	PART NO.	MATERIAL	SPECIFICATION
	SUPERSEDED BY				GRADE
	SUPERSEDES 'MD'				17.5.89
				A.D.E.	D.E.

16 CYL VEE ENGINE (6E)
6 CYL INLINE ENGINE

ASSEMBLY

NOZZLE BODY & NOZZLE VALVE

	17.5.89	S.D.O.
	28.4.89	CHD.
		DRN.
Nagar	27.9.88	TRD.

SCALE

DIESEL LOCOMOTIVE WORKS
VARANASI

PART NO.
10050036

23C-74073

23C74073