

भारतसरकार GOVERNMENT OF INDIA
रेलमंत्रालय MINISTRY OF RAILWAYS
रेलवेबोर्ड RAILWAY BOARD

No. 2014/M (L)/466/1(4)

New Delhi, dt. 01.10.2015

Chief Mechanical Engineers,
All Indian Railways.

Sub: Tooling items for HHP Locomotives.

Please find enclosed a copy of the report of committee consisting of Sr.DME/BGKT/NWR and Dy. CME/Tooling/DLW nominated in HHP BIM 2014 to review the HHP toolings for Zonal Railways.

The following are the decisions on the committee report:

1. The list of 25 items at annexure 'A' of the report, proposed to be added to the list of tooling items is approved.
2. The list of 04 items at annexure 'B' of the report, proposed to be deleted from the list of tooling items is approved.
3. The quantity proposed for a holding of 50 locomotives as given in annexure 'C' should be circulated to Zonal Railways for their guidance.
4. For the additional 34 items proposed by BGKT, DLW should develop the drawing and specification in the next 6 months and procure these items for Zonal Railways for 2017-18.

All concerned are advised to follow accordingly.

Encl: One report of 13 pages

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1.10.15
(Vivek Kumar)
Exec.Dir. Mech. Engg.(Tr.)
Railway Board

Copy to: CME/ DLW/ Varanasi

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DLW/Varanasi

No. : DLW/Dy(T)/Maint. Tool

Office of the DyCME/Tooling
Date : 13.11.2014

Sub.: Joint note between SrDME (Diesel)/BGKT/NWR and DLW to review
Maintenance Tooling items given to ZR's.

Ref. : Minutes of BIM meeting held at DLW on 22&23 August 2014.

Persons present from DLW

1. Shri Anupam Chowdhury, DyCME/Tooling
2. Shri Shankar Kumar, SSE/P&T

Persons present from BGKT Shed

1. Shri Manish Rajvanshi, SrDME (Diesel)/BGKT/NWR
2. Shri Ajay Parashar, SSE/Elec./BGKT
3. Shri Ghashyam Jangir, JE/Mech./BGKT

In the misc. agenda of minutes of BIM referred above, a committee consisting of SrDME (Diesel)/BGKT and DyCME/Tooling DLW was constituted by EDME(Traction)/Rly. Bd. to discuss the requirement of toolings for ZR sheds and review the existing list of 68 items (17 DLW made+51 procured).

In this regard SrDME (Diesel)/BGKT/NWR along with his team has visited DLW from 12.11.2014 to 13.11.2014. All the items available in existing maint. tool catalogue were discussed in detail. Some items have been proposed to add and few were considered for deletion. The proposed list of items for addition as well as deletion has been enclosed as annexure A & B respectively. The detail position is given as under:

1. Total no. of items available in maint. Tool catalogue – 99
2. Total no. of Maint. Tool items provided to ZR's by DLW on date : 68
3. No. of items proposed to be added : 25
4. No. of items proposed to be deleted from existing 68 items : 04
5. Proposed total No. of items to be given by DLW : 89

All the maint tool items in catalogue have been discussed assembly wise like power assy, cyl. hd. Assy., Engine assy., carrier piston assy., Piston assy., Turbo assy., liner assy., Governor assy., Conn rod assy., cooling and lubrication assy., Fuel injection assy., chassis assy., Electrical, Misc. items. It was further decided to divide the requirement of ZR's in 4 category.

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Category A : Tools required for running maintenance.

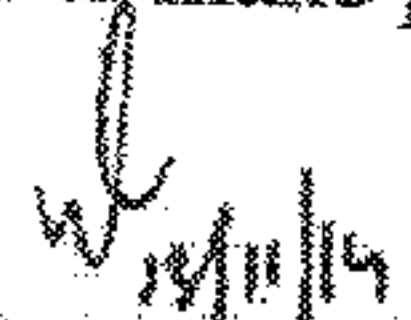
Category B : Tools required for yearly and 3rd yearly schedules.

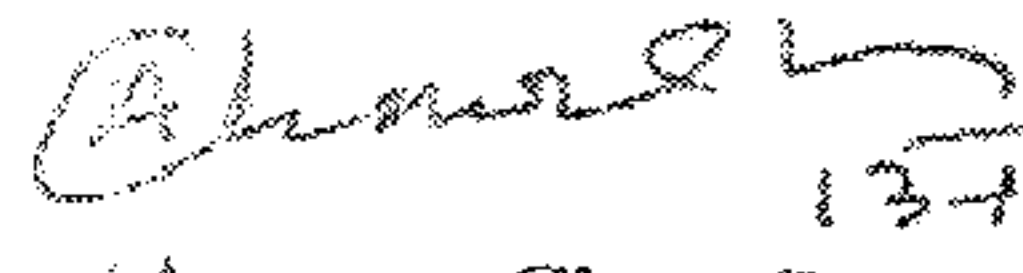
Category C : Tools required for OOC (out of course)/repair of power pack assembly and six yearly.

Category D : Tools required for dismantling/Assly. of Crankcase & oil pan.

The quantity proposed for holding of 50 locomotives is given under category A, B, C & D and given in enclosed Annexure - C.

Further BGKT shed has proposed to include few more electrical and mechanical tooling items (14 mechanical tooling items and 20 electrical tooling items) total 34 items which they felt necessary for diesel sheds but they are not a part of 99 items in maint. tool catalogue. The list of such proposed mechanical and electrical items have been given in Annexure - D. However these items do not have any drawing or part no. They only have catalogue no. of manufacturers therefore DLW shall not be able to procure these items for ZR sheds. However BGKT shed has insisted to make procurement of these 34 items through DLW.


(Manish Rajvanshi)
SrDME (Diesel)/BGKT/NWR


(Anupam Chowdhury)
DyCME/Tooling/DLW/BSB

Annexure - A

List of Maintenance Tooling Items proposed to be Added

Sl.No	PL no.	Description	Drq. No.
1	15610603	Wrench for cylinder test valve	MT01GM0165
2	15610615	Pressing tool for water pump impeller to drive shaft assly.	MT05GM0168
3	15610627	Valve bridge spring compressor	MT05GM0169
4	15610639	Gauge to check minimum clearance between lash adjuster body & the end of valve stem	MT01GM0170
5	15610640	Installer for hydraulic lash adjuster	MT05GM0171
6	15610652	Tram for exhaust valve height checking	MT05GM0172
7	15610664	Tube for crab stud thread protector	MT01GM0173
8	15610690	Puller for Valve Bridge Lash Adjuster	MT05G40085
9	15610718	Pin vise for holding 0.0" - 0.040" dia. Wire	SP02GM0041
10	15610720	Pry bar for injector removing	MT01GM0176
11	15610731	Wrench for loosening nut of injector assembly	MT02GM0177
12	15610743	Clamp (connecting rod positioning during assembly/removal)	MT01GM0178
13	15610755	Fitting Arrangement for snap Ring of valve bridge	MT05GM0131
14	15610779	Remover for upper main bearing shell (except 2 center bearing)	MT01GM0182
15	15610792	Seal inserter for head frame	MT01GM0184
16	15610809	Gauge block for lash adjuster test stand	MT05GM0185
17	15610810	Box socket wrench -half moon 5/8" x 3/4"(for water pump mounting bolts & governor rear nuts)	MT01GM0186
18	15610822	Water pump disassembly tool	MT05GM0187
19	15610846	Crank over tool (manual operation) for EMD engines	SP02GM0043
20	15610858	Air drive kit for crank over tool	SP02GM0044
21	15610860	Wrench for basket bolt & nut	MT01GM0190
22	15610871	Tool for oil loading in lash adjuster	MT05GM0193
23	15610883	Reamer for cylinder test valve seat	MT01GM0194
24	15610895	Lead wire holder(for piston to cyl. Head clearance check)	MT01GM0195
25	15620013	Special socket 1-1/4" hex. For diode	MT21GM0191

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Annexure - B

List of Maintenance Tooling items proposed to be deleted

Sl.No	PL no.	Description	Drg. No.
1	15610299	Reaming Fixture For Oil Pan with Starter Motor Bracket	MS01G40241
2	15610305	Engine turning fixture	MT01GM0167
3	15610380	Pointer disc used for timing engine.	MT01GM0144
4	15610500	Pressing tool for 1/2" O.D. Tube in main frame member of crank case	MT01GM0145

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CRANKCASE

S.N	TOOL	DLW Part no.	DLW DRG. No.	Use	QTY. REQ for 50 locos	Category	REMARK
1	Lifting Tool	15610019	MT01GM0044	For lifting accessory drive housing	02	D	Required for dismantling/Assly . Of Crankcase & oil pan
2	Jacking Tool	15610020	MT01GM0138	Mounted over the end of accessory drive shaft & use for adjusting & lining up accessory drive housing on engine assembly line.	02	D	-DO-
3	Jacking tool	15610032	MT01GM00111	Mounted into splines of governor driver gear flange & use for lining accessory drive housing on engine assembly line.	02	D	-DO-
4	Alignment gauge	15610044	MT01GM0094	For accessory drive housing alignment use on L.H water pump holes.	01	D	-DO-
5	Alignment gauge	15610056	GP01GM0017	For accessory drive housing alignment use oil pump holes.	02	D	-DO-
6	Distance gauge	15610068	GP01GM0009	Distance gauge # 2 idler gear stub & L/S & R/S cam shaft	01	C	Required for OOC repair and power pack assembly .
7	Master gauge	15610070	GP01GM0238	Master for setting gauge no. GP01GM0009(Distance gauge # 2 idler gear stub & L/S cam shaft)	01	C	-DO-
8	Guide pin	15610081	MT01GM0136	To line up oil pan to crankcase during asy.	08	D	Required for dismantling/Assly . Of Crankcase & oil pan
9	Alignment gauge (accessory end)	15610093	GP01GM0012	To check line up of pan & crank case on accessory end.	01	D	-DO-
10	Alignment gauge (Camshaft drive end)	15610100	GP01GM0013	To check line up of oil pan & crank case on camshaft drive end.	01	D	-DO-
11	Line up fixture(big length)	15610111	MT01GM0116	To Line up crankcase during assembly with oil pan	03	D	-DO-
12	Line up fixture(Small length)	15610123	MT01GM0137	To Line up crankcase during assembly with oil pan.	01	D	-DO-
13	Gauge with dial indicator	15610135	GP01GM0098	To check overhang of oil pan to crankcase	01	D	-DO-
14	Cranking Tool	15610159	MT01G40081	For cranking the crank shaft	06	A	Required for running maintenance .
15	Gauge	15610160	GP01GM0236	To set up of stubshaft from crankshaft & camshaft assly.	01	C	Required for OOC repair and power pack assembly .
16	Gauge	15610172	GP01GM0244	To check backlash on starter gear & bracket assly.	01	C	Required for OOC repair and power pack assembly .
17	Lifter	15610214	MT01GM0106	For lifting Aux.Gen.Assly.	02	C	Required for 06 yearly sch. and OOC repair
18	Spanner bar	15610226	MT01GM0060	Spanner bar to check flexing of accessory drive gear assly.	01	C	Required for 06 yearly sch.
19	Hook and clamp	15610238	MT01GM0041	Hook and clamp for lifting tube oil Strainer assly.	02	C	-DO-
20	Bracket lifting	15610240	MT01GM0045	For lifting camshaft drive housing	02	D	Required for

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				assembly.			dismantling/Assly Of Crankcase & oil pan
21	Lifter	15610251	MT01GM0046	For lifting turbo air duct assly.	02	B	Required for 03 & 06 yearly sch. and OOC repair
22	Timing gauge	15610263	MT01GM40083	Timing gauge for end of injection at full rack	12	A	Required for running maintenance.
23	Locater	15610275	MT01GM0100	Locating pad for end crab cyl head at accessory end.	02	C	Required for 06 yearly sch. and OOC repair
24	Lifting beam	15610287	SK01GM0032	For lifting engine assly. without generator	01	C	Required for OOC repair and power pack assembly.
25	Holding fixture.	15610317	MT01GM0151	Holding Fix for crankshaft with crank case.	01	D	Required for dismantling/Assly . Of Crankcase & oil pan
26	Lifting Fixture	15610330	MT01GM0042	For lifting aftercooler assly during engine assly.	02	B	Required for 03 & 06 yearly sch. and OOC repair
27	C, clamp	15610342	SK01GM0114	For clamping auxiliary generator assly during backlash checking	02	B	Required for 03 & 06 yearly sch. and OOC repair
28	Try square 12" (standard)	15610354	MT01GM00142	Counterweight alignment at accessory drive end.	01	C	Required for OOC repair and power pack assembly
29	Reaming fixture	15610366	MT01GM0153	Ream fix. And plug to be used to ream stub shaft	02	C	-DO-
30	Lifter	15610433	MT01GM0149	For lifting head frame	02	C	Required for 06 yearly sch.
31	Steel strtaight edge 36" long	15610457	MT01GM00143	Counterweight alignment at accessory drive end.	01	C	Required for OOC repair and power pack assembly
32	Alignment gauge	15610469	GP01GM0243	Counterweight alignment at camshaft drive end.	02	C	-DO-
33	Alignment gauge	15610470	MT01GM0147	For accessory drive housing alignment on R.H water pump holes.	01	C	-DO-
34	Alignment gauge	15610482	GA01GM0014	For alignment of camshaft drive housing	01	C	-DO-
35	Clamp lifter	15610494	MT01GM0141	For lifting idler gear stub shaft in horizontal	02	C	-DO-
36	Cleaning tool.	15610512	MT05GM0152	For cleaning water seal counterbore in liner	02	C	For sum assembly O/H
37	Lifter for bearing caps.	15610524	MT01GM0158	For lifting main bearing caps during assembly.	10	D	Required for dismantling/Assly . Of Crankcase & oil pan
38	Wire brush.	15610536	EQ04G40052	For cleaning of piston cooling pipe.	08	C	Required for 06 yearly sch.
39	Wire brush.	15610548	EQ01G40083	For cleaning of c/case lube oil manifold.	08	C	Required for OOC repair and power pack assembly
40	Tube	15610664	MT01GM0173	To protect crab stud thread	40	C	Required for 06 yearly sch. and OOC repair
41	Upper main bearing shell remover	15610779	MT01GM0182	To remove all upper MB shell	06	C	Required for 06 yearly sch. and OOC repair
42	Head Frame Seal inserter	15610792	MT01GM0184	For installation of seal inside head frame cover	02	C	-DO-

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CARRIER PISTON

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S.N	TOOL	DLW Part no.	DLW DRG .No.	Use	QTY. REQ for 50 locos	Cate gory	REMARK
1	Assembly fixture.	15610391	MT01GM0101	Assly. Fix. For connecting rod, carrier & piston pin.	02	C	For sub assembly O/H

PISTON

S.N	TOOL	DLW Part no.	DLW DRG .No.	Use	QTY. REQ for 50 locos	Cate gory	REMARK
1	Guide	15610408	MT05GM0096	For piston ring compressor.	02	C	For sub assembly O/H
2	Eye bolt for lifting piston	15610676	MT05GM0174	For lifting piston(very low valve simple item - not to be given by DLW)	NIL	C	For sub assembly O/H

TURBO SUPERCHARGER

S.N	TOOL	DLW Part no.	DLW DRG .No.	Use	QTY. REQ for 50 locos	Cate gory	REMARK
1	Lifter	15610147	MT01GM0040	Lifter for 'G' turbocharger.	02	B	Required for 03 & 06 yearly sch. and OOC repair
2	Eye bolt	15610378	MT01GM0040/1 3	For lifting turbocharger.	08	B	-DO-

CYLINDER LINER

S.N	TOOL	DLW Part no.	DLW DRG .No.	Use	QTY. REQ for 50 locos	Cate gory	REMARK
1	Lifter.	15610445	MT05G40051	For lifting cyl. Liner assly. with stud.	04	C	For sub assembly O/H

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S.N	TOOL	DLW	DLW DRG .No.	Use	QTY.	Cate	REMARK
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		Part no.			REQ for 50 locos	gory	
1	Jacking tool	15610329	MT01GM0140	Jacking tool for governor injector link setting.	03	A	Required for running maintenance.
2	Box socket Wrench	15610810	MT01GM0186	For removing two rear nuts retaining governor & water pump mounting bolts	02	C	-DO-

CONNECTING ROD

S.N	TOOL	DLW Part no.	DLW DRG. No.	Use	QTY. REQ for 50 locos	Category	REMARK
1	Gauge	15610585	GP06GM0094	To check length & twist of connecting rod fork.	01	C	Required for sub assembly O/H
2	Gauge	15610597	GP06GM0094	To check length & twist of connecting rod blade.	01	C	-DO-
3	Wrench-basket bolt and nut	15610860	MT01GM0190	For tightening / removing the lower basket bolt and self locking nut	06	A	Required for 03 & 06 yearly sch. and OOC repair
4	Lead wire holder	15610895	MT01GM0195	To check piston to cyl. Head clearance.	32	B	Required for Yearly sch.

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S.N	TOOL	DLW Part no.	DLW DRG. No.	Use	QTY. REQ for 50 locos	Category	REMARK
1	Line up tool	15630018	MT21GM0002	For line up engine to compressor applied to shaft.	02	C	Required for 05 yearly sch. and OOC repair
2	Fixture.	15630020	MT21GM0006	For doweling generator	01	C	Required for OOC repair
3	Alignment fixture	15630031	MT21GM0031	For aligning water coupling (engine) to equipment rack.	01	C	Required for 03 & 06 yearly sch. and OOC repair
4	Lifter	15630043	MT21GM0124	For lifting radiator asy.	02	B	Required for 03 yearly sch. and OOC repair
5	Lifter	15630055	MT21GM0130	For lifting cooling fan asy.	02	C	Required for 06 yearly sch. and OOC repair
6	Alignment device	15630080	MT21GM0159	For alignment of alternator & engine during asy.	02	C	Required for OOC repair
7	Alignment device	15630092	MT21GM0157	For alignment of driving end of auxiliary generator (mounted on shaft dia)	02	B	Required for yearly sch. and OOC repair

COOLING AND LUBRICATION

S.N	TOOL	DLW Part no.	DLW DRG. No.	Use	QTY. REQ for 50	Cat ego ry	REMARK

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POWER ASSEMBLY

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S.N	TOOL	DLW Part no.	DLW DRG .No.	Use	QTY . REQ for 50 locos	Cate gory	REMARK
1	Power assly. removing tool.	15610184	MT01GM0097	Clamp lifting piston , liner and cyl. Head	10	C	Required for 06 yearly sch. and OOC repair
2	Piston holder	15610196	MT01GM0098	Piston holder for power pack drop.	48	C	Required for 03 & 06 yearly sch. and OOC repair
3	Clamp	15610202	MT01GM0103	For removing & installing cylinder head.	08	C	For sum assembly O/H
4	Test gauge	15610410	MT01GM0112	To check leakage of power pack assly.	04	C	For sum assembly O/H
5	Cradle for four power pack.	15610573	MT05GM0052	To store power assemblies	08	C	For sum assembly O/H
6	Clamp for Con rod Positioning	15610743	MT01GM0178	For positioning Con Rod during assembly and removal cylinder liner.	16	B	Required for 03 & 06 yearly sch. and OOC repair

CYLINDER HEAD

S.N	TOOL	DLW Part no.	DLW DRG .No.	Use	QTY . REQ for 50 locos	Categ ory	REMARK
1	Compressor	15510670	MST/E/3170	For compressing valve spring (single)	02	C	For sum assembly O/H
2	Mandrel	15610421	MT01GM0061	For installing / removing cyl. Head exhaust valve guide.	04	C	-DO-
3	Wrench for cyl. Test valve	15610603	MT01GM0163	Open & close the cyl. Test valve.	05	B	Required for running maintenance .
4	Valve bridge spring compr.	15610627	MT05GM0169	For compressing spring during assly / removal of valve bridge.	02	C	For sum assembly O/H
5	Lash adjuster min clearance gauge	15610639	MT01GM0170	To check min clearance between lash adjuster body and end of valve stem.	08	A	Required for running maintenance .
6	Installer hydraulic lash adjuster	15610640	MT01GM0171	For installation of hydraulic lash adjuster in valve bridge assembly.	02	B	For sub assembly O/H
7	Trammel valve height checking	15610652	MT05GM0172	For checking valve height with feeler gauge.	02	C	-DO-
8	Multiple puller for hydraulic lash adjuster	15610690	MT05GM40085	To remove hydraulic lash adjuster assembly from valve bridge	02	B	-DO-
9	Guide	15610755	MT05GM0131	To install valve bridge snap ring .	02	B	-DO-
10	Gauge block for lash adjuster test stand	15610809	MT05GM0185	To check & adjuster the tripping point of switches of lash adjuster test stand.	02	B	-DO-
11	Tool for oil loading	15610871	MT05GM0193	To check & adjuster the tripping point of switches of lash adjuster test stand.	02	B	-DO-
12	Reamer for cyl. Test valve seat	15610883	MT01GM0194	For reaming cyl. Test valve seat	02	B	Required for 03 yearly OOC and sub assembly O/H

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1	Installer - water pump impeller	15610615	MT05GM0168	To assemble the impeller to drive shaft in support housing	02	B	Required for sub assembly O/E
2	Water pump dis-assembly tool	15610822	MT05GM0187	For dis-assembly of water pump.	02	B	-DO-

TOOL INJECTION EQUIPMENT

S.N	TOOL	DLW Part no.	DLW DRG No.	Use	QTY. REQ for 50 locos	Category	REMARK
1	Gauge Injector rack setting.	15610561	GA01GM0015	To set the injector racks within the setting range marks on the gauge during engine assy.	06	A	Required for yearly sch. and OOC repair
2	Gauge Block-1"	15610688	GA01GM0015	To check the accuracy of the injector rack gauge by inserting the master block in the gauge body	06	A	-DO-
3	Pin vise - pin dia- 0.07-0.40	15610718	SP02GM0041	For holding cleaning wires.	02	B	Required for sub assembly O/E
4	Injector pry bar	15610720	MT01GM0176	To remove the injector from eye head.	02	B	Required for OOC repair
5	Wrench - injector assy	15610731	MT02GM0177	For loosening nut of injector assy.	02	B	Required for sub assembly O/E

MISCELLANEOUS

S.N	TOOL	DLW Part no.	DLW DRG No.	Use	QTY. REQ for 50 locos	Category	REMARK
1	Crank cover tool for manual operation	15610846	SP02GM0043	To rotate EMD crankshafts on any engine with ring gear including heavy flywheel. can be applied without starters.	03	A	Required for yearly sch. and OOC repair
2	Air drive kit	15610858	SP02GM0044	For pneumatic operation of crank cover tool SP02GM0043	02	A	Required with above tool

CATEGORY LEGENDS

- A- Tools required for running maintenance
- B- Tools required for yearly and 3rd yearly schedule
- C- Tools required for OOC/repair of power pack assy. and 6 yearly schedule
- D- Tools required for dismantling/Assly. of Crankcase & oil pan

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Electrical Tools -I

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S.N	TOOL /PART/DRG NO.	USE	REQ.QTY . PER 50 LOCO.	CATEG ORY
1	CRIMPING TOOL FOR GOVERNER AMPHENOL PLUG TO ASTRO PART NO. M22520/1-01 , OF ASTRO MAKE. or Similar	TO CRIMP GOV.AMPH. PLUG SLEEVE AND ELBOW SHOES	1	A
2	HAND TOOLS WITH AMPNO 91523-1 OF TYCO MAKE or Similar	TO CRIMP EM 2000 CONT.PINS& CPC CONECTOR PINS	1	A
3	CRIMPING TOOL TO MODEL YYT-7 MADE IN TAIWAN OR HAND CRIMPING TOOL SIZE 18-12 AWG OF MAKE PALLADIN MODEL CRIMP ALL SERIES or Similar	TO CRIMP EMD PART NOS.SN. 1)- 8250906 ,(2)8138189 (3) 821098(4)8210500 (5)10594789 (6)8189218 (7)3126723 (8)8200891 (9)3123282 (10)8380934 (11)8389529 (12)8402844 (13)8272337 (14)8137872	1	C
4	CRIMPING TOOL 208-B MODEL MADE IN TAIWAN or Similar	AMP NOS 3- 521191 -2 ,3-520141-2 ,4-520448-2	1	C
5	INSERTION TOOL KIT CONSISTING 3 TOLLS IN A LEATHER CASE TO PART NO KA -260 , A-4598 , A-4599 AND A-4600 OF MAKE JONARD INDUSTRIES COPRATION or Similar	TO INSERT GOVERNOR AMPHENOL PLUG PINS	1	A
6	REMOVAL TOOL KIT CONSISTING 3 TOOLS IN A LEATHER CASE TO PART NO KR -260 , R-4601 , R-4602 , AND R-9461 OF MAKE JONARD INDUSTRIES CORPORTION or Similar	TO EXTRACT GOVERNOR AMPHENOL PINS	1	A
7	PIN EXTRATION TOOL TO AMP PART NO.305183 or Similar	TO EXTRACT CPC CONNECTOR CIRCULAR PINS	1	C
8	0-16 v six amp DC dual out put Regulated power supply to model no LD 1606-01 no of Make APLAB or Similar	to check speed indicator and Tractive Effort meter	1	C

Electrical Tools -II

S.N	ITEM NAME	RATING /PT NO/Make	USE	REQ.QTY. PER 50 LOCO.	CATEGORY
1	THERMAL IMAGER	TI 25/Fluke or similar	TO RECORD TEMP OF R/FAN CONTACTOR TIPS	1	A
2	TM PINION PRESSING AND REMOVING EQUIPEMENT	40,000 PSI, PO NO- 60135017172195/Enerpac or similar	TO REMOVE /Install PINION of TRACTION MOTOR	2	A

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ADDITIONAL TOOLS REQUIRED

(suggested by diesel shed BOKT)

Mechanical Tools

S.N	TOOL	EMD Part no.	DLW DRG .No.	Use	QTY REQ	Category	REMARK
1	Tester valve seat seal	8213518	.....	To test leakage between valve and valve seat	02	C	Required for sub assembly O/H
2	Installer remover bonded for air comp.	8238562	.....	To install and remove bonded joints of couplings	02	C	Required for 06 yearly sch. and OOC repair
3	Expander Piston ring	8349892	.....	To install piston rings.	02	C	Required for sub assembly O/H
4	Torque wrench Kit exhaust Manifold	8463511	.....	To torque exhaust manifold bolts.	04	A	Required for yearly sch. and OOC repair
5	Torque Multiplier 18.5 to 1 Power ratio 3200 ft. cap. 1" Square Drive	9566139	.....	To torque alternator foundation.	01	C	Required for alternator foundation bolt torquing
6	Square Drive Kit	9572173	.....	To use with torque multiplier.	01 set	C	Required with tool at SI no.-5
7	Compression Tester	9572281	.....	To check comp. and firing pressures of power assemblies	32 (02 loco set)	A	Required for yearly sch.
8	Video boroscope of make milwaukee / Geofennal	40034179	.....	To check liner inner surface and cylinder head valve condition on loco	01	A	Required for yearly sch. and OOC repair
9	Gauge fork rod tapped holes	8265955	.....	To check tapped holes of fork connecting rod.	02	C	Required for sub assembly O/H
10	Test stand lash adjuster	8267432	.....	To test lash adjuster	01	B	Required for sub assembly testing
11	Injector tester	9549055	.....	To evaluate the condition of injectors by checking leakage rate and fuel spray pattern.	01	B	-DO-
12	Lever injector pop test	40021839	.....	To test injector on loco	01	B	-DO-
13	Wrench spin on fuel filter	9083713	.....	To change spin on filter	05	A	Required for running maintenance
14	Counter sink fuel oil manifold block	8214852	.....	To repair fuel and manifold	02	C	-DO-

12/11/14

Chandh
13-11-14

