

WOSS 510/4

British Railways Board

Director of Mechanical and Electrical Engineering

Batteries

Nickel Alkaline ; Light Attention

WORKSHOP OVERHAUL STANDARD SPECIFICATION



REVISION RECORD

This Specification will be updated when necessary by the issue of amended pages accompanied by revision letters. The amended or additional part of re-issued pages will be marked with a vertical black line.

If you consider that an amendment is necessary, complete BR Form 14298 and pass it to the local BRB Resident Engineer or Area Quality Engineer. Submission of a form does not authorise the proposed amendments.

Revision No.	Re-issued Page Nos	Date	Inserted by
1	RR,1,2, 7	Feb 86	

Revision No.	Re-issued Page Nos	Date	Inserted by

© Director of Mechanical & Electrical Engineering
 British Railways Board
 The Railway Technical Centre
 London Road
 Derby
 DE2 8UP

First published - March 1985

This is a proprietary specification of the Director of Mechanical & Electrical Engineering, British Railways Board. The specification (including the data and information relating thereto) is not to be used, disseminated, reproduced, copied or adapted, either in whole or in part, without the express written approval of the Electrical Equipment Engineer at the above address.

Should any query arise regarding the contents of this document telephone 0332 42442 Ext. 3516, BR Code is 056 3516, or write to the above address.

This Specification applies to equipment fitted to the vehicles indicated 'X' below, but it is only to be implemented when authorised by an appropriate maintenance/overhaul document.

LOCOMOTIVES

03	
08	X
09	X
20	
25	
26	X
27	X
31	
33	
37	
43	
45	
47	
50	
56	
58	

73	
81	X
85	X
86	X
87	X
88	
89	
91	

DMU's

101	X
104	
107	
108	X
110	
111	
114	
115	
116	
117	
119	
121	
122	
123	
140	
141	
142	
143	
150	
151	
210	

EMU's

302	X
303	X
304	X
305	X
307	X
308	X
309	X
310	X
311	X
312	X
313	X
314	X
315	X
317	X
318	
319	
504	X
507	
508	

411	X
412	X
413	X
414	X
415	X
416	X
419	
421	X
422	X
423	X
432	X
455	X
485	
486	
487	X
488	X
489	X
491	

DEMU's

201	
202	
203	
204	
205	
207	

COACHING STOCK

Mk 1	
Mk 2, 2a-c	
Mk 2d-e	
Mk 2f	
Mk 2 DBSO	
Mk 3a	
Mk 3b	
Mk 3 (HST)	
Mk 3 SLE and SLEP	
Non Passenger	X

WORKSHOP OVERHAUL STANDARD SPECIFICATION 510/4

BATTERIES

Nickel Alkaline : Light Attention

CONTENTS

Reference Documents

Tools and Materials

Section 1 - Repair Procedure

Notes

1. Cleaning and Examination
2. Charging

Section 2 - N/A

Section 3 - Technical Data

Table 1 - Vehicle Classes, Battery Type and Charging Rates

Table 2 - Marathon Alcad Date Codes

REFERENCE DOCUMENTS

WOSS 510/1 Batteries Nickel Alkaline

WOSS 510/3 Battery Boxes

TOOLS AND MATERIALS

BR CAT NO.

Topping up gun (manual)		54/29022
Level testing tube		54/43002
Insulated box spanners:-	1/4"	98/7530
	3/8"	98/3772
	5/8"	98/3773
	7/8"	98/3774
	M10	98/7528
	M20	98/7529
Hydrometers:- 12" 1.100-1.300		54/42185
18" 1.100-1.300		54/42190
Thermometer 12-15" 0-50°C		39/66306
Voltmeter		
Rubber aprons:- 40" long with bib		44/3170
48" " " "		
Rubber gloves:- Size 7.5		44/115710
Size 8.5		44/115711
Size 9.5		44/115712
Size 10.5		44/115713
Goggles		44/116120
		44/116152
Bottle brush 1.1/8" dia		5/1285
Petroleum jelly (terminals)		27/27000
Petroleum jelly (cell top depression)		27/27001
Boric acid		7/510
Eye wash solution 500 ml		34/1340
1000 ml		34/1342
Mounting bracket for solution bottle		11/26125
Topping up water		see WOSS 501/1
Litmus Paper, blue		7/58602
Litmus Paper, red		7/58603
Bristle Brush		5/3500

SECTION 1 REPAIR PROCEDURE

NOTES:-

1. Apron goggles and gloves must be worn when working with cells or electrolyte.
2. Hydrometers used on lead acid cells must not be used on alkaline cells.
3. A stock of litmus papers should be held so that any contamination or spillage may be identified.

Red litmus will turn to blue on contact with alkali.
Blue litmus will turn to red on contact with acid.
4. Neutralise alkaline spillage with a solution of approx 1% boric acid to 99% water (1/4 cup to 1 gallon).
5. Do not smoke or bring naked lights in the vicinity of the battery.
6. use insulated spanners on all connections. Do not lay tools on the cells.
7. Do not allow the cases of steel contained cells to touch each other.

1. Cleaning and Examination

- 1.1 Disconnect connecting links and remove all nuts, bolts and washers from the terminals.
- 1.2 Clean the connecting links, nuts, bolts and washers with hot, clean water and a bristle brush.
- 1.3 Examine the connecting links, nuts, bolts and washers for damage and corrosion. Discard any defective items.
- 1.4 Seal each cell by fitting a filler cap or rubber or plastic transit plugs. Renew any caps which do not seal correctly.
- 1.5 Clean off dirt, grease and corrosion from the crates, cells and terminals using hot, clean water and a bristle brush. Wipe dry with clean cloth.
- 1.6 Examine each cell for the following defects. Remove the cell from the crate and take the specified action if defective.
 - 1.6.1 Distorted cell case: return cell to manufacturer for repair.
 - 1.6.2 Loose terminals: renew insulation washers.
 - 1.6.3 Damaged terminals: return cell to manufacturer for repair.
 - 1.6.4 Damaged or flaking paint. Re-paint in accordance with WOSS 510/1.
 - 1.6.5 Electrolyte level considerably less than the other cells.
- 1.7 Examine crates for defective paintwork. If defective re-paint in accordance with WOSS 510/1.
- 1.8 Remove the filler caps/transit plugs.
- 1.9 Renew any damaged filler caps. Renew any filler cap springs which do not have a snap action or have lost tension.
- 1.10 Fit any cells which have been removed into the crates. Renew any defective cell supports.
- 1.11 Top up the electrolyte with topping-up water to the level given in Section 3 Table 2 of WOSS 510/1.

WOSS 510/4

2. Charging

- 2.1 Using new connecting links, nuts, bolts and washers for those discarded or missing, connect the cells in series for charging. The number of cells will be dependant on the charging source, but battery units removed from the vehicles should whenever possible be kept together. Discard any cell whose internal temperature exceeds 45°C during the charge.
- 2.2 Charge the cells for 7 hours at the constant current given in Section 3 Table 1.
- 2.3 At the end of the period given in 2.2 measure the voltage of each cell with charging current still applied. Discard any cell with a reading below 1.6 V.
- 2.4 Continue the constant current charge taking cell voltage readings at hourly intervals upto a maximum of 10 hours. Switch off the charging current when consecutive cell voltage readings become the same.
- 2.5 Measure the specific gravity of the electrolyte in each cell. If any cell is less than 1.145 each cell in the crate is to have its electrolyte changed. See WOSS 510/1.
- 2.6 Allow the battery to stand for 12 hours.
- 2.7 Measure the (open circuit) voltage of each cell. If any cell has a reading below 1.25 V the crate is to be overhauled in accordance with WOSS 510/1.
- 2.8 Replacement cells added at this stage are to be of a similar age and/or state of charge wherever possible. New cells are to be treated in accordance with WOSS 510/1, Additional Procedure 4.
- 2.9 Top up the electrolyte with topping up water to the level given in WOSS 510/1.
- 2.10 Fit all filler caps and dry all cell tops with a clean cloth.
- 2.11 Pour melted petroleum jelly into each cell top depression and fill up to the flange rim.
- 2.12 Coat the terminals with petroleum jelly applied with a brush.
- 2.13 Assemble the appropriate number of crates to form a battery. See WOSS 510/1.

SECTION 3 TECHNICAL DATA

Table 1 Vehicle Classes, Battery Types and Charging Rates

CLASS	NO. OF CELLS	TYPE	CONSTANT CURRENT CHARGING RATE (A)
08	72	DL8	17
09	60	DL10	20
26	72	DL15	31
27	72	DL15	31
81 82 85	72	ES5	11
83	72	ES8	17
86 87	72	VF5 D13	8
101 108 Power Car	19	LR40	80
101 108 Trailer	19	RV30	60
302-5 307-12	72	VF7 C15	16
313-18	72	VF5 D13	8
370 Power Car	75	RVP5	10

Table 1 Vehicle Classes, Battery Types and Charging Rates (Cont'd)

CLASS	NO. OF CELLS	TYPE	CONSTANT CURRENT CHARGING RATE (A)
370 Trailer	75	RV20	40
411-13 414 415-16 (part) 421-23 489	46 45	VF5 D13	8
415-16 (part)	47	ES6	12
432 437	46	VF7 C18	20
455 507-8	72	VF5 D13	8
487			
488	19	VF7 C18	20
504	72	VF7 C15	16
GUV	19	VF5 B17	25

Table 2 Marathon Alcad Date Codes

2.1 Cells Manufactured Prior to 1970

First letter indicates the quarter of the year of manufacture:

C	J	S	W
April	July	October	January

The last two digits indicate the year of manufacture, either by a number and a letter or two letters:

C	U	M	B	E	R	L	A	N	D
1	2	3	4	5	6	7	8	9	0

eg. C5R or CER = April-June 1956.

2.2 Cells Manufactured 1970 - 1979

First letter indicates year of manufacture. Second and third indicate the week of the year:

C	U	M	B	E	R	L	A	N	D
1	2	3	4	5	6	7	8	9	0

eg. CUM = 1971, 23rd week.

2.3 Cells Manufactured 1980 Onwards

Four letters indicating year and week of manufacture:

C	U	M	B	E	R	L	A	N	D
1	2	3	4	5	6	7	8	9	0

eg. AUBE = 1982, 45th week.