AAR SPECIFICATION M-214 INSPECTION CHECKLIST

I. ORGANIZATION

DESCRIPTION	M-214 PARAGRAPH	YES	NO	COMMENTS
1. Is there separation between quality control and production responsibility?	App. B.2.8			
2. Are there procedures for qualifying supervisors and methods of training and determining performance?	App. B.2.8.1.2			
3. Does the facility have a documented and implemented training program for qualifying employees in key operations with written notice (certificate) of completion?	App. C.5			
4. Are there written procedures for qualifying personnel for particular jobs and/or training for new employees?	App. B.2.8.1.1			
5. Is there an acceptable gage control program?	App. C.8			
6. Is there a program for periodically calibrating or verifying gage accuracy and is it properly documented?	App. B.2.8			
7. Are gages within the tolerances of the gage drawings and Table 1A?	Table D.1			
8. Are necessary AAR publications and other referenced materials available and current?				
MSRP Section D, S-306**,** S-307**,** S-308**,** RP-323 **MSRP Section S**, M-214, <u>M-220 If Reconditioning Trucks 45 years and older for ICL</u>. **MSRP Section SII**, S-325, S-327, S-378, S-392	App. C.9			
AAR Circular Letters	App. C.9			
Field Manual of the AAR Interchange Rules	App. C.9			
AWS D15.1 Railroad Welding Specification for Cars	App. B.2.4			
9. Does the facility maintain written guidelines and procedures for?				
Inspection, identification, and segregation of incoming material	App. C.4			
Acceptance and rejection criteria and limits. <u>If reconditioning trucks 45 years and older for ICL. Magnetic Particle Testing & Dye Penetrant Testing.</u>	App. C.4			
Dismantling, modifying or component removal	App. C.4			
Defining the necessary repair work to be done	App. C.4			
Materials to be used (including part numbers and weld filler material)	App. C.4			
Verifying the integrity and dimensional accuracy of the reconditioned castings	App. C.4			
Controlling critical operations (welding parameters, dimensional inspection/layout, heat application, heat treatment, etc.	App. C.4			
Inspection, identification and segregation of reconditioned product	App. C.4			
Training, testing and certification of workers in critical occupations. <u>If reconditioning trucks 45 years and older for ICL. Magnetic Particle Testing & Dye Penetrant Testing.</u>	App. C.4			

II. PRELIMINARY INSPECTION

DESCRIPTION	M-214 PARAGRAPH	YES	NO	COMMENTS
1. Are parts being cleaned and free of dirt, paint, rust and scale which will interfere with gaging and inspection?	2.1.2			
2. Are Castings evaluated in accordance with Section 2.0?	3.1.1			
3. Are Side Frames & Bolsters with Pattern Numbers listed in Field Manual, Rule 47 & Rule 48 being scrapped?	2.2.1			
4. Are castings having condemning cracks scrapped?	2.2.2			
5. Does the facility adequately maintain required gages for the types of castings being reconditioned?	Table D.1, App. C.7			
6. Are castings that qualify for secondhand separated?	3.0			
7. Are proper casting markings present, including manufacturers pattern number and marking, date cast and AAR I.D. or Code Number?	2.2.3			
8. Are designer's maintenance manuals and gages available for castings being reconditioned? RC & SSRC Ridemaster Motion Control Swing Motion 40 Tonne Capacity SSRM SSRC Trucks with Bolted Bolster WP Barber Buckeye XC-R National C-1 National Super C-1 Wedgelock Strato 70 Ton Q4	App. C.2			
9. Is initial inspection of castings adequate?	App. B.2.2			
10. Is there a written procedure for calibrating?	FAQ Views & Interpretations			
a. Welding Machines	8.6			
b. Wire Feeders	8.6			
c. Flow Meters	8.7			
d. Rod Ovens	8.8			
11. Did shop personnel demonstrate proper gaging techniques?	App. B.2.2			
12. Did shop personnel have an adequate understanding of critical and noncritical casting areas and how they relate to repair procedures?	App. B.2.2			
13. Do shop personnel know how to properly remove casting defects, air arc and/or oxyacetylene scarfing methods, prior to weld repair?	App. B.2.3			
14. Is the reconditioner adequately able to identify critical casting flaws that may lead to failure?	App. B.2.8			

III. WELDING

DESCRIPTION	M-214 PARAGRAPH	YES	NO	COMMENTS
1. Are welders qualified for welding positions used? a. Name. b. Weld Process (i.e. – FCAW, SMAW, and/or GMAW). c. Position(s) Qualified to. d. Weld Progression. e. Pass or Fail f. WPS qualified to. 2. CWI or Designated Inspector signed it.	5.1.3.2			
3. Are welders and welding procedures qualified in accordance with AWS D15.1? a. Company Name. b. Weld Process (i.e. – FCAW, SMAW, and etc. c. Pre-Qualified or Qualified by Weld. d. Weld Joint design. e. Volts/Amps/Gas Flow. f. Type of Gas. 4. CWI or Designated Inspector signed it.	5.1.2.1			
5. Are welds acceptable under the provisions of AWS D15.1 and AAR Specification M-1001, Chapter V, Section 5.1?	5.1.1			
6. Is proper wire or electrodes used for Grade of castings?	5.1.1.1			
7. If low hydrogen rods are used, are the electrodes as specified?	5.1.7.1			
8. If low hydrogen rods are used, are they stored in accordance with AWS D15.1?	5.1.7.1			
9. Is welding done only in allowable locations?	4.3.1.7			
10. Are castings at correct temperature when welded?	5.1.6			
11. Are castings properly prepared for welding to include preheat of Grade “C” if applicable?	5.1.6 & 4.3.1.4			
12. Is trimming and blending proper?	5.1.5			
13. Are electrodes and/or welding wire properly stored?	5.1.1.1			
14. Are rod ovens, with acceptable method of determining interior temperature, in use?	FAQ Views & Interpretations 8.8			
15. Are adequate personnel available to perform welding tests and resolve welding questions?	App. B.2.8.1.3			

5.1.7 Suggested Electrodes by Process and Base Metal

5.1.7.1 Shielded Metal Arc Welding (SMAW)

M-201 Grade of Steel	Electrode
B	AWS/ASTM E7015, E7016, E7018, or equivalent
B+	AWS/ASTM E8015, E8016, E8018, or equivalent
C	ASW/ASTM E9015, E9016, E9018, or equivalent
Max. electrode diameter 5/32 in.	

5.1.7.2 Flux-Core Arc Welding (FCAW)

M-201 Grade of Steel	Electrode
B	E71T-1M, E71T-7, E71T-8
B+	E81T-B2
C	E91T1-B3, E91T1-K2
Max. wire diameter 1/16 in. Use shielding gas if appropriate for the selected electrode.	

5.1.7.3 Gas-Metal Arc Welding (GMAW)

M-201 Grade of Steel	Electrode
B	ER70S-2MH, ER70C-2MH, ER70S-G, ER70C-G
B+	ER80S-D2, ER80C-D2, ER81S-F, ER81C-G
C	ER90S-D2, ER90C-D2, ER91S-G, ER91C-G
Max. wire diameter 1/16 in. Use shielding gas if appropriate for the selected electrode.	

IV. HEAT TREATMENT (Grade C Reconditioners Only)

DESCRIPTION	M-214 PARAGRAPH	YES	NO	COMMENTS
1. Are furnace controls operable and accurate?	5.1.9.2			
2. Has pyrometer been calibrated within 3 months?	5.1.9.5			
3. Is recorded temperature within range and held for proper time?	5.1.9.2			
4. Is type of product, prescribed heat treatment, and actual time of heat treatment recorded on a furnace log sheet for each heat treat load?	5.1.9.3			
5. Is date and furnace number identified on each time temperature chart?	5.1.9.5			
6. Have heat treatment standards been developed and are they followed as required?	5.1.9.1			
7. Is heat treatment performed before application of wear plates and liners?	4.3.1.8			
8. Are castings segregated by grade for furnace batches?	App. B.2.5			
9. Is tempering performed as required?	5.1.8.1			
10. Are welds ground to remove surface discontinuities?	App. B.2.6			
11. Are castings grit or shot blasted for cleaning after heat treatment?	5.1.8.2			

V. FINAL ASSEMBLY AND MARKING

DESCRIPTION	M-214 PARAGRAPH	YES	NO	COMMENTS
1. Is reconditioning performed in accordance with Section 4.0 of M-214?	4.1.7			
2. Are reclamation or classification marks stamped or dot peened in place and proper on all completed components?	4.1.6.3.2			
3. If reconditioning trucks 45 years and older for ICL. Magnetic Particle Testing & Dye Penetrant Testing.	6.4.1			
4. Has the facility performed the ICL inspection on any side frames or bolsters and have they reported this inspection quarterly to castings@aar.com?	6.7 & 6.7.1			
5. Are wear plates applied properly to side frames?	4.2.2			
6. Are brake beam guides cut out properly?	4.2.9			
7. Are wear plates or liners applied properly to bolsters?	4.3.2			
8. Are bolster top extensions prepared correctly for wear plates or inserts?	4.3.1.10			
9. Are side frames measured for wheel base and stamped properly?	4.2.5			
10. Are finished casting gaged for dimensional accuracy and inspected?	App. C.4			
11. Is finished grinding of castings adequate to insure surface discontinuities resulting from weld repair are properly contoured to the surrounding surface?	App. B.2.6			
12. Is there a written procedure for resolving controversy between operations and quality control regarding non-conforming items?	App. B.2.8			
13. Have bolsters and side frames been field registered into Umler (As Needed) and CID label applied? (As Needed)	AAR Field Manual Rule 47.B.10, Rule 48.B.9, & S-920			
14. Have design code feature numbers been applied to bolsters and side frames?	3.1.3.2 & 4.1.6.2			

M-214 TABLE 1 REQUIRED GAGES

(Alternate Gage Construction Permitted if Gaging Method Does Not Change)

GAGE	DESCRIPTION	APPLICATION	YES	NO
	BOLSTER GAGES			
EC-1109	GO Gage 14” Bowl w/o Horizontal Liner	Fig. 8.21, M-210		
EC-1126	GO Gage 14” & 16” Bowl with Center Plate Liner	Fig. 8.22, M-210		
EC-1110	NO GO Gage for 14” & 16” Bowl w/o Vertical Liner	Fig. 8.23, M-210		
EC-1127	NO GO Gage for 14” & 16” Bowl with Vertical Liner	Fig. 8.24, M-210		
	SIDE FRAME GAGES			
EC-1107-1	Pairing Gage	Fig. 8.5, M-210		
EC-1107-2	Enlarged View of Scale on Wheel Base Gage	Fig. 8.4, M-210		
EC-1120	Side Frame Column GO Gage	Fig. 8.7, M-210		
EC-1121	Side Frame Column NO GO Gage	Fig. 8.8, M-210		
EC-1090-2 or EC-1157-A	Application of key slot gage and journal roof to key slope gage for pedestal side frames	Fig. 8.19, M-210/Fig. D.8, M-214		

Other M-214 Required Gages

GAGE	DESCRIPTION	APPLICATION	REFERENCE	YES	NO
	Pedestal Squareness Gage	Figure 2.1 & 2.2, S-327	M-214, 3.2.1.2, 4.2.2.2		
EC-1200	Side Frame Pedestal Roof Wear Limits Gage	Figure D.2, M-214 and Fig. B, Field Manual Rule 48	M-214, 3.2.2.2.3		
EC-1148	Bolster Gib Restoration Gage	Fig. D.5, M-214	M-214, 3.3.2.1, 4.3.3.1		

REMOVE THIS PAGE WHEN SENDING REPORT INTO CASTINGS MANAGER

OEM GAGES IN USE

NOTE: Use this page to list M-214 gages in use as required by OEM Maintenance Manuals.
(Refer to facilities gage listing of M-214 gages in use)

STANDARD CAR TRUCK	RIDE CONTROL	SUPER SERVICE RIDE CONTROL	RIDEMASTER	MOTION CONTROL/SUPER SERVICE RIDEMASTER	SWING MOTION
BOLSTER	BOLSTER	BOLSTER	BOLSTER	BOLSTER	BOLSTER
SK-1689/SK-2527 OEM Slope Angle & Construction Point Gage	**1-8985/1-9025/1-9031** OEM Construction Point Gage	**1-8985/1-9025/1-9031** OEM Construction Point Gage	**1-9002** OEM Slope Angle Gage	**1-9206** OEM Column Land Outer Gage	**51932** OEM Rocker Seat Gage
SK-2546/SK-2548/SK-2547 OEM Side Wall Gage	**1-7927** OEM Slope Angle Gage	**1-7927** OEM Slope Angle Gage	**1-9003** OEM Pocket Contour Gage	**1-9207** OEM Column Land Inner Gage	**51933** OEM Rocker Seat Bearing Gage
SK-1504/SK-2264 OEM Gib Gage	**1-8062** OEM Winged Clearance Gage (or new Friction Casting)	**1-8062** OEM Winged Clearance Gage (or new Friction Casting)	**1-9004** OEM Construction Point Gage	**1-9201** OEM Slope Angle Gage	**51436** OEM Bolster Wedge Pocket Gage
No-go Bolster Bowl Ring Gage	**1-8982** OEM Gib Gage	**1-8982** OEM Gib Gage	**1-8999** OEM Gib Gage	**1-9203** OEM Construction Point Gage	**48468** OEM Bolster Land Gage
Bolster Bowl Depth Gage	**1-8986** OEM Inner Rotation Stop Gib Gage	**1-8986** OEM Inner Rotation Stop Gib Gage	**1-8997** OEM Column Land Outer Gage	**1-9202** OEM Winged Clearance Gage (or new Friction Casting)	**No-go Bolster Bowl Ring Gage**
	1-8987 (when needed) OEM Column Land Gage	**1-8987** (when needed) OEM Column Land Gage	**1-8998** OEM Column Land Inner Gage	**1-9205** OEM Gib Gage	**Bolster Bowl Depth Gage**
	1-8988 OEM Outer Gib Contour Gage	**1-8988** OEM Outer Gib Contour Gage	**1-9007** OEM Outer Gib Contour Gage	**1-9209** OEM Outer Gib Contour Gage	
	No-go Bolster Bowl Ring Gage	**No-go Bolster Bowl Ring Gage**	**No-go Bolster Bowl Ring Gage**	**No-go Bolster Bowl Ring Gage**	
	Bolster Bowl Depth Gage	**Bolster Bowl Depth Gage**	**Bolster Bowl Depth Gage**	**Bolster Bowl Depth Gage**	
SIDE FRAMES	SIDE FRAMES	SIDE FRAMES	SIDE FRAMES	SIDE FRAMES	SIDE FRAMES
SK-1503/SK-1560/SK-2265/SK-2524 (or other suitable gage) OEM Column Wear Plate & Column Guide Gage	**1-8989** (or other suitable gage) OEM Column Guide Go Gage	**1-8989** (or other suitable gage) OEM Column Guide Go Gage	**1-9011** (or other suitable gage) OEM Column Guide Go Gage	**1-9211** (or other suitable gage) OEM Column Guide Go Gage	**51934** OEM Column Wear Plate Gage
Pedestal Thrust Lug gage	**1-8990** (or other suitable gage) OEM Column Wear Plate Go Gage	**1-8990** (or other suitable gage) OEM Column Wear Plate Go Gage	**1-8995** (or other suitable gage) OEM Column Wear Plate Go Gage	**1-9212** (or other suitable gage) OEM Column Wear Plate Go Gage	**Pedestal Thrust Lug gage**
Suitable Square & Block	**1-8991** (or other suitable gage) OEM Column Wear Plate No-Go Gage	**1-8991** (or other suitable gage) OEM Column Wear Plate No-Go Gage	**1-8994** (or other suitable gage) OEM Column Wear Plate No-Go Gage	**1-9213** (or other suitable gage) OEM Column Wear Plate No-Go Gage	**Suitable Square & Block**
Pairing Gage	**1-8992** (or other suitable gage) OEM Rotation Stop Lug Gage	**1-8992** (or other suitable gage) OEM Rotation Stop Lug Gage	**Pedestal Thrust Lug gage**	**Pedestal Thrust Lug gage**	**Pairing Gage**
	Pedestal Thrust Lug gage	**Pedestal Thrust Lug gage**	**Suitable Square & Block**	**Suitable Square & Block**	
	Suitable Square & Block	**Suitable Square & Block**	**Pairing Gage**	**Pairing Gage**	
	Pairing Gage	**Pairing Gage**			