STEAM LOCOMOTIVE BOILER VISUAL INSPECTION CHECKLIST
BSB 0600-05 - Attachment 1 Rev 1
INTERNAL EXTERNAL

BOILER INFORMATION

NC NO:	OWNER NAME:
MANUFACTURER:	OWNER ADDRESS:
YEAR BUILT:	OWNER CITY/STATE:
BOILER TYPE:	USER NAME:
ENGINE NO:	USER ADDRESS:
OTHER ID NO:	USER CITY/STATE:
TOTAL HEATING SURFACE:	MAWP:
SAFETY VALVE MANUFACTURER:	SAFETY VALVE SET PRESSURE: SAFETY VALVE CAPACITY:
UT THICKNESS READINGS TAKEN: Y ☐ N ☐	ATTACH ULTRASONIC THICKNESS TESTING CHECKLIST: Y ☐ N ☐
MAWP OF BARREL CALCULATED Y ☐ N ☐	MAWP OF STAYED SURFACES CALCULATED Y ☐ N ☐

INITIAL INSPECTION Y ☐ N ☐	Date:
INSPECTOR NAME:	INSPECTOR SIGNATURE:

CAUTION: The boiler has to be cleaned for inspection in order to identify defects. If the boiler is not clean do not proceed with visual or non-destructive examinations.

STEAM LOCOMOTIVE BOILER CHECKLIST
FOR VISUAL INTERNAL AND EXTERNAL INSPECTION
ATTACHMENT 1

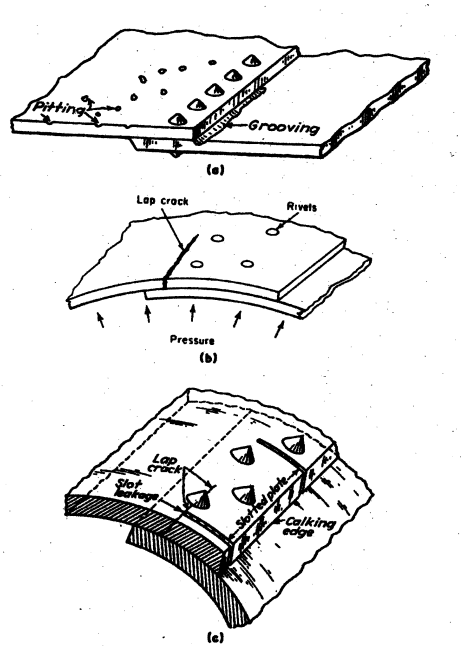
GENERAL REQUIREMENTS

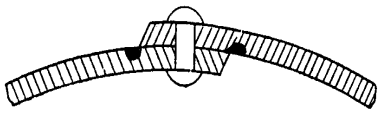
INSPECT RIVETED SEAMS AND RIVET HEADS FOR:

a) Grooving;
b) Corrosion;
c) Cracks;
d) Pitting;
e) Leakage;
f) Separation of the plates;
g) Excessive or deep caulking of the plate edges and rivet head;
h) Seal welding of the plate edges and rivet heads;
i) Rivet heads that have been built up, or covered over completely by welding;
j) Rivet replaced by patch bolts;
k) Defective components of the seam, especially longitudinal lap seams which are prone to cracking;
l) Rivet heads. NBIC part 2 Fig. S1.4.2.1 l).

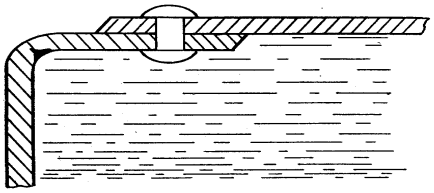
INPSECT WELDED AND RIVETED REPAIRS FOR:

- Correct application of welded patches or weld build up;
- Correct application of riveting;
- Cracks;
- Separation of the plates;
- Dents or other mechanical damage;
- Leakage.

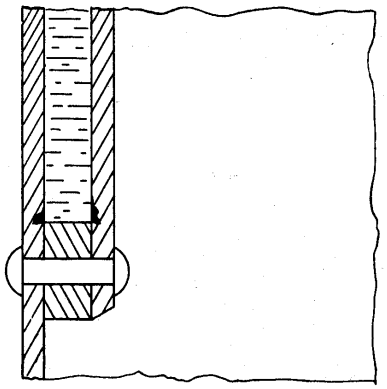




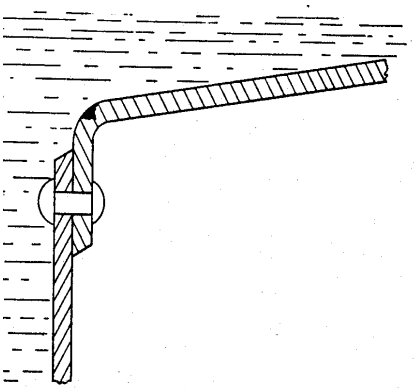
(d) Grooving near longitudinal seam of lap joint construction



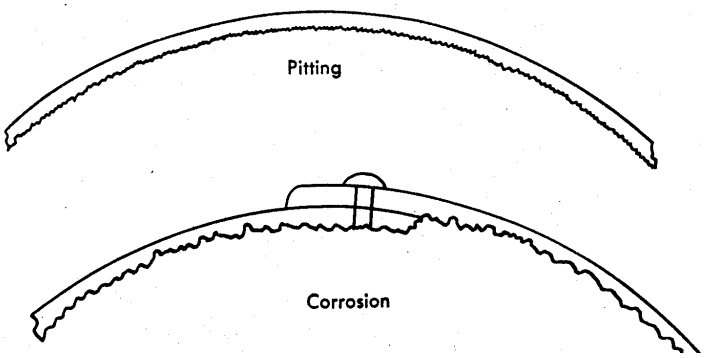
Grooving in corner where head joins shell



Grooving at bottom of water legs.



Grooving at corner on crown sheet of locomotive boiler



For those items that are not applicable indicate "N/A".

	DESCRIPTION	ACC	REJ	REMARKS
#1	**BOILER SHELL COURSE – Internal/External**			
	• Grooving or cuts;	☐	☐	
	• Corrosion;	☐	☐	
	• Cracks;	☐	☐	
	• Pitting;	☐	☐	
	• Separation of the plates;	☐	☐	
	• Dents or other mechanical damage;	☐	☐	
	• Leakage.	☐	☐	
	• Check thickness.	☐	☐	
#2	**DOME AND DOME LID - Internal/External**			
	• Grooving;	☐	☐	
	• Corrosion, especially at interior attached to boiler shell;	☐	☐	
	• Cracks;	☐	☐	
	• Pitting;	☐	☐	
	• Separation of the plates;	☐	☐	
	• Dents or other mechanical damage;	☐	☐	
	• Leakage.	☐	☐	
	• Stretched, bent, or corroded dome studs;	☐	☐	
	• Damage to the steam dome sealing surfaces.	☐	☐	
	• Check thickness.	☐	☐	

	DESCRIPTION	ACC	REJ	REMARKS
#3	**MUDRING**			
	• Mud and scale on the waterside;	☐	☐	
	• Debris on the waterside;	☐	☐	
	• Grooving or cuts;	☐	☐	
	• Corrosion;	☐	☐	
	• Cracks;	☐	☐	
	• Separation of the firebox plates from the mudring;	☐	☐	
	• Dents or other mechanical damage;	☐	☐	
	• Leakage.	☐	☐	
	• Check thickness.	☐	☐	
#4	**FLUE (TUBE) SHEETS**			
	• Grooving around flue holes, rivet seams and braces;	☐	☐	
	• Fireside and waterside corrosion;	☐	☐	
	• Fire cracks at riveted lap seams;	☐	☐	
	• Cracks;	☐	☐	
	• Pitting;	☐	☐	
	• Bulges;	☐	☐	
	• Leakage.	☐	☐	
	• Excessive or deep caulking of the plate edges;	☐	☐	
	• Check thickness.	☐	☐	
Note: Corrosion is a common at the bottom section of the front flue sheet. Inspect the joint between the flue sheet and the shell closely.				

	DESCRIPTION	ACC	REJ	REMARKS
#5	**FLANGED SHEETS**			
	• Corrosion;	☐	☐	
	• Cracks;	☐	☐	
	• Grooving;	☐	☐	
	• Pitting;	☐	☐	
	• Mud and scale deposits;	☐	☐	
	• Correct fit up and alignment of the flanged sheet to adjacent sheets.	☐	☐	
	• Check thickness.	☐	☐	
Note: Corrosion is a common at the bottom section of the front flue sheet. The flanges should have a smooth uniform curvature and make a smooth transition to the flat sheets.				
#6	**STAYED SHEETS (INCLUDES CROWN SHEET)**			
	• Fireside and waterside corrosion;	☐	☐	
	• Cracks;	☐	☐	
	• Grooving around staybolt holes;	☐	☐	
	• Grooving on the waterside section;	☐	☐	
	• Deterioration of the joint between the staybolt and the sheet;	☐	☐	
	• Pitting;	☐	☐	
	• Mud and scale deposits;	☐	☐	
	• Overheating;	☐	☐	
	• Bulges.	☐	☐	
	• Fire cracks at riveted lap seams;	☐	☐	
	• Check thickness.	☐	☐	
Close inspection should be made for grooving on the waterside surfaces just above the mudring and for fireside corrosion behind refractory or grates. Fire cracks extending to rivet holes may be acceptable. See NBIC Part 2, 3.4.9.				

	DESCRIPTION	ACC	REJ	REMARKS
#7	**STAYBOLTS – GIRDER STAYS – CROWN STAYS –CROWN BARS – SLING STAYS – DIAGONAL STAYS**			
	• Cracks or breakage in the body;	☐	☐	
	• Erosion of the driven head from corrosion or combustion gases;	☐	☐	
	• Staybolt head flush with or below the surface of the sheet;	☐	☐	
	• Plugging of telltale holes (some plugging may be permitted in 49 CFR Part 230.41?);	☐	☐	
	• Waterside corrosion;	☐	☐	
	• Staybolt heads that have been covered by welding;	☐	☐	
	• Fasteners, pins, nuts and retainers not missing and are correctly installed.	☐	☐	
	• Correct seal welding of staybolt heads.	☐	☐	
	1. An indicator of staybolt corrosion on threaded staybolts is a lack of threads just above the sheet. 2. Broken staybolts may be detected by leakage at the telltale hole and by hammer testing; both methods are most effective when the boiler is under a hydrostatic test of at least 95% MAWP. 3. A telltale that is plugged by a nail or pin may indicate a broken staybolt. 4. When a broken staybolt is found it is important to closely inspect he adjacent staybolts.			
#8	**FLUES**			
	Fire cracks;	☐	☐	
	Pitting;	☐	☐	
	Corrosion;	☐	☐	
	Erosion;	☐	☐	
	Obstructions in the flue interior;	☐	☐	
	Mud and scale deposits on the waterside;	☐	☐	
	Erosion or cracking on the flue ends, flue beads and/ or seal welds;	☐	☐	
	Leakage;	☐	☐	
	Check thickness.	☐	☐	

	DESCRIPTION	ACC	REJ	REMARKS
#9	**SUPERHEATERS**			
	Pitting;	☐	☐	
	Corrosion;	☐	☐	
	Erosion;	☐	☐	
	Fire cracks;	☐	☐	
	Cracks;	☐	☐	
	Bulges;	☐	☐	
	Leakage;	☐	☐	
	Missing Shields;	☐	☐	
	Supports;	☐	☐	
	Check thickness.	☐	☐	
10#	**ARCH TUBES and WATER BAR TUBES**			
	Pitting;	☐	☐	
	Corrosion;	☐	☐	
	Erosion;	☐	☐	
	Fire cracks;	☐	☐	
	Cracking of tube ends;	☐	☐	
	Overheating and blistering;	☐	☐	
	Mud and scale build up in the waterside;	☐	☐	
	Bulges;	☐	☐	
Weld buildup or welded patches are not permitted on arch tubes and water bar tubes. Defective tubes must be replaced.				

	DESCRIPTION	ACC	REJ	REMARKS
#11	**THERMIC SIPHONS**			
	Pitting;	☐	☐	
	Corrosion;	☐	☐	
	Erosion;	☐	☐	
	Fire cracks;	☐	☐	
	Cracking of the siphon neck;	☐	☐	
	Overheating and blistering;	☐	☐	
	Mud and scale build up in the waterside;	☐	☐	
	Broken or damaged staybolts.	☐	☐	
	Check thickness.	☐	☐	
#12	**DRY PIPE**			
	Corrosion;	☐	☐	
	Erosion;	☐	☐	
	Cracks;	☐	☐	
	Adequate bracing;	☐	☐	
	Loose, bent or damaged rivets, nuts, bolts and studs.	☐	☐	
A steam leak in the dry pipe of a dome mounted (internal) throttle valve will send an unregulated flow of steam to the cylinders.				
#13	**THROTTLE AND THROTTLE VALVE**			
	DESCRIPTION	**ACC**	**REJ**	**REMARKS**
	Proper operation;	☐	☐	
	Lost motion or looseness;	☐	☐	
	Loose, bent or damaged rivets, nuts, bolts and studs.	☐	☐	

The throttle handle shall be equipped with some type of locking mechanism to prevent the throttle from being opened by the steam pressure.				
#14	**SCREW-TYPE WASHOUT PLUGS, HOLES AND SLEEEVES**			
	DESCRIPTION	**ACC**	**REJ**	**REMARKS**
	Damaged or cracked threads;	☐	☐	
	Corrosion;	☐	☐	
	Leakage;	☐	☐	
	Number of threads adequate for the service?	☐	☐	
#15	**HANDHOLE WASHOUT DOORS**			
	Damaged or cracked threads on the door studs;	☐	☐	
	Corrosion of door sealing surfaces;	☐	☐	
	Cracks;	☐	☐	
	Stretching or bending of door stud or handhole door;	☐	☐	
	Leakage and steam cuts;	☐	☐	
	Proper gasket material.	☐	☐	
#16	**FUSIBLE PLUGS**			
	Corrosion;	☐	☐	
	Scale build up in the waterside;	☐	☐	
	Damage;	☐	☐	
	Leakage;	☐	☐	
	Height above waterside of the crown sheet;	☐	☐	
	Proper marking.	☐	☐	

	DESCRIPTION	ACC	REJ	REMARKS
#17	**WATER GLASS, WATER COLUMN AND GAGE COCKS**			
	Mud and scale blockage;	☐	☐	
	Condition of the glass;	☐	☐	
	Correct installation of the test(try cocks) and drain valves;	☐	☐	
	Correct size of connections to the boiler;	☐	☐	
	Is there a light? Is it working?	☐	☐	
	Is there a safety shield for glass?	☐	☐	
	General condition of piping. No sagging;	☐	☐	
	Has the level in the gage been verified? The bottom of the gage glass and lowest test valve shall be above the highest point of the crown sheet.	☐	☐	
#18	**STEAM PRESSURE GAGE**			
	Range of gage appropriate;	☐	☐	
	Adequately supported;	☐	☐	
	Siphon installed properly;	☐	☐	
	Proper lighting for viewing;	☐	☐	
	Calibration;	☐	☐	
#19	**SAFETY VALVE**			
	Is the safety ASME/NB certified?	☐	☐	
	Has the safety valve been repaired?	☐	☐	
	Is the safety valve properly supported?	☐	☐	

	DESCRIPTION	ACC	REJ	REMARKS
#20	**PIPING AND VALVES**			
	Piping and valves shall be suitable for the service pressure and temperature.	☐	☐	
	Piping and valves hall be in good repair.	☐	☐	
	The operation of valves shall be demonstrated.	☐	☐	