GUIDE FOR CERTIFICATION AND INSPECTION OF WHEEL SHOPS

Routine ☒ **Special** ☐ **Shop Certification** ☐ **Follow up Inspection** ☐

M-1003 Approved ☒ **ISO Approved** ☐

SR = See Report Attachments Y/N N/A NI = Not Inspected

#	MOUNTED WHEELS	Maj	Mod	Min
1	Equipment and Practices (Mounted Sets Checked for Bent Condition, 0.001 for each 1" separation between roller and dial indicator, or between two dial indicators, if checked on axle centers. (Minimum of 5.5" apart) Checked for Tread Defects, Axle body nicks & gouges removed (*MAXIMUM 25 EA**.)**, 1/8" depth limit. (Repairs made using a 2-in. radius or larger) MPI repaired areas and journal fillets by wet method. All axles with surface defects 1/8 in. deep or deeper must be scrapped or repaired using the full-body machining technique according to paragraph **Rule 1.1.2.1 or 1.1.12.3.**			
2	Spacing & Mounted Pairs (Back-to-Back - 52-15/16" to 53-3/16", & Tape Sizes-Same Size, etc.) within 1 tape for turns sets, the same tape size for new mounts **Rules 1.4.5 and 1.4.6**			
3	* IF ROLLER BEARINGS NOT INSTALLED AND WHEELS STORED, HAS RUST PRVENTATIVE BEEN APPLIED **Rule 1.7.4**			
4	*COMPLETED WHEEL SETS POSITIONED PROPERLY AND NO METAL TO METAL CONTACT DURING HANDLING**. Rules 1.7.5 - 1.7.6.2**			
5	Total number of Mounted Wheel Sets Inspected: _____			
#	**WHEEL LATHES**	**Maj**	**Mod**	**Min**
6	Machine Tolerances (Plane 0.045" & Radial 0.030", Flanges thickness reading on wheelset must not vary more than 2/16" from one flange to the other. **Rule 1.5.4**			
7	Equipment and Practices (Within One Tape Size, Witness Grooves –3/64" Max., etc.) NARROW /WIDE FLANGE BACK TO BACK CORRECT**? Rules 1.5.3 and 2.4.3**			
8	Flange Contours (AAR 1-B Profile Verified with 1/32" Gage, Excessive distance between feed marks – 1/8" Limit, etc.) **Rule 1.5.4**			
9	Tape Sizes (Tape Sizes Verified With Tape Gage, One tape difference max, etc.) **Rule 1.5.4**			
10	Are refinished treads being UT per Ultrasonic section of this form? **Rule 2.10**			
11	Total number of Wheel Lathes: _____ Total number of facility machined wheelsets: _____			

#	ULTRASONIC INSPECTION PROCEDURES & EQUIPMENT	Maj	Mod	Min
12	Equipment and Practices (5 MHz Transducer, Automatic Flaw Alarm, Detect flaws Between ½" & 2", Suitable Couplant, After final machining, Reference Standard simulating defects, Using DAC, Written Approved Procedure by Level III, etc.) TYPE MASTER USED (Defective Wheel, Wheel Portion, etc.) **Rules 1.5.7 and 2.10**			
13	Recalibration (Damage to system, change in transducers, cables etc., Loss of power, every 8 hours, etc.) **Rule 2.10.4.1**			
14	Operators SNT-TC-1A Certified (Equipment Set-Up requires Level II SNT-TC-1A Qualified, Level III available, Proof of Certification, etc.) **Rules 2.10.8.1 - 2.10.8.3**			
15	Ultrasonic Inspection (Complete Tread Inspection, Equipment Calibration Records Maintained, Test Standard for Calibration, Written Procedure, Nominal 5MHz Transducer, "The equipment must produce all required indications with the same settings as normal testing." **Rule 2.10.1**			
16	UT Personnel Requirements (Level II Machine Set-Up, Level III Advisor, All UT Personnel ASNT Qualified, etc.) If phase array is used are rejects retested by Phase Array Level 2? (per SNT-TC-1A) Is additional training for phased array in place? **Ref. the SNT-TC-1A**			
17	Total number of inspection equipment: _____ Total number of Wheel sets Checked: _____			
#	**AXLE LATHES**	**Maj**	**Mod**	**Min**
18	Dust Guards – V-Notches - **Rule 1.1.12.4**, Runout compared to wheel seat .006" - **Fig. 4.3**, Fitted and non-fitted identified correctly - **Rule 1.2.9**			
19	Equipment and Practices (Center Holes Cleaned & at 60 Degrees, Rust Removed, Fillets Cleaned or Machined (No pitting, fretting, rust, etc.), Check for Bent Condition – on centers two dial indicators are required no closer than 5.5" together. (0.001 allowed for each inch separation of dial indicators) **Rule 1.2.2.** Nicks & Gouges less than 1/8"removed from axle body (2" radius & 90 Ra ground or 125 Ra machined), Class "X" Standard used. **Rule 1.1.12.1**			
20	Wheel Seats (Taper, Out-of-Round, Proper Chamfer, etc.) Measurements shall be taken a minimum of 1 in. from the wheel seat outboard edge, at the center, and 1 in. from the wheel seat inboard edge. The variation for any two of these measurements must not exceed 0.002 in. (No reverse taper). Proper chamfer is 1/32 in. less than the wheel seat diameter and extending a maximum of 1/2 in. Snap gage ring gage must be Z grade or better **Rules 1.1.7 and 1.1.8**			

#	AXLE LATHES (Continued)	Maj	Mod	Min
21	Journals (Seal Wear Ring Grooves Acceptable – 0.002" average or 0.004" maximum at one location , Undersize or Oversize Journals, Check Journal Length,, Journal Micro-finish – 63 micro inch limit, Checked for Up-Set ends-0.003" Max., Fillet Gage Used, etc., No depression exceeding 1/16" depth in journal, etc.) **Rules 1.2.4 and 1.2.8**			
22	Fillet Repairs-If Applicable (Proper Repairs, Checked Journal Length & U-dimensions, etc.) **Rule 1.2.3** Check for undercuts **Rule 1.2.10.1**			
23	Rough Turning (Sufficient Stock Remaining for Proper Finish Machining, Out-of-Round, Taper, Micro-finish on Axle Body, Correct "O" dimension, etc.) **Rule 1.1.2.1 and Fig. 4.1**			
24	Are new & converted axles received from subcontractors sampled? **Rule 1.1.2.2**			
25	Are all secondhand axles check by radial UT test per G-II 1.1.15? (setup for UT is set to 80% full screen height backface reflection at thickest part of the body and at wheel seat. Two radial sweeps must be performed along the axle length offset by about 90° **Rule 1.1.15** Record largest loss of backface reflection in inches from the Serial Number end **Rule1.1.15.5**			
26	Total number of Axle Lathes: _____ Total number of newly machined axles: _____			
#	**AXLE GRINDERS (New Axle Finishing or Downsizing)**	**Maj**	**Mod**	**Min**
27	Machine Tolerances (Taper, Out-of-Round, U-dimensions, Fillet radius, etc.) Rule 1.1.8 and Fig. 4.3			
28	Equipment and Practices (Surface Micro-finish – 63 micro inch limit, Correct "U", "O" & "M" dimension, etc.) **Rule 1.2.4**			
29	Journals (Journal Length, Undersize & Oversize Journals, Dust Guard Size, "U" dimension, etc.) **Rule 1.2.4**			
30	Total number of Axle Grinders: _____ Total number of newly machined journals: _____			
#	**DOWNSIZE DRILL & TAPPING (New Axle or Downsizing)**	**Maj**	**Mod**	**Min**
31	Machine Tolerances (Holes in Proper Location, 120 Degrees Apart, etc.) **Fig. 5.12**			
32	Equipment and Practices (Taps Sharp, Holes cleaned out & checked, etc.) (Go & No-Go Gage, Thread size, depth, etc.) **Rule 1.2.5**			

#	DOWNSIZE DRILL & TAPPING (New Axle or Downsizing) (Continued)	Maj	Mod	Min
33	Downsizing Axles (Axle Markings Restored, Old Bolt Holes Properly Plugged, Bolt Holes Properly Located & Checked with Bolt Hole Location Gage, Shop Finishing Marks Legible & include "X" for downsizing, etc. **Rule 2.1.2** Converted axles must be marked in accordance with **Fig. 4.8, Note 10.**			
34	Total number of Drill & Tap Equipment: _____ Total number of machined axles: _____			
#	**MAGNETIC PARTICLE INSPECTION EQUIPMENT**	**Maj**	**Mod**	**Min**
35	Equipment and Practices (**CENTERFUGE TUBE CERT AVAILABLE** Daily Delectability Test Documented – This will verify that light, solution & amperes are acceptable, Axles De-Magnetized - 8 Gauss Max, etc.) **Rule 1.1.9**			
36	Test Axle / Test Piece (Test Piece used Properly at Beginning of Each Shift to Verify Effectiveness of Operation, Test Piece acceptable, etc.) **Rule 1.1.9**			
37	Operators ASNT Certified (Level I ASNT Qualified, Proof of Certification, etc.) **Rule 1.2.3** Current E-1444-16e1 (07/2016) (SNT-TC-1A 2016)			
38	Total number of magnaflux equipment: _____ Total number of Axles Checked: _____ **HAND HELD TYPE** _____			
#	**BORING MILLS**	**Maj**	**Mod**	**Min**
39	Machine Tolerances (Verify tolerances with Test Wheel – Plane 0.015" & Radial 0.008" Rule 1.3.2 or Alternate Method – Plane 0.060" & Radial 0.030", etc.) or see **Rule 2.2.2** alternate method. IF SINGLE POINT FINISHING TOOLS IS USED: SPIRAL FINISH – MIN 30 GROOVES PER LENGTH OF BORE, MAX .008 DEEP? **Rule 1.3.5**			
40	Equipment and Practices (Adhering to approximately 0.001" Interference Fit Per Inch of Wheel Seat Diameter Allowance, Matching Tape Sizes, Matching Wheel Manufacturer & Wheel Type, etc.) **Rules 1.3.4, 1.4.6 and 1.4.7**			
41	Bore Specifications: three points in the wheel's length and on two different diameters at each of these points to ensure rotundity and consistent accuracy in bore diameter **Rule 1.3.3**			
42	Total number of Boring Mills: _____ Total number of newly bored wheels: _____ **AUTOMATIC TYPE** ☐ **MANUAL TYPE** ☐			

#	WHEEL PRESS EQUIPMENT	Maj	Mod	Min
43	Equipment and Practices (Wheels mounted centrally within 3/32", Is temperature being checked and within spec.? etc.) not to exceed more than 15° difference from center of the bore to wheel seat In addition, the temperature difference between any two locations on the two components must not exceed 25 °F before boring. **Rule 1.3.4 and 1.4.4**			
44	Mounting Press (Press Alignment, Proper Back-to-Back Measurements, Journal Protectors must protect all of the dust guard and journal (53" to 53-3/32" for Newly Mounted Wheels) **Rule 1.4.2 , 1.4.5 and Fig. 4.31-4.32**			
45	Dismounting Press (Press Alignment-Not Producing Up-Set Ends, Journal Protectors, * GALLING OF WHEEL SEAT OR JOURNAL etc.) **Rule 1.4.2**			
46	Pressure Gage & Recorder (Gage & Recorder within 2%, Chart graduation no larger than 5 ton increments, Minimum resolution of 100 tons per inch, Gages Checked Every Six Months, Test Date & In-Service Date Attached, etc.) **Rule 1.4.1**			
47	Mounting Diagrams (Complete & Acceptable Diagrams, Max & Min Pressures Attained, Records retained for **10** years, Wheel Mounting Template, etc.) **Rule 1.4.1.1**			
48	Misfit Log (Misfit Date, Demounting Date, Serial Numbers, Disposition, Records retained for **10** years, etc.) **Rule 1.4.1.4**			
49	Wheel Mounting Lubricant (Approved Compound-Appendix A, Not Contaminated, properly applied, etc.) PROPERLY COVERED **Rule 1.4.3** NOTE: Higher minimum tonnage is required when using WM-**10 Table 4.2**			
50	Wheel Hub Stamping (Proper Location & Size (5/32" to 5/16") Legible, Proper Shop Code, Proper alignment, etc.) no closer than 1/8" from edge of hub or wheel bore **Rule 1.4.11** A 1/8-in. radius or a 1/8-in. to 3/8-in. chamfer must be provided at the entry or back of the hub of all wheels after the finishing cut (see Fig. 4.16). **Rule 1.3.5**			
51	ARE BARCODES APPLIED TO OUTSIDE PLATE (MIN 1 PER SET) AND WHEELSET REGISTERED WITH RAILINC **Rule 1.1.3** ARE PURCHASED CORES MARKED WITH YELLOW TAG**.** **Per F.M. Appendix A (Wheel Set Purchased Core)**			
52	Total number of Wheel Presses: _____ Total number of newly mounted wheel sets: _____ *ENSURE MOUNTED WHEELS ARE NOT PROHIBITED **Rule 1.4.7.4 through 1.4.9**			

#	ROLLER BEARING MOUNTING	Maj	Mod	Min
53	Equipment and Practices (Journal Clean, Proper Rust Preventative & Journal Lubrication, Torqued Properly, Tabs Bent Properly, Torque Wrenches Accurate-4% Max, etc.) * TYPE TORQUING EQUIPMENT USED, TORQUE MULTIPLIER, AIR TORQUE GUN, TORQUE WRENCH Breakaway torques must be verified each shift – **Rule 1.8.4.2.1** Torque set points for automated torquing devices to be posted in work area – **Rule 1.8.4.5 and Fig. 4.71**. Alternate torquing devices must have WABL approval letter – **Rule 1.8.4** Prior to measuring the mounted lateral, the bearing must be manually rotated one full revolution. 0.001 – 0.015" allowed, (0.00 is allowed if bearing turns freely by hand) **Rule 1.8.5.1**			
54	Pressure Gage (Functioning Relief Valve, Gages Checked Every Six Months, Test Date & In-Service Date Attached, etc.) **Rule 1.8.2.11**			
55	AAR Charts Posted in Work Area (Seating Pressures & Torque Values, etc.) **Rule 1.8.2.11**			
56	Total number of Roller Bearings Mounted: _____			
57	Total number of Roller Bearing Removed for Inspection: _____			
#	**EQUIPMENT INSPECTION REPORTS**	**Maj**	**Mod**	**Min**
58	Accurate and Up to Date (MINIMUM Weekly, Retained for two years, etc.) **Rule 1.7.1 and Fig 4.76**			
59	Total number of months reviewed: _____			
#	**GAGES, SERVICE & LIMIT WEAR**	**Maj**	**Mod**	**Min**
60	Required Gages (Required Gages or Suitable Alternate, Proper usage observed in good condition etc.) *Gages listed throughout G-II.*			
61	Gages in Good Working Condition (Gages not damaged or broken, Gages Calibrated, etc.)			
#	**TOTAL WHEELSETS INSPECTED**	**Maj**	**Mod**	**Min**
62	Total Number of New and Secondhand Wheelsets Inspected: _____ *** PREVIOUS CHALK MARKINGS REMOVED Rule 1.7.11**			
#	**AAR REQUIRED FORMS**	**Maj**	**Mod**	**Min**
63	Forms MD11, MD12 & MD115(*** 7.1 FORM)** (Completed as Required & Submitted to **Rule 3.1 Wheel, Axle, and Bearing Failure Reports**			
#	**WHEEL & AXLE STORAGE**	**Maj**	**Mod**	**Min**
64	Are procedures established to prevent excessive rust and wheels not exposed to standing water? Wheels must not be stored horizontally and uncovered outside or a period of time exceeding 90 days. Wheels and axles should be inspected prior to use. **Rule 3.2.2**			

#	STORAGE OF WHEELSETS & REMOVED BEARINGS	Maj	Mod	Min
65	Miscellaneous Items ARE WHEEL SETS HELD FOR BEARING TEARDOWN PROPERLY HANDLED? **Rule 3.1.3** When bearings have been removed, they must be covered completely or stored indoors prior to internal teardown or shipment for internal teardown. Loose bearings must not be stored for longer than 60 days prior to shipment for internal teardown. **Rule 2.6.4**			

TOTAL EXCEPTIONS	_____	_____	_____