

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

**APPENDIX B
CERTIFICATION OF TANK CAR FACILITIES**

CONTENTS

Paragraph	Subject	Page
1.0	Introduction.....	C-III[M-1002]146
1.1	Scope.....	C-III[M-1002]146
1.2	Objective	C-III[M-1002]146
1.3	Definitions and Context Meanings	C-III[M-1002]146
2.0	M-1003 Quality Assurance Program Requirement	C-III[M-1002]146
3.0	M-1002 Technical Approval Requirements.....	C-III[M-1002]147
3.1	Certification Elements	C-III[M-1002]147
3.2	Publications	C-III[M-1002]151
3.3	Personnel Qualifications.....	C-III[M-1002]151
3.4	Subcontracting	C-III[M-1002]152
3.5	Mobile Operations	C-III[M-1002]152
3.6	Demonstration Capability	C-III[M-1002]153
4.0	Administrative Provisions	C-III[M-1002]170
4.1	AAR M-1003 Application System	C-III[M-1002]170
4.2	Establishing and Managing a User Account	C-III[M-1002]170
4.3	Application Process	C-III[M-1002]171
4.4	On-Site Audits.....	C-III[M-1002]171
4.5	Adverse Audit Finding Reports and Facility Responses.....	C-III[M-1002]171
4.6	Certification.....	C-III[M-1002]172
4.7	Maintaining Certification	C-III[M-1002]172
4.8	Fees.....	C-III[M-1002]172
4.9	Change Notifications.....	C-III[M-1002]173
4.10	Request for Reconsideration.....	C-III[M-1002]174
4.11	Denial or Withdrawal of Certification	C-III[M-1002]174
4.12	Appeals	C-III[M-1002]174
4.13	Status of Existing Facility Certification Pending Review/Appeal	C-III[M-1002]174
4.14	Certification Live Registry.....	C-III[M-1002]174
4.15	Exhibits.....	C-III[M-1002]174
4.16	AAR Staff Contact for This Appendix	C-III[M-1002]174
Exhibit B-1	Subcontractor Evaluation Sheet	C-III[M-1002]175
Exhibit B-3A	Certification Additional Information Form.....	C-III[M-1002]176

IMPLEMENTED 04/2020

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

**APPENDIX B
CERTIFICATION OF TANK CAR FACILITIES**

1.0 INTRODUCTION

For the safe, efficient, and uniform interchange of rail equipment in North America, *tank car facilities* must comply with all applicable *AAR* specifications, standards, recommended practices, and interchange rules.

Additionally, the *AAR* Tank Car Committee has been delegated by the DOT under Title 49 CFR Subchapter C, Part 179, Subpart A, Section §179.7 to approve the quality assurance program of each *tank car facility* and ensure that the requirements of §179.7 are met.

1.1 Scope

This appendix establishes, for each *tank car facility*, the requirement to obtain and maintain *certification* to the *AAR* M-1003 Quality Assurance Program, the *AAR* M-1002 technical *approval* requirements for each *activity*, and the administrative provisions pertaining to *certification*.

For *activities* outside the scope of this appendix, facilities should refer to *AAR MSRP* Section J, Specification M-1003, Appendix A, to determine if the *activity* requires additional *certification*.

Per paragraph 3.1.6 and paragraph 3.1.6.11 *tank car facility certification* is not required for *service equipment category* C or F for activity codes C4a, C4m and C5; however, a *tank car facility* may obtain and maintain certification to the *AAR* M-1003 Quality Assurance Program requirements and the *AAR* M-1002 technical *approval* requirements for *service equipment category* C or F for activity codes C4a, C4m and C5 on a voluntary basis.

1.2 Objective

The objective of this appendix is to specify the technical requirements that must be met for *AAR certification* of a *tank car facility*. This is accomplished through evaluation by an *AAR audit* agency of the effective implementation and integration of the *activity* within the *tank car facility* quality assurance program.

1.3 Definitions and Context Meanings

When terms or abbreviations are used in this appendix and are printed in italics, they shall have the meanings stated in Chapter 1.

Unless otherwise specified, chapters and appendices referenced herein are those of Specification M-1002.

2.0 M-1003 QUALITY ASSURANCE PROGRAM REQUIREMENT

Each *tank car facility* must establish and effectively implement a quality assurance program per *AAR MSRP* Section J, Specification M-1003.

IMPLEMENTED 04/2020

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

3.0 M-1002 TECHNICAL APPROVAL REQUIREMENTS

3.1 Certification Elements

Table B.1 lists the elements that govern the *certification* of a *tank car facility* by the applicable *activity code(s)*, *material group(s)*, *repair level(s)*, and *service equipment* category. Populated cells indicate required elements that must be obtained and maintained in order to be certified to the *activity* listed; blank cells indicate not applicable.

Table B.1 Certification elements for tank car facilities (page 1 of 2)

Activity code	Activity	Technical Approval Dependencies	Material Group Required	Repair Level Required	Service Equipment Category Required
A19	Construction of Tank Cars by Manufacturing	S-2034 ^a , B81, C6i	See paragraph 3.1.2		
<u>A19c</u>	<u>Construction of Cryogenic Tank Cars by Manufacturing</u>	<u>S-2034^a, B81, C6i</u>	<u>Material Groups 1 and 3</u>		
B24	Maintenance and Modification of Tank Car Tanks	B81	See paragraph 3.1.2	RL1, or RL2, <u>or</u> RLC	
B78	Construction of Tank Cars by Assembly	S-2034 ^a , B81, C6i			
B81	Qualification of Tank Car Tanks	A19, B24, B78 and/or B82			
B82	Manufacture Tank Car Tanks	B81	See paragraph 3.1.2		
B85	Manufacture Tank Car Tank Components		See paragraph 3.1.2		
B87	Maintenance and Qualification of Fuel Tanks for Locomotive Fuel Tenders		See paragraph 3.1.2	<u>See paragraph 3.6.7</u>	
B89	Maintenance, Modification, and Qualification of Safety Systems				
B90	Maintenance, Alteration, and Qualification of Tank Car Stub Sills			RLS	
C4a	Assemble and Qualification of Tank Car Service Equipment				See paragraph 3.1.4
C4m	Manufacture and Qualification of Tank Car Service Equipment				See paragraph 3.1.4
C5	Maintenance and Qualification of Tank Car Service Equipment				See paragraph 3.1.4
C6i	Install Tank Car Service Equipment, Including Leakage Test	A19 and B78			
C6r	Remove and Replace Tank Car Service Equipment, Including Gaskets, Leakage Test, and Modifications				See paragraph 3.1.4
C7	Removal of Interior Linings and Interior Coatings in Tank Cars				
C8	Installation and Qualification of Interior Linings and Interior Coatings in Tank Cars				

IMPLEMENTED 04/2020

Formatted: Indent: Left: 0.04", Line spacing: Exactly 12 pt

Field Code Changed

Formatted: Underline, Highlight

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

C9	<i>Qualification of Interior Linings and Interior Coatings in Tank Cars</i>				
----	---	--	--	--	--

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

Table B.1 Certification elements for tank car facilities (page 2 of 2)

Activity code	Activity	Technical Approval Dependencies	Material Group Required	Repair Level Required	Service Equipment Category Required
C10	Maintenance and Qualification of Interior Linings and Interior Coatings in Tank Cars				
C12	Maintenance and Qualification of Locomotive Fuel Tender Service Equipment				See paragraph 3.1.4

Field Code Changed

^{a/} Per AAR MSRP Section J, Specification M-1003, Appendix A

3.1.1 Activity Codes

Table B.1 lists the *activities* that require technical *approval*. Each *activity code* is independent unless otherwise specified in Table B.1.

3.1.2 Material Groups

Table B.2 lists the *approved material groups* from Appendix M. For those *activities* specified in Table B.1, the *tank car facility* must be certified to one or more of the *material groups* listed in Table B.2. Each *material group* is independent, and a *tank car facility* can perform welding only under the *material group(s)* to which it is certified.

Table B.2 Material groups

Group	Reference	Material
Group 1	Appendix M, paragraph 3.1	Carbon steel plate
	Appendix M, paragraph 3.6	Manganese-molybdenum steel plate
	Appendix M, paragraph 3.7	Manganese-silicon steel plate
Group 2	Appendix M, paragraph 3.2	Aluminum alloy plate
Group 3	Appendix M, paragraph 3.3	High alloy steel plate (stainless steel)
Group 4	Appendix M, paragraph 3.4	Nickel plate
Group 5	Open	
Group 6	Open	
Group 7	Appendix M, paragraph 3.5	Nickel alloy steel plate

3.1.3 Repair Level

For those *activities* specified in Table B.1, the *tank car facility* must be certified to the appropriate *repair level* listed in Table B.3. Each *repair level* is independent except that RL2 encompasses RL1 capability, and that RLC encompasses RL2 capability. A *tank car facility* can perform weld *repairs* only under the *repair level(s)* to which it is certified.

Table B.3 Repair levels

Repair Level	Description
RL1	This <i>repair level</i> allows a <i>tank car facility</i> to perform all weld purpose codes referenced in Appendix R, Table R.2, with the exception of welding purpose code H and I.
RL2	This <i>repair level</i> allows a <i>tank car facility</i> to perform all welding purpose codes referenced in Appendix R, Table R.2.
<u>RLC</u>	<u>This <i>repair level</i> allows a <i>tank car facility</i> to perform all welding purpose codes referenced in Appendix R, Table R.2 and includes cryogenic tank car tanks.</u>
RLJ	This <i>repair level</i> allows a <i>tank car facility</i> to perform weld <i>repairs</i> to <i>tank car</i> jackets.
RLS	This <i>repair level</i> allows a <i>tank car facility</i> to perform weld <i>repairs</i> to the <i>tank car stub sills</i> , sill pads, and sill-to-pad attachment welds.

IMPLEMENTED 04/2020

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

3.1.4 Service Equipment Category

For those activities specified in Table B.1, the *tank car facility* must be certified to one or more *service equipment* categories listed in Table B.4. Each *service equipment* category is independent, and a *tank car facility* can perform activities only under the *service equipment* category to which it is certified.

Table B.4 Service equipment category

Category	Description
C	Closures
F	Fittings
H	(reserved)
I	Instruments
S	Safety Relief Devices
V	Valves

3.1.5 Certification Conditions

3.1.5.1 *Tank car facilities* certified to A19, B24, and/or B82 activity codes may subcontract the manufacturing of *tank car tank components* to an approved design, provided that the *tank car facility* complies with paragraph 3.4. In those circumstances, the manufacturer of the *tank car tank component* is not required to separately obtain *AAR certification*. Otherwise, B85 is required for the *tank car facility* that manufactures *tank car tank components*.

3.1.5.2 *Tank car facilities* certified to A19 and/or B78 that are not located in North America must have either a designated *AAR agent* or an *AAR repair facility/repair track* in North America where final acceptance to safety appliances, air brake systems, and *AAR interchange requirements* can be confirmed.

3.1.5.3 *Tank car facility certification* to C7, C8, and/or C10 is required for *interior linings* and *interior coatings* in *tank cars* that transport materials for product purity, excluding qualification per paragraph 3.1.6.13.

3.1.5.4 *Tank car facility certification* to C7, C8, C9 and/or C10 is required for *interior linings* and *interior coatings* in *tank cars* that transport materials that are corrosive or reactive to the *tank car tank* as defined in 49 CFR 180.503.

3.1.5.5 Only *tank car facilities* certified to A19, B24, B78, B81, B82, B90, C6i, C6r, C7, C8, C9, or C10 can replace and/or repair the *qualification markings* per 49 CFR 180.515, the *tank car stenciled specification*, and *variable identification plate* per 49 CFR 179.24 on a *tank car*.

3.1.5.6 Activity code B82 applies to the *manufacturing of tank car tanks* moved to and from the facility without trucks (running gear), and, if applicable, includes the underframe and the support structure.

3.1.5.7 *Tank car facility certification* to C8 permits the installer of *tank car interior linings* and *interior coatings* to perform *repairs* as part of the *installation process*; however once the *tank car lining or coating* is qualified, the *tank car facility* must be certified to *activity code C9* in order to perform *qualification* and/or *activity code C10* in order to perform *maintenance* and *qualification* to the *tank car interior lining or interior coating*.

3.1.5.8 *Tank car facility certification* to A19 does not require *activity code B24* if *repairs* are performed as part of the *manufacturing process*; however once a *tank car* is certified by the A19 facility (certified *AAR Form 4-2*) the *tank car facility* must be certified to *activity code B24* in order to perform *maintenance* and *qualification* to that *tank car tank*.

IMPLEMENTED 04/2020

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

3.1.5.9 *Activity codes C4m and C5 include welding of tank car service equipment, and therefore certification to those activity codes requires the tank car facility to comply with paragraph 3.3.1.2.*

3.1.5.10 *Activity code C4m includes the application of linings or coatings of tank car service equipment, if performed.*

3.1.5.11 *Activity code C5 includes the removal/maintenance of linings or coatings of tank car service equipment, if performed.*

3.1.5.12 *Removal/replacement of eyebolt(s) does not qualify as a minimum demonstration for activity code C6r.*

3.1.5.13 *Tank car facility certification to B78 does not authorize welding to the tank car tank; however, it does authorize welding to the reinforcing pads, jacket flashing/standoffs, and any other tank car tank attachments, provided the tank car facility complies with paragraph 3.3.1.2.*

3.1.5.14 *Activity code C4a covers those facilities that produce new tank car service equipment by way of an assembling process, without any manufacturing processes. Those facilities that have a combination of manufacturing and assembling processes must be certified to C4a and C4m. For example, and by way of clarification, C4a is not intended to cover reconditioning tank car service equipment, which is covered by C5.*

3.1.5.15 *Activity code C4m covers those facilities that produce new tank car service equipment by manufacturing.*

3.1.5.16 *The leakage test in activity codes C6i and C6r refers to the qualification of the connection of service equipment to the tank car.*

3.1.5.17 *Repair level RLJ is required only if a tank car facility performs welded repairs to tank car jackets. RLJ can be added to any activity, excluding A19 and B78. [RLJ does not apply to outer jackets of cryogenic tanks, or fuel tanks for locomotive tenders manufactured in accordance with M-1004, Chapter 2.](#)*

3.1.5.18 *Repair level RLS excludes pad-to-tank welds. Pad-to-tank welds require B24 certification.*

3.1.5.19 *Tank car facilities certified to C9 cannot obtain certification to activity code C8 and/or C10 and vice versa.*

3.1.5.20 *Activity codes C7, C8, C9, and/or C10 do not include C6r for the removal and replacement of tank car service equipment, including gaskets.*

3.1.5.21 *[Activity code A19 applies to the construction of new pressure and non-pressure tank cars by manufacturing.](#)*

3.1.5.22 *[Activity code A19c applies to the construction of new cryogenic tank cars by manufacturing. Tank car facilities certified to activity code A19c will also receive certification to activity code A19 without having to perform separately the demonstrations of paragraph 3.6.1, but not vice versa.](#)*

3.1.5.23 *[Repair level RLC is only required for Activity code B24 if the facility seeks to maintain or modify cryogenic tanks; or Activity code B87 if a facility seeks to maintain fuel tanks for locomotive tenders manufactured in accordance with M-1004, Chapter 2.](#)*

3.1.6 Exceptions

Tank car facility certification is not required for the following:

3.1.6.1 *Examinations prior to shipping per 49 CFR 173.31(d).*

3.1.6.2 *Conductivity or resistivity examinations of tank car interior linings and interior coatings prior to shipping.*

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

3.1.6.3 Replacement/repair of any markings or stencils on *tank cars* other than those specified in paragraph 3.1.5.5.

3.1.6.4 Double shelf coupler replacement (i.e., coupler vertical restraint system) in accordance with the *Field Manual of the AAR Interchange Rules*.

3.1.6.5 Replacement of gaskets with the correct size as specified by the *equipment owner* and compatible with the lading on the following *service equipment*: hinged and bolted manway cover, fill port cover, bottom outlet cap, secondary closure, secondary fitting, secondary valve, and quick disconnect dust cap.

3.1.6.6 Replacement of O-rings with the correct size as specified by the *equipment owner* on gauging device caps and thermometer well housing tubes.

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

3.1.6.7 Replacement of the rupture disc, including the rupture disc gasket with the correct dimensional size and pressure rating as specified by the *equipment owner* and compatible with the lading.

3.1.6.8 *Manufacture* of O-rings, gaskets, eye-bolts, washers, and threaded fasteners.

3.1.6.9 The *repair of attachments* to jacket pads (see *Field Manual of the AAR Interchange Rules*, Rule 81).

3.1.6.10 The *repair* of draft lugs, striker, draft key slot, and coupler carrier (see *Field Manual of the AAR Interchange Rules*, Rule 81).

3.1.6.11 Service equipment category C or F for activity codes C4a, C4m and C5.

3.1.6.12 Replacement of manway eyebolts, bottom outlet valve caps, magnetic gauging device rods, chains, *secondary closures*, *secondary fittings*, and *secondary valves* as specified by the original or alternative approved design.

3.1.6.13 The *qualification* of product purity *interior linings* or *internal coatings*.

3.2 Publications

3.2.1 Each *tank car facility* must have lawful access to the latest versions of the *AAR* publications below. Information on where to obtain *AAR* publications can be found in the “Ordering Information” section of this specification.

3.2.1.1 *MSRP*, Section C, Part III, Specification M-1002, “Specifications for Tank Cars”

3.2.1.2 *MSRP*, Section J, Specification M-1003, “Specifications for Quality Assurance”

3.2.1.3 *Field Manual of the AAR Interchange Rules*

3.2.1.4 *Office Manual of the AAR Interchange Rules*

3.2.1.5 Safety and Operations circular letters

3.2.2 Each *tank car facility* certified to A19 or B78 must have lawful access to the latest version of the *AAR* publications below:

3.2.2.1 *MSRP*, Section C, Standard S-2034, “Car Builder Certification”

3.2.2.2 *MSRP*, Section C, Part II, Specification M-1001, “Design, Fabrication, and Construction of Freight Cars”

3.2.3 Each *tank car facility* must have access to the applicable federal regulations.

3.3 Personnel Qualifications

The following are personnel *qualification* requirements for the special processes associated with technical *approval*.

3.3.1 Welding

3.3.1.1 Personnel engaged in welding on *tank car tanks* must be performance-qualified in accordance with Appendix W, paragraph 11.0.

3.3.1.2 Personnel engaged in all other welding shall be performance-qualified in accordance with the American Welding Society (AWS) Railroad Welding Specification D15.1, latest revision. This includes, but is not limited to, the welding on *tank car jackets*, *stub sills*, and *service equipment*.

3.3.2 Nondestructive Testing (NDT)

Personnel engaged in *NDT* processes must be qualified and certified in accordance with Appendix T, paragraph 1.5.

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

3.3.3 Interior Lining and Interior Coating

Personnel engaged in *interior lining* and/or *interior coating activities* must be qualified in accordance with Appendix L, paragraph 3.0.

3.3.4 Local Postweld Heat Treatment

Personnel engaged in local postweld heat treatment processes must be qualified in accordance with Appendix R, paragraph 19.3.2.5.

3.4 Subcontracting

Subject to the limitations in paragraph 3.4.1, a *tank car facility* can *subcontract* provided the *tank car facility* assumes responsibility for all work performed by the subcontractor. A *tank car facility* cannot *subcontract* an *activity*.

3.4.1 A *tank car facility* can *subcontract* only those products, services, and/or equipment listed below:

- *Interior coating* inspector per Appendix L
- *Interior lining* inspector per Appendix L
- Welding inspector per Appendix W
- *NDT* personnel (level I, II, and III) per Appendix T
- *LPWHT* per Appendix R
- Hardness testing per Appendix W
- Measuring and test equipment calibration
- Internal QA M-1003 *audits*
- Engineering services
- Metallurgical or physical lab services
- Any component(s) for *service equipment* categories F, V, S, and I (applicable only to C4a, C4m, C5, and C12)
- Manufacture of tank car tank components per paragraph 3.1.5.1 (applicable only to A19, B24, and B82)

3.4.2 For each subcontracted product, service, and/or equipment, the *tank car facility* must comply with Specification M-1003, Chapter 2, paragraph 2.9 by the following:

3.4.2.1 Evaluating and selecting each subcontractor

3.4.2.2 Documenting the verification method and the results of each subcontractor assessment, including objective evidence

3.4.2.3 Completing an Exhibit B-1 form to attest that each subcontractor meets the requirements of this specification

3.4.2.4 Ensuring on a continuing basis, using the documented verification method(s), that each subcontractor performs work in accordance with this specification

3.4.3 Exhibit B-1 forms are valid for one year from the attest date.

3.4.4 The process in paragraph 3.4.2 must be repeated under the following circumstances:

3.4.4.1 Prior to the expiration date of the current Exhibit B-1 form; or

3.4.4.2 When changes with the subcontractor invalidate the current Exhibit B-1 form.

3.5 Mobile Operations

3.5.1 A *tank car facility* may conduct mobile operations, provided that the following circumstances exist:

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

- 3.5.1.1 The *tank car facility* maintains record(s) for each *mobile unit*; and
 - 3.5.1.2 Each *mobile unit* employee is identified and traceable and functions in accordance with the quality assurance program of that *tank car facility*; and
 - 3.5.1.3 Each *mobile unit* is based at and operated from that *tank car facility*; and
 - 3.5.1.4 Each *mobile unit* must remain under the direction and control of that *tank car facility*; and
 - 3.5.1.5 Each *mobile unit* operates only to *activity code(s)* for which that *tank car facility* is certified to perform.
- 3.5.2 Notwithstanding anything in paragraph 3.5.1, *mobile units* are not permitted to perform *activity codes* A19, B78, and/or B82.
- 3.5.3 Each *mobile unit* must be physically present and available for evaluation at every AAR on-site *audit*.

3.6 Demonstration Capability

To obtain and maintain technical *approval* to this specification, each *tank car facility* must be capable of physically demonstrating the following items:

- The effective implementation of the quality assurance program to support the execution of the production, inspection, and test plans for each activity.
- The minimum capabilities for each *activity* outlined in this section.

3.6.1 A19—Construction of Tank Cars by Manufacturing

When requested by an auditor, an A19 facility must demonstrate the ability to *construct* a completed *tank car* to an AAR-approved design by *manufacturing*. The facility must demonstrate the following:

- 3.6.1.1 The use of the production, inspection, and test plan, including the acceptance criteria, that comply with AAR standards, AAR interchange rules, and federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.5)
- 3.6.1.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)
- 3.6.1.3 Possession of all applicable AAR publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)
- 3.6.1.4 For the intended demonstration, provision of the *approved AAR Form 4-2* and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)
- 3.6.1.5 Proper storage, selection, and traceability of an *approved tank car tank* plate from the applicable *material group(s)* (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)
- 3.6.1.6 The use of special processes controlled by qualified personnel and controlled equipment for the following:
 - Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
 - Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
 - Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
 - Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
 - Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
 - Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

IMPLEMENTED 04/2020

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

- 3.6.1.6.1 Rolling flat plate into two ring sections and joining the rings with a longitudinal and circumferential weld
- 3.6.1.6.2 Fit-up and welding of a tank head to the ring sections
- 3.6.1.6.3 Fit-up and welding of the *tank car tank* closing seam
- 3.6.1.6.4 Volumetric inspection (radiography or ultrasonic) of the tank longitudinal and circumferential welds
- 3.6.1.6.5 Layout, fit-up, and welding of the reinforcing pads to the *tank car tank*
- 3.6.1.6.6 Layout, fit-up, tank shell preparation, and welding of the *nozzles*, sumps, and/or outlet saddles to the *tank car tank*
- 3.6.1.6.7 If applicable, layout, fit-up, and welding of the exterior heater coils
- 3.6.1.6.8 Layout, fit-up, and welding of the body bolsters and the *stub sills* to the reinforcing pads
- 3.6.1.6.9 Unit postweld heat treatment
- 3.6.1.6.10 Hydrostatic testing of *tank car tank*
- 3.6.1.6.11 If applicable to the *approved* design, the application of insulation, jacket, head shields, and any other *safety system*
- 3.6.1.7 Final *inspection and test*, including *qualification* stenciling, tank identification plate, and all associated markings on the *tank car* (AAR M-1003 QA ELEMENT 2.12, 2.15)
- 3.6.1.8 Car file preparation, including all *inspection and test* records and signed AAR Form 4-2 (AAR M-1003 QA ELEMENT 2.17)

3.6.2 A19c—Construction of Tank Cars by Manufacturing

When requested by an auditor, an A19c facility must demonstrate the ability to construct a completed cryogenic tank car to an AAR-approved design by manufacturing. The facility must demonstrate the following:

- 3.6.2.1 The use of the production, inspection, and test plan, including the acceptance criteria, that comply with AAR standards, AAR interchange rules, and federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.5)
- 3.6.2.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)
- 3.6.2.3 Possession of all applicable AAR publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)
- 3.6.2.4 For the intended demonstration, provision of the approved AAR Form 4-2 and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)
- 3.6.2.5 Proper storage, selection, and traceability of an approved tank car tank plate from the material groups 1 and 3 (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)
- 3.6.2.6 The use of special processes controlled by qualified personnel and controlled equipment for the following:
 - Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
 - Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
 - Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
 - Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
 - Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
 - Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

- [3.6.2.6.1 Construction of the *inner tank* shall be from Material Group 3 and include paragraphs 3.6.1.6.1 through 3.6.1.6.6, and 3.6.1.6.10.](#)
- [3.6.2.6.1.1 If *cryogenic tank* manufacturing is not being conducted at time of audit, demonstration of paragraph 3.6.2.6.1 may be substituted on an *inner tank* of a *cryogenic storage vessel* provided that a\) the plate thickness of the *inner tank* is at least 3/16-inch or greater, b\) the inner diameter of the *inner tank* is 100 inches or greater, and c\) the storage vessel has been reviewed and approved for construction by the authorizing agency \(i.e. ASME\).](#)
- [3.6.2.6.2 Unless the *outer jacket* is obtained from another A19 or B82 facility, the construction of the *outer jacket* shall be from Material Group 1 and include paragraphs 3.6.1.6.1 through 3.6.1.6.6, 3.6.1.6.8 and 3.6.1.6.9.](#)
- [3.6.2.6.2.1 If *cryogenic tank* manufacturing is not being conducted at time of audit, demonstration of 3.6.2.6.2 may be substituted on an *outer jacket* of a *cryogenic storage vessel* provided that a\) the plate thickness of the *outer jacket* is at least 3/8-inch or greater, b\) the inner diameter of the *outer jacket* is 114 inches or greater, and c\) the storage vessel has been reviewed and approved for construction by the authorizing agency \(i.e. ASME\).](#)
- [3.6.2.6.3 Layout, fit-up, and welding of the annular space piping. Welding demonstration must include groove weld on 3" nominal pipe.](#)
- [3.6.2.6.4 Application of the insulation system and *support system* to the *inner tank*.](#)
- [3.6.2.6.5 Insertion of the *inner tank / support system* into both halves of the *outer jacket*.](#)
- [3.6.2.6.6 Fit-up and welding of the *outer jacket* closing seam, including volumetric inspection \(ultrasonic\).](#)
- [3.6.2.6.7 Drawing a vacuum in the annular space and a helium mass spectrometer leak test on the *cryogenic tank*.](#)
- [3.6.2.6.8 If applicable to the approved design, the application of insulation, jacket, head shields, and any other safety system](#)
- [3.6.2.7 Final inspection and test, including qualification stenciling, tank identification plate, and all associated markings on the *tank car* \(AAR M-1003 QA ELEMENT 2.12, 2.15\)](#)
- [3.6.2.8 Car file preparation, including all inspection and test records and signed AAR Form 4-2 \(AAR M-1003 QA ELEMENT 2.17\)](#)

3.6.3 B24—Maintenance and Modification of Tank Car Tanks

When requested by an auditor, a B24 facility must demonstrate the ability to maintain and modify a *tank car tank*. Demonstration of the following can be performed on either a *tank car tank* or a *tank car tank* test plate.

- 3.6.3.1** The use of the production, inspection, and test plan, including the acceptance criteria established by the *tank car owner*, that comply with AAR standards, AAR interchange rules, and federal regulations (AAR M-1003 QA Element 2.3, 2.5, 2.23)
- 3.6.3.2** Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)
- 3.6.3.3** Possession of all applicable AAR publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)
- 3.6.3.4** For the intended demonstration, provision of the *approved AAR Form 4-2* and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

3.6.3.5 Proper storage, selection, and traceability of an *approved tank car tank* plate from the applicable *material group(s)* (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)

3.6.3.6 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

3.6.2.6.1 RL1 or RL2 Demonstration

3.6.2.6.1.1 Demonstration of *repair level* RL1 capability requires, at a minimum, a welder qualified by the facility in accord with Appendix W using the facility's qualified welding procedure specifications (WPS) per Appendix W. If the demonstration is performed on a *tank car tank*, the qualified welder must perform a welded *repair* in accord with Appendix R. In lieu of a *tank car facility* demonstrating *repair level* RL1 capability on a *tank car*, a facility is permitted to use a test plate, provided that the test plate material is from the listed materials in the *material group(s)* identified in the application for *certification*. The test plate must be the contour of a *tank car tank* and be a minimum size of 4 ft in width and 4 ft in height. The qualified welder must perform a horizontal position 2F fillet weld that simulates a weld *attachment* using a material from a *material group* for which the facility seeks *certification*. The fillet weld size must be a minimum 5/16 in., and the length must be a minimum of 12 in. The facility is required to perform and document nondestructive testing using *NDT* methods MT or PT, and set-up of postweld heat treatment as prescribed in Appendix R.

3.6.2.6.1.2 Demonstration of *repair level* RL2 capability requires, at a minimum, a welder qualified by the facility in accord with Appendix W using the facility's qualified welding procedure specifications (WPS) per Appendix W. This capability can be demonstrated by performing a defect *repair* (insert or through shell/head crack) to a *tank car tank*. If the demonstration is performed on a *tank car tank*, the qualified welder must perform the *repair* in accord with Appendix R. In lieu of a *tank car facility* demonstrating *repair level* RL2 capability on a *tank car*, a facility is permitted to use a test plate, provided that the test plate material is from the listed materials in the *material group(s)* identified in the application for *certification*. The test plate must be the contour of a *tank car tank* and be a minimum size of 4 ft in width and 4 ft in height. The qualified welder must perform a double-weld groove joint on a tank shell insert with a 1 in. minimum corner radius. The insert must restore original contour. The minimum size of the insert must be at least 1 ft² in size. The qualified welder must demonstrate, at a minimum, horizontal position 2G and vertical position 3G groove welds. The facility is required to perform and document nondestructive testing using *NDT* methods UT or RT on the double-weld groove joint, and set-up of postweld heat treatment as prescribed in Appendix R.

3.6.2.6.2 RLC Demonstration

Demonstration of *repair level*/RLC capability requires, at a minimum, a welder, qualified by the facility in accord with Appendix W using the facility's qualified welding procedure specifications (WPS) per Appendix W. This capability must be demonstrated on either a *cryogenic tank* or a series of test weldments, in accordance with an approved design, as follows:

3.6.2.6.2.1 Groove weld on inner tank in accordance with paragraph 3.6.2.6.1.2 and using Material Group 3.

3.6.2.6.2.2 Groove weld on outer jacket in accordance with paragraph 3.6.2.6.1.2 and using Material Group 1. Weld joint must be single sided V-groove with backing.

3.6.2.6.2.3 Groove weld of a nominal 3-inch diameter schedule 40 pipe at least 12 inches long to a fitting (elbow or tee) contained within the annular space and oriented to project through the outer jacket. Pipe and fitting shall be stainless / alloy steel to represent the load / unload piping system.

For a test weldment, the *outer jacket* material must be rolled to the contour of the approved design and be a minimum size of 4 ft in width and 4 ft in height with a reinforced penetration opening that is 8 inches in diameter and centered on the plate. The outer jacket steel is not required to meet Appendix M for this paragraph; however, the penetration reinforcement must be from Material Group 1 and may be skip welded around its circumference. The inner tank may be of any material that provides a visual / physical block to the welder. The annular space (or distance between inner tank and outer jacket) shall be 6" nominal and the orientation of the pipe penetration must be at 30 degrees down from vertical.

IMPLEMENTED 04/2020

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

3.6.2.6.2.4 [Welding of a penetration closure plate to the outer jacket reinforcement and the 3-inch diameter stainless pipe from paragraph 3.6.2.6.2.3 for the joining of dissimilar materials. Closure plate shall have dimensions and material of the approved design.](#)

3.6.2.6.3 If applicable, the use of tooling and fixtures to *remove* deformations of the *tank car tank*.

3.6.3.7 Car file preparation, including all *inspection and test* records, and compliance with TCID (AAR M-1003 QA ELEMENT 2.17)

3.6.4 B78—Construction of Tank Cars by Assembly

When requested by an auditor, a B78 facility must demonstrate the ability to *construct* a completed *tank car* to an *AAR-approved* design by *assembly*. The facility must demonstrate the following:

3.6.4.1 The use of the production, inspection, and test plan, including the acceptance criteria, that comply with *AAR* standards, *AAR* interchange rules, and federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.5)

3.6.4.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.4.3 Possession of all applicable *AAR* publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.4.4 For the intended demonstration, provision of the *approved AAR* Form 4-2 and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.4.5 Incoming inspection and receipt of the *tank car tank* (AAR M-1003 QA ELEMENT 2.10, 2.14, 2.16, 2.17, as applicable 2.9)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

3.6.4.6 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.3.6.1 If welding the underframe is applicable, the facility must demonstrate the following using special processes controlled by qualified personnel and controlled equipment:

3.6.3.6.1.1 Vacant

3.6.3.6.1.2 Layout, fit-up, and welding the body bolsters to the reinforcing pads

3.6.3.6.1.3 Layout, fit-up, and welding the *stub sills* to the reinforcing pads or full center sill attachment

3.6.3.6.2 If applicable, the *assembly/construction* of insulation, jacket, head shields, and any other *safety system*

3.6.3.6.3 If applicable, perform hydrostatic test on a *tank car tank*

3.6.4.7 Final *inspection and test*, including *qualification* stenciling, tank identification plate, and all associated markings on the *tank car* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.4.8 Car file preparation, including all *inspection and test* records and signed Form AAR 4-2 (AAR M-1003 QA ELEMENT 2.17)

3.6.5 B81—Qualification of Tank Car Tanks

When requested by an auditor, a B81 facility must demonstrate the ability to perform the *qualification* of an *AAR-approved tank car tank*. The facility must demonstrate the following:

3.6.5.1 The use of the production, inspection, and test plan, including the acceptance criteria, that comply with *AAR* standards, *AAR* interchange rules, and federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.5)

3.6.5.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.5.3 Possession of all applicable *AAR* publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

3.6.5.4 Performance of each of the following *qualification* events, as specified by the associated *activity codes*, using special processes controlled by qualified personnel and controlled equipment:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.4.4.1 For *activity codes* A19 and B78, demonstrate on a *tank car tank* the Visual Inspection, Structural Integrity Inspection, Thickness Test, and *Safety System* Inspection. This shall occur in conjunction with the production, inspection, and test plan *activities* of A19 and B78.

3.6.4.4.2 For *activity code* B82, demonstrate on a *tank car tank* the Visual Inspection and Thickness Test, and, if applicable, the Structural Integrity Inspection when welding the underframe. This shall occur in conjunction with the production, inspection, and test plan *activities* of B82.

3.6.4.4.3 For *activity code* B24, demonstrate on a *tank car tank* or test apparatus the Visual Inspection, Structural Integrity Inspection, Thickness Test, and *Safety System* Inspection.

3.6.5.5 Final *inspection and test*, including the *qualification* event of the *tank car tank* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.5.6 Marking of *tank cars* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.5.7 Car file preparation, including all *inspection and test* records (AAR M-1003 QA ELEMENT 2.17)

3.6.6 B82—Manufacture Tank Car Tanks

When requested by an auditor, a B82 facility must demonstrate the ability to *manufacture a tank car tank* to an *AAR-approved* design. The facility must demonstrate the following:

3.6.6.1 The use of the production, inspection, and test plan, including the acceptance criteria, that comply with *AAR* standards, *AAR* interchange rules, and federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.5)

3.6.6.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.6.3 Possession of all applicable *AAR* publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.6.4 For the intended demonstration, provision of the *approved AAR* Form 4-2 and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.6.5 Proper storage, selection, and traceability of an *approved tank car tank* plate from the applicable *material group(s)* (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)

IMPLEMENTED 04/2020

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

3.6.6.6 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.5.6.1 Rolling flat plate into two ring sections, and joining the rings with a longitudinal and circumferential weld

3.6.5.6.2 Fit-up and welding of a tank head to the ring sections

3.6.5.6.3 Fit-up and welding of the *tank car tank* closing seam

3.6.5.6.4 Volumetric inspection (radiography or ultrasonic) of the tank longitudinal and circumferential welds

3.6.5.6.5 Layout, tank shell preparation, fit-up, and welding of the *nozzles*, sumps, and/or outlet saddles to the *tank car tank*

3.6.5.6.6 Layout, fit-up, and welding of the reinforcing pads to the *tank car tank*

3.6.5.6.7 If applicable, layout, fit-up, and welding of the exterior heater coils

3.6.5.6.8 Unit postweld heat treatment

3.6.5.6.9 Hydrostatic testing of *tank car tank*

3.6.6.7 If welding the underframe is applicable, the facility must demonstrate the following using special processes controlled by qualified personnel and controlled equipment:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.5.7.1 Layout, fit-up, and welding the body bolsters to the reinforcing pads

3.6.5.7.2 Layout, fit-up, and welding the *stub sills* to the reinforcing pads

3.6.6.8 File preparation, including all *inspection and test* records (AAR M-1003 QA ELEMENT 2.17)

3.6.6 B85—Manufacture Tank Car Tank Components

When requested by an auditor, a B85 facility must demonstrate the ability to *manufacture tank car tank components* to an *AAR-approved* design. The facility must demonstrate the following:

3.6.6.1 The use of the production, inspection, and test plan, including the acceptance criteria, that comply with *AAR* standards, *AAR* interchange rules, and federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.5)

3.6.6.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

- 3.6.6.3** Possession of all applicable *AAR* publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)
- 3.6.6.4** For the intended demonstration, provision of the *approved AAR* Form 4-2 and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)
- 3.6.6.5** Proper storage, selection, and traceability of *approved* materials per M-1002 Appendix M (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)
- 3.6.6.6** The use of special processes controlled by qualified personnel and controlled equipment:
- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
 - Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
 - Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
 - Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
 - Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
 - Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)
- 3.6.6.7** All *manufacturing* process(es) employed to produce one or more *tank car tank* component, including, as applicable, layout methods, tooling, fixturing, and component fit-up
- 3.6.6.8** File preparation, including all *inspection and test* records (AAR M-1003 QA ELEMENT 2.17)
- 3.6.7 B87—Maintenance and Qualification of Fuel Tanks for Locomotive Fuel Tenders**
- When requested by an auditor, a B87 facility must demonstrate the ability to maintain and qualify a *fuel tank* manufactured to an approved design in accordance with M-1004.
- 3.6.7.1 Locomotive Fuel Tank Manufactured in Accordance with Chapter 2 of M-1004**
- This capability must be demonstrated on either a *fuel tank* or a series of test weldments, in accordance with paragraphs 3.6.2.1 through 3.6.2.6 and 3.6.2.6.2 (*repair level*/RLC), and shall include:
- 3.6.7.1.1** The use of the production, inspection, and test plan, including the acceptance criteria, that comply with AAR standards, AAR interchange rules, and federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.5)
- 3.6.7.1.2** If applicable, the use of tooling and fixtures to remove deformations from the *fuel tank*.
- 3.6.7.1.3** Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)
- 3.6.7.1.4** Possession of all applicable AAR publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)
- 3.6.7.1.5** Performance of each of the following qualification events, as specified by M-1004, Appendix K, using special processes controlled by qualified personnel and controlled equipment:
- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
 - Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
 - Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
 - Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
 - Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
 - Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

IMPLEMENTED 04/2020

Formatted: Font color: Blue

Formatted: Underline, Font color: Blue

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

[3.6.7.1.5.1 Demonstrate on a fuel tank or test apparatus the Visual Inspection, Structural Integrity Inspection and Thickness Test of the jacket.](#)

[3.6.7.1.6 Final inspection and test, including the qualification event of the *fuel tank* \(AAR M-1003 QA ELEMENT 2.12, 2.15\)](#)

[3.6.7.1.7 Marking of the fuel tender \(AAR M-1003 QA ELEMENT 2.12, 2.15\)](#)

[3.6.7.1.8 Preparation of fuel tank maintenance, repair, and qualification files, including all inspection and test records, in compliance with M-1004, Appendices K and L \(AAR M-1003 QA ELEMENT 2.17\)](#)

3.6.7.2 Locomotive Fuel Tank Manufactured in Accordance with Chapter 3 of M-1004

[This capability shall be performed only by the fuel tank manufacturer, using manufacturer maintenance / repair procedures. Refer to M-1004, Chapter 1, paragraph 1.8.](#)

3.6.7.3 Locomotive Fuel Tank Manufactured in Accordance with Chapter 4 of M-1004

[Reserved](#)

3.6.8 B89—Maintenance, Modification, and Qualification of Safety Systems

When requested by an auditor, a B89 facility must demonstrate the ability to maintain, modify, and qualify *tank car safety systems*. The facility must demonstrate the following:

3.6.8.1 The use of the production, inspection, and test plan, including the acceptance criteria established by the *tank car owner*, that comply with AAR standards, AAR interchange rules, and federal regulations (AAR M-1003 QA Element 2.3, 2.5, 2.23)

3.6.8.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.8.3 Possession of all applicable AAR publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.8.4 Proper storage, selection, and traceability of materials (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)

3.6.8.5 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.8.6 The *maintenance or modification* and *qualification* employed to one or more *safety systems* (thermal protection systems, insulation systems, tank head puncture resistance systems, and systems used to protect discontinuities (e.g., skid protection and protective housing))

AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars

APPENDIX B

M-1002

3.6.8.7 Car file preparation, including all *inspection and test* records, and compliance with TCID (AAR M-1003 QA ELEMENT 2.17)

3.6.9 B90—Maintenance, Alteration, and Qualification of Tank Car Stub Sills

When requested by an auditor, a B90 facility must demonstrate the ability to maintain, alter, and qualify the *tank car stub sills*, sill pads, and sill *attachment* welds both inboard and outboard of bolsters, of an *approved stub sill* design. The facility must demonstrate the following:

3.6.9.1 The use of the production, inspection, and test plan, including the acceptance criteria established by the *tank car owner*, that comply with AAR standards, AAR interchange rules, and federal regulations (AAR M-1003 QA Element 2.3, 2.5, 2.23)

3.6.9.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.9.3 Possession of all applicable AAR publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.9.4 *Qualification* demonstration: perform the *qualification event* on a *tank car stub sill* using special processes controlled by qualified personnel and controlled equipment:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.9.5 Utilization of one or more *NDT* methods during the *qualification* process

3.6.9.6 *Maintenance* demonstration: perform a *stub sill weld repair* or *alteration* to a *stub sill* using a welder qualified by the facility in accord with AWS D15.1 using the facility's qualified welding procedure specifications (WPS). This capability can be demonstrated by one of the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.9.6.1 *Tank car stub sill*: perform a welded *repair* or *alteration* to a *tank car stub sill* in accordance with the *approved* design provided by the *tank car owner*. Demonstration of *repair level* RLS capability requires, at a minimum, a welder qualified by the facility in accord with AWS D15.1 using the facility's qualified welding procedure specifications (WPS) per AWS D15.1.

3.6.9.6.2 In lieu of a *tank car facility* demonstrating *repair level* RLS capability on a *tank car stub sill*, a facility is permitted to use a test plate, provided the material is from Appendix M. The test plate must be a two-piece tee joint configuration and be a minimum size of 1 ft in width and 1 ft in height. The test plate must be positioned no more than 48 in. from the ground. A welder qualified by the facility in accord with AWS D15.1 using the facility's qualified welding procedure specifications (WPS) per AWS D15.1 must perform an overhead position 4F fillet weld that simulates a *stub sill attachment* weld to tank pad. The fillet weld size must be a minimum 3/8 in., and the length must be a minimum of 12 in.

3.6.9.6.3 Utilization of one or more *NDT* methods during the *maintenance* process.

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

3.6.9.7 Final *inspection and test*, including the *qualification* event of the *tank car stub sill* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.9.8 Marking of the stub still *qualification* stencil on the *tank car* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.9.9 Car file preparation, including all *inspection and test* records, and compliance with TCID (AAR M-1003 QA ELEMENT 2.17)

3.6.10 C4a—Assemble and Qualification of Tank Car Service Equipment

When requested by an auditor, a C4a facility must demonstrate the ability to *assemble* and qualify new *tank car service equipment* to an *AAR-approved* design. The facility must demonstrate the following:

3.6.10.1 The use of the production, inspection, and test plan, including the acceptance criteria, that comply with *AAR* standards, *AAR* interchange rules, and federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.5)

3.6.10.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.10.3 Possession of all applicable *AAR* publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.10.4 For the intended demonstration, provision of the *approved AAR* Forms 4-3, 4-5, and 4-7, and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.10.5 If applicable, provision of the associated *AAR* Form 4-4 and/or 4-6 (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.10.6 Proper storage, selection, and traceability of materials per the *AAR-approved* design (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)

3.6.10.7 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.10.7.1 The *assembly* process(es) employed to produce one or more from each applicable category of *tank car service equipment* (*closures, fittings, instruments, safety relief devices, and/or valves*) for which the facility wants to obtain and maintain *certification*. This includes, as applicable, the layout methods, tooling, fixturing, and component fit-up.

3.6.10.8 If applicable, utilization of all *NDT* methods employed during the *assembly* process

3.6.10.9 Final *inspection and test*, including the *qualification* event of the *service equipment* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.10.10 Marking of the *tank car service equipment* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.10.11 File preparation, including all *inspection and test* records (AAR M-1003 QA ELEMENT 2.17)

IMPLEMENTED 04/2020

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

3.6.11 C4m—Manufacture and Qualification of Tank Car Service Equipment

When requested by an auditor, a C4m facility must demonstrate the ability to *manufacture* and qualify new *tank car service equipment* to an *AAR-approved* design, including the application of linings and coatings, as applicable. The facility must demonstrate the following:

3.6.11.1 The use of the production, inspection, and test plan, including the acceptance criteria, that comply with *AAR* standards, *AAR* interchange rules, and federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.5)

3.6.11.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.11.3 Possession of all applicable *AAR* publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.11.4 For the intended demonstration, provision of the *approved AAR* Forms 4-2, 4-3, 4-5, and 4-7, and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.11.5 If applicable, provision of the associated *AAR* Form 4-4 and/or 4-6 (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.11.6 Proper storage, selection, and traceability of materials per the *AAR-approved* design (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)

3.6.11.7 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.11.8 *Manufacturing* process(es) employed to produce one or more from each applicable category of *tank car service equipment* (*closures, fittings, instruments, safety relief devices, and/or valves*) for which the facility wants to obtain and maintain *certification*. This includes, as applicable, the layout methods, tooling, fixturing, and component fit-up.

3.6.11.8.1 If applicable, utilization of all *NDT* methods employed during the *manufacturing* process

3.6.11.8.2 If applicable, the *installation* and *qualification* of a lining or coating to each category of *tank car service equipment*

3.6.11.8.3 If applicable, utilization of welding employed during *maintenance* process

3.6.11.9 Final *inspection and test*, including the *qualification* event of the *service equipment* demonstration (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.11.10 Marking of *tank car service equipment* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.11.11 File preparation, including all *inspection and test* records (AAR M-1003 QA ELEMENT 2.17)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

3.6.12 C5—Maintenance and Qualification of Tank Car Service Equipment

When requested by an auditor, a C5 facility must demonstrate the ability to maintain and qualify *tank car service equipment* to an *AAR-approved* design, including the *maintenance* and *qualification* of the lining and coating, if applicable. The facility must demonstrate the following:

3.6.12.1 The use of the production, inspection, and test plan, including the acceptance criteria established by the *equipment owner*, that comply with *AAR* standards, *AAR* interchange rules, and federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.5, 2.23)

3.6.12.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.12.3 Possession of all applicable *AAR* publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.12.4 For the intended demonstration, provision of the *approved AAR* Forms 4-2, 4-3, 4-5, and/or 4-7, and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.12.5 Proper storage, selection, and traceability of materials per the *AAR-approved* design (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)

3.6.12.6 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.12.7 *Maintenance* process(es) employed to *repair* and/or *recondition* one or more from each applicable category of *tank car service equipment* (*closures, fittings, instruments, safety relief devices, and/or valves*) for which the facility wants to obtain and maintain *certification*. This includes, as applicable, the layout methods, tooling, fixturing, and component fit-up.

3.6.12.7.1 If applicable, utilization of all *NDT* methods employed during the *maintenance* process

3.6.12.7.2 If applicable, the *removal, maintenance, and qualification* of a lining or coating to each category of *tank car service equipment*

3.6.12.7.3 If applicable, utilization of welding employed during *maintenance* process

3.6.12.8 Final *inspection and test*, including the *qualification* event of the *service equipment* demonstration (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.12.9 Marking of *tank car service equipment* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.12.10 File preparation, including all *inspection and test* records (AAR M-1003 QA ELEMENT 2.17)

IMPLEMENTED 04/2020

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

3.6.13 C6i—Install Tank Car Service Equipment, Including Leakage Test

When requested by an auditor, a C6i facility must demonstrate the *installation* of *tank car service equipment*, including the leakage test, on a *tank car* (associated with A19 or B78 only). The facility must demonstrate the following:

3.6.13.1 The use of the production, inspection, and test plan, including the acceptance criteria, that comply with AAR standards, AAR interchange rules, and federal regulations (AAR M-1003 QA Element 2.3, 2.5, 2.23)

3.6.13.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.13.3 Possession of all applicable AAR publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.13.4 For the intended demonstration, provision of the *approved* AAR Forms 4-2, 4-3, and/or 4-5, and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.13.5 Proper storage and selection of materials (*service equipment* and elastomers) (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)

3.6.13.6 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.13.6.1 The *installation* process(es) employed to connect one or more categories of *tank car service equipment* (*closures, fittings, instruments, safety relief devices, and/or valves*) to the *tank car* as specified on the *approved* AAR Form 4-2 and applicable drawings

3.6.13.6.2 The means for traceability when *installing tank car service equipment*

3.6.13.7 Final inspection and leakage test of the *connection* of the *service equipment* to the *tank car* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.13.8 Marking of *tank car service equipment* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.13.9 If applicable, the marking of the *service equipment qualification* stencil on the *tank car* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.13.10 Car file preparation, including all *inspection and test* records (AAR M-1003 QA ELEMENT 2.17)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

3.6.14 C6r—Remove and Replace Tank Car Service Equipment, Including Gaskets, Leakage Test, and Modifications

When requested by an auditor, a C6r facility must demonstrate the *removal* and replacement of *tank car service equipment*, including gaskets, leakage test, and *modifications*. The facility must demonstrate the following:

3.6.14.1 The use of the production, inspection, and test plan, including the acceptance criteria established by the *equipment owner*, that comply with AAR standards, AAR interchange rules, and federal regulations (AAR M-1003 QA Element 2.3, 2.5, 2.23)

3.6.14.1.1 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.14.1.2 The process employed when the *activity* results in a *modification* to the *tank car*:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.14.2 Possession of all applicable AAR publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.14.3 For the intended demonstration, provision of the *approved* AAR Forms 4-2, 4-3, 4-5, and/or 4-7, and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.14.4 Proper storage and selection of materials (*service equipment* and elastomers) (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)

3.6.14.5 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.14.6 The process(es) employed to disconnect and reconnect one or more categories of *tank car service equipment* (*closures, fittings, instruments, safety relief devices, and/or valves*). This capability can be demonstrated on a *tank car* or in lieu of a *tank car*, a test fixture:

3.6.14.6.1 A *tank car*—performed by utilizing the *equipment owner's* instructions and acceptance criteria

3.6.14.6.2 A test fixture—performed by utilizing *approved* acceptance criteria

3.6.14.6.3 The means for traceability when replacing *tank car service equipment*

3.6.14.7 Final inspection and leakage test of the *connection* of the *service equipment* to the *tank car* or test fixture (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.14.8 Marking of *tank car service equipment* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.14.9 If applicable, the marking of the *service equipment qualification* stencil on the *tank car* (AAR M-1003 QA ELEMENT 2.12, 2.15)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

3.6.14.10 Car file preparation, including all *inspection and test* records, and compliance with TCID for *modifications* to the *tank car* (AAR M-1003 QA ELEMENT 2.17)

3.6.15 C7—Removal of Interior Linings and Interior Coatings in Tank Cars

When requested by an auditor, a C7 facility must demonstrate the *removal of interior linings* and *interior coatings* on a *tank car tank nozzle* or *tank car tank* plate material. The facility must demonstrate the following:

3.6.15.1 The use of the production, inspection, and test plan, including the acceptance criteria, that comply with AAR standards, AAR interchange rules, and federal regulations (AAR M-1003 QA Element 2.3, 2.5, 2.23)

3.6.15.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.15.3 Possession of all applicable AAR publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.15.4 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.15.4.1 The *removal* and replacement and/or protection of the *tank car service equipment*

3.6.15.4.2 The method(s) employed to *remove* the *interior lining* or *interior coating*. This can be demonstrated on a *tank car tank nozzle* or test plate of *tank car tank* plate material. The demonstration must include a cleaning method as authorized in Appendix L on a coated or lined test plate of *tank car tank* plate material. The test plate must be the contour of a *tank car tank* shell plate and be a minimum size of 4 ft in width, 4 ft in height, and 7/16 in. thick. The full interior side of the test plate shall be cleaned of lining or coating material and prepared according to *equipment owner's* instructions.

3.6.15.4.3 Utilization of one or more *NDT* methods to perform visual inspection and thickness tests of the *tank car tank* after the *removal* of the *interior lining* or *interior coating*.

3.6.15.5 Update of the *tank car qualification* stencil for *removal* of the *interior lining* or *interior coating* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.15.6 Car file preparation, including all *inspection and test* records, and, as applicable, compliance with TCID for *modifications* to the *tank car* (AAR M-1003 QA ELEMENT 2.17)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

3.6.16 C8—Installation and Qualification of Interior Linings and Interior Coatings in Tank Cars

When requested by an auditor, a C8 facility must demonstrate the *installation* and *qualification* of *interior linings* and *interior coatings* on a *tank car tank nozzle* or on *tank car tank* plate material. The facility must demonstrate the following:

3.6.16.1 The use of the production, inspection, and test plan, including the acceptance criteria established by the *equipment owner*, that comply with *AAR* standards, *AAR* interchange rules, and federal regulations (AAR M-1003 QA Element 2.3, 2.5, 2.23)

3.6.16.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.16.3 Possession of all applicable *AAR* publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.16.4 Where *interior linings* or *interior coating* are required by the specification, provision of the *approved AAR* Form 4-2 and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.16.5 Proper storage, selection, and traceability of *interior lining* or *interior coating* material (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)

3.6.16.6 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.16.6.1 The *removal and* replacement and/or protection of the *tank car service equipment*

3.6.16.6.2 Utilization of one or more *NDT* methods to perform visual inspection and thickness tests of the *tank car tank* prior to *installation* of the *interior lining* or *interior coating*

3.6.16.6.3 The method(s) employed to prepare the *tank car tank* and *install* the *interior lining* or *interior coating* either on a *tank car tank nozzle* or test plate of *tank car tank* plate material:

3.6.16.6.3.1 Demonstrate a cleaning/preparation method as authorized in Appendix L on a bare (unlined/uncoated) *tank car tank nozzle* or test plate of *tank car tank* plate material. The test plate must be the contour of a *tank car tank* shell plate and be a minimum size of 4 ft in width, 4 ft in height, and 7/16 in. thick. The cleaning /preparation shall encompass the full interior side of the *tank car tank nozzle* or test plate.

3.6.16.6.3.2 As applicable to the *interior lining* or *interior coating* type, demonstrate all in-process measurements on the prepared substrate per the production, inspection, and test plan.

3.6.16.6.3.3 Using the same *tank car tank nozzle* or test plate from paragraph 3.6.16.6.3.1, demonstrate the *installation* of a new *interior lining* or *interior coating* as authorized in Appendix L. The *installation* shall encompass the full interior side of the *tank car tank nozzle* or test plate.

3.6.16.6.3.4 As applicable to the *interior lining* or *interior coating* type, demonstrate all in-process measurements of the *installation* per the production, inspection, and test plan.

3.6.16.7 Final *inspection and test*, including the *qualification* event of the *interior lining* or *interior coating* (AAR M-1003 QA ELEMENT 2.12, 2.15)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

3.6.16.8 Marking of the *tank car qualification* stencil for *installation* of the *interior lining* or *interior coating* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.16.9 Car file preparation, including all *inspection and test* records, and, as applicable, compliance with TCID for *modifications* to the *tank car* (AAR M-1003 QA ELEMENT 2.17)

3.6.17 C9—Qualification of Interior Linings and Interior Coatings in Tank Cars

When requested by an auditor, a C9 facility must demonstrate the *qualification of interior linings* and *interior coatings* on a tank car or *tank car tank* plate material. The facility must demonstrate the following:

3.6.17.1 The use of the production, inspection, and test plan, including the acceptance criteria established by the *equipment owner*, that comply with *AAR* standards, *AAR* interchange rules, and federal regulations (AAR M-1003 QA Element 2.3, 2.5, 2.23)

3.6.17.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.17.3 Possession of all applicable *AAR* publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.17.4 Where *interior linings* or *interior coatings* are required by the specification, provision of the *approved AAR* Form 4-2 and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.17.5 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.17.5.1 The *removal* and *replacement* and/or protection of the *tank car service equipment*

3.6.17.5.2 Demonstrate the *qualification* event on a coated or lined *tank car tank nozzle* or test plate of *tank car tank* plate material. The test plate must be the contour of a *tank car tank* shell plate and be a minimum size of 4 ft in width, 4 ft in height, and 7/16 in. thick.

3.6.17.5.3 Utilization of one or more *NDT* methods to perform the *interior lining* and *interior coating* inspection and test

3.6.17.5.4 The procedure used to process the tank car when the *qualification* event of the *interior lining* or *interior coating* does not meet the acceptance criteria called out in the production, inspection, and test plan.

3.6.17.6 Final *inspection and test* for the *qualification* event of the *interior lining* or *interior coating* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.17.7 Marking of the *tank car qualification* stencil for *qualification* of the *interior lining* or *interior coating* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.17.8 Car file preparation, including all *inspection and test* records, and, as applicable, compliance with TCID for *modifications* to the *tank car* (AAR M-1003 QA ELEMENT 2.17)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

3.6.18 C10—Maintenance and Qualification of Interior Linings and Interior Coatings in Tank Cars

When requested by an auditor, a C10 facility must demonstrate the *maintenance* and *qualification* of *interior linings* and *interior coating* on a *tank car tank nozzle* or on *tank car tank* plate material. The facility must demonstrate the following:

3.6.18.1 The use of the production, inspection, and test plan, including the acceptance criteria established by the *equipment owner*, that comply with *AAR* standards, *AAR* interchange rules, and federal regulations (AAR M-1003 QA Element 2.3, 2.5, 2.23)

3.6.18.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.18.3 Possession of all applicable *AAR* publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.18.4 Where *interior linings/coatings* are required by the specification, provision of the *approved AAR Form 4-2* and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.18.5 Proper storage, selection, and traceability of *interior lining* or *interior coating* material (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)

3.6.18.6 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.18.6.1 The *removal and* replacement and/or protection of the *tank car service equipment*

3.6.18.6.2 The method(s) employed to prepare the *tank car tank* and maintain the *interior lining* or *interior coating* either on a *tank car tank nozzle* or test plate of *tank car tank* plate material:

3.6.18.6.2.1 Demonstrate a cleaning/preparation method as authorized in Appendix L on a coated or lined *tank car tank nozzle* or test plate of *tank car tank* plate material. The test plate must be the contour of a *tank car tank* shell plate and be a minimum size of 4 ft in width, 4 ft in height, and 7/16 in. thick. The cleaning/preparation shall encompass a minimum area of 1 ft² of the *tank car tank nozzle* or test plate.

3.6.18.6.2.2 As applicable to the *interior lining* or *interior coating* type, demonstrate all in-process measurements on the prepared substrate per the production, inspection, and test plan.

3.6.18.6.2.3 Utilization of one or more *NDT* methods to perform visual inspection and thickness tests of the *tank car tank* during *maintenance* of the *interior lining* or *interior coating*.

3.6.18.6.2.4 Using the same *tank car tank nozzle* or test plate from paragraph 3.6.18.6.2.1, demonstrate the *repair* application of an *interior lining* or *interior coating* as authorized in Appendix L. The *maintenance* shall encompass the area prepared in paragraph 3.6.18.6.2.1.

3.6.18.6.2.5 As applicable to the *interior lining* or *interior coating* type, demonstrate all in-process measurements of the *repair* application per the production, inspection, and test plan.

3.6.18.7 Final *inspection and test*, including the *qualification* event of the *interior lining* or *interior coating* (AAR M-1003 QA ELEMENT 2.12, 2.15)

IMPLEMENTED 04/2020

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

APPENDIX B

M-1002

3.6.18.8 When applicable, update the *tank car qualification* stencil for the *interior lining* or *interior coating* (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.18.9 Car file preparation, including all *inspection and test* records, and, as applicable, compliance with TCID for *modifications* to the *tank car* (AAR M-1003 QA ELEMENT 2.17)

3.6.19 C12—Maintenance and Qualification of Locomotive Fuel Tender Service Equipment

When requested by an auditor, a C12 facility must demonstrate the ability to maintain and qualify fuel tank service equipment to an AAR-approved design and the tender owner's qualification plan per M-1004, Appendix K. The facility must demonstrate the following:

3.6.19.1 The use of the production, inspection, and test plan, including the acceptance criteria established by the tender owner, that comply with AAR standards, AAR interchange rules, and federal regulations (AAR M-1003 QA Element 2.3, 2.5, 2.23)

3.6.19.2 Incoming inspection of materials, products, and/or services, including those that are subcontracted (AAR M-1003 QA ELEMENT 2.9, 2.10)

3.6.19.3 Possession of all applicable AAR publications and access to federal regulations (AAR M-1003 QA ELEMENT 2.3, 2.7)

3.6.19.4 For the intended demonstration, provision of the approved AAR Forms 4-2, 4-3, 4-5, and/or 4-7, and applicable drawings (AAR M-1003 QA ELEMENT 2.7, 2.24)

3.6.19.5 Proper storage, selection, and traceability of materials per the AAR-approved design (AAR M-1003 QA ELEMENT 2.9, 2.14, 2.16, 2.24)

3.6.19.6 The use of special processes controlled by qualified personnel and controlled equipment for the following:

- Product (AAR M-1003 QA ELEMENT 2.5, 2.11, 2.13, 2.18, 2.20)
- Personnel (AAR M-1003 QA ELEMENT 2.9, 2.15, 2.22)
- Documents (AAR M-1003 QA ELEMENT 2.5, 2.7, 2.15, 2.17)
- Equipment (AAR M-1003 QA ELEMENT 2.8, 2.9, 2.15)
- Materials (AAR M-1003 QA ELEMENT 2.9, 2.10, 2.13, 2.14, 2.16, 2.18, 2.20)
- Environment (AAR M-1003 QA ELEMENT 2.15, 2.16)

3.6.19.7 Maintenance process(es) employed to repair and/or recondition the following:

3.6.19.7.1 One or more from each applicable category of tank car service equipment (closures, fittings, instruments, safety relief devices, and/or valves) for which the facility wants to obtain and maintain certification. This includes, as applicable, the layout methods, tooling, fixturing, and component fit-up.

3.6.19.7.2 If applicable, vacuum integrity, pressure build system, and/or fuel tank pump

3.6.19.7.3 If applicable, utilization of all NDT methods employed during the maintenance process

3.6.19.7.4 If applicable, utilization of welding employed during maintenance process. For service equipment welded to pipe, demonstration must include a test weldment using stainless / alloy pipe or tubing, in the 2G/5G or 6G position.

3.6.19.8 Final inspection and test, including the qualification event of the service equipment demonstration (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.19.9 Marking of fuel tender service equipment (AAR M-1003 QA ELEMENT 2.12, 2.15)

3.6.19.10 File preparation, including all inspection and test records (AAR M-1003 QA ELEMENT 2.17)

**AAR Manual of Standards and Recommended Practices
Specifications for Tank Cars**

M-1002

APPENDIX B

3.6.20 RLJ—Repair Level for Tank Car Jacket Repair

Listed in this section are the minimum demonstration capability requirements for *repair level* RLJ.

3.6.20.1 Demonstration of *repair level* RLJ capability requires, at a minimum, a welder qualified by the facility in accord with AWS D15.1 using the facility's qualified welding procedure specifications (WPS) per AWS D15.1.

3.6.20.1.1 If the demonstration is performed on a *tank car*, the qualified welder must perform a welded *repair* on an 11-gauge jacket in accordance with the *tank car owner's* instructions.

3.6.20.1.2 In lieu of demonstrating *repair level* RLJ on a *tank car*, a facility is permitted to use a test plate, provided that the test plate material is 11-gauge ASTM A1011. The test plate must be the contour of a typical *tank car* jacket and be a minimum size of 2 ft in width and 2 ft in height. The facility is required to apply a protective coating to the faying surface of the patch prior to welding. The qualified welder must apply a minimum 1 ft² patch of 11-gauge ASTM 1011 lapped and contoured to the test plate. With the top edge of the patch oriented in the horizontal 2F position, the welder must fillet-weld the full circumference of the patch to the test plate. An AWS D15.1 designated trained and qualified inspector or qualified and certified personnel in accord with Appendix T must perform nondestructive testing using the AWS D15.1 acceptance criteria.

4.0 ADMINISTRATIVE PROVISIONS

4.1 AAR M-1003 Application System

The AAR M-1003 Application System (the online system) for which tank car facility *certification* is administered and managed resides within the AAR's Quality Assurance Resource Center at <https://aar.iirx.net>

4.2 Establishing and Managing a User Account

A user must request and establish an account with the AAR through the following link: