



2022 RSI EXPO & TECHNICAL CONFERENCE

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October 11-13
Fort Worth, TX

2022 RSI EXPO & TECHNICAL CONFERENCE



Module 1

What is the purpose of RSI-100
and why was it developed?

Presenter: Tom DeLafosse

Goal of Module 1

- This module will explain why RSI-100 was developed and how it has evolved from its inception until today.
- This module will also explain the (8) various “*Product Conformance Plans*” (PCP’s) related to the various pressure retaining components applied to tank cars.
- Identifies where the standard can be found as well as how it is maintained.

Expansion of AAR Facility Certification

- The expansion of AAR Facility Certification was driven by DOT letters of interpretation from 2015 & 2018
- This expanded the scope of facility certification to include all types of service equipment
- Closures and fittings added to the service equipment definition in 2014:
 - Imposed significant constraints on subcontracting. Those constraints required all parts of the manufacturing process be performed by an AAR certified tank car facility, e.g.; drilling, rolling, machining, forming, etc.
 - Which in turn greatly impacted the supply chain by reducing it, leading to the potential impact on safety, operational efficiency and innovation.

Tank Car Service Equipment (Component) Demand

- Service Equipment orders are cyclical in nature and based on demand
- Demand can increase by 100% over a year
- Manufacturer's need flexibility in their supply chain
- Many small non-AAR certified local companies provide components to the tank car manufacturers and repair shops
- AAR certification:
 - Can take a very long time to achieve
 - Adds costs to all suppliers, large and small
 - Often redundant with supplier's quality management system
 - Questionable value

Initial Focus of RSI-100 - 2019



(Fittings Plate)



(Blind Flange)

- Less Complex Fittings and Closures
- Covers, Spools, Fittings Plates
- Tank Car Manufacturers / Repair Shops Remain Accountable
- Incoming Inspection
- Installation to Tank
- Leak Testing

RSI - 2 Paths Forward

- **Contest DOT Letters of Interpretation**
 - Leverage DOT Notice of Review of Guidance (Feb 5, 2019)
 - Document Regulatory History of Facility Certification
 - Conduct Cost/Benefit Analysis – Industry Impact
 - Propose an Alternative Plan
- **Develop RSI-100**
 - Focus on Closures and Fittings
 - Suppliers Must Have a QAP/QMS
 - Product Certification by Supplier
 - Verification of Supplier Compliance
 - Ensure Tank Manufacturer / Repair Shops are Responsible for Component Quality

DOT Revised Guidance

- On October 9, 2019 PHMSA issued a letter that defined what a tank car facility is and isn't.
- Revised Interpretation
 - “requiring manufacturers of tank car components to maintain QAPs that meet the requirements of § 179.7 is beyond the scope of the current requirements.”
 - An entity that qualifies a tank car is a tank car facility... responsible for ensuring the quality of all service equipment.
- Based on this guidance RSI requested the AAR Tank Car Committee to modify Appendix B to Align with Federal Requirements. Except for Valves and Instruments (10/2019)
- Manufacturing of Closures and Fittings Excluded from Facility Certification Requirements. Appendix B (12/2019)

FRA's New Focus

- Enhanced incoming inspections for all tank car pressure retaining components at tank car manufacturers and repair facilities:
 - Dimensional verification
 - Material specification verification
 - Verification of Critical To Quality (CTQ) characteristics
 - Verification of all required AAR component approvals

Facility Compliance Information

- RSI-100 enhancements since its original concept:
 - Manufacturing facility scope includes AAR certified facilities (valve and instrument manufactures)
 - Recognizes other high reliability QMS (ISO/AS9100/IATF16949)
 - Facilities without certified QAP's must have some form of evaluation or as an option be subjected to a 13-element audit
 - Expanded component scope beyond closures and fittings
 - Developed and added 8 Product Conformance Plans (PCP's)
 - Developed Incoming Material Inspection Guidelines
 - Critical to Quality (CTQ) Validation Table
 - Methods for Verification (Documentation/Inspection/Measurement)
 - Sampling Requirements (ANSI/ASQ Z1.4-2003)
 - Added Critical to Conformance (CTC) Requirements
 - Form to Document Evidence of Validation

Product Conformance

- *Product quality conformance* is the action or process of providing an official document (*i.e.*, a *statement of conformity*) attesting that the *product* conforms to the specified *quality requirement*. The action or process includes a certification PCP(s) that provides confidence that a *product* conforms to the specified *quality requirement* through selection, conformance assessment, review, certification decision, and, when required, monitoring.

RSI-100 Product Conformance Plans

* If Applicable

PCP Product Category	1	2	3	4	5	6	7	8
Products Manufactured by Machining or Cutting	X			*				
Products Manufactured by Welding	X	X		*				
Products Manufactured by Casting	X	X	X	*				
Products that Include Lining or Coating				X				
Gaskets and Sealing Products	X				X			
Valves and Instruments	X	*	X	*		X		*
Fasteners							X	
Pressure Retaining Tank Car Tank Components	X	X		*				X

Minimum Supplier QMS Requirements:

- Contract Review
- Design Control
- Material Receipt
- Material Control
- Measuring and Test Equipment
- Production, Inspection and Test Plan (PITP)
- Document Control
- Nonconformance Control
- Corrective Action
- Training
- Product Certification and Release of Material
- Shipping
- Record Keeping

Purchasing Requirements:

Purchaser's M-1003 QAP:

- **How** the facility complies with the RSI-100 standard;
- **Who** at their facility responsible
- **Train** RSI Form 100-04
- **Approve** PCP used by a supplier
- **Purchase Order** documentation requirements

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Inspection Material
Inspection Form

Form: RSI-100-04
Revision: 000 12-10-
Date:
Revised By:
Revised:

The purchaser facility receiving parts, materials, or components must ensure that the manufacturer or distributor provides any requested certificates of conformance, compliance (measurement, testing or mill test reports) required by the purchasing documents that provides the objective evidence that the required inspection points called in Appendix A of RSI-100 were in fact performed. Each facility is responsible to address the CTC characteristics/requirements identified in Appendix A.

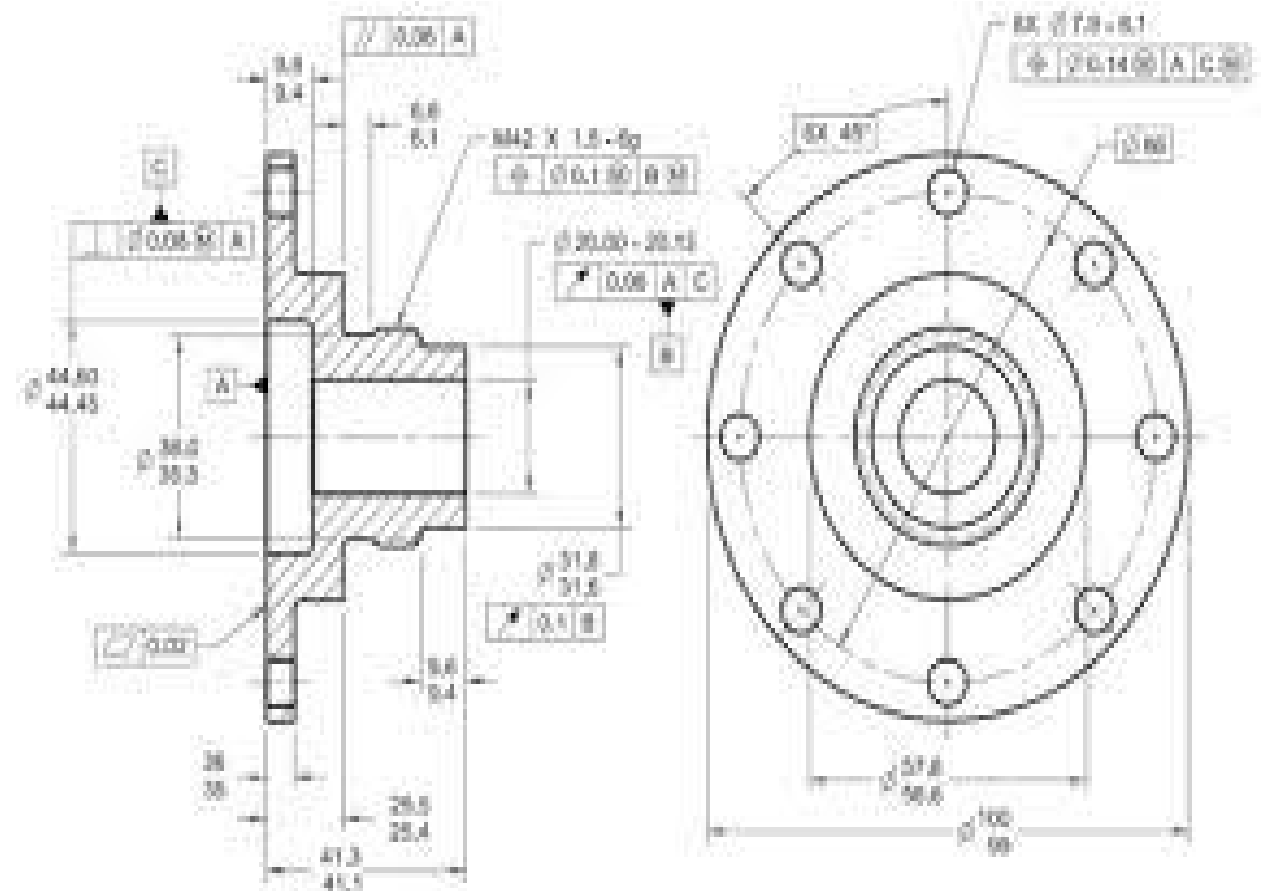
Purchasing Document: _____
Brand and Model Number: _____
Facility Part Number: _____

Inspection Method

Item Inspected	Inspection Method	Inspection Criteria	Inspection Results	Pass/Fail	Inspection Date
Yanum Relief Valve	■ AAR Design Approval				
	■ Model				
	■ Manufacturing Facility				
	■ Control - Flange Dimensions				
	■ Control - Thread Specification				
	■ Length				
	■ Bore Diameter				
	■ Bore Material				
	■ Lining Material (If Applicable)				
	■ Seal/O-Ring Dimensions				
	■ Seal/O-Ring Material				
	■ OEM Test Certificate				
	■ Manufacturer marking				
■ Manufacturer's design					

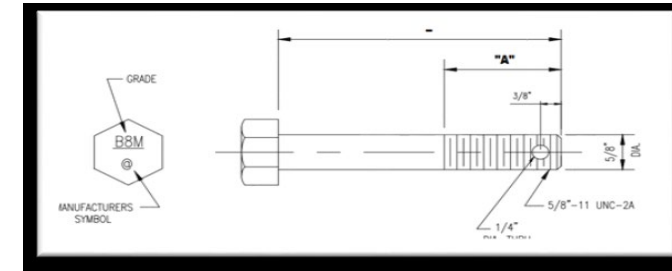
Purchasing Requirements:


- Purchase Order drawing, instruction, statement of work
- Material and grade requirement
- Testing
- Association of American Railroad's (AAR's) MSRP, Section C, Part III, M 1002
- Approved supplier list
- Serialize Manway covers, Valves and fittings plates , record retention
- Inspection requirements, minimum, Schedule A



Schedule A – Tank Car Products:

- Critical to Conformance (CTC) verification criteria for incoming tank car products
- Tank car products that must conform, Section 6
- Section 3 Receiving, incoming inspection form RSI-100-05.



 RAILWAY SUPPLY INSTITUTE <small>Support, Convenience, Accessibility</small>	Incoming Material	Form No: RS-100-05
	Inspection Form	Original Date: _____ Revision Level: VER 0-38-20
		Revision Date: _____ Revised By: _____ Approved By: _____

The tank car facility receiving parts, materials, or components must ensure that the manufacturer or distributor provides any requested certificates of conformance, compliance (measurement, testing or mill test reports) required by the purchasing documents that provide the objective evidence that the required inspection points noted in Appendix A of a RS-100 were in fact performed. Each Facility is responsible to address the CTC characteristics requirements identified in Appendix A.


Purchasing Document(s): PURCHASE ORDER PO#00502520 - INVOICE INV#1188 1188-000000

Brand and Model number: PLATE#GACD00 PROHESAT02STELLARACE VENTUE INC

Facility Part Number: PLATE TCU1088 1188-0-000000

INSPECTION MATRIX								
D = Document Verification (certificates), I = Inspection Verification (Marking), M = Measurement Verification Criteria								
Section	Item Inspected	Quantity Inspected	Imp. Method (I, or ME)	Inspection Criteria	Conformance Provided Y/N	Inspection Performed Y/N	Pass / Fail P/F	Measurement Equipment ID#
Fittings	D			AAR Design Approval (If Contractually Specified)	Y	Y	P	
	D			Material Specification	Y	Y	P	
	D			Thickness	Y	Y	P	TAPE RULE JWBFS
	D			Sealing Style (Opening Style, Flat Face, Raised, or Tongue and Groove)	Y	Y	P	
	M			Gauge tapped threads	Y	Y	P	THIN GAUGE JTBGAS
	I&M			Machined Characteristics / Gasket Surface / Fitting holes/booth holes	Y	Y	P	TAPE RULE JWBFS

INSPECTOR NAME: RILEY HARRIS

SIGNATURE: 

DATE: 8/2/20

Schedule A Requirements:

- Section 6 Criteria
- Document (**D**)
- Inspection (**I**)
- Measurement (**M**)



RSI-100 Product Conformance Plans

- PCP 1 – Machined Component
- Plan Production Activity
- Produce to Specification
- Verify CTQ Characteristics
- Accept or Reject
- The supplier must subject the finished product to a conformance assessment activity, based on a statistically valid sample plan, and issue a statement of conformity for the product for each shipment.



PCP 1 – Manufacture vs Distributor

CLOSURES and FITTINGS - CTQ INSPECTION CRITERIA <i>D – Document Verification (certificates); I – Inspection Verification (Marking); and M – Measurement Verification Criteria</i>				
Item and PCP(s)	Inspection Criteria	Manufacturer	Distributor	Facility
Fittings Plate with no nozzles PCP 1 (4 if required)	AAR Device Approval (If Contractually Specified)	D	D	D
	Material Specification	D	D	D
	Thickness	M	M	D
	Sealing Style (Opening Style, Flat Face, Raised, or Tongue and Groove)	M	M	D
	Gauge tapped threads	M	M	M
	Machined Characteristics / Gasket Surface / fitting holes/bolt holes	M	M	I & M

RSI-100 Product Conformance Plans

- PCP 2 – Machined & Welded Component
- PCP 1 Requirements Plus:
- Sampling of the product from points of production, to confirm conformance to the specified quality requirement by the supplier
- Monitoring of the production process by the purchaser or ITP auditor.

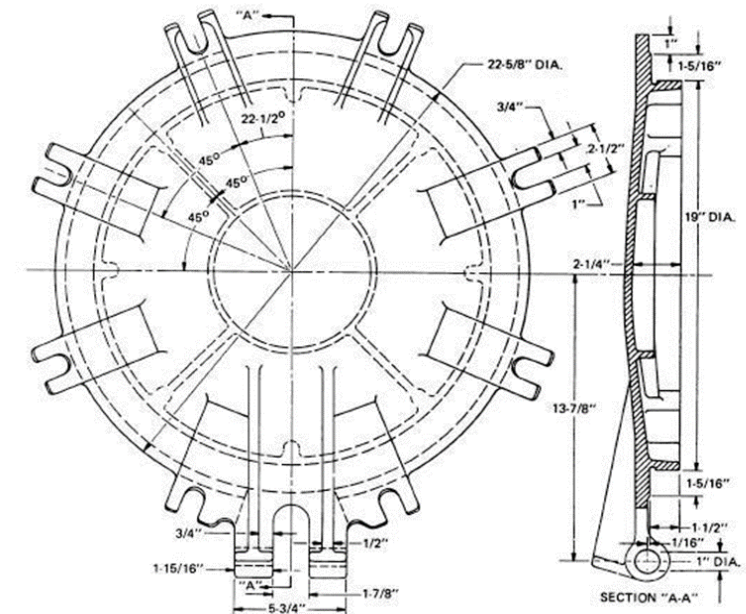


PCP 1 and 2

CLOSURES and FITTINGS - CTQ INSPECTION CRITERIA <i>D – Document Verification (certificates); I – Inspection Verification (Marking); and M – Measurement Verification Criteria</i>				
Item and PCP(s)	Inspection Criteria	Manufacturer	Distributor	Facility
Hinged and Bolted Manway or Fill Hole Cover (Fabricated) PCP 1, & 2 (4 if required)	AAR Device Approval (If Contractually Specified)	D	D	D
	Material Specification	D	D	D
	Thickness (Dished, Flanged, or Grooved)	M	M	I
	Nozzle Dimensions	M	M	M
	Sealing Style (Opening Style, Flat Face, Raised, or Tongue and Groove)	I	I	I
	Bolt Pattern	M	M	D
	Weld Size and Type	I	I	I
	Hinge Position	M	M	I
	Bolt Slot Opening Dimensions	M	M	M
	Gasket Groove Dimensions (I.D., O.D., Finish, and Profile)	M	M	M
	Special Features (Single Bolt “Kelso” or Submarine Style “Baier”)	M	M	I

RSI-100 Product Conformance Plans

- PCP 3 - Cast & Machined Components
- PCP 1 & 2 Requirements Plus: Qualification of the foundry process
- Casting samples radiographed for qualification
- (Quality Level/Indications)
- Changes to patterns, rigging, foundry processes, or material changes require requalification of foundry process



RSI-100 Product Conformance Plans

- PCP 4 - Coating
- Conformance Assessment
- Includes inspection/documentation:
- Pre-surface preparation process
- Surface preparation process
- Post-surface preparation process
- Application process
- Curing process
- Testing processes confirming conformance to the applicable specification/standard.



RSI-100 Product Conformance Plans

- PCP 5 - Gaskets and Sealing Components
- PCP-1 Requirements Plus:
- Verification of all material certificates of conformance and or test reports.
- Traceability of all stock
- Verify torque instructions
- Ensure remnants are traceable
- Maintain traceability for a period
- of not less than 10 years.



RSI-100 Product Conformance Plans

- PCP-6 Valves & Instruments
- PCP-1 and 2,3,4 as Applicable Plus:
- Certification manufactured in an AAR Certified (M-1003/M-1002) facility.
- Certification manufactured in compliance with its AAR approved design.
- A drawing of the valve suitable for verifying design approval.
- A pressure test certificate serialized in conformance with AAR requirements.



RSI-100 Product Conformance Plans

- PCP 7 - Fasteners
- Chemical requirements verified by mill
- certificates traceable to heat numbers.
- Mechanical properties are tested per ASTM A370 or equivalent.
- Surface discontinuities are evaluated per ASTM F788.
- Visual inspection performed per print
- Dimensional specifications performed per print



PCP 7 - Fasteners

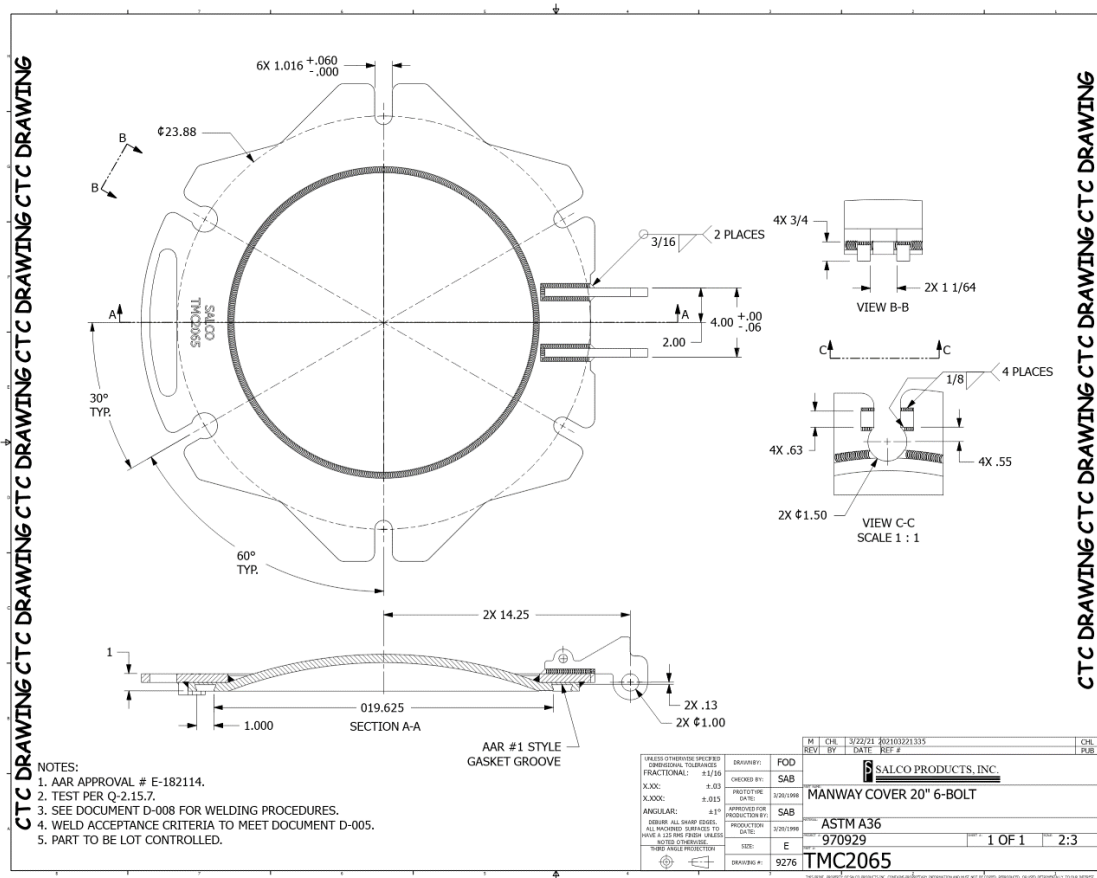
FASTENERS - CTQ INSPECTION CRITERIA <i>D – Document Verification (certificates); I – Inspection Verification (Marking); and M – Measurement Verification Criteria</i>				
Item and PCP(s)	Inspection Criteria	Manufacturer	Distributor	Facility
Eyebolts PCP 7	Material Specification	D	D	D
	Marking	I	I	I
	Thread Specification	M	M	D
	Overall Length	M	M	M
	Length of Threads	M	M	M
	Length of Shoulder	M	M	M
	Diameter	M	M	M
	Nut length across flats and thickness	M	M	M
	Nut style square/hex	M	M	M
	Eyelet ID/OD	M	M	M
Nut PCP 7	Material Specification	Per ASME B18.18, Category 2. ASTM F1470, ASTM 370 ASTM F788		D
	Marking			I
	Thread Specification			D
	Length across flats			M
	Thickness			M
	Style (Square or Hex)			I
Washer PCP 7	Material Specification	Per ASME B18.18, Category 2. ASTM F1470 ASTM 370 ASTM F788		D
	Marking			I
	Inside Diameter			M
	Outside Diameter			M
	Thickness			M
	Flatness			M
	Style (Flat or Spring or Lock)			I

RSI-100 Product Conformance Plans

- PCP 8 - Pressure Retaining Tank Car Tank Components
- PCP-1 Requirements Plus:
- Components manufactured by welding are subject to the certification requirements of PCP 2 and,
- Supplier must certify that welding procedures and welders follow AAR M-1002, Appendix W.



CTC Drawing Example



- Supplier may choose to provide CTC drawings for products of their design. Purchasers may provide drawings for their designed products and require certification that their CTC requirements have been met.

Inclusion of any Required AAR Approval's

APPLICATION FOR RENEWAL OF APPROVAL FOR PRESSURE RELIEF DEVICES, VALVES, CLOSURES, AND FITTINGS

1. AAR APPROVAL No. E202141
2. Date of Application 10/01/2019
3. Previous AAR Approval E-099034
4. Applicant: Salco Products Inc.
5. Address: 1385 101st Street, Suite A, Lemont IL 60439
6. Drawing No. D13087 7. Latest rev. Q 8. Date of latest rev. 02/08/2018
9. Description of device: Vacuum Relief Valve 2 12" 10. Device ID No. VVN25S41XXA

CERTIFICATION: The subject device is **unchanged** from the previous approval, and conforms with the latest revision of AAR Specifications for Tank Cars, Appendix A. The device conforms with drawing listed above.

- All products that require AAR approval **must be supplied with each shipment** showing that they are current and contain their approval number.

Inclusion of Any:

- Certificates of Test(s) or
- Mill Test Reports (MTR's)
- (All test certificates must accompany every order)



Vacuum Relief Valve Certificate of Test

Procedure: Q-2.15.7-2
Revision Level: B
Approved by: J. Pasqua 219702

This document certifies that the below stated part number(s) and serial number(s) have been tested in accordance with AAR, MSRP, Section C-III, Specification for Tank Cars, M-1002 and applicable Salco Products, Inc. Quality Procedures.

Part Number:	
Serial Number:	
Location:	
Temperature Range:	
Temperature During Testing:	
Pressure Medium:	
Positive Pressure Range:	
Set Positive Test Pressure:	
Vacuum Pressure Range:	
Set Vacuum Test Pressure:	
Gasket Material:	
Test Date:	

Printed Name:	
Signed Name:	
NDT Level:	
Date:	

Coating Certificate of Conformance Attests to:

- The statement of conformity must detail product characteristics (e.g., drawing / material specification, NACE/SSPC Standards, etc.). The PCP must include the following activities as a minimum:
- Inspection and documentation of the pre-surface preparation process.
- Inspection and documentation of the surface preparation process.
- Inspection and documentation of the post-surface preparation process.
- Inspection and documentation of the application process
- Documentation of the inspection and testing processes confirming conformance to the applicable specification/standard.
- Documentation of the curing process/methods used.
- Post-curing documentation of the inspection and testing processes confirming conformance to the applicable specification/standard.
- *(These are the requirements noted in section 8.2.4 of the standard that a coatings applicator must attest to for each coated item under PCP-4)*

RSI-100 Schedule B - Supplier product certification requirements that, at a minimum each certificate of conformance must include.

 		RSI-100 Schedule B
	Product Conformance Certification	Revision Level: 1
	Documentation Requirements	Date: 1/4/2021 Approved By: J. Byrne

1. The supplier's product conformance certification document must (at a minimum) contain the following information:
 - 1.1. Name and Address of manufacturer/distributor
 - 1.2. Name and address of facility where component was manufactured
 - 1.3. Purchase document reference (Contract/Order Number)
 - 1.4. Purchaser Name / Facility / Delivery Address
 - 1.5. Description of component
 - 1.6. Component Drawing Number with Revision Level and Date
 - 1.7. Component Part Number
 - 1.8. Shipping Document Reference
 - 1.9. Quantity of Parts Delivered
 - 1.10. RSI-100 Product Conformance Certification Plan(s) followed (Statement of Certification)
 - 1.11. Signature of Certifying Individual and Date
 - 1.12. Printed Name of Certifying Individual and Title
2. Additional requirements (if applicable)
 - 2.1. AAR Facility Designation
 - 2.2. Date of AAR Facility Certification Expiration
 - 2.3. Component AAR Device Approval
 - 2.4. Batch or Lot Number
 - 2.5. Material Test Report
 - 2.6. Component Marking /Serial Numbers
 - 2.7. Tests and/or Inspection Reports

PCP Certificate of Conformance Attesting that the PCP(s) Conforms to RSI-100 Schedule B

CERTIFICATE OF CONFORMANCE			
1.1 Name & Address of Manufacturer/Distributor		1.2 Name & Address of where component was manufactured	
Name	Salco Products, Inc.	Name	Salco Products, Inc.
Address	-	Address	-
1.3a Purchase Order/Contract Number		1.3b Sales Order Number	
1.4 Name & Address of Purchaser			
(a) Name			
(b) Address			
1.5 Description of Component			
1.6a Component Drawing Number		1.6b Revision Level	1.6c Drawing Date
1.7 Component Part Number			
1.8 Shipper Number		1.9 Quantity	
1.10 RSI Product Certification Plan(s) Followed			
This certifies that Salco Products, Inc. has inspected the CTQ criteria of the identified product to the supplied print. This inspection satisfies the requirements of Product Quality Certification, RSI-100 Original Issue, dated 9/21/2020.			
<input type="checkbox"/> PCP 1 - Components Manufactured by Machining or Cutting		<input type="checkbox"/> PCP 5 - Gaskets and Sealing Products	1.10b Customer not Party to RSI-100 <input type="checkbox"/>
<input type="checkbox"/> PCP 2 - Components Manufactured by Welding		<input type="checkbox"/> PCP 6 - Valves and Instruments	
<input type="checkbox"/> PCP 3 - Components Manufactured by Casting		<input type="checkbox"/> PCP 7 - Fasteners	
<input type="checkbox"/> PCP 4 - Components that Include Lining or Coating		<input type="checkbox"/> PCP 8 - Pressure Retaining Tank Car Tank Components	
2. Component Certification (if applicable)			
2.1 AAR Facility Designation		2.2 Date of Facility Certification Expiration	
None		None	
2.3 Component AAR Device Approval		2.4 & 2.6 Lot/Serial Number(s)	
-			
2.5 Material Test Report			
<input type="checkbox"/> Yes (attached) <input type="checkbox"/> No (on file)			
2.7 Test and/or Inspection Report (list all that apply)			
1.11a Certified by Signature		1.11b Date	1/7/2021
1.12a Certified by Printed Name		1.12b Title	-
-			

Document #: Q-2.14-1, Revision: A, Approved by: CMP

Implementation and Management of RSI-100

- 1. rsiweb.org
- 2. Data and Technical Resources
- 3. RSI-100 Product Quality Certification/Material Inspection Guidelines
- 4. Sign up for updates
 - Maintain Current Revisions of RSI-100 on RSI Website
 - Create a registry of Users (suppliers and purchasers)
 - Create Feedback Forum / FAQs
 - Leverage Feedback to Ensure Continuous Improvement



RSI-100 Documents

- RSI-100 Revision 1
- Schedule A – Tank Car Product Incoming Verification Guidance Document
- Schedule B – Product Conformance Certification Documentation Requirements
- RSI-100-01 – Supplier Quality Assurance Program Checklist
- RSI-100-02 – Process Compliance Assessment Checklist
- RSI-100-03 - Record of Supplier Authorization and Compliance
- RSI-100-04 - Training Record
- RSI-100-05 – Certified Facility, Incoming Material Inspection Form

Summary

- RSI-100 was originally developed as an alternative for AAR facility certification for closures, fittings and some subcontracted services.
- In its present form this voluntary recommended practice offers the tank car certified facilities a tool to aid them in meeting FRA's enforcement of 49 CFR 197.7 (4) and (5) which are:
- (4) Procedures to ensure that the fabrication and construction materials received are properly identified and documented. (**Note:** this applies to purchasing/subcontracting and incoming inspection. *If your procedures do not address your incoming inspection requirements, the FRA violation will reference this section*)
- (5) A description of the manufacturing, repair, inspection, testing, and qualification or maintenance program, including the acceptance criteria, so that an inspector can identify the characteristics of the tank car and the elements to inspect, examine, and test at each point. (**Note:** This applies to Production, Inspection, and Test Planning, *If your PITP doesn't identify how you meet this, the FRA violation will reference this section*)

Summary

- Additionally, FRA will take exception to 49 CFR 179.7 (f) if:
- (f) No tank car facility may manufacture, repair, inspect, test, qualify or maintain tank cars subject to requirements of this subchapter, unless it is operating in conformance with a quality assurance program and written procedures required by paragraphs (a) and (b) of this section.
(**Note:** *If a facility identifies their incoming inspection criteria and are not following them, the FRA violation will reference this section*).
- Module 2 will identify Schedule A's requirements for the listed tank car pressure retaining components that fall into Product Certification Plans 1 through 8.