

South Carolina Department of Transportation

**Qualified Product Policy
For
Corrugated Aluminum Alloy Pipe (CAAP) & Spiral Ribbed Aluminum Pipe (SRAP)**

1. General

The purpose of this policy is to establish the minimum qualifications for the manufacture and acceptance of corrugated aluminum alloy pipe (CAAP) and Spiral Ribbed Aluminum Pipe (SRAP). This policy provides the requirements for producers, testing frequencies, re-testing procedures, and product identification. Qualified producers will be listed on SCDOT Qualified Products Listing (QPL) 68. All pipes must conform to the requirements given in Section 714 of the SCDOT Standard Specifications.

To be considered for qualification, the producer must submit to the Structural Materials Engineer (SME) the following:

- 1.1 A Quality Control Audit, signed by a registered P.E. in South Carolina.**
- 1.2 A Hydrostatic Pressure Test certification and copies of test results for each joint design for range of pipe sizes, conducted at the producer's facility.**
- 1.3 A Quality Control Plan for the plant.**
- 1.4 A professional engineer certification and documentation (structural calculations) that the pipe listed meets or exceeds the fill height table requirements shown on SCDOT Standard Drawings.**

Note: Guidelines for initial and continued qualification are provided at the end of this document.

2. Procedures

- 2.1. **Producer Requirements:** All producers of CAAP and SRAP will operate under quality control procedures that assure that their products conform to all applicable ASTM/AASHTO specifications and the procedures additionally required by the SCDOT as outlined in this Policy. Their quality control system will be inspected annually by a Professional Engineer (P.E.) licensed in the state of South Carolina who will certify that the specified quality procedures are being followed at manufacturing locations. The qualifying P.E. will use the checklist (included in this document as an appendix) as a guideline.

The inspecting P.E. will audit SCDOT production and quality records as required in this QPP, note any discrepancies and determine if the facility is meeting the requirements of the QPP. The inspecting P.E. will provide a copy of this audit to the SCDOT Structural Materials Engineer. If the P.E. deems that certain requirements of the QPP are not being met, that facility must provide documented evidence within 30 days to the P.E. that all discrepancies have been remedied and the facility is in compliance to the satisfaction of the P.E. Failure to do so will result in that facility being disqualified per section 8 of this Policy and having their name removed from the SCDOT Qualified Products List 68 (Authorized Producers of Corrugated Aluminum Alloy Pipe (CAAP) & Spiral Ribbed Aluminum Pipe (SRAP)) by the SCDOT Structural Materials Engineer.

2.2. Manufacture: All CAAP and SRAP shall be manufactured in strict accordance to the dimensions and details shown on the SCDOT Standard Drawings, approved shop drawings, plans, or ASTM/AASHTO specifications.

2.3. Materials:

2.3.1. Use only pipe gages listed in Table 714-810B for CAAP and 714-605B for SRAP of SCDOT Standard Drawings 714-810-02 and 714-605-02 respectively.

2.3.2. Aluminum alloy sheets or coils shall conform to the applicable requirements of AASHTO M 197 for alclad alloy 3004-H34 for annular pipe and alclad alloy 3004-H32 for helical pipe.

2.3.3. The sheet material shall conform to the chemical composition limits in AASHTO M 197.

2.3.4. The sheet material shall conform to the mechanical composition limits in AASHTO M 197 when tested prior to corrugating or other fabrication.

2.3.5. All CAAP and SRAP shall conform to AASHTO M 196.

2.4. Products: All CAAP and SRAP products must comply with the following:

2.4.1. Supplemental Technical Specification 714 (SC-M-714).

2.4.2. SCDOT Instructional Bulletin 2007-04 for the design cover height for the project and the pipe material chosen.

2.4.3. SCDOT Standard Drawings.

2.4.4. Engineering Directive Memorandum 24 (EDM 24).

3. Quality Control Program

3.1. Quality Control Plan (QCP): Each production facility shall have a QCP verified by a licensed P.E. registered in South Carolina. This plan is to include the testing frequencies and the final products as well as a contingency plan to address periods of quality control personnel turnover. Ensure that any changes of items in the plan, such as quality control personnel turnover, are addressed by immediately contacting the SME with a follow-up submittal of a revised QCP. A recent QCP showing personnel responsible for the QCP and their telephone numbers must be provided to the SME before approval.

3.2. Testing Equipment and Laboratory:

3.2.1. Each production facility shall be fully equipped to perform the required tests on CAAP and SRAP.

3.2.2. The testing equipment shall be certified a minimum of every 12 months. The producer shall maintain documentation and records of all certifications.

3.3. Quality Control (QC) Personnel:

- 3.3.1. The QC Manager of each respective plant is responsible for maintaining the Quality Control Manual and accountable for the overall Quality Control function and training of all plant employees.
- 3.3.2. The CAAP/SRAP QC Technician is any employee under the direction of the QC Manager who has successfully completed all levels of progressive expertise within the QC Program Training Manual. The QC Technician shall have the authority to make necessary adjustments, cease production, or reject products when the quality of the product is in question.
- 3.3.3. All employees shall be trained as QC Technicians for the areas in which they work and will be certified after having passed a training assessment test of the relevant section(s) of the QC Training Program. Training records and the assessment tests will be retained by the manufacturer. The Training Program will include reassessment and recertification of each technician's competency on a regular frequency. Recertification records will be documented and kept by the manufacturer.
- 3.3.4. Once certified, the CAAP/SRAP Quality Control Technician shall complete all related test reports and quality control data submittals involved in the acceptance of CAAP/SRAP by the producer.

4. Acceptance Testing

- 4.1. All testing for acceptance shall be completed as a minimum for each lot. A LOT is defined as a day's production. Smaller LOTS are acceptable. Each pipe must bear legible markings identifying the pipe LOT number.
 - 4.1.1. Acceptance testing shall include an examination of the pipe for finished workmanship and the specific requirements applicable to the type of pipe and method of fabrication.
 - 4.1.2. Samples shall be taken in accordance with AASHTO M 197.
- 4.2. A product will be acceptable if all of the following items are met:
 - 4.2.1. All the acceptance test results for the LOT comply with the requirements of the applicable specifications.
 - 4.2.2. The product is manufactured within the variations allowable for the applicable specification.
 - 4.2.3. The product is manufactured in accordance with the rejection limits established for the applicable specification.
- 4.3. Hydrostatic Test on Pipe Joints
 - 4.3.1. Perform a hydrostatic test at the pressures appropriate for the application. Perform such tests in the presence of the Quality Control and Verification inspectors or as otherwise deemed appropriate by the Office of Materials and Research (OMR). Tests are to be performed and reported on sizes 18, 24, 54, and 120 inches, and joint system combinations that will be used in field applications and listed on QPL 68. Hydrostatic test will be performed only one time, unless there is a change in the product. This data

and a certification of pressure testing for applicable sizes needs to be submitted with the initial product submittal to the Structural Materials Engineer.

5. Marking

- 5.1. Each product shall be marked in accordance with AASHTO M 196 and the items listed in Section 5.2.
- 5.2. Each product shall also contain an adhesive backed tag or sticker (no smaller than 2" high and 3" wide) on the inside of each product displaying the following information:
 - The name of the facility where the product was manufactured.
 - The date it was shipped.
 - Diameter.
 - AASHTO/ASTM designation.
 - The following wording, "This product meets the SCDOT Quality Control Standards."

6. Documentation and Reporting

- 6.1. The producer shall keep daily reports documenting each product made that day and the number made. The report shall identify the date, type, and test results of all acceptance tests made for that product.
- 6.2. The producer shall maintain equipment calibration, LOT numbers for materials and pipes, number and type of pipes in each LOT, applicable test data, and record of the list of the delivered pipes.
- 6.3. The producer shall maintain this information for a minimum of three years.

7. SCDOT Verification testing and inspection

- 7.1. The SCDOT retains the right to test and/or request the producer to retest any LOT for verification purposes. Verification may include any of the acceptance tests identified. The frequency of the verification testing will vary at the discretion of the OMR inspector.
- 7.2. If verification test results do not comply with product specifications, or reasonably resemble the test results of the acceptance results, then all products represented by the manufacturer's acceptance test results will be immediately considered "questionable for acceptance" and additional testing will be required.
- 7.3. Additional testing will entail that 2 additional samples of product manufactured the same day as the verification sample will be tested. Both test results must exceed the requirements of the applicable test. If both results do not comply with specification requirements, the products from that day are unacceptable and shall not be used on SCDOT projects.
- 7.4. If products are deemed unacceptable as determined above, then additional verification testing shall be conducted on other products produced.
- 7.5. The SCDOT will maintain records and documentation of all verification testing that occurs and shall have the right to review and inspect all producer quality control data, records, and files to ensure compliance with these requirements.

8. Disqualification of Producers

- 8.1. If a producer fails to maintain their certification they will not be allowed to produce products for use on SCDOT projects.
- 8.2. The SCDOT may disqualify a producer if they fail to manufacture, test, accept, or certify in accordance with the procedure set forth in this Policy.
- 8.3. The SCDOT may disqualify a producer if any individual within the company, or representing the company, falsifies acceptance test results or certifies/stamps products that have not met acceptance criteria.
- 8.4. The SCDOT may disqualify a producer if SCDOT verification testing indicates that the quality of product being manufactured is questionable.

9. Shipment

- 9.1. Each shipment of product will include a shipping ticket with the following minimum information:
 - Quantity of material shipped.
 - Size of material shipped.
 - Thickness of material shipped.
 - Heat Number of material shipped.
 - A signed or stamped dated certification that the described product meets the SCDOT Qualified Product Policy.
- 4.1 No products shall be shipped from the fabrication plant/stockyard to SCDOT projects until they have met all acceptance criteria.

10. Requests for Qualification

Requests to have products included on SCDOT QPL 68 shall be made in writing to:

Caleb Gunter, PE
Structural Steel Engineer
South Carolina Department of Transportation
Office of Materials and Research
PO Box 191
Columbia, SC 29202
Email: guntercb@scdot.org
Phone: (803) 737-6694

Guidelines for Initial Qualification

1. A Quality Control Audit, signed by a registered P.E. in South Carolina.
2. A Hydrostatic Pressure Test certification and copies of test results for each joint design for range of pipe sizes, conducted at the producer's facility.
3. A Quality Control Plan for the plant.
4. A professional engineer certification and documentation that the pipe listed meets or exceeds the fill height table requirements.

Guidelines for Continued Qualification

1. Up to date copies of the Quality Control Audit, signed by a registered P.E. in South Carolina.
2. Up to date copies of the Quality Control Plan.

QC Audit for SCDOT QPP for CAAP/SRAP

Revised 5/6/2008

COMPANY:

PLANT:

AUDIT BY:

DATE:

SUBJECT	YES	NO	REQUIREMENTS	COMMENTS
Materials			Sheets/Coils conform to AASHTO M 197	
			Pipe/bands conforms to AASHTO M 196	
			Products conform to all SCDOT specifications as discussed in QPP 68	
Quality Control			Plant maintains a current quality control manual	
			Plant personnel are adhering to quality control measures	
			Quality Control Technician has been designated for the plant	
			QC Technician can demonstrate they are trained in QC measures	
			QC Technician training/testing records maintained by manufacturer	
			QC Technician is certified under the SCDOT Technician Certification Program	
			Lock Seam (LS) Tensile Tester Certification - Calibrated annually	
			Daily records kept of product made showing date/type/number made/number shipped/who was QC inspector	
			Quality Control Documentation kept for 3 years	
Acceptance Testing			Product conforms to AASHTO M 197 for each lot (day of production)	
			Product conforms to AASHTO M 196 for each lot (day of production)	
			Hydrostatic test has been performed as required by QPP	
			Samples taken in accordance with AASHTO M 197	
Shipping Tickets			Quantity of material shipped	
			Size of material shipped	
			Thickness of material shipped	
			Heat number of material shipped	
			Signed or stamped dated certification that the product meets SCDOT QPP	
Product Marking (either coined or stenciled on outside)			Name of sheet manufacturer	
			Name of fabricator if different than manufacturer	
			Alloy and temper	
			Specified thickness	
			Date of forming into pipe showing year/month/day (00/00/00)	
			AASHTO designation number	
Additional Labeling of Product			Label has adhesive backing	
			No smaller than 2" high and 3 " wide	
			Name of facility producing pipe	
			Ship date	
		Contains wording "This product meets SCDOT Quality Control Standards"		