



STANDARD SPECIFICATION
ALUMINUM EMBEDDED FINNED TUBES

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1.0 SCOPE

- 1.1 This specification governs materials, fabrication and tolerances (where required) applicable to aluminum embedded finned tubes fabricated by Vulcan Finned Tubes, L.P. ("Vulcan").
- 1.2 Tube material may be carbon steel or stainless steel. The fin material shall be aluminum 1100-0.

2.0 ORDERING INFORMATION

- 2.1 The purchaser is responsible for specifying all information necessary for ordering the required materials.
- 2.2 Tube material information will include quantity, tube specification, OD and wall thickness and over-all tube length.
- 2.3 Fin material information will include fin specification, fin height, number of fins per inch, length of finned length and length of tube bare ends.
- 2.4 If tube supports are required, type and location must be specified.

3.0 TUBE SPECIFICATIONS

- 3.1 The tubes may be supplied by the purchaser or by Vulcan, as agreed between the two parties. If purchaser supplies tubes, Vulcan will specify the lengths of tubes supplied and the number of spares required.
- 3.2 If purchaser supplies the tubes, they must send mill test reports with the tube material. Mill test reports or other acceptable manufacturer's certification shall be provided to the purchaser for all tubes supplied by Vulcan.
- 3.3 To be suitable for finning, tubes must be straight, the OD must be free from any pitting, dents, surface defects or excessive grease or oil that would interfere with the application of the fin.
- 3.4 The tube's chemical and physical characteristics shall be per the specification chosen by the purchaser unless otherwise specified.
- 3.5 Standard OD's for aluminum embedded finned tubes shall be 1", 1-1/4" or 1-1/2" as specified (+/- .003"). Tube ID and OD must be concentric and ovality shall be within .002".

- 3.6 Tube wall thickness must be .083" minimum.
- 3.7 Tube surface hardness shall not exceed 62 RcB without prior approval from Vulcan.
- 3.8 Length tolerance for tubes cut to length by Vulcan shall be as follows:

Tube Length	Plus Tolerance	Minus Tolerance
Less than 24 ft.	.125 in.	.125 in.
Greater than 24 ft.	.25 in.	.125 in.

- 3.9 Tube end preparation shall be square-cut and deburred on ID and OD.

4.0 FIN STRIP SPECIFICATIONS

- 4.1 Vulcan shall supply fin strip material.
- 4.2 The fin strip material shall be aluminum 1100-0.
- 4.3 If requested by customer at time of order, Vulcan shall furnish mill test reports or other acceptable manufacturer's certification for fin strip materials.
- 4.4 Standard fin heights shall be 1/2" or 5/8" as specified by purchaser.
- 4.5 Fin strip thickness shall be .016" (+/- .001") thick before being formed around tube.
- 4.6 Standard fin pitch is 8 to 11 fins per inch with 10 fins per inch being most commonly purchased.

5.0 FABRICATION

- 5.1 Tubes used in the production of aluminum embedded finned tubes must be cleaned prior to having the fins applied.
- 5.2 The aluminum fin strip is mechanically embedded into the wall of the tube. The embedding process is controlled by tooling that first plows a groove into the tubes OD (.012 in. deep), then guides the base of the fin into the groove and finally locks the fin in place by rolling the groove closed on the base of the fin. Two galvanized staples shall secure each finned end.
- 5.3 Fin OD dimensions shall be as specified +0" -.015".
- 5.4 Length of bare ends shall be +/- 1/4".

- 5.5 Length of groove beyond fin on bare ends shall be no more than 1/4".
- 5.6 Fin splices are permissible, providing there are no splices within 10 ft. of another and tubes with splices do not account for more than 10 percent of the total order.
- 5.7 Due to the manufacturing process, portions of the fin may not be fully embedded into the tube. This is allowable to a maximum of 5% of the finned length of any one tube.
- 5.8 Fin pull tests will be performed randomly on a minimum of 10% of the order. Testing is done by making two cuts through the fin about a 1/2" apart at the fin base. A minimum of 10 lbs. pull will be applied to the 1/2" fin section via vise grip pliers.
- 5.9 The number of fins per inch shall be as specified +/- 5 percent as determined on not less than 12 in. of finned length.
- 5.10 Finished finned tubes shall be straight with a maximum deviation of 1/4" in any 10 ft. section of tube.

6.0 INSPECTION

- 6.1 Upon receipt at Vulcan's shop, tubes shall be visually inspected to verify dimensions and material specification and to ensure no obvious defects. Tube material having any defects that may effect weld quality will be separated, returned to vendor or scrapped. After inspection, conforming tube materials will be separated by shop order and placed in their proper location.
- 6.2 Prior to production, fin material shall be visually inspected to verify dimensions and material specification and to ensure no obvious defects. Fin material having any defects that may affect weld quality will be separated, returned to vendor or scrapped.
- 6.3 All finned tubes are visually inspected at machine setup and randomly throughout the finning process to ensure they meet Standard Specifications. A final inspection is provided before the product is packaged. All finned tubes shall meet Standard Specifications and have a workmanlike finish and be free from obvious defects.

7.0 PRODUCT MARKING

- 7.1 Due to the nature of this product, individual adhesive trace labels cannot be used. However, Vulcan will supply mill test reports on all orders.

8.0 PRODUCT PACKAGING

- 8.1 Standard packaging options are fully enclosed steel-banded wooden crates. Other options such as export quality crating and fumigation can be provided upon request.