

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS C-1059
		Former Designation: TMS-1059
TITLE: Aluminum Tubing for Engine Air/Fluid Systems		CURRENT REV No.: 1704
		DATE: April 2017
WRITTEN/EDITED BY: W. Cook	APPROVED BY: R. Goluch	SUPERSEDES: Rev. 1604 – April 2016
PRINTED COPIES OF THIS DOCUMENT MUST BE VERIFIED FOR CURRENT REVISION		
<i>This specification may involve hazardous materials, equipment, and procedures. This specification does not purport to address all of the safety issues associated with its use. The user is responsible to consult appropriate safety and health practices and to determine the applicability of regulatory limits prior to use.</i>		

1.0 APPLICATION

This specification covers aluminum tubing used in coolant, engine air intake, and charge air cooler systems (CAC), with formed, beaded, or straight ends.

2.0 SCOPE

This specification covers construction, material, welding, dimensional tolerances, KCC, workmanship standards, source approval and quality control, and shipping requirements.

NOTE: Existing drawings for product covered by this specification may refer to Engineering Drawing AM-74447 or to MPAPS F-1058 for workmanship standards; such references on existing drawings are superseded by this specification.

NOTE: Coolant hose end form designs are covered by MPAPS F-1. Any releases after April 2012 shall use that standard.

2.1 Restricted Chemical Substances

Effective January 1, 2007, all product supplied to the requirements of this specification must comply with the requirements of the MPAPS B-50 specification.

3.0 REFERENCE DOCUMENTS

Unless otherwise specified, the latest issue of all referenced standards shall apply. The following Specifications, Standards, and Regulations are referenced in this specification.

Quality System Standard ISO 9001 or TS-16949	NAVISTAR MPAPS F-1
CFR Title 29, Part 1910	NAVISTAR MPAPS F-2
CFR Title 40, Section 205	NAVISTAR MPAPS C-10
NAVISTAR Supplier Packing and Shipping Std. D-13	AWS A2.4
NAVISTAR Engineering Design Std A-16	ANSI H35.2
NAVISTAR MPAPS B-50	AWS D1.2

This document is restricted and may not be sent outside Navistar, Inc. or reproduced without permission from Corporate Technical Standards. Suppliers are required to assume all patent liability. ©2017 by Navistar, Inc.

APRIL 2017



Documents

Page 1 of 15

Document Sharing Hub

NUMBER: MPAPS C-1059	TITLE: Aluminum Tubing for Engine Air/Fluid Systems	REVISION: 1704
--------------------------------	---	--------------------------

4.0 REQUIREMENTS

4.1 Construction

4.1.1 Engineering design (RPO) is generally based upon single piece construction, rather than cut and weld construction. The welding process adds extra cost and introduces distortion, which reduces the consistency and accuracy of alignment at the tube ends. Unless otherwise specified on the engineering drawing or purchase order, the use of cut and weld construction shall require engineering approval.

4.1.2 In many cases, tubing used in the air intake and/or charge air systems are parts of the truck system which are required to meet Federal Noise Regulations (CFR Title 40, Section 205). All such applications shall be so indicated on the engineering drawing, and in these applications no deviations in construction and/or material shall be permitted without prior Engineering approval.

4.2 Material Requirements

Unless otherwise specified on the engineering drawing, tubing supplied will meet the following requirements:

4.2.1 Tubing Material: Shall be 3003, 6061, or 6063 aluminum per MPAPS C-10.

4.2.2 Temper: Unless engineering drawing specifies a particular temper, the tubing fabricator is responsible to select a temper suitable for fabrication which will allow the part(s) to meet the requirements of this specification.

4.2.3 Tubing: Shall be seamless drawn, extruded, or welded tube at the option of the tubing fabricator. Tubing shall meet dimensional requirements of ANSI H35.2.

4.3 Dimensional Tolerances

Unless otherwise specified, the dimensional tolerances shown in Figs. 2 thru 10 of this specification shall apply to fabricated tube and tube assemblies, and the standard dimensional tolerances shown in the title block of the Navistar Engineering drawing are not applicable.

4.3.1 Tubing Wall Thickness

Tubing wall thickness shall be specified on the engineering drawing. On existing drawings where thickness is not specified, wall thickness shall be 0.083 inch.

4.4 Welding

Required welding will be specified on the engineering drawing, and will comply with the American Welding Society standard AWS D1.2, Structural Welding Code for aluminum. Weld symbols shown on engineering drawings shall be in accordance with AWS A2.4. Sizes of fillet/groove welds shown on the engineering drawing are *minimum* values.

4.4.1 Welds on Fabricated Tubing

All welds on fabricated tube shall be neat and continuous with a minimum of flash and/or weld spatter. No weld spatter is permitted on flange sealing surfaces.

4.4.2 Leakage

Welded pipes/tubing shall show no leakage when pressure-tested at 25 psi (min) pressure.

NUMBER: MPAPS C-1059	TITLE: Aluminum Tubing for Engine Air/Fluid Systems	REVISION: 1704
--------------------------------	---	--------------------------

4.5 Workmanship

4.5.1 Unless otherwise specified, contour of the pipes/tube is to be maintained to provide ± 0.25 -inch location of the end points with the layout. Intermediate points shall be located within ± 0.25 inch. Bend radii to be within ± 0.25 inch. See Figures 2 and 3.

4.5.2 Wrinkles in or adjacent to bends shall not exceed 0.030-inch depth on pipes/tubes up to 3.0 inch OD (inch) and shall not exceed 0.040-inch depth on larger OD pipes/tubes.

4.5.3 Reduction of the OD in bend areas shall conform to limits shown in chart #1 and Fig. 3.

4.5.4 There shall be no severe scratches or tool marks on the pipe/tube. All product supplied to the requirements of this specification shall be free of oxidation, stains, oil, dirt, metal chips, grease, etc., and shall be clean and dry to the touch. When specified on the engineering drawing, the pipe shall meet cleanliness requirements of MPAPS F-2 and, when so specified, the ends of the pipe shall be capped or otherwise protected to prevent contamination in shipment and/or storage.

5.0 QUALIFICATION

Engineering qualification of sources is required in advance of production shipments. Samples shall be accompanied by test data certifying that all requirements of the specification have been met.

5.1 Quality Control Plan

A Quality Control Plan for products supplied to the requirements of this specification will be established by mutual agreement between NAVISTAR and the supplier. Unless specific exception is noted, the following characteristics, where applicable*, shall be included in the plan as features for management by statistical process control.**



- * Other characteristics for inclusion in the control plan may be specified on the engineering drawing and/or purchase order.
- ** See NAVISTAR Engineering Design Standard A-16

5.2 KCC Requirements Applicable To CAC Pipes

Specific dimensions have been designated by Engineering as KCC features for all charge air cooler (CAC) pipes. Unless specific exception is noted on the engineering drawing and/or purchase order, the following characteristics are designated as KCC features:



1. OD of the pipe within 1.5 inches of the pipe ends.
2. Height of the sealing bead.

5.3 KCC Requirements Applicable to Air Cleaner Pipes

Specific dimensions have been designated by Engineering as KCC features for air cleaner pipes. Unless specific exception is noted on the engineering drawing and/or purchase order, the following characteristics are designated as KCC features:



1. OD of the pipe within 1.8 inches of the pipe ends.
2. Height of the sealing bead.

This document is restricted and may not be sent outside Navistar, Inc. or reproduced without permission from Corporate Technical Standards. Suppliers are required to assume all patent liability. ©2017 by Navistar, Inc.

APRIL 2017



Documents

Page 3 of 15
Document Sharing Hub

NUMBER: MPAPS C-1059	TITLE: Aluminum Tubing for Engine Air/Fluid Systems	REVISION: 1704
---------------------------------------	--	---------------------------------

6.0 SOURCE APPROVAL AND QUALITY CONTROL

6.1 Supplier Requirements

All suppliers to NAVISTAR are required to be registered to ISO 9001 Quality System Requirements. NAVISTAR will also accept TS-16949 registration as long as the supplier can also fulfill all AIAG PPAP (Production Part Approval Process) documentation and approval requirements. Suppliers must maintain their certification with an accredited registrar and must furnish copies of registration certificates to their Corporate Buyer upon request.

6.2 Approval

Parts supplied against contracts or purchase orders citing this specification shall be equivalent in all respects to those samples which were approved by the purchaser. No changes in formulation or processing practices are permitted without approval. In the event that changes in material, properties, processing practices, construction, color, or labeling of the product are required, the supplier shall notify NAVISTAR Materials Engineering and Purchasing and Supplier Development of the proposed change(s). Test data indicating conformance to all requirements of this specification, test samples, and new or amended or updated Material Safety Data Sheet(s) (MSDS), in accordance with CFR Title 29, Part 1910 shall be submitted with the request for change.

6.3 Process Control

The supplier shall either perform and report results of tests on specific lots of parts produced using ISO 9001 or TS-16949 guidelines, or provide statistical evidence of the lot having been produced in a state of statistical control and with a process capable of providing all required properties. The part supplier and the quality control manager of the using NAVISTAR plant may determine testing and reporting requirements on specific products.

7.0 SHIPPING AND HANDLING

Shipping and identification shall be in accordance with NAVISTAR Supplier Packing and Shipping Standard D-13. Parts shall be packaged so as to avoid any damage in shipment detrimental to the appearance of the part.

8.0 DESIGNATION ON DRAWINGS

The drawing must indicate material and workmanship as per MPAPS C-1059. Standard drafting stamps/notes are included in the UG library.

Example of note to use on drawings:

1. For pipe material, material specification, and workmanship, see MPAPS C-1059.
2. Bead design per MPAPS C-1059, Fig. 5 or Fig. 7
3. Optional Engagement Dimple per MPAPS C-1059, Fig. 9
4. Cleanliness per MPAPS F-2; ends to be capped.



See requirements per MPAPS C-1059

This document is restricted and may not be sent outside Navistar, Inc. or reproduced without permission from Corporate Technical Standards. Suppliers are required to assume all patent liability. ©2017 by Navistar, Inc.

APRIL 2017



Documents

Page 4 of 15
Document Sharing Hub

NUMBER: MPAPS C-1059	TITLE: Aluminum Tubing for Engine Air/Fluid Systems	REVISION: 1704
---------------------------------------	--	---------------------------------

9.0 TECHNICAL INFORMATION

For further information related to the technical content of this specification, contact:	Suppliers may purchase controlled copies of this specification by contacting:
Materials Engineering and Technology Dept. 10400 W. North Avenue Melrose Park, IL 60160 E-mail: MaterialsEngineering@Navistar.com	IHS Markit Inc. 15 Inverness Way East Englewood CO 80112-5776 Phone: 1-800-854-7179 E-mail: Automotive@IHS.com Website: http://global.ihs.com

This document is restricted and may not be sent outside Navistar, Inc. or reproduced without permission from Corporate Technical Standards. Suppliers are required to assume all patent liability. ©2017 by Navistar, Inc.

APRIL 2017



Documents

Page 5 of 15

Document Sharing Hub