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TITLE: Quality Requirements For Laser Welded Parts		CURRENT REV. No.: 1212 DATE: December 2012
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<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>		
Change Notice: NEW		
Keywords: Welding, laser welding, sheet metal welding, tailor welded blanks.		

1.0 APPLICATION

This specification covers the quality requirements for laser welding used in fabricating truck parts, bodies, and other truck components made from uncoated low carbon or high-strength steel grades (CEMS A-6 Part I), galvanized steel (CEMS A-6 Part II), stainless steel per CEMS A-37, and aluminum alloys per CEMS C-10. Laser welding may generally be considered for parts having material thicknesses in the range of 0.6 to 3.5 mm. A laser weld is expected to be at least as strong as the parent material.

2.0 SCOPE

This specification establishes quality requirements and defines test procedures used to assess quality and performance of laser welded parts.

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 CEMS B-50 specification.

3.0 REFERENCE DOCUMENTS

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

Quality System Standard ISO 9001 or TS-16949	NAVISTAR CEMS A-6, Part I
NAVISTAR Manufacturing Standard MS-D-13	NAVISTAR CEMS A-6, Part II
CFR Title 29, Part 1910	NAVISTAR CEMS A-37
NAVISTAR CEMS B-50	NAVISTAR CEMS C-10
AWS A2.4	AWS C7.2M

4.0 GENERAL REQUIREMENTS

4.1 Base Metal

4.1.1 Uncoated Metal

The type of uncoated metals covered in this spec would include:

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- 1) low carbon steel (Grade 1 per CEMS A-6, Part I)
- 2) structural steel (SS) (Grade 6, Types 205SS-380SS, per CEMS A-6, Part I)
- 3) high-strength low-alloy (HSLA) steel (Grade 6, Types 275X-550X per CEMS A-6, Part I)
- 4) stainless steel per CEMS A-37
- 5) aluminum alloys per CEMS C-10

4.1.2 Metallic Coated Steel

Carbon steel sheet to be laser welded may also be coated, on one or both sides, with zinc or zinc alloy coating (Grade 1GALV or Grade 6GALV) or aluminum (Grade 1A) per CEMS A-6, Part II.

4.2 Weld Requirements

The type of welds required and weld joint location will be specified on the engineering drawing using standard welding symbols per American Welding Society AWS A2.4. In addition, LBW (laser beam weld) will be placed in the weld symbol tail to indicate that laser welding is required.

4.2.1 Types of Joints

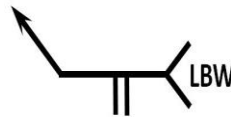
4.2.1.1 Butt Joint

The butt joint is a joint between two members lying approximately in the same plane, as shown below. Most laser welded butt joints are prepared as square groove welds (see weld symbol below).

Example of butt joint:



Square groove weld symbol:



4.2.1.2 Other Joints

Other joints which are sometimes joined using laser welding include the T-joint and lap joint. The choice of weld symbols for these types of joints would depend on the desired weld requirements. See AWS A2.4 for weld symbols to use.

4.2.1.2.1 T-Joint

A T-joint is the joint between two members located approximately at right angles to each other to form a "T" (see below). Refer to AWS C7.2M, Figure 7.11, for common T-joint configurations related to laser welding.

Example of T-joint:



4.2.1.2.2 Lap Joint

A lap joint is a joint between two overlapping members as shown in the figure below. Refer to AWS C7.2M, Figure 7.12, for common lap joint configurations related to laser welding. The applicable weld symbol would be shown on the engineering drawing, depending on the type of lap joint weld required.

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