



Engineering Specification

Larson Electronics LLC
9419 US-HWY 175
Kemp, Texas 75143

Name: **LARSON ELECTRONICS' MODIFIED SAE ALUMINUM ALLOY 310**

Part #: **EPL-AEB**

Purpose: This specification establishes requirements for aluminum sand casting alloy used in Larson Electronics' products.

Applicability: This specification is applicable to all modified SAE 310 secondary aluminum sand casting alloy purchased and used by foundries producing sand castings for Larson Electronics. Cross reference to modified SAE 310 is modified ANSI, ASTM or AA No. 712.2.

Authority: Revisions to this specification shall be granted only after being submitted to Product Engineering for approval.
All casting drawings using this specification should have the material called out in the "Notes" area as follows:

"MATERIAL: Modified SAE 310 Aluminum Alloy per
Larson Electronics' Engineering Specification APL-
AEB."

General: Product Engineering must investigate any changes that could affect third party listings or approvals. Changes may require resubmittal to one or more third party agencies (e.g. for Factory Mutual use Form 797).

1.0 General Modified SAE 310 aluminum sand casting alloy is used for general structural castings requiring high strength and shock resistance without requiring heat treating.
The 310 alloy has an average ability to withstand contraction stress while cooling through hot-short or brittle temperature ranges and above average pressure tightness and fluidity of liquid alloy to flow readily filling thin sections.

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2.0 Aging of Castings

2.1

Castings must be aged 21 days at room temperature to obtain full strength. Normal machining can only be done after the aging process is completed.

2.2

Accelerated aging can be obtained by oven treatment of the castings at 350°F +/- 10°F (177°C +/- 6°C) for a period of ten hours.

3.0 CHEMICAL COMPOSITION OF MODIFIED SAE 310 SECONDARY ALUMINUM INGOT & FINISHED CASTINGS

3.1

Element values are maximum percentages except where indicated as a range.

Elements	Ingot		Finished Castings	
	Minimum	Maximum	Minimum	Maximum
Zinc (Zn)	5.00	6.50	5.00	6.50
Magnesium (Mg)	.65	.75	.60	
Chromium (Cr)	.40	.60	.40	.60
Manganese (Mn)		.10		.10
Copper (Cu)		.25		.25
Silicon (Si)				.30
Iron (Fe)		.0		.50
Nickel (Ni)				.05
Titanium (Ti)	.5	.25		.25
Tin (Sn)		.05		.05
Lead (Pb)		.05		.05
Aluminum (Al)	Remainder		Remainder	

3.2

During the casting process the percentage of magnesium must be maintained to meet the finished casting element requirements. If the magnesium burns out of the alloy during the process, magnesium must be added to ensure the strength factor of the casting.



4.0 **Certification**

4.1

With each shipment of ingots, vendor to supply Larson Electronics' Quality Assurance Department certification that ingots meet requirements for modified SAE 310 alloy. Ingots to be issued lot and date code identification for traceability.

4.2

Foundries to provide with each shipment of castings, ingot lot number and date code information. Larson Electronics' Quality Assurance incoming inspection department to periodically send samples to an independent laboratory for chemical analysis and Brinell Hardness check. Chemical analysis to be made for the elements which are listed under 3.1. If, however, the presence of other elements in to be in excess of the specified limits, further analysis is made to determine that those elements are not in excess of the amount specified.

5.0 **TYPICAL MECHANICAL AND PHYSICAL PROPERTIES OF MODIFIED SEA 310 ALUMINUM SAND CASTING ALLOYS** (Note: Design strength should be less)

5.1

Mechanical Properties Specified Limits
Tensile strength minimum - 35000 P.S.I. (241316 kPa)
Yield strength (0.2% offset) minimum - 25000 P.S.I. (172369 kPa) Elongation in 2 inches (50.8 mm) minimum % - 4.0
Temper -T 5

5.2

Typical Physical Properties (Aged)
Hardness - Brinell scale
10 mm standard ball
500 kg load
Reading 75

Density - .102 lbs/in³ (2823 kg/m³)



6.0 **COMMERCIAL PACKAGING**

- 6.1 Each shipment shall be marked with the Larson Electronics' Purchase Order number, type material, specification number, alloy and temper, gross and net weight, and the manufacturer's name or trademark.

7.0 **REJECTION AND DISPOSAL**

- 7.1 If the material upon delivery to the purchaser does not comply with these specifications, the supplier shall be so advised so that suitable arrangements for the disposal of material can be made. Purchaser shall be allowed full credit for all material returned at purchase price, including freight and handling charge. If the material is to be replaced, a new order will be entered at terms acceptable to the purchaser.