



Zinc Alloy Ingots for High Pressure Die Casting

1 Scope

This material specification covers commercial zinc alloys in ingot form for remelting for the manufacturing of high pressure die castings used in automotive applications and other allied industries. Zinc alloy ingots are specified by the chemical composition.

1.1 Material Description. These zinc alloy ingots are produced for use in high pressure die casting. Each zinc ingot grade has a composition that aligns with, but is tighter than, the respective die cast grade. The various grades of pressure die cast zinc alloys can be referenced in GMW worldwide specification GMW3341.

1.1.1 Material Identification. This specification covers the GMW3344 ingot grades listed below in Table 1 and the commercial alloy that each ingot will ultimately make. Appendix Table A1 provides a relationship between some of the national and international specifications and these GMW3344 alloy grades.

Table 1: Ingot Grades and Commercial Alloys

Ingot Grades	Commercial Alloy
Al4Mg	Zamak 3
Al4Cu1Mg	Zamak 5
Al4Cu3Mg	Zamak 2
Al8Cu1Mg	ZA 8
Al11Cu1Mg	ZA 12
Al27Cu2Mg	ZA 27
Cu6Al3Mg	ACuZinc 5
Cu10Al4Mg	ACuZinc 10

1.2 Symbols. Not applicable.

1.3 Applicability. Zinc alloy ingots are used as the base melting stock to cast zinc alloy parts for automotive usage. Various compositions are needed to meet the strength requirements of the different high pressure die casting grades.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM B240 ASTM B892 EN 1774 ISO 301

2.2 GM Standards/Specifications.

GMW3059 GMW3341

3 Requirements

3.1 Requirements on Delivery.

3.1.1 Chemical Requirements. Ingots furnished to this specification shall conform to the chemical composition limits shown in Table 2. Exceptions to GMW3344 composition requirements require agreement from purchaser (Design Responsible Engineer or delegate), and shall be explicitly documented on the GM engineering drawing and other equivalent part specification documents. Sampling of the zinc alloy ingots for compliance with the chemical requirements shall be in accordance with ASTM B240.

Table 2: Chemical Composition Limits for GMW3344 Zinc Alloy Ingot

Element ^{Note 1}	Al	Cu	Mg	Fe	Pb	Cd	Sn
Al4Mg	3.9 to 4.3	0.10 max.	0.025 to 0.05	0.075 max.	0.004 max.	0.003 max.	0.002 max.
Al4Cu1Mg	3.9 to 4.3	0.75 to 1.25	0.03 to 0.06	0.075 max.	0.004 max.	0.003 max.	0.002 max.
Al4Cu3Mg	3.9 to 4.3	2.5 to 3.3	0.025 to 0.05	0.075 max.	0.004 max.	0.003 max.	0.002 max.
Al18Cu1Mg	8.2 to 8.8	0.8 to 1.3	0.02 to 0.03	0.065 max.	0.005 max.	0.005 max.	0.002 max.
Al11Cu1Mg	10.8 to 11.5	0.5 to 1.2	0.02 to 0.03	0.065 max.	0.005 max.	0.005 max.	0.002 max.
Al27Cu2Mg	25.5 to 28.0	2.0 to 2.5	0.012 to 0.02	0.072 max.	0.005 max.	0.005 max.	0.002 max.
Cu6Al3Mg	2.8 to 3.3	5.2 to 6.0	0.035 to 0.05	0.05 max.	0.004 max.	0.003 max.	0.002 max.
Cu10Al4Mg	3.2 to 4.0	10.2 to 11.0	0.035 to 0.05	0.05 max.	0.004 max.	0.003 max.	0.002 max.

max. = maximum

Note 1: Composition limits in percent (%) by weight. Remainder of each alloy is Zn.

3.1.2 Identification Requirements. Each ingot shall be marked with a grade designation by a cast, stamped or color identification. In addition, each bundle or pallet of ingots shall be identified with the manufacturer's name, the respective heat or lot identification and the total weight of each bundle or pallet.

3.1.3 Color Coding. The color coding for zinc ingots shall consist of a two color system with the exception of Cu10Al4Mg which use a three color code. The color coding for each ingot grade is listed in Table 3.

Table 3: Color Coding by Ingot Grade

Ingot Grade	Color Code
Al4Mg	White/yellow
Al4Cu1Mg	White/black
Al4Cu3Mg	White/green
Al8Cu1Mg	White/blue
Al11Cu1Mg	White/orange
Al27Cu2Mg	White/violet
Cu6Al3Mg	White/red
Cu10Al4Mg	White/red/green

3.1.4 Shape of Ingots. The shape of the ingots shall be at the discretion of the supplier, unless a specific shape is agreed upon between the purchaser and the supplier.