Aluminum 2A12 and LY12: The Chinese Aerospace Standards (GB/T)

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Designation History and Relationship

For US-based engineers and procurement managers, **2A12** and **LY12** are often sources of confusion. They are effectively the Chinese equivalents of **AA2024**, governed by the **GB/T 3190** standard.[3]

- **LY12 (Old Designation):** Derived from the Chinese Pinyin system—"Lü" (Aluminum) and "Ying" (Hard). This designation was used in older standards (YZ/T) and Soviet-influenced nomenclature.
- **2A12 (Current Designation):** The modern designation under GB/T 3190. The "2" indicates the Al-Cu series, and "A" indicates the original alloy composition.
- **Equivalence:LY12 = 2A12 $\approx$ AA2024**.[4][5]

Chemical Composition: GB/T 2A12 vs. AA2024

While 2A12 is the "equivalent" of 2024, there are subtle differences in impurity limits that can affect certification for western aerospace projects (e.g., FAA/EASA parts).

Element	2A12 (GB/T 3190)	2024 (ASTM B209 / AMS)	Difference Analysis
Copper (Cu)	3.8 – 4.9	3.8 – 4.9	Identical range.
Magnesium (Mg)	1.2 – 1.8	1.2 – 1.8	Identical range.
Manganese (Mn)	0.3 – 0.9	0.3 – 0.9	Identical range.
Iron (Fe)	$\le$ 0.50	$\le$ 0.50	Identical limit.
Silicon (Si)	$\le$ 0.50	$\le$ 0.50	Identical limit.
Zinc (Zn)	**$\le$ 0.30**	**$\le$ 0.25**	2A12 allows slightly more Zn.[46]
Nickel (Ni)	**$\le$ 0.10**	Not Specified	2A12 explicitly limits Ni.[46]
Titanium (Ti)	$\le$ 0.15	$\le$ 0.15	Identical limit.

Data Source: [38]

Certification Risk: While the chemistry is nearly identical, a material certified *only* as 2A12 may not automatically meet AMS 4037 specifications required for Boeing/Airbus parts without re-certification, particularly regarding the specific controls on trace elements and the rigorous batch testing protocols required by AMS.[38]

Mechanical Properties (2A12-T4)

The mechanical performance of 2A12-T4 mirrors 2024-T4, confirming its suitability as a direct substitute in non-certified or domestic (Chinese) aviation applications.

Property	2A12-T4	Unit
Ultimate Tensile Strength	415 – 470	MPa [48]
Yield Strength	265 – 300	MPa [48]
Elongation	10 – 15%	% [48]
Hardness	120 HB	HB [38]

Applications of 2A12/LY12

- **Chinese Aerospace:** Structural skins, bulkheads, and wing ribs for domestic aircraft (e.g., COMAC) and military aviation.[46]
- **General Manufacturing:** High-load components, rivets (used in annealed condition), and molds where 2024 would be specified.[2]