

What Is 3003 H22 Aluminum Diamond Tread Plate?

If you are looking for a reliable material for industrial flooring or vehicle modification, you will often see the specification "3003 H22." But what exactly is it?

A 3003 H22 aluminum diamond tread plate is a medium-strength aluminum alloy sheet featuring a raised diamond or bar pattern on its surface. It is specifically designed for anti-slip safety, excellent corrosion resistance, and lightweight structural applications.

Here is the basic technical breakdown:

- Alloy: 3003 (An Aluminum-Manganese alloy)
- Temper: H22 (Strain-hardened and partially annealed)
- Surface Pattern: Diamond pattern / Checker pattern / 5-Bar pattern
- Manufacturing Standard: ASTM B209 / QQ-A-250/2

Because it balances durability, safety, and cost, this specific aluminum checker plate is widely used globally in manufacturing truck beds, stair treads, cold storage flooring, and heavy-duty industrial platforms.

1 . 3003 Aluminum Plate Chemical Composition

Element	Content (%)
Aluminum (Al)	≥ 96.8
Manganese (Mn)	1.0 - 1.5
Copper (Cu)	0.05 - 0.20
Silicon (Si)	≤ 0.6
Iron (Fe)	≤ 0.7
Zinc (Zn)	≤ 0.1

Engineering Insight for Buyers:

The most important element here is Manganese (Mn). Adding 1.0% to 1.5% manganese increases the overall strength of the 3003 alloy, making it about 20% stronger than the standard 1100 series pure aluminum. Despite this increase in strength, it still maintains the excellent rust resistance and weldability that aluminum is famous for.

2 . Mechanical Properties of 3003 H22 Aluminum Tread Plate

Property	Typical Value
----------	---------------

Tensile Strength	~140 MPa
Yield Strength	~94 MPa
Elongation	≥ 7%
Hardness (HB)	~37
Elastic Modulus	~70 GPa

What these numbers mean for your project:

- Yield Strength (94 MPa): This indicates how much stress the plate can handle before it permanently deforms. It is sufficient for standard foot traffic and light hand-trolley movement.
- Elongation (≥ 7%): This shows the material is flexible enough to be bent into shapes (like toolbox edges or stair nosings) without cracking at the corners.

3 . What Does "H22" Temper Mean?

Many buyers understand the 3003 alloy but get confused by the "H22" temper designation. The temper indicates how the metal was treated after it was cast, which directly affects its hardness and flexibility.

H22 stands for: Strain Hardened + Partially Annealed (Quarter Hard).

During production, the aluminum is rolled at room temperature to make it stronger (strain hardening). However, this makes the metal brittle. To fix this, the factory applies a specific heat treatment (partial annealing) to soften it just enough to prevent cracking during future bending, while keeping most of the strength.

3003 H22 vs. Other Tempers (Comparison Table):

Temper	Strength Level	Formability / Bending	Best Application
O (Soft)	Low	Excellent	Wall decoration, complex pressing
H14	Medium	Good	Light-duty panels, standard covers
H22	Medium+	Good+	Flooring, general structural use
H24	Higher	Moderate	Heavy load areas, flat truck beds

Conclusion: The H22 temper provides the perfect middle ground. It is stronger than the fully soft (O) condition, yet much easier to bend and fabricate than the H24 condition. This makes it the standard choice for general contractors and manufacturers.

4 . Why Buy 3003 H22 Aluminum Diamond Plate?

- **Excellent Corrosion Resistance:** It naturally resists oxidation and rust. It is highly suitable for humid indoor environments or outdoor exposure where regular carbon steel would quickly rust.
- **Reliable Anti-Slip Surface:** The raised diamond or bar patterns create strong friction. This improves safety for workers and prevents cargo from sliding during transport.
- **Extremely Lightweight:** Aluminum is only about one-third the weight of steel. Using aluminum floor plates reduces the structural load on buildings and saves significant fuel costs for commercial transport vehicles.
- **Easy Fabrication & Weldability:** You can easily cut, drill, bend, and weld 3003 H22 aluminum plates using standard factory equipment. This reduces labor time and installation costs.
- **Cost-Effective:** Compared to the stronger 5052 or 6061 marine-grade aluminum alloys, 3003 is much more affordable. It offers the best return on investment for projects that do not involve heavy saltwater exposure.

5 . Typical Applications of 3003 H22 Aluminum Diamond Plate

- **Truck Beds & Trailers:** Used as the flooring for pickup trucks, utility trailers, and delivery vans. It protects the vehicle structure and stops cargo from shifting easily.
- **Industrial Flooring & Walkways:** Installed in factories, power plants, and chemical facilities to create safe, non-slip elevated platforms for machine operators.
- **Stair Treads & Ramps:** Used for building durable stairways and wheelchair access ramps, ensuring safe footing even when the surface is wet from rain.
- **Cold Storage Flooring:** Cold rooms experience heavy condensation. Because 3003 aluminum does not rust in freezing, wet conditions, it is the standard flooring material for food processing plants and freezer warehouses.
- **Decorative Wall Panels:** The bright, industrial diamond pattern is often used to protect walls in commercial kitchens, gyms, and retail stores from trolley impacts.

(1) Recommended Sizes for Purchasing

Application Scenario	Recommended Thickness	Recommended Temper
Pedestrian Flooring	2.5 mm - 4.0 mm	H22 / H24
Truck Beds / Trailers	3.0 mm - 6.0 mm	H22 / H24
Cold Storage Rooms	2.0 mm - 3.0 mm	H14 / H22
Wall Protection / Decoration	1.0 mm - 2.0 mm	O / H14

Note: The most popular and versatile specification purchased by our global clients is the 3.0 mm thickness, H22 temper, with a 5-bar or Diamond pattern.

6 . Factory Manufacturing Process

At GNEE, our production follows a standardized industrial flow:

- **Aluminum Ingot Melting:** High-purity aluminum ingots are melted and mixed with manganese to create the exact 3003 chemical composition.
- **Hot Rolling & Cold Rolling:** The cast aluminum blocks are rolled under massive pressure to reach the desired base thickness.
- **Embossing (Pattern Creation):** The flat sheet passes through specialized embossing steel rollers. Extreme pressure forces the aluminum into the engraved rollers, creating the raised diamond or bar patterns.
- **Heat Treatment:** The plates are carefully heated in annealing furnaces to achieve the precise H22 temper, balancing strength and bending ability.
- **Surface Finishing & Cutting:** The edges are trimmed, and the plates are cut to the standard sizes (e.g., 4x8 ft) or custom dimensions requested by the buyer.

7 . Quality Control & Inspection

- **Chemical Analysis:** Spectrometers verify that the Manganese and other elements meet ASTM B209 standards.
- **Mechanical Testing:** We test samples for tensile strength and elongation to ensure the H22 temper is accurate.
- **Thickness & Tolerance Check:** Digital micrometers ensure the base thickness (excluding the pattern height) matches the order requirements.
- **Surface Inspection:** We visually and mechanically check for heavy oil stains, deep scratches, oxidation, and pattern uniformity.
- **Ultrasonic Testing:** For very thick plates, we use ultrasonic waves to ensure there are no hidden internal cracks or air bubbles.

8 . Export Packaging & Delivery

(1) Packaging Steps:

- **Moisture Barrier:** Every stack of plates is wrapped tightly in waterproof Kraft paper and tough PE plastic film.
- **Desiccant Addition:** Drying agents are placed inside the wrapping to absorb any condensation during ocean transit.
- **Edge Protection:** Rigid protectors are placed on all corners and edges to prevent bending from crane straps.
- **Palletizing:** The protected stack is secured with heavy-duty steel straps to fumigated, seaworthy wooden pallets or custom steel pallets.

(2) Delivery Information:

- **Factory Lead Time:** 7 to 25 days after deposit, depending on the production schedule and order size.
- **Shipping Range:** Global shipping via CIF, FOB, or DDP to Europe, Southeast Asia, the Middle East, Africa, and the Americas.

9 . Why Choose GNEE as Your Aluminum Supplier?

- **18+ Years Export Experience:** We understand international standards, shipping documents, and customs clearance.
- **Certified Production:** All materials strictly comply with ASTM B209, EN 573, and GB/T standards.
- **Stable Supply Chain:** Beyond 3003, we maintain massive stock and production capacity for 1000, 5000 (like 5052/5083 marine grade), and 6000-series aluminum products.
- **Customization:** We do not just sell standard 4x8 sheets. We provide custom widths, lengths, and specific pattern designs to minimize your factory waste.

10 . FAQ

Q1: Is 3003 H22 aluminum diamond plate strong enough for factory flooring?

Yes. For walking traffic, hand pallet jacks, and standard factory operations, it provides excellent anti-slip performance and structural support. Just ensure you select the correct thickness (usually 3.0mm to 5.0mm for heavy traffic).

Q2: Can I use 3003 H22 aluminum outdoors permanently?

Yes. The 3003 alloy has strong natural corrosion resistance. Rain and normal outdoor exposure will not cause it to rust like carbon steel. However, if it will be constantly submerged in deep seawater, we recommend upgrading to 5052 or 5083 marine-grade aluminum.

Q3: Which pattern offers the best anti-slip performance?

The 5-bar pattern generally offers the best multi-directional grip for industrial boots and tires. The 1-diamond pattern is also excellent and is often chosen for its balanced grip and highly attractive, classic appearance.

Q4: Can this material be laser cut or bent?

Yes. The H22 temper makes it highly suitable for cutting and bending. You can use standard press brakes to bend it up to 90 degrees without cracking, making it perfect for custom toolboxes and stair nosings.

Ready to start your project? Contact GNEE today for reliable quality and competitive factory-direct pricing.