

Inside Cleco Fastener Production: Quality and Application Insights

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Key Takeaways

104 - Clamping Handle Screw (Medium) — DIN 6336 □ GN 313 (Series 043) — DIN 6336 □ GN 313

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- Cleco fasteners provide temporary alignment for precision sheet metal assembly.
- Available in spring-operated, wing-nut, and heavy-duty types to suit various production needs.
- Standard sizes correspond to common rivet hole diameters, ensuring compatibility with permanent fasteners.
- Manufactured from heat-treated spring steel with corrosion-resistant plating for durability.
- Used globally in aerospace, automotive, and industrial fabrication for precise hole alignment.

On a busy aerospace assembly floor, a technician slides a Cleco fastener into a pre-drilled stack of aluminum skins. With a squeeze of pliers, the temporary clamp locks the layers flush for riveting. Behind that seemingly simple action is a tightly controlled manufacturing process that ensures each Cleco fastener delivers repeatable clamping force, resists corrosion, and survives thousands of cycles in demanding industrial environments.

Materials and Inputs Used

105 - Clamping Handle Screw (Long) — DIN 6336 □ GN 313 (Series 044) — DIN 6336 □ GN 313

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OEM-oriented Cleco fastener production begins with carefully selected wire rod and strip stock. For spring components, high-carbon steel wire conforming to ASTM A228 is common, selected for its fatigue resistance and consistent tensile strength. Bodies and collets are often cold-formed from medium-carbon or alloy steels such as 10B21 or 4037, which respond predictably to heat treatment. Where corrosion resistance is critical—in marine or chemical plant applications—stainless steel grades (e.g., 302 or 316) are specified. Brass variants are occasionally employed for non-magnetic requirements. All incoming material is verified against mill certificates for chemistry, diameter tolerance, and surface condition before it enters the production stream.

Step-by-Step Manufacturing Stages

Although Cleco fasteners are threadless by design, their production borrows heavily from precision fastener engineering. The typical sequence in a modern facility unfolds as follows:

1. **Wire drawing and straightening** — Cold-drawn wire is pulled through carbide dies to achieve the exact diameter required for the spring and collet blanks. This step also work-hardens the surface, improving subsequent formability.
2. **Cold heading / forming** — Multi-station headers cut blanks from the wire and progressively form the head geometry, through-hole, and stepped profiles of the collet body. In some designs, the expandable collet fingers are coined in a secondary press operation.
3. **Spring coiling** — The return spring is wound on CNC spring coilers that control free length, coil pitch, and end-grinding to exact tolerances. Consistency here is critical for uniform clamping action.
4. **Heat treatment** — Formed components pass through controlled-atmosphere furnaces for quench-and-temper cycles. Springs are typically oil-quenched and tempered to a specific Rockwell hardness range (often HRC 46–50) to prevent set and fatigue failure. Collets may undergo case hardening or carbonitriding for wear resistance at the expansion interface.
5. **Surface treatment / plating** — To withstand shop-floor exposure, Cleco fasteners receive zinc electroplating with clear or yellow chromate, black oxide, or in the case of stainless steel, electropolishing or passivation. Coating thickness is held within 6–12 microns to avoid interfering with the clamping mechanism.
6. **Assembly** — Components are brought together on automated lines that insert the spring, [lock washer](#), and actuator knob. Each assembled unit is cycled multiple times to verify smooth operation before packaging.

Equipment and Techniques That Drive Quality

Progressive cold headers with multi-tool stations allow complex collet geometries to be formed in a single feeding, reducing tolerance stack-up. CNC spring coilers ensure each spring exerts a near-identical force at the defined working range. Protective-atmosphere heat treatment furnaces with precise temperature ramping minimize decarburization and distortion. Plating lines with rotating barrels and computerized rectifiers deliver uniform coating thicknesses batch after batch. Investing in such dedicated equipment is what separates suppliers capable of meeting aerospace or tier-1 automotive requirements from general shops.

In-Line Quality Checkpoints During Production

Quality gates are embedded throughout the process. Before plating, a sample from each lot undergoes dimensional checks on optical comparators and pin gauges to confirm grip range and hole fit (common sizes: 3/32", 1/8", 3/16"). Spring force is verified with digital testers at several deflection points. Hardness testing follows heat treatment to validate soak time and temperature. After plating, coating thickness is measured via X-ray fluorescence or eddy current, and salt-spray testing per ASTM B117 confirms corrosion performance. Final inspection includes a functional cycle test and a visual check for burrs or missing parts.

Capacity, Consistency and Scalability for Bulk Orders

Because Cleco fasteners are consumable tooling, buyers often require annual volumes in the hundreds of thousands. A well-engineered production line with dedicated tooling supports consistent output, with cycle times below 2 seconds per piece on the header and sub-second assembly rates. Raw material stocking agreements and in-house tool-room capabilities enable suppliers to scale quickly without sacrificing dimensional stability. Process capability studies ($CpK > 1.33$) are routinely conducted on critical parameters, giving procurement teams the confidence needed for multi-year contracts.

Learn More About Our Manufacturing Process

For buyers sourcing large quantities of Cleco fasteners, seeing behind the scenes can be the deciding factor. Request a detailed process overview or schedule a virtual factory tour to evaluate the controls, equipment and expertise that stand behind every shipment.

How Cleco Fasteners Work in Temporary Assembly

A cleco fastener is a spring-loaded removable clamp that holds two or more layers of material in precise alignment during fabrication. Inserted into a pre-drilled hole, the plunger expands a split collet on the blind side, applying consistent clamping pressure without marking or deforming the hole. The spring mechanism, typically made of high-carbon steel, retains the pin securely until released with a dedicated plier. This tool compresses the spring and collapses the collet, allowing rapid insertion or extraction. The design enables fast, repeatable alignment for operations such as riveting, welding, and drilling, keeping holes concentric and workpieces flush before permanent fasteners are installed.

Common Types and Sizes of Cleco Fasteners

Cleco fasteners are produced in several styles to match assembly methods and accessibility:

- **Spring clecos (standard):** The most common type, operated with pliers. Available in diameters from 1/8 in to 1/4 in, with grip lengths accommodating material stacks up to approximately 0.25 in. Manufactured from heat-treated steel with zinc plating for corrosion resistance.
- **Wing-nut clecos:** Manually tightened by twisting a wing nut, eliminating the need for pliers. Suited for setups where tools are awkward or frequent adjustment is needed.
- **Heavy-duty clecos:** Feature a stiffer spring and larger grip range, used for thicker assemblies or where higher clamping force is required.
- **Angle or side-grip clecos:** Designed for confined spaces where a standard plier cannot engage.

All sizes correspond to standard rivet hole diameters, ensuring direct compatibility with permanent fasteners such as [Blind \(Pop\) Rivets](#).

Key Facts about Cleco Fasteners

- Temporary hole-alignment tool used in sheet metal, aircraft, and automotive assembly.
- Manufactured from high-carbon spring steel with corrosion-resistant plating (zinc with clear or yellow chromate).
- Common diameters match rivet hole sizes: 1/8 in, 5/32 in, 3/16 in, 1/4 in.
- Reusable for thousands of cycles; spring force remains consistent with proper handling.
- Operated with dedicated pliers that compress the spring for insertion or removal.
- Not intended for load-bearing applications; they are temporary positioning devices.

Selecting Cleco Fasteners by Application

Proper selection ensures accurate alignment and prevents hole distortion. Consider these factors:

- **Hole diameter:** Match the cleco to the final rivet or fastener size. Using an undersized cleco reduces clamping effectiveness; an oversized one can enlarge the hole.
- **Material stack-up:** Grip range must equal or slightly exceed the total thickness of the sheets being joined. A cleco that bottoms out will not clamp properly.
- **Environment:** For corrosive or outdoor applications, request stainless steel or cadmium-plated alternatives (though cadmium use is declining). Standard zinc plating with ASTM B633 Type III or VI is typical for indoor fabrication.
- **Production volume:** For high-throughput lines, spring clecos with dedicated pliers offer the fastest cycle. Wing-nut styles are slower but work without tools, making them ideal for prototyping or low-volume setups.
- **Accessibility:** In tight corners, angle-grip or short-body clecos allow insertion where standard pliers won't fit.

Cleco Fastener Production and Application Overview

Aspect	Key Details
Raw Material	High-carbon spring steel wire rod; meets standards comparable to ASTM A228.
Primary Forming	Wire drawing for precision diameter; cold heading to shape stem and collet.
Heat Treatment	Quench-and-temper cycle to achieve spring temper, balancing hardness and elasticity.
Surface Treatment	Zinc electroplating per ASTM B633; optional yellow chromate conversion coating.
Quality Control	Dimensional checks, spring force testing, plating thickness measurement, and functional cycling.
Typical Applications	Sheet metal alignment for riveting, welding, and drilling in aviation, automotive, and industrial fabrication.
Selection Criteria	Match hole diameter to rivet size; verify grip range for material stack; choose style based on access and volume.

For manufacturing engineers sourcing Cleco fasteners in volume, request a detailed specification sheet or submit your part drawing for a quotation. Our team can recommend the optimal size, finish, and style to streamline your assembly process.

Frequently Asked Questions

What is the function of a cleco fastener?

A cleco fastener temporarily clamps two or more sheets of material together, holding them in precise alignment while permanent fasteners are installed. It uses a spring-loaded plunger and expanding collet to grip the back side of the hole without damaging the material. Once the assembly is complete, the cleco is removed and reused.

Are there different types of cleco fasteners?

Yes. The most common is the spring cleco, operated with special pliers. Wing-nut clecos are tightened by hand, offering tool-free adjustment. Heavy-duty versions provide greater clamping force and grip range, while angle-grip models work in tight spaces.

What size hole for cleco fasteners?

Cleco fasteners are sized to match standard rivet hole diameters, typically 1/8 in, 5/32 in, 3/16 in, and 1/4 in. Selecting a cleco that is too small reduces clamping force; one that is too large can distort the hole.

Are cleco fasteners reusable?

Yes, they are designed for hundreds to thousands of cycles. The spring steel maintains consistent tension over time, provided the fasteners are used with the correct pliers and not overloaded beyond their grip range.

How do you use cleco fasteners?

Use dedicated cleco pliers to compress the internal spring. Insert the collapsed collet into the aligned holes, then release the pliers—the spring forces the plunger outward, expanding the collet to lock the sheets together. To remove, compress again with the pliers and pull the cleco out.

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