



EUROPERF

European Perforators Association

LIST OF RAW MATERIALS

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MILD STEEL (CARBON STEEL)

Mild steel is the most corrosive and therefore the least expensive of the three most commonly perforated metals.

It is manufactured in either sheet or coil form by roller flattening it to the desired thickness either initially whilst the steel is still hot or again after it has cooled, each of the Mild steel types listed below are referred to as either Hot Rolled or Cold Rolled. Differences in the processes result in products that differ in terms of cost, quality, and mechanical properties.

Hot Rolled is typically less expensive and produced in thicker gauges 1.5mm upwards whereas, Cold Rolled provides tighter tolerances, better surface finishes, and while it can be produced in practically any gauge, it is most readily available in thinner gauges 1.5mm – 0.4mm.

Due to mild steel being susceptible to corrosion, it is used in either unexposed applications or with a protective coating. Coatings such as paint and powder are applied after perforating and completely protect the material. Zinc and aluminised based coated metals (i.e. Aluminised Pre-Galvanised, Galvannealed, etc.) are produced and supplied from the mill and may not completely protect the material where the mild steel substrate is exposed during the perforating process.

Commonly Perforated Mild Steel (Carbon Steel) Types

Commercial Steel (HR, CR, GALVANISED, ALUMINISED)

Low cost steel that has good drawing, forming, and welding qualities, moderate strength, but is subject to strains, fluting, and fracture due to aging. To reduce the affects caused by aging, Drawing Steel is recommended.

Drawing Steel (HR, CR)

Steel with a greater degree of ductility and uniformity of properties than seen in Commercial Steel providing improved performance during manufacturing.

Forming Steel (GALV)

A steel with lower strength and higher elongation than Commercial Steel. Recommended when stresses from forming either crack or weaken Commercial Steel.

Unless specified by the customer, Perforating companies reserve the right to quote and/or supply either Hot Rolled or Cold Rolled Steel - depending on what is available, economical, and commonly perforated given the size and application.

If a steel type is not specified, Commercial Steel will be used for pricing and production.

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STAINLESS STEEL

In many situations galvanic protection from painting a mild steel surface is impractical. This is where the special oxide film formed on Chromium alloyed stainless steels become useful.

Many types of stainless steels have been developed to resist different corrosion environments and working conditions ensuring that works are safe, things last longer and our food is hygienic. Stainless steel is even used for things to clean up the exhaust gases from cars and power stations.

Stainless steel is also recyclable: when scrapped, it can be re-melted to make something new.

Stainless steels are Chromium containing steel alloys. The minimum Chromium content of the standardised stainless steels is 10,5 %. Chromium makes the steel 'stainless' -- this means improved corrosion resistance.

The better corrosion resistance is due to a Chromium oxide film that is formed on the steel surface. This extremely thin layer, under the right conditions, is also self-repairing.

Beside Chromium, typical alloying elements are Molybdenum, Nickel and Nitrogen. Nickel is mostly alloyed to improve the formability and ductility of stainless steel. Alloying these elements brings out different crystal structures for to different properties in machining, forming, welding etc.

The major types of stainless steel are:

- Austenitic stainless steels, which can be hardened by cold working, meet a wide range of design criteria. They are essentially non-magnetic although they may become slightly magnetic due to cold working.
- Martensitic stainless steels are straight-chromium types that can be hardened by heat treatment. They are magnetic.
- Ferritic stainless steels, like Martensitic stainless steels, are straight-chromium types and they are magnetic. Ferric stainless steel, however, cannot be hardened by heat treating and only moderately hardened by cold working.

Commonly Perforated Stainless Steel Types

EN 1.4301 (Austenitic)

One of the most widely used general-purpose stainless steels. It possesses an excellent combination of strength, corrosion resistance and fabricates well. To reduce carbide precipitation when welding, use 1.4307 for its lower-carbon content.

EN 1.4401 (Austenitic)

Superior corrosion resistance compared to other 300 series alloys when used in used harsh corrosive environments (ex. sea water, chemicals, etc.). To reduce carbide precipitation when welding, use 1.4404 for its lower-carbon content.

EN 1.4541 (Austenitic)

Titanium stabilised stainless steel to prevent intergranular formation of chromium carbide. It exhibits strength characteristics superior to those of 1.4301 stainless, thus making it best suited for parts, which cannot be subsequently annealed.

EN 1.4512 (Ferritic)

The lowest chromium content of the stainless steels, combines good elevated temperature corrosion resistance with medium strength, good formability and overall cost.

EN 1.4016 (Ferritic)

A general-purpose non-heat-treatable chromium type used for highly polished trim applications in mild atmospheres. Its strengths are in ductility, formability, good corrosion and oxidation resistance, thermal conductivity and finish quality.

If a stainless steel type is not specified, Europerf companies will use 1.4301 which is the most commonly perforated stainless steel for pricing and production

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ALUMINIUM

Aluminium is also corrosion resistant. It is, however, much lighter and softer than Stainless and Mild Steel. To prevent the dull appearance that results from the oxidation of the outer layer, Aluminium can be either be clear or colour anodised after perforating. Unlike paint or powder coating, anodise film is built from the aluminium itself and takes on a translucent appearance.

Commonly Perforated Aluminium Types

Al99.5

This commercially pure, low-strength alloy has excellent corrosion resistance and satisfactory anodising and coating finishes. It is unmatched by any other commercial aluminium alloy in workability.

AlMn1

A widely used general-purpose alloy because of its good corrosion resistance, moderate strength, formability, and weldability. This alloy may show some slight discoloration when anodised, but reacts well to other coating finishes.

AlMg1 (B)

Comparable to AlMn1 in strength and formability, this alloy has superior finishing characteristics making it much better for anodising.

AlMg2

A versatile high-strength alloy with good forming characteristics and excellent corrosion resistance. Although easily welded, it is not recommended for brazing and soldering applications. Anodised coatings may take on a yellowish tint if applied too thick.

If an aluminum type is not specified, Europerf companies will use Al99.5 which is the most commonly perforated alloy for pricing and production.