WDS Components Help Desk

Stainless Steel Fasteners

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How to Choose the Right Stainless Steel Fasteners for Your Application

When it comes to fasteners, there is wide and sometimes baffling choice regarding the correct fastener to choose for an application. This practical guide is designed as an overview for those familiar with basic fastener properties, but requiring focused guidance to make confident, application-specific choices.

We'll walk through how to choose the right stainless steel screws, bolts, panel fasteners, pins, and the nuts and washers to complete them, plus introduce the INOX Noir range, offering enhanced corrosion resistance and a sleek black finish.

Understanding Fasteners

Put simply, fasteners are mechanical components that join parts together. Common types (which this guide will concentrate on) include:

Screws and Bolts: Provide strong, often removable joints

Nuts and Washers: Secure screws/bolts and distribute load

Panel Fasteners: Enable quick access to components or enclosures

Detent Pins: Allow for fast, tool-free locking and release

Choosing the right fastener is key. Choosing the wrong fastener risks mechanical failure, poor longevity, or safety issues, particularly in demanding environments like aerospace, automotive, or outdoor installations.

Focus On Questions Regarding Your Application

To narrow the search for the right fastener, the following questions should be asked:

· Where will the fastener be used? Consider whether indoors, outdoors, marine, aerospace, automotive, food-safe, etc.

· What properties must it have? Think: corrosion resistance, strength, torque capacity, visual finish, tamper resistance, impact resistance, load strength.

· What are the environmental and mechanical conditions? Observe whether exposure to chemicals, moisture, vibration, high/low temperatures, speed of installation or removal.

· Are there industry standards or regulations to meet? e.g., ASTM, ISO, cleanroom, food safe, or aerospace specifications.

· What are the space constraints and tools available where the fastener will be used? This affects head type, clearance, and installation speed.

Material Considerations

In general, 303 and 304 stainless steel are appropriate for general use and where elements are enclosed. Added molybdenum increases 316 stainless steel's resistance to corrosion. This allows it to undergo regular and intensive chemical washdown without deterioration, making it the best choice for food grade or pharmaceutical uses.

INOX Noir fasteners are chemically blackened 303, 304 or 316 stainless steel. The black oxide process forms a durable, matte black magnetite layer that enhances the inherent corrosion resistance of stainless steel without affecting dimensions or fit, which is ideal for design-sensitive or exposed environments.

INOX Noir outperformed competitors in 240-hour ASTM B117 salt spray tests, showing no corrosion, making it ideal for marine, automotive, defense, and stage/screen applications.

The following table gives a summary of material considerations:

Property	303/304	316	INOX Noir
Corrosion Resistance	Moderate (general use)	Excellent (marine/chemical)	Excellent
(marine/chemical)			
Strength	High (tensile 500-700 MPa)	High (tensile 500-700 MPa)	High (tensile 500-700 MPa)

Aesthetics		
Industrial/standard		
Premium finish		
Premium finish		
Cost		
Low to moderate		
high		
high		
Typical Applications		
Machined parts, shafts, bolts, nuts, general fasteners		
Marine and chemical, high corrosion areas, visible fasteners, pharmaceutical		
Marine and chemical, high corrosion areas, visible fasteners, design		

Application Examples by Industry:

1. Marine & Offshore

Uses: Boats, docks, outdoor structures

Materials: 316 or INOX Noir

Why: Resistant to salt, moisture, and constant exposure

Examples: Loss prevention detent pins to secure doors or hatches, nuts and washers create precision seals with maximum corrosion resistance. Eyelets and eye nuts for ropes and lanyards.

2. Aerospace & Defense

Uses: Aircraft interiors, UAVs, satellite panels

Materials: 303/304, 316, INOX Noir

Why: Strength and corrosion resistance. INOX Noir reduces reflectivity in tactical uses while adding strength and durability.

3. Automotive & Motorsport

Uses: Body panels, engine mounts, exterior trim, underbody fixings

Materials: 303/304 for general use, 316 for harsh environments, INOX Noir for high-end finishes.

Why: Stainless Steel in these grades combines performance, impact resistance, and sleek design

Examples: INOX Noir fasteners are ideal for grilles, spoilers, or exposed bodywork where design consideration is as important as strength.

4. Architecture & Construction

Uses: Façades, bridges, railings, wall systems

Materials: 303/304 (general), 316 (when exposure or environmental concerns) INOX Noir (aesthetic and additional corrosion resistance)

Why: Weather resistance with visual appeal

Examples: Captive fasteners for use in panels and enclosures, hexagonal screws.

5. Food & Beverage Processing

Uses: Processing equipment, bottling lines, enclosures

Materials: 303/304 or 316 stainless steel.

Why: Easy to clean, corrosion resistant, food safe

Examples: Loss prevention detent pins for use in shut off mechanisms, bolts installed within hygienic areas or washdown areas. 303/304 is suitable in enclosed environments for example in an outward facing door. Captive socket cap screws prevent loss in food handling environments.

6. Medical & Pharmaceutical

Uses: Cleanrooms, surgical tools, lab furniture

Materials: 316 stainless steel

Why: Non-reactive, easy to sterilise, meets hygiene standards

Examples: Captive screws in 316 stainless steel prevent loss of the component in situations requiring frequent wash downs or subject to large amounts of vibration.

7. Rail & Transit / Heavy Industry

Uses: Train interiors, track systems, machinery

Materials: 303/304, 316, INOX Noir

Why: Anti-vibration, weatherproof, reduced glare

Examples: Captive screws and washers useful for material handling or assembly (operator safety as set out in the EU Machinery Directive 2006/42/EC)

8. Stage, Screen, and Entertainment

Uses: Truss frames, rigging, props, modern furniture

Materials: 316 Stainless Steel and INOX Noir

Why: Matte black finish minimises light reflection and blends into background; 316 for highly aesthetic finishes

Examples: Ideal for camera rigs, film sets, lighting rigs, especially outdoors

Conclusion

Selecting the right fastener isn't just about function: it's also about ensuring your design holds up under real-world conditions, looks right, meets safety and material directives and minimises maintenance.

 Match material to the environment and mechanical stress

 INOX Noir = performance + aesthetics + corrosion resistance

 Consider full lifecycle cost, not just upfront price

 Account for load/tensile strength, chemical exposure, and finish

 Check for compliance with industry standards

 Think about magnetic/non-magnetic needs (esp. in electronics)

Need help specifying fasteners for a project? We can help match product types, material grades, or finishes to your exact application.

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