



OHIO GRATINGS, INC.

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— A SPECIFICATION & PROCUREMENT GUIDE

TYPICAL FINISHES FOR

CARBON STEEL BAR GRATING

BUILT RIGHT. DELIVERED ON TIME. A STEP AHEAD.

BUILT FOR

Architects • Engineers • Fabricators • Supply Partners

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EXECUTIVE SUMMARY

Choosing the right finish for carbon steel bar grating is a critical decision point that directly affects project economics, structural longevity, and downstream maintenance costs. A finish that underperforms its environment leads to reduced service life, unplanned replacement and potential liability exposure.

This guide is built for the full project team — everyone who touches a grating specification, procurement decision, or supply relationship:

ARCHITECTS

Need finish guidance that informs both design intent and long-term appearance, and who are specifying materials on behalf of their clients and the project team.

ENGINEERS

Need standards-referenced performance data to make defensible specification decisions and protect the integrity of the structure over its service life.

FABRICATORS

Need practical guidance on finish compatibility with downstream cutting and welding, fabrication logistics, and procurement considerations.

SUPPLY PARTNERS

Need product knowledge to guide their customers to the right finish and position themselves as informed, trustworthy advisors.

Inside, you'll find a comparative overview of six standard finish types, from uncoated mill finish to high-performance duplex systems, along with a quick-reference selection matrix and practical storage and maintenance guidance.

FROM THE OHIO GRATINGS TECHNICAL TEAM

Our technical team is available to support specification, sourcing, and fabrication decisions at every stage of your project.

01 INTRODUCTION

Carbon steel bar grating is the workhorse of industrial infrastructure. Valued for strength, versatility, and cost-effectiveness, it's specified across manufacturing plants, refineries, walkways, bridge decks, utility vault covers, storage rack decking, and architectural applications. Selecting the right finish for carbon steel can reduce corrosion and extend service life of the product.

The finish you specify isn't just a coating decision. It's a lifecycle decision — one that determines how long a product performs in service, how much maintenance it requires, and what it costs to own over time.

This white paper provides engineers, specifiers, and procurement teams with a practical technical overview of the most common finishes applied to carbon steel bar grating, including performance characteristics, typical applications, applicable standards, and selection considerations tailored to real project conditions.

02 WHY FINISH SELECTION MATTERS

Carbon steel is composed primarily of iron. When exposed to oxygen and moisture, iron oxidizes readily — a process that leads to rust, structural compromise, and surface degradation. Left unchecked, corrosion shortens service life, reduces load-bearing capacity, and creates personnel safety hazards.

PROTECTIVE FINISHES ACCOMPLISH THREE THINGS

CORROSION RESISTANCE

Slowing or stopping oxidative degradation over the product's service life.

DURABILITY

Extending the usable lifespan of the grating in its operating environment.

SAFETY & AESTHETICS

Maintaining traction surface integrity and visual standards.

The right finish depends on environment severity, budget constraints, service life expectations, applicable codes, and downstream fabrication requirements. **No single finish is universally correct, which is precisely why understanding the differences matters.**

3.1 MILL FINISH (UNCOATED)

TEMPORARY USE

Mill finish refers to carbon steel grating that has not received any protective coating after fabrication. It retains the natural appearance of hot-rolled steel, often with minor surface scale or oxidation.

ADVANTAGES

- ◆ Lowest-cost option — no coating process or material cost
- ◆ Suitable for indoor, dry, controlled environments
- ◆ Appropriate for temporary applications or components to be painted on-site

LIMITATIONS

- Poor corrosion resistance — will rust rapidly when exposed to moisture
- Not suitable for outdoor, humid, or chemically aggressive environments
- Requires more frequent maintenance inspection and replacement cycles

TYPICAL USES · Indoor machinery platforms, mezzanines, equipment guards, temporary flooring, and components to be field-painted or further coated.

DESIGN & SPECIFICATION CONSIDERATIONS

Mill finish is appropriate for indoor, dry applications where the finish will be painted on-site or where the application is temporary or low-exposure. It provides poor corrosion resistance and is not suitable for outdoor or humid conditions. Specify a protective finish for any application with moisture or environmental exposure. Mill finish requires more frequent maintenance and replacement cycles than protected finishes.

PROCUREMENT & INSTALLATION CONSIDERATIONS

Mill finish is the lowest-cost option, appropriate for grating that will be further fabricated or field-painted on-site. Confirm the application is dry and indoor and that field coating is planned before quoting. Mill finish is not appropriate for any application with moisture or outdoor exposure.

3.2 SHOP BLACK (PAINTED)

TRANSIT PROTECTION

Shop black is a basic protective paint coating applied to grating panels at the factory. It is a low-cost primer-grade paint intended to provide temporary corrosion protection during shipment, short-term storage, and initial installation — not long-term environmental protection.

ADVANTAGES

- ◆ Low-cost option with minimal lead time impact
- ◆ Limits flash rust on bare steel during transit and early installation phases

LIMITATIONS

- Low corrosion resistance — not designed for outdoor, humid, or chemically active environments
- Coverage variability at edges and welds due to spray application method
- Not a long-term corrosion protection solution

TYPICAL USES • Projects where cost efficiency is the primary driver, further on-site painting is planned, or the grating will remain in a dry, protected interior.

DESIGN & SPECIFICATION CONSIDERATIONS

Not designed as a final finish. Shop black is intended as transit, short-term storage, and initial installation protection only. Specify it where field painting or topcoating is planned, not where appearance or long-term performance is required. Performance degrades in outdoor, humid, or chemically active environments. Specify a protective finish (HDG, powder coat, or duplex) for any permanent installation with exposure risk.

PROCUREMENT & INSTALLATION CONSIDERATIONS

Appropriate for projects where further fabrication may be performed. The coating provides temporary corrosion protection during shipment, storage, and initial installation. Coverage may vary at edges and welds, so plan for touch-up after fabrication. Before quoting, confirm the customer plans to paint or coat on-site. If not, and there is any moisture or outdoor exposure, guide them to a protective finish.

3.3 SHOP BLACK POWDER COAT

INDUSTRIAL BUDGET

Shop black powder coat is a factory-applied powder coating offering moderate corrosion protection for industrial applications. It provides a more durable base than a standard shop black paint, while remaining a lower-cost alternative to a full specification-grade powder coat system.

ADVANTAGES

- ◆ More durable and consistent finish than shop-applied liquid paint
- ◆ Provides moderate corrosion protection in controlled to mildly challenging environments
- ◆ Cost-effective balance between performance and budget

LIMITATIONS

- Coverage and adhesion may be less consistent than a full specification-grade powder coat
- Not recommended for outdoor or chemically aggressive environments long-term

TYPICAL USES · Machinery platforms, mezzanines, equipment guards, and walkways where some corrosion protection is required and budget sensitivity is a factor.

DESIGN & SPECIFICATION CONSIDERATIONS

A budget alternative to full specification powder coating. Provides moderate corrosion protection in controlled to mildly challenging environments and moderate durability for industrial-grade visible surfaces. Coverage and adhesion are more variable than a standard powder coat, and the finish does not deliver long-term corrosion resistance in outdoor, humid, or chemically aggressive conditions. Specify HDG or duplex for permanent outdoor or industrial corrosion protection.

PROCUREMENT & INSTALLATION CONSIDERATIONS

More durable in handling and transit than shop black paint. Coverage and adhesion are more variable than a standard powder coat, so plan for touch-up if cuts or welds are added on site. The right product when a customer wants powder coat quality at a lower budget than full specification powder coating. Set expectations clearly: industrial use, not architectural; moderate corrosion protection, not long-term outdoor protection. Recommend a step up when permanent outdoor or chemical performance is required.

3.4 HOT-DIP GALVANIZED (HDG)

INDUSTRY STANDARD

Hot-dip galvanizing involves immersing fabricated grating into a bath of molten zinc, which metallurgically bonds to the steel surface. The result is a robust, uniform zinc coating that provides long-term, low-maintenance corrosion protection — including at welds, edges, and cut surfaces. The applicable standard is **ASTM A123/A123M** — Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

ADVANTAGES

- ◆ Superior corrosion resistance across the full surface, including welds and edges
- ◆ Self-healing: zinc provides galvanic protection at scratches and minor damage areas
- ◆ Proven decades-long service life in outdoor and industrial environments
- ◆ Minimal ongoing maintenance requirements
- ◆ Uniform coverage achieved through full immersion

LIMITATIONS

- Adds a silver-gray appearance with no color customization
- May cause minor dimensional changes due to coating thickness
- Initial cost higher than uncoated or shop-painted options

APPEARANCE AND WEATHERING

The initial appearance of hot-dip galvanized steel is unpredictable — it may appear shiny, spangled, dull, mottled, or a combination. Over time, the coating weathers to a uniform matte gray as a protective zinc patina develops. This is normal and expected. For detailed appearance guidance, refer to the American Galvanizers Association's "Hot-Dip Galvanized Coating Appearance" publication.

TYPICAL USES • Outdoor platforms, chemical plants, wastewater treatment facilities, marine environments, bridges, and general industrial applications where long-term performance is the priority.

DESIGN & SPECIFICATION CONSIDERATIONS

HDG is the industry standard for outdoor and industrial applications. ASTM A123/A123M governs coating thickness and performance. HDG delivers proven long-term performance with minimal ongoing maintenance. The coating weathers to a silver-gray matte patina over time, which is natural, expected, and part of the corrosion protection. If the project requires color or a specific appearance, specify a duplex system (HDG plus powder topcoat) for the same corrosion performance with full color flexibility. For marine, chemical, or offshore environments, see Section 3.6.

3.4 HOT-DIP GALVANIZED (HDG) — CONTINUED

PROCUREMENT & INSTALLATION CONSIDERATIONS

HDG is applied to fabricated grating after fabrication is complete. The coating adds minor dimensional changes due to coating thickness. For small areas of post-fabrication damage, touch-up with zinc-rich paint per ASTM A780 is acceptable per Section 6 maintenance guidance. Customers often ask about appearance change. Set the expectation early: the silver-gray matte patina that develops over time is natural and expected, and is part of the corrosion protection. When a customer wants color flexibility with the same long-term performance, recommend duplex.

3.5 POWDER COATING

ARCHITECTURAL

Powder coating is a dry finishing process in which electrostatically charged polymer powder is applied to a conductive steel surface, then cured under heat to form a uniform, continuous protective film. Powder coating provides a durable, consistent finish that helps protect the steel surface from moisture exposure and reduces routine maintenance needs in appropriate applications.

Powder coating offers a wide range of colors, textures, and gloss levels, making it the finish of choice when appearance standards or safety color coding is required.

ADVANTAGES

- ◆ Corrosion resistance — acts as a barrier between the steel and environmental moisture
- ◆ Aesthetic versatility — full range of colors, textures, matte, gloss, and metallic finishes
- ◆ Environmentally responsible — no solvents, minimal hazardous waste, overspray recovery possible
- ◆ Low maintenance — once applied, requires minimal upkeep

LIMITATIONS

- Susceptible to damage at impact points or edges, which can initiate undercutting corrosion — a two-coat (duplex) system is recommended for exterior applications
- Standard polyester formulations have limited solvent resistance compared to epoxy coatings

TYPICAL USES • Architectural catwalks and elevated walkways in commercial buildings; machine guarding where safety yellow or safety orange is specified; handrail infill and security screens; storage rack decking.

DESIGN & SPECIFICATION CONSIDERATIONS

The finish of choice when appearance is part of the specification. Available in matte, gloss, metallic, and textured options, including safety colors for applications like machine guarding. Powder coating provides barrier protection between the steel and environmental moisture. Powder coatings in this category may be specified to AAMA 2603. Some exclusions may apply based on the color selection. Physical damage at impact points or edges can compromise the coating and expose the underlying steel to corrosion. For exterior installations, specify a duplex system (HDG plus powder topcoat) rather than powder coat alone. Standard polyester powder has limited solvent resistance. For solvent-rich environments, specify an appropriate chemistry rather than standard polyester.

PROCUREMENT & INSTALLATION CONSIDERATIONS

For any exterior application, spec the duplex system: HDG base coat plus powder topcoat. The zinc provides galvanic protection at coating breaks and significantly extends service life outdoors. Powder coat alone on bare steel in an exposed environment will underperform. When a customer asks about color or safety color compliance, powder coating is the answer. The duplex upgrade delivers 1.5 to 2.3 times the service life of HDG or paint alone in exterior applications.

3.6

DUPLEX FINISH (HDG + TOPCOAT)

**HIGHEST
PERFORMANCE**

A duplex finish is a two-layer protective system combining hot-dip galvanizing with a secondary topcoat — typically a powder coat or PVDF paint applied over a prepared zinc surface. The two systems work synergistically: the zinc provides sacrificial corrosion protection, while the topcoat delivers barrier protection, UV resistance, and color options. The result is a system that consistently outperforms either layer applied alone. According to the American Galvanizers Association, a duplex finish may deliver a **1.5 to 2.3 times** increase in the service life of galvanizing or paint alone.

PROCESS

- ◆ **Step 1.** Carbon steel grating is hot-dip galvanized per ASTM A123/A123M.
- ◆ **Step 2.** The galvanized surface is prepared (light sweep blasting or chemical treatment) to ensure topcoat adhesion.
- ◆ **Step 3.** A topcoat — typically powder coat or PVDF paint — is applied over the prepared zinc surface within the required window.

ADVANTAGES

- ◆ Enhanced corrosion resistance: 1.5–2.3× the service life of HDG or paint alone
- ◆ Synergistic protection: zinc protects at coating breaks; topcoat slows zinc consumption
- ◆ Color and aesthetic options available
- ◆ Suitable for highly aggressive marine, offshore, and chemical environments
- ◆ Reduced total lifecycle maintenance cost

LIMITATIONS

- Higher upfront cost than single-coat systems
- Requires careful coordination between galvanizer and powder coater, particularly when contracted separately
- Topcoat must be applied within a defined window after surface preparation to ensure adhesion

TYPICAL USES • Marine and coastal environments (piers, docks, shipyards); chemical plants and refineries; offshore platforms; architectural façades and pedestrian bridges; wastewater treatment facilities; public infrastructure requiring long service life and minimal maintenance.

DESIGN & SPECIFICATION CONSIDERATIONS

Specify duplex when the project demands both long-term performance and design flexibility. HDG at the base, powder topcoat for color, texture, and gloss for coastal, marine, or architectural applications such as façades and pedestrian bridges. Define the galvanizing spec (ASTM A123/A123M), surface preparation method, and topcoat system clearly in the specification. A powder coating topcoat in this category may be specified to AAMA 2603 or AAMA 2604. Some exclusions may apply based on the color selection. The long-term performance of a duplex system depends on proper coordination between galvanizing, surface preparation, and topcoat application.

3.6 DUPLEX FINISH (HDG + TOPCOAT) — CONTINUED

PROCUREMENT & INSTALLATION CONSIDERATIONS

Duplex requires coordination across two finishing operations. The topcoat must be applied within a short time period after surface preparation for proper adhesion. Clear communication between the galvanizer and topcoat applicator on surface preparation method and timing is required, particularly when the two services are contracted separately. Duplex is the right recommendation when a customer needs both long-term outdoor performance and color or architectural appearance. Higher upfront cost than single-coat systems, but the system delivers 1.5 to 2.3 times the service life of HDG or paint alone.

04 FINISH SELECTION GUIDE

Use the table below as a quick-reference guide when matching finish type to project environment and performance requirements. For complex or high-consequence applications, consult with an Ohio Gratings technical representative before finalizing your specification.

FINISH TYPE	COST	CORROSION RESISTANCE	BEST FOR
MILL FINISH (UNCOATED)	LOWEST	VERY POOR	Indoor dry areas; temporary use; to be further fabricated or painted
SHOP BLACK (PAINTED)	LOW	FAIR (TEMPORARY)	Indoor or sheltered applications where budget is the primary driver
SHOP BLACK POWDER COAT	LOW-MODERATE	MODERATE	Industrial platforms and mezzanines; moderate environments
HOT-DIP GALVANIZED	MODERATE	EXCELLENT	Outdoor, wet, or industrial environments; long service life required
POWDER COATED	MOD-HIGH	GOOD	Architectural, commercial, or safety-color applications
DUPLEX (HDG + TOPCOAT)	HIGH	EXCELLENT 1.5–2.3× the service life of HDG or paint alone	Marine, chemical, offshore, or high-visibility architectural environments

KEY SELECTION FACTORS TO EVALUATE

- **Environment severity:** indoor dry, indoor wet, outdoor sheltered, outdoor exposed, marine, or chemical
- **Maintenance access & frequency:** can the structure be periodically inspected and recoated?
- **Budget:** upfront cost versus total lifecycle cost analysis
- **Service life requirement:** short-term (1–5 yrs), medium-term (5–15 yrs), or long-term (15+ yrs)
- **Color or appearance requirement:** safety code, architectural, or corporate spec
- **Downstream fabrication:** will cutting, welding, or field modification occur after finish?

05 STORAGE

Grating stored at the jobsite should be stored under cover or protected with a weatherproof tarp. When covered storage is used, take precautions to prevent wet storage staining:

- Ensure adequate airflow around and between stacked panels
- Prevent standing water and condensation from accumulating on product surfaces
- Elevate product off the ground to allow air circulation beneath

Wet storage staining on galvanized surfaces typically presents as white or gray surface discoloration. In most cases, stains can be reduced or removed with a stiff nylon brush and appropriate cleaning solution. For complete guidance, refer to the American Galvanizers Association publications: "Cleaning Wet Storage Stain from Galvanized Surfaces" and "Wet Storage Stain."

06 MAINTENANCE & INSPECTION

Regardless of finish type, periodic inspection and maintenance are required to ensure personnel safety and maximize service life. Inspections should evaluate:

- Corrosion or coating damage, particularly at welds, edges, and high-wear areas
- Loose welds or connections
- Surface debris or standing water that reduces traction surface effectiveness

Hot-dip galvanized grating is engineered for decades of maintenance-free service in outdoor industrial environments. However, all grating products should be periodically cleaned to remove foreign material that would reduce walking surface traction. For small areas of coating damage on galvanized grating, touch-up with zinc-rich paint per ASTM A780 is acceptable. For larger areas, consult with your Ohio Gratings representative. For products with an OnGrip® Traction Surface, refer to the Ohio Gratings "OnGrip® Cleaning Guide" for specific maintenance instructions.

07 CONCLUSION

Finish selection is one of the most consequential specification decisions in a carbon steel bar grating project. The right finish for a dry indoor mezzanine is categorically different from the right finish for an offshore platform or a coastal walkway — and specifying the wrong one creates costs that far exceed the upfront price difference.

The framework is straightforward: match the finish to the environment, account for service life expectations, and factor total lifecycle cost into the decision. When appearance standards or safety color coding apply, powder coating or duplex systems provide the combination of protection and aesthetics that commodity finishes cannot.

Ohio Gratings, Inc. has been the only privately owned bar grating manufacturer in America for over six decades. Our team brings deep application experience across architectural, industrial, and infrastructure projects, helping customers make informed specification decisions and solve complex finish challenges with confidence. Built right. Delivered on time. A Step Ahead.



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Have a project that requires finish guidance? Ohio Gratings' technical team is ready. Contact us at ohiogratings.com or speak directly with your Ohio Gratings representative.

ABOUT OHIO GRATINGS, INC.

Ohio Gratings, Inc. specializes in metal bar grating design, manufacturing, and custom fabrication across a range of construction materials, including carbon steel and aluminum. As the only privately owned grating company in the nation, Ohio Gratings partners with engineers, fabricators, architects, and contractors to deliver safe, seamless solutions.

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