

Engineers, contactors and owners often need to decide on the best Corrosion Resistant Reinforcement (CRR) to use on their projects in order to match the corrosion protection required to attain the lowest life cycle cost. There are many variables beyond the corrosion protection that need to be considered in this decision, including how the chosen material affects the downstream work of the contractors, detailers, fabricators and rebar placers.



**DESIGN ACCORDING
TO ACI 318-19 CODE**

The smaller details of working with CRR materials can potentially cause unexpected project expenses in both time and material. In addition, incorrect handling of some CRR materials can jeopardize the intended benefits of the CRR selected, adding unanticipated costs to the project.

The Concrete Reinforcing Steel Institute (CRSI) published **CRSI – Specialty & Corrosion-Resistant Steel Reinforcement: Product Guide** (July 2013), which compares handling requirements and other factors to consider for five commonly available CRR bar materials. The following table summarizes CRSI’s CRR Product Guide. The CRSI Product Guide indicates that ChromX® rebar can be handled in the same manner as common carbon reinforcing steel. Other CRR products have several challenges and special handling requirements that must be taken into consideration from estimating through placement in the project.

Item	ChromX® Uncoated	Epoxy Coated (ECR) Bars	Galvanized Bars	Dual Coated "Z Bars"	Stainless Steel "SS" Bars
Material Specification	ASTM A1035/A1035M	ASTM A775/A775M ASTM A934/A934M	ASTM A767/A767M coating options Class I and Class II	ASTM A1055/A1055M	ASTM A955/A955M
Estimating	Standard lap lengths	Lap lengths greater than uncoated bars	<ul style="list-style-type: none"> • 6 to 8% greater weight than uncoated bars • Consider final weights prior to shipment to avoid overweight trucking 	Lap lengths greater than uncoated bars	<ul style="list-style-type: none"> • #7 through #18 bars available up to 40 feet • Smaller bars are straightened to 60 feet from coiled bar
Detailing	Same as carbon steel bar	Field bending may require EOR approval	Bar lengths greater than 40 feet may need double-dip coating	Field bending may require EOR approval	Same as carbon steel bar
Fabrication	<ul style="list-style-type: none"> • Same bend diameters as carbon steel bars • Cutting by shearing or fluid-cooled saw • Torch cutting not allowed 	<ul style="list-style-type: none"> • Care needed to not damage coating • Coating damage and cut ends must be repaired • Fabrication equipment contact points covered by protective covering 	<ul style="list-style-type: none"> • Larger bend radii than carbon steel bars • Coating on cut ends and coating damage must be patched • Potential for strainage embrittlement for fabrication prior to galvanizing 	<ul style="list-style-type: none"> • Care needed to not damage coating • Fabrication equipment contact points covered by protective covering • Bending temps should be between 158 and 176F (70 to 80C) to minimize coating damage 	<ul style="list-style-type: none"> • Prevent contamination through exposure to carbon steel particles • Equipment to be dedicated or cleaned to remove contaminants • Contaminants must be removed with pickling paste or chemical passivation
Handling and Storage	Same as carbon steel bar	<ul style="list-style-type: none"> • Lift by synthetic straps • Storage and shipping contact points plastic-lined 	No contact with or beneath uncoated steel	<ul style="list-style-type: none"> • Lift by synthetic straps • Storage and shipping contact points plastic-lined 	<ul style="list-style-type: none"> • Lift by synthetic straps • Storage away from carbon steel to prevent contamination from mill scale and ferrous metals



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Placing	Same as carbon steel bar	<ul style="list-style-type: none"> • Protect against coating damage • Plastic-headed vibrators used to consolidate concrete 	Field cut ends touch-up per ASTM A780	<ul style="list-style-type: none"> • Protect against coating damage • Plastic-headed vibrators used to consolidate concrete 	<ul style="list-style-type: none"> • Placing equipment contact points to be synthetic or SS • Hand tools use for SS bars and not carbon steel
Mechanical Splices (Couplers)	Install per coupler manufacturer's recommendations	Epoxy coated for corrosion protection	Galvanized, or epoxy coated for corrosion protection	Epoxy or dual coated for corrosion protection	Stainless Steel for corrosion protection

