

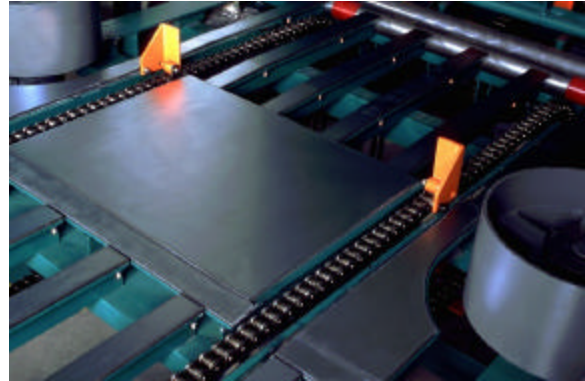
## Installation/Studding/Bolting/Welding Guidelines

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**CRODON<sup>®</sup>**

*Hard Coat wear plate  
and tile*

Since introduction, **CRODON<sup>®</sup>** Hard Coat wear plate and tile has shown superior performance in a variety of severe environments including abrasion, impact, and material sticking/hang-up. Another advantage is the ease of installation, saving the you time, resources, and productive capacity. Following are installation recommendations and techniques for studding, bolting, and welding, of **CRODON<sup>®</sup>** Hard Coat wear plate and tile.



### 1. FIRST RULES OF INSTALLATION

#### A. Keep the CRODON<sup>®</sup> Hard Coat Wear Surface Facing Abrasive Environment

To achieve the performance advantages inherent with **CRODON<sup>®</sup>** Hard Coat wear plate, it must be installed so that only the **CRODON<sup>®</sup>** Hard Coat wear surface is exposed to the materials causing abrasion, sticking, and impact. Exposing the steel substrate to abrasion and impact will cause the base material to wear underneath the CRODON<sup>®</sup> Hard Coat wear surface and lead to shortened life cycle. Exposing the steel substrate to sticky material will promote material buildup.

#### B. Keep Edges Flush

When matching two CRODON<sup>®</sup> Hard Coat wear plates onto a continuous surface, keep edges matched at a flush right angle. Plasma cutting usually leaves a "radiused" edge and can cause a small gap between two aligned pieces. It may be necessary to grind back the steel at the edge to obtain a flush, right angle finish.

#### C. Keep CRODON<sup>®</sup> Hard Coat wear plate Cool when Welding, Cutting, & Forming

Heating CRODON<sup>®</sup> Hard Coat wear plate above 572° F can have a negative impact on life cycle.<sup>1</sup>

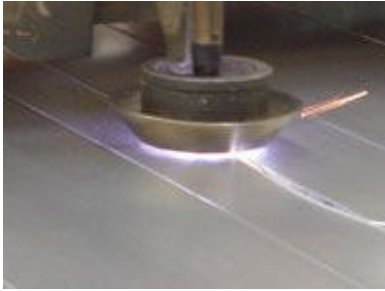
If you follow the basic rules and the instructions that follow, your **CRODON<sup>®</sup>** Hard Coat wear plate and tile will provide an effective and readily installed protective surface:

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<sup>1</sup> Temperature Limits: No discernible effect up to 500 F° (250 C°), Degradation of wear resistance beginning at 572 F° (300 C°), Significant degradation at 662 F° (350 C°).

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Plasma  
Cutter

- Order standard dimensions or pre-cut to your custom requirements,  
OR
- Order a full sheet CRODON® Hard Coat wear plate and cut in the field to match unique sizes or fitted dimensions. We recommend plasma cutting. This method provides the fastest, least expensive cut with good results. However, you can also use a laser cutter (cutting from the back side) water-jet cutter or an abrasive saw.

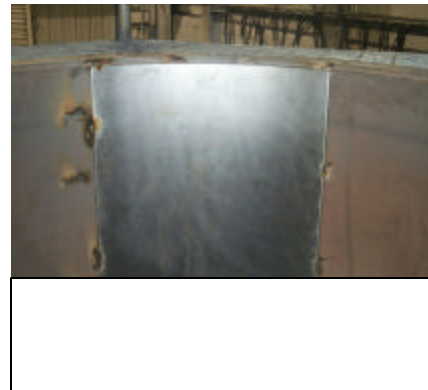


Water-Jet Cutter



Abrasive Saw

- **DO NOT** cut CRODON® Hard Coat wear plate with an oxygen-acetylene torch.
- Cold work the CRODON® Hard Coat wear plate into the shape required. Bend, roll, and form **WITHOUT** applying heat.
- Attach multiple CRODON® Hard Coat wear tiles together connected directly to each other (along the backside) or to a connecting base frame.

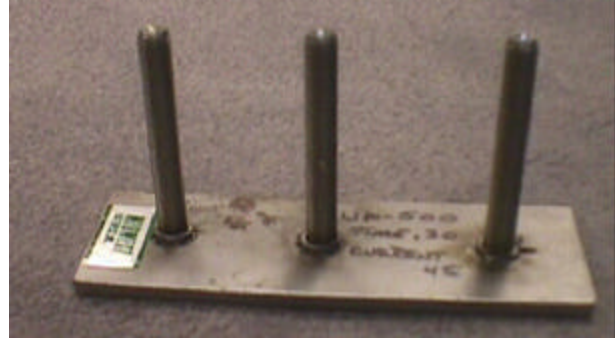


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### 2. STUDDING

When possible, studs are recommended over welding for connecting a wear surface to subsurface structural material. There are two types of recognized studding techniques that work well with CRODON® Hard Coat wear plate and tile:



Capacitor Discharge Welding and Arc Stud Welding. The appropriate choice varies according to the thickness of the base material and the size of the stud needed.<sup>2</sup>

#### A. General Rules for Studs

- Studs should always be installed to the non-chrome side.
- Base metal must be at least 1/8" thick. A minimum thickness of 3/16" is recommended.
- Stud and base material should be made from compatible materials. Low carbon mild steel and stainless steel studs are recommended with CRODON® Hard Coat wear plate.
- Mild steel and stainless steel studs require flux for a sound weld. Studs with the flux within or permanently affixed to the stud base are ideal.
- Make sure that contact to the base metal is made in at least two opposing locations around the stud. A single contact can result in a weld that does not cover the entire stud base.
- Stud diameter - The following maximum stud diameters should be used for the specified base steel thickness:

1/8" steel base:	1/8" diameter stud
1/4" steel base:	3/8" diameter stud
3/8" steel base:	3/8" diameter stud
1/2" steel base:	1/2" diameter stud

#### B. Capacitor Discharge Stud Welding

- Required for all stud application where the base metal is less than 1/4" thick or less than 1.5" wide. This method produces the least heat input to the base metal.
- Stud sizes can range from 1/8" - 3/8". Keep in mind the base steel thickness and stud diameter recommendations listed above.

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<sup>2</sup> Stud welding is highly effective for standard mild steels (1010 or 1020), stainless steel, and CC AR plate but is not recommended at this time for high carbon steels. Industry literature comments that welds with high carbon steels tend to be weak/brittle. When high carbon steels or other steels not generally recommended for standard welding techniques are indicated, an alternative solution would be the use of headed bolts installed via drilled holes. See Section 3 for discussion.

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- Caution - capacitor discharge welds are not as strong as Arc stud welds and are not recommended for environments with high impact or significant vibration.

### C. Arc Stud Welding

- Base steel must be at least 1/4" thick and 1.5" wide.
- Recommended for environments with impact or significant vibration.
- Maximum recommended stud diameter at this time is 1/2".
- Usually requires a disposable ceramic ferrule around the base and flux in the stud base or a protective (inert) gas shield to obtain a sound weld.

### 3. BOLTING

**CRODON**® Hard Coat wear plate can be drilled and, if required, counter sunk by Chromium Corporation for headed bolts to attach two pieces. We strongly recommend that you allow this service to be provided by the manufacturing services department of Chromium Corporation.



### 4. WELDING

- **Do not weld to the CRODON® Hard Coat wear surface.** Welds do not attach well to the CRODON® Hard Coat wear surface and welding directly to the surface risks impairing its resistance to abrasive wear through overheating.
- Avoid designs that require multiple small pieces welded together. Provide the structural support, while minimizing the amount of continuous seam welding. Plan to use as few separate pieces as possible and cold form shapes as necessary.
- Keep the base material and CRODON® Hard Coat wear plate under 572 F° (300°C). Use a Tempilstik or a surface pyrometer on the CRODON® Hard Coat wear surface to monitor temperature input.
- Place a wet sponge, rag, or towel to the CRODON® Hard Coat wear plate side to keep it cool when necessary.
- Tack welding is the recommended technique for attaching CRODON® Hard Coat wear plate and tile to a base surface, especially when using rods. Use a small tack (1/4" to 1/2" long) on the bottom half of the steel base material. Welds can be placed at 2" to 4" intervals.
- MIG welding is the least disruptive welding method and the only method recommended when tack are not sufficient. A 0.035" mild steel wire is recommended.
- When stick welding, only apply tack welds and use the coolest rod available. Welding shops have recommended a standard 7018 welding rod.