



# Chromium Carbide Overlay (CCO) Plate

Chromium-carbide overlay plates are manufactured by hardfacing a steel base plate with an abrasion-resistant material using arc welding processes. Hardfacing overlay products are suitable for extremely severe abrasive wear and moderate to low impact. The structure of the overlay is a high proportion (up to 30 to 45%) of hard primary  $M_7C_3$  chromium carbides in a eutectic matrix.

## Applications

Chromium carbide overlay plates are widely used in mining, power generation, cement, dredging, steel production, waste handling, glass production, and pulp and paper industries. Some specific applications include:

- **Mining:** Truck bed liner, dozer blade liner, shovel bucket liner, dragline bucket liner, excavator liner, chute/hopper;
- **Cement:** Separator guide vane, discharge cone for clinker storage bin, chute for sintering ore conveying, outlet duct of clinker grinding mill, receiving hopper;
- **Dredging:** Dredging pipe, dredging pump, suction pipeline, pump discharge;
- **Steel:** Blast furnace liner, fan blade/housing, coke vibrating screen plate;
- **Power:** Coal handling chute, coal feeder liner, crusher screen plate, classifier cone, journal liner, silo bunkers.

## Chemical Composition

The chemical composition shown below is an undiluted composition. The specific overlay composition depends on the number of layers, welding parameters, cooling process and substrate. For example, if the overlay is made on a mild steel substrate, the overlay chemical compositions would be lower in alloy content than shown below. (Special chemical compositions can be custom-formulated upon request.)

|           |       |
|-----------|-------|
| Carbon    | 6.0 % |
| Manganese | 1.0%  |
| Silicon   | 1.2%  |
| Chromium  | 32 %  |
| Boron     | 1%    |

## Standard Size

|  | Specification               |                               |                                   |
|--|-----------------------------|-------------------------------|-----------------------------------|
|  | Single Pass                 | Double Pass                   | Triple Pass                       |
|  | 1/8" on 1/4" (3 mm on 6 mm) | 1/4" on 1/4" (6 mm on 6 mm)   | 1/2" on 1/2" (12.7 mm on 12.7 mm) |
|  | 1/4" on 1/4" (6 mm on 6 mm) | 1/4" on 3/8" (6 mm on 10 mm)  |                                   |
|  |                             | 3/8" on 3/8" (10 mm on 10 mm) |                                   |

Plate Size: 5' x 10' (1.5 m x 3 m); 6' x 10' (1.8 m x 3 m)

Other plate size and customized thickness can be produced upon request.

## Surface Hardness

|                    |              |
|--------------------|--------------|
| Single layer plate | 55 to 59 HRC |
| Double layer plate | 58 to 61 HRC |
| Triple layer plate | 59 to 63 HRC |



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|                                  |  |
|----------------------------------|--|
| <b>Product Surface Condition</b> | Hardfacing plates are normally supplied in as-welded conditions, but can be also supplied in ground conditions upon request.   |
| <b>Tolerances</b>                | <b>Thickness Tolerance:</b> Plate overall thickness tolerance can be guaranteed $\pm 10\%$ .<br><b>Flatness Tolerance:</b> Plate flatness tolerance can be guaranteed within $\pm \frac{1}{8}$ " ( $\pm 3$ mm) over 5' (1.5 m) plate length.   |
| <b>Cutting</b>                   | CCO plate can be cut by plasma, laser, water jet, arc gouge, and abrasive saw;<br>CCO plate cannot be cut by oxy-fuel;<br>When cutting CCO plate, make sure to cut from base metal side to minimize carbon contamination;<br>When beveling, CCO plate can be burned from the hard side;  |
| <b>Machining</b>                 | CCO plates are not machinable by conventional methods;<br>Finishing of CCO plates should be by Blanchard Grinding only;<br>Countersunk holes can be precisely produced by EDM (Electrical Discharge Machining);<br>Pre-machined mild steel inserts can be used if extra machining is required.   |
| <b>Pipe Roll Forming</b>         | The chromium carbide overlay plate is commonly formed with the overlay to the inside and depending on the radius with the overlay to the outside. Please consult SSAB Wear Solutions Sales Office on specific requirements/radius. For pipes with diameter smaller than 24", hardfacing pipe is recommended instead of pipes fabricated from hardfacing plate. |
| <b>Welding</b>                   | For joining base metal, using AWS E7018, E8018 or E81T1-Ni2;<br>For joining hardfacing layer, use hardfacing rod/wire to cover;  |
| <b>Lining</b>                    | CCO plate can be lined to the substrate by plug weld (both from hardfacing layer side and base metal side), stud welding, or by using a bolt with countersunk hole. Note that any surface that is exposed to severe wear should be protected by hardfacing rod/wire.   |