QAME
CCO SPECIALISTS

QCLAD™ X2

BI-LAYER CHROMIUM CARBIDE OVERLAY · IMPACT UNDERLAYER WITH HARD CAP

TECHNICAL DATA SHEET

QCLAD™ X2 is a two-layer chromium carbide overlay wear plate for duties that combine heavy impact with sliding abrasion. A tough Q1 underlayer is deposited first onto the backing plate to absorb impact and resist spalling, and a Q2 hard cap is deposited over it to carry the abrasion. The result keeps the abrasion resistance of a premium chromium carbide overlay in places where a single hard layer would crack through and lift under impact.

Specification

QCLAD™ X2 is manufactured by submerged arc welding in two passes with different consumables. Both layers are controlled for chemistry, hardness and thickness; the Q2 cap is manufactured to the same microstructure and hardness requirements as QCLAD™ 60 / 80 and the Q1 underlayer to a lower-carbide, higher-toughness specification. Certified test values are issued with each order.

Layer structure

Layer	Role	Microstructure	Typical hardness
Q2 hard cap	Carries the sliding abrasion	Primary M_7C_3 carbides in a eutectic austenite / carbide matrix	>630 HV30 (~57 HRC)
Q1 impact underlayer	Absorbs impact, arrests crack propagation, bonds cap to backing	Lower carbide fraction in a tough austenitic matrix	On request
Backing plate	Structural, weldable	Mild steel; NM400 / NM450 / NM500 on request	—

Typical properties

Property	QCLAD™ X2
Duty	Heavy impact combined with sliding abrasion
Cap hardness	>630 HV30 (~57 HRC)
Primary M_7C_3 carbide (cap)	~1500 HV0.5
Abrasion resistance (ASTM G65-04 Proc. A)	On request
Impact resistance	Continuous heavy impact
Temperature range	Up to 595 °C
Standard thickness	Cap and underlayer thickness to suit the duty; typical total overlay 10–20 mm on 10–16 mm backing, up to 50+20
Standard sheet sizes	1100 × 2300 · 1200 × 2400 · 1480 × 3050 · 1500 × 3000 · 2000 × 3000 · 2200 × 3000 mm
Density	~7700 kg/m³ average (varies with overlay-to-backing ratio)

Values are typical and for guidance; certified test values are available on request.

Plate characteristics

The overlay surface consists of welded beads with relief check cracks evenly dispersed. In QCLAD™ X2 the check cracks of the cap are arrested at the Q1 underlayer rather than running to the backing plate, which is what gives the plate its resistance to spalling under impact. Flatness within 1 mm over 300 mm and 5 mm over 1000 mm; standard finish Ra < 7 µm.

Cutting, forming and welding

- Cut by plasma arc from the mild steel side; arc air, abrasive disc and water jet are also suitable.
- Roll or press perpendicular to the weld bead direction with a wide-set bottom die and rounded tooling. Because of the thicker total overlay, minimum bend radius is larger than for single-layer plate; consult QAME before specifying formed X2 parts.
- Backing plate side: low hydrogen electrode or MIG wire; weld size not to exceed the backing thickness. Hardface side: cap plug welds and joints with QARC™ 60 or 80 to match the Q2 layer.
- Attach by plug-weld holes, countersunk or counterbored holes, threaded studs or perimeter fillet weld.

Where to specify QCLAD™ X2

- Crusher feed chutes and primary transfer points receiving run-of-mine lump
- Dead boxes, rock boxes and impact zones at the head of a chute
- Truck tray and bin impact plates
- Reclaimer and bucket-wheel wear zones subject to lump impact
- Anywhere single-layer chromium carbide overlay has failed by spalling rather than wearing out

For pure sliding abrasion without heavy impact, QCLAD™ 60 / 80 or FLOWCLAD™ is the more economical choice; for fine-particle abrasion the MAXCLAD™ tungsten series or QMAX™ 50. Please consult your QAME technical expert to match the overlay to the duty.