

QCLAD™ is manufactured with high quality materials as a bulk overlay of high chromium, high carbon alloy onto a mild steel base plate utilising submerged arc welding, producing a wear resistant plate for a wide variety of material handling applications.

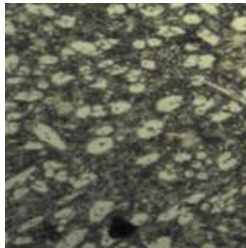
Specification

QCLAD™ overlay is manufactured to ensure compliance with the microstructure, chemistry and hardness requirements of AS/NZS 2576:2005 — Grade 2355 (QCLAD 60), Grade 2455 (QCLAD 80) and Grade 2560 (QCLAD 90), Group 2 Alloys.

Microstructure: Each QCLAD™ grade has a distinct overlay microstructure:

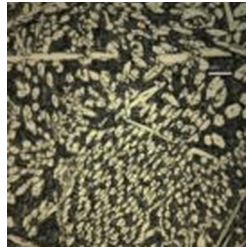
QCLAD 60

Primary M_7C_3 carbides in a eutectic matrix of austenite and eutectic M_7C_3 carbide — designed for abrasion and impact.



QCLAD 80

Primary M_7C_3 and MC complex carbides in a eutectic austenite matrix — for medium to high abrasion with impact.



QCLAD 90

Primary M_7C_3 carbides in a matrix of martensite and eutectic M_7C_3 carbide — for fine particle abrasion.

Micrograph — QCLAD 90

Chemical Composition: A typical deposit consists of the chemistry limits (%) shown below.

Grade	C	Cr	Mn+Si	B	Ni+Nb+Ti+V+W	Bal.
QCLAD 60	3.5–7.5%	21–35%	–	–	–	Fe
QCLAD 80	4.0–6.5%	21–35%	1–3.5%	–	2.5–14%	Fe
QCLAD 90	4.0–6.5%	21–35%	–	≤2%	–	Fe

Typical Properties

Property	QCLAD 60	QCLAD 80	QCLAD 90
AS/NZS 2576:2005	Grade 2355	Grade 2455	Grade 2560
Duty	General sliding abrasion & impact	Medium–high abrasion & impact	Fine particle abrasion
Bulk hardness	>630 HV30 (~57 HRC)	>630 HV30 (~57 HRC)	700–780 HV30 (60–64 HRC)
Primary M_7C_3 carbide	~1500 HV0.5	~1500 HV0.5	~1500 HV0.5
Primary carbide volume fraction	20–40%	15–35%	25–40%
Abrasion resistance (ASTM G65-04 Proc. A)	<0.26 g	<0.26 g	on request
Temperature range	up to 595 °C	up to 595 °C	up to 595 °C
Impact resistance	Continuous impact	Continuous impact	Not for continuous impact

Plate Characteristics: The overlay surface consists of welded beads of varying widths with relief check cracks evenly dispersed that protrude to the backing plate only; these check cracks assist in thermal expansion and contraction of the plate in service.

Flatness: Within 1 mm over 300 mm and within 5 mm over 1000 mm.

Surface Roughness: Standard smooth finish $Ra < 7 \mu m$; Ultra Polish $Ra < 0.5 \mu m$ (if requested).

Density: *Average is $\sim 7700 \text{ kg/m}^3$. (*Varies depending on proportion of overlay to backing plate.)

Base Plate: The standard base material is mild steel plate of varying thickness, ensuring the finished parts are readily weldable. Alternative base plate grades can be incorporated with the QCLAD™ overlay to meet specific customer requirements.

Cutting

Plate is preferably cut with plasma arc — 200 A is sufficient to cut most available thicknesses. All cutting should be performed from the mild steel side to eliminate carbon contamination of the backing plate. Other suitable methods include arc air / carbon arc, abrasive disc, water jet and abrasive saw.

Machining

Plate can be surface ground using an abrasive grinding disc only.

Cold Forming

Roll or press QCLAD™ perpendicular to the weld bead direction. A wide-set bottom die with rounded corners and a rounded press tool should always be used. Minimum bending radius is 75 mm for thin overlays and 1000 mm for thicker overlays — please consult your QAME technical expert, as specific methods can be adopted during manufacture to ensure a quality formed product.

Forming plate with the overlay on the outside will place the hardface layer in tension; surface cracks will open up, requiring repair.

Welding

Backing plate side — Use low hydrogen electrode or MIG wire. Weld size must not exceed the thickness of the backing plate. Where the weld would exceed the backing plate thickness, use an ER307 consumable with Argoshield 69 shielding gas.

Hardface side — Use the matching QARC™ hardfacing wire.

Attachment Methods

QCLAD™ can be attached using the following methods:

- Plug weld holes
- Countersink, counterbore, taper and tapped holes
- Threaded studs
- Perimeter fillet weld