



ISO 9001:2015 Certified

## SEVERE IMPACT AND ABRASION RESISTANT PLATE

### Mechanical Information

QT-PLUS® has the mechanical properties necessary for the harshest environments.

#### Mechanical Properties:

**Hardness:**

Thickness <1"– 461/537 BHN

Thickness >1"– 444/514 BHN

**Tensile (typical):**

225,000 psi

**Elongation in 2":**

11% (typical)

**Charpy V:**

25 ft/lbs @ -40°F (typical)

**Yield (typical):**

165,000 psi

### General Information

#### Individual Plates Available

QT-PLUS® comes in a variety of standard or cut-to-size dimensions. JADCO stocks plate in sizes from 1/4" up to 5" thick.

#### Weldability

QT-PLUS® wear steel exhibits excellent weldability because of a tightly controlled carbon range (.24/.26) and with extremely low hydrogen levels, (>4 parts per million or ppm).

#### Toughness

QT-PLUS® wear steel is extremely tough due to enriched nickel content and proprietary heat treat.

#### Through-Hardness

QT-PLUS® wear steel chemical composition produces a material that retains hardness throughout the entire plate thickness. Commodity grade steels possess a lean chemistry and that does not allow for through-hardness resulting in excessive wear.

#### Consistent Properties

QT-PLUS® wear steel has uniform characteristics time after time **EVERY TIME**. With commodity AR grade steels, inconsistent heat treating practices and wide variation in chemistries create "hard" and "soft" spots which reduce workability.

#### Quality Parts

QT-PLUS® wear steel is manufactured under the strictest quality standards always. With commodity AR grade steels, lack of consistent quality control results in plates that can have characteristics such as warping or waviness, making installations difficult and costly.

QT-PLUS® wear steel is produced and processed with ISO 9001:2015 certified standards to ensure the best quality.

Typical Chemistry (%)									
C	Mn	P	S	Si	Ni	Mo	Cr	B	H
0.24 - 0.26	1.0	0.035	0.005	0.55	1.0 – 2.0	0.50	0.65	0.03	< 4
max.	max.	max.	max.	max.			max.	max.	ppm



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**QT-PLUS®** wear steel, a JADCO Manufacturing exclusive, combines a specific chemistry with a unique thermal heat-treating process. Result: a premium-quality grade of alloy steel unmatched in the industry, with up to 3-5 times the wear life of commodity grade AR steel. Parts made from QT-PLUS® not only provide outstanding resistance to abrasion and wear, but they remain amazingly ductile due to their rich chemistry.

### Fabrication Facts

QT-PLUS® wear steel is a high quality, premium steel that can be easily fabricated.

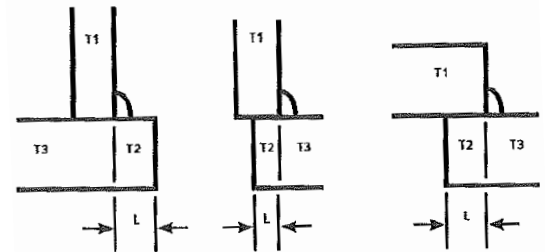
**Flame Cutting:** QT-PLUS® is easily flame cut with oxyacetylene or plasma. Hardening will occur at the edge of the cut and it's beneficial to pre-heat before flame cutting (300°F) or allow enough stock to get below the hardened edge. The minimum plate temperature prior to thermal cutting should be +60°F. **Note:** At JADCO, high-definition plasma is used to burn and the material is under water to decrease distortion of the heat-affected area. For plates 3/4" and thicker preheat the plate to 300°F to prevent edge cracking. When preheating the plate do not heat directly with a torch, use indirect heat to heat evenly over the entire plate.

**Machining:** With proper tooling and speeds, QT-PLUS® can be machined and drilled using conventional methods. Please contact your JADCO representative to discuss your specific requirements.

**Forming:** QT-PLUS® was designed for superior formability, when compared to other high abrasion resistant plate in its class. QT-PLUS® is cold-formable with the proper equipment. The material's toughness enables it to be rolled or formed for almost any application up through 2" thick. 8T across the grain and 12T with the grain is recommended. For plate over 2" thick 12T transverse to the grain is recommended. Following the outlined procedures will help to minimize cracking concerns.

**Welding:** Rods should be dry-welded on a moisture-free surface. Use E7018 or E8018 weld rod. Pre-heating is preferred to reduce thermal shock (250° is a general rule). If pre-heating is not possible, a 309 stainless rod/wire is preferred. Welds in restraint should be avoided.

Carbon equivalent = .64. Fluxcore 70 is recommended when welding QT-PLUS® to mild steel.



If L is Less Than or Equal to 1/2 T2, Consider T2 = 0

### Forming Guidelines:

QT Plus Forming	
Bend Transverse to Rolling Direction	8 x Thickness = Radius
Bend Parallel to Rolling Direction	12 x Thickness = Radius

- » For best results, plate must be bent in direction perpendicular to the grain.
- » Grind corners of gas-cut edge 12" beyond bend area before bending.
- » Grind any notches off gas cut surface in area of bend.
- » Preheat plate to 200° to 300° F.
- » Use as wide a female die (throat) as possible.
- » Use as wide a male punch as possible. (3" radius rather than a 1" radius)
- » Look at outside radius surface before bending and grinding out any gouges.

**CHROME WELD™ 600** is a unique material that is ideal for surfaces requiring high levels of abrasion resistance. It is a premium grade of chromium carbide wear plate. It is produced with a mild steel base plate and hardfaced/overlayed with our proprietary CHROME WELD™ 600 wire. Regardless of whether a CHROME WELD™ 600 application requires machining, cold bending, welding, CHROME WELD™ 600 will yield outstanding results if you follow these helpful instructions.

## Fabrication Facts

**Cutting:** Plasma burning, air arc, abrasive saw cutting, or waterjet.

**Machining:** The overlay surface can be finished by grinding only. EDM, plasma arc cutting, or carbon-arc gouging may produce countersunk holes for bolts. Pre-machined mild steel inserts may be welded into straight holes for additional machining. CHROME WELD™ 600 cannot be machined by ordinary methods.

**Cold Bending:** When using a press brake, forming should be perpendicular to the weld pass direction. Plate rolling should be performed in the direction of the overlay beads. Forming CHROME WELD™ 600 to the outside will cause cross-check cracks to open. This may require post-fabrication weld repair using suitable weld rod/wire.

**Welding:** CHROME WELD™ 600 overlay plate can be joined by welding substrate to substrate using 309 weld wire/rod. Liner plates can be plug welded in place by welding the substrate to the base plate. Stud welds can be applied, but it is highly recommended that stainless steel studs be used. All weld seams: plug-weld holes, bolt holes, and all other joints exposed to wear should be protected by a cap weld of one of our JADCO FUSION™ Wires.

## Mechanical Information

CHROME WELD™ 600 typical hardness ranges from 58-62 HRC based on weld deposit thickness. The surface of the plate is a composite of chromium iron carbides in a chromium austenitic matrix. The surface of the plate exhibits numerous hairline cracks which are a natural stress relieving phenomenon that is essential to the performance of the plate and enable it to be formed, bent, and rolled without damage.

## General Overlay Chemistry

- » Standard Plate size is 90" X 120" with bead direction running the length. 90" x 240" plates available in certain thicknesses.
- » CHROME WELD™ 600 displays excellent abrasion resistance and will withstand continuous moderate impact.
- » CHROME WELD™ 600 overlay will remain abrasion resistant at temperatures up to 1100°F.
- » Standard thicknesses range from 1/8" on 1/8" (.25") through 1/2" on 1" (1.5").
- » Your specific application needs, including custom requirements (thickness, alloy and size), are capable at JADCO. The JADCO process produces a microstructure consisting of fully austenitic matrix filled with primary carbides. This structure provides outstanding abrasion resistance in the most challenging applications.



Etched Micro @ 50X

TYPICAL CHEMISTRY %				
2 Layer Deposit				
Carbon ( C )	Chromium ( Cr )	Manganese ( Mn )	Silicon ( Si )	Iron ( Fe )
4.5-6	25-30	0-2	0-2	balance