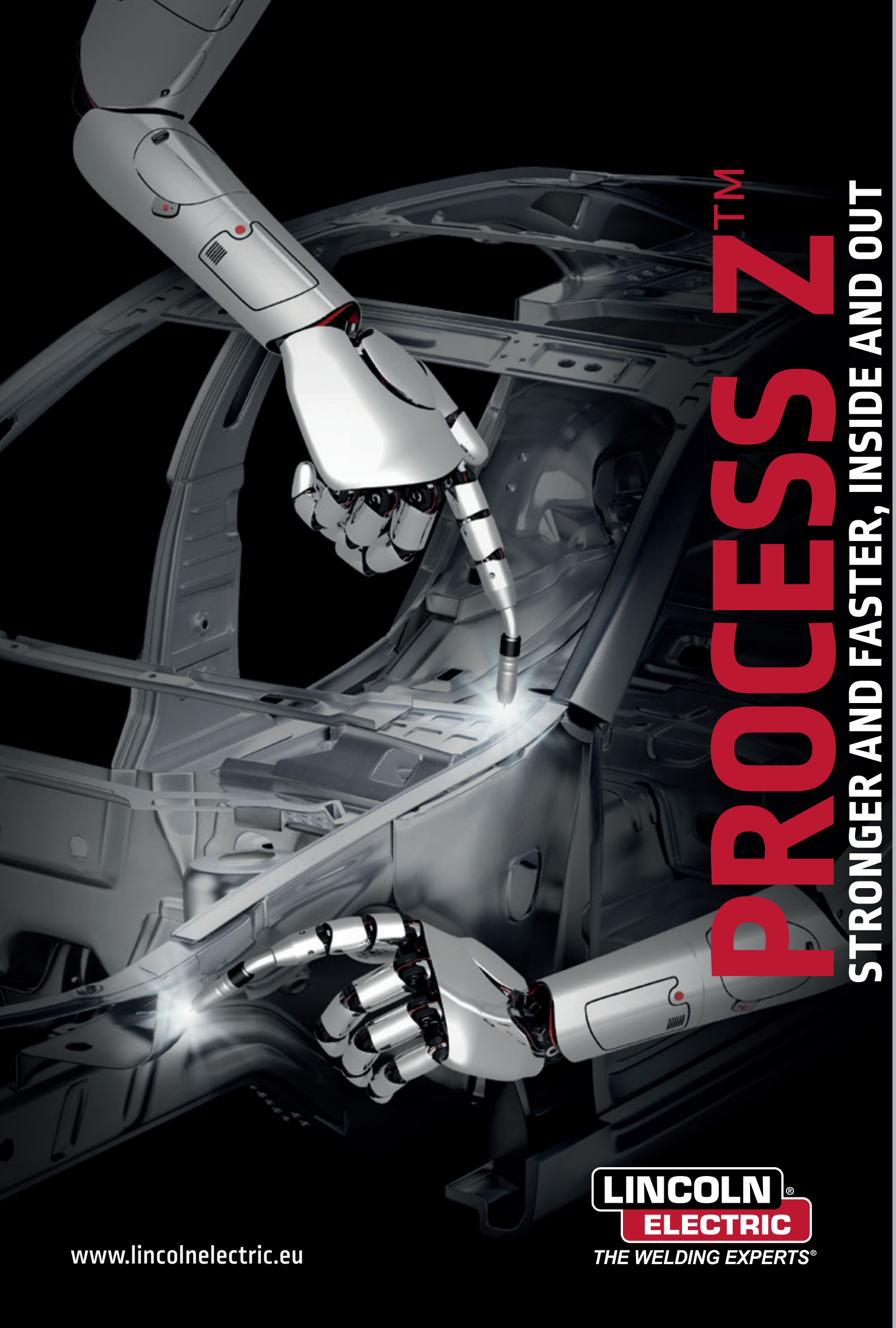


PROCESS Z™

STRONGER AND FASTER, INSIDE AND OUT

LINCOLN® ELECTRIC

THE WELDING EXPERTS®

www.lincolnelectric.eu

FOR OVER 120 YEARS, KNOWN WORLDWIDE
FOR RELIABILITY AND PERFORMANCE

11 000 Employees worldwide

160 Active in 160 countries

48 Manufacturing locations for consumables and equipment

325 R&D engineers worldwide

42 Solution Centers

2.7 Billion USD Revenue

TABLE OF CONTENTS

METALSHIELD® Z
metal - cored wire

TOTAL SOLUTION FOR ZINC COATED MATERIALS

WELDING CONSUMABLES

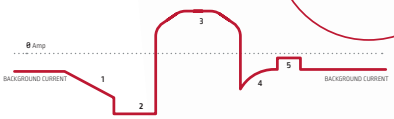
WAVEFORM

CUSTOMER SUPPORT& APPLICATION EXPERTISE

POWER WAVE® TECHNOLOGY

FULL ROBOTIC AUTOMATION EXPERTISE

We will optimize your process and calculate your savings !



Rapid Z® waveform

The **Advanced Module** enables AC waveforms with Power Wave®

Maximize robotic performance with **ArcLink® XT**, dress-out kits, and full suite of power sources, modules, and wire feeder options.

HIGH SPEED LOW POROSITY

PROCESS Z™ masters the challenges of welding zinc-coated materials in the automotive industry. It is the perfect solution for delivering defect-free welding, quickly and efficiently.

Welding on galvanized is difficult

- The zinc coating varies
- The fit up varies
- Porosity can occur

You are often forced to make hard choices resulting in

- Lower travel speeds
- Risk of burn-through on thin parts
- Spatter and porosity

Today	PROCESS Z™
• Low speed	• High speed
• Hidden porosity	• X-ray quality welds

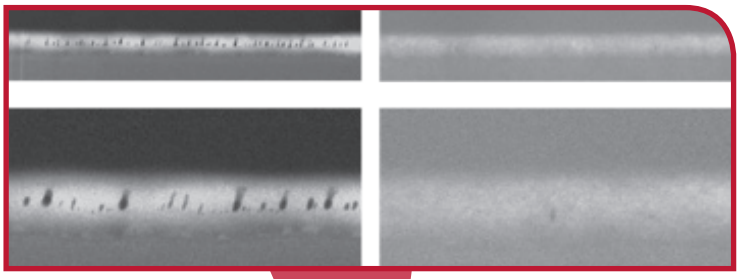
PROCESS Z™ solves the issues inherent to welding zinc-coated steels – most importantly the challenge of porosity.

Achieve better, faster, higher quality welds with PROCESS Z™.

THE TREND TO ZINC COATING

The switch to galvanized parts may be a fix for thin metal corrosion, but it hurts productivity.

Rapid Z® waveform and Metalshield® Z welding wire enable travel speeds similar to what's possible with uncoated parts, with extremely low internal and no external porosity.



Conventional weld on galvanized chassis part, with dangerous tunneling porosity.

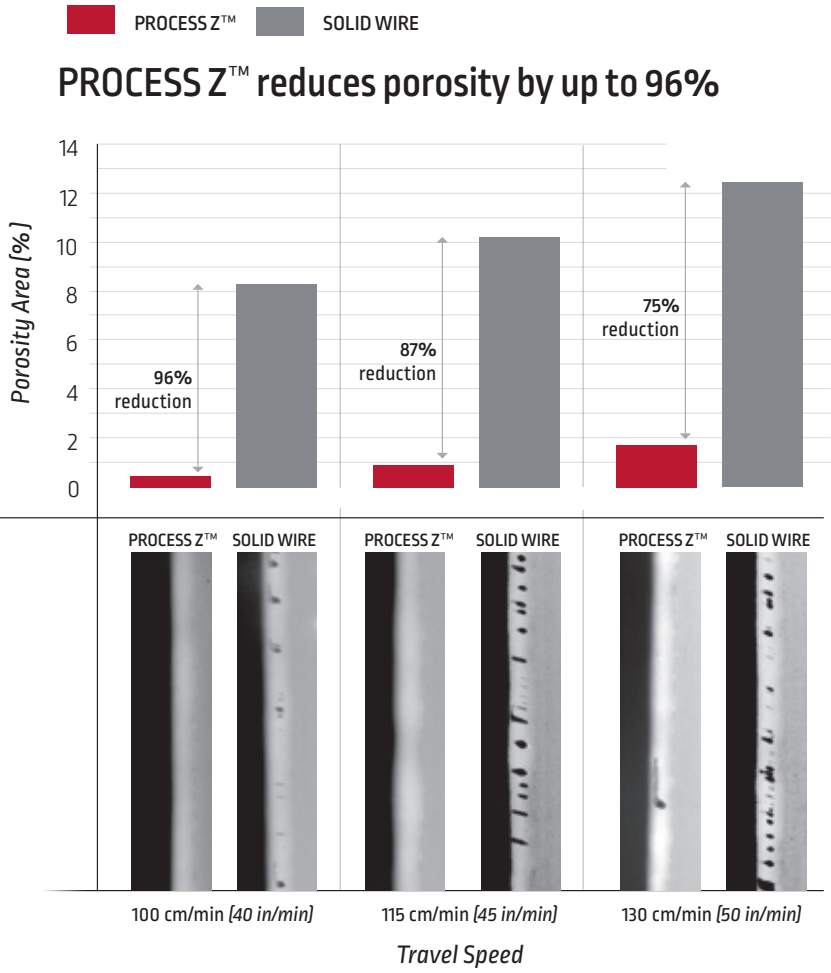
Process Z™ weld on galvanized chassis part, with almost no internal porosity at faster travel speeds.

SOLVING THE POROSITY CHALLENGE WITH PROCESS Z™

Zinc-coated automotive components are particularly challenging to weld.

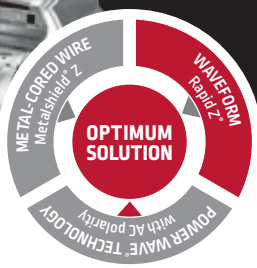
The main reason?

Porosity.



On the surface a weld may look perfect, but an X-ray could tell a different story.

Example X-ray images correspond to data above. Dark spots indicate porosity.



THE Z FACTOR: STRONGER AND FASTER, INSIDE AND OUT

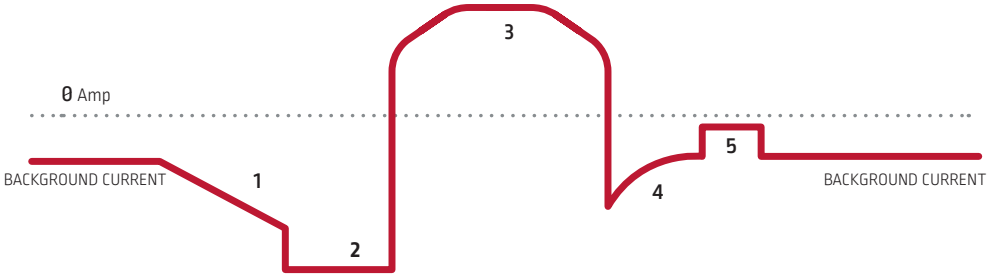
THE INSIDE PICTURE

Getting it done right the first time saves time and money on the production line. PROCESS Z™ enables minimal porosity and X-ray quality welds. The result is stronger welds inside and out, and little or no rework.

CLEAN WELDS

A clean surface is always easier to work with. Typically, the welding of galvanized automotive components requires post-weld cleaning to remove silicate and spatter prior to e-coating. PROCESS Z™ produces minimal spatter, which reduces post-weld prep requirements.

RAPID Z®



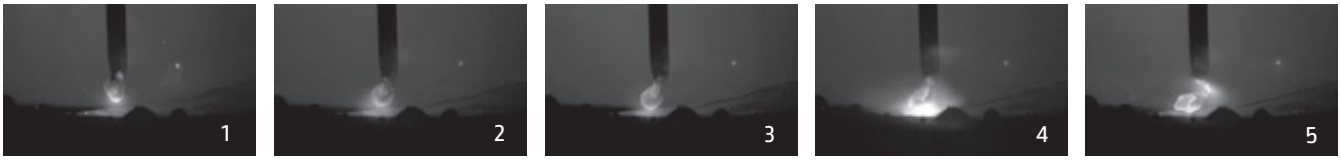
WATCH VIDEO

Rapid Z® is a proprietary waveform developed by Lincoln Electric and integrated in the Power Wave® to fully control the process.

EFFECT OF RAPID Z® WAVEFORM

Smooth, Stable Metal Transfer

WATCH VIDEO



With Rapid Z® Waveform

The electrode droplet transfer is focused and predictable. Less of the surrounding zinc coating is introduced into the weld - meaning less internal porosity. Smooth droplet transfer also delivers more stability and less spatter when welding at increased travel speeds.

Standard DC

Zinc vaporizes quickly and unpredictably, causing interruptions in weld droplet transfer. This erratic, unfocused arc introduces more of the surrounding zinc coating into the weld – resulting in higher levels of internal porosity. Uncontrolled droplet transfer also results in more spatter, even when welding at moderate travel speeds.

POWER WAVE® TECHNOLOGY

Lincoln Electric's advanced process Power Wave® equipment is designed to embody a philosophy of weld process control. With a view of the entire welding operation as a system, Power Wave® equipment provides the tools required for complete weld quality control. The system operates on three principles:

IMPLEMENT - Waveform Control Technology®
Optimize arc performance for a specific welding application and dial in the best waveform for the job.

CONTROL - User Interface Point of Use
Ensure quality and enhance part-to-part consistency with equipment and operator metrics, along with procedure range lockouts.

VERIFY - Software Solutions
Make smart business decisions by having a dashboard view of your welding operation and pinpoint operations requiring improvement.

VIEW WEB PAGE

Power Wave® S500 / R450
Power Wave® Advanced Module

FASTEST TRAVEL SPEED

Up to **130 cm/min** *(50 in/min)*

LOWEST POROSITY

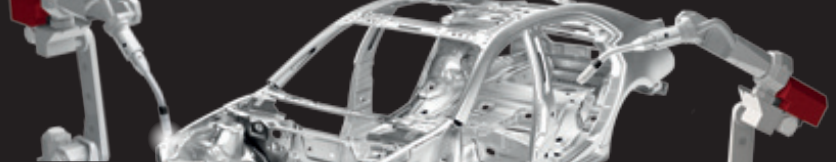
Porosity Levels **< 1%**

METALSHIELD® Z

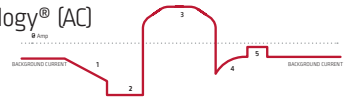
METALSHIELD® Z metal-cored wire is packed with everything necessary to wet bead edges, provide adequate freezing characteristics and increase travel speeds while delivering minimal spatter and extremely low internal porosity to the weld. METALSHIELD® Z wire is available in:

- 250 kg (500 lb) drums for high productivity applications
- 15 kg (33 lb) spools for direct wire feeder mounting

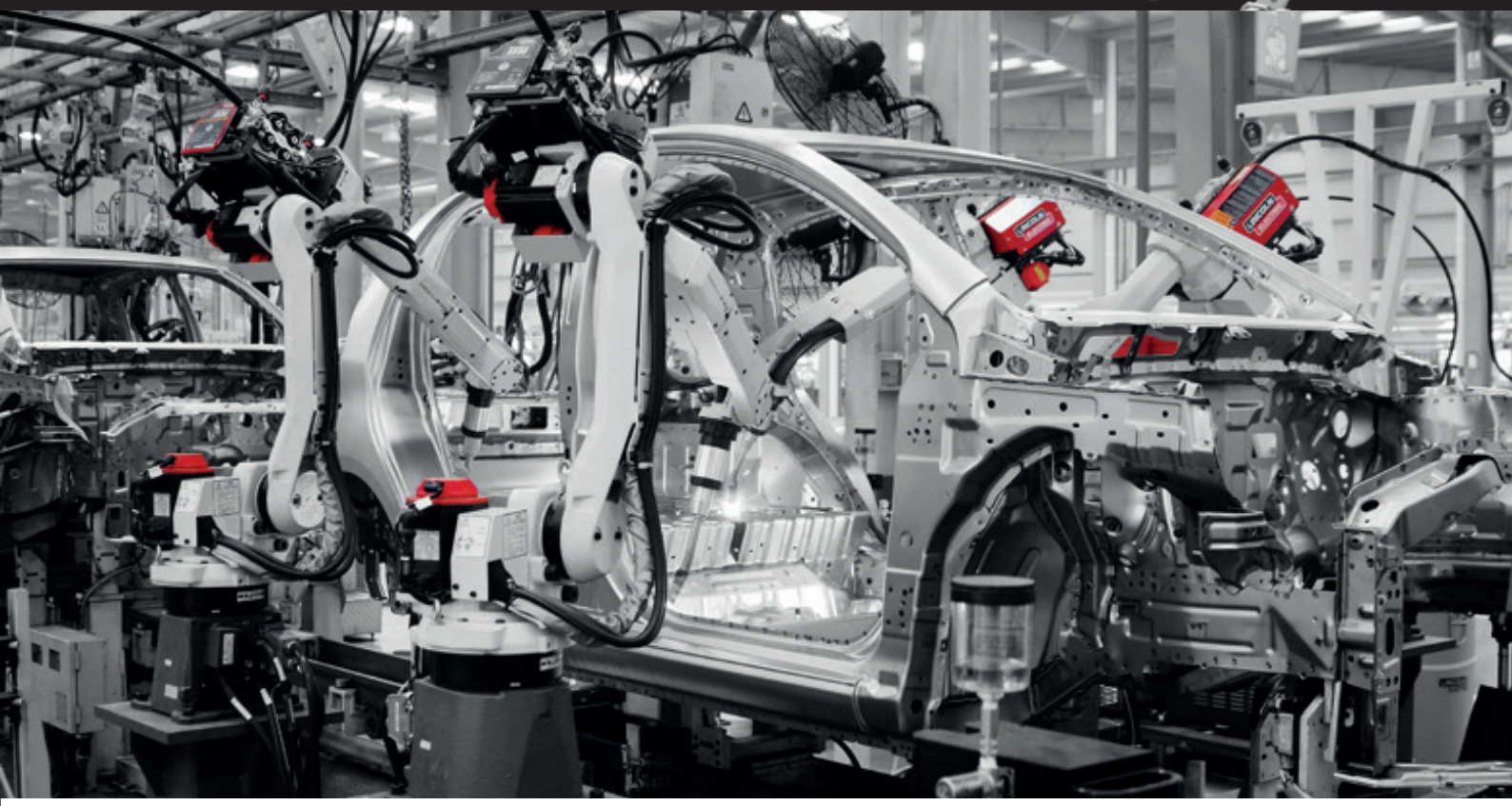
VIEW WEB PAGE



SUITE OF SOLUTIONS

Good Results use **Metalshied® Z** with...	• Conventional CV Power Source (DCEN)		**LOW** POROSITY	Porosity Levels **<5%**	**FAST** TRAVEL SPEED	Up to **100 cm/min** *(40 in/min)*
Better Results use **Metalshied® Z** with...	• Power Wave® S500 / R450 (DCEN) • Precision Pulse Waveform Control Technology®	 		Porosity Levels **<3%**		Up to **115 cm/min** *(45 in/min)*
Best Results use **Metalshied® Z** with...	• Power Wave® S500 / R450 • Power Wave® Advanced Module • Rapid Z® Waveform Control Technology® (AC)	 	**LOWEST** POROSITY	Porosity Levels **<1%**	**FASTEST** TRAVEL SPEED	Up to **130 cm/min** *(50 in/min)*

THIN GAUGE SHEET	Thin gauge sheet is difficult to weld – especially when it is galvanized. Potential for burn through is high, forcing most solutions to run colder and slower. **Process Z™ can weld material as thin as 1.0 mm at 75 cm/min (30 in/min).**
CRUSH CAN	The challenges of welding thin gauge sheet are made even more difficult when the joint changes from a lap weld to a T-joint or fillet weld. Process Z™ excels in these applications by limiting heat input to manage burn through. Using solid wire on this part limited travel speed to 50 cm/min (20 in/min) above that, porosity became too severe. **Process Z™ increased travel speed by 100% to achieve 100 cm/min (40 in/min) with no surface porosity.**
DOOR FRAME	This part has dissimilar base materials, with different thicknesses, in a joint that has a tendency to trap zinc. Solid wire required two passes at 75 cm/min (30 in/min) to reduce porosity on this part. **Process Z™ increased travel speed to 100 cm/min (40 in/min) and eliminated porosity with a single pass.**
DOOR COMPONENT	It can be tough to accommodate dissimilar base materials and different thicknesses. Using solid wire on this part required two passes at 75 cm/min (30 in/min) to reduce porosity. **Process Z™ reduced cycle time by 50% by welding at the same travel speed in a single pass – with no porosity.**
CONTROL ARM	Gap variability is common in automotive components. This particular part exhibited gaps up to 2.0 mm – as thick as the base material. **Process Z™ handles poor fit up – even at increased travel speeds of 130 cm/min (50 in/min) and higher – with minimal porosity.**
FRAME & CRADLE COMPONENTS	In this case, differing base material thickness, gap variability, and out-of-position welding caused porosity, burn through, and overall inconsistent welds with solid wire at 75 cm/min (30 in/min). **Process Z™ eliminated burn through and porosity at travel speeds over 100 cm/min (40 in/min) , improving first pass yield by over 50%.**
THICK PLATE STRUCTURAL	At the opposite end of the thickness spectrum, thicker plates often have thicker coatings, which make them nearly impossible to weld. Often this requires an additional grinding step to remove the coating before welding. **Process Z™ saved time and money by eliminating the grinding step - and the porosity - by welding over the coating with a single pass.**



PROCESS Z™ COST REDUCTION POTENTIAL

Give us your data. We will optimize your process and calculate your savings.

INCREASE TRAVEL SPEED

USED SOLID WIRE:
75 cm/min (30 in/min)

NOW PROCESS Z™:
100 cm/min (40 in/min)

GAIN:
33% higher travel speed

SAVE:
3 333 labor hours per year

ANNUAL SAVINGS
€ 84 450 *($ 92 900)*

LOWER REPAIR AND SCRAP RATES

USED SOLID WIRE:
Rejection: 20% / Scrap: 2%

NOW PROCESS Z™:
Rejection rate: 5% / Scrap: 0.50%

GAIN:
75% lower rejection rate
75% lower scrap rate

SAVE:
18 000 fewer parts repaired per year
1 800 fewer parts scrapped per year

ANNUAL SAVINGS
€ 51 800 *($ 57 000)*

TOTAL ANNUAL SAVINGS: € 136 250 *($ 149 900)*

PROCESS Z™

- Metalshied® Z metal-cored wire
- Power Wave® Advanced Technology
- Rapid Z® Waveform Control Technology®

THE SOLUTION FOR ZINC-COATED MATERIAL

- **FAST TRAVEL SPEEDS UP TO 130 CM/MIN (50 IN / MIN)**
- **WIDE MATERIAL THICKNESS RANGE**
- **MINIMUM POROSITY**
- **LOW SPATTER**
- **LOW HEAT INPUT**


ST 430

DOWNLOAD THE BROCHURE

LINCOLN ELECTRIC

CUSTOMER ASSISTANCE POLICY

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