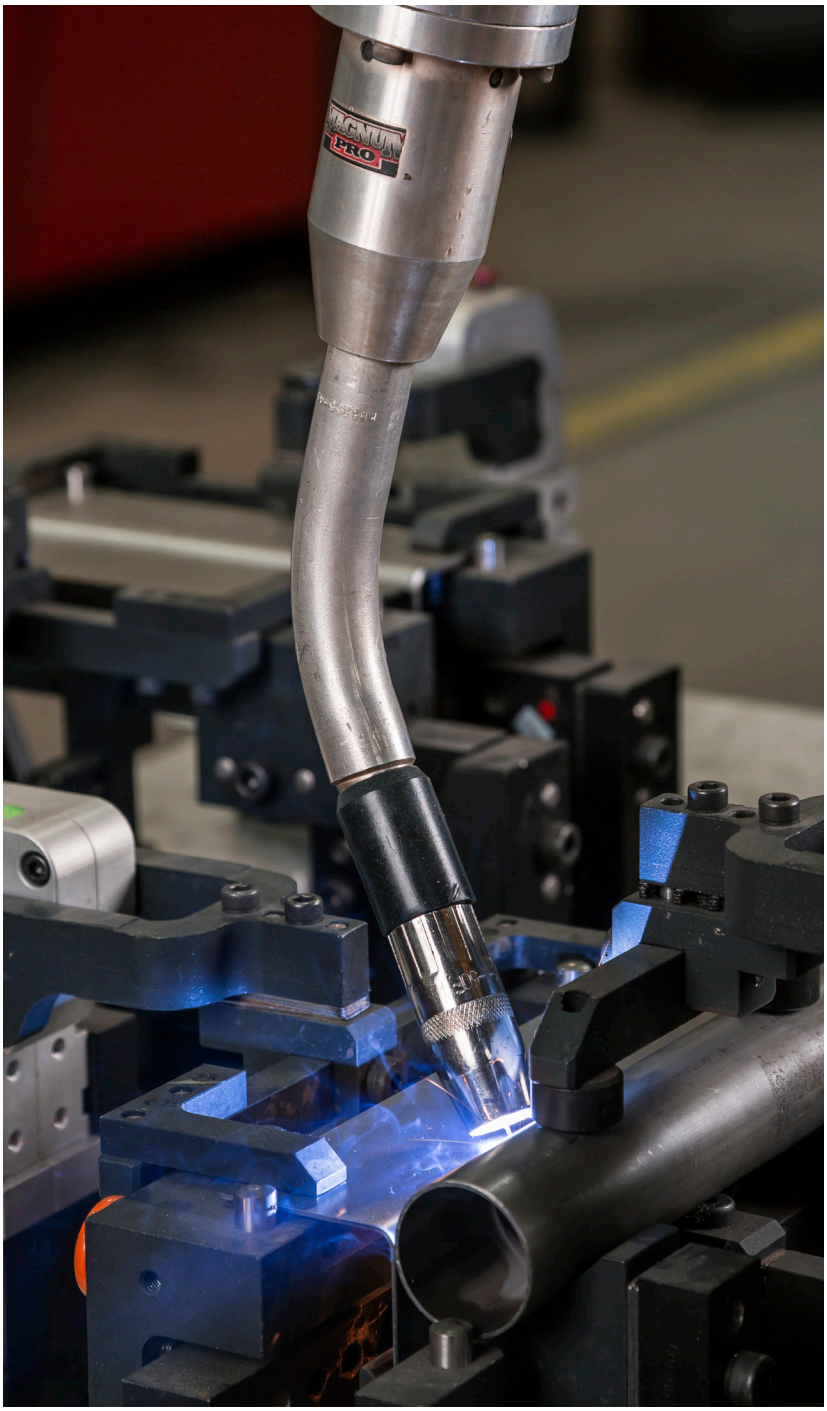
STT® Braze - MIG Brazing Process



Overview

STT® Braze - High performance, low spatter brazing

- Reduced Spatter
- Improved Travel Speeds
- Robust, Cost-Effective Brazing Solution

Index

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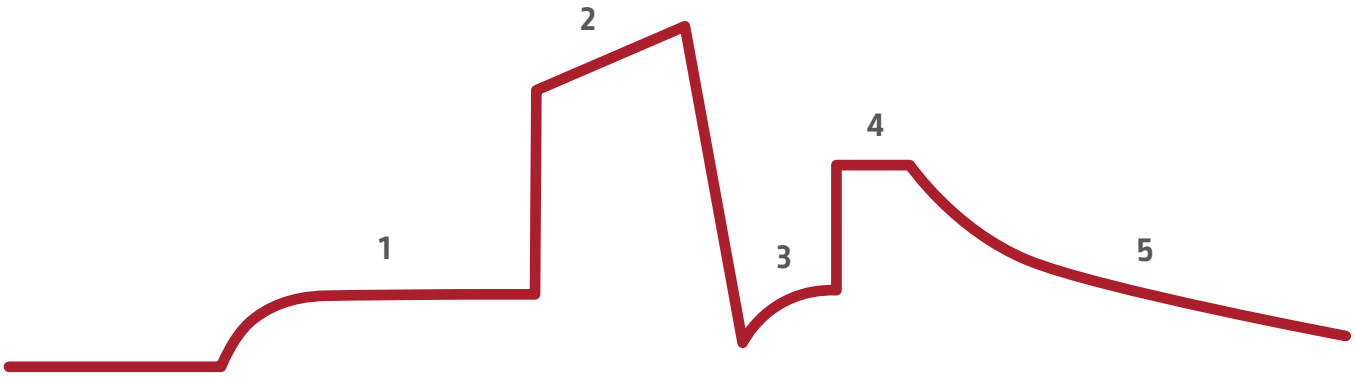
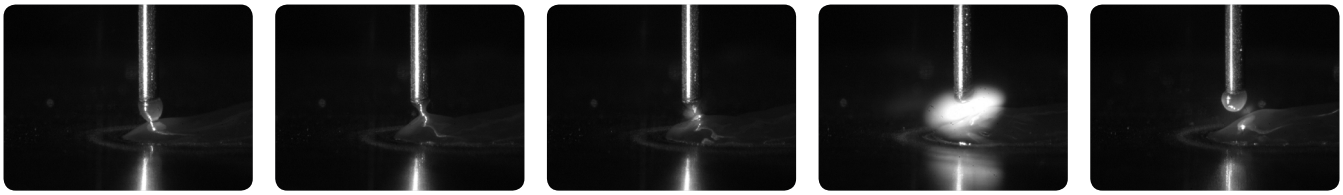
www.lincolnelectric.com

Process Description

The STT® Braze process was designed for thin sheet metal applications requiring Silicon Bronze filler material. Utilizing the low-spatter technology of our patented STT® waveform, STT® Braze is specifically tuned for SiBR brazing applications, altering the waveform shape to match the characteristics of copper based electrodes for brazing. The result is a stable, low spatter process that provides consistent results.

Waveform





1. Wet-in

Molten ball makes initial contact with braze pool and current is held constant.

2. Pinch Current

As the wire necks down, special circuitry determines that the short is about to break.

3. Detachment

The STT Switch quickly reduces the current at the instant the droplet detaches, reducing spatter

4. Peak Current

Peak Current sets a pre-defined arc length.

5. Tailout & Background

Background regulation maintains a consistent molten ball size.

Synergic Welding

1. Adjust WFS to the desired setting. Refer to the Applications section for the recommended settings.

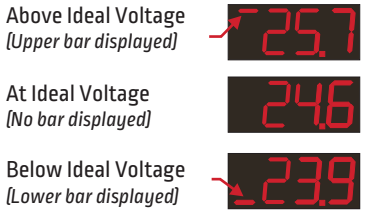
Voltage and UltimArc®

2. Based on WFS, a pre-programmed nominal voltage is selected.

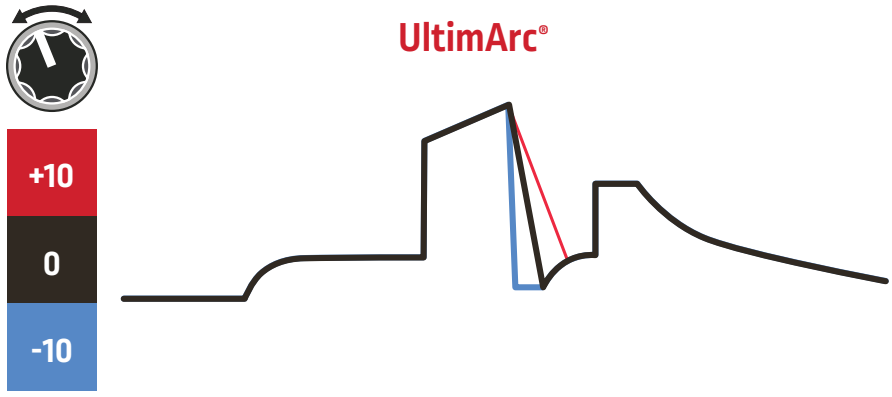
3. Adjusting voltage increases or decreases the arc length, allowing the user to fine tune arc characteristics.

4. Synergic Weld modes improve the ease of set-up by pre-selecting an ideal voltage based on the selected WFS. The user can then fine tune their Voltage setting based on their personal preference and can easily see whether they are above or below the nominal setting.

Voltage Display



5. The UltimArc® control fine-tunes the heat input into the plate.



ASTM Designations for Hot-Dipped Galvanized Plate

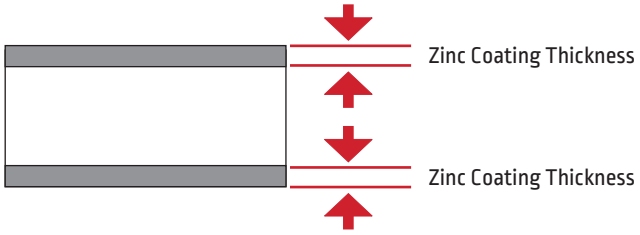
ENGLISH:

60G60G designates the minimum coating weight per ASTM specification.

METRIC:

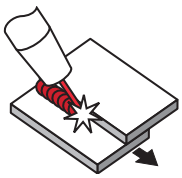
Z120 designates the minimum coating weight per ASTM specification.

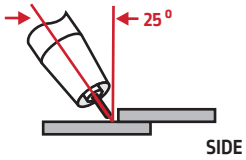
Typical Zinc Coating Thickness for these ASTM specifications average 9.1 microns.

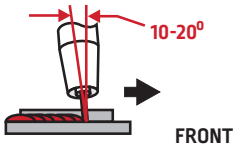


Lap Weld Procedures

Coated Materials	
Travel Angle	10-20° Push
Work Angle	25°
CTWD	
3/8 in	9.5 mm







100% Ar

SuperGlaze® SiBR 0.035 in

60G60G

Material Thickness	Wire Feed Speed	Travel Speed	Trim	UltimArc®
mm	in/min	in/min		
0.8	375	40	0.95	0
1.0	425	40	0.95	0
1.2	450	40	0.95	0

SuperGlaze® SiBR 0.040 in

60G60G

Material Thickness	Wire Feed Speed	Travel Speed	Trim	UltimArc®
mm	in/min	in/min		
0.8	310	40	0.95	0
1.0	325	40	0.95	0
1.2	350	40	0.95	0

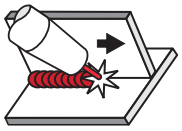
SuperGlaze® SiBR 0.045 in

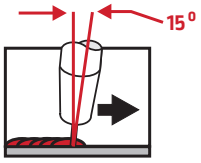
60G60G

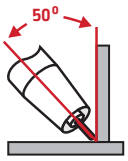
Material Thickness	Wire Feed Speed	Travel Speed	Trim	UltimArc®
mm	in/min	in/min		
0.8	225	40	0.95	0
1.0	250	40	0.95	0
1.2	275	40	0.95	0

Fillet Weld Procedures

COATED MATERIALS	
Travel Angle	15° Push
Work Angle	50°
CTWD	
0.5 in	15 mm







100% Ar

SuperGlaze® SiBR 0.035 in

Material Thickness	Wire Feed Speed	Travel Speed	Trim	UltimArc®
mm	in/min	in/min		
0.8	415	40	1	-5
1.0	450	35	0.95	-5
1.2	450	30	0.95	-5

SuperGlaze® SiBR 0.040 in

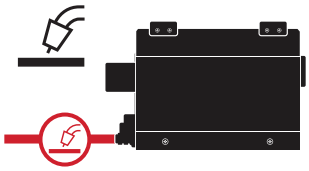
Material Thickness	Wire Feed Speed	Travel Speed	Trim	UltimArc®
mm	in/min	in/min		
0.8	325	40	1	-10
1.0	350	35	0.95	-5
1.2	350	30	0.95	-5

SuperGlaze® SiBR 0.045 in

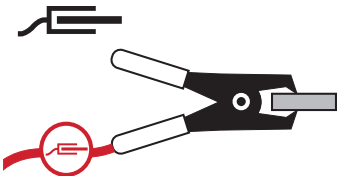
Material Thickness	Wire Feed Speed	Travel Speed	Trim	UltimArc®
mm	in/min	in/min		
0.8	250	40	1	-10
1.0	275	35	0.95	-5
1.2	275	30	0.95	-5

Sense Leads

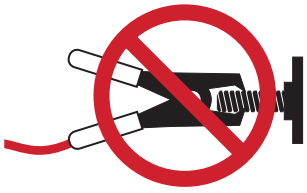
An electrode sense lead is required. This is a standard connection in an ArcLink® cable.



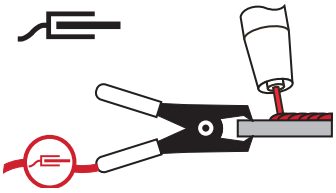
A work sense lead (optional) is highly recommended for total welding cable lengths >50 ft. and should be connected directly to the workpiece.



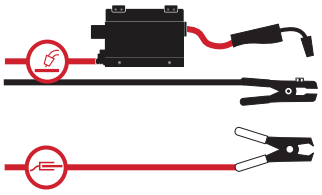
DO NOT connect either sense lead to a welding stud on the power source as this may result in erratic arc behavior.



For best performance, connect the work sense lead close to the welding arc.



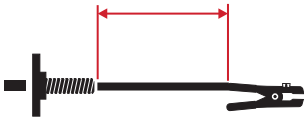
The work sense lead should be separated away from welding cables to minimize interference.



DO NOT route sense lead cable close to high current welding cables as this may distort the sense lead signal.

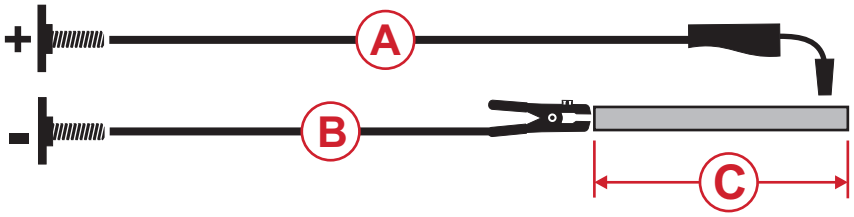
Work Leads

Connect the work lead to the negative stud on the power source and directly to the work piece. Maintain the shortest connection length possible.

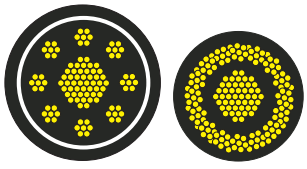


Test cable inductance levels using the Power Wave® Manager software exclusively from Lincoln Electric® Software. Available at www.powerwavesoftware.com.

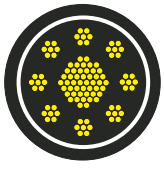
The total length of the welding current loop (A+B+C) should be minimized to reduce inductance. Route cables (A,B) close together to further reduce cable inductance.



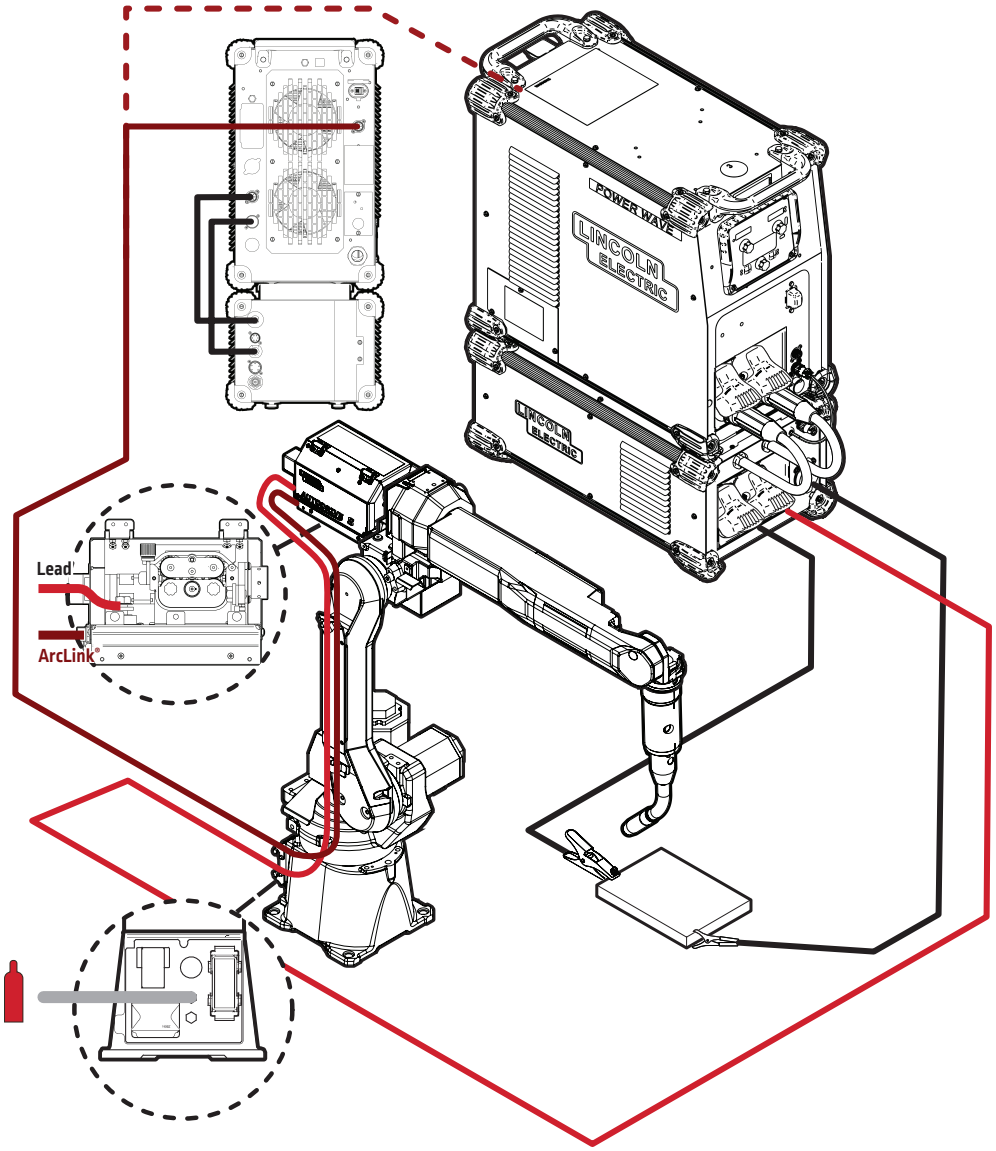
For configurations with excessive inductance, use Lincoln Electric® patented coaxial welding cables.



Lincoln Electric coaxial cables combine the positive and negative welding leads into one cable to minimize cable inductance.



Connection Diagram



Recommended MIG Torch Components

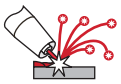
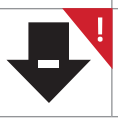
AutoDrive® 4R220

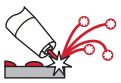
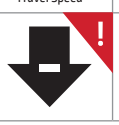
Description	Product Number
Magnum® PRO 350A Diffuser	KP2746-1
Magnum PRO 350A Tapered Tip 0.035"	KP2744-035T
Magnum PRO 350A Tapered Tip 3/64" 5356	KP2744-364AT5356
Drive Roll & Wire Guide Kit - Aluminum Wire 0.035"	KP1507-035A
Drive Roll & Wire Guide Kit - Aluminum Wire 0.045"	KP1507-3/64A
Magnum PRO 350A Standard 0.375" Recess Nozzle	KP2742-1-38R
Magnum PRO 350A Gun Tube Insulator	KP2773-2
Connector (Thru Arm) Small Liner Size	K466-12

AutoDrive® S

Description	Product Number
Magnum PRO 350A Diffuser	KP2746-1
Magnum PRO 350A Tapered Tip 0.035"	KP2744-035T
Magnum PRO 350A Tapered Tip 3/64" 5356	KP2744-364AT5356
Magnum PRO 350A Standard 0.375" Recess Nozzle	KP2742-1-38R
Magnum PRO 350A Gun Tube Insulator	KP2773-2

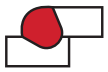
Troubleshooting

 SPATTER	Check ▶	Trim	Travel Speed	Contact Tip to Work Surface	Wire Feed Speed	Gas Coverage	Push Angle	UltimArc®	Work Sense Lead
	Action ▶								

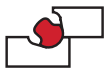
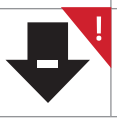
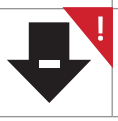
 ERRATIC ARC	Check ▶	Travel Speed	Proper Feeding	Trim	Wire Feed Speed	Push Angle	Tip	Surface Contaminates	Work Sense Lead
	Action ▶								

 POROSITY	Check ▶	Gas Coverage	Surface Contaminates	Contact Tip to Work Surface
	Action ▶			

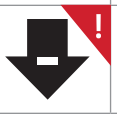
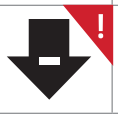
 CONCAVE BEAD	Check ▶	Trim	Wire Feed Speed	Contact Tip to Work Surface	Push Angle
	Action ▶				

 CONVEX BEAD	Check ▶	Travel Speed	Wire Feed Speed	Trim	Contact Tip to Work Surface	Push Angle
	Action ▶					

Troubleshooting

 UNDER CUT	Check ▶	Trim	Travel Speed	Wire Feed Speed	
	Action ▶				

 BURN THROUGH	Check ▶	Travel Speed	Wire Feed Speed	Contact Tip to Work Surface	Push Angle	
	Action ▶					

 POOR PENETRATION	Check ▶	Travel Speed	Wire Feed Speed	Contact Tip to Work Surface	Push Angle	
	Action ▶					

 Increase

 Decrease

 Inspect & Replace

 Important

Icons

 Wire Type	 Gas	 Material Thickness	 Wire Feed Speed	 Travel Speed	 Trim	 Amps	 Contact Tip to Work Surface	 Push Angle	 Arc Length
 Control Knob	 Weld Stud	 Torch	 Work Sense Lead	 Work Clamp	 Torch Nozzle	 Spatter	 Erratic Arc	 Proper Feeding	 Stop / Avoid
 Gas Coverage	 Porosity	 Concave Bead	 Burn Through	 Under Cut	 Convex Bead	 Poor Penetration	 UltimArc®	 Surface Contaminates	

Technical Terms

Cable Inductance	Resistance to change in current. Should not exceed 65 µH.
GMAW	Gas metal arc welding including metal inert gas (MIG) and metal active gas (MAG) welding.
Porosity	Gas entrapped in solidifying metal forms spherical or elongated pores in the weld.
Push Angle	The angle at which the electrode leads the weld pool relative to the direction of travel.
Synergic	A mode of control which automatically selects a preprogrammed nominal voltage based on the wire feed speed (WFS) set by the operator.
Work Angle	The angle of the electrode, off perpendicular, relative to the work piece surface.

Procedure Notes

All listed procedures are starting points and may require some adjustment depending on the specific application.

Torch angle, electrode placement, contamination, mill scale, joint fit up, and joint consistency are factors that may require special consideration depending on the specific application.

At higher travel speeds, joint fit up, wire placement, and contamination all become factors that are more significant.

The result of welding at higher travel speeds is a tendency to produce more spatter, less penetration, more undercut, and a less desirable bead shape. Depending on the limitations / requirements of the actual application, slower travel speeds and higher arc voltages may be required.

As the travel speed increases in fast follow applications (1/4" to 14 Gauge), a tighter arc length must be maintained so that the puddle properly follows the arc. Operators typically reduce the arc length control (Voltage) to achieve this. At faster travel speeds, the bead-shape can become very convex (or ropy), and the weld will not "wet" well. There is a point at which the arc is set so short that the arc will become unstable and stubbing will occur. This forms a limitation of just how fast the travel speed can be raised.

It is ultimately the responsibility of the end user to ensure the proper weld deposition rate, bead profile, and structural integrity of a given weld application.

CUSTOMER ASSISTANCE POLICY

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