

**HLQ**

INDUCTION HEATING EQUIPMENT

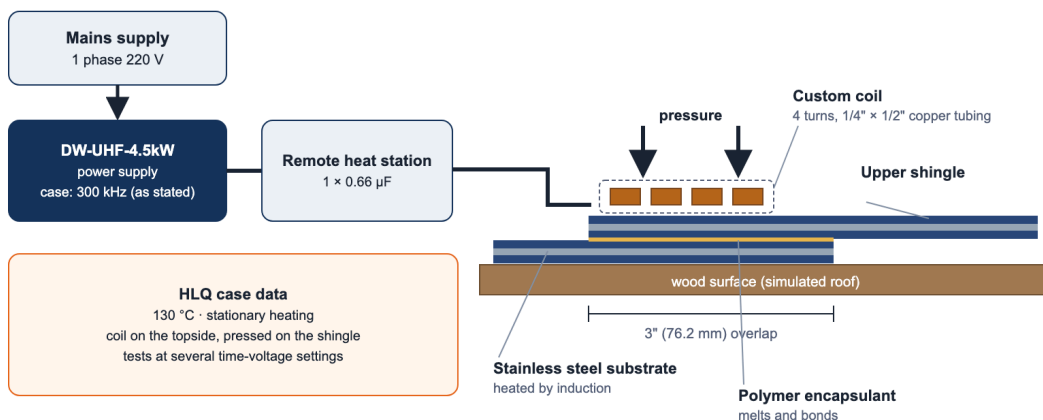
Induction Bonding Solar Panel Shingles

Induction heats the stainless steel substrate of a solar panel shingle so the polymer encapsulant melts and two shingles bond at a 3" overlap – at 130 °C, with a water-cooled coil pressed on the topside, giving excellent bonds without encapsulant bubbling.

Induction Bonding Solar Panel Shingles – Working Principle

HLQ

The coil heats the stainless steel substrate; the polymer encapsulant melts at the 3" overlap and bonds two shingles.



Result: excellent bond formation, no encapsulant bubbling, only slight surface texture change.

Sample: 3" × 10.25" section of a 21" solar panel shingle. Coil measures 24" × 2 1/4".

Schematic after the original HLQ drawing; not to scale. Data from the HLQ induction bonding solar panel case.

130 °C

bonding temperature

3"

(76.2 mm) overlap

4-turn coil

24" × 2 1/4"

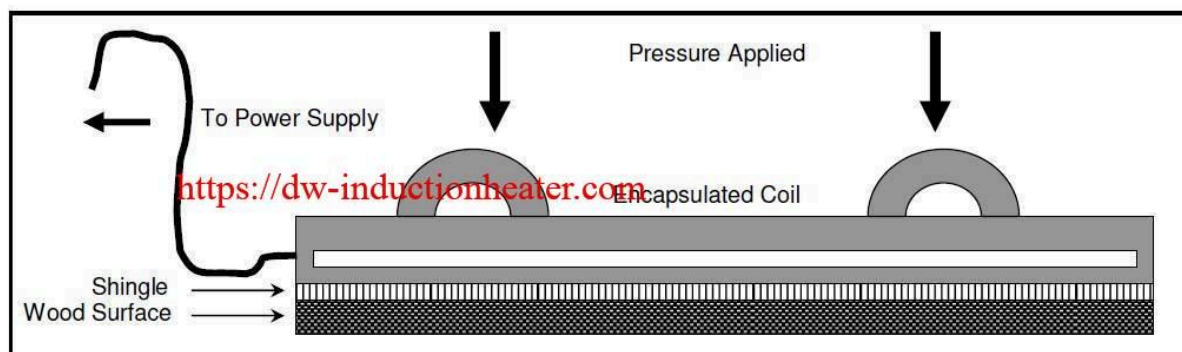
No bubbling

of the encapsulant

01 The HLQ solar panel bonding case

Objective: heat the stainless steel substrate of a solar panel shingle to melt the polymer encapsulant, so that two shingles bond together with a 3" overlap.

Item	Case data
Material	3" × 10.25" (76.2 × 260.35 mm) section of a 21" (533.4 mm) solar panel shingle
Temperature	130 °C
Frequency	300 kHz (as stated)
Equipment	DW-UHF-4.5kW power supply with a remote heat station containing one 0.66 µF capacitor (original: "0.66mF")
Coil	Custom-made: 4 turns of 1/4" × 1/2" (6.35 × 12.7 mm) rectangular copper tubing, measuring 24" × 2 1/4" (609.6 × 57.15 mm)
Process	Stationary heating with the coil on the topside of the sample; shingles overlapped and placed on wood to simulate a roof; pressure applied by pressing the water-cooled coil against the shingle; tests at several time-voltage settings
Results	Excellent bond formation; no encapsulant bubbling; only slight surface texture change



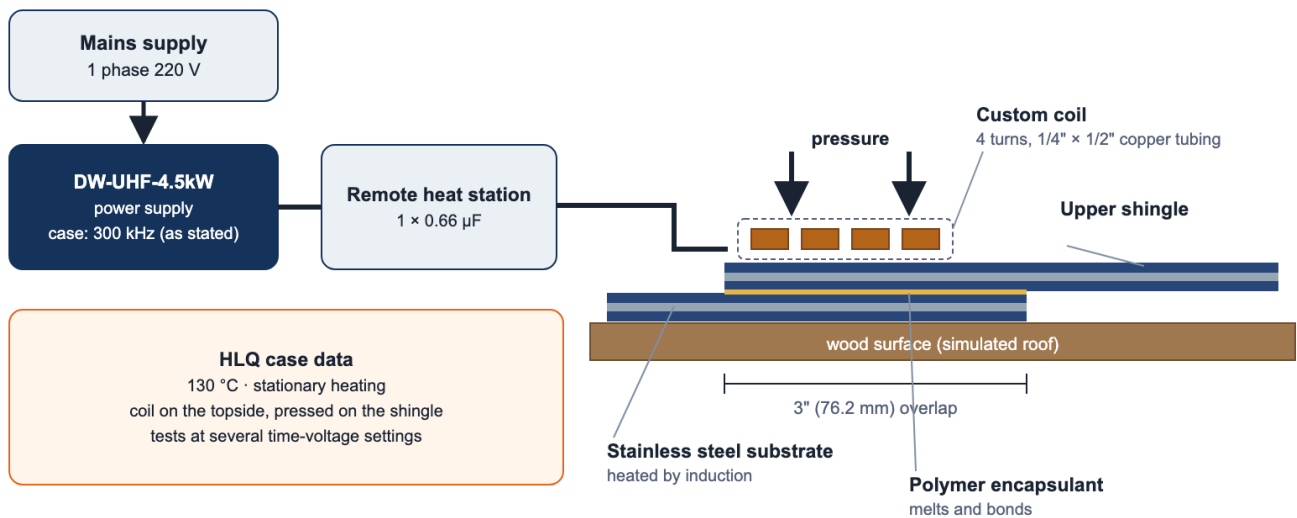
Encapsulated coil pressed on the shingle on a wood surface (original HLQ drawing).

02 How it works

Induction Bonding Solar Panel Shingles – Working Principle

HLQ

The coil heats the stainless steel substrate; the polymer encapsulant melts at the 3" overlap and bonds two shingles.



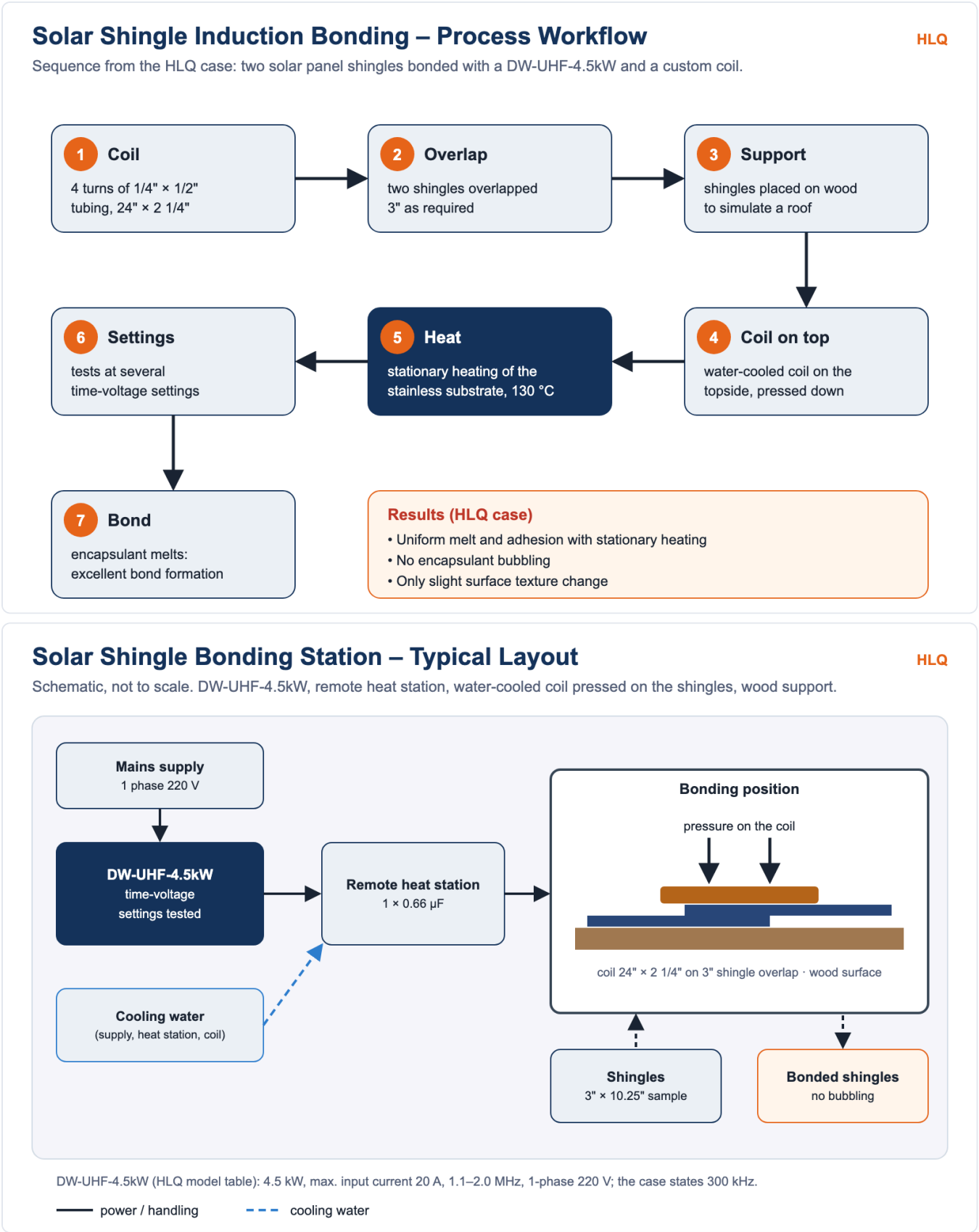
Result: excellent bond formation, no encapsulant bubbling, only slight surface texture change.

Sample: 3" × 10.25" section of a 21" solar panel shingle. Coil measures 24" × 2 1/4".

Schematic after the original HLQ drawing; not to scale. Data from the HLQ induction bonding solar panel case.

The coil on the topside induces heat in the stainless steel substrate of the shingles. The polymer encapsulant at the 3" overlap melts at 130 °C, while the coil is pressed against the shingle to help the bond form.

04 Process workflow and station layout



05 DW-UHF series for solar panel bonding

Model	Power	Max. input current	Frequency	Supply
DW-UHF-4.5KW	4.5 kW	20 A	1.1–2.0 MHz	1-ph 220 V
DW-UHF-6.0KW	6.0 kW	28 A	300–1100 kHz	1-ph 220 V
DW-UHF-10KW	10 kW	15 A	100–500 kHz	3-ph 380 V

HLQ model table, 100% duty cycle. This case states DW-UHF-4.5kW at 300 kHz, outside the 1.1–2.0 MHz range listed for this model.

Solar and polymer jobs (HLQ cases)

Job	Power supply	Frequency	Time
Solar panel shingle bonding	DW-UHF-4.5kW	300 kHz (as stated)	several time-voltage settings
Solar flex circuit soldering	DW-UHF-4.5kW	278 kHz (as stated)	10 s
Catheter tube braid	DW-UHF-4.5kW	306 kHz (as stated)	3.5 s

06 Frequently asked questions

What was bonded?

Two solar panel shingles, overlapped by 3", through their polymer encapsulant.

What is heated?

The stainless steel substrate of the shingle; the encapsulant melts from that heat.

What temperature?

130 °C.

Which equipment?

A DW-UHF-4.5kW with a remote heat station containing one 0.66 µF capacitor; 300 kHz as stated.

Which coil?

A custom 4-turn coil of 1/4" × 1/2" rectangular copper tubing, measuring 24" × 2 1/4".

How is pressure applied?

By pressing the water-cooled coil against the shingle.

What was the result?

Excellent bond formation, no encapsulant bubbling and only slight surface texture change.

Why choose HLQ

Excellent bonds

No encapsulant bubbling.

Uniform melt

Stationary heating.

Custom coils

24" rectangular coil.

Coil as press

Water-cooled coil applies pressure.

Solar experience

Shingles and flex circuits.

Compact

Single-phase DW-UHF.

Request a solar panel bonding test

Send us the panel or shingle construction, the encapsulant and the overlap. We will propose the coil, fixture and power supply.

Email

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Tel / WhatsApp / Telegram

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Website

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Factory address

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Dongguan City, Guangdong Province, China
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Please include in your inquiry

- Panel / shingle construction
- Substrate metal and encapsulant
- Overlap size
- Bonding temperature and cycle time
- Available supply and cooling water