

# Induction Bonding Plastic, Rubber and Metal

Induction heats the metal part – an insert, braid, clip or substrate – so the plastic, rubber, polymer or adhesive in contact with it reflows, melts or bonds. HLQ cases bond in 1.5 to 12 seconds with repeatable, evenly distributed heat.



**1.5–12 s**

heating in HLQ cases

**121–370 °C**

bonding temperatures

**10 s vs 90 s**

induction vs ultrasonic

**DW-UHF**

4.5–10 kW

## 01 What induction bonding does

Induction bonding uses induction heating to cure bonding adhesives and to join plastics, rubber and polymers to metal. It is used for car body components, composite-to-metal and carbon fiber joints, brake shoes and magnets, and guides, rails, shelves and panels in white goods. Two main automotive types: spot bonding of small segments, and full-ring bonding of complete joints.

| HLQ case                             | Data                                                                                                       |
|--------------------------------------|------------------------------------------------------------------------------------------------------------|
| Metal braid in plastic catheter tube | 250 °F (121 °C); 306 kHz; DW-UHF-4.5kW (as stated); single-turn coil; 3.5 s; metal braid melts the plastic |
| Rubber gaskets to steel gas tank     | 320 °F (160 °C); 200 / 231 kHz; DW-UHF-10kW; two 2-turn pancake coils; 6.5 s                               |
| Stainless inserts into plastic       | 500 °F (260 °C); 230 kHz; DW-UHF-6kW-I (as stated); 6-position helical coil; 10 s vs 90 s ultrasonic       |



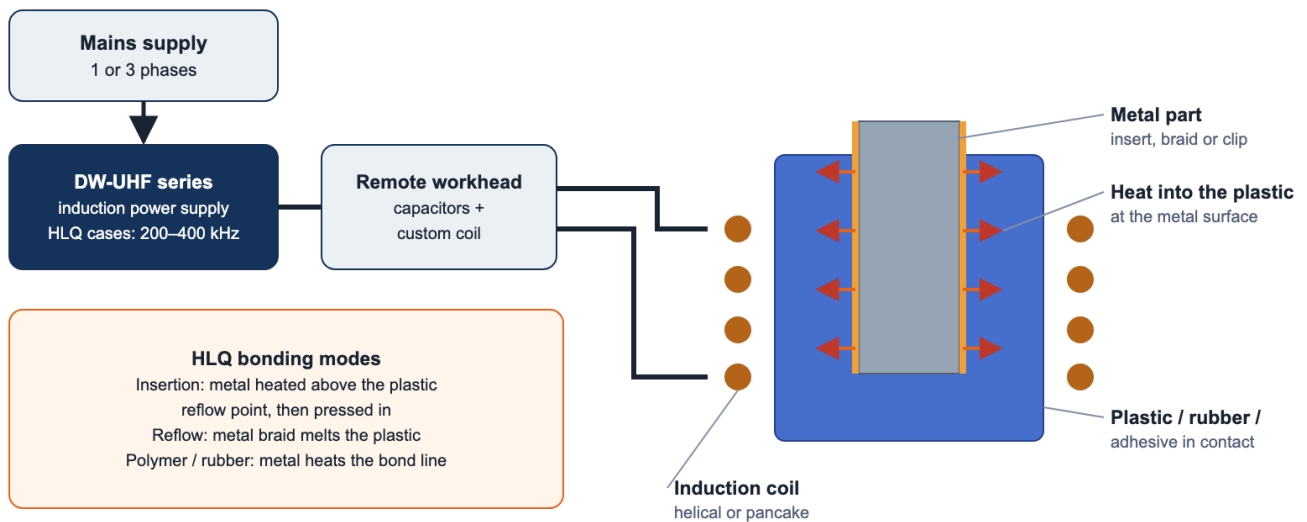
Plastic part in a pancake coil, and a seal ring on a metal ring in a pancake coil (original HLQ page images).

## 02 How it works

### Induction Bonding Plastic to Metal – Working Principle

HLQ

The coil heats only the metal part; the plastic, rubber or adhesive in contact with it reflows, melts or bonds.



Result in HLQ cases: rapid, repeatable heating cycles of 1.5–12 s and even heat at the bond line.

Schematic, not to scale. Sources: HLQ heat staking, stainless steel insertion, catheter tube, rubber-to-steel and solar panel bonding cases.

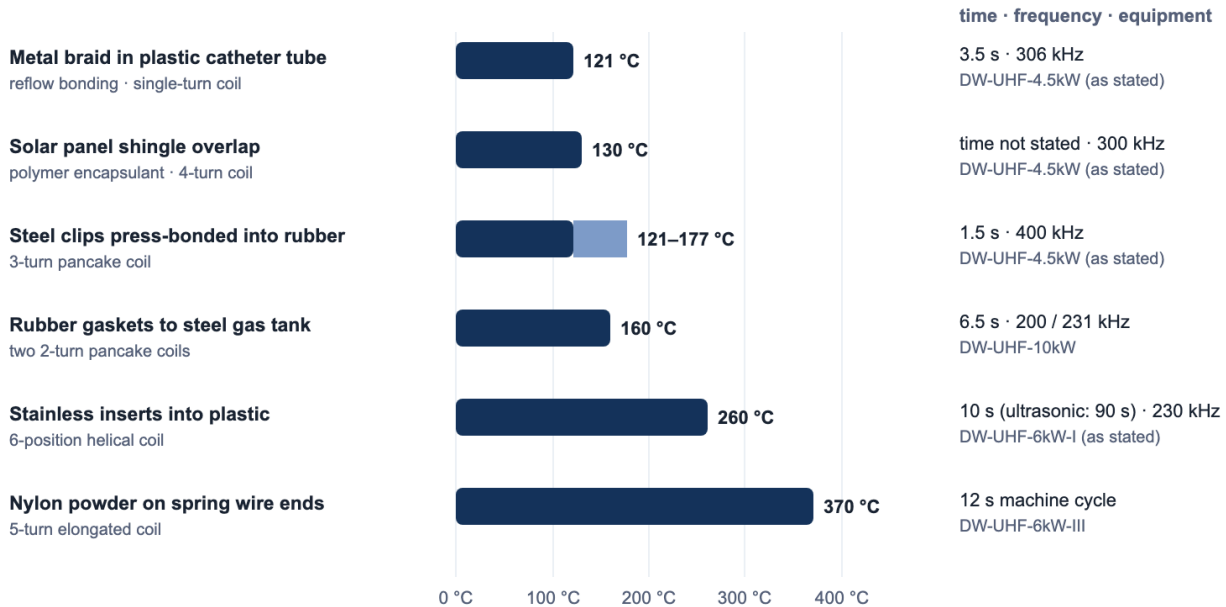
The coil induces heat in the metal part. For insertion, the metal is heated above the plastic reflow point and pressed in; for reflow bonding, a metal braid melts the surrounding plastic; for rubber and polymer bonding, the metal substrate heats the bond line.

## 03 HLQ plastic, rubber and polymer bonding cases

### HLQ Plastic, Rubber and Polymer Bonding Cases

HLQ

Published HLQ data: bonding temperature, heating time, frequency and equipment.



°C from the °F values where given: 250 °F, 250–350 °F, 320 °F, 500 °F. "As stated": frequency outside the model-table range.

Sources: HLQ catheter tube, solar panel, steel-into-rubber, rubber-to-steel, stainless insertion and heat staking cases.

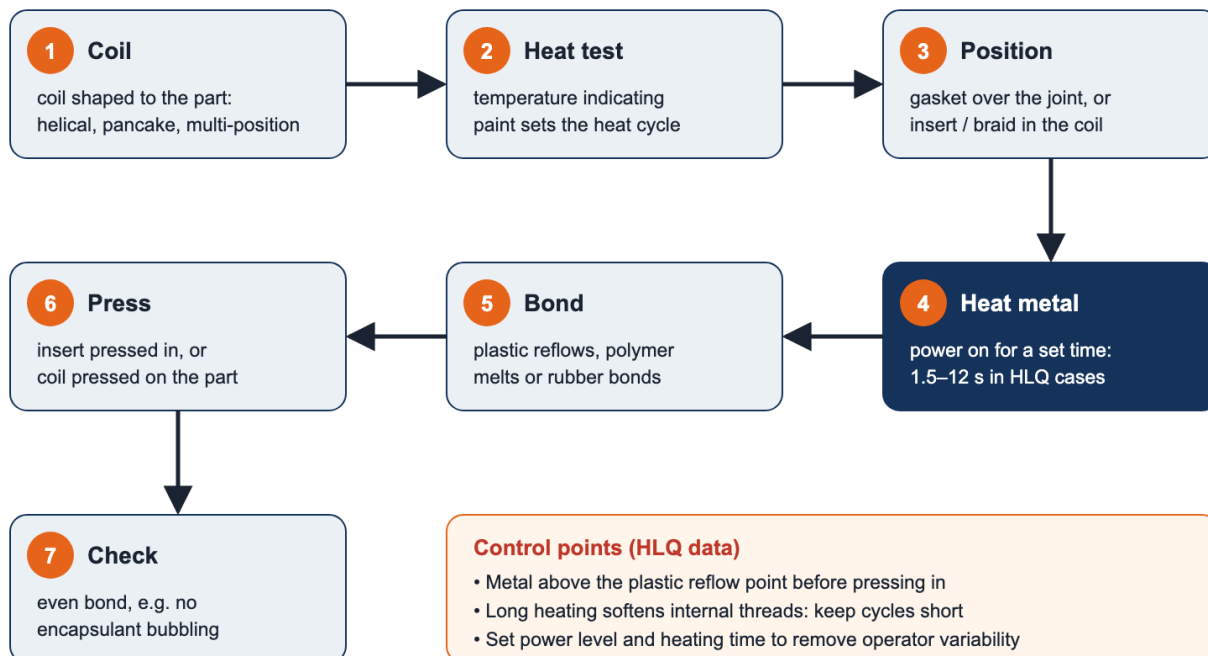
| Case                           | Temperature             | Time  | Equipment                         |
|--------------------------------|-------------------------|-------|-----------------------------------|
| Plastic catheter tube braid    | 250 °F (121 °C)         | 3.5 s | DW-UHF-4.5kW, 306 kHz (as stated) |
| Solar panel shingle            | 130 °C                  | –     | DW-UHF-4.5kW, 300 kHz (as stated) |
| Steel clips into rubber        | 250–350 °F (121–177 °C) | 1.5 s | DW-UHF-4.5kW, 400 kHz (as stated) |
| Rubber gaskets to steel tank   | 320 °F (160 °C)         | 6.5 s | DW-UHF-10kW, 200 / 231 kHz        |
| Stainless inserts into plastic | 500 °F (260 °C)         | 10 s  | DW-UHF-6kW-I, 230 kHz (as stated) |
| Nylon powder on spring wire    | 370 °C                  | 12 s  | DW-UHF-6kW-III                    |

## 04 Process workflow and station layout

### Induction Bonding Plastic and Rubber – Process Workflow

HLQ

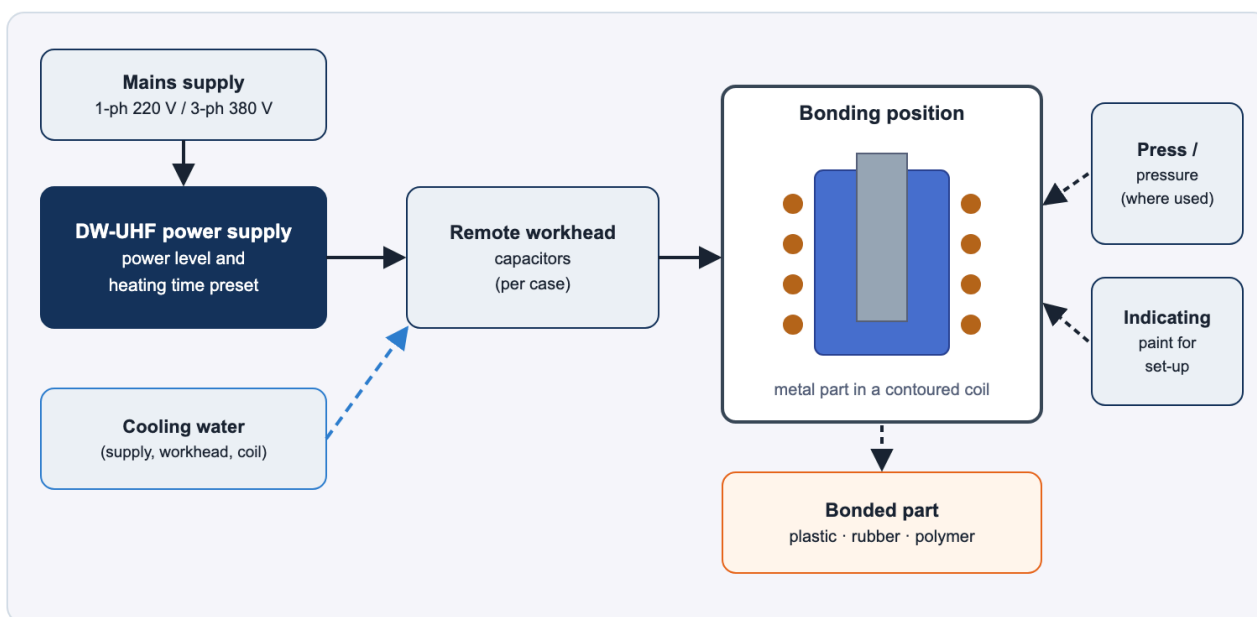
Sequence compiled from HLQ insertion, catheter tube, rubber-to-steel and solar panel bonding cases.



### Induction Bonding Station – Typical Layout

HLQ

Schematic, not to scale. Power supply, remote workhead with a coil shaped to the part, fixture or press, cooling water.



HLQ cases used DW-UHF-4.5kW, DW-UHF-6kW and DW-UHF-10kW supplies with remote workheads and coils designed for each part.

## 05 DW-UHF series for induction 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. The original page names the DW-UHF and DW-HF series as the primary power supplies for induction bonding. The DW-UHF-4.5kW and DW-UHF-6kW-I cases state frequencies (230–400 kHz) outside these listed ranges.

### Bonding jobs (HLQ cases)

| Job                            | Power supply   | Frequency           | Time  |
|--------------------------------|----------------|---------------------|-------|
| Catheter tube braid            | DW-UHF-4.5kW   | 306 kHz (as stated) | 3.5 s |
| Steel clips into rubber        | DW-UHF-4.5kW   | 400 kHz (as stated) | 1.5 s |
| Rubber gaskets to steel tank   | DW-UHF-10kW    | 200 / 231 kHz       | 6.5 s |
| Stainless inserts into plastic | DW-UHF-6kW-I   | 230 kHz (as stated) | 10 s  |
| Nylon powder on spring wire    | DW-UHF-6kW-III | –                   | 12 s  |

## 06 Frequently asked questions

### What is induction bonding?

Induction heating used to cure bonding adhesives and to join plastics, rubber and polymers to metal.

### Does induction heat the plastic directly?

No. The metal part is heated, and the plastic, rubber or adhesive in contact with it reflows, melts or bonds.

### How fast is it?

1.5 to 12 seconds in HLQ cases; 10 s for stainless inserts versus 90 s with ultrasonic heating.

### Which temperatures?

From 250 °F (121 °C) for catheter tubes to 370 °C for nylon powder coating in HLQ cases.

### Which coils?

Helical, pancake, contoured and multi-position coils designed for each part.

### Which equipment?

DW-UHF series: 4.5 kW, 6 kW and 10 kW systems in HLQ cases.

### What do I send for a quote?

Part drawings, metal and plastic materials, bonding temperature, cycle time and output.

### Why choose HLQ

#### Fast cycles

1.5–12 s in HLQ cases.

#### Repeatable

Preset power and time.

#### Even heat

Uniform bond line.

#### Custom coils

Pancake, helical, contoured.

#### Faster than ultrasonic

10 s vs 90 s inserts.

#### Compact

Single-phase DW-UHF.

# Request an induction bonding test

Send us the metal and plastic parts and the bonding temperature. We will propose the coil, fixture and power supply.

**Email**

[sales@dw-inductionheater.com](mailto:sales@dw-inductionheater.com)

**Tel / WhatsApp / Telegram**

+86 131 5596 5571

**Website**

[dw-inductionheater.com](http://dw-inductionheater.com)

**Factory address**

Jiangbei Village, Wusha Area, Chang'an Town,  
Dongguan City, Guangdong Province, China  
523859

**Please include in your inquiry**

- Metal part and plastic / rubber material
- Bonding or reflow temperature
- Insertion, reflow or adhesive bonding
- Cycle time and parts per hour
- Available supply and cooling water