

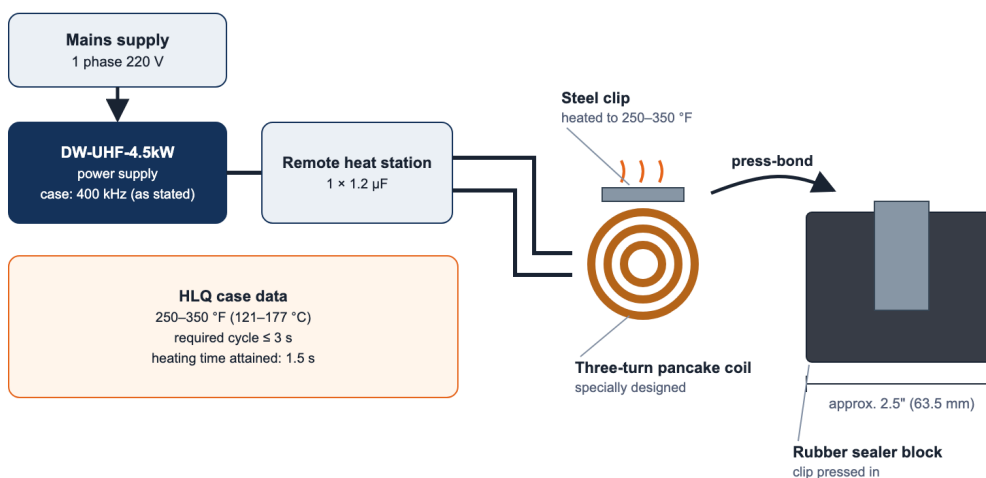
Bonding Steel Into Rubber With Induction

Steel clips heated to 250–350 °F by a specially designed three-turn pancake coil and press-bonded into rubber seals. The requirement was a cycle not exceeding 3 seconds – HLQ attained 1.5 seconds with an even heat pattern.

Bonding Steel Into Rubber – Working Principle

HLQ

A three-turn pancake coil heats the steel clip to 250–350 °F; the hot clip is press-bonded into the rubber seal.



Result: acceptable bond formation due to the even heat pattern; shorter times possible with the fast power supply.

Schematic after the original HLQ drawing; not to scale. Data from the HLQ bonding steel into rubber case.

1.5 s

heating time

≤ 3 s

required cycle

250–350 °F

(121–177 °C)

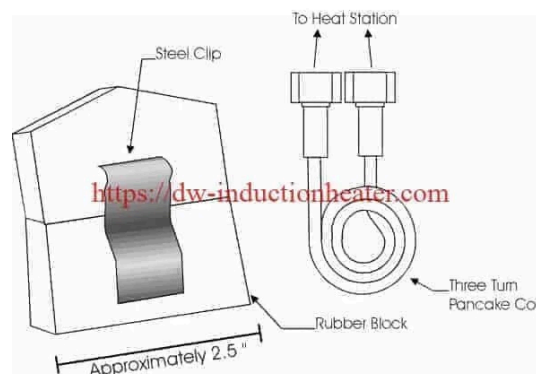
3-turn

pancake coil

01 The HLQ steel-into-rubber bonding case

Objective: heat metal clips and press-bond them into rubber seals. The metal needs to reach 250–350 °F with a cycle time not exceeding 3 seconds.

Item	Case data
Material	Steel clips and rubber sealer blocks (block approx. 2.5" / 63.5 mm, per the original drawing)
Temperature	250 °F to 350 °F (121–177 °C)
Frequency	400 kHz (as stated)
Equipment	DW-UHF-4.5kW power supply with one remote heat station containing one 1.2 µF capacitor
Coil	Specially designed three-turn pancake coil
Required cycle	Not exceeding 3 seconds
Results	Heating time of 1.5 seconds attained; shorter heating times possible due to the fast response of the power supply; acceptable bond formation due to the even heat pattern



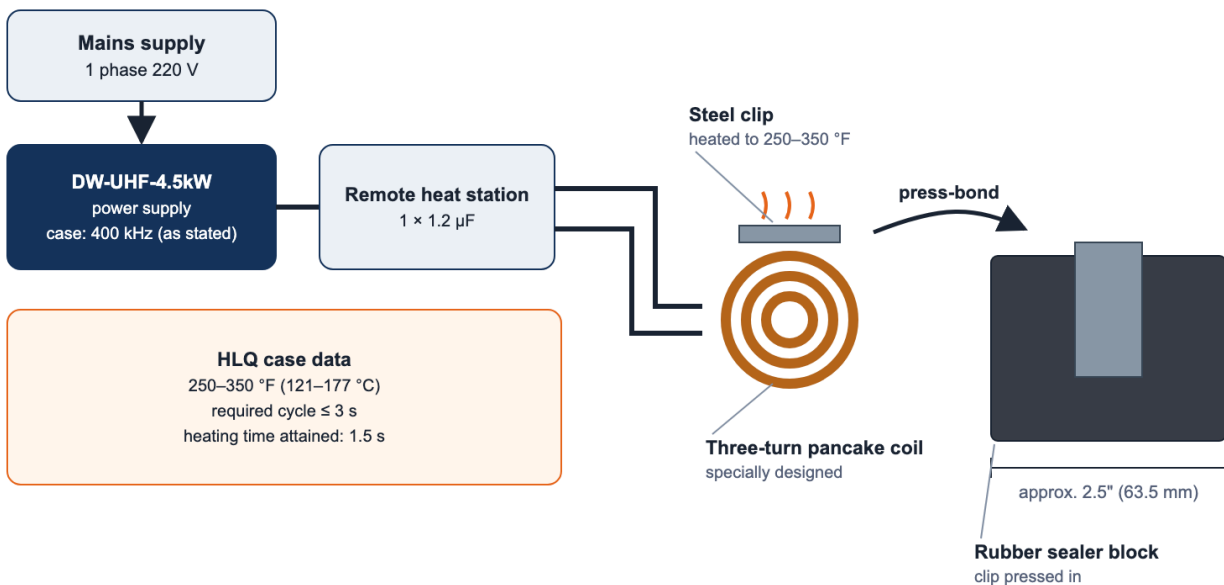
Steel clip, rubber block and three-turn pancake coil (original HLQ drawing).

02 How it works

Bonding Steel Into Rubber – Working Principle

HLQ

A three-turn pancake coil heats the steel clip to 250–350 °F; the hot clip is press-bonded into the rubber seal.

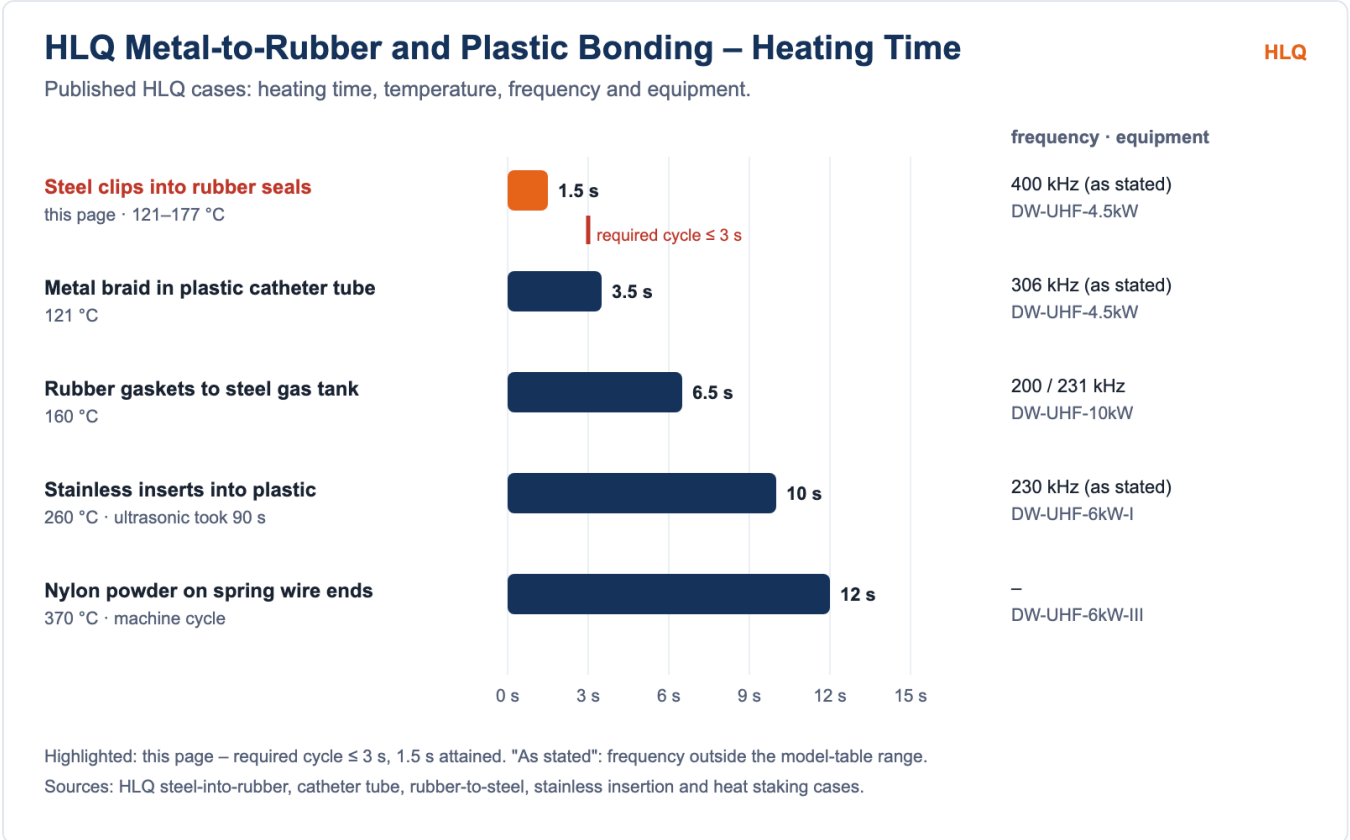


Result: acceptable bond formation due to the even heat pattern; shorter times possible with the fast power supply.

Schematic after the original HLQ drawing; not to scale. Data from the HLQ bonding steel into rubber case.

The three-turn pancake coil induces heat in the steel clip. Once the clip reaches 250–350 °F, it is press-bonded into the rubber sealer block. The even heat pattern of induction gives acceptable bond formation.

03 HLQ metal-to-rubber and plastic bonding cases



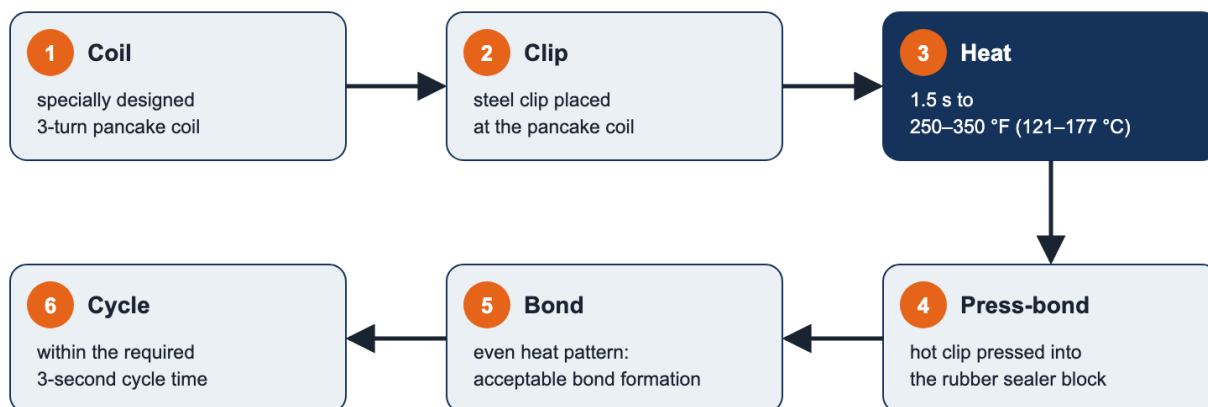
Case	Temperature	Time	Equipment
Steel clips into rubber seals (this case)	250–350 °F (121–177 °C)	1.5 s	DW-UHF-4.5kW, 400 kHz (as stated)
Plastic catheter tube braid	250 °F (121 °C)	3.5 s	DW-UHF-4.5kW, 306 kHz (as stated)
Rubber gaskets to steel tank	320 °F (160 °C)	6.5 s	DW-UHF-10kW, 200 / 231 kHz
Stainless 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

Steel Clip to Rubber Seal Bonding – Process Workflow

HLQ

Sequence from the HLQ case: steel clips heated and press-bonded into rubber seals with a DW-UHF-4.5kW.



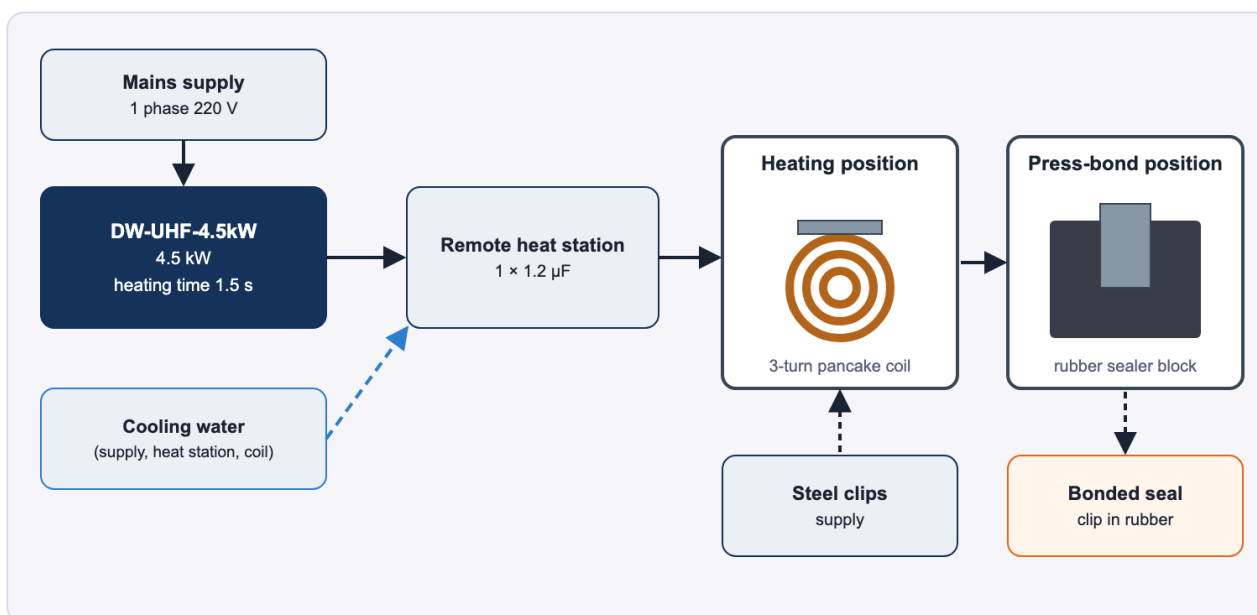
Case data and results

- DW-UHF-4.5kW; one remote heat station with one 1.2 μF capacitor; 400 kHz (as stated)
- Requirement: 250–350 °F with a cycle time not exceeding 3 s – attained 1.5 s
- Shorter heating times are possible due to the fast response of the power supply

Steel Clip Bonding Station – Typical Layout

HLQ

Schematic, not to scale. DW-UHF-4.5kW, remote heat station with pancake coil, press-bond position, cooling water.



DW-UHF-4.5kW (HLQ model table): 4.5 kW, max. input current 20 A, 1.1–2.0 MHz, 1-phase 220 V; the case states 400 kHz.

— power / handling - - - cooling water

05 DW-UHF series for metal-to-rubber 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 400 kHz, outside the 1.1–2.0 MHz range listed for this model.

Bonding jobs (HLQ cases)

Job	Power supply	Frequency	Time
Steel clips into rubber seals	DW-UHF-4.5kW	400 kHz (as stated)	1.5 s
Catheter tube braid	DW-UHF-4.5kW	306 kHz (as stated)	3.5 s
Rubber gaskets to steel tank	DW-UHF-10kW	200 / 231 kHz	6.5 s

06 Frequently asked questions

What was bonded?

Steel clips, heated and press-bonded into rubber sealer blocks.

What temperature?

250 °F to 350 °F (121–177 °C).

How fast?

1.5 seconds, against a requirement of no more than 3 seconds.

Can it be faster?

Shorter heating times are possible due to the fast response of the power supply.

Which equipment?

A DW-UHF-4.5kW with one remote heat station containing one 1.2 µF capacitor; 400 kHz as stated.

Which coil?

A specially designed three-turn pancake coil.

What do I send for a quote?

Clip and seal drawings, materials, required temperature, cycle time and output.

Why choose HLQ

1.5 s heating

Half the required cycle.

Fast response

Shorter times possible.

Even heat

Acceptable bonds.

Pancake coils

Designed per part.

Compact

Single-phase DW-UHF.

Rubber and plastic

Seals, gaskets, inserts.

Request a metal-to-rubber bonding test

Send us the metal clips and rubber seals, the temperature and the cycle time. We will propose the coil, fixture and power supply.

Email

sales@dw-inductionheater.com

Tel / WhatsApp / Telegram

+86 131 5596 5571

Website

dw-inductionheater.com

Factory address

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

Please include in your inquiry

- Clip material and size
- Rubber seal type
- Required temperature
- Cycle time and parts per hour
- Available supply and cooling water