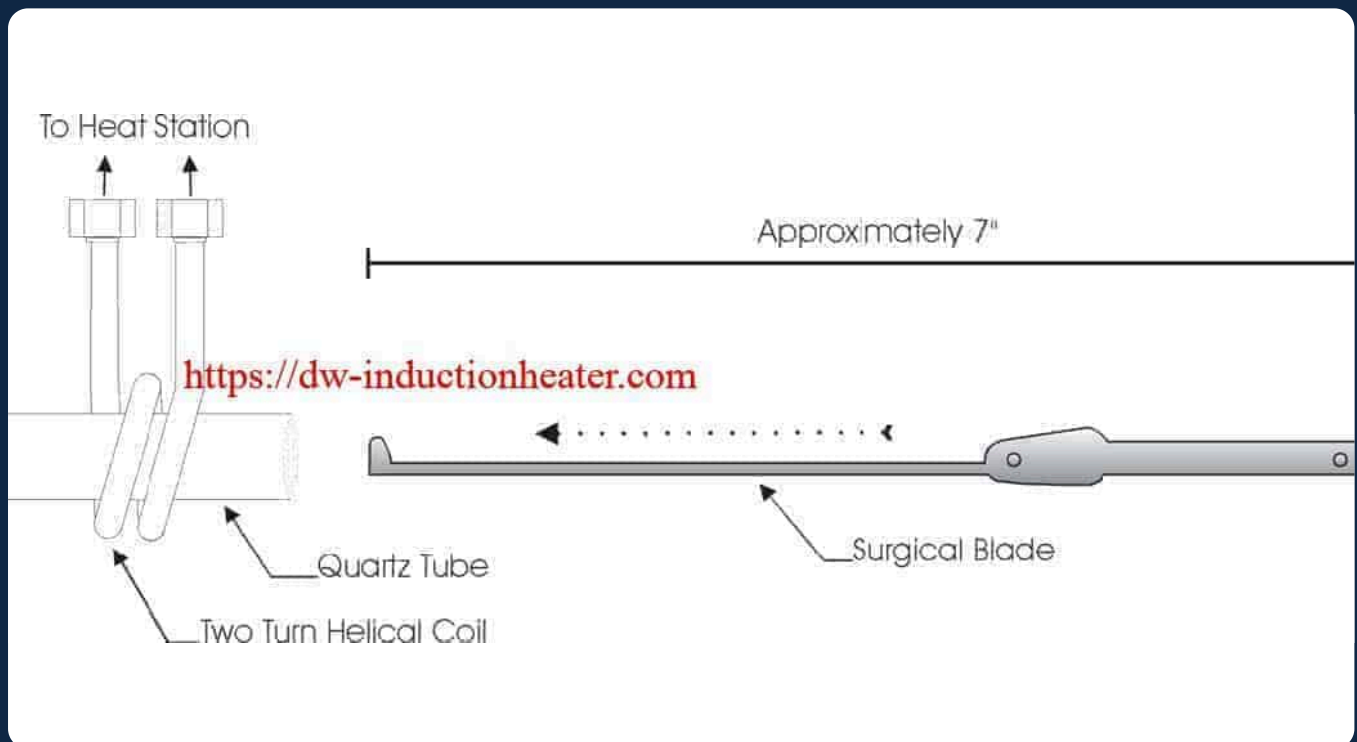


**HLQ**

INDUCTION HEATING EQUIPMENT

Induction Hardening Stainless Steel Knife Blades

420 stainless steel surgical blades: a two-turn helical coil with an internal quartz tube scans a 4" section of the 7" blade, heating it to 1850 °F (1010 °C) at 365 kHz for 48–53 Rockwell C.

**1850 °F**

(1010 °C)

365 kHz

DW-UHF-6kW

4"

(101.6 mm) section

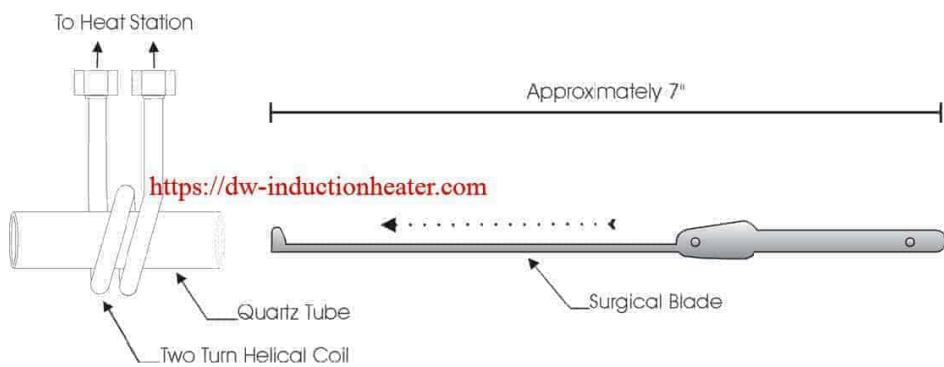
48–53 HRC

after processing

01 The HLQ surgical blade case

Objective: harden a 4" (101.6 mm) section of a stainless steel surgical blade measuring 7" (177.8 mm) long to 48–53 Rockwell C.

Item	Case data
Material	420 stainless steel surgical blades, 7" (177.8 mm) long, 1/4" (6.35 mm) wide at the shank, 0.085" (2.2 mm) thick at the blade
Temperature	1850 °F (1010 °C)
Frequency	365 kHz
Equipment	DW-UHF-6kW induction heating system with a remote workhead including one capacitor of 1.2 µF
Coil	Two-turn helical coil with an internal quartz tube, designed and developed specifically for this application
Process	The coil scans the length of the blade and heats it to 1850 °F (1010 °C)
Target	48–53 Rockwell C on the blade after processing
Benefits	Flameless process; improved production rate; consistent and repeatable results



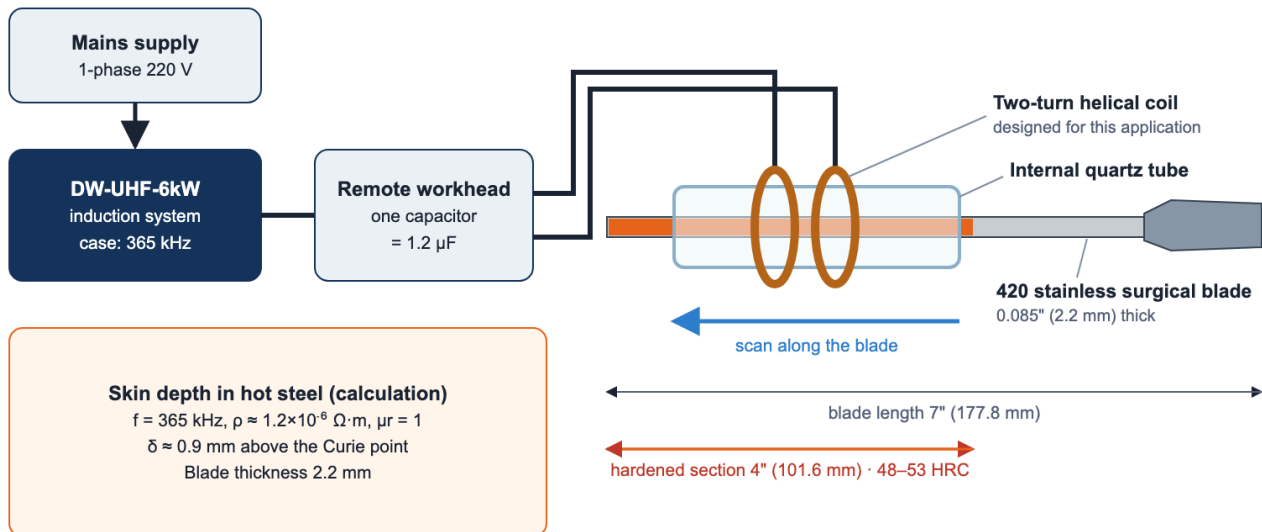
Two-turn helical coil, quartz tube and surgical blade (original HLQ drawing).

02 How it works

Induction Hardening 420 Stainless Steel Surgical Blades

HLQ

A two-turn helical coil with an internal quartz tube scans a 4" section of a 7" blade, heating it to 1850 °F (1010 °C) at 365 kHz.

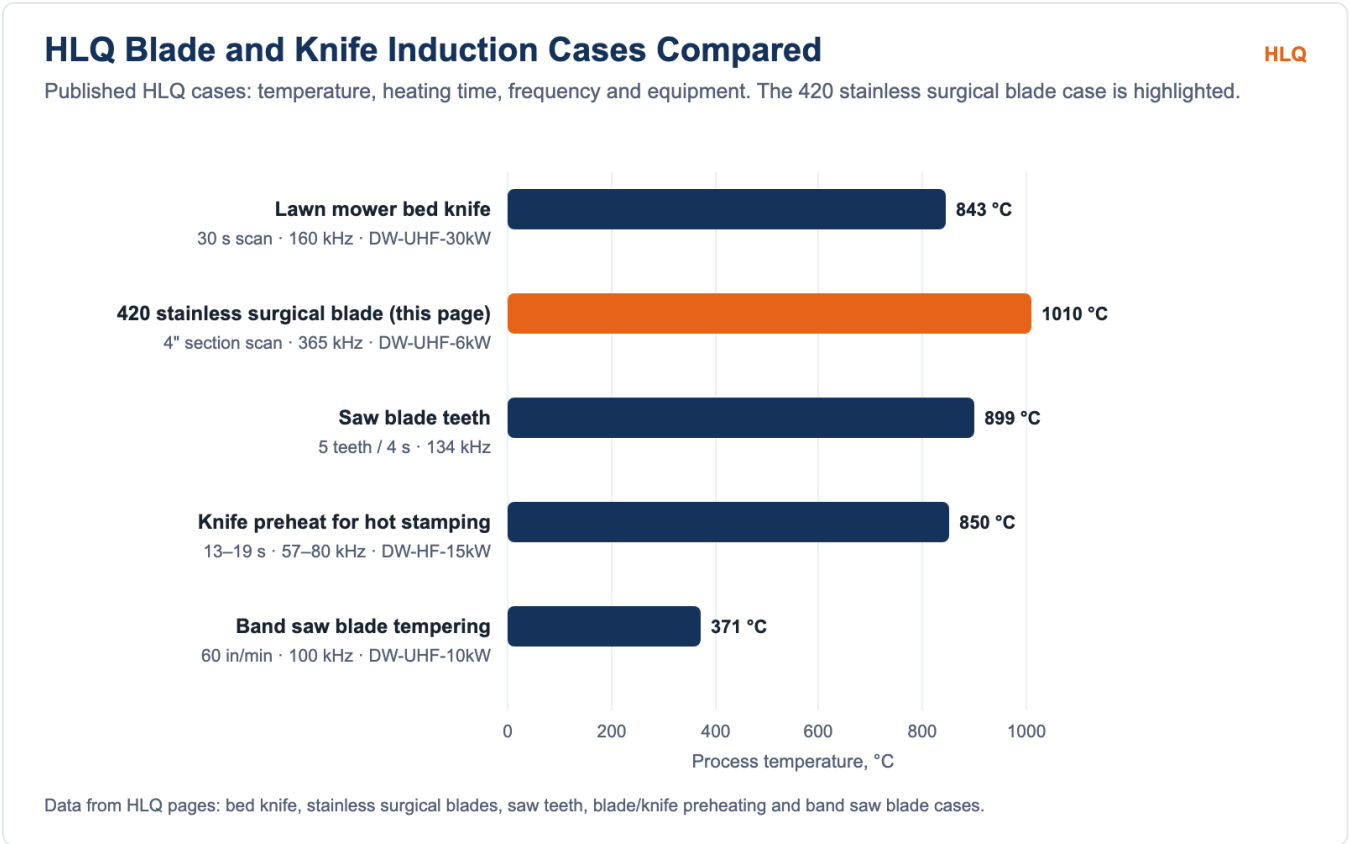


Target: 48–53 Rockwell C on the blade after processing (case objective).

Schematic side view based on the HLQ case drawing; not to scale. Blade: 7" (177.8 mm) long, 1/4" (6.35 mm) wide at the shank, 0.085" (2.2 mm) thick.

Skin depth calculation: at 365 kHz, hot steel above the Curie point ($\rho \approx 1.2 \times 10^{-6} \Omega \cdot \text{m}$, $\mu_r = 1$) gives $\delta \approx 0.9 \text{ mm}$, against a blade thickness of 2.2 mm. The high frequency concentrates heat in the thin blade section inside the coil.

03 HLQ blade and knife cases



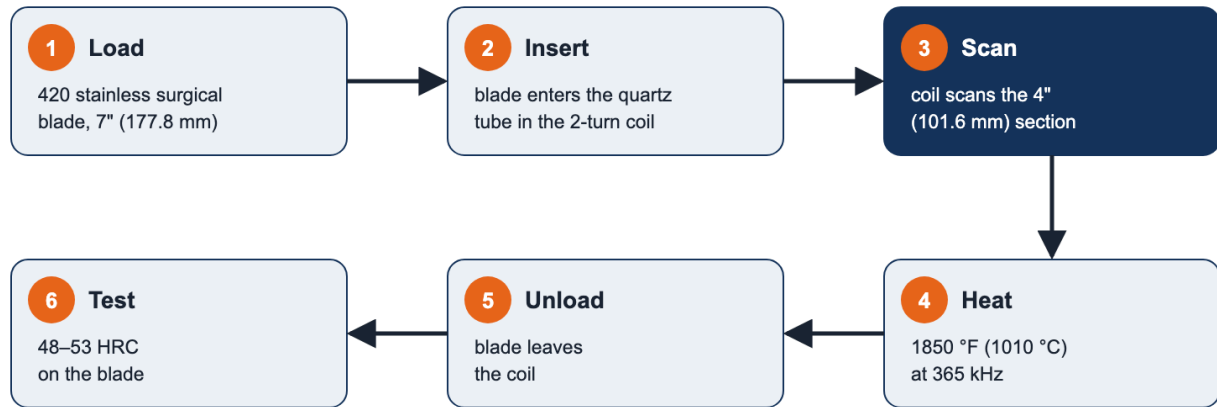
Case	Temperature	Frequency	Equipment
420 stainless surgical blades (this case)	1850 °F (1010 °C)	365 kHz	DW-UHF-6kW
Lawn mower bed knife, 1070 steel	1550 °F (843.3 °C)	160 kHz	DW-UHF-30kW
Knife preheating before forming	850 °C in 13–19 s	57–80 kHz	DW-HF-15kW
Band saw blade tempering	700 °F (371 °C)	100 kHz	DW-UHF-10kW

04 Process workflow and station layout

Surgical Blade Induction Hardening – Process Workflow

HLQ

Sequence from the HLQ 420 stainless steel surgical blade case (DW-UHF-6kW, 365 kHz).



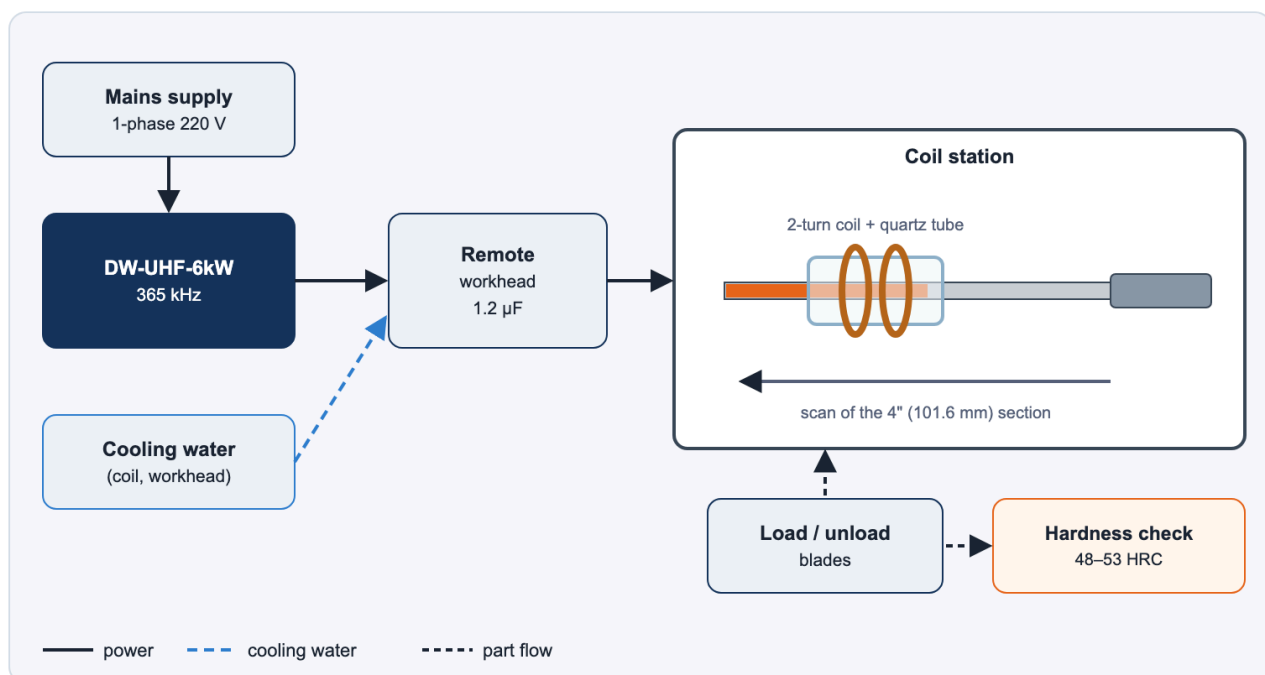
Control points

- Only the 4" (101.6 mm) section of the 7" blade is scanned
- Same 1850 °F (1010 °C) temperature on every blade for consistent, repeatable results
- Cooling/quench method is not stated in the original case – confirm for your process

Surgical Blade Hardening Station – Typical Layout

HLQ

Schematic, not to scale. DW-UHF-6kW, remote workhead, two-turn helical coil with quartz tube, and hardness check.



05 Equipment selection

DW-UHF model	Power	Frequency	Supply
DW-UHF-4.5KW	4.5 kW	1.1–2.0 MHz	1-ph 220 V
DW-UHF-6.0KW	6.0 kW	300–1100 kHz	1-ph 220 V
DW-UHF-10KW	10 kW	100–500 kHz	3-ph 380 V
DW-UHF-20KW	20 kW	50–250 kHz	3-ph 380 V
DW-UHF-30KW	30 kW	50–200 kHz	3-ph 380 V

Selection notes

Requirement	Case reference
Small, thin stainless blades	DW-UHF-6kW, 365 kHz, two-turn helical coil with quartz tube (this case)
Long carbon steel blades, edge zone	DW-UHF-30kW, 160 kHz, single-turn channel coil (bed knife case)
Through-heating before forming	DW-HF-15kW, 57–80 kHz (blade/knife preheating case)
Tempering after hardening	DW-UHF-10kW, 100 kHz (band saw blade case)

06 Frequently asked questions

What was hardened?

A 4" (101.6 mm) section of a 7" (177.8 mm) 420 stainless steel surgical blade.

What hardness was specified?

48–53 Rockwell C on the blade after processing.

What temperature and frequency?

1850 °F (1010 °C) at 365 kHz.

Which equipment?

A DW-UHF-6kW with a remote workhead including one 1.2 µF capacitor.

Which coil?

A two-turn helical coil with an internal quartz tube, designed to scan the length of the blade.

What are the benefits?

A flameless process, improved production rate, and consistent and repeatable results.

What do I send for a quote?

Blade drawing, steel grade, hardened section, hardness and output.

Why choose HLQ

Flameless

Clean induction heat.

Repeatable

Consistent results every blade.

Productive

Improved production rate.

Custom coils

Designed for each blade.

Full range

DW-UHF 4.5–60 kW.

Blade experience

Surgical, knife, saw blades.

Request a blade hardening proposal

Send us the blade drawing, steel grade and hardness specification. We will propose the coil, workhead 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

- Blade drawing (length, width, thickness)
- Steel grade
- Hardened section and hardness
- Parts per hour
- Available supply and cooling water