

# Relationship between induction frequency and quenching depth (hardening depth)

United Induction Heating Machine Limited

We are experienced in Induction Heating, induction heating machine, Induction Heating equipment. They are widely used in induction heating service, induction heat treatment, induction brazing, induction hardening, induction welding, induction forging, induction quenching, induction soldering, induction melting and induction surface treatment applications  
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The quenching depth (hardening depth) depends on the output frequency of induction heater. Generally, higher frequency will bring smaller quenching depth (shallower). The relationship between the frequency  $f$  and the heating depth  $\delta$  has the following empirical formula:

$$\delta = 20/\sqrt{f}(20^{\circ}\text{C}) \quad \delta = 500/\sqrt{f}(800^{\circ}\text{C})$$

Where:  $f$  is the frequency, the unit is Hz;  $\delta$  is the quenching depth, the unit is millimeter (mm).

The relationship between the output frequency and the quenching depth (the cooling medium is tap water) at 800 °C is shown in the table below:

d/mm

f/KHZ

0.76

450

1.14

200

2.11

100

2.26

50

3.20

25

5.08

10

9.27

3

16.05

1

22.71

0.5

37.85

0.18

65.53

0.06



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