CWH700 Intrinsically Safe Infrared Thermometer

Operation manual

⚠**Warning**

It is forbidden to disassemble and repair the device in underground or environment with explosive gas!
It is forbidden to charge and replace the battery underground!
It is forbidden to change the models, specifications and parameters of intrinsically safe circuits and the components related to intrinsically safe circuits!
It is forbidden to use batteries other than those specified in this manual!

In order to prevent eye injury or personal injury, please read the following safety instructions before using the product:

- Do not irradiate people or animals directly or indirectly through object reflection.
- Do not look directly at the laser or through optical tools (binoculars, microscopes, etc.) to prevent eye injury.
- If the battery symbol is flashing on the LCD when using the product; please replace the battery immediately to prevent inaccurate measurement.
- Before using the product, please check the product. Do not use it if it is damaged, cracked on the surface, or missing rubber parts.
- Please refer to the radiance (refer to the Emissivity Form) for the actual temperature. Reflective objects will cause the measured temperature to be lower than the actual temperature. Pay attention to the risk of scald when measuring these objects.
- In order to ensure the measurement accuracy, put the product in the current environment for more than 30 minutes before using the product.
- Avoid keeping the thermometer close to high-temperature objects for a long time.

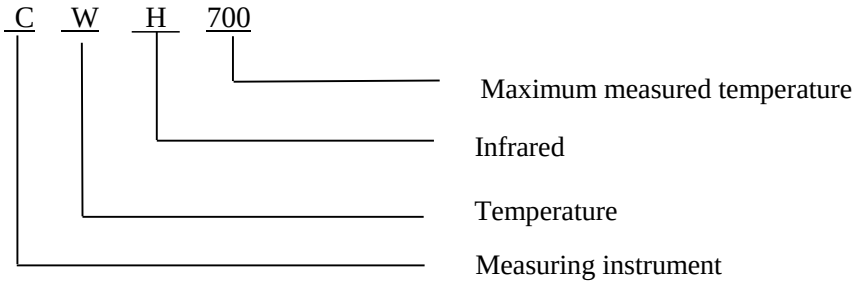
I overview

1. Product features and applications

CWH700 intrinsically safe infrared thermometer (hereinafter referred to as the thermometer) is a professional-grade non-contact high-precision infrared temperature detection instrument, which can quickly and accurately determine the surface temperature of the target by measuring the infrared energy radiated by the target surface. It has the characteristics of ruggedness, small volume, and high precision, dustproof, waterproof and easy to use.

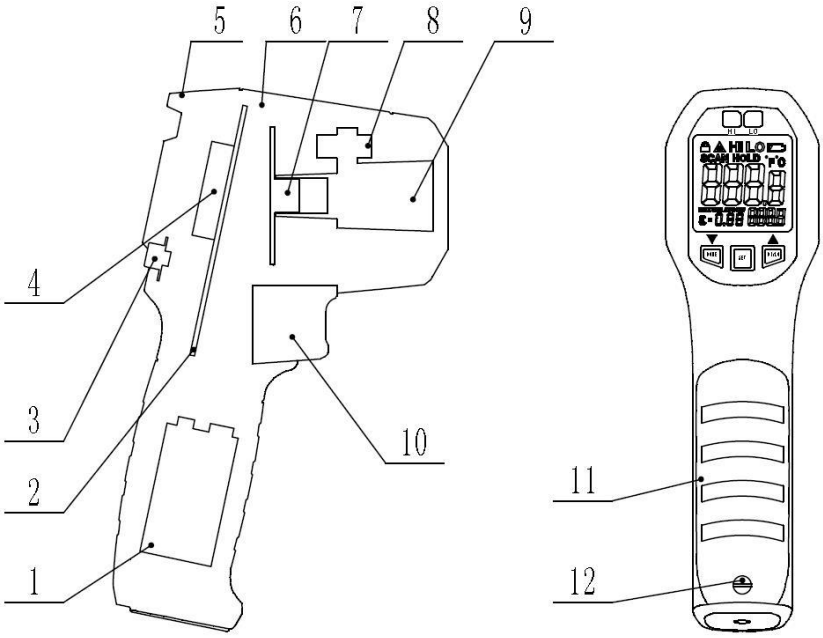
The thermometer is mainly suitable for non-contact rapid measurement of the temperature of the object surface in the working environment with flammable, explosive and combustible gas mixture.

2. Type marking



II Structural features and working principle

1. The structural features of the thermometer are shown in the figure 1.



1. Battery; 2. Circuit board; 3. Operation keys; 4. LCD display; 5. Back cover; 6. Front shell; 7. Infrared sensor; 8. Laser head; 9. Optical system; 10. Trigger; 11. Battery cover; 12. Special screw

Figure 1

2. Working principle

The block diagram of the working principle of the thermometer is shown in the figure 2.

The thermometer can measure the surface temperature of opaque objects. The optical system concentrates the infrared radiation energy of the target in the field of view. The infrared energy is focused on the infrared sensor and converted into corresponding electrical signals. After the signal is amplified and conditioned, the 16 bit single chip microcomputer performs data processing and radiation coefficient compensation, and finally converts it into the temperature value of the measured target and displays it on the LCD display screen.

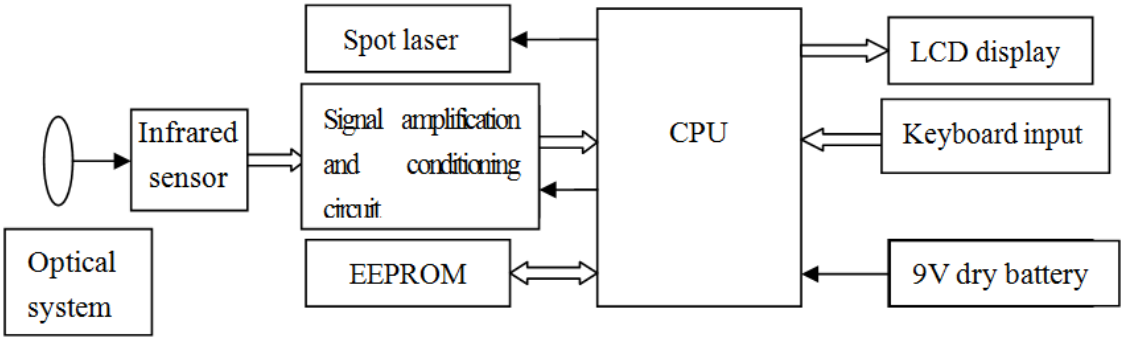


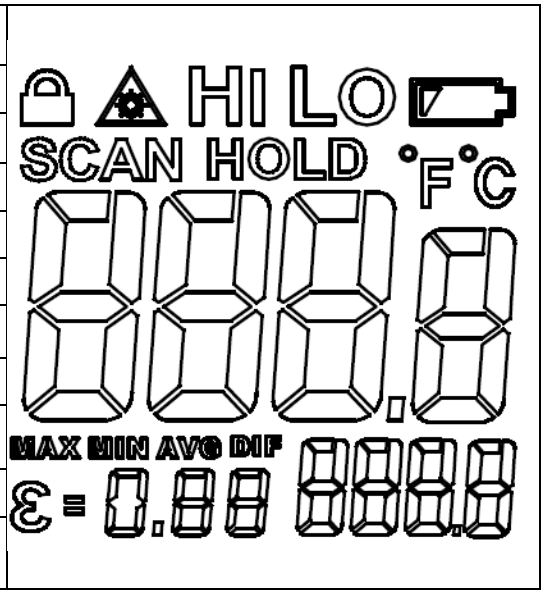
Figure 2

III Main technical parameters

Item	Main technical specification		
Measurement range	(-32-700) ℃		
Intrinsic error: Calibration ambient temperature is 21 ℃ to 25 ℃ (70 ℉ to 77 ℉)	-32＜T≤ 0	0＜T≤100	100＜T≤700
	±2 ℃	±1.5 ℃	±2% of the true value
Temperature coefficient	0.1 ℃ or ±0.1% of reading per degree, take a larger value		
Optical resolution	20:1		
Response time	250ms(95% of reading)		
Spectral response	(8-14)μm		
Display resolution	0.1 ℃ (0.1 ℉)		
Emissivity	0.95		
Aiming method	laser aiming		
Number of lasers	1		
Display hold time	8s		
Battery pack	6F22 type / 9V battery		
Explosion-proof type	Exib I Mb		
Dimension	(180×130×53)mm		
Weight	292g		
Operating environment	Operating temperature: 0 ℃- 40 ℃ ; Operating humidity: <90% (non-condensing); Atmospheric pressure: (86 - 116) kPa		

IV Function Description

	Temperature measurement lock is triggered
	Laser on
HI LO	High and low limit alarm
	Low battery
SCAN	Temperature measurement is triggered
HOLD	Hold the measurement data
°F °C	Unit
8888	Measured value main display
MAX MIN AVG DIF	Mode
ε = 0.88	Emissivity
8888	Measured value secondary display

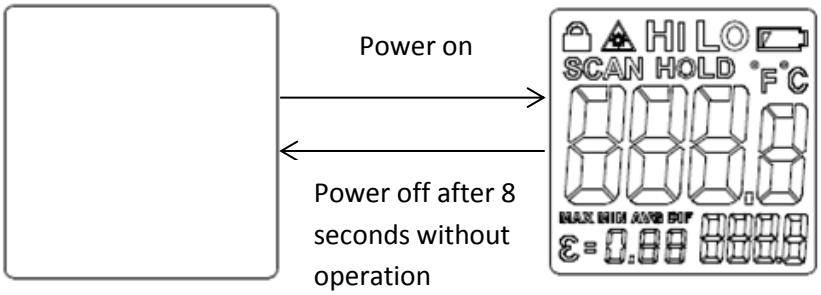


V Use and operation

1. Power on and off

1) Pull the trigger lightly to turn on the thermometer, the LCD display will display, and the white backlight will turn on.

2) The thermometer will automatically shut down after 8 seconds without any operation.



2. Manual measurement

1) After aiming at the measured target, pull the trigger and hold it. When the SCAN icon on the thermometer display flashes, it indicates that the thermometer is measuring the temperature of the target object.

2) Release the trigger, the SCAN icon on the thermometer display disappears, and the HOLD icon displays. The thermometer stops measuring the temperature and holds the last measured temperature value.

3. Lock measurement

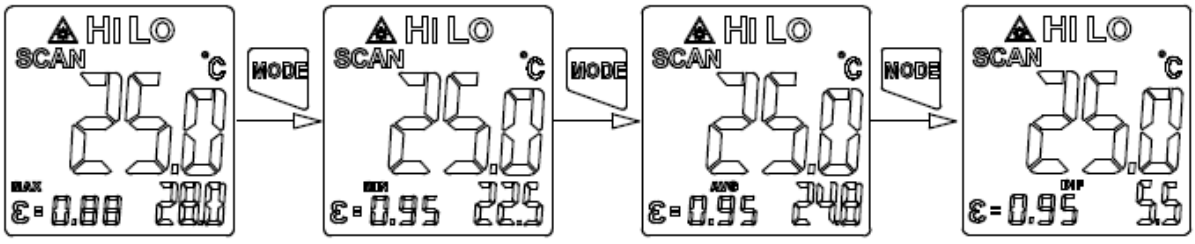
1) When the lock measurement function is turned on, gently pull the trigger to trigger the lock measurement function (no need to press the trigger for a long time), icon displays on the thermometer, the SCAN icon flashes, the thermometer keeps measuring continuously, and the backlight automatically turns off after 2 minutes.

2) Pull the trigger again, the icon on the thermometer display disappears, the SCAN icon disappears, the HOLD icon appears, and the thermometer stops measuring and holds the last measured temperature value.

Note: When measuring, the target must be larger than the light spot; otherwise it will affect the measurement accuracy. Please refer to D:S value.

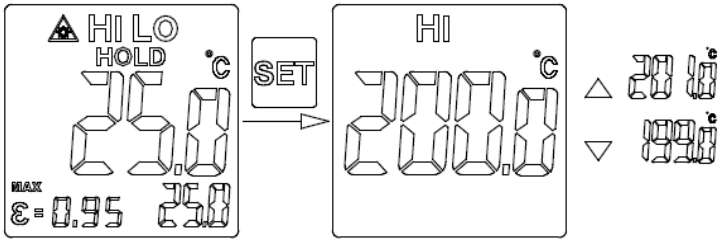
4. MAX/MIN/AVG/DIF value reading

Short press the MODE key to switch the MAX/MIN/AVG/DIF mode indicator in turn and the temperature value of the corresponding mode will be displayed in the secondary display position of the measured value. (As shown below)



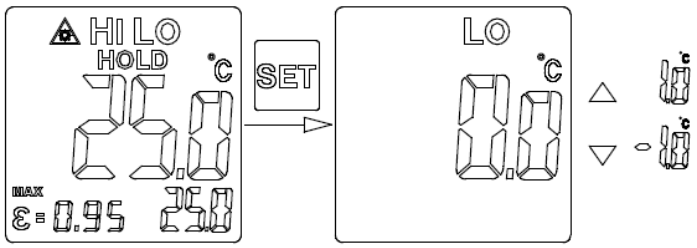
5. Set the HIGH alarm limit range

Short press the SET key to enter the HIGH alarm limit range setting interface (as shown in the figure below). Then operate the up and down function keys to set the value. Short press the up or down key each time the value increases or decreases by 1, long Press the up or down key to increase or decrease the value by 10 per second. If there is no operation for 5 seconds, the thermometer will exit the HIGH alarm limit range setting.



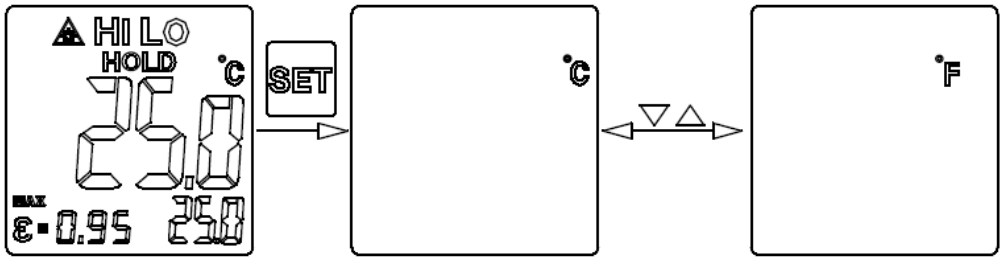
6. Set the LOW alarm limit range

Short press the SET key to enter the setting interface of the LOW alarm limit range (as shown in the figure below), please follow the HIGH alarm limit steps to set.



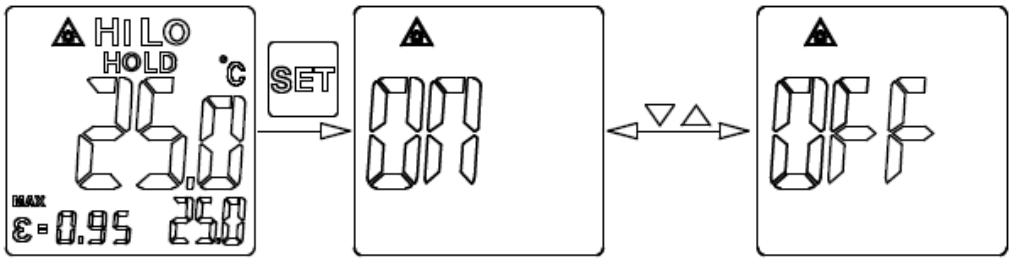
7. Set unit

Short press the SET button to enter the unit setting interface (as shown in the figure below). Then operate the up or down button to switch between unit ^{o}C and ^{o}F. If there is no operation for 5 seconds, the thermometer will exit the unit setting.



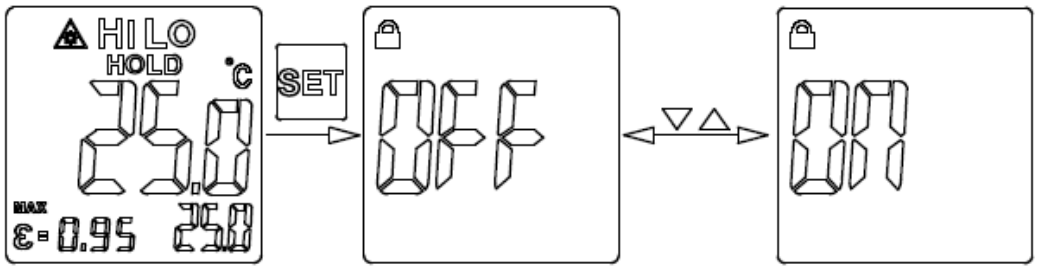
8. Set the laser on/ off

Short press the SET button to enter the laser on / off setting interface (as shown in the figure below). Then operate the up or down button to set the laser on /off. If there is no operation for 5 seconds, the thermometer will exit the laser on/off setting.



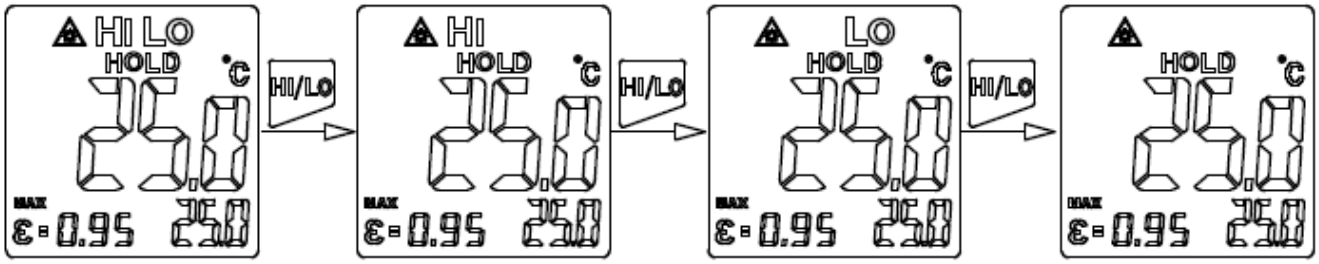
9. Set lock measurement on/off

Press the SET button shortly to enter the lock measurement on/off setting interface (as shown in the figure below). Then operate the up or down button to open or close the lock measurement function. If there is no operation for 5 seconds, the thermometer will exit the lock measurement function on/off setting.



10. Turn on / off high limit and low limit alarm functions

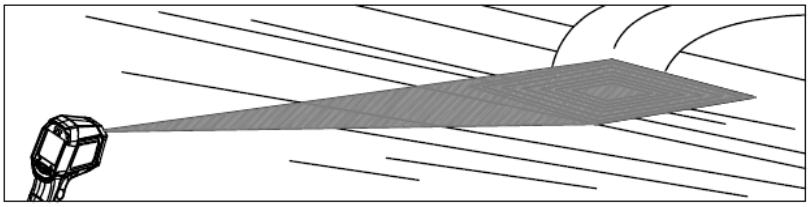
Short press the HI/LO function button to turn on or off the high limit and low limit alarm functions in sequence. The sequence is: HI LO limit alarm is turned on at the same time → LO limit alarm function is off → HI limit alarm function is off → HI LO limit alarm functions are turned off → HI LO limit alarm functions are turned on at the same time, cyclically. (As shown below)



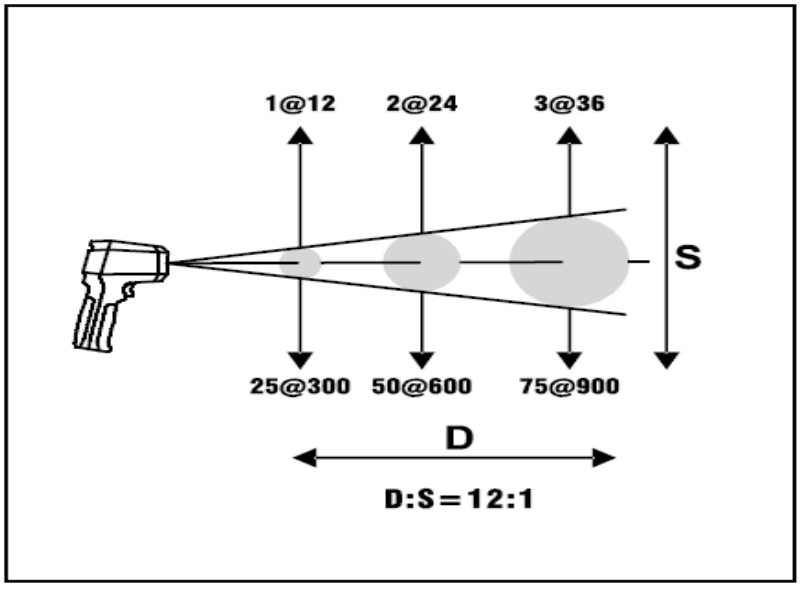
When the corresponding limit alarm function is turned on, an alarm will be given when the temperature exceeds the set limit during temperature measurement. If the measured temperature is higher than the set HIGH limit, the red LED and the HI icon on the display will flash and alarm; If the measured temperature is lower than the set LOW limit, the blue LED and the LO icon on the display will flash and alarm.

11. Find hot or cold spots

To find hot or cold spots, aim the thermometer at the target area and slowly move up and down to scan the entire area until you find the hot and cold spots.

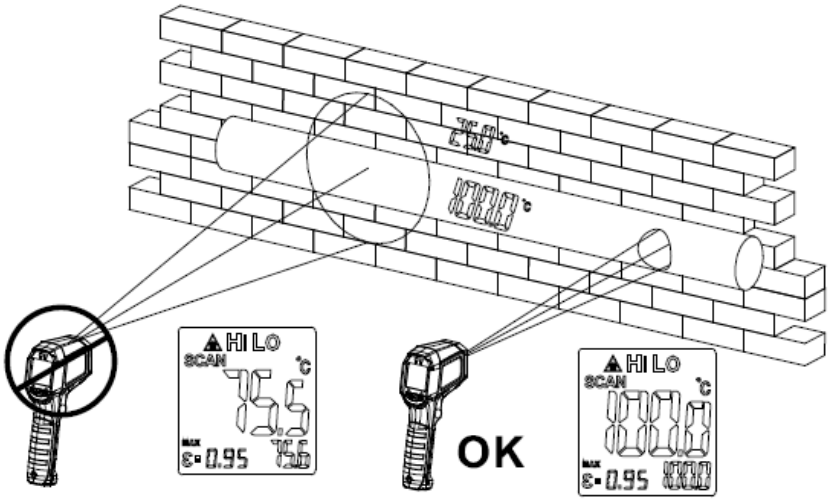


12. D: S (distance coefficient)



13. Field of view

Make sure the target is larger than the size of the light spot, and the smaller the target, the closer the test distance should be. It is recommended that the measurement distance should be less than 75% of the theoretical value.



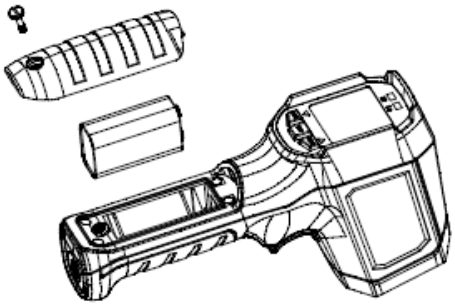
VI maintenance

Clean

Use clean compressed air to blow away the fallen particles, carefully wipe the surface of the lens with a cotton swab moistened with clean water, and clean the product shell with a moist sponge or soft cloth.

Replacement battery

Install or replace the 6F22 9V battery as shown below



VII Whole set

1. Thermometer	1PC
2. 9V battery	1PC
3. Operation manual	1PC
4. Certificate of conformity	1PC
5. Instrument case	1PC

VIII Transportation and storage

1. The thermometer can be transported by various means including land transportation, water transportation and air transportation. During transportation, it must be protected from rain and mixed with corrosive products.

2. The thermometer should be stored in a warehouse with air circulation, no corrosive gas, no dripping water and liquid invasion, air relative humidity not more than 90%, and temperature (-40~60)℃.

IX Out of box audit

After open the packing case, check the completeness of instrument accessories according to the “Packing List” or clause VII “Whole set” of the operation manual.

X Guarantee

We guarantee the quality of the instrument within 12 months from the date when it is sold and would be responsible to repair it free of charge for any non-man-made damage during the period (except for any damage from irresistible factors, e.g. natural disasters, war, etc).

Notice: Manufacturer reserves the right to modify the contents of manual without prior notice.

Manufacturer
Address: No,3699, Shangyuan Road, Caotan Ecological Industrial Park, E&T Developing Zone, Xi’an.
Post Code: 710018
Tel: 029-86260611
Fax: 029-86562529
E-mail: starsales@gokang.com
Website：www.asttar.com

Annex : Emissivity Form (only for reference)

Form A Emissivity Form of Common Metal

Material		Emissivity	Material		Emissivity
aluminum	non-oxygenation	0.02---0.10	steel	cold rolled steel	0.70---0.90
	oxygenation	0.20---0.40		rough board	0.40---0.60
alumina	oxygenation	0.30		polished board	0.10
	coarse	0.20---0.30		oxidized	0.70---0.90
	polished	0.02---0.10		stainless steel	0.10---0.80
brass	polished	0.01---0.05	titanium	polished	0.05---0.20
	abrade to bright	0.30		oxidized	0.50---0.60
	oxidized	0.50	zinc	oxidized	0.10
chrome		0.02---0.20		polished	0.02
copper	polished	0.03	cast iron	unpolished	0.90
	abrade to bright	0.05---0.10	lead	polished	0.05---0.10
	oxidized	0.40---0.80		coarse	0.40
gold		0.01---0.10		oxidized	0.20---0.60
nickel-chrome--ferrous alloy	oxidized	0.70---0.95	magnesium		0.02---0.10
	frosted	0.30---0.60	Hg		0.05---0.15
	electrolytic polishing	0.15	molybdenum	oxidized	0.20---0.60
iron	oxidized	0.50---0.90		non-oxidized	0.10
	non-oxidized	0.05---0.20	nickel-copper alloy		0.10---0.14
	rusty	0.50---0.70	nickel	oxygenation	0.20---0.50
cast iron	oxidized	0.60---0.95		electrolytical	0.05---0.15
	non-oxidized	0.20	platinum-dark		0.90
	molten	0.20---0.30	silver		0.02
tin	non-oxidized	0.05			

Form B Emissivity Form of Unfamiliar Metal

Material	Emissivity	Material		Emissivity
coal	0.95	ice		0.95
asbestos	0.95	paint		0.97
asphaltum	0.95	rubber		0.95
basalt	0.70	calcareousness		0.98
ceramics	0.95	coating	non-alkaline	0.90---0.95
brick	0.93	soil	dry	0.92
carborundum	0.90		mud	0.95
clay	0.95	snow		0.90
beton	0.95	water		0.93
cloth	0.95	sand		0.90
glass	0.85	timber		0.90---0.95
pebble	0.95	paper		0.95
gesso	0.80---0.95	plastic	opaque	0.95