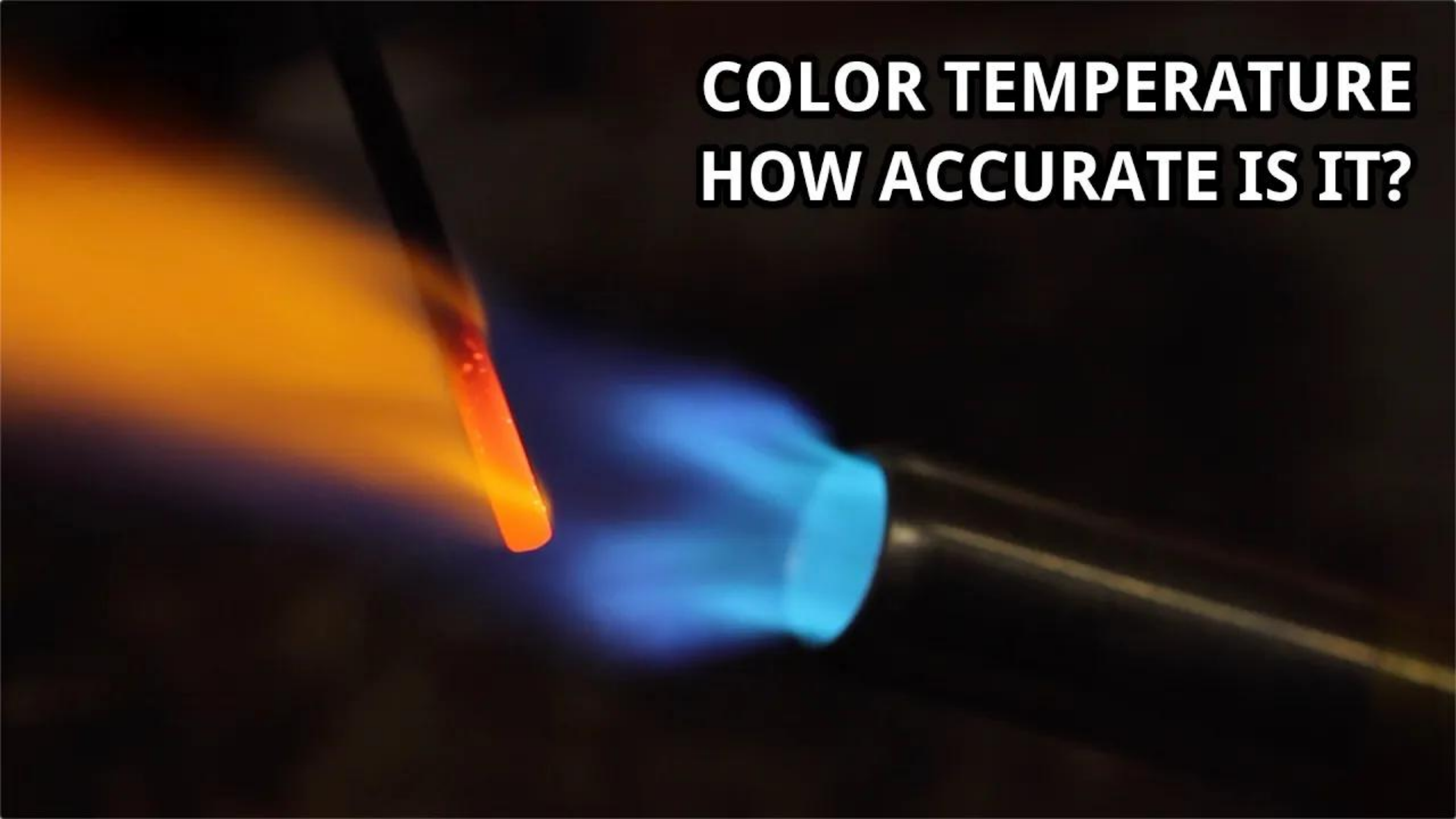
COLOR TEMPERATURE
HOW ACCURATE IS IT?

1
00:00:04,880 --> 00:00:02,180
people sometimes show photos like this

2
00:00:07,369 --> 00:00:04,890
one and say that it shows molten metal

3
00:00:09,500 --> 00:00:07,379
and they claim this is because of the

4
00:00:11,720 --> 00:00:09,510
color that you see here we see something

5
00:00:13,459 --> 00:00:11,730
that's orange in yellow and they say

6
00:00:15,770 --> 00:00:13,469
that the color here indicates this is

7
00:00:17,810 --> 00:00:15,780
molten is this actually true though I

8
00:00:20,269 --> 00:00:17,820
decided to do some experiments to find

9
00:00:22,820 --> 00:00:20,279
out so you probably a chart like this

10
00:00:26,240 --> 00:00:22,830
before it's showing the whoops what

11
00:00:27,950 --> 00:00:26,250
color iron or steel should look like if

12
00:00:30,169 --> 00:00:27,960
it is a certain temperature temperature

13
00:00:32,979 --> 00:00:30,179

in degrees C you see when it's being

14
00:00:36,920 --> 00:00:32,989
red-hot it's about 500 plus degrees C

15
00:00:40,610 --> 00:00:36,930
orange topped is like around 950 here

16
00:00:44,660 --> 00:00:40,620
and white hot as 1300 degrees C and it

17
00:00:48,200 --> 00:00:44,670
melts around 15 something so these would

18
00:00:50,600 --> 00:00:48,210
be very very hot here yellow or white is

19
00:00:52,160 --> 00:00:50,610
quite hot now I noticed earlier that

20
00:00:55,279 --> 00:00:52,170
when I was looking at this through the

21
00:00:57,260 --> 00:00:55,289
my phone camera it looks different to

22
00:01:01,160 --> 00:00:57,270
what I was actually seeing so what I've

23
00:01:03,680 --> 00:01:01,170
got is my temperature probe here which

24
00:01:05,509 --> 00:01:03,690
is I'm gonna heat with a torch and I've

25
00:01:08,990 --> 00:01:05,519
got it plugged in so I can see how hot

26
00:01:11,630 --> 00:01:09,000
it is and I've got another camera over

27
00:01:12,920 --> 00:01:11,640
here which is going to record what it

28
00:01:16,999 --> 00:01:12,930
actually looks like now I've set the

29
00:01:18,730 --> 00:01:17,009
exposure down to stops there and that

30
00:01:22,640 --> 00:01:18,740
will hopefully give a better

31
00:01:24,710 --> 00:01:22,650
representation of what it looks like I'm

32
00:01:27,440 --> 00:01:24,720
going to point to this chart as to where

33
00:01:32,480 --> 00:01:27,450
I think the temperature of this is

34
00:01:34,039 --> 00:01:32,490
visually so let's give that a go all

35
00:01:35,660 --> 00:01:34,049
right we can see everything there I'm

36
00:01:38,960 --> 00:01:35,670
just gonna use this torch here to get is

37
00:01:44,200 --> 00:01:38,970
quite hot enough now let's see what

38
00:01:55,190 --> 00:01:52,780

all right now its temperatures going up

39
00:02:02,510 --> 00:01:55,200
600 degrees C and it's already kind of

40
00:02:04,730 --> 00:02:02,520
orange I put it around maybe here still

41
00:02:08,120 --> 00:02:04,740
kind of orange bright orange maybe we

42
00:02:09,650 --> 00:02:08,130
were around here see like the

43
00:02:10,730 --> 00:02:09,660
temperature is like eight hundred and

44
00:02:15,410 --> 00:02:10,740
something here which will be down here

45
00:02:17,900 --> 00:02:15,420
what I'm seeing is a brighter orange if

46
00:02:20,720 --> 00:02:17,910
I take this off mmm it's kind of goes to

47
00:02:22,850 --> 00:02:20,730
that pretty much straightaway let's see

48
00:02:23,979 --> 00:02:22,860
if we can get it to be a bit a bit

49
00:02:28,330 --> 00:02:23,989
brighter

50
00:02:35,740 --> 00:02:28,340
all right that's around about here still

51
00:02:41,600 --> 00:02:37,910
alright that isn't gonna get much hotter

52
00:02:46,000 --> 00:02:41,610
than that so I'm gonna try using a more

53
00:02:59,330 --> 00:02:46,010
powerful torch thank you little touch

54
00:03:01,580 --> 00:02:59,340
here we got the map Pro touch I'm going

55
00:03:03,680 --> 00:03:01,590
to spray you the very loud audio there

56
00:03:04,910 --> 00:03:03,690
he couldn't really hear me talking but

57
00:03:07,789 --> 00:03:04,920
what I was saying here was basically

58
00:03:10,340 --> 00:03:07,799
that that what I'm pointing to 1100

59
00:03:13,070 --> 00:03:10,350
degrees matched the thermometer and as

60
00:03:16,850 --> 00:03:13,080
you can see it also matches the close-up

61
00:03:18,259 --> 00:03:16,860
video it didn't get white-hot and it

62
00:03:19,820 --> 00:03:18,269
took a while before it really got bright

63
00:03:22,490 --> 00:03:19,830

yellow it seemed to lag a little bit

64
00:03:25,759 --> 00:03:22,500
behind being more kind of very bright

65
00:03:29,270 --> 00:03:25,769
orange bright yellow than then getting

66
00:03:31,250 --> 00:03:29,280
towards any kind of white hotness and it

67
00:03:32,930 --> 00:03:31,260
didn't look like he was melting at all

68
00:03:35,750 --> 00:03:32,940
he doesn't like a blob you can kind of

69
00:03:38,509 --> 00:03:35,760
see it looks a bit like a blob in in the

70
00:03:40,340 --> 00:03:38,519
video of the iPhone video but it looked

71
00:03:44,059 --> 00:03:40,350
very clear as you can see in the

72
00:03:55,759 --> 00:03:48,800
orange mmm Stiller is very quickly down

73
00:03:58,069 --> 00:03:55,769
already so what can we learn from this

74
00:03:59,989 --> 00:03:58,079
firstly that the color you see by eye is

75
00:04:01,580 --> 00:03:59,999
a pretty good indication of temperature

76
00:04:03,470 --> 00:04:01,590
although in this light you can't really

77
00:04:06,069 --> 00:04:03,480
see the dollar reds but it works very

78
00:04:09,649 --> 00:04:06,079
well for the orange to white heart range

79
00:04:11,809 --> 00:04:09,659
secondly any video or photo of a small

80
00:04:14,599 --> 00:04:11,819
glowing object greatly exaggerated s--

81
00:04:16,099 --> 00:04:14,609
the brightness above red-hot and so it

82
00:04:18,499 --> 00:04:16,109
makes it looks a lot hotter than it

83
00:04:20,689 --> 00:04:18,509
really is we can see these most clear at

84
00:04:22,370 --> 00:04:20,699
the end here while the torch is still on

85
00:04:23,960 --> 00:04:22,380
the probe when I correctly identifies

86
00:04:26,480 --> 00:04:23,970
the temperature as in the upper part of

87
00:04:28,240 --> 00:04:26,490
1,100 degrees C and the close-up

88
00:04:30,650 --> 00:04:28,250

underexposed video also matches as well

89
00:04:33,529 --> 00:04:30,660
however the phone camera shows it as

90
00:04:35,810 --> 00:04:33,539
white-hot second later I remove the

91
00:04:37,339 --> 00:04:35,820
torch from the iPhone perspective it

92
00:04:40,219 --> 00:04:37,349
looks like it's a molten blob of white

93
00:04:41,900 --> 00:04:40,229
hot steel but to my eye and the close-up

94
00:04:45,200 --> 00:04:41,910
camera we can see it's just yellow hot

95
00:04:47,029 --> 00:04:45,210
not close to molten at all as it cools

96
00:04:49,879 --> 00:04:47,039
down we can see it matches well by I and

97
00:04:52,219 --> 00:04:49,889
my close-up as it drops below a thousand

98
00:04:54,610 --> 00:04:52,229
degrees it's now orange hot but my phone

99
00:04:57,499 --> 00:04:54,620
still thinks it's white hot on the end

100
00:04:58,790 --> 00:04:57,509
only when it drops below 902 Gries does

101
00:05:01,700 --> 00:04:58,800
the phone color start to match what I

102
00:05:03,620 --> 00:05:01,710
see so the lesson here is color

103
00:05:05,420 --> 00:05:03,630
temperature and photos and videos is

104
00:05:07,640 --> 00:05:05,430
greatly affected by the overall lighting

105
00:05:09,860 --> 00:05:07,650
and exposure and small orange hot

106
00:05:12,800 --> 00:05:09,870
objects at 950 degrees C can look like

107
00:05:14,390 --> 00:05:12,810
the white hot at over 1,300 degrees C or