

Measuring error [°C] for Pt100 thermometers according to IEC 751

-with wire-wound sensors-

from	-200	°C								
in	1	°C steps								
class:	C	datas without warranty								
°C	0	1	2	3	4	5	6	7	8	9
-200					± 2,56	± 2,55	± 2,54	± 2,53	± 2,52	± 2,51
-190	± 2,50	± 2,49	± 2,48	± 2,47	± 2,46	± 2,45	± 2,44	± 2,43	± 2,42	± 2,41
-180	± 2,40	± 2,39	± 2,38	± 2,37	± 2,36	± 2,35	± 2,34	± 2,33	± 2,32	± 2,31
-170	± 2,30	± 2,29	± 2,28	± 2,27	± 2,26	± 2,25	± 2,24	± 2,23	± 2,22	± 2,21
-160	± 2,20	± 2,19	± 2,18	± 2,17	± 2,16	± 2,15	± 2,14	± 2,13	± 2,12	± 2,11
-150	± 2,10	± 2,09	± 2,08	± 2,07	± 2,06	± 2,05	± 2,04	± 2,03	± 2,02	± 2,01
-140	± 2,00	± 1,99	± 1,98	± 1,97	± 1,96	± 1,95	± 1,94	± 1,93	± 1,92	± 1,91
-130	± 1,90	± 1,89	± 1,88	± 1,87	± 1,86	± 1,85	± 1,84	± 1,83	± 1,82	± 1,81
-120	± 1,80	± 1,79	± 1,78	± 1,77	± 1,76	± 1,75	± 1,74	± 1,73	± 1,72	± 1,71
-110	± 1,70	± 1,69	± 1,68	± 1,67	± 1,66	± 1,65	± 1,64	± 1,63	± 1,62	± 1,61
-100	± 1,60	± 1,59	± 1,58	± 1,57	± 1,56	± 1,55	± 1,54	± 1,53	± 1,52	± 1,51
-90	± 1,50	± 1,49	± 1,48	± 1,47	± 1,46	± 1,45	± 1,44	± 1,43	± 1,42	± 1,41
-80	± 1,40	± 1,39	± 1,38	± 1,37	± 1,36	± 1,35	± 1,34	± 1,33	± 1,32	± 1,31
-70	± 1,30	± 1,29	± 1,28	± 1,27	± 1,26	± 1,25	± 1,24	± 1,23	± 1,22	± 1,21
-60	± 1,20	± 1,19	± 1,18	± 1,17	± 1,16	± 1,15	± 1,14	± 1,13	± 1,12	± 1,11
-50	± 1,10	± 1,09	± 1,08	± 1,07	± 1,06	± 1,05	± 1,04	± 1,03	± 1,02	± 1,01
-40	± 1,00	± 0,99	± 0,98	± 0,97	± 0,96	± 0,95	± 0,94	± 0,93	± 0,92	± 0,91
-30	± 0,90	± 0,89	± 0,88	± 0,87	± 0,86	± 0,85	± 0,84	± 0,83	± 0,82	± 0,81
-20	± 0,80	± 0,79	± 0,78	± 0,77	± 0,76	± 0,75	± 0,74	± 0,73	± 0,72	± 0,71
-10	± 0,70	± 0,69	± 0,68	± 0,67	± 0,66	± 0,65	± 0,64	± 0,63	± 0,62	± 0,61
0	± 0,60	± 0,61	± 0,62	± 0,63	± 0,64	± 0,65	± 0,66	± 0,67	± 0,68	± 0,69
10	± 0,70	± 0,71	± 0,72	± 0,73	± 0,74	± 0,75	± 0,76	± 0,77	± 0,78	± 0,79
20	± 0,80	± 0,81	± 0,82	± 0,83	± 0,84	± 0,85	± 0,86	± 0,87	± 0,88	± 0,89
30	± 0,90	± 0,91	± 0,92	± 0,93	± 0,94	± 0,95	± 0,96	± 0,97	± 0,98	± 0,99
40	± 1,00	± 1,01	± 1,02	± 1,03	± 1,04	± 1,05	± 1,06	± 1,07	± 1,08	± 1,09
50	± 1,10	± 1,11	± 1,12	± 1,13	± 1,14	± 1,15	± 1,16	± 1,17	± 1,18	± 1,19
60	± 1,20	± 1,21	± 1,22	± 1,23	± 1,24	± 1,25	± 1,26	± 1,27	± 1,28	± 1,29
70	± 1,30	± 1,31	± 1,32	± 1,33	± 1,34	± 1,35	± 1,36	± 1,37	± 1,38	± 1,39
80	± 1,40	± 1,41	± 1,42	± 1,43	± 1,44	± 1,45	± 1,46	± 1,47	± 1,48	± 1,49
90	± 1,50	± 1,51	± 1,52	± 1,53	± 1,54	± 1,55	± 1,56	± 1,57	± 1,58	± 1,59
100	± 1,60	± 1,61	± 1,62	± 1,63	± 1,64	± 1,65	± 1,66	± 1,67	± 1,68	± 1,69
110	± 1,70	± 1,71	± 1,72	± 1,73	± 1,74	± 1,75	± 1,76	± 1,77	± 1,78	± 1,79
120	± 1,80	± 1,81	± 1,82	± 1,83	± 1,84	± 1,85	± 1,86	± 1,87	± 1,88	± 1,89
130	± 1,90	± 1,91	± 1,92	± 1,93	± 1,94	± 1,95	± 1,96	± 1,97	± 1,98	± 1,99
140	± 2,00	± 2,01	± 2,02	± 2,03	± 2,04	± 2,05	± 2,06	± 2,07	± 2,08	± 2,09
150	± 2,10	± 2,11	± 2,12	± 2,13	± 2,14	± 2,15	± 2,16	± 2,17	± 2,18	± 2,19
160	± 2,20	± 2,21	± 2,22	± 2,23	± 2,24	± 2,25	± 2,26	± 2,27	± 2,28	± 2,29
170	± 2,30	± 2,31	± 2,32	± 2,33	± 2,34	± 2,35	± 2,36	± 2,37	± 2,38	± 2,39
180	± 2,40	± 2,41	± 2,42	± 2,43	± 2,44	± 2,45	± 2,46	± 2,47	± 2,48	± 2,49
190	± 2,50	± 2,51	± 2,52	± 2,53	± 2,54	± 2,55	± 2,56	± 2,57	± 2,58	± 2,59
200	± 2,60	± 2,61	± 2,62	± 2,63	± 2,64	± 2,65	± 2,66	± 2,67	± 2,68	± 2,69
210	± 2,70	± 2,71	± 2,72	± 2,73	± 2,74	± 2,75	± 2,76	± 2,77	± 2,78	± 2,79
220	± 2,80	± 2,81	± 2,82	± 2,83	± 2,84	± 2,85	± 2,86	± 2,87	± 2,88	± 2,89
230	± 2,90	± 2,91	± 2,92	± 2,93	± 2,94	± 2,95	± 2,96	± 2,97	± 2,98	± 2,99
240	± 3,00	± 3,01	± 3,02	± 3,03	± 3,04	± 3,05	± 3,06	± 3,07	± 3,08	± 3,09
250	± 3,10	± 3,11	± 3,12	± 3,13	± 3,14	± 3,15	± 3,16	± 3,17	± 3,18	± 3,19
260	± 3,20	± 3,21	± 3,22	± 3,23	± 3,24	± 3,25	± 3,26	± 3,27	± 3,28	± 3,29
270	± 3,30	± 3,31	± 3,32	± 3,33	± 3,34	± 3,35	± 3,36	± 3,37	± 3,38	± 3,39
280	± 3,40	± 3,41	± 3,42	± 3,43	± 3,44	± 3,45	± 3,46	± 3,47	± 3,48	± 3,49
290	± 3,50	± 3,51	± 3,52	± 3,53	± 3,54	± 3,55	± 3,56	± 3,57	± 3,58	± 3,59
300	± 3,60	± 3,61	± 3,62	± 3,63	± 3,64	± 3,65	± 3,66	± 3,67	± 3,68	± 3,69

red values are not defined for resistance thermometers with thin-film sensors

Measuring error [°C] for Pt100 thermometers according to IEC 751

-with wire-wound sensors-

class: C

datas without warranty

°C	+0°C	+1°C	+2°C	+3°C	+4°C	+5°C	+6°C	+7°C	+8°C	+9°C
310	± 3,70	± 3,71	± 3,72	± 3,73	± 3,74	± 3,75	± 3,76	± 3,77	± 3,78	± 3,79
320	± 3,80	± 3,81	± 3,82	± 3,83	± 3,84	± 3,85	± 3,86	± 3,87	± 3,88	± 3,89
330	± 3,90	± 3,91	± 3,92	± 3,93	± 3,94	± 3,95	± 3,96	± 3,97	± 3,98	± 3,99
340	± 4,00	± 4,01	± 4,02	± 4,03	± 4,04	± 4,05	± 4,06	± 4,07	± 4,08	± 4,09
350	± 4,10	± 4,11	± 4,12	± 4,13	± 4,14	± 4,15	± 4,16	± 4,17	± 4,18	± 4,19
360	± 4,20	± 4,21	± 4,22	± 4,23	± 4,24	± 4,25	± 4,26	± 4,27	± 4,28	± 4,29
370	± 4,30	± 4,31	± 4,32	± 4,33	± 4,34	± 4,35	± 4,36	± 4,37	± 4,38	± 4,39
380	± 4,40	± 4,41	± 4,42	± 4,43	± 4,44	± 4,45	± 4,46	± 4,47	± 4,48	± 4,49
390	± 4,50	± 4,51	± 4,52	± 4,53	± 4,54	± 4,55	± 4,56	± 4,57	± 4,58	± 4,59
400	± 4,60	± 4,61	± 4,62	± 4,63	± 4,64	± 4,65	± 4,66	± 4,67	± 4,68	± 4,69
410	± 4,70	± 4,71	± 4,72	± 4,73	± 4,74	± 4,75	± 4,76	± 4,77	± 4,78	± 4,79
420	± 4,80	± 4,81	± 4,82	± 4,83	± 4,84	± 4,85	± 4,86	± 4,87	± 4,88	± 4,89
430	± 4,90	± 4,91	± 4,92	± 4,93	± 4,94	± 4,95	± 4,96	± 4,97	± 4,98	± 4,99
440	± 5,00	± 5,01	± 5,02	± 5,03	± 5,04	± 5,05	± 5,06	± 5,07	± 5,08	± 5,09
450	± 5,10	± 5,11	± 5,12	± 5,13	± 5,14	± 5,15	± 5,16	± 5,17	± 5,18	± 5,19
460	± 5,20	± 5,21	± 5,22	± 5,23	± 5,24	± 5,25	± 5,26	± 5,27	± 5,28	± 5,29
470	± 5,30	± 5,31	± 5,32	± 5,33	± 5,34	± 5,35	± 5,36	± 5,37	± 5,38	± 5,39
480	± 5,40	± 5,41	± 5,42	± 5,43	± 5,44	± 5,45	± 5,46	± 5,47	± 5,48	± 5,49
490	± 5,50	± 5,51	± 5,52	± 5,53	± 5,54	± 5,55	± 5,56	± 5,57	± 5,58	± 5,59
500	± 5,60	± 5,61	± 5,62	± 5,63	± 5,64	± 5,65	± 5,66	± 5,67	± 5,68	± 5,69
510	± 5,70	± 5,71	± 5,72	± 5,73	± 5,74	± 5,75	± 5,76	± 5,77	± 5,78	± 5,79
520	± 5,80	± 5,81	± 5,82	± 5,83	± 5,84	± 5,85	± 5,86	± 5,87	± 5,88	± 5,89
530	± 5,90	± 5,91	± 5,92	± 5,93	± 5,94	± 5,95	± 5,96	± 5,97	± 5,98	± 5,99
540	± 6,00	± 6,01	± 6,02	± 6,03	± 6,04	± 6,05	± 6,06	± 6,07	± 6,08	± 6,09
550	± 6,10	± 6,11	± 6,12	± 6,13	± 6,14	± 6,15	± 6,16	± 6,17	± 6,18	± 6,19
560	± 6,20	± 6,21	± 6,22	± 6,23	± 6,24	± 6,25	± 6,26	± 6,27	± 6,28	± 6,29
570	± 6,30	± 6,31	± 6,32	± 6,33	± 6,34	± 6,35	± 6,36	± 6,37	± 6,38	± 6,39
580	± 6,40	± 6,41	± 6,42	± 6,43	± 6,44	± 6,45	± 6,46	± 6,47	± 6,48	± 6,49
590	± 6,50	± 6,51	± 6,52	± 6,53	± 6,54	± 6,55	± 6,56	± 6,57	± 6,58	± 6,59
600	± 6,60									
610										
620										
630										
640										
650										
660										
670										
680										
690										
700										
710										
720										
730										
740										
750										
760										
770										
780										
790										
800										
810										
820										
830										
840										
850										

red values are not defined for resistance thermometers with thin-film sensors

Please note:

The above values apply to Pt100 resistance thermometers.

A Pt100 resistance thermometer consists of the built-in Pt100 sensor, which is installed in a protective fitting equipped with a mechanical and electrical connection for protection.

As practice has shown, a Pt100 resistance thermometer does not necessarily have the accuracy class of the built-in Pt100 sensor. Other accuracy classes therefore apply to the built-in sensor.

When calculating the accuracy of a Pt100 resistance thermometer, it should also be noted that thin-film sensors show a different, temperature-dependent behavior at higher temperatures than wire-wound sensors. For this reason, different temperature ranges have been defined for Pt100 resistance thermometers with thin-film sensors and Pt100 resistance thermometers with wire-wound sensors, in which the accuracy class is valid.

Calculation formula limit deviation class C:

$$t_F = \pm (0,60 + 0,01 * t)$$

t= measured temperature without sign (absolute value without + or -)

tF= measurement error in °C

Valid temperature range:

Resistance thermometer with thin-film sensor: from -50 to +600 °C

Resistance thermometer with wire-wound sensor: from -196 to +600 °C