



Most common method deficiency in all plants inspected to date is that temperature is being measured on the pH meter inside of a lab area (not the compliance point).

## Unacceptable Temperature Methods



pH Meter



DO Meter

**Most common method deficiency in all plants inspected to date is that temperature is being measured on the pH meter inside of a lab area (not the compliance point).**

**Temperature must:**

**-Be measured with either a glass or resistance thermometer (any other devices must be approved by the USEPA Region 9;**

**-Be measured at the compliance point immediately.**

**-Have working thermometers calibrated periodically with a NIST certified thermometer (correction factor if necessary).**

**-Be done in duplicate at 10% frequency or every 10 samples.**



WIKIPEDIA The Free Encyclopedia

- Main page
- Contents
- Featured content
- Current events
- Random article
- Donate to Wikipedia

- Interaction
  - Help
  - About Wikipedia
  - Community portal
  - Recent changes
  - Contact Wikipedia

- Toolbox
- Print/export

- Languages
  - Беларуская
  - Беларуская (тарашкевіца)
  - Български
  - Català
  - Deutsch
  - Español
  - Français

Article Discussion Read Edit View history Search

# Resistance thermometer

From Wikipedia, the free encyclopedia

 This article **needs additional citations for verification**. Please help [improve this article](#) by adding [reliable references](#). Unsourced material may be [challenged and removed](#). *(February 2009)*

**Resistance thermometers**, also called **resistance temperature detectors** or **resistive thermal devices** (RTDs), are [temperature sensors](#) that exploit the predictable change in [electrical resistance](#) of some materials with changing temperature. As they are almost invariably made of [platinum](#), they are often called **platinum resistance thermometers** (PRTs). They are slowly replacing the use of [thermocouples](#) in many industrial applications below 600 °C, due to higher accuracy and repeatability.<sup>[1]</sup>

**Contents** [hide]

- General description
- Function
- Advantages and limitations
  - RTDs vs Thermocouples
- Elements
- Construction
- Wiring configurations
  - Two-wire configuration
  - Three-wire configuration
  - Four-wire configuration
- History
- Standard resistance thermometer data
- Values for various popular resistance thermometers
- The function for temperature value acquisition (C++)
- See also
- References



**Partial Immersion Glass Thermometer**



**Total Immersion Glass Thermometer  
Not Usually Practical for Field!**

**Most common method deficiency in all plants inspected to date is that temperature is being measured on the pH meter inside of a lab area (not the compliance point).**

**Temperature must:**

**-Be measured with either a glass or resistance thermometer (any other devices must be approved by the USEPA Region 9;**

**-Be measured at the compliance point immediately.**

**-Have working thermometers calibrated periodically with a NIST certified thermometer (correction factor if necessary).**

**-Be done in duplicate at 10% frequency or every 10 samples.**

**Most common method deficiency in all plants inspected to date is that temperature is being measured on the pH meter inside of a lab area (not the compliance point).**

**Temperature must:**

**-Be measured with either a glass or resistance thermometer (any other devices must be approved by the USEPA Region 9;**

**-Be measured at the compliance point immediately.**

**-Have working thermometers calibrated periodically with a NIST certified thermometer (correction factor if necessary).**

**-Be done in duplicate at 10% frequency or every 10 samples.**





## ORDER

[Hide Additional Info](#)

[ADD TO BASKET](#)

[VIEW SHOPPING BASKET](#)

Description	Length	Accuracy	Calibration Points	Divisions	Range	Immersion	Cat. No.	Unit	Price	Quantity
Mercury Filled	460 mm (18 <sup>1</sup> / <sub>8</sub> "	±0.3°	0, 10, 20, 30, 37, 40, 50°C	0.1°C	-1 to 51°C	Total	61054-503	Each	\$757.81	<input type="text" value="0"/>
Spirit Filled	460 mm (18 <sup>1</sup> / <sub>8</sub> "	±0.3°	0, 10, 20, 30, 37, 40, 50°C	0.1°C	-1 to 51°C	Total	89082-162	Each	\$623.41	<input type="text" value="0"/>
Spirit Filled	460 mm (18 <sup>1</sup> / <sub>8</sub> "	±1°	0, 10, 20, 30, 37, 40, 50°C	0.1°C	-1 to 51°C	76 mm (3")	89082-160	Each	\$623.41	<input type="text" value="0"/>
Spirit Filled	610 mm (24")	±1°	0, 10, 20, 37, 40, 50, 56, 60, 70, 80, 90, 100°C	0.1°C	-1 to 101°C	76 mm (3")	89082-164	Each	\$767.75	<input type="text" value="0"/>
Mercury Filled	610 mm (24")	±0.4° to 100°C; ±0.5° above 100°C	0, 25, 37, 44.6, 100, 121, 140, 150, 180, 200°C	0.2°C	-1 to 201°C	Total	61222-532	Each	\$710.28	<input type="text" value="0"/>
Spirit Filled	610 mm (24")	±1°	0, 25, 37, 44.6, 100, 121, 140, 150, 180, 200°C	0.2°C	-1 to 201°C	76 mm (3")	89082-168	Each	\$652.57	<input type="text" value="0"/>
Mercury Filled	460 mm (18 <sup>1</sup> / <sub>8</sub> "	±0.3°	0, 10, 20, 30, 37, 40, 50, 56, 60, 70, 80, 90, 100°C	0.1°C	-1 to 101°C	Total	61054-569	Each	\$802.57	<input type="text" value="0"/>
Mercury Filled	610 mm (24")	±1°	0, 10, 20, 30, 40, 50, 56, 60, 70, 80, 90, 100°C	0.1°C	-1 to 101°C	76 mm (3")	61222-662	Each	\$718.04	<input type="text" value="0"/>
Mercury Filled	305 mm (12")	±0.1°	0, 25, 30, 37°C	0.5°C	24 to 38°C	95 mm (3 <sup>11</sup> / <sub>16</sub> "	61054-627	Each	\$676.23	<input type="text" value="0"/>
Easy-Read Fill	305 mm (12")	±1°	0, 37, 56°C	1°C	-20 to 110°C	Total	89082-158	Each	\$225.52	<input type="text" value="0"/>
										
Easy-Read Fill	300 mm (11 <sup>13</sup> / <sub>16</sub> "	±1°	0, 37, 56°C	1°C	-20 to 110°C	76 mm (3")	89082-156	Each	\$225.52	<input type="text" value="0"/>
										

[ADD TO BASKET](#)

[VIEW SHOPPING BASKET](#)





## ORDER

[Hide Additional Info](#)

[ADD TO BASKET](#)

[VIEW SHOPPING BASKET](#)

Description	Length	Accuracy	Calibration Points	Divisions	Range	Immersion	Cat. No.	Unit	Price	Quantity
Mercury Filled	460 mm (18 <sup>1</sup> / <sub>8</sub> "	±0.3°	0, 10, 20, 30, 37, 40, 50°C	0.1°C	-1 to 51°C	Total	61054-503	Each	\$757.81	<input type="text" value="0"/>
Spirit Filled	460 mm (18 <sup>1</sup> / <sub>8</sub> "	±0.3°	0, 10, 20, 30, 37, 40, 50°C	0.1°C	-1 to 51°C	Total	89082-162	Each	\$623.41	<input type="text" value="0"/>
Spirit Filled	460 mm (18 <sup>1</sup> / <sub>8</sub> "	±1°	0, 10, 20, 30, 37, 40, 50°C	0.1°C	-1 to 51°C	76 mm (3")	89082-160	Each	\$623.41	<input type="text" value="0"/>
Spirit Filled	610 mm (24")	±1°	0, 10, 20, 37, 40, 50, 56, 60, 70, 80, 90, 100°C	0.1°C	-1 to 101° C	76 mm (3")	89082-164	Each	\$767.75	<input type="text" value="0"/>
Mercury Filled	610 mm (24")	±0.4° to 100°C; ±0.5° above 100°C	0, 25, 37, 44.6, 100, 121, 140, 150, 180, 200°C	0.2°C	-1 to 201° C	Total	61222-532	Each	\$710.28	<input type="text" value="0"/>
Spirit Filled	610 mm (24")	±1°	0, 25, 37, 44.6, 100, 121, 140, 150, 180, 200°C	0.2°C	-1 to 201° C	76 mm (3")	89082-168	Each	\$652.57	<input type="text" value="0"/>
Mercury Filled	460 mm (18 <sup>1</sup> / <sub>8</sub> "	±0.3°	0, 10, 20, 30, 37, 40, 50, 56, 60, 70, 80, 90, 100°C	0.1°C	-1 to 101° C	Total	61054-569	Each	\$802.57	<input type="text" value="0"/>
Mercury Filled	610 mm (24")	±1°	0, 10, 20, 30, 40, 50, 56, 60, 70, 80, 90, 100°C	0.1°C	-1 to 101° C	76 mm (3")	61222-662	Each	\$718.04	<input type="text" value="0"/>
Mercury Filled	305 mm (12")	±0.1°	0, 25, 30, 37°C	0.5°C	24 to 38°C	95 mm (3 <sup>11</sup> / <sub>16</sub> "	61054-627	Each	\$676.23	<input type="text" value="0"/>
Easy-Read Fill	305 mm (12")	±1°	0, 37, 56°C	1°C	-20 to 110°C	Total	89082-158	Each	\$225.52	<input type="text" value="0"/>
										
Easy-Read Fill	300 mm (11 <sup>13</sup> / <sub>16</sub> "	±1°	0, 37, 56°C	1°C	-20 to 110°C	76 mm (3")	89082-156	Each	\$225.52	<input type="text" value="0"/>
										

[ADD TO BASKET](#)

[VIEW SHOPPING BASKET](#)

# Temperature Calibration Records Required:

- physical paper or electronic record
- thermometer serial #
- temperature correction factor, if needed (used)
- units measuring – typically ° C
- date, month, year
- initials of person calibrating
- comments



*Serial numbers are on the back of the thermometers.*

5B Glass nitrogen filled Serial-No. 3359 PG **EMCO** Made



**Most common method deficiency in all plants inspected to date is that temperature is being measured on the pH meter inside of a lab area (not the compliance point).**

**Temperature must:**

**-Be measured with either a glass or resistance thermometer (any other devices must be approved by the USEPA Region 9;**

**-Be measured at the compliance point immediately.**

**-Have working thermometers calibrated periodically with a NIST certified thermometer (correction factor if necessary).**

**-Should be done in duplicate at 10% frequency or every 10 samples.  
22<sup>nd</sup> Edition Removed this requirement.**

TABLE 2020:II. SUMMARY OF ONGOING QUALITY CONTROL FOR METHODS IN PART 2000

	Section	Calibrate or Standardize	QCS	MB	LFB	Duplicates	LFM	
2120B	Color	X	X	-	-	X		
2120C		X	X	-	-	X		
2120D		X	X	-	-	X		
2120E		X	X	-	-	X		
2120F		X	X	-	-	X		
2130B		Turbidity	X	X	-	-	-	
2150B	Odor	-	-	X	-	-		
2160B	Taste	-	-	X	-	-		
2170B	Flavor Profile Analysis	-	-	X	-	X		
2310B	Acidity	X	X	X	X	X		
2320B	Alkalinity	X	X	X	X	X		
2340C	Hardness	X	X	X	X	X		
2350B	Oxidant Demand/ Requirement	-	-	X	-	-		
2350C		-	-	X	-	-		
2350D		-	-	X	-	-		
2350E		-	-	X	-	-		
2510B	Conductivity	X	X	-	X	X		
2520B	Salinity	X	X	-	X	X		
2520C		X	X	-	-	X		
2540B	Solids	-	-	X	-	X		
2540C		-	-	-	-	X		
2540D		-	-	-	X	-	X	
2540E		-	-	-	X	-	X	
2540F		-	-	-	-	-	X	
2540G		-	-	-	X	-	X	
2550B		Temperature	X	-	-	-	-	
2560B	Particle Counting and Size Distribution	X	X	X	X	X		
2560C		X	X	X	X	X		
2560D		X	X	X	X	X		

# Field Video Demonstration



B - Temperature Video 1.wmv