



When product integrity counts...

Manufacturers of laboratory calibrated temperature and humidity data loggers, real-time monitoring and cold chain solutions

Rate of cooling

Rate of cooling statistics are a measure of the rate at which an environment or product cools after reaching a peak value. Temprecord always calculates these statistics between the start (F7) and end (F8) marker samples, in the following way:

- The temperature record between the start and end samples is scanned for the maximum value.
- The interval between the maximum sample and the **Zone 1 End** temperature is called 'Zone 1' and is treated as the first rate of cooling interval.
- The interval between the point at which the **Zone 1 End** temperature is reached, and the point at which the **Zone 2 End** temperature is reached is called 'Zone 2' and is treated as the second rate of cooling interval, and so on.
- The statistics (duration, rate of cooling in degrees per hour) are calculated for each interval
- The statistics for these intervals are calculated until the end of the measurement period, which is until the number of zones specified has been reached, until 5 zones have been done, or until the end (F8) sample is reached.



Temprecord also prints and displays two total durations after the rate of cooling values. The first total is the time taken from the maximum temperature till the end of the measurement period. The second total is the time taken from the end of zone 1 (i.e. from flag 2) until the end of the measurement period - i.e. it does not include zone 1

Show Rate of Cooling Statistics

Check this box if you want the [Rate of Cooling](#) (ROC) statistics to be displayed and printed as well as the normal statistical data.



This option must be checked in order for Rate of Cooling statistics to be graphed, printed, or exported.

Rate of Cooling Options – Zones

Specify the number of Rate of Cooling zones you want shown on the displayed graph, the printed graph, the displayed and printed Rate of Cooling statistics and the exported Rate of Cooling statistics.

You can enter any number from 1 to 5.



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Rate of Cooling Options - Zones 1 through 5

Enter the temperature (in the currently selected units) that each Rate of Cooling zone is to end at. The first zone is defined as the interval between the first maximum and the temperature specified in the **Zone 1 End** field. The second zone is defined as the interval between the time the first zone temperature is reached and the time the second zone temperature is reached, and so on. The zone end temperatures must be descending, i.e. the zone 2 end temperature must be less than the zone 1 end temperature and so on. If they are not, Temprecord will re-order them for you.

Options View – Select Rate of Cooling Statistics

The screenshot shows the Temprecord Options dialog box with the 'Rate of Cooling' section selected. The 'Show Rate of Cooling Statistics' checkbox is checked. The 'Zones' dropdown is set to 4. The end temperatures for the zones are: Zone 1 end: 120.00, Zone 2 end: 80.00, Zone 3 end: 45.00, Zone 4 end: 40.00, and Zone 5 end: 32.00. The background shows a data graph with a time axis from 14:00 to 08:00 on 31/07/2022.

Zone	End Temperature
Zone 1	120.00
Zone 2	80.00
Zone 3	45.00
Zone 4	40.00
Zone 5	32.00



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Statistics view

Rate of Cooling information shown in the Statistics View:

- Zone is stated as desired temperature at end of zone
- End point – sample number
- Date and time
- End Temperature
- Elapsed Time
- Rate of cooling – degrees per minute

Temprecord

File Program View Options Help

File PorPol 19438.trx

Summary | Graph | Values | **Statistics**

39.99 °F | 129.99 °F

Percentage Below 90.1

Both Limits (39.99 °F to 129.99 °F)

Time Inside 2:40:00

Samples Inside 160

Percentage Inside 9.3

Time Outside 26:01:00

Samples Outside 1,561

Percentage Outside 90.7

Rate of Cooling Statistics
Temperature

The following rate of cooling statistics pertain to the data between the start and end markers (samples 4 through 619).

Information

Start Marker is at sample 4 (Saturday, 30 July 2022 6:57:09 am, 140.88 °F)

End Marker is at sample 619 (Saturday, 30 July 2022 5:12:09 pm, 33.96 °F)

Maximum at sample 4 (Saturday, 30 July 2022 6:57:09 am, 140.88 °F)

Zone	Ends at sample	Date	Time	Ending temp.	Elapsed time	Rate °F/min
1	17	Saturday, 30 July 2022	7:10:09 am	120.00	0:14:00	-5.90
2	50	Saturday, 30 July 2022	7:43:09 am	80.00	0:33:00	1.21
3	138	Saturday, 30 July 2022	9:11:09 am	45.00	1:28:00	0.40
4	171	Saturday, 30 July 2022	9:44:09 am	40.00	0:33:00	0.15

Total from maximum temperature (flag 1) to end of zone 4 2:48:00

Total from flag 2 to end of zone 4 2:34:00

End