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**Content Based
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Boiling Point Elevation Calculator

The spreadsheet contains algorithms that "read" the popular boiling point elevation chart found in Perry's Chemical Engineers' Handbook. This table has been used for years as a reliable source of boiling point elevations.

You can add sheets to this workbook or insert the page titled "BPE" into current workbooks and link to and from the sheet to call BPE information where ever it may be needed in you calculations.

This spreadsheet contains English and Metric Units

Compounds included are : NaOH, CaCl₂, NaCl, KOH, KCl, MgCl₂, H₂SO₄, Glycerol, Kraft Liquid, Citric Acid, Sucrose, NaNO₃, (NH₄)₂SO₄, K₂CO₃, Ca(NO₃)₂, HNO₃, LiNO₃, and LiCl

Sheets are protected, Workbook structure may be changed.

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Revision History :

Boiling Point Elevations

Notes: To get the BPE's at the maximum limits, enter a point just below the maximum. For example, if the max is 60%, enter 59.9%

These tools essentially read values interpolated from Duhring-style charts from literature or charts that were developed from other sources. The primary source of the data is from *Perry's Chemical Engineers' Handbook*.

Sodium Hydroxide (NaOH) Maximum concentration is 80%, Maximum solution temperature is 200 °C or 392 °F

English Units

Metric Units

Concentration (by weight) = 45 %
Solution Temperature (°F) = 212

Concentration (by weight) = 50 %
Solution Temperature (°C) = 100

Boiling Point of Solution = 279.1 °F
Boiling Point Elevation = 67.1 °F

Boiling Point of Solution = 143.3 °C
Boiling Point Elevation = 43.3 °C

Calcium Chloride (CaCl₂)

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)

English Units

Metric Units

Concentration (by weight) = 42 %
Solution Temperature (°F) = 212

Concentration (by weight) = 59.9 %
Solution Temperature (°C) = 100

Boiling Point of Solution = 249.0 °F
Boiling Point Elevation = 37.0 °F

Boiling Point of Solution = 141.1 °C
Boiling Point Elevation = 41.1 °C

Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
On average, you may want to adjust a value from that range up by about 5%

Sodium Chloride (NaCl)

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)

English Units

Metric Units

Concentration (by weight) = 42 %
Solution Temperature (°F) = 212

Concentration (by weight) = 59.9 %
Solution Temperature (°C) = 100

Boiling Point of Solution = 319.0 °F
Boiling Point Elevation = 107.0 °F

Boiling Point of Solution = 143.5 °C
Boiling Point Elevation = 43.5 °C

Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
On average, you may want to adjust a value from that range up by about 5%

Potassium Hydroxide (KOH)

Maximum concentration is 60%, Maximum solution temperature is 100 °C or 212 °F
Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)
Above 100 °C or 212 °F, data is being extrapolated, ie. Original data is at or near atmospheric pressure.

English Units

Metric Units

Concentration (by weight) = 59.9 %
Solution Temperature (°F) = 212

Concentration (by weight) = 59.9 %
Solution Temperature (°C) = 100

Boiling Point of Solution = 319.0 °F
Boiling Point Elevation = 107.0 °F

Boiling Point of Solution = 159.5 °C
Boiling Point Elevation = 59.5 °C

Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
On average, you may want to adjust a value from that range up by about 5%

Potassium Chloride (KCl)

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)
Above 100 °C or 212 °F, data is being extrapolated, ie. Original data is at or near atmospheric pressure.

English Units

Metric Units

Concentration (by weight) = 50 %
Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
Solution Temperature (°C) = 100

Boiling Point of Solution = 225.8 °F
Boiling Point Elevation = 25.8 °F

Boiling Point of Solution = 121.1 °C
Boiling Point Elevation = 21.1 °C

Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
On average, you may want to adjust a value from that range up by about 5%

Magnesium Chloride (MgCl₂)

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)

English Units**Metric Units**

Concentration (by weight) = 50 %
 Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
 Solution Temperature (°C) = 100

Boiling Point of Solution = 276.4 °F
 Boiling Point Elevation = 76.4 °F

Boiling Point of Solution = 164.0 °C
 Boiling Point Elevation = 64.0 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
 On average, you may want to adjust a value from that range up by about 5%*

Sulfuric Acid (H₂SO₄)

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
 Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)

English Units**Metric Units**

Concentration (by weight) = 50 %
 Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
 Solution Temperature (°C) = 100

Boiling Point of Solution = 0.0 °F
 Boiling Point Elevation = 0.0 °F

Boiling Point of Solution = 0.0 °C
 Boiling Point Elevation = 0.0 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
 On average, you may want to adjust a value from that range up by about 5%*

Glycerol

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
 Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)

English Units**Metric Units**

Concentration (by weight) = 40 %
 Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
 Solution Temperature (°C) = 100

Boiling Point of Solution = 208.1 °F
 Boiling Point Elevation = 8.1 °F

Boiling Point of Solution = 110.4 °C
 Boiling Point Elevation = 10.4 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
 On average, you may want to adjust a value from that range up by about 5%*

Kraft Liquid

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
 Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)

English Units**Metric Units**

Concentration (by weight) = 35 %
 Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
 Solution Temperature (°C) = 100

Boiling Point of Solution = 205.2 °F
 Boiling Point Elevation = 5.2 °F

Boiling Point of Solution = 109.0 °C
 Boiling Point Elevation = 9.0 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
 On average, you may want to adjust a value from that range up by about 5%*

Citric Acid

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
 Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)
 Above 100 °C or 212 °F, data is being extrapolated, ie. Original data is at or near atmospheric pressure.

English Units**Metric Units**

Concentration (by weight) = 15 %
 Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
 Solution Temperature (°C) = 100

Boiling Point of Solution = 200.6 °F
 Boiling Point Elevation = 0.6 °F

Boiling Point of Solution = 105.5 °C
 Boiling Point Elevation = 5.5 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
 On average, you may want to adjust a value from that range up by about 5%*

Sucrose

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
 Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)

English Units

Metric Units

Concentration (by weight) = 15 %
 Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
 Solution Temperature (°C) = 100

Boiling Point of Solution = 200.2 °F
 Boiling Point Elevation = 0.2 °F

Boiling Point of Solution = 103.1 °C
 Boiling Point Elevation = 3.1 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
 On average, you may want to adjust a value from that range up by about 5%*

Sodium Nitrate (NaNO₃)

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
 Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)

English Units

Metric Units

Concentration (by weight) = 15 %
 Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
 Solution Temperature (°C) = 100

Boiling Point of Solution = 201.4 °F
 Boiling Point Elevation = 1.4 °F

Boiling Point of Solution = 113.8 °C
 Boiling Point Elevation = 13.8 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
 On average, you may want to adjust a value from that range up by about 5%*

Ammonium Sulfate ((NH₄)₂SO₄)

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
 Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)

English Units

Metric Units

Concentration (by weight) = 15 %
 Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
 Solution Temperature (°C) = 100

Boiling Point of Solution = 201.5 °F
 Boiling Point Elevation = 1.5 °F

Boiling Point of Solution = 115.1 °C
 Boiling Point Elevation = 15.1 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
 On average, you may want to adjust a value from that range up by about 5%*

Potassium Carbonate (K₂CO₃)

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
 Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)
 Above 100 °C or 212 °F, data is being extrapolated, ie. Original data is at or near atmospheric pressure.

English Units

Metric Units

Concentration (by weight) = 15 %
 Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
 Solution Temperature (°C) = 100

Boiling Point of Solution = 202.2 °F
 Boiling Point Elevation = 2.1 °F

Boiling Point of Solution = 119.1 °C
 Boiling Point Elevation = 19.1 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
 On average, you may want to adjust a value from that range up by about 5%*

Calcium Nitrate (Ca(NO₃)₂)

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
 Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)

English Units

Metric Units

Concentration (by weight) = 50 %
 Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
 Solution Temperature (°C) = 100

Boiling Point of Solution = 225.0 °F
 Boiling Point Elevation = 25.0 °F

Boiling Point of Solution = 120.5 °C
 Boiling Point Elevation = 20.5 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
 On average, you may want to adjust a value from that range up by about 5%*

Nitric Acid (HNO₃)

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
 Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)

English Units

Metric Units

Concentration (by weight) = 50 %
Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
Solution Temperature (°C) = 100

Boiling Point of Solution = 232.8 °F
Boiling Point Elevation = 32.8 °F

Boiling Point of Solution = 126.6 °C
Boiling Point Elevation = 26.6 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
On average, you may want to adjust a value from that range up by about 5%*

Lithium Nitrate (LiNO₃)

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)

English Units

Metric Units

Concentration (by weight) = 15 %
Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
Solution Temperature (°C) = 100

Boiling Point of Solution = 203.2 °F
Boiling Point Elevation = 3.2 °F

Boiling Point of Solution = 129.9 °C
Boiling Point Elevation = 29.9 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
On average, you may want to adjust a value from that range up by about 5%*

Lithium Chloride (LiCl)

Maximum concentration is 60%, Maximum solution temperature is 176 °C or 350 °F
Below 38 °C or 100 °F, data is being extrapolated from original source (*Perry's Chemical Engineers' Handbook*)
Above 100 °C or 212 °F, data is being extrapolated, ie. Original data is at or near atmospheric pressure.

English Units

Metric Units

Concentration (by weight) = 55 %
Solution Temperature (°F) = 200

Concentration (by weight) = 59.9 %
Solution Temperature (°C) = 100

Boiling Point of Solution = 291.2 °F
Boiling Point Elevation = 91.2 °F

Boiling Point of Solution = 162.3 °C
Boiling Point Elevation = 62.3 °C

*Accuracy Note: This calculation can have error between 5-10% between 50 and 60% concentration.
On average, you may want to adjust a value from that range up by about 5%*