## **Physical Properties** for Steam and Water

# AFT SteamCalc<sup>™</sup>

The SteamCalc Viewer is included for free in all AFT software.



#### Steam/Water Properties:

- Bulk Modulus of Elasticity
- Prandtl Number
- Quality
- Saturation Temperature
  - Sonic Velocity
- Compressibility Factor
- Enthalpy

• Density

• Entropy

- Internal Energy
- Kinematic Viscosity
- Isentropic Expansion Coefficient, Gamma
- Phase
- Pressure

- Specific Heat, cp
- Specific Volume
- Specific Heat, cv
- Temperature Subcool
- Temperature Superheat
- Thermal Conductivity
- Temperature
- Viscosity

|                         | 8 4    | - 10 M             | <b>油</b> 紀 🛍            |                      |                      |   |                          |                              |
|-------------------------|--------|--------------------|-------------------------|----------------------|----------------------|---|--------------------------|------------------------------|
| Single Point            | TNO    | Points             | Bange                   |                      |                      |   |                          |                              |
| Property #1             |        |                    |                         |                      |                      |   |                          |                              |
|                         | •      |                    | -                       | 100                  | _                    |   | -                        |                              |
| Pressure                |        |                    | ■ X                     | alua: 100            |                      | peia  | -                        |                              |
| Property #2             | h.     |                    | Start Va                | alua: 200            |                      | dep. F  | <b>T</b>                 |                              |
| Tenperat.               | 2      |                    | ■ Start Va              | aga:  200            |                      | the second se | r                        |                              |
| Lenhear                 | iie    |                    | End Va                  | alug:   500          |                      | Igorement 25  |                          | Ediculate                    |
|                         |        |                    |                         |                      | 100                  |   | 1.0                      |                              |
| Temperature<br>(deg. F) | Phase  | Pressure<br>(psia) | Temperature<br>(deg. F) | Density<br>(Ibm/ft3) | Enthalpy<br> Btu/lbm |   | Viscosity<br>(Ibm/hr-ft) | Thermal Cond<br>(Bluzhr-R-B) |
| = 200                   | Liquid | 100.000            | 200.000                 | 60.138109            | 16B.30               | 0 1.004904  | 0.7329016                | 0.3903049                    |
| = 225                   | Liquid | 100.000            | 225.000                 | 59.513746            | 193.47               | 3 1.009124  | 0.6334978                | 0.3935873                    |
| = 250                   | Liquid | 100.000            | 250.000                 | 58.835256            | 218.76               | 5 1.014391  | 0.5561280                | 0.3955225                    |
| = 275                   | Liquid | 100.000            | 275.000                 | 58.103872            | 244.20               | 3 1.020831  | 0.4947043                | 0.3961698                    |
| = 300                   | Liquid | 100.000            | 300.000                 | 57.319500            | 269.81               | 8 1.028634  | 0.4450730                | 0.3955759                    |
| = 325                   | Liquid | 100.000            | 325.000                 | 56.480737            | 295.64               | 8 1.038069  | 0.4043173                | 0.3937750                    |
| = 350                   | Gas    | 100.000            | 350.000                 | 0.217754             | 1200.44              | 0 0.566972  | 0.0363031                | 0.0192960                    |
| = 375                   | Gas    | 100.000            | 375.000                 | 0.209808             | 1214.31              |   | 0.0377214                | 0.0197624                    |
| = 400                   | Gas    | 100.000            | 400.000                 | 0.202602             | 1227.76              | 6 0.531365  | 0.0391401                | 0.0203328                    |
| = 425                   | Gas    | 100.000            | 425.000                 | 0.195999             | 1240.92              | 0 0.521440  | 0.0405594                | 0.0209757                    |
| = 450                   | Gas    | 100.000            | 450.000                 | 0.189905             | 1253.86              | 1 0.514206  | 0.0419796                | 0.0216709                    |
| = 475                   | Gas    | 100.000            | 475.000                 | 0.184248             | 1266.64              | 7 0.508950  | 0.0434004                | 0.0224056                    |
| = 500                   | Gas    | 100.000            | 500.000                 | 0.178970             | 1279.32              | 1 0.505192  | 0.0446218                | 0.0231712                    |
|                         |        |                    |                         |                      |                      |   |                          |                              |

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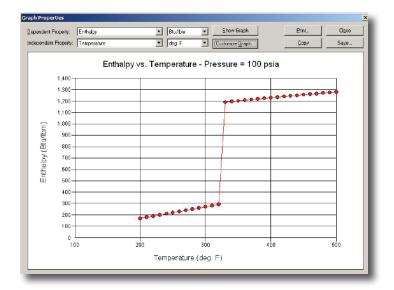
## AFT SteamCalc Viewer provides three ways to calculate steam and water properties from a broad range of input parameters:

- Single Point properties calculated at a single point
- **Two Points -** the difference in value between the two inputs for all selected output parameters
- **Range** properties calculated over a range of points based on two inputs. The first input is a single value and the second input includes a start value, end value and increment. The output displays properties for each increment over the range. Range output may also be graphed.

|   |                    |                           |     |  | Paramete  | er  | V   | alue   |
|---|--------------------|---------------------------|-----|--|---|---|---|--|
|   |                    |                           |     | Phas   | e   |   |   | Gas  |
|   |                    |                           |     | Pres   | sure (psia)   |   | -   | 00.000   |
|   |                    |                           |     | Tem  | perature (deg.  | F)  |   | 400.000  |
|   |                    |                           |     | Dens   | sity (lbm/ft3)  |   | 0.  | 202602   |
|   |                    |                           |     | Enth   | alpy (Btu/lbm)  |   | -   | 227.77   |
|   |                    |                           |     | Spec   | cific Heat, cp. (I  | Btu/Ibm-F   | 3) 0.   | 531365   |
| Single Point                            |                    |                           |     | Visco  | osity (Ibm/hr-ft)   |   | 0.0   | 391401   |
|   |                    |                           |     | Ther   | mal Cond. (Btu  | /hr-ft-R)   | 0.0   | 203328   |
| Property #1:                            |                    |                           |     | Qual   | ity (Percent)   |   |   | N/A  |
| Pressure                                | •                  | <u>V</u> alue:            | 100 | psia   |   | -   |   | -  |
| Property #2:<br>Temperature             | -                  | V <u>a</u> lue:           | 400 | deg. F   | -   |   | Calculate   |  |
|   | ¥                  | V <u>a</u> lue:           | 400 | Quality  | Phase   | Pressure  | <u>Calculate</u><br>Density   | Enthalp  |
|   | ×                  | V <u>a</u> lue:           | 400 | Quality<br>(Percent)   | Phase   | Pressure<br>(psia)  | Calculate<br>Density<br>(Ibm/ft3)                                       | Enthalp<br>(Btu/lbr  |
|   | ×                  | V <u>a</u> lue:           | 400 | Quality  | Phase<br>Saturated Liquid   | Pressure<br>(psia)<br>250.0   | Calculate<br>Density<br>(Ibm/ft3)<br>53.6116                            | Enthalp<br>(Btu/Ibr<br>376   |
|   | ×                  | V <u>a</u> lue:           | 400 | Quality<br>(Percent)<br>= 0<br>= 20<br>= 40                                  | Phase   | Pressure<br>(psia)<br>250.0<br>250.0  | Calculate<br>Density<br>(Ibm/ft3)                                       | Enthalp<br>(Btu/Ibn<br>376<br>541<br>706                               |
|   | _                  | V <u>a</u> lue:           | 400 | Quality<br>(Percent)<br>= 0<br>= 20<br>= 40<br>= 60                          | Phase<br>Saturated Liquid<br>Saturated<br>Saturated<br>Saturated<br>Saturated       | Pressure<br>(psia)<br>250.0<br>250.0<br>250.0<br>250.0                            | Density<br>(lbm/ft3)<br>53.6116<br>2.6062<br>1.3356<br>0.8978           | Enthalp,<br>(Btu/Ibm<br>376<br>541<br>706<br>871                       |
| Temperature                             | ▼<br><u>R</u> ange | V <u>a</u> lue:           | 400 | Quality<br>(Percent)<br>= 0<br>= 20<br>= 40<br>= 60<br>= 80                  | Phase<br>Saturated Liquid<br>Saturated<br>Saturated<br>Saturated<br>Saturated       | Pressure<br>(psia)<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0          | Density<br>(Ibm/ft3)<br>53.6116<br>2.6062<br>1.3356<br>0.8978<br>0.6762 | Enthalp<br>(Btu/lbn<br>376<br>541<br>706<br>871<br>1036                |
|   | _                  | Value:                    | 400 | Quality<br>(Percent)<br>= 0<br>= 20<br>= 40<br>= 60                          | Phase<br>Saturated Liquid<br>Saturated<br>Saturated<br>Saturated<br>Saturated       | Pressure<br>(psia)<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0          | Density<br>(lbm/ft3)<br>53.6116<br>2.6062<br>1.3356<br>0.8978           | Enthalps<br>(Btu/lbm<br>376,<br>541,<br>706,<br>871,<br>1036,<br>1201, |
| Temperature                             | _                  | V <u>a</u> lue:<br>⊻alue: |     | Quality<br>(Percent)<br>= 0<br>= 20<br>= 40<br>= 60<br>= 80                  | Phase<br>Saturated Liquid<br>Saturated<br>Saturated<br>Saturated<br>Saturated       | Pressure<br>(psia)<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0 | Density<br>(Ibm/ft3)<br>53.6116<br>2.6062<br>1.3356<br>0.8978<br>0.6762 | Enthalp<br>(Btu/lbn<br>376<br>541<br>706<br>871<br>1036                |
| Temperature<br>Property #1:             | Range              | Value:                    | 250 | Quality<br>(Percent)<br>= 0<br>= 20<br>= 40<br>= 60<br>= 80<br>= 100<br>psia | Phase<br>Saturated Liquid<br>Saturated<br>Saturated<br>Saturated<br>Saturated Vapor | Pressure<br>(psia)<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0 | Density<br>(Ibm/ft3)<br>53.6116<br>2.6062<br>1.3356<br>0.8978<br>0.6762 | Enthalp<br>(Btu/lbn<br>376<br>541<br>706<br>871<br>1036                |
| Temperature<br>Property #1:<br>Pressure | Bange              | 1                         | 250 | Quality<br>(Percent)<br>= 0<br>= 20<br>= 40<br>= 60<br>= 80<br>= 100         | Phase<br>Saturated Liquid<br>Saturated<br>Saturated<br>Saturated<br>Saturated Vapor | Pressure<br>(psia)<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0<br>250.0 | Density<br>(Ibm/ft3)<br>53.6116<br>2.6062<br>1.3356<br>0.8978<br>0.6762 | Enthalp<br>(Btu/lbn<br>376<br>541<br>706<br>871<br>1036                |

# Output

- Configure parameters displayed, display order and number of digits
- Supports English and SI units
- Save or set your parameter and unit preferences as the default
- Save and reload input sets
- Customize your graphs using colors, axis scale, titles, markers and more
- Use your graphs in other documents





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