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# Type977 fitting for heat pump SINK-8TES

# Parametric Heat Pump calculation

**Dani Carbonell**
dani.carbonell@spf.ch

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Table 1: Fitted coefficients for the heat pump.

| Coefficient | Description | $[kW]$ |
|---|---|---|
| $P_{Q_1}$ | $1^{st}$ *condenser polynomial coefficient* | -7.2355e+01 |
| $P_{Q_2}$ | $2^{st}$ *condenser polynomial coefficient* | 1.9817e+02 |
| $P_{Q_3}$ | $3^{st}$ *condenser polynomial coefficient* | 1.1390e+03 |
| $P_{Q_4}$ | $4^{st}$ *condenser polynomial coefficient* | -8.8478e+02 |
| $P_{Q_5}$ | $5^{st}$ *condenser polynomial coefficient* | 4.4131e+01 |
| $P_{Q_6}$ | $6^{st}$ *condenser polynomial coefficient* | -3.7861e+03 |
| $P_{COP_1}$ | $1^{st}$ *COP polynomial coefficient* | 1.2951e+02 |
| $P_{COP_2}$ | $2^{st}$ *COP polynomial coefficient* | -9.2195e+01 |
| $P_{COP_3}$ | $3^{st}$ *COP polynomial coefficient* | -1.7201e+03 |
| $P_{COP_4}$ | $4^{st}$ *COP polynomial coefficient* | 7.9259e+02 |
| $P_{COP_5}$ | $5^{st}$ *COP polynomial coefficient* | 2.0555e+02 |
| $P_{COP_6}$ | $6^{st}$ *COP polynomial coefficient* | 5.5566e+03 |
| $\dot{m}_{cond}$ | 1000.00 $[kg/h]$ | |
| $\dot{m}_{evap}$ | 1000.00 $[kg/h]$ | |
| $COP_{nom}$ (A0W35) | 3.51 | |
| $Q_{cond,nom}$ (A0W35) | 8.73 $[kW]$ | |
| $Q_{evap,nom}$ (A0W35) | 6.24 $[kW]$ | |
| $W_{comp,nom}$ (A0W35) | 2.49 $[kW]$ | |
| $RMS_{COP}$ | $2.55e-02$ | |
| $RMS_{Q_{cond}}$ | $2.66e-02$ | |
| $RMS_{W_{comp}}$ | $9.87e-03$ | |
| Fit model | Average Temperature | |

Table 2: Differences between experiments and fitted data for the heat pump. $error = 100 \cdot |\frac{Q_{exp}-Q_{num}}{Q_{exp}}|$ and $RMS = \sqrt{\sum \frac{(Q_{exp}-Q_{num})^2}{n_p}}$ where $n_p$ is the number of data points.

| $T_{cond,out}$ $^oC$ | $T_{evap,in}$ $^oC$ | $COP$ [–] | $COP_{exp}$ [–] | error [%] | $Q_{cond}$ $[kW]$ | $Q_{cond,exp}$ $[kW]$ | error [%] | $W_{comp}$ $[kW]$ | $W_{comp,exp}$ $[kW]$ | error [%] |
|---|---|---|---|---|---|---|---|---|---|---|
| 35.00 | -5.00 | 4.18 | 4.19 | 0.2 | 6.72 | 6.70 | 0.3 | 1.61 | 1.60 | 0.55 |
| 35.00 | 0.00 | 4.85 | 4.81 | 0.8 | 7.77 | 7.80 | 0.4 | 1.60 | 1.62 | 1.24 |
| 35.00 | 5.00 | 5.58 | 5.63 | 0.9 | 8.88 | 8.90 | 0.3 | 1.59 | 1.58 | 0.70 |
| 55.00 | 0.00 | 2.90 | 2.91 | 0.5 | 7.09 | 7.10 | 0.1 | 2.45 | 2.44 | 0.38 |
| 55.00 | 5.00 | 3.33 | 3.31 | 0.7 | 8.01 | 8.00 | 0.2 | 2.41 | 2.42 | 0.53 |
| 35.00 | 10.00 | 6.36 | 6.33 | 0.4 | 10.06 | 10.00 | 0.6 | 1.58 | 1.58 | 0.16 |
| 35.00 | 15.00 | 7.41 | 7.42 | 0.0 | 11.18 | 11.20 | 0.2 | 1.51 | 1.51 | 0.17 |
| 55.00 | 10.00 | 3.71 | 3.71 | 0.2 | 9.09 | 9.10 | 0.1 | 2.45 | 2.45 | 0.08 |
| 55.00 | 15.00 | 4.19 | 4.20 | 0.1 | 10.20 | 10.20 | 0.0 | 2.43 | 2.43 | 0.10 |
| Sum | | | | 3.8 | | | 2.2 | | | 3.91 |
| $RMS_{COP}$ | $2.55e-02$ | | | | | | | | | |
| $RMS_{Q_{cond}}$ | $2.66e-02$ | | | | | | | | | |
| $RMS_{W_{comp}}$ | $9.87e-03$ | | | | | | | | | |

Meier/SINK-8TES/SINK-8TES-Qcond.pdf

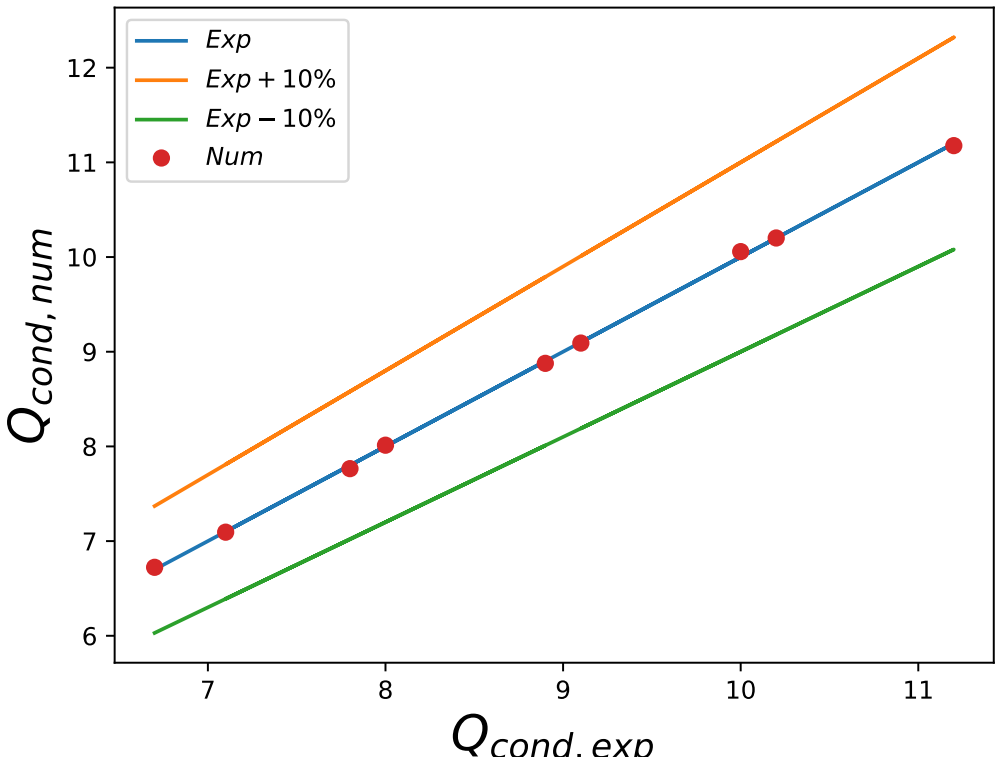


Figure 1: $Q_{cond}$ differences between experiments and fitted data

Meier/SINK-8TES/SINK-8TES-Qcomp.pdf

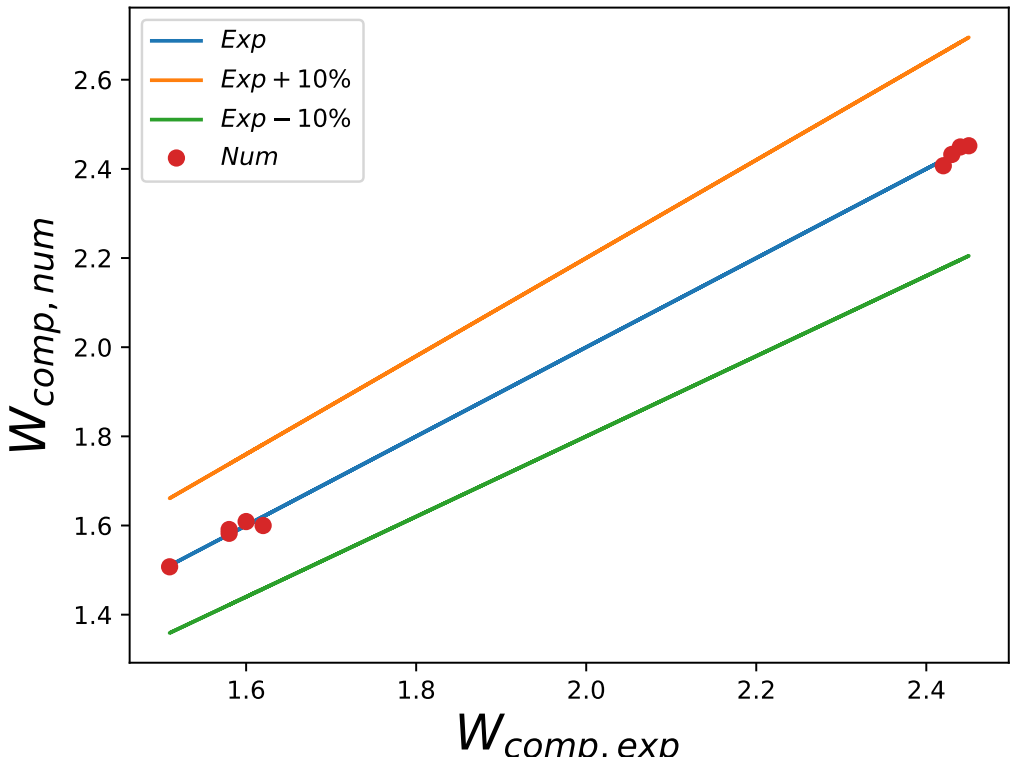


Figure 2: $W_{comp}$ differences between experiments and fitted data

Meier/SINK-8TES/SINK-8TES-COP.pdf

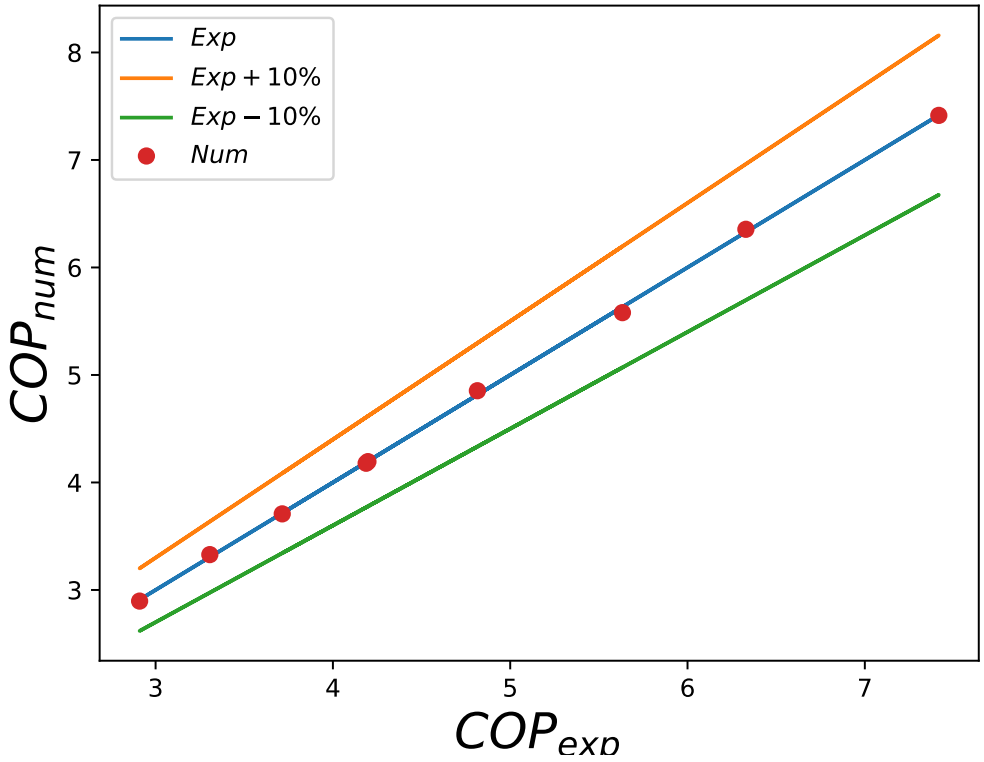


Figure 3: *COP* differences between experiments and fitted data