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# Type977 fitting for heat pump SINH-40TE

## Parametric Heat Pump calculation

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Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	[kW]
$P_{Q_1}$	1 <sup>st</sup> condenser polynomial coefficient	2.7674e+01
$P_{Q_2}$	2 <sup>st</sup> condenser polynomial coefficient	2.9865e+02
$P_{Q_3}$	3 <sup>st</sup> condenser polynomial coefficient	1.5404e+02
$P_{Q_4}$	4 <sup>st</sup> condenser polynomial coefficient	1.2184e+02
$P_{Q_5}$	5 <sup>st</sup> condenser polynomial coefficient	9.5060e+02
$P_{Q_6}$	6 <sup>st</sup> condenser polynomial coefficient	-6.8462e+02
$P_{COP_1}$	1 <sup>st</sup> COP polynomial coefficient	4.6135e+00
$P_{COP_2}$	2 <sup>st</sup> COP polynomial coefficient	3.4499e+01
$P_{COP_3}$	3 <sup>st</sup> COP polynomial coefficient	9.3772e+00
$P_{COP_4}$	4 <sup>st</sup> COP polynomial coefficient	-4.0699e+01
$P_{COP_5}$	5 <sup>st</sup> COP polynomial coefficient	-2.9816e+01
$P_{COP_6}$	6 <sup>st</sup> COP polynomial coefficient	-1.0015e+02
$\dot{m}_{cond}$	5500.00 [kg/h]	
$\dot{m}_{evap}$	5500.00 [kg/h]	
$COP_{nom}$ (A0W35)	4.04	
$Q_{cond,nom}$ (A0W35)	33.52 [kW]	
$Q_{evap,nom}$ (A0W35)	25.22 [kW]	
$W_{comp,nom}$ (A0W35)	8.30 [kW]	
$RMS_{COP}$	$3.19e - 02$	
$RMS_{Q_{cond}}$	$5.34e - 01$	
$RMS_{W_{comp}}$	$1.63e - 01$	
Fit model	Average Temperature	

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

$T_{cond,out}$ °C	$T_{evap,in}$ °C	$COP$ [-]	$COP_{exp}$ [-]	error [%]	$Q_{cond}$ [kW]	$Q_{cond,exp}$ [kW]	error [%]	$W_{comp}$ [kW]	$W_{comp,exp}$ [kW]	error [%]
35.00	-5.00	3.54	3.50	1.1	29.10	28.20	3.2	8.22	8.06	2.05
35.00	0.00	4.08	4.10	0.5	33.86	34.20	1.0	8.30	8.34	0.52
35.00	5.00	4.60	4.62	0.3	39.12	39.70	1.5	8.50	8.60	1.15
50.00	-5.00	2.54	2.56	0.7	26.73	28.07	4.8	10.53	10.98	4.13
50.00	0.00	3.02	2.96	2.1	31.63	30.85	2.5	10.48	10.43	0.45
50.00	5.00	3.52	3.47	1.6	37.15	37.02	0.3	10.55	10.68	1.19
45.00	-5.00	2.93	2.96	0.8	27.91	28.13	0.8	9.52	9.52	0.02
45.00	0.00	3.44	3.46	0.7	32.80	32.52	0.9	9.53	9.39	1.52
45.00	5.00	3.95	3.98	0.8	38.22	38.36	0.4	9.68	9.64	0.42
55.00	0.00	2.53	2.54	0.4	30.06	29.17	3.1	11.87	11.48	3.44
55.00	5.00	3.03	3.05	0.5	35.69	35.69	0.0	11.77	11.71	0.50
35.00	10.00	5.10	5.10	0.0	44.85	45.20	0.8	8.79	8.86	0.76
35.00	15.00	5.58	5.56	0.4	51.05	50.70	0.7	9.15	9.12	0.31
50.00	10.00	4.00	3.96	1.2	43.14	43.20	0.1	10.77	10.92	1.35
50.00	15.00	4.47	4.42	1.0	49.57	49.38	0.4	11.10	11.16	0.58
45.00	10.00	4.44	4.47	0.7	44.11	44.20	0.2	9.94	9.89	0.55
45.00	15.00	4.90	4.93	0.6	50.46	50.04	0.8	10.29	10.14	1.49
55.00	10.00	3.51	3.53	0.6	41.78	42.20	1.0	11.90	11.95	0.43
55.00	15.00	3.97	4.00	0.7	48.32	48.72	0.8	12.17	12.19	0.13
Sum				14.5			23.2			20.97
$RMS_{COP}$	3.19e - 02									
$RMS_{Q_{cond}}$	5.34e - 01									
$RMS_{W_{comp}}$	1.63e - 01									

Meier/SINH-40TE/SINH-40TE-Qcond.pdf

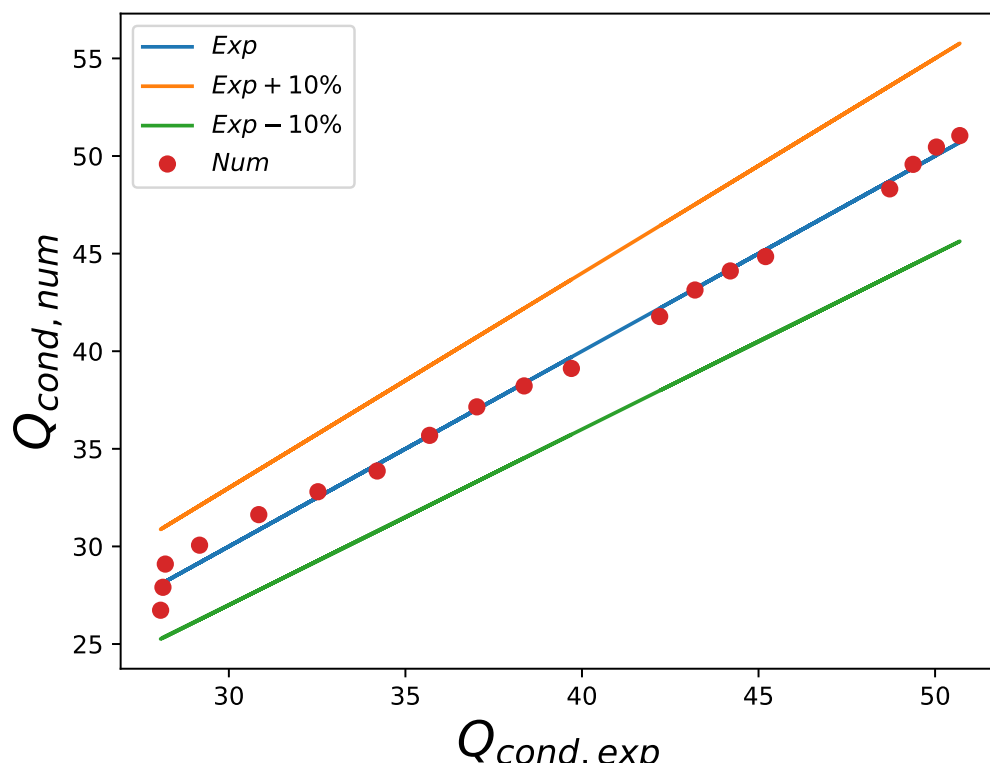


Figure 1:  $Q_{cond}$  differences between experiments and fitted data

Meier/SINH-40TE/SINH-40TE-Qcomp.pdf

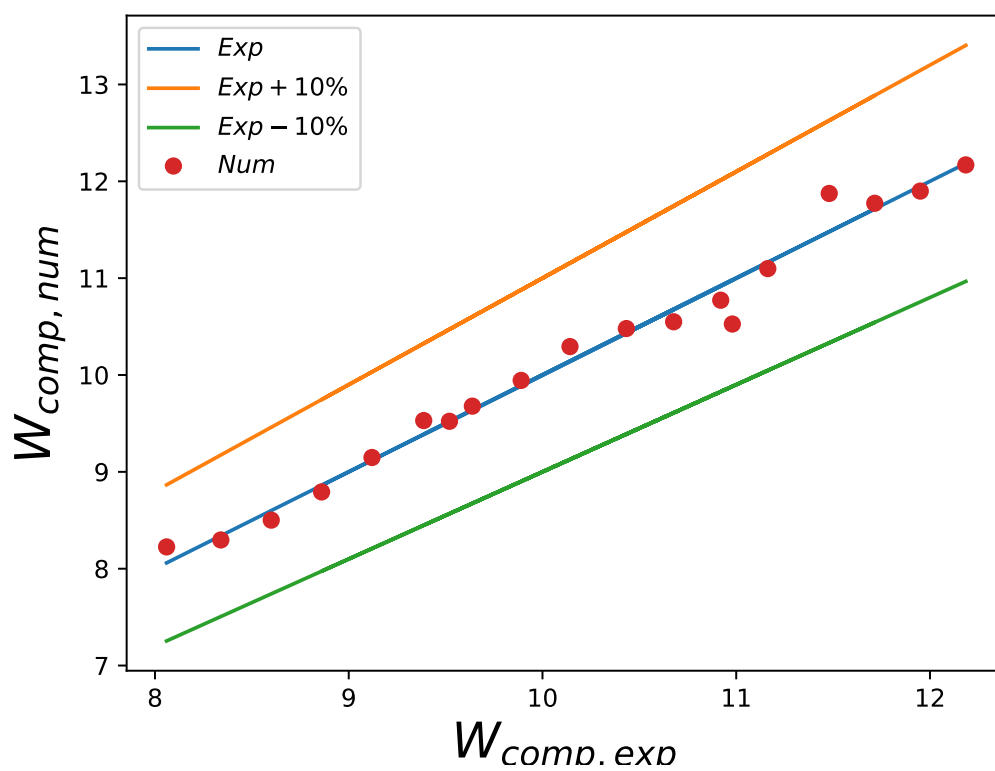


Figure 2:  $W_{comp}$  differences between experiments and fitted data

Meier/SINH-40TE/SINH-40TE-COP.pdf

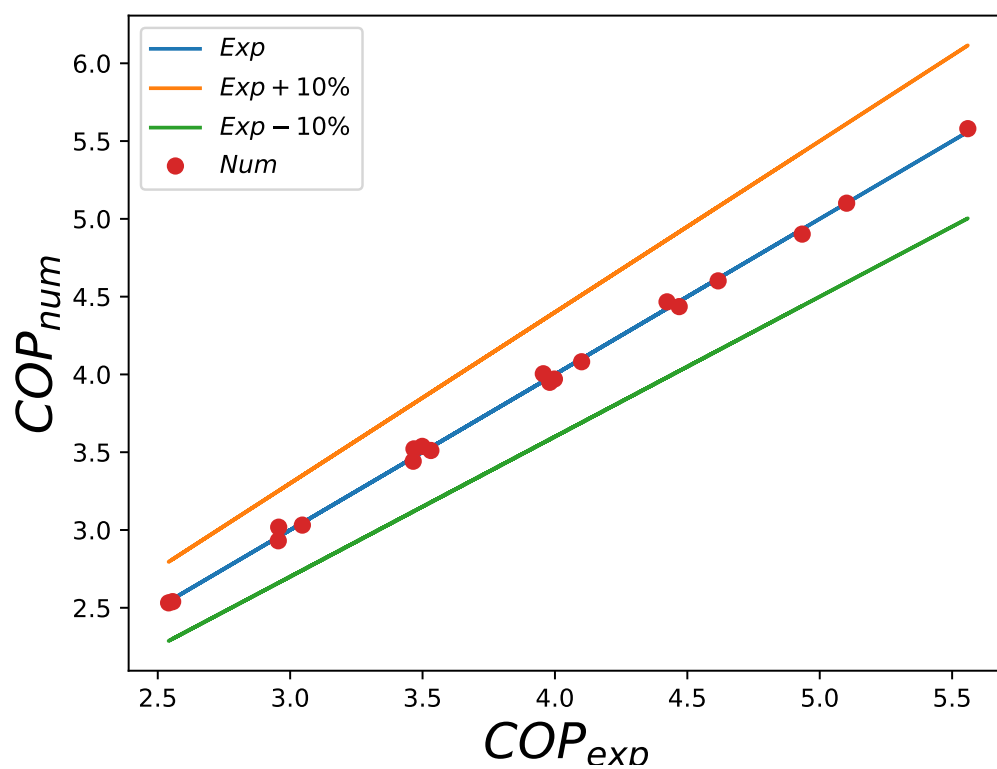


Figure 3:  $COP$  differences between experiments and fitted data