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# Type977 fitting for heat pump SI-GEO-25-100

## 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	8.2991e+01
$P_{Q_2}$	2 <sup>st</sup> condenser polynomial coefficient	9.9593e+02
$P_{Q_3}$	3 <sup>st</sup> condenser polynomial coefficient	2.3932e+02
$P_{Q_4}$	4 <sup>st</sup> condenser polynomial coefficient	-9.5125e+02
$P_{Q_5}$	5 <sup>st</sup> condenser polynomial coefficient	3.5117e+02
$P_{Q_6}$	6 <sup>st</sup> condenser polynomial coefficient	-1.2309e+03
$P_{COP_1}$	1 <sup>st</sup> COP polynomial coefficient	5.0683e+00
$P_{COP_2}$	2 <sup>st</sup> COP polynomial coefficient	6.2479e+01
$P_{COP_3}$	3 <sup>st</sup> COP polynomial coefficient	1.0696e+01
$P_{COP_4}$	4 <sup>st</sup> COP polynomial coefficient	-1.6477e+02
$P_{COP_5}$	5 <sup>st</sup> COP polynomial coefficient	-1.4540e+01
$P_{COP_6}$	6 <sup>st</sup> COP polynomial coefficient	-1.1243e+02
$\dot{m}_{cond}$	14213.00 [kg/h]	
$\dot{m}_{evap}$	14213.00 [kg/h]	
$COP_{nom}$ (A0W35)	4.36	
$Q_{cond,nom}$ (A0W35)	85.99 [kW]	
$Q_{evap,nom}$ (A0W35)	66.25 [kW]	
$W_{comp,nom}$ (A0W35)	19.74 [kW]	
$RMS_{COP}$	$4.76e - 02$	
$RMS_{Q_{cond}}$	$1.89e - 01$	
$RMS_{W_{comp}}$	$2.36e - 01$	
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	3.67	3.70	0.8	72.41	72.49	0.1	19.74	19.61	0.66
35.00	0.00	4.40	4.30	2.4	86.88	86.70	0.2	19.72	20.16	2.18
35.00	5.00	5.14	5.20	1.1	101.57	101.62	0.1	19.75	19.54	1.06
50.00	-5.00	2.69	2.67	0.8	67.81	67.94	0.2	25.24	25.48	0.95
50.00	0.00	3.29	3.23	1.7	81.63	81.20	0.5	24.82	25.11	1.16
50.00	5.00	3.90	3.83	1.7	95.72	95.55	0.2	24.57	24.94	1.50
45.00	-5.00	3.09	3.11	0.8	70.06	70.21	0.2	22.69	22.56	0.59
45.00	0.00	3.74	3.78	1.1	84.12	83.96	0.2	22.51	22.21	1.33
45.00	5.00	4.39	4.43	1.0	98.42	98.60	0.2	22.42	22.24	0.81
55.00	0.00	2.77	2.80	1.2	78.47	78.46	0.0	28.35	28.00	1.26
55.00	5.00	3.33	3.35	0.5	92.33	92.53	0.2	27.73	27.64	0.32
35.00	10.00	5.88	5.90	0.3	116.48	116.55	0.1	19.81	19.76	0.26
35.00	15.00	6.62	6.58	0.5	131.60	131.47	0.1	19.89	19.97	0.40
50.00	10.00	4.50	4.44	1.5	110.03	109.91	0.1	24.44	24.77	1.35
50.00	15.00	5.11	5.05	1.2	124.55	124.27	0.2	24.39	24.62	0.94
45.00	10.00	5.04	5.08	0.9	112.93	113.23	0.3	22.40	22.27	0.59
45.00	15.00	5.69	5.74	0.8	127.67	127.88	0.2	22.43	22.29	0.66
55.00	10.00	3.89	3.91	0.4	106.41	106.60	0.2	27.36	27.29	0.25
55.00	15.00	4.45	4.48	0.7	120.72	120.67	0.0	27.13	26.93	0.74
Sum				19.4			3.2			16.98
$RMS_{COP}$	4.76e - 02									
$RMS_{Q_{cond}}$	1.89e - 01									
$RMS_{W_{comp}}$	2.36e - 01									

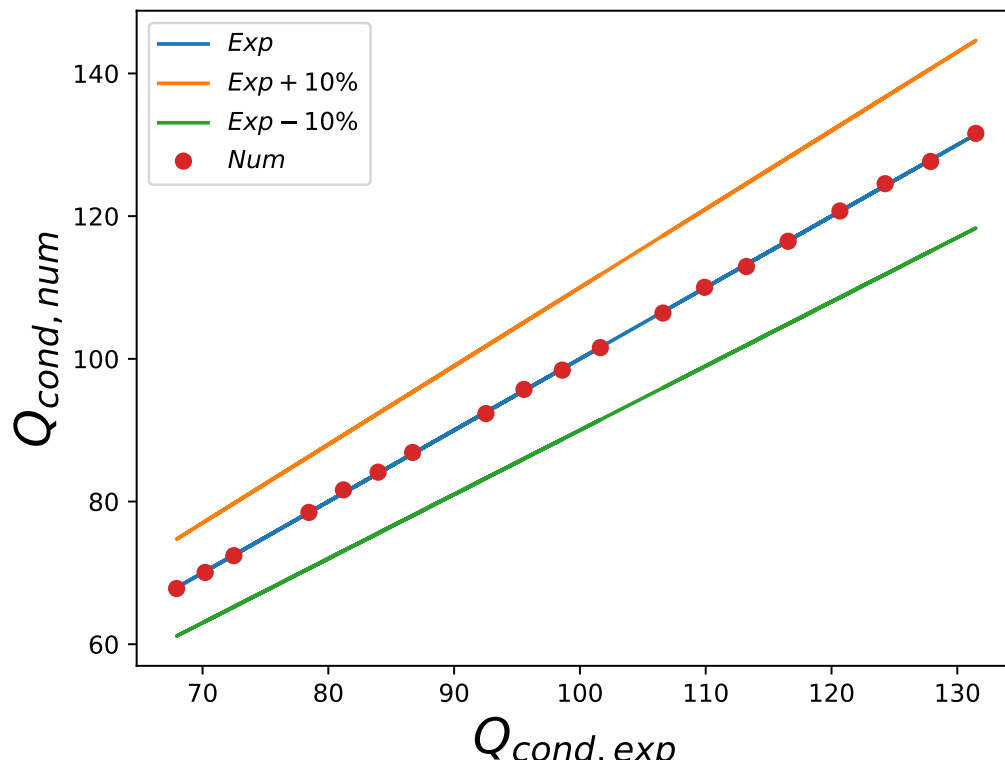


Figure 1:  $Q_{cond}$  differences between experiments and fitted data

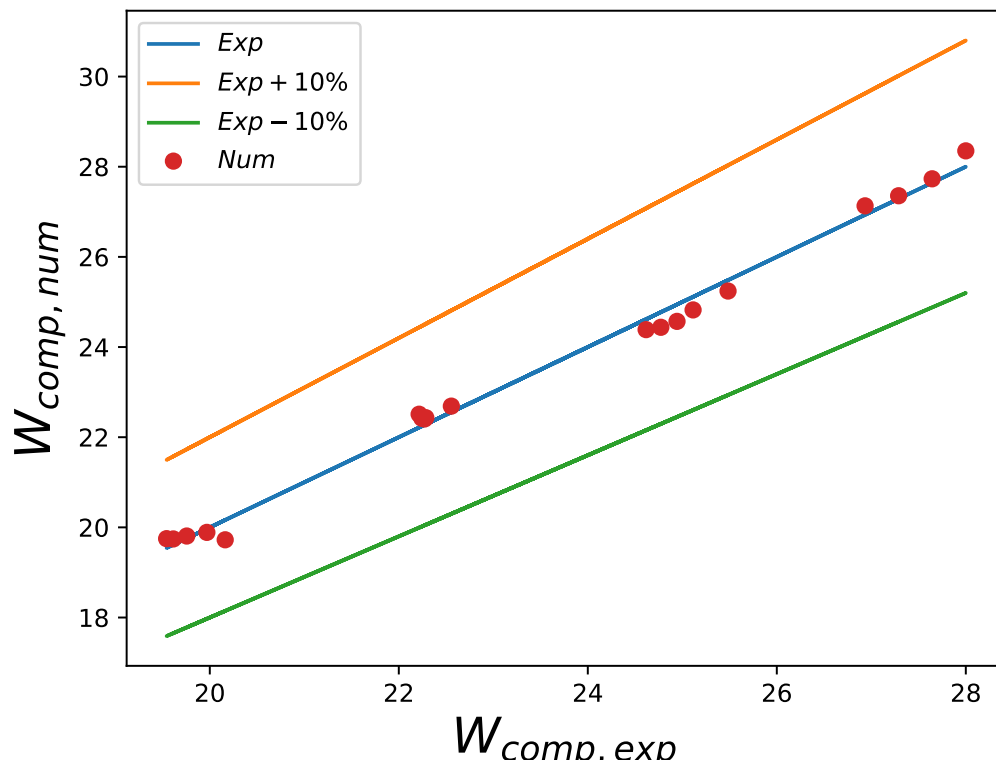


Figure 2:  $W_{comp}$  differences between experiments and fitted data

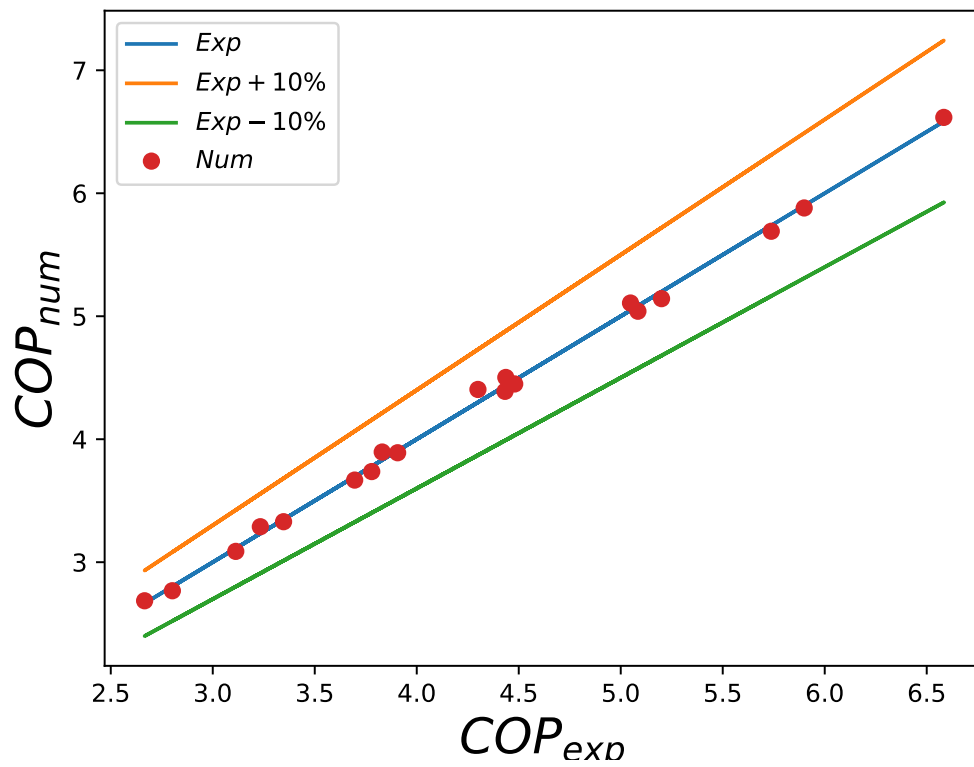


Figure 3:  $COP$  differences between experiments and fitted data