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# Type977 fitting for heat pump HP12L-M-WEB

## 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	2.0444e+01
$P_{Q_2}$	2 <sup>st</sup> condenser polynomial coefficient	1.5038e+02
$P_{Q_3}$	3 <sup>st</sup> condenser polynomial coefficient	-3.3455e+00
$P_{Q_4}$	4 <sup>st</sup> condenser polynomial coefficient	-8.4008e+01
$P_{Q_5}$	5 <sup>st</sup> condenser polynomial coefficient	2.4348e+02
$P_{Q_6}$	6 <sup>st</sup> condenser polynomial coefficient	-1.5790e+02
$P_{COP_1}$	1 <sup>st</sup> COP polynomial coefficient	9.7089e+00
$P_{COP_2}$	2 <sup>st</sup> COP polynomial coefficient	5.6154e+01
$P_{COP_3}$	3 <sup>st</sup> COP polynomial coefficient	-5.3049e+01
$P_{COP_4}$	4 <sup>st</sup> COP polynomial coefficient	-1.8809e+02
$P_{COP_5}$	5 <sup>st</sup> COP polynomial coefficient	7.5283e+01
$P_{COP_6}$	6 <sup>st</sup> COP polynomial coefficient	7.9729e+01
$\dot{m}_{cond}$	3100.00 [kg/h]	
$\dot{m}_{evap}$	7750.00 [kg/h]	
$COP_{nom}$ (A0W35)	4.22	
$Q_{cond,nom}$ (A0W35)	16.55 [kW]	
$Q_{evap,nom}$ (A0W35)	12.63 [kW]	
$W_{comp,nom}$ (A0W35)	3.92 [kW]	
$RMS_{COP}$	1.10e - 01	
$RMS_{Q_{cond}}$	5.61e - 01	
$RMS_{W_{comp}}$	7.64e - 02	
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	20.00	6.89	6.93	0.6	26.80	26.53	1.0	3.89	3.83	1.62
35.00	10.00	5.47	5.49	0.3	21.45	21.84	1.8	3.92	3.98	1.51
35.00	7.00	5.09	5.21	2.2	19.94	20.78	4.0	3.92	3.99	1.82
35.00	2.00	4.41	4.19	5.2	17.45	16.56	5.4	3.96	3.95	0.16
35.00	-7.00	3.43	3.33	3.0	13.41	12.89	4.1	3.91	3.87	0.98
35.00	-15.00	2.70	2.83	4.4	10.19	10.60	3.8	3.77	3.75	0.57
45.00	7.00	3.86	4.00	3.6	18.40	19.01	3.2	4.77	4.75	0.38
45.00	2.00	3.32	3.22	3.0	15.93	15.14	5.2	4.80	4.70	2.13
45.00	-7.00	2.55	2.51	1.5	11.93	11.54	3.4	4.68	4.59	1.87
45.00	-15.00	2.01	2.07	2.9	8.75	9.28	5.7	4.36	4.49	2.90
50.00	20.00	4.66	4.50	3.7	24.24	23.78	1.9	5.20	5.29	1.75
50.00	15.00	4.14	4.23	2.2	21.59	22.35	3.4	5.22	5.28	1.22
50.00	7.00	3.32	3.44	3.4	17.48	18.07	3.2	5.26	5.25	0.18
50.00	2.00	2.85	2.78	2.6	15.02	14.43	4.1	5.27	5.19	1.50
50.00	-7.00	2.19	2.14	2.3	11.04	10.85	1.7	5.04	5.07	0.55
55.00	20.00	4.03	3.98	1.2	23.20	22.77	1.9	5.76	5.72	0.63
55.00	7.00	2.84	3.00	5.5	16.46	17.06	3.5	5.80	5.68	2.07
55.00	-7.00	1.87	1.79	4.6	10.02	9.84	1.9	5.35	5.50	2.64
Sum				52.3			59.3			24.48
$RMS_{COP}$	1.10e - 01									
$RMS_{Q_{cond}}$	5.61e - 01									
$RMS_{W_{comp}}$	7.64e - 02									

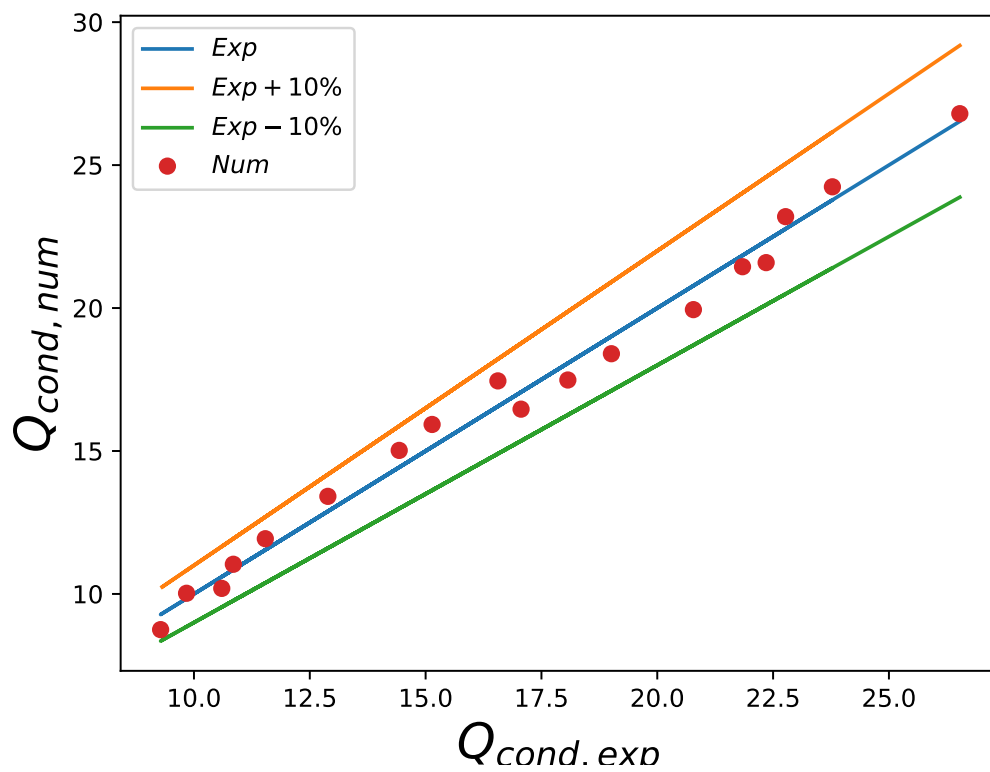


Figure 1:  $Q_{cond}$  differences between experiments and fitted data

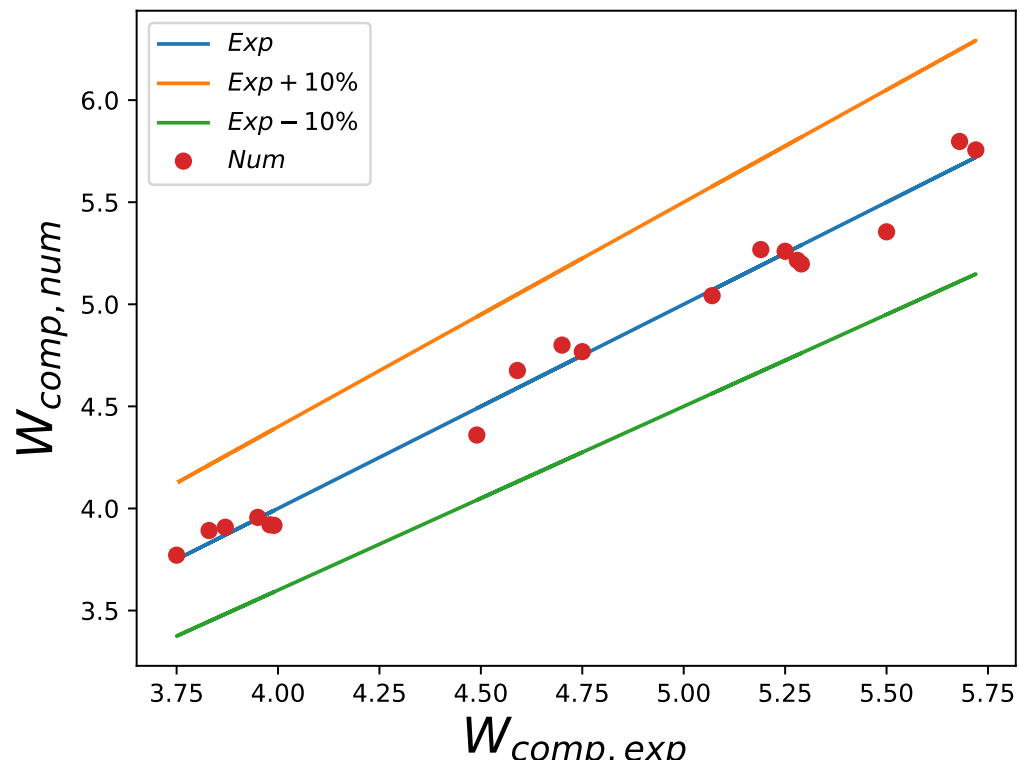


Figure 2:  $W_{comp}$  differences between experiments and fitted data

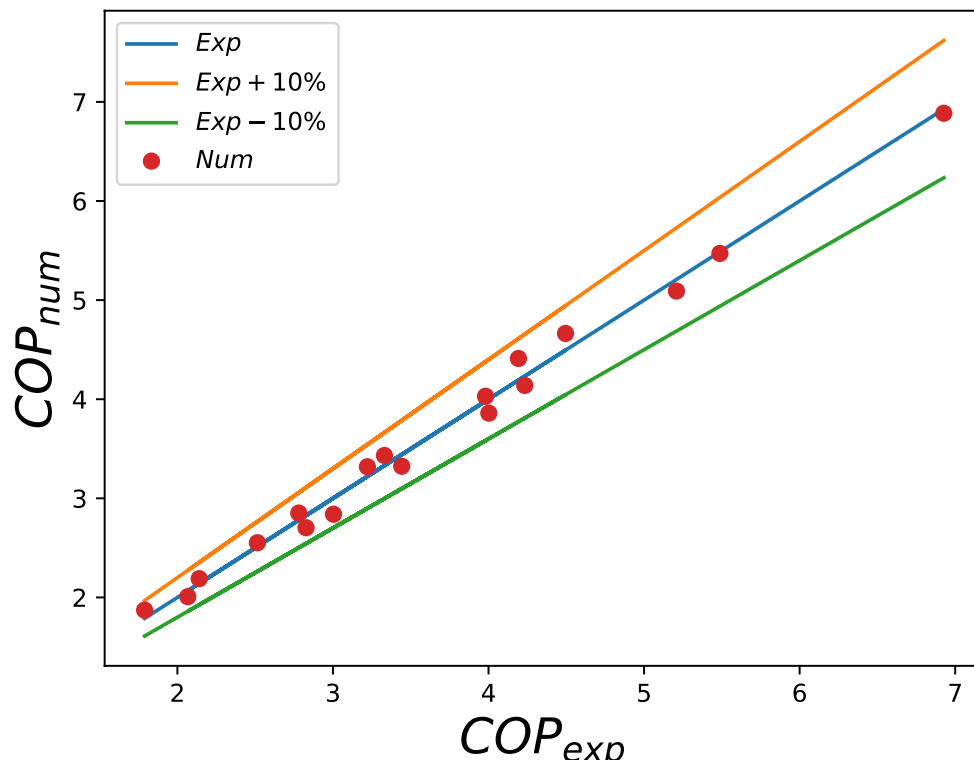


Figure 3:  $COP$  differences between experiments and fitted data