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# Type977 fitting for heat pump HP10L-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	1.3928e+01
$P_{Q_2}$	2 <sup>st</sup> condenser polynomial coefficient	7.0109e+01
$P_{Q_3}$	3 <sup>st</sup> condenser polynomial coefficient	-2.8286e+01
$P_{Q_4}$	4 <sup>st</sup> condenser polynomial coefficient	7.9397e+01
$P_{Q_5}$	5 <sup>st</sup> condenser polynomial coefficient	1.4315e+02
$P_{Q_6}$	6 <sup>st</sup> condenser polynomial coefficient	7.0718e+00
$P_{COP_1}$	1 <sup>st</sup> COP polynomial coefficient	9.5084e+00
$P_{COP_2}$	2 <sup>st</sup> COP polynomial coefficient	5.7050e+01
$P_{COP_3}$	3 <sup>st</sup> COP polynomial coefficient	-5.0748e+01
$P_{COP_4}$	4 <sup>st</sup> COP polynomial coefficient	-1.9264e+02
$P_{COP_5}$	5 <sup>st</sup> COP polynomial coefficient	8.9936e+01
$P_{COP_6}$	6 <sup>st</sup> COP polynomial coefficient	7.3762e+01
$\dot{m}_{cond}$	2100.00 [kg/h]	
$\dot{m}_{evap}$	5250.00 [kg/h]	
$COP_{nom}$ (A0W35)	4.21	
$Q_{cond,nom}$ (A0W35)	9.95 [kW]	
$Q_{evap,nom}$ (A0W35)	7.58 [kW]	
$W_{comp,nom}$ (A0W35)	2.36 [kW]	
$RMS_{COP}$	$9.03e - 02$	
$RMS_{Q_{cond}}$	$2.68e - 01$	
$RMS_{W_{comp}}$	$6.26e - 02$	
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	6.95	6.98	0.4	15.91	15.63	1.8	2.29	2.24	2.23
35.00	10.00	5.49	5.53	0.7	12.82	13.15	2.5	2.34	2.38	1.79
35.00	7.00	5.09	5.20	2.0	11.95	12.47	4.1	2.35	2.40	2.14
35.00	2.00	4.41	4.17	5.8	10.52	10.00	5.2	2.39	2.40	0.59
35.00	-7.00	3.43	3.40	1.0	8.19	7.99	2.5	2.38	2.35	1.47
35.00	-15.00	2.72	2.83	3.8	6.33	6.45	1.9	2.33	2.28	2.03
45.00	7.00	3.87	3.89	0.4	11.13	11.43	2.6	2.87	2.94	2.23
45.00	2.00	3.34	3.25	2.6	9.66	9.30	3.8	2.89	2.86	1.17
45.00	-7.00	2.58	2.56	0.5	7.23	7.13	1.3	2.80	2.78	0.84
45.00	-15.00	2.05	2.05	0.3	5.26	5.47	3.8	2.56	2.67	4.04
50.00	20.00	4.75	4.66	2.0	14.91	14.81	0.7	3.14	3.18	1.35
50.00	15.00	4.18	4.30	2.9	13.26	13.60	2.5	3.17	3.16	0.38
50.00	7.00	3.33	3.44	3.0	10.74	10.83	0.9	3.22	3.15	2.25
50.00	2.00	2.87	2.88	0.2	9.24	8.95	3.3	3.22	3.11	3.48
50.00	-7.00	2.22	2.21	0.2	6.75	6.68	1.1	3.05	3.02	0.87
55.00	20.00	4.11	4.03	2.1	14.60	14.46	1.0	3.55	3.59	1.10
55.00	7.00	2.85	2.94	3.1	10.36	10.48	1.1	3.63	3.56	2.07
55.00	-7.00	1.91	1.85	3.3	6.30	6.33	0.6	3.30	3.43	3.69
Sum				34.5			40.5			33.71
$RMS_{COP}$	9.03e - 02									
$RMS_{Q_{cond}}$	2.68e - 01									
$RMS_{W_{comp}}$	6.26e - 02									

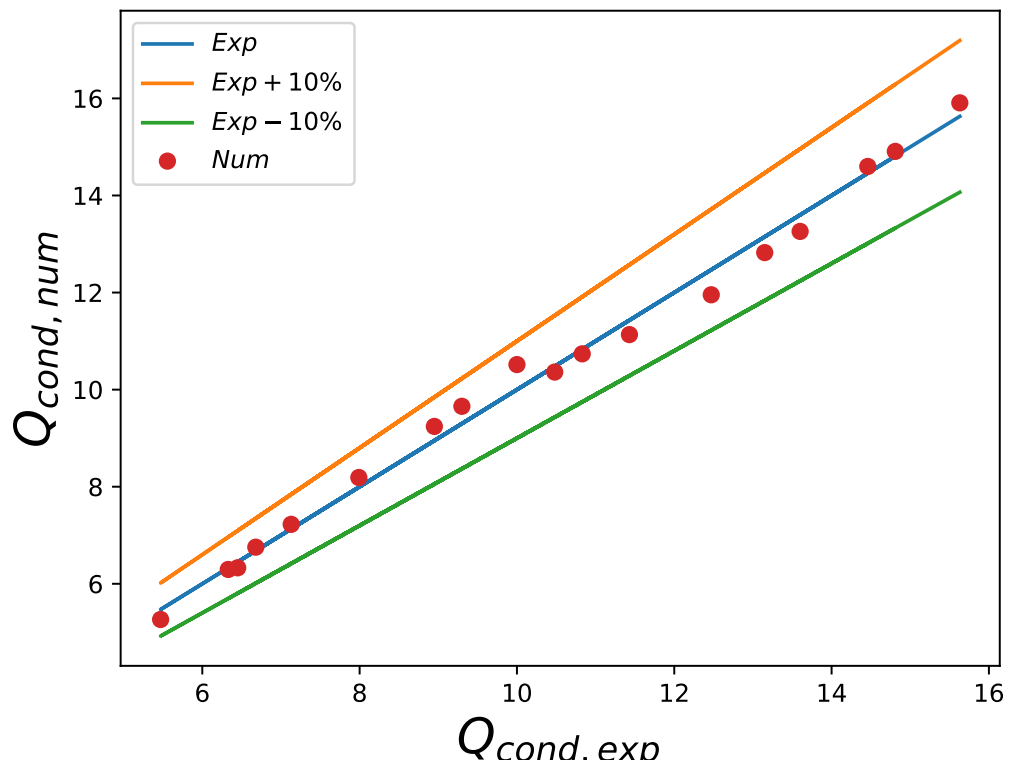


Figure 1:  $Q_{cond}$  differences between experiments and fitted data

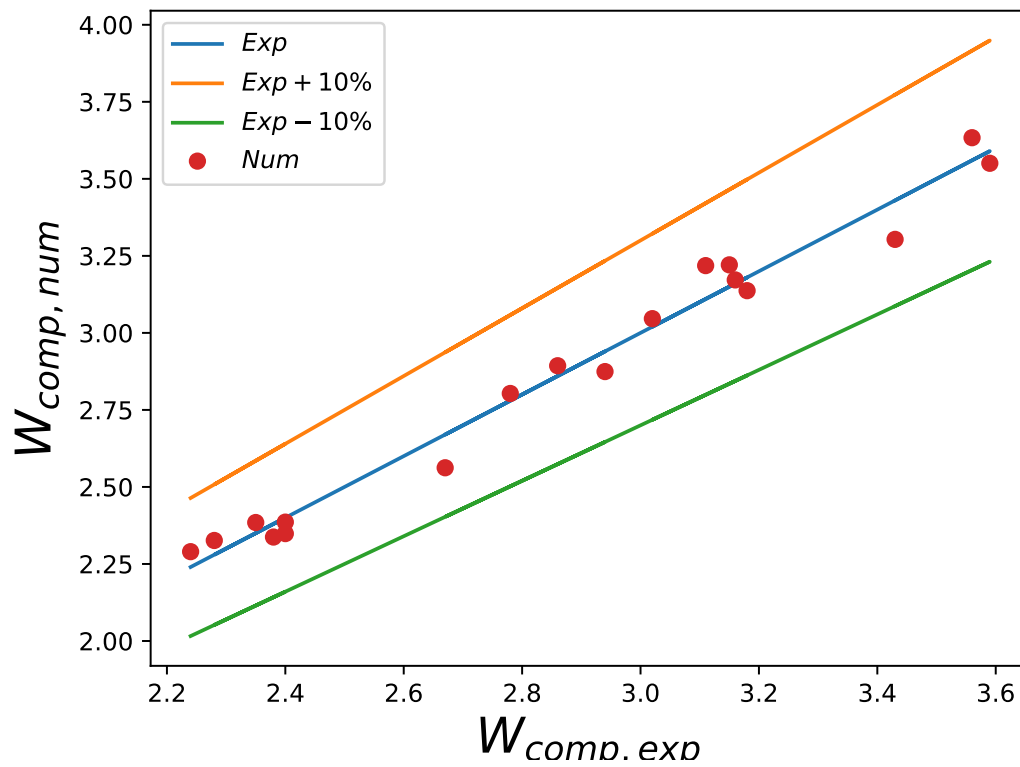


Figure 2:  $W_{comp}$  differences between experiments and fitted data

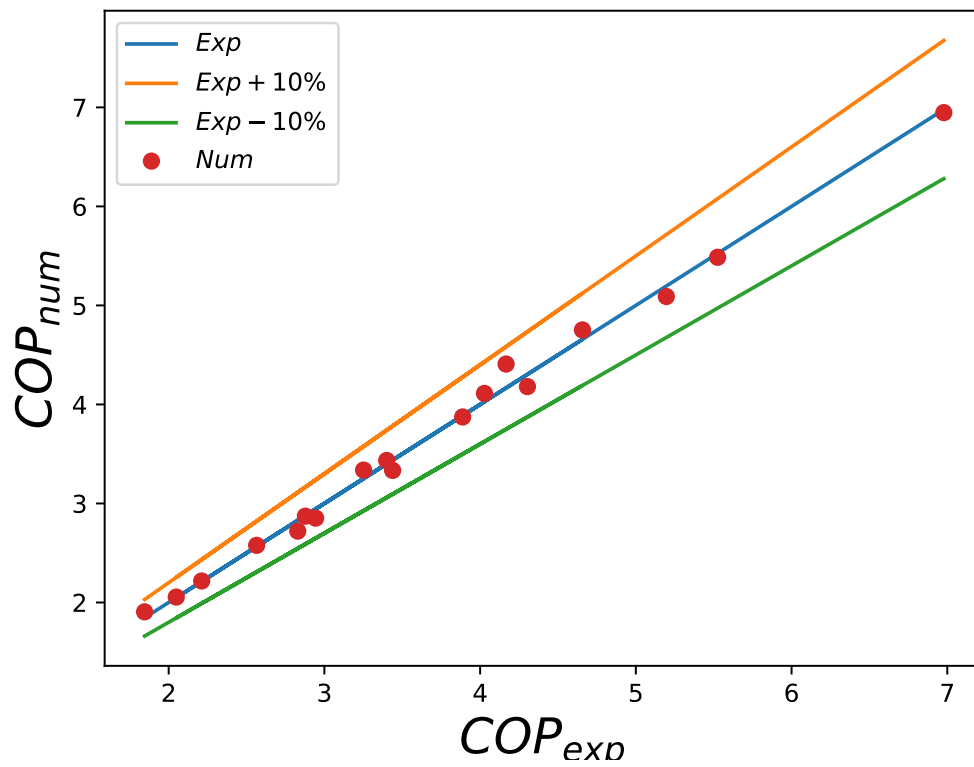


Figure 3:  $COP$  differences between experiments and fitted data