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# Type977 fitting for heat pump SIN-75TU

## 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	7.0114e+01
$P_{Q_2}$	2 <sup>st</sup> condenser polynomial coefficient	7.6974e+02
$P_{Q_3}$	3 <sup>st</sup> condenser polynomial coefficient	1.9787e+02
$P_{Q_4}$	4 <sup>st</sup> condenser polynomial coefficient	-1.2662e+03
$P_{Q_5}$	5 <sup>st</sup> condenser polynomial coefficient	1.0354e+03
$P_{Q_6}$	6 <sup>st</sup> condenser polynomial coefficient	-1.0177e+03
$P_{COP_1}$	1 <sup>st</sup> COP polynomial coefficient	6.3036e+00
$P_{COP_2}$	2 <sup>st</sup> COP polynomial coefficient	4.6365e+01
$P_{COP_3}$	3 <sup>st</sup> COP polynomial coefficient	-3.4720e-01
$P_{COP_4}$	4 <sup>st</sup> COP polynomial coefficient	-1.3030e+02
$P_{COP_5}$	5 <sup>st</sup> COP polynomial coefficient	1.5616e+01
$P_{COP_6}$	6 <sup>st</sup> COP polynomial coefficient	-8.7543e+01
$\dot{m}_{cond}$	12700.00 [kg/h]	
$\dot{m}_{evap}$	12700.00 [kg/h]	
$COP_{nom}$ (A0W35)	4.74	
$Q_{cond,nom}$ (A0W35)	73.67 [kW]	
$Q_{evap,nom}$ (A0W35)	58.13 [kW]	
$W_{comp,nom}$ (A0W35)	15.54 [kW]	
$RMS_{COP}$	$4.93e - 02$	
$RMS_{Q_{cond}}$	$4.14e - 01$	
$RMS_{W_{comp}}$	$2.03e - 01$	
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	4.24	4.30	1.3	64.41	65.10	1.1	15.18	15.14	0.26
35.00	0.00	4.77	4.70	1.6	74.36	73.50	1.2	15.58	15.64	0.41
35.00	5.00	5.33	5.31	0.3	84.93	84.90	0.0	15.93	15.98	0.28
50.00	-5.00	3.00	2.94	2.0	61.03	61.03	0.0	20.38	20.78	1.95
50.00	0.00	3.42	3.35	1.9	70.00	69.37	0.9	20.48	20.69	1.00
50.00	5.00	3.86	3.81	1.3	79.63	79.67	0.1	20.61	20.88	1.33
45.00	-5.00	3.47	3.51	1.1	62.80	63.07	0.4	18.09	17.96	0.73
45.00	0.00	3.93	3.93	0.1	72.09	71.43	0.9	18.34	18.16	0.99
45.00	5.00	4.41	4.46	1.1	82.04	82.28	0.3	18.58	18.43	0.82
55.00	0.00	2.85	2.90	1.7	67.31	67.30	0.0	23.62	23.21	1.76
55.00	5.00	3.26	3.30	1.4	76.60	77.05	0.6	23.52	23.34	0.79
35.00	10.00	5.90	5.90	0.1	96.09	96.30	0.2	16.30	16.32	0.14
35.00	15.00	6.47	6.46	0.1	107.83	107.70	0.1	16.66	16.66	0.01
50.00	10.00	4.32	4.27	1.2	89.85	89.97	0.1	20.79	21.08	1.36
50.00	15.00	4.79	4.71	1.6	100.66	100.27	0.4	21.02	21.28	1.19
45.00	10.00	4.91	4.98	1.4	92.59	93.13	0.6	18.86	18.70	0.83
45.00	15.00	5.42	5.48	1.2	103.72	103.98	0.3	19.15	18.97	0.96
55.00	10.00	3.67	3.70	0.7	86.50	86.80	0.3	23.54	23.46	0.34
55.00	15.00	4.10	4.09	0.2	96.98	96.55	0.4	23.64	23.59	0.25
Sum				20.4			8.0			15.40
$RMS_{COP}$	4.93e - 02									
$RMS_{Q_{cond}}$	4.14e - 01									
$RMS_{W_{comp}}$	2.03e - 01									

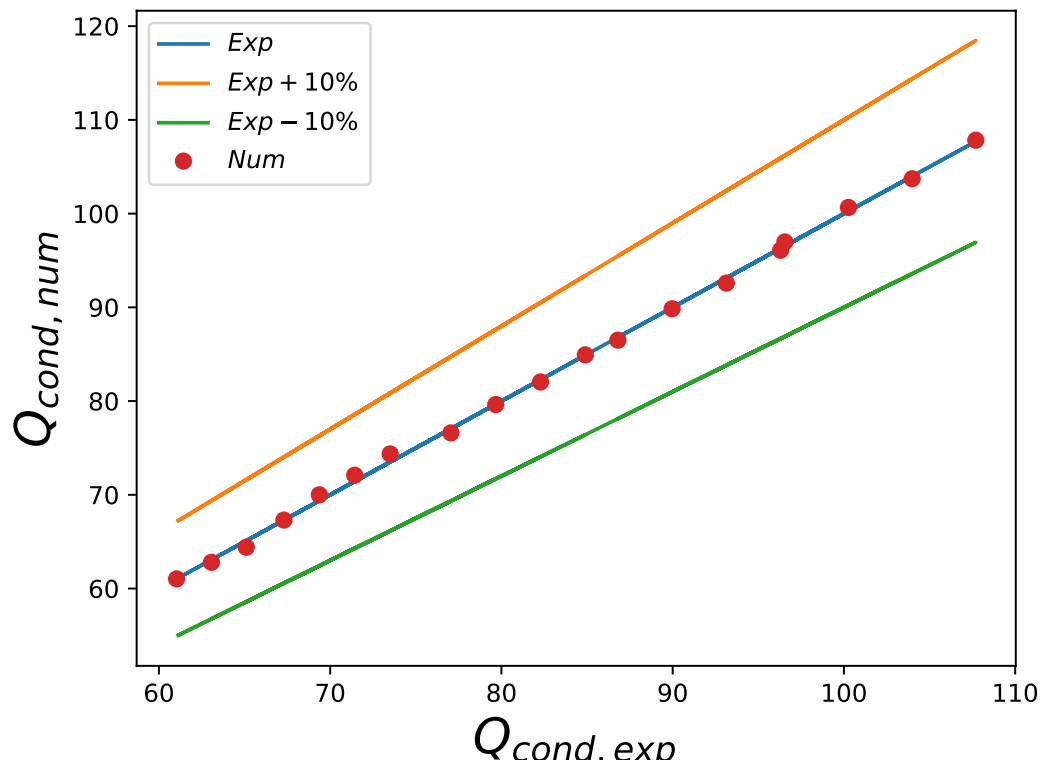


Figure 1:  $Q_{cond}$  differences between experiments and fitted data

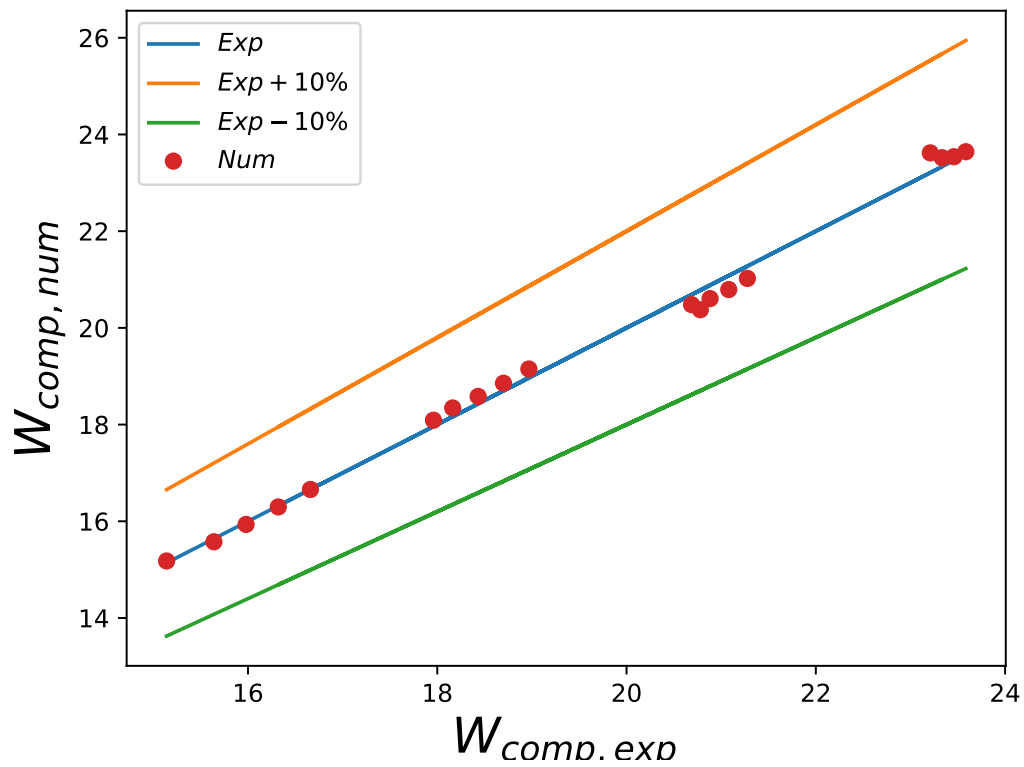


Figure 2:  $W_{comp}$  differences between experiments and fitted data

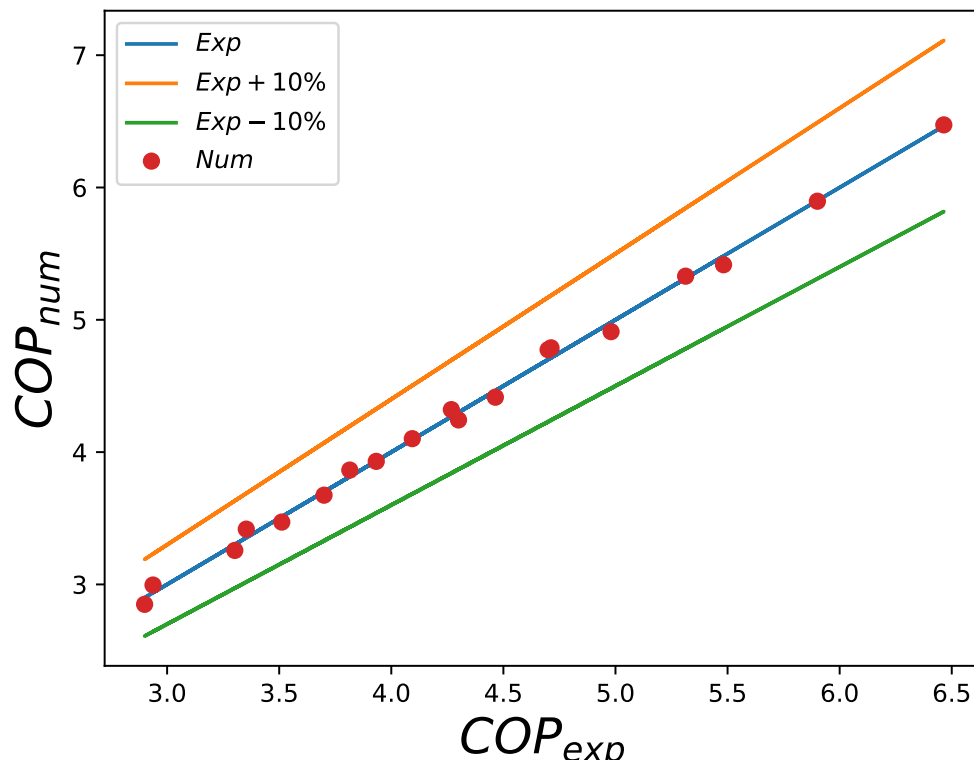


Figure 3:  $COP$  differences between experiments and fitted data