Python calculation for heat pump SIN-100TE

Parametric Heat Pump calculation

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Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	$[kW]$
PQ_1	1^{st} *condenser polynomial coefficient*	8.8992e+01
PQ_2	2^{st} *condenser polynomial coefficient*	6.8460e+02
PQ_3	3^{st} *condenser polynomial coefficient*	1.8677e+02
PQ_4	4^{st} *condenser polynomial coefficient*	-3.6498e+02
PQ_5	5^{st} *condenser polynomial coefficient*	5.8326e+01
PQ_6	6^{st} *condenser polynomial coefficient*	-9.8419e+02
$PCOP_1$	1^{st} *COP polynomial coefficient*	5.4931e+00
$PCOP_2$	2^{st} *COP polynomial coefficient*	2.4336e+01
$PCOP_3$	3^{st} *COP polynomial coefficient*	2.6236e+00
$PCOP_4$	4^{st} *COP polynomial coefficient*	-1.0492e+01
$PCOP_5$	5^{st} *COP polynomial coefficient*	-7.4207e+00
$PCOP_6$	6^{st} *COP polynomial coefficient*	-8.8722e+01
$\dot{m}_{cond}$	16300.00 $[kg/h]$	
$\dot{m}_{evap}$	16300.00 $[kg/h]$	
COP_{nom} (B0W35)	4.37	
$Q_{c,nom}$ (B0W35)	92.43 kW	
COP_{nom} (B2W35)	4.54	
$Q_{c,nom}$ (B2W35)	96.86 kW	
COP_{nom} (B10W35)	5.20	
$Q_{c,nom}$ (B10W35)	114.61 kW	

Table 2: Predicting results of the heat pump.

$T_{evap,in}$ ^oC	$T_{evap,out}$ ^oC	$T_{cond,in}$ ^oC	$T_{cond,out}$ ^oC	COP $[-]$	Q_{cond} $[kW]$	Q_{evap} $[kW]$	W_{comp} $[kW]$	$\dot{m}_{cond}$ kg/h	$\dot{m}_{evap}$ kg/h	ΔT_{evap} K	ΔT_{cond} K
-7.00	-10.38	25.93	30.00	4.08	77.27	58.35	18.92	16300	16300	3.4	4.1
-7.00	-10.16	34.72	38.75	3.51	76.40	54.66	21.74	16300	16300	3.2	4.0
-7.00	-9.72	43.61	47.50	2.76	73.73	47.06	26.67	16300	16300	2.7	3.9
-7.00	-8.84	52.59	56.25	1.84	69.45	31.77	37.68	16300	16300	1.8	3.7
-7.00	-6.11	61.57	65.00	0.81	65.07	-15.40	80.47	16300	16300	-0.9	3.4
-4.00	-7.74	25.58	30.00	4.34	83.92	64.58	19.34	16300	16300	3.7	4.4
-4.00	-7.53	34.38	38.75	3.77	82.97	60.95	22.02	16300	16300	3.5	4.4
-4.00	-7.10	43.27	47.50	3.02	80.20	53.62	26.58	16300	16300	3.1	4.2
-4.00	-6.29	52.26	56.25	2.09	75.75	39.55	36.20	16300	16300	2.3	4.0
-4.00	-4.13	61.28	65.00	1.03	70.66	2.17	68.49	16300	16300	0.1	3.7
-1.00	-5.10	25.22	30.00	4.59	90.59	70.86	19.73	16300	16300	4.1	4.8
-1.00	-4.89	34.03	38.75	4.02	89.55	67.27	22.28	16300	16300	3.9	4.7
-1.00	-4.48	42.93	47.50	3.27	86.68	60.16	26.52	16300	16300	3.5	4.6
-1.00	-3.72	51.92	56.25	2.34	82.10	47.03	35.07	16300	16300	2.7	4.3
-1.00	-1.92	60.97	65.00	1.26	76.52	15.96	60.56	16300	16300	0.9	4.0
2.00	-2.47	24.87	30.00	4.84	97.27	77.18	20.09	16300	16300	4.5	5.1
2.00	-2.26	33.68	38.75	4.27	96.15	73.63	22.52	16300	16300	4.3	5.1
2.00	-1.86	42.59	47.50	3.52	93.19	66.70	26.48	16300	16300	3.9	4.9
2.00	-1.14	51.59	56.25	2.59	88.47	54.30	34.17	16300	16300	3.1	4.7
2.00	0.41	60.65	65.00	1.50	82.53	27.50	55.04	16300	16300	1.6	4.4
5.00	0.16	24.52	30.00	5.09	103.96	83.54	20.42	16300	16300	4.8	5.5
5.00	0.37	33.33	38.75	4.52	102.76	80.02	22.74	16300	16300	4.6	5.4
5.00	0.76	42.24	47.50	3.77	99.71	73.24	26.47	16300	16300	4.2	5.3
5.00	1.45	51.25	56.25	2.84	94.87	61.42	33.46	16300	16300	3.6	5.0
5.00	2.82	60.33	65.00	1.74	88.66	37.65	51.01	16300	16300	2.2	4.7
8.00	2.79	24.17	30.00	5.34	110.67	89.94	20.73	16300	16300	5.2	5.8
8.00	3.00	32.98	38.75	4.77	109.39	86.44	22.95	16300	16300	5.0	5.8
8.00	3.38	41.90	47.50	4.01	106.24	79.78	26.46	16300	16300	4.6	5.6
8.00	4.04	50.91	56.25	3.08	101.30	68.42	32.87	16300	16300	4.0	5.3
8.00	5.29	60.00	65.00	1.98	94.85	46.89	47.97	16300	16300	2.7	5.0
11.00	5.42	23.81	30.00	5.58	117.39	96.37	21.02	16300	16300	5.6	6.2
11.00	5.62	32.63	38.75	5.01	116.03	92.88	23.15	16300	16300	5.4	6.1
11.00	6.00	41.55	47.50	4.26	112.80	86.32	26.48	16300	16300	5.0	5.9
11.00	6.64	50.57	56.25	3.33	107.74	75.35	32.40	16300	16300	4.4	5.7
11.00	7.79	59.67	65.00	2.22	101.11	55.50	45.60	16300	16300	3.2	5.3
14.00	8.05	23.46	30.00	5.83	124.13	102.83	21.29	16300	16300	6.0	6.5
14.00	8.25	32.28	38.75	5.26	122.68	99.35	23.33	16300	16300	5.8	6.5
14.00	8.63	41.21	47.50	4.50	119.37	92.87	26.50	16300	16300	5.4	6.3
14.00	9.24	50.23	56.25	3.57	114.21	82.21	32.00	16300	16300	4.8	6.0
14.00	10.31	59.34	65.00	2.46	107.41	63.68	43.72	16300	16300	3.7	5.7
17.00	10.67	23.10	30.00	6.07	130.88	109.32	21.55	16300	16300	6.3	6.9
17.00	10.87	31.93	38.75	5.50	129.36	105.84	23.52	16300	16300	6.1	6.8
17.00	11.25	40.86	47.50	4.75	125.95	99.42	26.53	16300	16300	5.8	6.6
17.00	11.85	49.89	56.25	3.81	120.70	89.02	31.67	16300	16300	5.2	6.4
17.00	12.86	59.00	65.00	2.70	113.74	71.54	42.20	16300	16300	4.1	6.0
20.00	13.30	22.74	30.00	6.31	137.64	115.84	21.80	16300	16300	6.7	7.3
20.00	13.50	31.58	38.75	5.74	136.04	112.35	23.69	16300	16300	6.5	7.2
20.00	13.87	40.51	47.50	4.99	132.56	105.98	26.57	16300	16300	6.1	7.0
20.00	14.46	49.54	56.25	4.05	127.20	95.80	31.40	16300	16300	5.5	6.7
20.00	15.42	58.67	65.00	2.93	120.11	79.16	40.95	16300	16300	4.6	6.3

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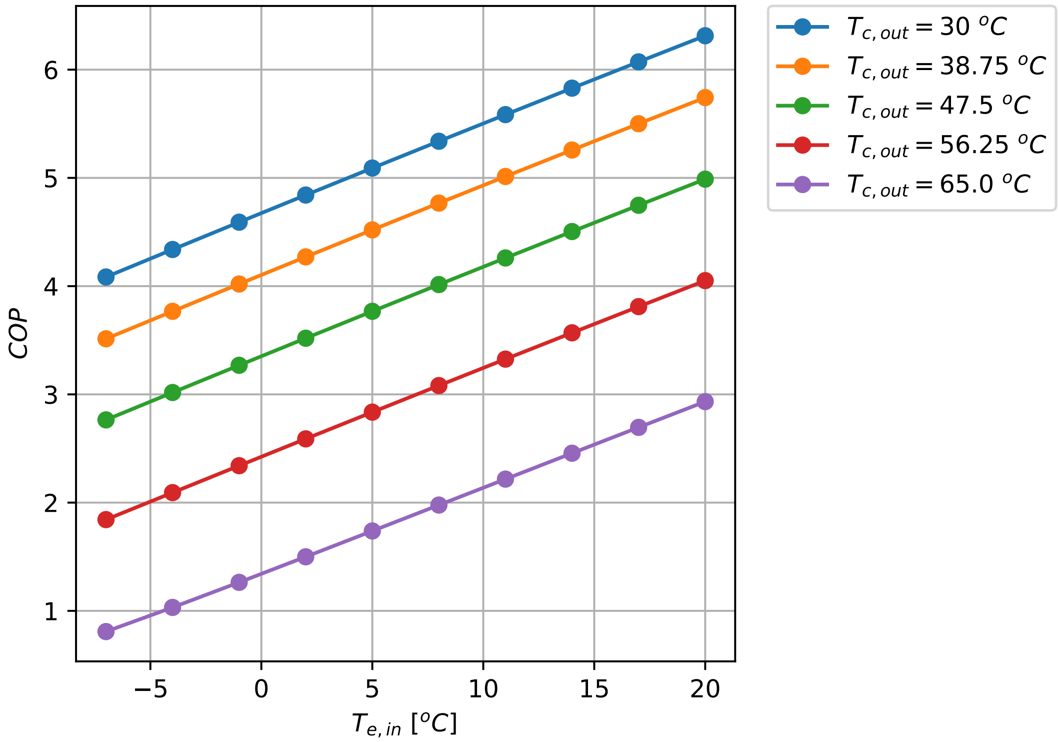

Figure 1: COP Results for the heat pump at the selected points

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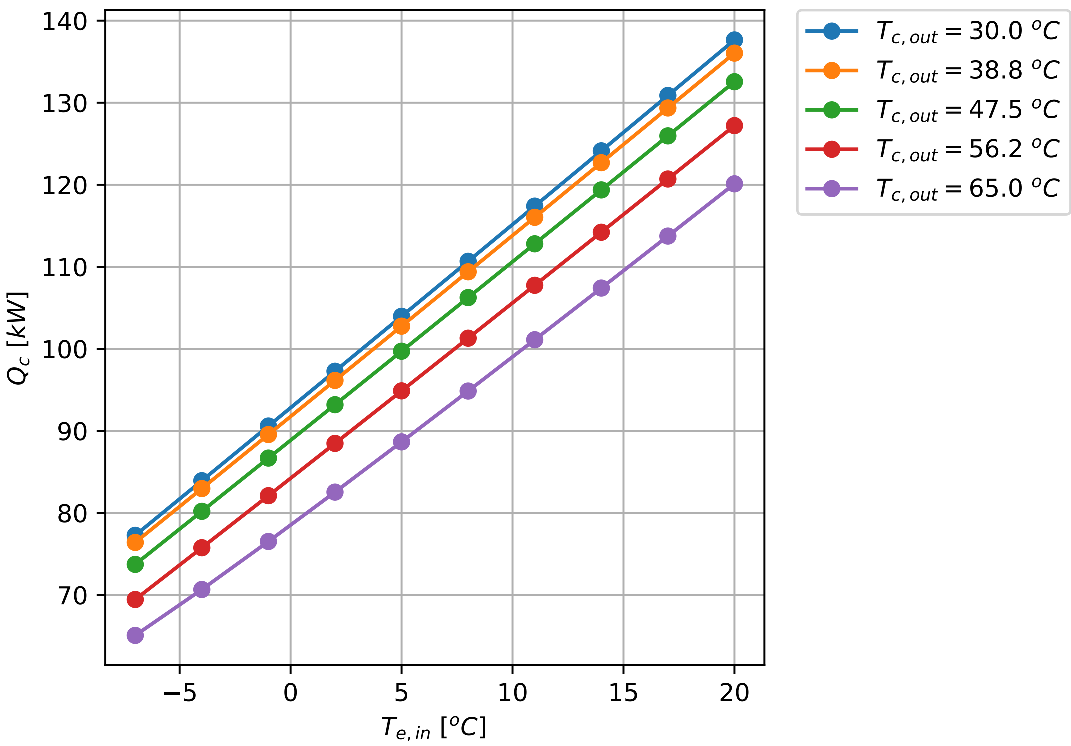

Figure 2: Q_c Results for the heat pump at the selected points