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# Python calculation for heat pump SIN-22TU

## Parametric Heat Pump calculation

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Table 1: Fitted coefficients for the heat pump.

Coefficient	Description	[kW]
$PQ_1$	1 <sup>st</sup> condenser polynomial coefficient	2.2267e+01
$PQ_2$	2 <sup>st</sup> condenser polynomial coefficient	2.0015e+02
$PQ_3$	3 <sup>st</sup> condenser polynomial coefficient	4.1062e+01
$PQ_4$	4 <sup>st</sup> condenser polynomial coefficient	-2.4655e+02
$PQ_5$	5 <sup>st</sup> condenser polynomial coefficient	-2.0174e+02
$PQ_6$	6 <sup>st</sup> condenser polynomial coefficient	-2.1232e+02
$PCOP_1$	1 <sup>st</sup> COP polynomial coefficient	5.6654e+00
$PCOP_2$	2 <sup>st</sup> COP polynomial coefficient	3.5744e+01
$PCOP_3$	3 <sup>st</sup> COP polynomial coefficient	3.3127e+00
$PCOP_4$	4 <sup>st</sup> COP polynomial coefficient	-7.4772e+01
$PCOP_5$	5 <sup>st</sup> COP polynomial coefficient	-1.5825e+02
$PCOP_6$	6 <sup>st</sup> COP polynomial coefficient	-8.9463e+01
$\dot{m}_{cond}$	4000.00 [kg/h]	
$\dot{m}_{evap}$	4000.00 [kg/h]	
$COP_{nom}$ (B0W35)	4.57	
$Q_{c,nom}$ (B0W35)	22.82 kW	
$COP_{nom}$ (B2W35)	4.77	
$Q_{c,nom}$ (B2W35)	24.00 kW	
$COP_{nom}$ (B10W35)	5.44	
$Q_{c,nom}$ (B10W35)	28.57 kW	

Table 2: Predicting results of the heat pump.

$T_{evap,in}$ °C	$T_{evap,out}$ °C	$T_{cond,in}$ °C	$T_{cond,out}$ °C	$COP$ [-]	$Q_{cond}$ [kW]	$Q_{evap}$ [kW]	$W_{comp}$ [kW]	$\dot{m}_{cond}$ kg/h	$\dot{m}_{evap}$ kg/h	$\Delta T_{evap}$ K	$\Delta T_{cond}$ K
-7.00	-10.28	26.02	30.00	4.02	18.51	13.90	4.61	4000	4000	3.3	4.0
-7.00	-10.13	34.77	38.75	3.53	18.51	13.27	5.24	4000	4000	3.1	4.0
-7.00	-9.78	43.61	47.50	2.87	18.13	11.80	6.33	4000	4000	2.8	3.9
-7.00	-9.08	52.51	56.25	2.03	17.40	8.82	8.58	4000	4000	2.1	3.7
-7.00	-7.20	61.45	65.00	1.05	16.54	0.84	15.71	4000	4000	0.2	3.6
-4.00	-7.72	25.62	30.00	4.40	20.40	15.76	4.64	4000	4000	3.7	4.4
-4.00	-7.56	34.38	38.75	3.89	20.33	15.10	5.23	4000	4000	3.6	4.4
-4.00	-7.22	43.23	47.50	3.20	19.87	13.67	6.21	4000	4000	3.2	4.3
-4.00	-6.57	52.16	56.25	2.34	19.05	10.90	8.16	4000	4000	2.6	4.1
-4.00	-5.01	61.13	65.00	1.31	18.01	4.30	13.71	4000	4000	1.0	3.9
-1.00	-5.14	25.22	30.00	4.75	22.25	17.57	4.69	4000	4000	4.1	4.8
-1.00	-4.98	34.00	38.75	4.22	22.11	16.87	5.24	4000	4000	4.0	4.8
-1.00	-4.64	42.86	47.50	3.51	21.58	15.43	6.15	4000	4000	3.6	4.6
-1.00	-4.01	51.81	56.25	2.61	20.68	12.77	7.91	4000	4000	3.0	4.4
-1.00	-2.64	60.81	65.00	1.55	19.50	6.94	12.56	4000	4000	1.6	4.2
2.00	-2.56	24.83	30.00	5.07	24.07	19.32	4.75	4000	4000	4.6	5.2
2.00	-2.38	33.62	38.75	4.52	23.86	18.58	5.28	4000	4000	4.4	5.1
2.00	-2.03	42.50	47.50	3.78	23.26	17.11	6.15	4000	4000	4.0	5.0
2.00	-1.42	51.47	56.25	2.86	22.27	14.49	7.78	4000	4000	3.4	4.8
2.00	-0.15	60.49	65.00	1.77	20.98	9.10	11.88	4000	4000	2.1	4.5
5.00	0.04	24.45	30.00	5.35	25.85	21.02	4.83	4000	4000	5.0	5.6
5.00	0.23	33.26	38.75	4.78	25.58	20.23	5.35	4000	4000	4.8	5.5
5.00	0.59	42.15	47.50	4.02	24.90	18.71	6.19	4000	4000	4.4	5.3
5.00	1.21	51.13	56.25	3.08	23.83	16.09	7.74	4000	4000	3.8	5.1
5.00	2.42	60.18	65.00	1.95	22.44	10.94	11.50	4000	4000	2.6	4.8
8.00	2.65	24.07	30.00	5.61	27.60	22.68	4.92	4000	4000	5.3	5.9
8.00	2.85	32.90	38.75	5.01	27.25	21.82	5.44	4000	4000	5.1	5.9
8.00	3.23	41.81	47.50	4.23	26.50	20.24	6.26	4000	4000	4.8	5.7
8.00	3.85	50.80	56.25	3.26	25.36	17.59	7.77	4000	4000	4.1	5.4
8.00	5.05	59.87	65.00	2.10	23.88	12.53	11.35	4000	4000	3.0	5.1
11.00	5.27	23.70	30.00	5.83	29.31	24.29	5.03	4000	4000	5.7	6.3
11.00	5.49	32.54	38.75	5.21	28.90	23.35	5.54	4000	4000	5.5	6.2
11.00	5.88	41.47	47.50	4.41	28.07	21.71	6.37	4000	4000	5.1	6.0
11.00	6.52	50.48	56.25	3.41	26.85	18.98	7.87	4000	4000	4.5	5.8
11.00	7.72	59.57	65.00	2.22	25.28	13.92	11.37	4000	4000	3.3	5.4
14.00	7.91	23.34	30.00	6.02	30.99	25.84	5.15	4000	4000	6.1	6.7
14.00	8.14	32.20	38.75	5.38	30.50	24.83	5.67	4000	4000	5.9	6.6
14.00	8.55	41.14	47.50	4.55	29.61	23.10	6.50	4000	4000	5.4	6.4
14.00	9.21	50.17	56.25	3.53	28.31	20.29	8.02	4000	4000	4.8	6.1
14.00	10.43	59.27	65.00	2.31	26.66	15.12	11.54	4000	4000	3.6	5.7
17.00	10.55	22.99	30.00	6.18	32.63	27.35	5.28	4000	4000	6.4	7.0
17.00	10.81	31.86	38.75	5.52	32.07	26.26	5.81	4000	4000	6.2	6.9
17.00	11.24	40.82	47.50	4.66	31.10	24.43	6.67	4000	4000	5.8	6.7
17.00	11.93	49.86	56.25	3.61	29.73	21.50	8.23	4000	4000	5.1	6.4
17.00	13.19	58.99	65.00	2.36	28.00	16.15	11.85	4000	4000	3.8	6.0
20.00	13.21	22.65	30.00	6.30	34.23	28.80	5.43	4000	4000	6.8	7.4
20.00	13.49	31.53	38.75	5.62	33.60	27.62	5.98	4000	4000	6.5	7.2
20.00	13.94	40.51	47.50	4.74	32.56	25.69	6.87	4000	4000	6.1	7.0
20.00	14.67	49.57	56.25	3.66	31.11	22.62	8.49	4000	4000	5.3	6.7
20.00	15.99	58.70	65.00	2.38	29.31	17.00	12.31	4000	4000	4.0	6.3

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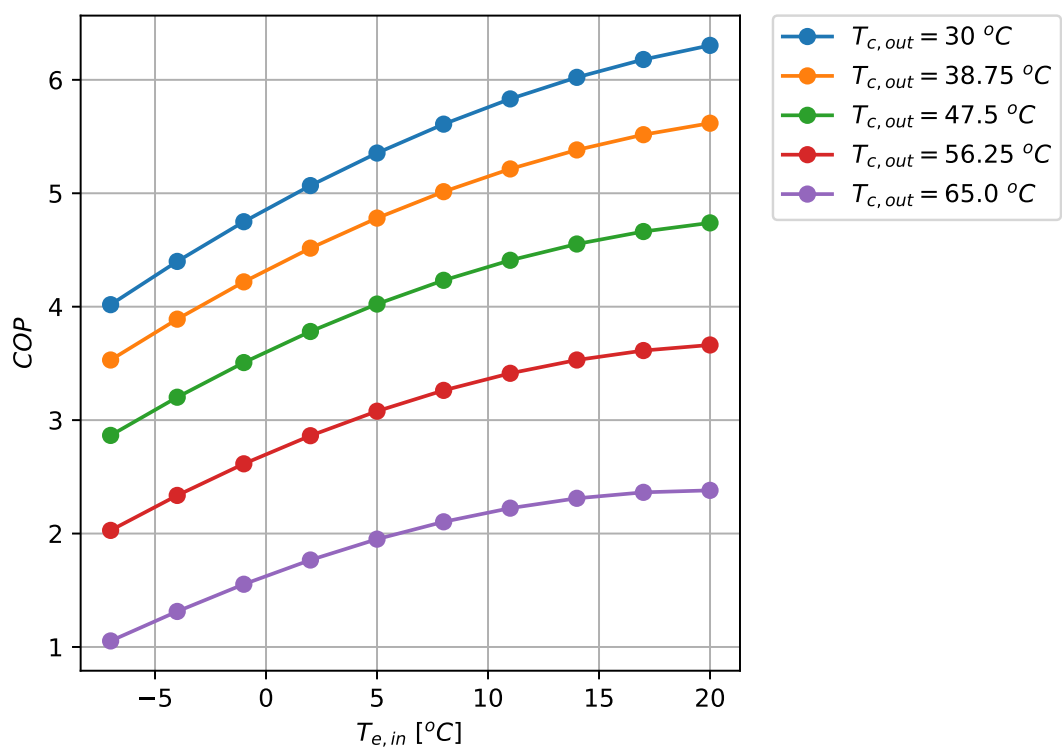


Figure 1: COP Results for the heat pump at the selected points

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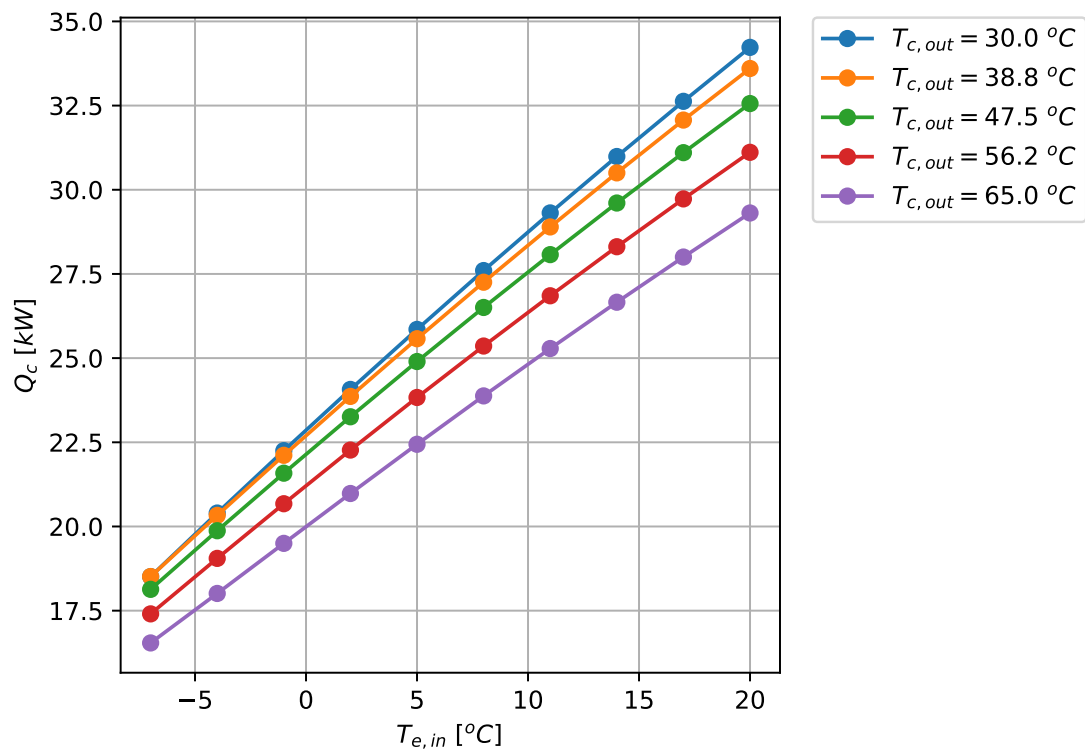


Figure 2:  $Q_c$  Results for the heat pump at the selected points