

COP variation with output temperature

Pump type and source	Typical use	35 °C	45 °C	55 °C	65 °C	75 °C	85 °C
		(e.g. heated screed floor)	(e.g. heated screed floor)	(e.g. heated timber floor)	(e.g. radiator or DHW)	(e.g. radiator and DHW)	(e.g. radiator and DHW)
High-efficiency air source heat pump (ASHP), air at -20 °C		2,2	2,0	-	-	-	-
Two-stage ASHP, air at -20 °C	Low source temperature	2,4	2,2	1,9	-	-	-
High efficiency ASHP, air at 0 °C	Low output temperature	3,8	2,8	2,2	2,0	-	-
Prototype transcritical CO ₂ (R744) heat pump with tripartite gas cooler, source at 0 °C	High output temperature	3,3	-	-	4,2	-	3,0
Ground source heat pump (GSHP), water at 0 °C[5]		5,0	3,7	2,9	2,4	-	-
GSHP, ground at 10 °C	Low output temperature	7,2	5,0	3,7	2,9	2,4	-
Theoretical Carnot Cycle limit, source -20 °C		5,6	4,9	4,4	4,0	3,7	3,4
Theoretical Carnot Cycle limit, source 0 °C		8,8	7,1	6,0	5,2	4,6	4,2
Theoretical Carnot Cycle limit, (CO ₂ pump), return fluid 25 °C, source 0 °C		10,1	8,8	7,9	7,1	6,5	6,1
Theoretical Carnot Cycle limit, source 10 °C		12,3	9,1	7,3	6,1	5,4	4,8