

Subtype TTF\TTC 10.5

Certificate Holder	tecalor GmbH
Address	Lütztringer Weg 3
ZIP	37603
City	Holzminden
Country	DE
Certification Body	RISE CERT
Subtype title	TTF\TTC 10.5
Registration number	012-C700170
Heat Pump Type	Brine/Water and Water/Water
Refrigerant	R452B
Mass of Refrigerant	0.9 kg
Certification Date	22.02.2023
Testing basis	EN 14511:2018, EN 14825:2018, EN 12102:2017.
Testing laboratory	RISE Research Institutes of Sweden

**Model TTC 10.5**

Model name	TTC 10.5
Application	Heating (medium temp)
Units	Indoor
Climate zone (for heating)	Colder, Warmer, Warmer Climate, Colder Climate
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

**General data**

Power supply	3x400V 50Hz
Off-peak product	Yes

**Brine/Water****EN 14511-4 | Heating**

Shutting off the heat transfer medium flow passed

Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

**EN 14511-2 | Heating**

	Low temperature	Medium temperature
Heat output	9.81 kW	9.25 kW
EI input	2.06 kW	3.04 kW
COP	4.76	3.05

**EN 12102-1 | Average Climate**

	Low temperature	Medium temperature
Sound power level indoor	41 dB(A)	42 dB(A)

**EN 14825 | Average Climate**

	Low temperature	Medium temperature
$\eta_s$	195 %	145 %
Prated	10.60 kW	11.77 kW
SCOP	5.09	3.84
Tbiv	-8 °C	-5 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	9.81 kW	9.39 kW
COP Tj = -7°C	4.78	3.26
Cdh Tj = -7 °C	0.996	0.997
Pdh Tj = +2°C	10.00 kW	9.63 kW
COP Tj = +2°C	5.08	3.86
Cdh Tj = +2 °C	0.996	0.997
Pdh Tj = +7°C	10.13 kW	9.76 kW
COP Tj = +7°C	5.37	4.24

Cdh Tj = +7 °C	0.996	0.996
Pdh Tj = 12°C	10.15 kW	9.88 kW
COP Tj = 12°C	5.62	4.69
Cdh Tj = +12 °C	0.995	0.996
Pdh Tj = Tbiv	9.79 kW	9.51 kW
COP Tj = Tbiv	4.73	3.44
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	9.74 kW	9.22 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	4.65	3.02
Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	0.996	0.997
WTOL	65 °C	65 °C
Poff	4 W	4 W
PTO	8 W	8 W
PSB	8 W	8 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.86 kW	2.55 kW
Annual energy consumption Qhe	4305 kWh	6337 kWh

**EN 12102-1 | Colder Climate**

	Low temperature	Medium temperature
Sound power level indoor	41 dB(A)	42 dB(A)

**EN 14825 | Colder Climate**

	Low temperature	Medium temperature
$\eta_s$	202 %	150 %
Prated	11.43 kW	11.29 kW
SCOP	5.24	3.94
Tbiv	-17 °C	-16 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	10.06 kW	9.59 kW
COP Tj = -7°C	5.17	3.72
Cdh Tj = -7 °C	0.996	0.997
Pdh Tj = +2°C	10.13 kW	9.73 kW
COP Tj = +2°C	5.40	4.15
Cdh Tj = +2 °C	0.996	0.996
Pdh Tj = +7°C	10.15 kW	9.84 kW
COP Tj = +7°C	5.56	4.54
Cdh Tj = +7 °C	0.995	0.996
Pdh Tj = 12°C	10.15 kW	9.93 kW
COP Tj = 12°C	5.59	4.87
Cdh Tj = +12 °C	0.995	0.996
Pdh Tj = Tbiv	9.93 kW	9.50 kW
COP Tj = Tbiv	4.96	3.44

Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	9.74 kW	9.22 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	4.65	3.02
Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	0.996	0.997
WTOL	65 °C	65 °C
Poff	4 W	4 W
PTO	8 W	8 W
PSB	8 W	8 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	1.69 kW	2.07 kW
Annual energy consumption Qhe	5379 kWh	7064 kWh

**EN 12102-1 | Warmer Climate**

	Low temperature	Medium temperature
Sound power level indoor	41 dB(A)	42 dB(A)

**EN 14825 | Warmer Climate**

	Low temperature	Medium temperature
ηs	198 %	147 %
Prated	11.52 kW	10.99 kW
SCOP	5.15	3.87
Tbiv	4 °C	4 °C
TOL	2 °C	2 °C
Pdh Tj = +2°C	9.74 kW	9.22 kW
COP Tj = +2°C	4.65	3.02
Cdh Tj = +2 °C	0.996	0.997
Pdh Tj = +7°C	9.99 kW	9.55 kW
COP Tj = +7°C	5.05	3.57
Cdh Tj = +7 °C	0.996	0.997
Pdh Tj = 12°C	10.14 kW	9.79 kW
COP Tj = 12°C	5.47	4.37
Cdh Tj = +12 °C	0.995	0.996
Pdh Tj = Tbiv	9.87 kW	9.42 kW
COP Tj = Tbiv	4.88	3.31
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	9.74 kW	9.22 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	4.65	3.02
Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	0.996	0.997
WTOL	65 °C	65 °C
Poff	4 W	4 W
PTO	8 W	8 W

PSB	8 W	8 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	1.78 kW	1.77 kW
Annual energy consumption Qhe	2990 kWh	3799 kWh

**Water/Water****EN 14511-4 | Heating**

Shutting off the heat transfer medium flow passed

Complete power supply failure	passed
Starting and operating test	passed

**EN 14511-2 | Heating**

	Low temperature	Medium temperature
Heat output	12.55 kW	12.01 kW
El input	2.13 kW	3.18 kW
COP	5.90	3.78

**EN 14825 | Average Climate**

	Low temperature	Medium temperature
$\eta_s$	247 %	186 %
Prated	13.27 kW	14.46 kW
SCOP	6.38	4.85
Tbiv	-9 °C	-6 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	12.76 kW	12.18 kW
COP Tj = -7°C	6.14	4.08
Cdh Tj = -7 °C	0.996	0.997
Pdh Tj = +2°C	12.73 kW	12.45 kW
COP Tj = +2°C	6.37	4.86
Cdh Tj = +2 °C	0.996	0.997
Pdh Tj = +7°C	12.64 kW	12.55 kW
COP Tj = +7°C	6.62	5.39
Cdh Tj = +7 °C	0.996	0.996
Pdh Tj = 12°C	12.51 kW	12.69 kW
COP Tj = 12°C	6.85	5.99
Cdh Tj = +12 °C	0.995	0.996
Pdh Tj = Tbiv	12.76 kW	12.24 kW
COP Tj = Tbiv	6.05	4.20
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	12.76 kW	12.01 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	6.01	3.78

Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	0.996	0.997
WTOL	65 °C	65 °C
Poff	4 W	4 W
PTO	8 W	8 W
PSB	8 W	8 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.51 kW	2.45 kW
Annual energy consumption Qhe	4301 kWh	6164 kWh

**EN 14825 | Colder Climate**

	Low temperature	Medium temperature
ηs	252 %	192 %
Prated	14.25 kW	14.10 kW
SCOP	6.50	4.99
Tbiv	-18 °C	-17 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	12.71 kW	12.40 kW
COP Tj = -7°C	6.45	4.68
Cdh Tj = -7 °C	0.996	0.997
Pdh Tj = +2°C	12.62 kW	12.53 kW
COP Tj = +2°C	6.65	5.27
Cdh Tj = +2 °C	0.996	0.996
Pdh Tj = +7°C	12.54 kW	12.64 kW
COP Tj = +7°C	6.79	5.80
Cdh Tj = +7 °C	0.995	0.996
Pdh Tj = 12°C	12.52 kW	12.74 kW
COP Tj = 12°C	6.82	6.24
Cdh Tj = +12 °C	0.995	0.996
Pdh Tj = Tbiv	12.75 kW	12.25 kW
COP Tj = Tbiv	6.23	4.22
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	12.76 kW	12.01 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	6.01	3.78
Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	0.996	0.997
WTOL	65 °C	65 °C
Poff	4 W	4 W
PTO	8 W	8 W
PSB	8 W	8 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	1.49 kW	2.09 kW

Annual energy consumption Qhe	4301 kWh	6970 kWh
EN 14825   Warmer Climate		
	Low temperature	Medium temperature
ηs	249 %	188 %
Prated	13.75 kW	14.24 kW
SCOP	6.42	4.89
Tbiv	3 °C	4 °C
TOL	2 °C	2 °C
Pdh Tj = +2°C	12.76 kW	12.01 kW
COP Tj = +2°C	6.01	3.78
Cdh Tj = +2 °C	0.996	0.997
Pdh Tj = +7°C	12.73 kW	12.35 kW
COP Tj = +7°C	6.33	4.50
Cdh Tj = +7 °C	0.996	0.997
Pdh Tj = 12°C	12.59 kW	12.59 kW
COP Tj = 12°C	6.70	5.58
Cdh Tj = +12 °C	0.996	0.996
Pdh Tj = Tbiv	12.76 kW	12.21 kW
COP Tj = Tbiv	6.11	4.14
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	12.76 kW	12.01 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	6.01	3.78
Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	0.996	0.997
WTOL	65 °C	65 °C
Poff	4 W	4 W
PTO	8 W	8 W
PSB	8 W	8 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.99 kW	2.23 kW
Annual energy consumption Qhe	2862 kWh	3890 kWh

**Model TTF 10.5**

Model name	TTF 10.5
Application	Heating (medium temp)
Units	Indoor
Climate zone (for heating)	Colder, Warmer, Warmer Climate, Colder Climate
Cooling mode application (optional)	n/a
Any additional heat sources	n/a

**General data**

Power supply	3x400V 50Hz
Off-peak product	Yes

**Brine/Water****EN 14511-4 | Heating**

Shutting off the heat transfer medium flow passed

Complete power supply failure	passed
Defrost test	passed
Starting and operating test	passed

**EN 14511-2 | Heating**

	Low temperature	Medium temperature
Heat output	9.81 kW	9.25 kW
EI input	2.06 kW	3.04 kW
COP	4.76	3.05

**EN 12102-1 | Average Climate**

	Low temperature	Medium temperature
Sound power level indoor	42 dB(A)	44 dB(A)

**EN 14825 | Average Climate**

	Low temperature	Medium temperature
$\eta_s$	195 %	145 %
Prated	10.60 kW	11.77 kW
SCOP	5.09	3.84
Tbiv	-8 °C	-5 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	9.81 kW	9.39 kW
COP Tj = -7°C	4.78	3.26
Cdh Tj = -7 °C	0.996	0.997
Pdh Tj = +2°C	10.00 kW	9.63 kW
COP Tj = +2°C	5.08	3.86
Cdh Tj = +2 °C	0.996	0.997
Pdh Tj = +7°C	10.13 kW	9.76 kW
COP Tj = +7°C	5.37	4.24

Cdh Tj = +7 °C	0.996	0.996
Pdh Tj = 12°C	10.15 kW	9.88 kW
COP Tj = 12°C	5.62	4.69
Cdh Tj = +12 °C	0.995	0.996
Pdh Tj = Tbiv	9.79 kW	9.51 kW
COP Tj = Tbiv	4.73	3.44
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	9.74 kW	9.22 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	4.65	3.02
Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	0.996	0.997
WTOL	65 °C	65 °C
Poff	4 W	4 W
PTO	8 W	8 W
PSB	8 W	8 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.86 kW	2.55 kW
Annual energy consumption Qhe	4305 kWh	6337 kWh

**EN 12102-1 | Colder Climate**

	Low temperature	Medium temperature
Sound power level indoor	42 dB(A)	44 dB(A)

**EN 14825 | Colder Climate**

	Low temperature	Medium temperature
$\eta_s$	202 %	150 %
Prated	11.43 kW	11.29 kW
SCOP	5.24	3.94
Tbiv	-17 °C	-16 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	10.06 kW	9.59 kW
COP Tj = -7°C	5.17	3.72
Cdh Tj = -7 °C	0.996	0.997
Pdh Tj = +2°C	10.13 kW	9.73 kW
COP Tj = +2°C	5.40	4.15
Cdh Tj = +2 °C	0.996	0.996
Pdh Tj = +7°C	10.15 kW	9.84 kW
COP Tj = +7°C	5.56	4.54
Cdh Tj = +7 °C	0.995	0.996
Pdh Tj = 12°C	10.15 kW	9.93 kW
COP Tj = 12°C	5.59	4.87
Cdh Tj = +12 °C	0.995	0.996
Pdh Tj = Tbiv	9.93 kW	9.50 kW
COP Tj = Tbiv	4.96	3.44

Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	9.74 kW	9.22 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	4.65	3.02
Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	0.996	0.997
WTOL	65 °C	65 °C
Poff	4 W	4 W
PTO	8 W	8 W
PSB	8 W	8 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	1.69 kW	2.07 kW
Annual energy consumption Qhe	5379 kWh	7064 kWh

**EN 12102-1 | Warmer Climate**

	Low temperature	Medium temperature
Sound power level indoor	42 dB(A)	44 dB(A)

**EN 14825 | Warmer Climate**

	Low temperature	Medium temperature
ηs	198 %	147 %
Prated	11.52 kW	10.99 kW
SCOP	5.15	3.87
Tbiv	4 °C	4 °C
TOL	2 °C	2 °C
Pdh Tj = +2°C	9.74 kW	9.22 kW
COP Tj = +2°C	4.65	3.02
Cdh Tj = +2 °C	0.996	0.997
Pdh Tj = +7°C	9.99 kW	9.55 kW
COP Tj = +7°C	5.05	3.57
Cdh Tj = +7 °C	0.996	0.997
Pdh Tj = 12°C	10.14 kW	9.79 kW
COP Tj = 12°C	5.47	4.37
Cdh Tj = +12 °C	0.995	0.996
Pdh Tj = Tbiv	9.87 kW	9.42 kW
COP Tj = Tbiv	4.88	3.31
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	9.74 kW	9.22 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	4.65	3.02
Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	0.996	0.997
WTOL	65 °C	65 °C
Poff	4 W	4 W
PTO	8 W	8 W

PSB	8 W	8 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	1.78 kW	1.77 kW
Annual energy consumption Qhe	2990 kWh	3799 kWh

**Water/Water****EN 14511-4 | Heating**

Shutting off the heat transfer medium flow passed

Complete power supply failure	passed
Starting and operating test	passed

**EN 14511-2 | Heating**

	Low temperature	Medium temperature
Heat output	12.55 kW	12.01 kW
El input	2.13 kW	3.18 kW
COP	5.90	3.78

**EN 14825 | Average Climate**

	Low temperature	Medium temperature
$\eta_s$	247 %	186 %
Prated	13.27 kW	14.46 kW
SCOP	6.38	4.85
Tbiv	-9 °C	-6 °C
TOL	-10 °C	-10 °C
Pdh Tj = -7°C	12.76 kW	12.18 kW
COP Tj = -7°C	6.14	4.08
Cdh Tj = -7 °C	0.996	0.997
Pdh Tj = +2°C	12.73 kW	12.45 kW
COP Tj = +2°C	6.37	4.86
Cdh Tj = +2 °C	0.996	0.997
Pdh Tj = +7°C	12.64 kW	12.55 kW
COP Tj = +7°C	6.62	5.39
Cdh Tj = +7 °C	0.996	0.996
Pdh Tj = 12°C	12.51 kW	12.69 kW
COP Tj = 12°C	6.85	5.99
Cdh Tj = +12 °C	0.995	0.996
Pdh Tj = Tbiv	12.76 kW	12.24 kW
COP Tj = Tbiv	6.05	4.20
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	12.76 kW	12.01 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	6.01	3.78

Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	0.996	0.997
WTOL	65 °C	65 °C
Poff	4 W	4 W
PTO	8 W	8 W
PSB	8 W	8 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.51 kW	2.45 kW
Annual energy consumption Qhe	4301 kWh	6164 kWh

**EN 14825 | Colder Climate**

	Low temperature	Medium temperature
ηs	252 %	192 %
Prated	14.25 kW	14.10 kW
SCOP	6.50	4.99
Tbiv	-18 °C	-17 °C
TOL	-22 °C	-22 °C
Pdh Tj = -7°C	12.71 kW	12.40 kW
COP Tj = -7°C	6.45	4.68
Cdh Tj = -7 °C	0.996	0.997
Pdh Tj = +2°C	12.62 kW	12.53 kW
COP Tj = +2°C	6.65	5.27
Cdh Tj = +2 °C	0.996	0.996
Pdh Tj = +7°C	12.54 kW	12.64 kW
COP Tj = +7°C	6.79	5.80
Cdh Tj = +7 °C	0.995	0.996
Pdh Tj = 12°C	12.52 kW	12.74 kW
COP Tj = 12°C	6.82	6.24
Cdh Tj = +12 °C	0.995	0.996
Pdh Tj = Tbiv	12.75 kW	12.25 kW
COP Tj = Tbiv	6.23	4.22
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	12.76 kW	12.01 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	6.01	3.78
Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	0.996	0.997
WTOL	65 °C	65 °C
Poff	4 W	4 W
PTO	8 W	8 W
PSB	8 W	8 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	1.49 kW	2.09 kW

Annual energy consumption Qhe	4301 kWh	6970 kWh
EN 14825   Warmer Climate		
	Low temperature	Medium temperature
ηs	249 %	188 %
Prated	13.75 kW	14.24 kW
SCOP	6.42	4.89
Tbiv	3 °C	4 °C
TOL	2 °C	2 °C
Pdh Tj = +2°C	12.76 kW	12.01 kW
COP Tj = +2°C	6.01	3.78
Cdh Tj = +2 °C	0.996	0.997
Pdh Tj = +7°C	12.73 kW	12.35 kW
COP Tj = +7°C	6.33	4.50
Cdh Tj = +7 °C	0.996	0.997
Pdh Tj = 12°C	12.59 kW	12.59 kW
COP Tj = 12°C	6.70	5.58
Cdh Tj = +12 °C	0.996	0.996
Pdh Tj = Tbiv	12.76 kW	12.21 kW
COP Tj = Tbiv	6.11	4.14
Pdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	12.76 kW	12.01 kW
COP Tj = TOL or COP Tj = Tdesignh if TOL < Tdesignh	6.01	3.78
Cdh Tj = TOL or Pdh Tj = Tdesignh if TOL < Tdesignh	0.996	0.997
WTOL	65 °C	65 °C
Poff	4 W	4 W
PTO	8 W	8 W
PSB	8 W	8 W
PCK	0 W	0 W
Supplementary Heater: Type of energy input	Electricity	Electricity
Supplementary Heater: PSUP	0.99 kW	2.23 kW
Annual energy consumption Qhe	2862 kWh	3890 kWh