Appendix I Test results

Table 1.	**Heating mode(Low temperature application):**							**P**
Model	CE-iVT9							
Product type	Air to Water	**Heating season**	☑	Average	☐	Warmer	☐	Colder

1. Test conditions:

Condition	**Part Load Ratio** in %				**Outdoor heat exchanger**	**Indoor heat exchanger**
	Formula	A	W		Inlet dry (wet) bulb temperature °C	Inlet/outlet water temperatures (°C)
A	(-7-16)/(Tdesignh-16)	88	N/A	N/A	-7(-8)	a / 34
B	(+2-16)/ (Tdesignh-16)	54	N/A	N/A	2(1)	a / 30
C	(+7-16)/(Tdesignh-16)	35	N/A	N/A	7(6)	a / 27
D	(+12-16)/(Tdesignh-16)	15	N/A	N/A	12(11)	a / 24
E	(TOL-16)/ (Tdesignh-16)				TOL	a / 35.3
F	(Tbivalent-16)/(Tdesignh-16)				Tbiv	a / 34
G	(-15-16)/(Tdesignh-16)	N/A	N/A	N/A	-15	N/A

Remark: a) With the water flow rate as determined at the standard rating conditions given in EN14511-2 at 30/35 conditions.

2.Tested data/correction data(Average):

General test conditions/ Part-Load	Unit	A(-7)/W34 (88%)	A2/W30 (54%)	A7/W27 (35%)	A12/W24 (15%)	A(-10)/W35.3 (100%)	A(-7)/W34 (88%)
	--	A	B	C	D	E	F
Data collection period	hh: min:sec	3:00:00	2:00:00	2:00:00	2:00:00	3:00:00	3:00:00
The heat pump defrosts	--	Yes	No	No	No	Yes	Yes
Complete Cycles	--	1	0	0	0	1	1
Barometric pressure	kPa	101.02	101.02	101.02	101.02	101.02	101.02
Voltage	V	232.8	219.2	232.6	232.7	219.4	232.8
Current input of the unit	A	9.01	4.51	3.30	2.79	9.60	9.01
Power input of the unit	kW	2.057	0.940	0.699	0.576	2.078	2.057
Test conditions **indoor** unit							
Inlet Water temperature, DB	°C	28.20	26.06	23.14	19.79	29.95	28.20
Outlet Water temperature, DB	°C	33.28*	29.88	26.94	23.97	34.48*	33.28*

Telephone : +86 20 38320668
Telefax : +86 20 38320478

http://www.tuv-sud.cn

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch, TÜV SÜD Group

5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou, 510656, P. R. China

Appendix I Test results

Test conditions **outdoor** unit							
Air **inlet** temperature, DB	°C	-6.86	2.00	7.19	12.04	-9.88	-6.86
Air **inlet** temperature, WB	°C	-7.75	1.00	6.00	11.03	-10.63	-7.75
Summary of the results							
Total heating capacity	kW	5.940	4.470	4.450	4.880	5.276	5.940
Effective power input	kW	2.080	0.963	0.723	0.599	2.102	2.080
Coefficient of performance (COP)	--	2.86	4.64	6.16	8.14	2.51	2.86
Compressor frequency	Hz	75	33	33	33	78	75
Water flow	m³/h	1.00	1.00	1.00	1.00	1.00	1.00
Remark: * In part condition, outlet temperature data is recorded by a full average complete cycle's data.							

3.Calculation/conclusion for SCOP(Average):

Tdesignh(°C)	-10	Tbiv(°C)	-7
Pdesignh(kW)	6.714	TOL(°C)	-10

Test result A, B, C, D, E, F conditions:

Condition	Part load	Measured capacity	COP at measured capacity	Cdh	CR	COP at part load
E	6.714	5.276	2.51	0.00	1.00	2.51
F	5.940	5.940	2.86	0.00	1.00	2.86
A	5.940	5.940	2.86	0.00	1.00	2.86
B	3.615	4.470	4.64	0.99	0.81	4.63
C	2.324	4.450	6.16	0.99	0.52	6.10
D	1.033	4.880	8.14	0.99	0.21	7.85
CR: part load divided by capacity;						

Telephone : +86 20 38320668
Telefax : +86 20 38320478

http://www.tuv-sud.cn

TÜV SÜD Certification and Testing (China) Co., Ltd.
Guangzhou Branch, TÜV SÜD Group

5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou, 510656, P. R. China

Appendix I Test results

Electric power consumptions	Unit	Value
Thermostat-off mode [P_{TO}]	kW	0.009
Standby mode [P_{SB}]	kW	0.009
Crankcase heater [P_{CK}]	kW	0.033
Off mode [P_{OFF}]	kW	0.009

Conclusions:	Unit	Value
SCOPon:	kWh/kWh	4.69
SCOP:	kWh/kWh	4.68
Q_H:	kWh/year	13872
Q_{HE}:	kWh/year	2966
$\eta_{s,h}$	%	184.1
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 2)	--	A+++

Telephone : +86 20 38320668
Telefax : +86 20 38320478

http://www.tuv-sud.cn

TÜV SÜD Certification and Testing (China) Co., Ltd.
Guangzhou Branch, TÜV SÜD Group

5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou, 510656, P. R. China

Appendix I Test results

Table 2.	**Heating mode(Medium temperature application):**							**P**
Model	CE-iVT9							
Product type	Air to Water	**Heating season**	☑	Average	☐	Warmer	☐	Colder

1. Test conditions:

Condition	**Part Load Ratio** in %				**Outdoor heat exchanger**	**Indoor heat exchanger**
	Formula	A	W	C	Inlet dry (wet) bulb temperature °C	Inlet/outlet water temperatures (°C)
A	(-7-16)/(Tdesignh-16)	88	N/A	N/A	-7(-8)	a / 52
B	(+2-16)/ (Tdesignh-16)	54	N/A	N/A	2(1)	a / 42
C	(+7-16)/(Tdesignh-16)	35	N/A	N/A	7(6)	a / 36
D	(+12-16)/(Tdesignh-16)	15	N/A	N/A	12(11)	a / 30
E	(TOL-16)/ (Tdesignh-16)				TOL	a / 55.3
F	(Tbivalent-16)/(Tdesignh-16)				Tbiv	a / 52
G	(-15-16)/(Tdesignh-16)	N/A	N/A	N/A	-15	N/A

Remark: a) With the water flow rate as determined at the standard rating conditions given in EN14511-2 at 47/55 conditions.

2.Tested data/correction data(Average):

General test conditions/ Part-Load	Unit	A(-7)/W52 (88%)	A2/W42 (54%)	A7/W36 (35%)	A12/W30 (15%)	A(-10)/W55.3 (100%)	A(-7)/W52 (88%)
	--	A	B	C	D	E	F
Data collection period	hh: min:sec	2:00:00	2:00:00	2:00:00	2:00:00	4:00:00	2:00:00
The heat pump defrosts	--	No	No	No	No	Yes	No
Complete Cycles	--	0	0	0	0	1	0
Barometric pressure	kPa	101.02	101.02	101.02	101.02	101.02	101.02
Voltage	V	230.0	230.8	233.2	231.2	230.5	230.0
Current input of the unit	A	12.69	4.79	4.07	3.33	12.40	12.69
Power input of the unit	kW	2.890	1.052	0.891	0.709	2.825	2.890
Test conditions **indoor** unit							
Inlet Water temperature, DB	°C	45.57	38.36	31.89	25.33	48.54	45.57
Outlet Water temperature, DB	°C	52.08	41.95	36.00	30.00	54.03*	52.08

Telephone : +86 20 38320668
Telefax : +86 20 38320478

http://www.tuv-sud.cn

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch, TÜV SÜD Group

5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou, 510656, P. R. China

Appendix I Test results

Test conditions **outdoor** unit							
Air **inlet** temperature, DB	°C	-6.99	2.01	7.00	12.05	-9.97	-6.99
Air **inlet** temperature, WB	°C	-7.64	1.00	6.00	11.00	-10.96	-7.64
Summary of the results							
Total heating capacity	kW	6.300	3.513	4.073	4.607	5.118	6.300
Effective power input	kW	2.909	1.070	0.909	0.727	2.843	2.909
Coefficient of performance (COP)	--	2.17	3.28	4.48	6.34	1.80	2.17
Compressor frequency	Hz	78	33	33	33	78	78
Water flow	m³/h	0.85	0.85	0.85	0.85	0.85	0.85
Remark: * In part condition, outlet temperature data is recorded by a full average complete cycle's data.							

3.Calculation/conclusion for SCOP(Average):			
Tdesignh(°C)	-10	Tbiv(°C)	-7
Pdesignh(kW)	7.122	TOL(°C)	-10

Test result A, B, C, D, E, F conditions:

Condition	Part load	Measured capacity	COP at measured capacity	Cdh	CR	COP at part load
E	7.122	5.118	1.80	0.00	1.00	1.80
F	6.300	6.300	2.17	0.00	1.00	2.17
A	6.300	6.300	2.17	0.00	1.00	2.17
B	3.835	3.513	3.28	0.00	1.00	3.28
C	2.465	4.073	4.48	0.99	0.61	4.45
D	1.096	4.607	6.34	0.99	0.24	6.14

CR: part load divided by capacity;

Telephone : +86 20 38320668
Telefax : +86 20 38320478

http://www.tuv-sud.cn

TÜV SÜD Certification and Testing (China) Co., Ltd.
Guangzhou Branch, TÜV SÜD Group

5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou, 510656, P. R. China

Appendix I Test results

Electric power consumptions	**Unit**	**Value**
Thermostat-off mode [P_{TO}]	kW	0.009
Standby mode [P_{SB}]	kW	0.009
Crankcase heater [P_{CK}]	kW	0.038
Off mode [P_{OFF}]	kW	0.009

Conclusions:	**Unit**	**Value**
SCOPon:	kWh/kWh	3.25
SCOP:	kWh/kWh	3.24
Q_H:	kWh/year	14713
Q_{HE}:	kWh/year	4542
$\eta_{s,h}$	%	126.6
Seasonal space heating energy efficiency classes: (According (EU) No 811/2013 Table 1)	--	A++

Telephone : +86 20 38320668
Telefax : +86 20 38320478

http://www.tuv-sud.cn

TÜV SÜD Certification and Testing (China) Co., Ltd.
Guangzhou Branch, TÜV SÜD Group

5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou, 510656, P. R. China

Appendix II Marking plate

Nameplate

Model: CE-iVT9

Cool Energy inverTech

Air Source Heat Pump

Model	CE-iVT9
Heating Capacity Min./Max. (A7)	4.37/9.5kW
Heating Input Power Min./Max.	0.79/2.14kW
Cooling Capacity Min./Max.	3.08/6.7kW
Cooling Input Power Min./Max.	0.85/2.67kW
Power Supply	220V-240V/50Hz
Shock Proof Grade	I
Ingress Protection	IPX4
Rated Input Current	6.2A
Max. Input Current	14.8A
Max. Water Outlet Temperature	55°C
Minimum Water Flow Rate	1m³/h
Refrigerant /Weight	R410A/1600g
Water Pressure Drop	20kPa
Water Pipe Connection	1" BSP
Max Water Pressure	1.0MPa
Net Weight	88kg
Product Barcode Right:	0 703694 534645
Serial - See Sticker Below:	

Cool Energy Holding Ltd
163 Cleethorpe Road, Grimsby
DN31 3AX, North East Lincolnshire, UK
www.coolenergyshop.com

UK CA CE

Telephone : +86 20 38320668
Telefax : +86 20 38320478
http://www.tuv-sud.cn

TÜV SÜD Certification and Testing (China) Co., Ltd.
Guangzhou Branch, TÜV SÜD Group
5F, Communication Building, 163 Pingyun Rd, Huangpu Ave. West, Guangzhou, 510656, P. R. China