

Thermostatic expansion valves
TV series

Technical parameter

Max. body temperature: 80 °C
 Max. bulb sensing temperature: 60 °C
 About R134a,R22,R407C,R404A/R507 system:
 Max. working pressure: 3 MPa
 Max. testing pressure: 3.3 MPa

About R410A system:
 Max. working pressure: 4.2 MPa
 Max. testing pressure: 4.6 MPa

Charge selector

Refrigerant	Applications	Operating temperature ranges (Unit: °C)										
		-40	-35	-29	-24	-18	-12	-6	0	4	10	
R134a	Freezers ,Ice makers, Transport refrigeration, Supermarket equipment, Commercial equipment, Bus air conditions, Refrigeration equipment	NC										
		NW15(MOP)										
		NW35(MOP)										
		NW55(MOP)										
R22/R407C	Conditioners & heat pumps, Water cool equipment, Supermarket equipment, Refrigeration air driers	XC/ZC										
		XW35/ZW35(MOP)										
		XW65/ZW65(MOP)										
		XW100/ZW100(MOP)										
R404A/507	Low temperature equipment, Commercial air conditioners, Ice makers, Environmental chambers, Soft ice cream machines	SC										
		SZ										
		SW45										
		SW65 (MOP)										
		SW110 (MOP)										
R410A	Commercial air conditioners, Refrigeration equipment	LC/LC										
		LW195/LW195(MOP)										

Selecting of external equalizer

Applications	Temperature range (°C)	Pressure drop \geq (MPa)
Air conditioning	+10~+2°C	0.022
Commercial	-1~-18°C	0.015
Low temperature	\leq -18°C	0.007

When the pressure drop across evaporator exceeds the data in the table, an external equalizer type valve should be used, otherwise using the internal equalizer type valve.

MOP motor overload protection

Applications	R134a	R22	R407C	R404A/507	R410A
Air conditioning	NW55	XW100	ZW100	SW110	LW195
Commercial	NW35	XW65	ZW65	SW65	-
Low temp.	NW15	XW35	ZW35	SW45	-

Thermostatic expansion valves TV series

Temperature of liquid entering valve correction factor

Refrigerant	Refrigerant liquid temperature °C																
	60	55	50	45	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20
R134a	0.71	0.77	0.83	0.89	0.94	1	1.06	1.11	1.17	1.23	1.28	1.34	1.39	1.45	1.5	1.56	1.61
R22	0.75	0.8	0.85	0.9	0.95	1	1.05	1.1	1.14	1.19	1.24	1.29	1.33	1.38	1.42	1.47	1.51
R407C	0.67	0.74	0.8	0.87	0.94	1	1.06	1.12	1.19	1.24	1.3	1.36	1.42	1.48	1.54	1.59	1.65
R404A/507	0.5	0.61	0.71	0.81	0.91	1	1.09	1.18	1.26	1.34	1.43	1.51	1.59	1.66	1.74	1.82	1.89
R410A	0.76	0.79	0.83	0.88	0.93	1	1.07	1.14	1.20	1.26	1.32	1.38	1.44	1.49	1.55	1.60	1.66

Valve capacities based on vapor free liquid refrigerant at +35°C.

To determine the capacities for other temperatures of vapor free liquid refrigerant entering the valve, multiply the capacities listed in the table of extend capacities.

Static superheat

Static superheat can be adjusted by superheat setting spindles.

The factory setting of static superheat is +3.5°C.

Selecting of a valve size

I. The method of using the extend capacity tables to select a valve size:

First determine:

1. Refrigerant in the system.
2. Temperature of liquid entering the valve.
3. The evaporating temperature.
4. Pressure drop across the valve.
5. The required refrigeration capacity.

Using above data in extend capacity table to select a proper valve.

If liquid refrigerant entering the valve is not at +35°C, please correct the required refrigeration capacity by the temperature of liquid entering valve correction factor table.

II. Other necessary information:

1. Refrigerant charge, see the table of the charge selector.
2. Internal or external equalizer requirement.
3. The length of capillary tube.
4. Size of connections.

III. Discretionarily selecting:

1. MOP function or not, see the table of MOP motor overload protection.

Example of selecting valve

Refrigerant: R22

Pressure drop across valve: $\Delta P = 1.4\text{MPa}$

Evaporating temperature: $t_e = -10^\circ\text{C}$

Capacity of evaporator :40KW(The required refrigeration capacity)

Temperature of liquid entering the valve: 50°C

Lookup the table of temperature of liquid entering valve correction factor, and correct the capacity of evaporator: $40/0.85=47.1\text{KW}$.

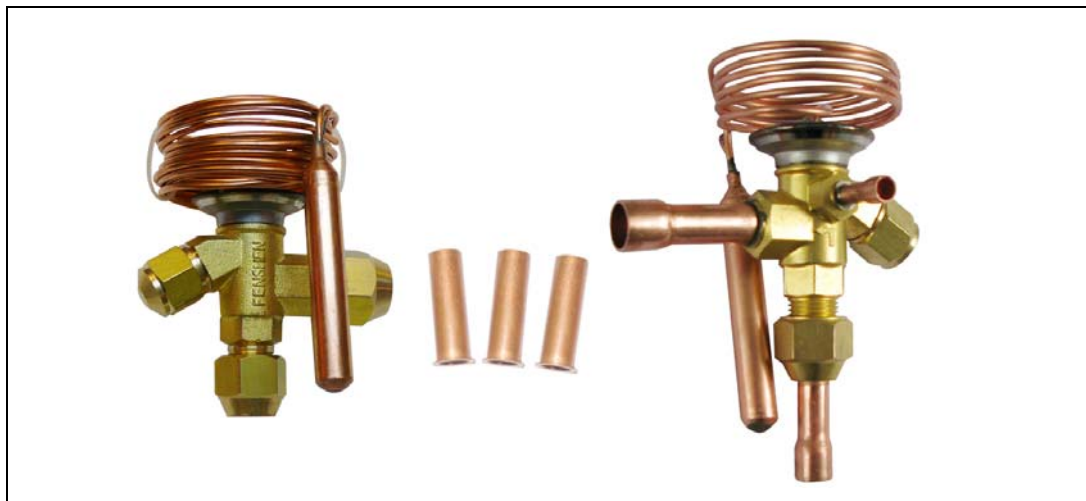
When the pressure drop across evaporator exceeds the data in the table, an external equalizer type valve should be used, otherwise using the internal equalizer type valve.

The capacity of thermostatic expansion valve is usually larger than capacity of evaporator.

Selecting the model ASTVE10X or BWTVE10X in the extend capacity table.

Thermostatic expansion valves CTV、DTV series

Introduction



Thermostatic expansion valves regulate the injection of refrigerant liquid into evaporators. Injection is controlled by the evaporators superheat.

CTV, DTV series thermostatic expansion valves can be used for refrigeration cabinet, ice machine, dehumidify unit, and refrigeration and air conditioning requirements in a wide range of temperature.

Characteristics

1. Constant superheat adjusting performance.
2. Interchangeable orifice assembly.
3. Wide range of evaporating temperature: -40→+10 °C.
4. Can be supplied with MOP (Max. Operating Pressure).

Type & data

Model	Equalization	Equalization connection (in.)	Connection form	Connection Inlet×Outlet (in.)	Capillary tube (m)
CTV	Internal		Flare SAE	3/8×1/2	1
CTVE	External	1/4 SAE			
DTV	Internal		Solder ODF		
DTVE	External	1/4 SAE			

Model	Orifice number	Nominal capacity (KW)			
		R134a	R22	R407C	R404A/R507
CTV(E)- DTV(E)-	0	0.65	1.14	1.13	0.8
	1	1.5	2.8	2.8	1.85
	2	2.5	4.7	4.57	3.1
	3	4	7.5	7.03	5
	4	6.7	12.2	11.96	8.1
	5	8.2	14.9	14.4	9.9
	6	9.5	17.2	16.9	11.4

Nominal capacities base on +38°C condensing temperature,+4°C evaporating temperature and 1K liquid sub cooling at the inlet of the expansion valve. Valve pressure drop for R134a is rated at 0.41MPa. Valve pressure drop for R22, R407C and R404A/507 is rated at 0.69MPa.

Thermostatic expansion valves
CTV、DTV series

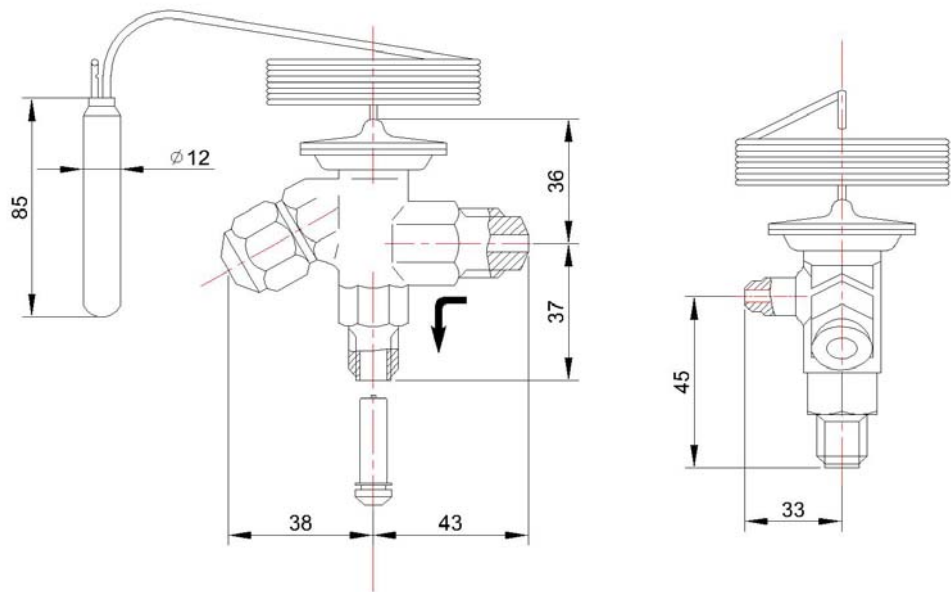
Ordering

Connection	Valve code	Equalization	Refrigerant code	Orifice number
C	TV	E	X	6
C: Flare SAE D: Solder ODF	Thermostatic expansion valve	"E" indicates external equalizer (Omit for internal equalizer)	N — R134a X — R22 Z — R407C S — R404A/507	Orifice (0~6#)

The model CTVEX-6# is an example in the table.

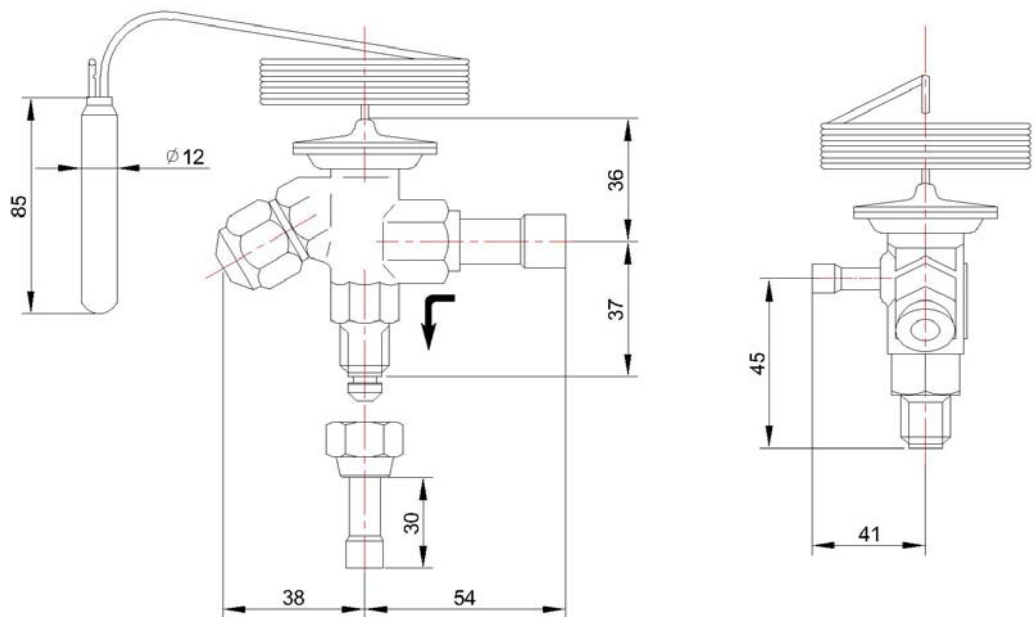
Dimension of CTV(E)

(Unit:mm)



Dimension of DTV(E)

(Unit:mm)



Thermostatic expansion valves
CTV、DTV series

R134a Extend capacity KW (Extend KW capacities based on vapor free liquid refrigerant at +35°C)

Model R134a		Evaporating temperature (°C)																	
		10						0						-10					
		Pressure drop across valve (MPa)																	
		0.3	0.4	0.6	0.7	0.8	1	0.4	0.6	0.7	0.8	1	1.1	0.4	0.6	0.7	0.8	1	1.1
CTV(E)N- DTV(E)N-	0	0.6	0.7	0.8	0.9	1	1.1	0.7	0.8	0.9	0.9	1.1	1.1	0.6	0.8	0.8	0.9	1	1.1
	1	1.4	1.6	1.9	2.1	2.2	2.5	1.5	1.8	2	2.1	2.4	2.5	1.5	1.8	1.9	2.1	2.3	2.4
	2	2.3	2.7	3.3	3.5	3.8	4.2	2.6	3.1	3.4	3.6	4.1	4.2	2.5	3	3.3	3.5	3.9	4.1
	3	3.8	4.4	5.4	5.8	6.2	6.9	4.2	5.2	5.6	6	6.7	7	4	5	5.4	5.7	6.4	6.7
	4	6	6.9	8.5	9.2	9.8	11	6.7	8.2	8.8	9.4	10.5	11.1	6.4	7.9	8.5	9.1	10.1	10.6
	5	7.6	8.8	10.7	11.6	12.4	13.8	8.4	10.3	11.1	11.9	13.3	14	8.1	9.9	10.7	11.4	12.8	13.4
6	9.8	11.3	13.8	15	16	17.9	10.9	13.3	14.4	15.4	17.2	18	10.5	12.8	13.8	14.8	16.5	17.3	

Model R134a		Evaporating temperature (°C)																	
		-20						-30						-40					
		Pressure drop across valve (MPa)																	
		0.6	0.7	0.8	1	1.1	1.2	0.6	0.7	0.8	1	1.1	1.2	0.6	0.7	0.8	1	1.1	1.2
CTV(E)N- DTV(E)N-	0	0.6	0.65	0.7	0.78	0.82	0.85	0.41	0.44	0.47	0.52	0.55	0.57	0.26	0.28	0.3	0.34	0.35	0.37
	1	1.4	1.5	1.6	1.8	1.8	1.9	0.9	1	1.1	1.2	1.2	1.3	0.59	0.64	0.68	0.76	0.8	0.84
	2	2.3	2.5	2.7	3	3.1	3.3	1.6	1.7	1.8	2	2.1	2.2	1	1.1	1.2	1.3	1.4	1.4
	3	3.8	4.1	4.4	4.9	5.2	5.4	2.6	2.8	3	3.3	3.5	3.6	1.6	1.8	1.9	2.1	2.2	2.3
	4	6	6.5	7	7.8	8.2	8.5	4.1	4.4	4.7	5.2	5.5	5.7	2.6	2.8	3	3.4	3.5	3.7
	5	7.6	8.2	8.8	9.8	10.3	10.8	5.1	5.5	5.9	6.6	6.9	7.2	3.3	3.6	3.8	4.3	4.5	4.7
6	9.8	10.6	11.3	12.7	13.3	13.9	6.6	7.1	7.6	8.5	8.9	9.3	4.3	4.6	4.9	5.5	5.8	6	

R22 Extend capacity KW (Extend KW capacities based on vapor free liquid refrigerant at +35°C)

Model R22		Evaporating temperature (°C)																	
		10						0						-10					
		Pressure drop across valve (MPa)																	
		0.5	0.7	0.9	1	1.2	1.4	0.5	0.7	0.9	1	1.2	1.4	0.7	0.9	1	1.2	1.4	1.6
CTV(E)X- DTV(E)X-	0	1	1.2	1.3	1.4	1.5	1.7	1	1.2	1.3	1.4	1.5	1.6	1.1	1.3	1.3	1.5	1.6	1.7
	1	2.5	3	3.3	3.5	3.9	4.2	2.4	2.9	3.3	3.5	3.8	4.1	2.8	3.2	3.4	3.7	4	4.3
	2	4.1	4.8	5.4	5.7	6.3	6.8	4	4.7	5.3	5.6	6.2	6.6	4.6	5.2	5.5	6	6.5	6.9
	3	6.5	7.7	8.8	9.3	10.1	11	6.4	7.6	8.6	9.1	9.9	10.7	7.4	8.4	8.9	9.7	10.5	11.2
	4	10.9	12.9	14.6	15.4	16.9	18.3	10.7	12.6	14.3	15.1	16.6	17.9	12.3	14	14.8	16.2	17.5	18.7
	5	13.1	15.5	17.6	18.5	20.3	21.9	12.8	15.2	17.2	18.1	19.9	21.5	14.8	16.8	17.7	19.4	21	22.4
6	15.3	18.1	20.5	21.6	23.7	25.6	15	17.7	20.1	21.2	23.2	25	17.3	19.6	20.7	22.6	24.5	26.1	

Model R22		Evaporating temperature (°C)																	
		-20						-30						-40					
		Pressure drop across valve (MPa)																	
		0.9	1	1.2	1.4	1.6	1.7	0.9	1	1.2	1.4	1.6	1.7	0.9	1	1.2	1.4	1.6	1.7
CTV(E)X- DTV(E)X-	0	1.1	1.1	1.3	1.4	1.5	1.5	0.8	0.8	0.9	1	1	1.1	0.5	0.6	0.6	0.7	0.7	0.7
	1	2.7	2.9	3.1	3.4	3.6	3.7	1.9	2.1	2.3	2.4	2.6	2.7	1.3	1.4	1.6	1.7	1.8	1.8
	2	4.4	4.7	5.1	5.5	5.9	6.1	3.2	3.3	3.7	4	4.2	4.4	2.2	2.3	2.5	2.7	2.9	3
	3	7.1	7.5	8.2	8.9	9.5	9.8	5.1	5.4	5.9	6.4	6.8	7	3.5	3.7	4.1	4.4	4.7	4.9
	4	11.9	12.5	13.7	14.9	15.9	16.4	8.5	9	9.8	10.6	11.4	11.7	5.9	6.2	6.8	7.3	7.8	8.1
	5	14.3	15.1	16.5	17.8	19	19.6	10.2	10.8	11.8	12.8	13.6	14.1	7.1	7.4	8.2	8.8	9.4	9.7
6	16.7	17.6	19.2	20.8	22.2	22.9	11.9	12.6	13.8	14.9	15.9	16.4	8.2	8.7	9.5	10.3	11	11.3	

Thermostatic expansion valves
CTV、DTV series

R407C Extend capacity KW (Extend KW capacities based on vapor free liquid refrigerant at +35°C)

Model R407C		Evaporating temperature (°C)																	
		10						0						-10					
		Pressure drop across valve (MPa)																	
		0.5	0.7	0.9	1	1.2	1.4	0.5	0.7	0.9	1	1.2	1.4	0.7	0.9	1	1.2	1.4	1.6
CTV(E)Z- DTV(E)Z-	0	1	1.2	1.4	1.4	1.6	1.7	1	1.2	1.3	1.4	1.5	1.6	1.1	1.3	1.3	1.5	1.6	1.7
	1	2.5	3	3.4	3.6	3.9	4.2	2.4	2.9	3.3	3.5	3.8	4.1	2.8	3.2	3.3	3.7	3.9	4.2
	2	4.1	4.9	5.5	5.8	6.4	6.9	4	4.7	5.3	5.6	6.1	6.7	4.5	5.1	5.4	5.9	6.4	6.9
	3	6.3	7.5	8.5	8.9	9.8	10.6	6.1	7.2	8.2	8.7	9.4	10.2	7	7.9	8.3	9.1	9.9	10.6
	4	10.6	12.7	14.4	15.2	16.7	18	10.4	12.3	14	14.7	16	17.4	11.9	13.5	14.2	15.5	16.8	17.9
	5	12.8	15.3	17.4	18.3	20.1	21.7	12.5	14.8	16.8	17.7	19.3	21	14.3	16.2	17.1	18.7	20.2	21.6
6	15	18	20.4	21.5	23.5	25.4	14.7	17.4	19.7	20.8	22.6	24.6	16.8	19	20	21.9	23.7	25.3	

Model R407C		Evaporating temperature (°C)																	
		-20						-30						-40					
		Pressure drop across valve (MPa)																	
		0.9	1	1.2	1.4	1.6	1.7	0.9	1	1.2	1.4	1.6	1.7	0.9	1	1.2	1.4	1.6	1.7
CTV(E)Z- DTV(E)Z-	0	1.05	1.1	1.2	1.3	1.4	1.5	0.8	0.8	0.9	0.9	1	1	0.5	0.6	0.6	0.7	0.7	0.7
	1	2.56	2.8	3.1	3.3	3.5	3.6	1.9	2	2.2	2.4	2.5	2.6	1.3	1.4	1.5	1.6	1.7	1.8
	2	4.2	4.5	5	5.4	5.7	5.9	3.1	3.2	3.6	3.8	4.1	4.2	2.1	2.2	2.5	2.6	2.8	2.9
	3	6.7	7	7.6	8.3	8.8	9.1	4.7	5	5.5	5.9	6.3	6.5	3.3	3.4	3.8	4.1	4.4	4.5
	4	11.2	11.9	13	14	15	15.5	8	8.5	9.3	10	10.7	11.1	5.6	5.9	6.4	6.9	7.4	7.6
	5	13.7	14.3	15.7	16.9	18.1	18.7	9.7	10.2	11.2	12.1	12.9	13.3	6.7	7.1	7.7	8.4	8.9	9.2
6	15.4	16.8	18.4	19.8	21.2	21.8	11.4	12	13.1	14.2	15.1	15.6	7.8	8.3	9.1	9.8	10.5	10.8	

R404A/507 Extend capacity KW (Extend KW capacities based on vapor free liquid refrigerant at +35°C)

Model R404A/507		Evaporating temperature (°C)																	
		10						0						-10					
		Pressure drop across valve (MPa)																	
		0.5	0.7	0.9	1	1.2	1.4	0.5	0.7	0.9	1	1.2	1.4	0.5	0.7	0.9	1	1.2	1.4
CTV(E)S- DTV(E)S-	0	0.74	0.87	0.99	1.04	1.14	1.24	0.7	0.83	0.95	1	1.09	1.18	0.67	0.79	0.9	0.95	1.04	1.12
	1	1.7	2	2.3	2.4	2.6	2.8	1.6	1.9	2.2	2.3	2.5	2.7	1.5	1.8	2.1	2.2	2.4	2.6
	2	2.9	3.4	3.9	4.1	4.5	4.8	2.8	3.3	3.7	3.9	4.3	4.6	2.6	3.1	3.5	3.7	4.1	4.4
	3	4.6	5.4	6.2	6.5	7.1	7.7	4.4	5.2	5.9	6.2	6.8	7.3	4.2	4.9	5.6	5.9	6.4	7
	4	7.5	8.8	10	10.6	11.6	12.5	7.1	8.4	9.6	10.1	11.1	12	6.8	8	9.1	9.6	10.5	11.3
	5	9.1	10.8	12.2	12.9	14.1	15.3	8.7	10.3	11.7	12.3	13.5	14.6	8.3	9.8	11.1	11.7	12.8	13.8
6	10.5	12.5	14.1	14.9	16.3	17.6	10.1	11.9	13.5	14.2	15.6	16.8	9.5	11.3	12.8	13.5	14.8	16	

Model R404A/507		Evaporating temperature (°C)																	
		-20						-30						-40					
		Pressure drop across valve (MPa)																	
		0.7	0.9	1	1.2	1.4	1.6	0.9	1	1.2	1.4	1.6	1.7	0.9	1	1.2	1.4	1.6	1.7
CTV(E)S- DTV(E)S-	0	0.67	0.76	0.8	0.87	0.94	1.01	0.53	0.56	0.61	0.66	0.71	0.73	0.36	0.38	0.42	0.45	0.48	0.5
	1	1.5	1.7	1.8	2	2.2	2.3	1.2	1.3	1.4	1.5	1.6	1.7	0.8	0.9	1	1	1.1	1.1
	2	2.6	3	3.1	3.4	3.7	4	2.1	2.2	2.4	2.6	2.8	2.8	1.4	1.5	1.6	1.8	1.9	1.9
	3	4.2	4.7	5	5.4	5.9	6.3	3.3	3.5	3.8	4.1	4.4	4.5	2.2	2.4	2.6	2.8	3	3.1
	4	6.8	7.7	8.1	8.9	9.6	10.2	5.4	5.7	6.2	6.7	7.2	7.4	3.7	3.9	4.2	4.6	4.9	5
	5	8.2	9.3	9.9	10.8	11.7	12.5	6.5	6.9	7.6	8.2	8.7	9	4.5	4.7	5.1	5.6	5.9	6.1
6	9.5	10.8	11.4	12.5	13.5	14.4	7.6	8	8.7	9.4	10.1	10.4	5.1	5.4	5.9	6.4	6.9	7.1	