



中外技术合作企业 Sino-Foreign Technical Cooperation Enterprise
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国家级高新技术企业 National High-Tech Enterprise

P-017

隔爆型、本安型热电偶

EXd and intrinsic safety type thermocouples

WR 系列
WR Series

WR 系列 隔爆型、本安型热电偶

WR Series
EXd and intrinsic safety type thermocouples



概述

工业用隔爆或本安型热电偶是一种温度传感器，在化学工业自控系统中应用极广，通过温度传感器，可将控制对象的温度参数变成电信号，传递给显示、记录和调节仪表，对系统实行检测、调节和控制。

在化工厂，生产现场常伴有各种易燃、易爆等化学气体、蒸汽，如果使用普通的热电偶非常不安全，极易引起环境气体爆炸。因此，在这些场合必须使用隔爆或本安型热电偶作温度传感器，本厂生产的隔爆或本安型热电偶产品适用在 dII BT4~d II CT6、ib II BT4、ia II BT4、ia II CT6 温度组别区间内具有爆炸性气体危险的场所内。

本厂生产的隔爆或本安型热电偶技术性能符合 JB/T9238-1999 工业热电偶技术条件和 GB/T16839.1-1997、GB/T1 6839.2-1997 工业热电偶分度表及允许误差，同时产品均符合爆炸性环境用防爆电气设备通用要求 GB3836.1-2000、GB3836.2-2000 标准，由国家级仪器仪表防爆安全监督检验站对产品的图样、技术文件、样机进行专门审定和批准，并发给防爆合格证。

目前本厂生产的工业用隔爆热电偶有镍铬 - 镍硅 (k 型) 和镍铬 - 铜镍 (E 型) 两种。

本安型热电偶必须使用本安补偿导线，其分布参数控制范围：总电感量 $\leq 2\text{mH}$ ，电容量 $\leq 0.06\mu\text{f}$ ，同时使用关联设备安全栅，关联设备的选用按下列原则，热电偶 (必须是绝缘式) 配低内阻二次仪表时，选用 MTL75 / ac, Z605 / EX、LB95/ac 配高内阻二次仪表时选用 MTL760 / ac,Z960 / ac,LB960 / ac 安全栅，安全栅的具体接线见制造厂的说明书。

主要技术指标 Main technical parameters

量程规格 Range specification

型号 Model	分度号 Graduation	测量范围 Range	精度等级 Accuracy	允许偏差 $\Delta t^{\circ}\text{C}$ Allowable deviation
WRN, WRNK WRN ₂ , WRNK ₂	K	0~800 $^{\circ}\text{C}$	I	$\pm 1.5^{\circ}\text{C}$ 或 $\pm 0.004 t $
			II	$\pm 2.5^{\circ}\text{C}$ 或 $\pm 0.0075 t $
WRE, WREK WRE ₂ , WREK ₂	E	0~600 $^{\circ}\text{C}$	I	$\pm 1.5^{\circ}\text{C}$ 或 $\pm 0.004 t $
			II	$\pm 2.5^{\circ}\text{C}$ 或 $\pm 0.0075 t $

注：“t”为感温元件实测温度。
Note: “T” for temperature elements actual temperature .

Overview

The industrial EXD and intrinsic safety type thermocouple is a temperature sensor that is widely used in the chemical industrial automatic control system. Through the temperature sensor, we can change the temperature parameter of the controlled object to the electrical signal and then transfer it to the display, recording and adjusting instruments to test, adjust and control the system.

In chemical plant, the production site is often accompanied by various inflammable, explosive chemical gas, steam and, if use common thermocouple not very safe and easy to cause the environment gas explosion. Therefore, in these field sets must use EXD or the Ann model thermocouple temperature sensor, this factory production every critical or the Ann model thermocouple product which is used in the dangerous sites with explosive gas in the dII BT4~dII CT6, ib II BT4, ia II BT4, ia II CT6 temperature group interval.

The technical performance of the EXD and intrinsic safety type thermocouple we produce accord with JB, T9238-1999 industrial thermocouple technical conditions as well as GB/T16839.1-1997, GB/T16839.2-1997 industrial thermocouple indexing table and allowance error. Meanwhile, the products accord with the explosive environment EXD electric devices GB3836.1-2000, GB3836.2-2000 standard. The national instruments EXD safety supervision and inspection offices examine and approve specially of the design, technical documents and prototype of the product, and issue the explosion-proof certificate.

At present, the industrial EXD thermocouple we produce includes k and E type.

Intrinsic safety thermocouple must be equipped with compensation wire, the total inductance amount is not more than 2mH, capacity is not more than $0.06 \mu\text{f}$, and with related safe barrier as well. When thermocouple (insulation) equipped with low-resistance secondary meter, safe barrier should be MTL75/ac, Z605/EX, LB95/ac; When equipped with high-resistance secondary meter, safe barrier should be MTL760/ac, Z960/ac, LB960/ac.

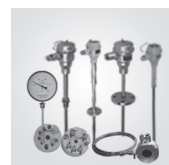
热响应时间 Thermal response time

在温度出现阶跃变化时，热电偶的输出变化值相当于该阶跃变化的 50 % 所需的时间，称为热响应时间，用 $\tau_{0.5}$ 表示。

When temperature step change appears, the thermocouple output change is equal to 50% of this step change, time needed is thermal response time, called as $\tau_{0.5}$.

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公称压力

一般是指常温下,保护管所能承受的静态外压而不破裂,试验压力一般采用公称压力的 1.5 倍。实际上允许工作压力不仅与保护管材料、直径、壁厚有关,而且还与其结构形式、安装方法、置入深度以及被测介质的流速、种类有关。

热电偶绝缘电阻

常温绝缘电阻的试验电压为:直流 500 ± 50V。测量常温绝缘电阻的大气条件为:温度 15~35℃,相对湿度 45%,大气压力 86~106kPa。

对于长度超过 1 米的热电偶,它的常温绝缘电阻值与其长度的乘积应不小于 100M Ω •m。

即: $R_r \cdot L > 100M \Omega \cdot m$ $L > 1m$

式中: R_r - 热电偶的常温绝缘电阻值, M Ω ;

L - 热电偶的长度, m。

对于长度等于或不足 1 米的热电偶它的常温绝缘电阻值应不小于 100M Ω。

铠装热电偶(绝缘式)的绝缘电阻

在环境温度为 20 ± 1.5℃相对湿度不大于 80%时,热电极与外套管之间的绝缘电阻应大于等于 1 000M Ω . m*, 试验电压为直流 500V。(* 绝缘电阻用 M Ω •m 表示,即为常温绝缘电阻与铠装热电偶长度的乘积。)

防爆类型和级组

防爆级组: dIIBT4 或 dIICT4 dIIBT6 或 dIICT6

本安级组: iaIIBT4 或 iaIIC4(多对式)

iaIIBT6 或 iaIIC6(多对式)

外壳防护等级 IP65

原理结构

隔爆或本安热电偶与装配式热电偶的结构、原理基本相同,所区别的是,隔爆或本安型产品接线盒(外壳)在设计上采用防爆特殊结构,接线盒用高强度铝合金压铸而成,并具有足够的内部空间、壁厚和机械强度,橡胶密封圈的热稳定性均符合国家防爆标准。所以,当接线盒内部的爆炸性混合气体发生爆炸时,其内压不会破坏接线盒,而由此产生的热能不能向外扩散一传爆。

由于产品采用上述防爆特殊结构,使产品完全符合使用在 dIIBT4 至 dIIC6、ibIIBT4、iaIIBT4、iaIIC6 防爆类范围内,只要用户严格遵守产品使用规则,产品就能达到可靠的防爆效果。

Nominal pressure

Usually, it refers to the static pressure the protection tube can withstand under normal temperature. Generally, the test pressure is 1.5 times of the nominal pressure. Actually, the allowance working pressure is not only related to the material, diameter, and wall thickness of the protection tube, but it's also related to structure, install method, put into depth and the flow velocity and type of media to be tested.

Thermocouple insulation resistance

Normal temperature test voltage of insulation resistance: dc 500 ± 50 V. Measuring insulation resistance at the atmospheric conditions: temperature 15 to 35 °C and 45% relative humidity, air pressure kPa 86~106.

For thermocouple over 1M, product of its ambient insulation resistance and length should be not less than 100M Ω *m.

$R_r \cdot L > 100M \Omega \cdot m$ $L > 1m$

R_r - ambient insulation resistance value M Ω

L - The length of the thermocouple

For length equal to or inadequate 1 M thermocouple its normal temperature insulation resistance value should be no less than 100 M Ω .

Armoured thermocouple (insulation type) insulation resistance

Under 20 ± 1.5 °C, relative humidity not more than 80%, insulation resistance between electrode and sleeve tube is not less than 1000M Ω .m*, test voltage is DC500V. (* insulation resistance is M Ω .m, it's product ambient insulation and length)

Explosion-proof type and magnitude group

Explosion-proof level group: dIIBT4 or dIICT4 dIIBT6 or dIICT6

Intrinsic safety group: iaIIBT4 or iaIIC4(multi-pair)

iaIIBT6 or iaIIC6(multi-pair)

Housing protection grade

Structure principles

The structure and principle of the EXD or intrinsic safety thermocouple is the same as the fabricated thermocouple, the different is, the design of explosion or intrinsic type junction box (shell) adopt special explosion-proof structure, with high-strength aluminum boxes casted, and have enough internal space, wall thickness and mechanical strength, thermal stability of the rubber sealing ring which conform to the national explosion-proof standards. So, when the gas mixture inner the junction box explode, the internal pressure won't damage the junction box, and the heat generated by the explosion won't spread outside.

As the product uses the flameproof special structure, make the product used in dIIBT4 to dIIC6, ibIIBT4, iaIIBT4, iaIIC6 explosion-proof range, as long as user strictly abide by the product use rules, the product can reach the explosive -proof effect that be explosion.

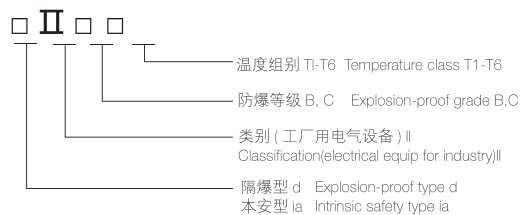


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防爆标志、类别、级别和温度组别 Explosion-proof sign, classification, grade and temperature class



电气设备分为二类：Ⅰ类——煤矿井下用电气设备；
Ⅱ类——工厂用电气设备。

Electric equipment: I- coal minery
II-industry

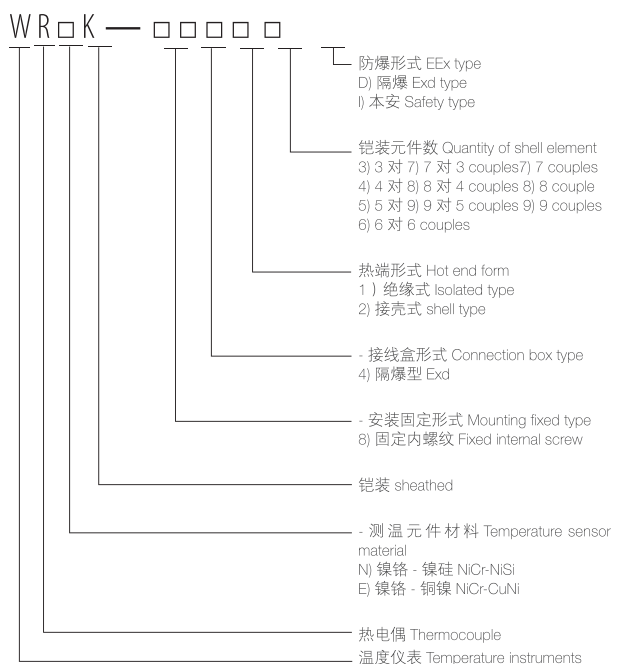
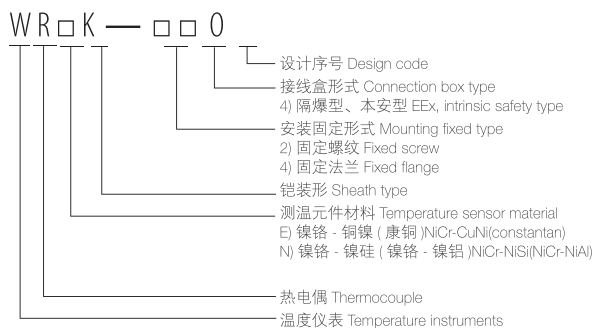
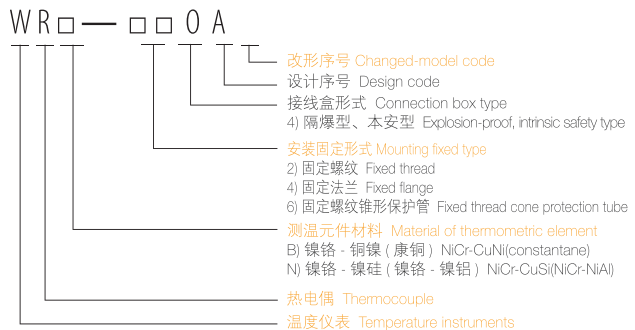
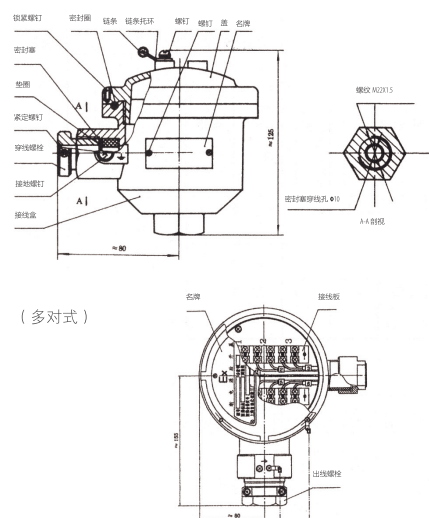
隔爆型、本安型热电偶的防爆等级按适用于爆炸性气体混合物最大安全间隙或最小点燃电流比分为 A、B、C 三级。

According to the max safety clearance or min fire Current, the explosion-proof grade was divided into A,B,C three types.

隔爆型、本安型热电偶的温度组别按其外露部分最高表面温度分为 T1~T6 六组。
According to the outside max temperature, divided into T1-T6 six groups

温度组别 Temperature class	允许最高表面温度 °C Allowable max surface temperature
T ₁	450
T ₂	300
T ₃	200
T ₄	135
T ₅	100
T ₆	85

隔爆型本安型热电偶接线盒结构示意图 Connection box drawing of explosion-proof, intrinsic safety thermocouples



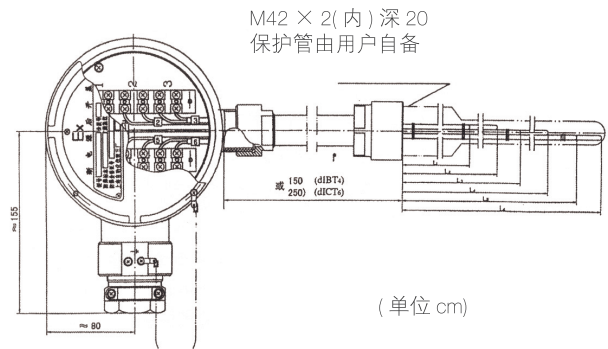
隔爆型、本安型热电偶
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隔爆型、本安型多对式热电偶的种类和规格
Types and specifications of explosion-proof, intrinsic safety multi type thermocouples

隔爆型、本安型多对式热电偶结构示意图 Construction drawing of explosion-proof, intrinsic safety multi-type thermocouples



隔爆型、本安型多对式热电偶的规格表 Specification sheet of explosion-proof, intrinsic safety multi-type thermocouples

Table with 7 columns: 型号 MODEL, 分度号 Grade, 测量范围 °C Measure range, 结构特征 Construction features, 保护管内径 D(mm) Inner diameter of protection tube, 插入深度 * / (mm) Insertion length, 防爆等级 Explosion-proof grade. It lists various models like WRNK-841n*D and WREK-841n*D with their respective grades and ranges.

*n 为铠装元件数, 有 4 5 6 7 8 9 对供用户选用
*n is the sheath element quantity, there are 4 5 6 7 8 9 couples for choose

安装固定位置 Fixed device

安装固定装置, 分固定螺纹、锥形固定螺纹、固定法兰等三种形式, 其结构尺寸见表。
Fixed thread, fixed taper thread and fixed flange, refer to the structure diagrams.

Table with 8 columns: Diagram, 用于保护管直径 Used for protection well diameter (d), M, h, s, D_o, 流速 wind speed m/s, 最高使用压力 max using pressure MPa. It details three types of fixed devices: 直形保护管固定螺纹 (fixed threads of straight protection tube), 锥形保护管固定螺纹 (fixed threads of tapered protection tube), and 固定法兰 (Fixed flange).





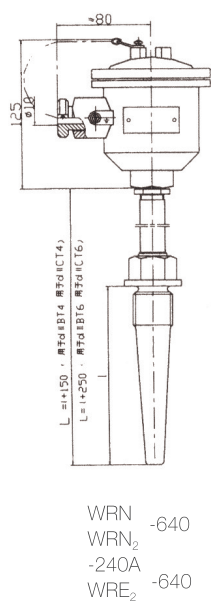
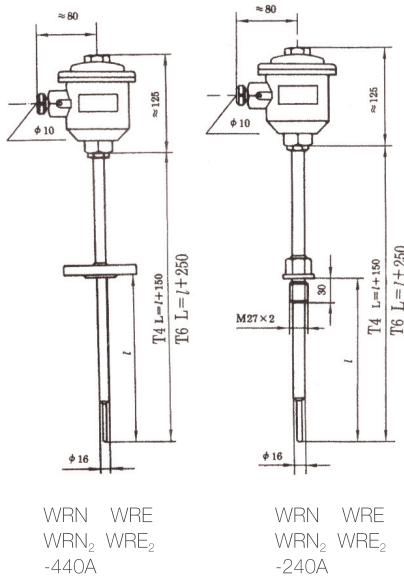
隔爆型、本安型热电偶
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隔爆型、本安型热电偶的种类和规格 model and specifications of Exd, safety type thermocouple

类别 Category	型号 Type	分度号 Graduation	测温范围 Temperature measuring range℃	保护管材料 Protection tube material	规格 Specification		热响应时间 Thermal response time τ 0.5s	公称压力 Nominal pressure Mpa	结构特征 Structure	防爆等级 Explosive-proof Grade	
					总长 L overall length mm	置深 l insertion length mm					
镍铬 - 镍硅 热电偶 NiCr-NiSi thermocouple	WRN-240A WRN ₂ -240A	K	0~800	或		150 200 250 300 400 500 750 1000 1500 2000	≤ 90	10	隔爆接线盒 Explosion-proof junction box	d II BT4 d II BT6 或 d II CT4 d II CT6	
镍铬 - 铜镍 热电偶 NiCr-CuNi thermocouple	WRE-240 WRE ₂ -240A	E	0~600			固定螺纹 fixed thread M27X2					
镍铬 - 镍硅 热电偶 NiCr-NiSi thermocouple	WRN-640 WRN ₂ -640	K	0~600			150 200 250		30	锥形保护管 taper protection tube		
镍铬 - 铜镍 热电偶 NiCr-CuNi thermocouple	WRE WRE ₂ -640	E	0~600						固定螺纹 fixed thread M33X2		
镍铬 - 镍硅 热电偶 NiCr-NiSi thermocouple	WRN -440A WRN ₂ -440A	K	0~800	或				150 200 250 300 400 500 750 1000 1500 2000	6.4		隔爆接线盒 Explosion-proof junction box
镍铬 - 铜镍 热电偶 NiCr-CuNi thermocouple	WRE -440A WRE ₂ -440A	E	0~600								固定法兰 fixed flange

注：防爆法兰是仪表行业标准 JB/t5219-1991 属平法兰
Notes: EEx flange is the instrument standard JB/t5219-1991, belong to RFW



防爆型、本安型热电偶
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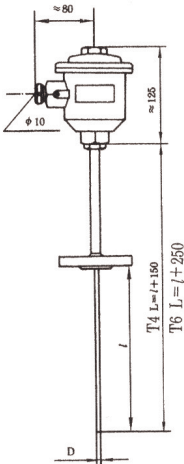
防爆型、本安型铠装热电偶规格表 Specification sheet of Exd, safety type thermocouple

型号 Model	分度号 Graduation	测量范围 (°C) Measure range	结构特征 Construction features	保护管直径 D (mm) Diameter of protection well	插入深度 l (mm) (Into) Insertion length	热响应时间 (S) T _{0.5} Thermal response time	公称压力 (MPa) Nominal pressure	防爆等级 Explosion-proof grade
WRNK - 240 WRNK ₂	K	0~800	M27X2 固定螺纹 fixed thread	Φ 8 Φ 6 Φ 5	按规格系列表 左框内尺寸选 取 select according to the specification table	≤ 8	10	dII BT4 dII BT6 或 dII CT4 dII CT6
WREK - 240 WREK ₂	E	0~600						
WRNK - 440 WRNK ₂	K	0~800	固定法兰 fixed flange			≤ 4	6.4	
WREK - 440 WREK ₂	E	0~600						

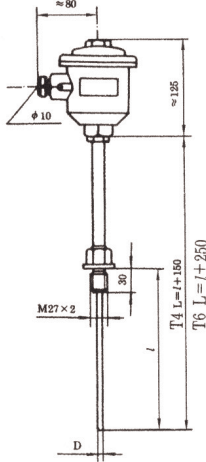
注：特殊规格订货必须双方协商而定
 Notes: if order the special specifications, please consult each other

隔爆型、本安型热电偶规格系列表 Specification sheet of Exd, safety type thermocouple

D(mm) 直径 Diameter	置深 l (mm) Insertion length														
	100	150	200	250	300	400	500	750	1000	1250	1500	2000	2500	3000	4000
Φ 8															
Φ 6															
Φ 5															



WRNK
 WRNK₂-440
 WREK
 WREK₂



WRNK
 WRNK₂-240
 WREK
 WREK₂

温度仪表系列 Temperature Instruments series



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可燃性气体、蒸汽级别、温度组别举例 Combustible gas, steam grade, temperature class GB3836.1-2000

序号 No	气体、蒸汽名称 Name of gas and steam	分子式 Formula	温度组别 Temp group
II A			
I 烃类			
1.1 链烷类			
1	甲烷	CH ₄	T1
2	乙烷	C ₂ H ₆	T1
3	丙烷	C ₃ H ₈	T1
4	丁烷	C ₄ H ₁₀	T2
5	戊烷	C ₅ H ₁₂	T3
6	己烷	C ₆ H ₁₄	T3
7	庚烷	C ₇ H ₁₆	T3
8	辛烷	C ₈ H ₁₈	T3
9	壬烷	C ₉ H ₂₀	T3
10	癸烷	C ₁₀ H ₂₂	T3
11	环丁烷	CH ₂ (CH ₂) ₂ CH ₂	-
12	环戊烷	CH ₂ (CH ₂) ₃ CH ₂	T2
13	环己烷	CH ₂ (CH ₂) ₄ CH ₂	T3
14	环庚烷	CH ₂ (CH ₂) ₅ CH ₂	-
15	甲基环丁烷	CH ₃ CH(CH ₂) ₃ CH ₂	-
16	甲基环戊烷	CH ₃ CH(CH ₂) ₃ CH ₂	T2
17	甲基环己烷	CH ₃ CH(CH ₂) ₄ CH ₂	T3
18	乙基环丁烷	C ₂ H ₅ CH(CH ₂) ₃ CH ₂	T3
19	乙基环戊烷	C ₂ H ₅ CH(CH ₂) ₃ CH ₂	T3
20	乙基环己烷	C ₂ H ₅ CH(CH ₂) ₄ CH ₂	T3
21	萘烷 (十氢化萘)	CH ₂ (CH ₂) ₃ CHCH(CH ₂) ₃ CH ₂	T3
1.2 链烯类			
22	丙烯	C ₂ H ₄ =CH ₂	T2
1.3 芳烃类			
	苯乙烯	C ₆ H ₅ CH=CH ₂	T1
23	异丙基苯		T1
24	(甲基苯乙炔)		
1.4 苯类			
25	苯	C ₆ H ₆	T1
26	甲苯	C ₆ H ₅ CH ₃	T1
27	二甲苯	C ₆ H ₄ (CH ₃) ₂	T1
28	乙苯	C ₆ H ₅ C ₂ H ₅	T2
29	三甲苯	C ₆ H ₃ (CH ₃) ₃	T1
30	萘	C ₁₀ H ₈	T3
31	异丙苯 (异丙基苯)	C ₆ H ₅ CH(CH ₃) ₂	T2
32	甲基, 异丙基苯	(CH ₃) ₂ CHC(CH ₃) ₂ H ₄ CH ₂	T2
1.5 混合烃类			
33	甲烷 (工业) ^①		T1
34	松节油		T3
35	古脑油		T3
36	煤焦油石脑油		T3
37	石油 (包括车用汽油)		T3
38	溶剂石或洗净石油		T3
39	燃料油		T3
40	煤油		T3
41	柴油		T3
42	动力苯		T1
2 含氧化合物			
2.1 氧化物 (包括醚)			

续表 Renewal table

序号 No	气体、蒸汽名称 Name of gas and steam	分子式 Formula	温度组别 Temp group
43	一氧化碳 ^②	CO	T1
44	(二) 丙醚	(C ₃ H ₇) ₂ O	-
2.2 醇和酚类			
45	甲醇	CH ₃ OH	T2
46	乙醇	C ₂ H ₅ OH	T2
47	丙醇	C ₃ H ₇ OH	T2
48	丁醇	C ₄ H ₉ OH	T2
49	戊醇	C ₅ H ₁₁ OH	T3
50	己醇	C ₆ H ₁₃ OH	T3
51	庚醇	C ₇ H ₁₅ OH	-
52	辛醇	C ₈ H ₁₇ OH	-
53	壬醇	C ₉ H ₁₉ OH	-
54	环己醇	CH ₂ (CH ₂) ₄ CHOH	T3
55	甲基环己醇	CH ₃ CH(CH ₂) ₄ CHOH	T3
56	苯酚	C ₆ H ₅ OH	T1
57	甲酚	CH ₃ C ₆ H ₄ OH	T1
58	4- 羟基 -4 • 甲基戊酮	(CH ₃) ₂ C(OH)CH ₂ COCH ₃	T1
(双丙酮醇)			
2.3 醛类			
59	乙醛	CH ₃ CHO	T4
60	聚乙醛	(CH ₃ CHO) _n	-
2.4 酮类			
61	乙基环己烷	(CH ₃) ₂ CO	T1
62	2- 丁酮 (乙基甲基酮)	C ₂ H ₅ COCH ₃	T1
63	2- 戊酮 (甲基 • 丙基甲酮)	C ₃ H ₇ COCH ₃	T1
64	2- 己酮 (甲基 • 丁基甲酮)	C ₄ H ₉ COCH ₃	T1
65	戊基甲基甲酮	C ₅ H ₁₁ COCH ₃	
66	戊间二酮 (乙酰丙酮)	CH ₃ COCH ₂ COCH ₃	T2
67	环乙酮	CH ₂ (CH ₂) ₄ CO	T2
2.5 酯类			
68	甲酸甲酯	HCOOCH ₃	T2
69	甲酸乙酯	HCOOC ₂ H ₅	T2
70	醋酸甲酯	CH ₃ COOCH ₃	T1
71	醋酸乙酯	CH ₃ COOC ₂ H ₅	T2
72	醋酸丙酯	CH ₃ COOC ₃ H ₇	T2
73	醋酸丁酯	CH ₃ COOC ₄ H ₉	T2
74	醋酸戊酯	CH ₃ COOC ₅ H ₁₁	T2
75	甲基丙烯酸甲酯 (异丁烯酸甲酯)	CH ₂ =C(CH ₃)COOCH ₃	T2
76	甲基丙烯酸乙酯 (异丁烯酸乙酯)	CH ₂ =C(CH ₃)COOC ₂ H ₅	-
77	醋酸乙烯酯	CH ₃ COOCH=CH ₂	T2
78	乙酰基醋酸乙酯	CH ₃ COCH ₂ COOC ₂ H ₅	T2
2.6 酸类			
79	醋酸	CH ₃ COOH	T1
3 含卤化合物			
3.1 无氧化合物			
80	甲基氯	CH ₃ Cl	T1
81	氯乙烷	C ₂ H ₅ Cl	T1
82	溴乙烷	C ₂ H ₅ Br	T1
83	氯丙烷	C ₃ H ₇ Cl	T1
84	氯丁烷	C ₄ H ₉ Cl	T3

隔爆型、本安型热电偶
EXd and intrinsic safety type thermocouples



WR 系列
WR Series

P-024

续表 Renewal table			
序号 No	气体、蒸汽名称 Name of gas and steam	分子式 Formula	温度组别 Temp group
85	溴丁烷	C ₄ H ₉ Br	T3
86	二氯乙烷	C ₂ H ₄ Cl ₂	T2
87	二氯丙烷	C ₃ H ₆ Cl ₂	T1
88	氯苯	C ₆ H ₅ Cl ₂	T1
89	苧基氯	C ₆ H ₅ CH ₂ Cl	T1
90	二氯苯	C ₆ H ₄ Cl ₂	T1
91	烯丙基氯	CH ₂ =CHCH ₂ Cl	T2
92	二氯乙烯	CHCl=CHCl	T1
93	氯乙烯	CH ₂ =CHCl	T1
94	三氯甲苯	C ₆ H ₄ CF ₃	T1
95	二氯甲烷 (甲叉二氯)	CH ₂ Cl ₂	T1
	3. 2 含氧化合物		
96	乙酰氯	CH ₃ COCl	T3
97	氯乙醇	CH ₂ ClCH ₂ OH	T2
	4 含硫化化合物		
98	乙硫醇	C ₂ H ₅ SH	T3
99	内硫醇	C ₃ H ₇ SH	-
100	噻吩	CH: CHCH: CHS	T2
101	四氢噻吩	CH ₂ : (CH ₂) ₂ : CH ₂ S	T3
	5 含氮化合物		
102	氮	NH ₃	T1
103	乙腈	CH ₃ CN	T1
104	亚硝酸乙酯	CH ₃ CH ₂ ONO	T6
105	硝基甲烷	CH ₃ NO ₂	T2
106	硝基乙烷	C ₂ H ₅ NO ₂	T2
	5.1 胺类		
107	甲胺	CH ₃ NH ₂	T2
108	二甲胺	(CH ₃) ₂ NH	T2
109	三甲胺	(CH ₃) ₃ N	T4
110	二乙胺	(C ₂ H ₅) ₂ NH	T2
111	三乙胺	(C ₂ H ₅) ₃ N	T1
112	正丙胺	C ₃ H ₇ NH ₂	T2
113	正丁胺	C ₄ H ₉ NH ₂	T2
114	环己胺	CH ₂ (CH ₂) ₄ CHNH ₂	T3
115	2- 乙二醇胺	NH ₂ CH ₂ CH ₂ OH	-
116	2- 二乙胺基乙醇	(C ₂ H ₅) ₂ NCH ₂ CH ₂ OH	-
117	二胺基乙烷	NH ₂ CH ₂ CH ₂ NH ₂	T2
118	苯胺	C ₆ H ₅ NH ₂	T1
119	NN- 二甲基苯胺	C ₆ H ₅ N(CH ₃) ₂	T2
120	苯胺基丙烷	C ₆ H ₅ CH ₂ CH(NH ₂)CH ₃	-
121	甲苯胺	CH ₃ C ₆ H ₄ NH ₂	T1

注：①甲烷 (工业) 包括 15%以下 (体积计的) 氢气的甲烷环合物。
②一氧化碳在异常环境温度下可以含有使它 与空气的混合物饱和的水份。

序号 No	气体、蒸汽名称 Name of gas and steam	分子式 Formula	温度组别 Temp group
122	吡啶 [胺 (杂) 苯]	C ₅ H ₅ N	T1
	II B		
	1 烃类		
123	丙炔	CH ₃ C≡CH	T1
124	乙烯	C ₂ H ₄	T2
125	环丙烷	CH ₂ CH ₂ CH ₂	T1
126	1,3- 丁二烯	CH ₂ =CHCH=CH ₂	T2
	2. 含氮化合物		
127	丙烯腈	CH ₂ =CHCN	T1
128	异丙基硝酸盐	(CH ₃) ₂ CHCONO ₂	-
129	氰化氢	HCN	T1
	3. 含氧化合物		
130	二甲醚	(CH ₃) ₂ O	T3
131	乙基甲基醚	CH ₃ OC ₂ H ₅	T4
132	二乙醚	(C ₂ H ₅) ₂ O	T4
133	二丁醚	(C ₄ H ₉) ₂ O	T4
134	环氧乙烷	CH ₂ CH ₂ O	T2
135	1,2- 环氧丙烷	CH ₃ CHCH ₂ O	T2
136	1,3- 二恶戊烷	CH ₂ CH ₂ OCH ₂ O	-
137	1,4- 二恶烷	CH ₂ CH ₂ OCH ₂ CH ₂ O	T2
138	1,3,5- 三恶烷	CH ₂ OCH ₂ OCH ₂ O	T2
139	羟基醋酸丁酯	HOCH ₂ COC ₄ H ₉	-
140	甲氢糖醇	CH ₂ CH ₂ CH ₂ OCHCH ₂ OH	T3
141	丙烯酸甲酯	CH ₂ =CHCOOCH ₃	T2
142	丙烯酸乙酯	CH ₂ =CHCOOC ₂ H ₅	T2
143	呋喃	CH=CHCH=CHO	T2
144	丁烯醛 (巴豆醛)	CH ₃ CH=CHCHO	T3
145	丙烯醛	CH ₂ =CHCHO	T3
146	四氢呋喃	CH ₂ (CH ₂) ₂ CH ₂ O	T3
	4. 混合物		
147	焦炉煤气		T1
	5 含卤化合物		
148	四氟乙烯	C ₂ F ₄	T4
149	氢甲代氧丙烷, 2- 氧	OCH ₂ CHCH ₂ Cl	T2
	-1,2- 环氧丙烷		
150	硫化氢	H ₂ S	T3
	II C		
151	氢		T1
152	乙炔		T2
153	二硫化碳		T5
154	硝酸乙酯		T6
155	水煤气		T1

Notes: (1) the methane (industrial) including below 15% (volume meter) hydrogen methane cyclization content.
(2) the carbon monoxide in the abnormal environment temperature can contain the moisture that make it and air mixture saturated.

温度仪表系列 Temperature Instruments series



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