

## 中华人民共和国国家标准

# 锰铁及高炉锰铁化学分析方法

## 气体容量法测定碳量

UDC 669.15'74  
:543.062

GB 7730.6—88

Methods for chemical analysis of ferromanganese  
and blast furnace ferromanganese  
The gasometric method for the determination  
of carbon content

本标准适用于低碳锰铁、中碳锰铁中碳量的测定。测定范围:0.400%~5.00%。

本标准遵守 GB 1467—78《冶金产品化学分析方法标准的总则及一般规定》。

### 1 方法提要

试样置于管式燃烧炉中加热并通氧燃烧,生成的二氧化碳等混合气体经除硫后收集于量气管中,然后以氢氧化钾溶液吸收其中的二氧化碳,吸收前后体积之差即为二氧化碳体积,再换算为碳量。

### 2 试剂及材料

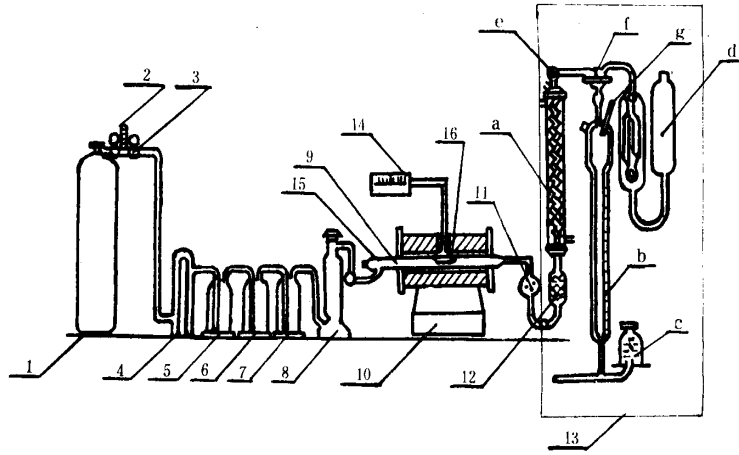
- 2.1 助熔剂:锡粒(0.4~0.8 mm)、铜、铁粉、五氧化二钒等。助熔剂中含碳量不大于 0.002%。
- 2.2 石棉纤维。
- 2.3 碱石灰或氢氧化钠。
- 2.4 氧化铝:活性、粒状。
- 2.5 二氧化锰:活性、粒状。
- 2.6 硫酸( $\rho$  1.84 g/mL)。
- 2.7 硫酸(0.1+100):滴加甲基红溶液呈红色。
- 2.8 铬酸饱和的硫酸溶液:于硫酸(2.6)中加重铬酸钾或铬酸酐至饱和,使用其上部澄清溶液。
- 2.9 氢氧化钾溶液(40%)。
- 2.10 氯化钠溶液(26%):以甲基红溶液作指示剂,滴加硫酸(1+1)至酸性。
- 2.11 氧气:纯度大于 99.5%。

### 3 仪器及设备

- 3.1 气体容量法定碳装置如下图。
  - 3.1.1 洗气瓶(5):内盛铬酸饱和的硫酸溶液(2.8)。
  - 3.1.2 洗气瓶(6):内装碱石灰或氢氧化钠。
  - 3.1.3 干燥塔(7、8):内装氧化铝(2.4)。
  - 3.1.4 高温燃烧管(9): $\phi \times L$ , mm:23~24×600。
  - 3.1.5 管式燃烧炉(10):可调节电流以保证燃烧试样所需温度。
  - 3.1.6 石棉纤维(11):灼烧至无碳。
  - 3.1.7 除硫管(12):内装二氧化锰(2.5)。

中华人民共和国冶金工业部 1988-02-02 批准

1989-03-01 实施



1—氧气瓶；2—氧气表；3—缓冲瓶；4—微型转子流量计；5、6—洗气瓶；7、8—干燥塔；  
9—高温燃烧管；10—管式燃烧炉；11—石棉纤维；12—除硫管；13—容量定碳仪(包括：  
冷凝管 a、量气管 b、水准瓶 c、吸收器 d、小活塞 e、三通活塞 f、温度计 g)；14—高温控  
制器；15—磨砂玻璃塞；16—瓷舟

3.1.8 瓷舟(16)：长 88 mm 或 97 mm，应预先于 1200 °C 管式燃烧炉中通氧灼烧至无碳，也可于 1 000 °C 高温炉中灼烧 4 h 以上，冷却后贮于盛有碱石棉或碱石灰和无水氯化钙的未涂油脂的干燥器中。

3.1.9 量气管(b)：内盛氯化钠溶液(2.10)或硫酸溶液(2.7)。每一格刻度为 0.05 mL，它是在 16 °C、101.32 kPa(760 mmHg)标准状况下刻制的。

3.1.10 吸收器(d)：内盛氢氧化钾溶液(2.9)。

3.1.11 小活塞(e)：有一方可通大气。

3.2 长钩：用低碳镍铬丝或耐热合金丝制成。

3.3 水银气压计：气压值应按公式(1)校正：

$$P = P' (1 - 0.000163t - 0.0026\cos 2\varphi - 0.0000002H) \dots\dots\dots (1)$$

式中：P ——校正后的气压值，kPa；

P' ——水银气压计测得的气压值，kPa；

t ——水银气压计所在处温度，°C；

φ ——水银气压计所在处纬度，(°)；

H ——水银气压计所在处海拔高度，m。

#### 4 试样

4.1 低碳锰铁、中碳锰铁试样应全部通过 0.149 mm 筛孔。

4.2 高炉锰铁试样应全部通过 0.125 mm 筛孔。

#### 5 分析步骤

##### 5.1 试样量

按表 1 称取试样和助熔剂。

表 1

碳量 %	试样量 g	助熔剂量(任选其一), g					
		锡粒	铜或 氧化铜	五氧化 二钒	氧化铜+ 五氧化二钒 (1+1)	铁粉+氧化铜 (1+1)	五氧化二钒 +铁粉 (1+1)
0.400~1.200	1.000 0	0.5	0.5~1.0	0.5~1.0	0.5~1.0	0.5~1.0	0.5~1.0
>1.200~2.500	0.500 0						
>2.500~5.000	0.200 0						

5.2 空白试验

随同试样做空白试验。

5.3 分析前的准备

将炉温升至 1 200~1 350 ℃, 检查管路及活塞是否漏气、装置是否正常, 燃烧标准试样, 检查仪器及操作。

5.4 测定

将试样(5.1)置于瓷舟(3.1.8)中, 按表 1 覆盖助熔剂, 将瓷舟推入高温燃烧管温度最高处, 立即塞紧磨砂玻璃塞(15), 将氧气表上的三通活塞(f)打开, 一边调节氧气流速至 120~140 mL/min, 一边通氧约 3 min, 使高温燃烧管中的温度恒定。

按容量定碳仪操作规程, 将混合气体导入量气管, 定容、吸收后, 测量其读数, 并确认残留的气体体积没有变化后, 启开磨砂玻璃塞, 用长钩将瓷舟拉出, 检查熔块, 确认燃烧完全后, 将残留气体放空。

6 计算

按公式(2)计算碳的百分含量:

$$C(\%) = \frac{(V_1A - V_2A) - V_0A}{m} \times f \times 100 \quad \dots\dots\dots(2)$$

式中: A —— 温度 16 ℃, 气压 101.32 kPa, 用酸性水作封闭液时, 封闭液面上每毫升二氧化碳中含碳量 A 值为 0.000 500 0 g; 用氯化钠酸性溶液作封闭液时 A 值为 0.000 502 2 g;

$V_1$  —— 混合气体的体积, mL;

$V_2$  —— 残留气体的体积, mL;

$V_0$  —— 空白试验的气体体积, mL;

$m$  —— 试样量, g;

$f$  —— 温度、气压校正系数, 见附录 A 表 A1 或表 A2。

7 允许差

实验室之间分析结果的差值应不大于表 2 所列允许差。

表 2

%

碳 量	允许差
≥0.400~1.200	0.030
>1.200~2.50	0.050
>2.50~5.00	0.10

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附录 A

A1 气体容量法测定碳的温度、气压修正系数表 (本表用 1:1000)

P mbar	t / °C																	
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
750	0.774	0.771	0.768	0.764	0.761	0.757	0.754	0.750	0.746	0.743	0.739	0.735	0.732	0.728	0.724	0.720	0.716	0.712
752	0.777	0.773	0.770	0.766	0.763	0.759	0.756	0.752	0.748	0.745	0.741	0.737	0.734	0.730	0.726	0.722	0.718	0.714
754	0.779	0.775	0.772	0.768	0.765	0.761	0.758	0.754	0.751	0.747	0.743	0.740	0.736	0.732	0.728	0.724	0.720	0.716
756	0.781	0.777	0.774	0.770	0.767	0.763	0.760	0.756	0.753	0.749	0.745	0.742	0.738	0.734	0.730	0.726	0.722	0.718
758	0.783	0.779	0.776	0.772	0.769	0.765	0.762	0.758	0.755	0.751	0.747	0.744	0.740	0.736	0.732	0.728	0.724	0.720
760	0.785	0.781	0.778	0.774	0.771	0.767	0.764	0.760	0.757	0.753	0.749	0.746	0.742	0.738	0.734	0.730	0.726	0.722
762	0.787	0.784	0.780	0.777	0.773	0.769	0.766	0.762	0.759	0.755	0.751	0.748	0.744	0.740	0.736	0.732	0.728	0.724
764	0.789	0.786	0.782	0.779	0.775	0.771	0.768	0.764	0.761	0.757	0.753	0.750	0.746	0.742	0.738	0.734	0.730	0.726
766	0.791	0.788	0.784	0.781	0.777	0.774	0.770	0.766	0.763	0.759	0.755	0.752	0.748	0.744	0.740	0.736	0.732	0.728
768	0.793	0.790	0.786	0.783	0.779	0.776	0.772	0.768	0.765	0.761	0.757	0.754	0.750	0.746	0.742	0.738	0.734	0.730
770	0.795	0.792	0.788	0.785	0.781	0.778	0.774	0.770	0.767	0.763	0.759	0.756	0.752	0.748	0.744	0.740	0.736	0.732
772	0.797	0.794	0.790	0.787	0.783	0.780	0.776	0.772	0.769	0.765	0.761	0.758	0.754	0.750	0.746	0.742	0.738	0.734
774	0.800	0.796	0.792	0.789	0.785	0.782	0.778	0.774	0.771	0.767	0.763	0.760	0.756	0.752	0.748	0.744	0.740	0.736
776	0.802	0.798	0.795	0.791	0.787	0.784	0.780	0.776	0.773	0.769	0.765	0.762	0.758	0.754	0.750	0.746	0.742	0.738
778	0.804	0.800	0.797	0.793	0.789	0.786	0.782	0.778	0.775	0.771	0.767	0.764	0.760	0.756	0.752	0.748	0.744	0.740
780	0.806	0.802	0.799	0.795	0.792	0.788	0.784	0.781	0.777	0.773	0.769	0.766	0.762	0.758	0.754	0.750	0.746	0.742
782	0.808	0.804	0.801	0.797	0.794	0.790	0.786	0.783	0.779	0.775	0.771	0.768	0.764	0.760	0.756	0.752	0.748	0.744
784	0.810	0.806	0.803	0.799	0.796	0.792	0.788	0.785	0.781	0.777	0.773	0.770	0.766	0.762	0.758	0.754	0.750	0.746
786	0.812	0.809	0.805	0.801	0.798	0.794	0.790	0.787	0.783	0.779	0.775	0.772	0.768	0.764	0.760	0.756	0.752	0.748
788	0.814	0.811	0.807	0.803	0.800	0.796	0.792	0.789	0.785	0.781	0.777	0.774	0.770	0.766	0.762	0.758	0.754	0.750
790	0.816	0.813	0.809	0.805	0.802	0.798	0.794	0.791	0.787	0.783	0.779	0.776	0.772	0.768	0.764	0.760	0.756	0.752
792	0.818	0.815	0.811	0.808	0.804	0.800	0.796	0.793	0.789	0.785	0.782	0.778	0.774	0.770	0.766	0.762	0.758	0.754
794	0.820	0.817	0.813	0.810	0.806	0.802	0.799	0.795	0.791	0.787	0.783	0.780	0.776	0.772	0.768	0.764	0.760	0.756
796	0.823	0.819	0.815	0.812	0.808	0.804	0.801	0.797	0.793	0.789	0.785	0.782	0.778	0.774	0.770	0.766	0.762	0.758
798	0.825	0.821	0.817	0.814	0.810	0.806	0.803	0.799	0.795	0.791	0.788	0.784	0.780	0.776	0.772	0.768	0.764	0.760
800	0.827	0.823	0.819	0.816	0.812	0.808	0.805	0.801	0.797	0.793	0.790	0.786	0.782	0.778	0.774	0.770	0.766	0.762
802	0.829	0.825	0.822	0.818	0.814	0.810	0.807	0.803	0.799	0.795	0.792	0.788	0.784	0.780	0.776	0.772	0.768	0.764

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(补 充 件)

的硫酸溶液作封闭液) 1mbar=0.750 mmHg (1bar=10<sup>5</sup> Pa)

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0.708	0.704	0.700	0.696	0.692	0.687	0.683	0.678	0.674	0.669	0.664	0.659	0.654	0.649	0.644	0.639	0.633	0.628	0.622	0.616
0.710	0.706	0.702	0.698	0.694	0.689	0.685	0.680	0.676	0.671	0.666	0.661	0.656	0.651	0.646	0.640	0.635	0.629	0.624	0.618
0.712	0.708	0.704	0.700	0.695	0.691	0.687	0.682	0.677	0.673	0.668	0.663	0.658	0.653	0.648	0.642	0.637	0.631	0.626	0.620
0.714	0.710	0.706	0.702	0.697	0.693	0.689	0.684	0.679	0.675	0.670	0.665	0.660	0.655	0.650	0.644	0.639	0.633	0.627	0.622
0.716	0.712	0.708	0.704	0.699	0.695	0.691	0.686	0.681	0.677	0.672	0.667	0.662	0.657	0.651	0.646	0.641	0.635	0.629	0.623
0.718	0.714	0.710	0.706	0.701	0.697	0.693	0.688	0.683	0.678	0.674	0.669	0.664	0.659	0.653	0.648	0.642	0.637	0.631	0.625
0.720	0.716	0.712	0.708	0.703	0.699	0.694	0.690	0.685	0.680	0.676	0.671	0.666	0.660	0.655	0.650	0.644	0.639	0.633	0.627
0.722	0.718	0.714	0.710	0.705	0.701	0.696	0.692	0.687	0.682	0.677	0.672	0.667	0.662	0.657	0.652	0.646	0.641	0.635	0.629
0.724	0.720	0.716	0.711	0.707	0.703	0.698	0.694	0.689	0.684	0.679	0.674	0.669	0.664	0.659	0.654	0.648	0.642	0.637	0.631
0.726	0.722	0.718	0.713	0.709	0.705	0.700	0.696	0.691	0.686	0.681	0.676	0.671	0.666	0.661	0.655	0.650	0.644	0.638	0.633
0.728	0.724	0.720	0.715	0.711	0.707	0.702	0.697	0.693	0.688	0.683	0.678	0.673	0.668	0.663	0.657	0.652	0.646	0.640	0.634
0.730	0.726	0.722	0.717	0.713	0.708	0.704	0.699	0.695	0.690	0.685	0.680	0.675	0.670	0.665	0.659	0.654	0.648	0.642	0.636
0.732	0.728	0.724	0.719	0.715	0.710	0.706	0.701	0.697	0.692	0.687	0.682	0.677	0.672	0.666	0.661	0.655	0.650	0.644	0.638
0.734	0.730	0.725	0.721	0.717	0.712	0.708	0.703	0.698	0.694	0.689	0.684	0.679	0.674	0.668	0.663	0.657	0.652	0.646	0.640
0.736	0.732	0.727	0.723	0.719	0.714	0.710	0.705	0.700	0.696	0.691	0.686	0.681	0.676	0.670	0.665	0.659	0.654	0.648	0.642
0.738	0.734	0.729	0.725	0.721	0.716	0.712	0.707	0.702	0.698	0.693	0.688	0.683	0.678	0.672	0.667	0.661	0.655	0.650	0.644
0.740	0.735	0.731	0.727	0.722	0.718	0.714	0.709	0.704	0.699	0.695	0.690	0.684	0.679	0.674	0.668	0.663	0.657	0.651	0.645
0.742	0.738	0.733	0.729	0.725	0.720	0.716	0.711	0.706	0.701	0.696	0.691	0.686	0.681	0.676	0.670	0.665	0.659	0.653	0.647
0.744	0.739	0.735	0.731	0.726	0.722	0.717	0.713	0.708	0.703	0.698	0.693	0.688	0.683	0.678	0.672	0.667	0.661	0.655	0.649
0.746	0.741	0.737	0.733	0.728	0.724	0.719	0.715	0.710	0.705	0.700	0.695	0.690	0.685	0.680	0.674	0.669	0.663	0.657	0.651
0.748	0.743	0.739	0.735	0.730	0.726	0.721	0.717	0.712	0.707	0.702	0.697	0.692	0.687	0.681	0.676	0.670	0.665	0.659	0.653
0.750	0.745	0.741	0.737	0.732	0.728	0.723	0.719	0.714	0.709	0.704	0.699	0.694	0.689	0.683	0.678	0.672	0.667	0.661	0.655
0.752	0.747	0.743	0.739	0.734	0.730	0.725	0.720	0.716	0.711	0.706	0.701	0.696	0.691	0.685	0.680	0.674	0.668	0.663	0.657
0.754	0.749	0.745	0.741	0.736	0.732	0.727	0.722	0.718	0.713	0.708	0.703	0.698	0.692	0.687	0.682	0.676	0.670	0.664	0.658
0.755	0.751	0.747	0.743	0.738	0.734	0.729	0.724	0.720	0.715	0.710	0.705	0.700	0.694	0.689	0.683	0.678	0.672	0.666	0.660
0.757	0.753	0.749	0.744	0.740	0.735	0.731	0.726	0.721	0.717	0.712	0.707	0.701	0.696	0.691	0.685	0.680	0.674	0.668	0.662
0.759	0.755	0.751	0.746	0.742	0.737	0.733	0.728	0.723	0.718	0.714	0.708	0.703	0.698	0.693	0.687	0.682	0.676	0.670	0.664

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续

$t^{\circ}\text{C}$ P mbar	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
804	0.831	0.827	0.824	0.820	0.816	0.812	0.809	0.805	0.801	0.797	0.794	0.790	0.786	0.782	0.778	0.774	0.770	0.766
806	0.833	0.829	0.826	0.822	0.818	0.815	0.811	0.807	0.803	0.799	0.796	0.792	0.788	0.784	0.780	0.776	0.772	0.768
808	0.835	0.831	0.828	0.824	0.820	0.817	0.813	0.809	0.805	0.802	0.798	0.794	0.790	0.786	0.782	0.778	0.774	0.770
810	0.837	0.833	0.830	0.826	0.822	0.819	0.815	0.811	0.807	0.804	0.800	0.796	0.792	0.788	0.784	0.780	0.776	0.771
812	0.839	0.836	0.832	0.828	0.824	0.821	0.817	0.813	0.809	0.806	0.802	0.798	0.794	0.790	0.786	0.782	0.778	0.773
814	0.841	0.838	0.834	0.830	0.826	0.823	0.819	0.815	0.811	0.808	0.804	0.800	0.796	0.792	0.788	0.784	0.780	0.775
816	0.843	0.840	0.836	0.832	0.829	0.825	0.821	0.817	0.813	0.810	0.806	0.802	0.798	0.794	0.790	0.786	0.782	0.777
818	0.845	0.842	0.838	0.834	0.831	0.827	0.823	0.819	0.816	0.812	0.808	0.804	0.800	0.796	0.792	0.788	0.784	0.779
820	0.848	0.844	0.840	0.836	0.833	0.829	0.825	0.821	0.818	0.814	0.810	0.806	0.802	0.798	0.794	0.790	0.786	0.781
822	0.850	0.846	0.842	0.838	0.835	0.831	0.827	0.823	0.820	0.816	0.812	0.808	0.804	0.800	0.796	0.792	0.788	0.783
824	0.852	0.848	0.844	0.841	0.837	0.833	0.829	0.825	0.822	0.818	0.814	0.810	0.806	0.802	0.798	0.794	0.789	0.785
826	0.854	0.850	0.846	0.843	0.839	0.835	0.831	0.827	0.824	0.820	0.816	0.812	0.808	0.804	0.800	0.796	0.791	0.787
828	0.856	0.852	0.848	0.845	0.841	0.837	0.833	0.830	0.826	0.822	0.818	0.814	0.810	0.806	0.802	0.798	0.793	0.789
830	0.858	0.854	0.850	0.847	0.843	0.839	0.835	0.832	0.828	0.824	0.820	0.816	0.812	0.808	0.804	0.800	0.795	0.791
832	0.860	0.856	0.853	0.849	0.845	0.841	0.837	0.834	0.830	0.826	0.822	0.818	0.814	0.810	0.806	0.802	0.797	0.793
834	0.862	0.858	0.855	0.851	0.847	0.843	0.839	0.836	0.832	0.828	0.824	0.820	0.816	0.812	0.808	0.804	0.799	0.795
836	0.864	0.860	0.857	0.853	0.849	0.845	0.842	0.838	0.834	0.830	0.826	0.822	0.818	0.814	0.810	0.806	0.801	0.797
838	0.866	0.863	0.859	0.855	0.851	0.847	0.844	0.840	0.836	0.832	0.828	0.824	0.820	0.816	0.812	0.808	0.803	0.799
840	0.868	0.865	0.861	0.857	0.853	0.849	0.846	0.842	0.838	0.834	0.830	0.826	0.822	0.818	0.814	0.810	0.805	0.801
842	0.871	0.867	0.863	0.859	0.855	0.852	0.848	0.844	0.840	0.836	0.832	0.828	0.824	0.820	0.816	0.811	0.807	0.803
844	0.873	0.869	0.865	0.861	0.857	0.854	0.850	0.846	0.842	0.838	0.834	0.830	0.826	0.822	0.818	0.813	0.809	0.805
846	0.875	0.871	0.867	0.863	0.859	0.856	0.852	0.848	0.844	0.840	0.836	0.832	0.828	0.824	0.820	0.815	0.811	0.807
848	0.877	0.873	0.869	0.865	0.862	0.858	0.854	0.850	0.846	0.842	0.838	0.834	0.830	0.826	0.822	0.817	0.813	0.809
850	0.879	0.875	0.871	0.867	0.864	0.860	0.856	0.852	0.848	0.844	0.840	0.836	0.832	0.828	0.824	0.819	0.815	0.811
852	0.881	0.877	0.873	0.870	0.866	0.862	0.858	0.854	0.850	0.846	0.842	0.838	0.834	0.830	0.826	0.821	0.817	0.813
854	0.883	0.879	0.875	0.872	0.868	0.864	0.860	0.856	0.852	0.848	0.844	0.840	0.836	0.832	0.828	0.823	0.819	0.815
856	0.885	0.881	0.878	0.874	0.870	0.866	0.862	0.858	0.854	0.850	0.846	0.842	0.838	0.834	0.830	0.825	0.821	0.817
858	0.887	0.883	0.880	0.876	0.872	0.868	0.864	0.860	0.856	0.852	0.848	0.844	0.840	0.836	0.832	0.827	0.823	0.819
860	0.889	0.886	0.882	0.878	0.874	0.870	0.866	0.862	0.858	0.854	0.850	0.846	0.842	0.838	0.834	0.829	0.825	0.821

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表 A1

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0.761	0.757	0.753	0.748	0.744	0.739	0.735	0.730	0.725	0.720	0.715	0.710	0.705	0.700	0.694	0.689	0.683	0.678	0.672	0.666
0.763	0.759	0.755	0.750	0.746	0.741	0.737	0.732	0.727	0.722	0.717	0.712	0.707	0.702	0.696	0.691	0.685	0.680	0.674	0.668
0.765	0.761	0.757	0.752	0.748	0.743	0.739	0.734	0.729	0.724	0.719	0.714	0.709	0.704	0.698	0.693	0.687	0.681	0.675	0.669
0.767	0.763	0.759	0.754	0.750	0.745	0.741	0.736	0.731	0.726	0.721	0.716	0.711	0.706	0.700	0.695	0.689	0.683	0.677	0.671
0.769	0.765	0.760	0.756	0.752	0.747	0.742	0.738	0.733	0.728	0.723	0.718	0.713	0.707	0.702	0.696	0.691	0.685	0.679	0.673
0.771	0.767	0.762	0.758	0.754	0.749	0.744	0.740	0.735	0.730	0.725	0.720	0.715	0.709	0.704	0.698	0.693	0.687	0.681	0.675
0.773	0.769	0.764	0.760	0.756	0.751	0.746	0.742	0.737	0.732	0.727	0.722	0.716	0.711	0.706	0.700	0.694	0.689	0.683	0.677
0.775	0.771	0.766	0.762	0.757	0.753	0.748	0.743	0.739	0.734	0.729	0.724	0.718	0.713	0.708	0.702	0.696	0.691	0.685	0.679
0.777	0.773	0.768	0.764	0.759	0.755	0.750	0.745	0.740	0.736	0.731	0.725	0.720	0.715	0.709	0.704	0.698	0.692	0.686	0.680
0.779	0.775	0.770	0.766	0.761	0.757	0.752	0.747	0.742	0.738	0.732	0.727	0.722	0.717	0.711	0.706	0.700	0.694	0.688	0.682
0.781	0.777	0.772	0.768	0.763	0.759	0.754	0.749	0.744	0.739	0.734	0.729	0.724	0.719	0.713	0.708	0.702	0.696	0.690	0.684
0.783	0.779	0.774	0.770	0.765	0.760	0.756	0.751	0.746	0.741	0.736	0.731	0.726	0.721	0.715	0.710	0.704	0.698	0.692	0.686
0.785	0.781	0.776	0.772	0.767	0.762	0.758	0.753	0.748	0.743	0.738	0.733	0.728	0.722	0.717	0.711	0.706	0.700	0.694	0.688
0.787	0.783	0.778	0.774	0.769	0.764	0.760	0.755	0.750	0.745	0.740	0.735	0.730	0.724	0.719	0.713	0.708	0.702	0.696	0.690
0.789	0.784	0.780	0.776	0.771	0.766	0.762	0.757	0.752	0.747	0.742	0.737	0.732	0.726	0.721	0.715	0.709	0.704	0.698	0.692
0.791	0.786	0.782	0.777	0.773	0.768	0.764	0.759	0.754	0.749	0.744	0.739	0.733	0.728	0.723	0.717	0.711	0.706	0.700	0.693
0.793	0.788	0.784	0.779	0.775	0.770	0.766	0.761	0.756	0.751	0.746	0.741	0.735	0.730	0.724	0.719	0.713	0.707	0.701	0.695
0.795	0.790	0.786	0.781	0.777	0.772	0.767	0.763	0.758	0.753	0.748	0.742	0.737	0.732	0.726	0.721	0.715	0.709	0.703	0.697
0.797	0.792	0.788	0.783	0.779	0.774	0.769	0.764	0.760	0.755	0.750	0.744	0.739	0.734	0.728	0.723	0.717	0.711	0.705	0.699
0.799	0.794	0.790	0.785	0.781	0.776	0.771	0.766	0.762	0.756	0.751	0.746	0.741	0.736	0.730	0.724	0.719	0.713	0.707	0.701
0.801	0.796	0.792	0.787	0.783	0.778	0.773	0.768	0.763	0.758	0.753	0.748	0.743	0.738	0.732	0.726	0.721	0.715	0.709	0.703
0.802	0.798	0.794	0.789	0.785	0.780	0.775	0.770	0.765	0.760	0.755	0.750	0.745	0.739	0.734	0.728	0.722	0.717	0.711	0.704
0.804	0.800	0.796	0.791	0.786	0.782	0.777	0.772	0.767	0.762	0.757	0.752	0.747	0.741	0.736	0.730	0.724	0.718	0.712	0.706
0.806	0.802	0.798	0.793	0.788	0.784	0.779	0.774	0.769	0.764	0.759	0.754	0.748	0.743	0.738	0.732	0.726	0.720	0.714	0.708
0.808	0.804	0.800	0.795	0.790	0.786	0.781	0.776	0.771	0.766	0.761	0.756	0.750	0.745	0.740	0.734	0.728	0.722	0.716	0.710
0.810	0.806	0.801	0.797	0.792	0.788	0.783	0.778	0.773	0.768	0.763	0.758	0.752	0.747	0.741	0.736	0.730	0.724	0.718	0.712
0.812	0.808	0.803	0.799	0.794	0.790	0.785	0.780	0.775	0.770	0.765	0.760	0.754	0.749	0.743	0.738	0.732	0.726	0.720	0.714
0.814	0.810	0.805	0.801	0.796	0.791	0.787	0.782	0.777	0.772	0.767	0.761	0.756	0.751	0.745	0.739	0.734	0.728	0.722	0.716
0.816	0.812	0.807	0.803	0.798	0.793	0.789	0.784	0.779	0.774	0.768	0.763	0.758	0.752	0.747	0.741	0.736	0.730	0.724	0.717

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续

$P$ mbar	$t^{\circ}\text{C}$	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
862		0.891	0.888	0.884	0.880	0.876	0.872	0.868	0.864	0.860	0.856	0.852	0.848	0.844	0.840	0.836	0.831	0.827	0.823
864		0.894	0.890	0.886	0.882	0.878	0.874	0.870	0.866	0.862	0.858	0.854	0.850	0.846	0.842	0.838	0.833	0.829	0.825
866		0.896	0.892	0.888	0.884	0.880	0.876	0.872	0.868	0.864	0.860	0.856	0.852	0.848	0.844	0.840	0.835	0.831	0.827
868		0.898	0.894	0.890	0.886	0.882	0.878	0.874	0.870	0.866	0.862	0.858	0.854	0.850	0.846	0.842	0.837	0.833	0.829
870		0.900	0.896	0.892	0.888	0.884	0.880	0.876	0.872	0.868	0.864	0.860	0.856	0.852	0.848	0.844	0.839	0.835	0.831
872		0.902	0.898	0.894	0.890	0.886	0.882	0.878	0.874	0.870	0.866	0.862	0.858	0.854	0.850	0.846	0.841	0.837	0.833
874		0.904	0.900	0.896	0.892	0.888	0.884	0.880	0.876	0.872	0.868	0.864	0.860	0.856	0.852	0.847	0.843	0.839	0.834
876		0.906	0.902	0.898	0.894	0.890	0.886	0.882	0.878	0.874	0.870	0.866	0.862	0.858	0.854	0.849	0.845	0.841	0.836
878		0.908	0.904	0.900	0.896	0.892	0.888	0.884	0.880	0.876	0.872	0.868	0.864	0.860	0.856	0.851	0.847	0.843	0.838
880		0.910	0.906	0.902	0.898	0.894	0.890	0.886	0.882	0.878	0.874	0.870	0.866	0.862	0.858	0.853	0.849	0.845	0.840
882		0.912	0.908	0.904	0.900	0.897	0.893	0.889	0.884	0.880	0.876	0.872	0.868	0.864	0.860	0.855	0.851	0.847	0.842
884		0.914	0.910	0.907	0.903	0.899	0.895	0.891	0.887	0.882	0.878	0.874	0.870	0.866	0.862	0.857	0.853	0.849	0.844
886		0.917	0.913	0.909	0.905	0.901	0.897	0.893	0.889	0.884	0.880	0.876	0.872	0.868	0.864	0.859	0.855	0.851	0.846
888		0.919	0.915	0.911	0.907	0.903	0.899	0.895	0.891	0.887	0.882	0.878	0.874	0.870	0.866	0.861	0.857	0.853	0.848
890		0.921	0.917	0.913	0.909	0.905	0.901	0.897	0.893	0.889	0.884	0.880	0.876	0.872	0.868	0.863	0.859	0.855	0.850
892		0.923	0.919	0.915	0.911	0.907	0.903	0.899	0.895	0.891	0.886	0.882	0.878	0.874	0.870	0.865	0.861	0.857	0.852
894		0.925	0.921	0.917	0.913	0.909	0.905	0.901	0.897	0.893	0.888	0.884	0.880	0.876	0.872	0.867	0.863	0.859	0.854
896		0.927	0.923	0.919	0.915	0.911	0.907	0.903	0.899	0.895	0.890	0.886	0.882	0.878	0.874	0.869	0.865	0.861	0.856
898		0.929	0.925	0.921	0.917	0.913	0.909	0.905	0.901	0.897	0.893	0.888	0.884	0.880	0.876	0.871	0.867	0.863	0.858
900		0.931	0.927	0.923	0.919	0.915	0.911	0.907	0.903	0.899	0.895	0.890	0.886	0.882	0.878	0.873	0.869	0.864	0.860
902		0.933	0.929	0.925	0.921	0.917	0.913	0.909	0.905	0.901	0.897	0.892	0.888	0.884	0.880	0.875	0.871	0.866	0.862
904		0.935	0.931	0.927	0.923	0.919	0.915	0.911	0.907	0.903	0.899	0.894	0.890	0.886	0.882	0.877	0.873	0.868	0.864
906		0.937	0.933	0.929	0.925	0.921	0.917	0.913	0.909	0.905	0.901	0.896	0.892	0.888	0.884	0.879	0.875	0.870	0.866
908		0.940	0.936	0.931	0.927	0.923	0.919	0.915	0.911	0.907	0.903	0.898	0.894	0.890	0.886	0.881	0.877	0.872	0.868
910		0.942	0.938	0.934	0.929	0.925	0.921	0.917	0.913	0.909	0.905	0.900	0.896	0.892	0.888	0.883	0.879	0.874	0.870
912		0.944	0.940	0.936	0.932	0.927	0.923	0.919	0.915	0.911	0.907	0.902	0.898	0.894	0.890	0.885	0.881	0.876	0.872
914		0.946	0.942	0.938	0.934	0.930	0.925	0.921	0.917	0.913	0.909	0.904	0.900	0.896	0.892	0.887	0.883	0.878	0.874
916		0.948	0.944	0.940	0.936	0.932	0.927	0.923	0.919	0.915	0.911	0.907	0.902	0.898	0.894	0.889	0.885	0.880	0.876



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表 A1

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0.818	0.814	0.809	0.805	0.800	0.795	0.791	0.786	0.781	0.776	0.770	0.765	0.760	0.754	0.749	0.743	0.737	0.731	0.725	0.719
0.820	0.816	0.811	0.807	0.802	0.797	0.792	0.788	0.782	0.778	0.772	0.767	0.762	0.756	0.751	0.745	0.739	0.733	0.727	0.721
0.822	0.818	0.813	0.809	0.804	0.799	0.794	0.789	0.784	0.779	0.774	0.769	0.764	0.758	0.753	0.747	0.741	0.735	0.729	0.723
0.824	0.820	0.815	0.810	0.806	0.801	0.796	0.791	0.786	0.781	0.776	0.771	0.766	0.760	0.754	0.749	0.743	0.737	0.731	0.725
0.826	0.822	0.817	0.812	0.808	0.803	0.798	0.793	0.788	0.783	0.778	0.773	0.767	0.762	0.756	0.751	0.745	0.739	0.733	0.727
0.828	0.824	0.819	0.814	0.810	0.805	0.800	0.795	0.790	0.785	0.780	0.775	0.769	0.764	0.758	0.752	0.747	0.741	0.735	0.728
0.830	0.826	0.821	0.816	0.812	0.807	0.802	0.797	0.792	0.787	0.782	0.776	0.771	0.766	0.760	0.754	0.748	0.743	0.736	0.730
0.832	0.828	0.823	0.818	0.814	0.809	0.804	0.799	0.794	0.789	0.784	0.778	0.773	0.768	0.762	0.756	0.750	0.744	0.738	0.732
0.834	0.829	0.825	0.820	0.816	0.811	0.806	0.801	0.796	0.791	0.786	0.780	0.775	0.769	0.764	0.758	0.752	0.746	0.740	0.734
0.836	0.831	0.827	0.822	0.818	0.813	0.808	0.803	0.798	0.793	0.788	0.782	0.777	0.771	0.766	0.760	0.754	0.748	0.742	0.736
0.838	0.833	0.829	0.824	0.819	0.815	0.810	0.805	0.800	0.795	0.789	0.784	0.779	0.773	0.768	0.762	0.756	0.750	0.744	0.738
0.840	0.835	0.831	0.826	0.821	0.817	0.812	0.807	0.802	0.796	0.791	0.786	0.781	0.775	0.769	0.764	0.758	0.752	0.746	0.740
0.842	0.837	0.833	0.828	0.823	0.818	0.814	0.809	0.804	0.798	0.793	0.788	0.782	0.777	0.771	0.766	0.760	0.754	0.748	0.741
0.844	0.839	0.835	0.830	0.825	0.820	0.816	0.810	0.806	0.800	0.795	0.790	0.784	0.779	0.773	0.767	0.762	0.756	0.750	0.743
0.846	0.841	0.837	0.832	0.827	0.822	0.817	0.812	0.807	0.802	0.797	0.792	0.786	0.781	0.775	0.769	0.763	0.757	0.751	0.745
0.848	0.843	0.839	0.834	0.829	0.824	0.819	0.814	0.809	0.804	0.799	0.794	0.788	0.783	0.777	0.771	0.765	0.759	0.753	0.747
0.850	0.845	0.840	0.836	0.831	0.826	0.821	0.816	0.811	0.806	0.801	0.795	0.790	0.784	0.779	0.773	0.767	0.761	0.755	0.749
0.852	0.847	0.842	0.838	0.833	0.828	0.823	0.818	0.813	0.808	0.803	0.797	0.792	0.786	0.781	0.775	0.769	0.763	0.757	0.751
0.854	0.849	0.844	0.840	0.835	0.830	0.825	0.820	0.815	0.810	0.805	0.799	0.794	0.788	0.783	0.777	0.771	0.765	0.759	0.752
0.856	0.851	0.846	0.842	0.837	0.832	0.827	0.822	0.817	0.812	0.806	0.801	0.796	0.790	0.784	0.779	0.773	0.767	0.761	0.754
0.858	0.853	0.848	0.844	0.839	0.834	0.829	0.824	0.819	0.814	0.808	0.803	0.798	0.792	0.786	0.780	0.775	0.769	0.762	0.756
0.859	0.855	0.850	0.845	0.841	0.836	0.831	0.826	0.821	0.816	0.810	0.805	0.799	0.794	0.788	0.782	0.776	0.770	0.764	0.758
0.861	0.857	0.852	0.847	0.843	0.838	0.833	0.828	0.823	0.818	0.812	0.807	0.801	0.796	0.790	0.784	0.778	0.772	0.766	0.760
0.863	0.859	0.854	0.849	0.845	0.840	0.835	0.830	0.825	0.819	0.814	0.809	0.803	0.798	0.792	0.786	0.780	0.774	0.768	0.762
0.865	0.861	0.856	0.851	0.846	0.842	0.837	0.832	0.826	0.821	0.816	0.811	0.805	0.800	0.794	0.788	0.782	0.776	0.770	0.763
0.867	0.863	0.858	0.853	0.848	0.844	0.839	0.834	0.828	0.823	0.818	0.812	0.807	0.801	0.796	0.790	0.784	0.778	0.772	0.765
0.869	0.865	0.860	0.855	0.850	0.845	0.840	0.835	0.830	0.825	0.820	0.814	0.809	0.803	0.798	0.792	0.786	0.780	0.774	0.767
0.871	0.867	0.862	0.857	0.852	0.847	0.842	0.837	0.832	0.827	0.822	0.816	0.811	0.805	0.799	0.794	0.788	0.782	0.775	0.769

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$t^{\circ}\text{C}$ P mbar	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
918	0.950	0.946	0.942	0.938	0.934	0.930	0.925	0.921	0.917	0.913	0.909	0.904	0.900	0.896	0.891	0.887	0.882	0.878
920	0.952	0.948	0.944	0.940	0.936	0.932	0.927	0.923	0.919	0.915	0.911	0.906	0.902	0.898	0.893	0.889	0.884	0.880
922	0.954	0.950	0.946	0.942	0.938	0.934	0.929	0.925	0.921	0.917	0.913	0.908	0.904	0.900	0.895	0.891	0.886	0.882
924	0.956	0.952	0.948	0.944	0.940	0.936	0.932	0.927	0.923	0.919	0.915	0.910	0.906	0.902	0.897	0.893	0.888	0.884
926	0.958	0.954	0.950	0.946	0.942	0.938	0.934	0.929	0.925	0.921	0.917	0.912	0.908	0.904	0.899	0.895	0.890	0.886
928	0.960	0.956	0.952	0.948	0.944	0.940	0.936	0.931	0.927	0.923	0.919	0.914	0.910	0.906	0.901	0.897	0.892	0.888
930	0.962	0.958	0.954	0.950	0.946	0.942	0.938	0.933	0.929	0.925	0.921	0.916	0.912	0.908	0.903	0.899	0.894	0.890
932	0.965	0.960	0.956	0.952	0.948	0.944	0.940	0.936	0.931	0.927	0.923	0.918	0.914	0.910	0.905	0.901	0.896	0.892
934	0.967	0.962	0.958	0.954	0.950	0.946	0.942	0.938	0.933	0.929	0.925	0.920	0.916	0.912	0.907	0.903	0.898	0.894
936	0.969	0.965	0.960	0.956	0.952	0.948	0.944	0.940	0.935	0.931	0.927	0.922	0.918	0.914	0.909	0.905	0.900	0.896
938	0.971	0.967	0.963	0.958	0.954	0.950	0.946	0.942	0.937	0.933	0.929	0.924	0.920	0.916	0.911	0.907	0.902	0.897
940	0.973	0.969	0.965	0.960	0.956	0.952	0.948	0.944	0.939	0.935	0.931	0.926	0.922	0.918	0.913	0.909	0.904	0.899
942	0.975	0.971	0.967	0.962	0.958	0.954	0.950	0.946	0.941	0.937	0.933	0.928	0.924	0.920	0.915	0.911	0.906	0.901
944	0.977	0.973	0.969	0.965	0.960	0.956	0.952	0.948	0.943	0.939	0.935	0.930	0.926	0.922	0.917	0.913	0.908	0.903
946	0.979	0.975	0.971	0.967	0.962	0.958	0.954	0.950	0.945	0.941	0.937	0.932	0.928	0.924	0.919	0.915	0.910	0.905
948	0.981	0.977	0.973	0.969	0.964	0.960	0.956	0.952	0.948	0.943	0.939	0.934	0.930	0.926	0.921	0.916	0.912	0.907
950	0.983	0.979	0.975	0.971	0.967	0.962	0.958	0.954	0.950	0.945	0.941	0.936	0.932	0.928	0.923	0.918	0.914	0.909
952	0.985	0.981	0.977	0.973	0.969	0.964	0.960	0.956	0.952	0.947	0.943	0.938	0.934	0.930	0.925	0.920	0.916	0.911
954	0.988	0.983	0.979	0.975	0.971	0.966	0.962	0.958	0.954	0.949	0.945	0.940	0.936	0.932	0.927	0.922	0.918	0.913
956	0.990	0.985	0.981	0.977	0.973	0.968	0.964	0.960	0.956	0.951	0.947	0.942	0.938	0.934	0.929	0.924	0.920	0.915
958	0.992	0.988	0.983	0.979	0.975	0.971	0.966	0.962	0.958	0.953	0.949	0.944	0.940	0.935	0.931	0.926	0.922	0.917
960	0.994	0.990	0.985	0.981	0.977	0.973	0.968	0.964	0.960	0.955	0.951	0.946	0.942	0.938	0.933	0.928	0.924	0.919
962	0.996	0.992	0.987	0.983	0.979	0.975	0.970	0.966	0.962	0.957	0.953	0.948	0.944	0.940	0.935	0.930	0.926	0.921
964	0.998	0.994	0.990	0.985	0.981	0.977	0.972	0.968	0.964	0.959	0.955	0.950	0.946	0.942	0.937	0.932	0.928	0.923
966	1.000	0.996	0.992	0.987	0.983	0.979	0.974	0.970	0.966	0.961	0.957	0.952	0.948	0.944	0.939	0.934	0.930	0.925
968	1.002	0.998	0.994	0.989	0.985	0.981	0.976	0.972	0.968	0.963	0.959	0.954	0.950	0.946	0.941	0.936	0.932	0.927
970	1.004	1.000	0.996	0.991	0.987	0.983	0.979	0.974	0.970	0.965	0.961	0.957	0.952	0.948	0.943	0.938	0.934	0.929
972	1.006	1.002	0.998	0.994	0.989	0.985	0.981	0.976	0.972	0.967	0.963	0.959	0.954	0.950	0.945	0.940	0.936	0.931

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表 A1

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0.8730	0.8690	0.8640	0.8590	0.8540	0.8490	0.8440	0.8390	0.8340	0.8290	0.8240	0.8180	0.8130	0.8070	0.8010	0.7960	0.7900	0.7830	0.7770	0.771
0.8750	0.8710	0.8660	0.8610	0.8560	0.8510	0.8460	0.8410	0.8360	0.8310	0.8250	0.8200	0.8140	0.8090	0.8030	0.7970	0.7910	0.7850	0.7790	0.773
0.8770	0.8720	0.8680	0.8630	0.8580	0.8530	0.8480	0.8430	0.8380	0.8330	0.8270	0.8220	0.8160	0.8110	0.8050	0.7990	0.7930	0.7870	0.7810	0.774
0.8790	0.8740	0.8700	0.8650	0.8600	0.8550	0.8500	0.8450	0.8400	0.8350	0.8290	0.8240	0.8180	0.8130	0.8070	0.8010	0.7950	0.7890	0.7830	0.776
0.8810	0.8760	0.8720	0.8670	0.8620	0.8570	0.8520	0.8470	0.8420	0.8360	0.8310	0.8260	0.8200	0.8150	0.8090	0.8030	0.7970	0.7910	0.7850	0.778
0.8830	0.8780	0.8740	0.8690	0.8640	0.8590	0.8540	0.8490	0.8440	0.8380	0.8330	0.8280	0.8220	0.8160	0.8110	0.8050	0.7990	0.7930	0.7860	0.780
0.8850	0.8800	0.8760	0.8710	0.8660	0.8610	0.8560	0.8510	0.8460	0.8400	0.8350	0.8300	0.8240	0.8180	0.8130	0.8070	0.8010	0.7950	0.7880	0.782
0.8870	0.8820	0.8780	0.8730	0.8680	0.8630	0.8580	0.8530	0.8480	0.8420	0.8370	0.8310	0.8260	0.8200	0.8140	0.8080	0.8020	0.7960	0.7900	0.784
0.8890	0.8840	0.8790	0.8750	0.8700	0.8650	0.8600	0.8550	0.8490	0.8440	0.8390	0.8330	0.8280	0.8220	0.8160	0.8100	0.8040	0.7980	0.7920	0.786
0.8910	0.8860	0.8810	0.8770	0.8720	0.8670	0.8620	0.8560	0.8510	0.8460	0.8410	0.8350	0.8300	0.8240	0.8180	0.8120	0.8060	0.8000	0.7940	0.787
0.8930	0.8880	0.8830	0.8790	0.8740	0.8690	0.8640	0.8580	0.8530	0.8480	0.8430	0.8370	0.8320	0.8260	0.8200	0.8140	0.8080	0.8020	0.7960	0.789
0.8950	0.8900	0.8850	0.8800	0.8760	0.8710	0.8660	0.8600	0.8550	0.8500	0.8440	0.8390	0.8330	0.8280	0.8220	0.8160	0.8100	0.8040	0.7980	0.791
0.8970	0.8920	0.8870	0.8820	0.8780	0.8730	0.8670	0.8620	0.8570	0.8520	0.8460	0.8410	0.8350	0.8300	0.8240	0.8180	0.8120	0.8060	0.7990	0.793
0.8990	0.8940	0.8890	0.8840	0.8790	0.8740	0.8690	0.8640	0.8590	0.8540	0.8480	0.8430	0.8370	0.8320	0.8260	0.8200	0.8140	0.8080	0.8010	0.795
0.9010	0.8960	0.8910	0.8860	0.8810	0.8760	0.8710	0.8660	0.8610	0.8560	0.8500	0.8450	0.8390	0.8330	0.8280	0.8220	0.8160	0.8090	0.8030	0.797
0.9030	0.8980	0.8930	0.8880	0.8830	0.8780	0.8730	0.8680	0.8630	0.8580	0.8520	0.8460	0.8410	0.8350	0.8290	0.8240	0.8170	0.8110	0.8050	0.798
0.9050	0.9000	0.8950	0.8900	0.8850	0.8800	0.8750	0.8700	0.8650	0.8590	0.8540	0.8480	0.8430	0.8370	0.8310	0.8250	0.8190	0.8130	0.8070	0.800
0.9070	0.9020	0.8970	0.8920	0.8870	0.8820	0.8770	0.8720	0.8670	0.8610	0.8560	0.8500	0.8450	0.8390	0.8330	0.8270	0.8210	0.8150	0.8090	0.802
0.9080	0.9040	0.8990	0.8940	0.8890	0.8840	0.8790	0.8740	0.8680	0.8630	0.8580	0.8520	0.8470	0.8410	0.8350	0.8290	0.8230	0.8170	0.8100	0.804
0.9100	0.9060	0.9010	0.8960	0.8910	0.8860	0.8810	0.8760	0.8700	0.8650	0.8600	0.8540	0.8480	0.8430	0.8370	0.8310	0.8250	0.8190	0.8120	0.806
0.9120	0.9080	0.9030	0.8980	0.8930	0.8880	0.8830	0.8780	0.8720	0.8670	0.8620	0.8560	0.8500	0.8450	0.8390	0.8330	0.8270	0.8210	0.8140	0.808
0.9140	0.9100	0.9050	0.9000	0.8950	0.8900	0.8850	0.8800	0.8740	0.8690	0.8630	0.8580	0.8520	0.8460	0.8410	0.8350	0.8290	0.8220	0.8160	0.810
0.9160	0.9120	0.9070	0.9020	0.8970	0.8920	0.8870	0.8810	0.8760	0.8710	0.8650	0.8600	0.8540	0.8480	0.8430	0.8370	0.8300	0.8240	0.8180	0.811
0.9180	0.9140	0.9090	0.9040	0.8990	0.8940	0.8890	0.8830	0.8780	0.8730	0.8670	0.8620	0.8560	0.8500	0.8440	0.8380	0.8320	0.8260	0.8200	0.813
0.9200	0.9160	0.9110	0.9060	0.9010	0.8960	0.8910	0.8850	0.8800	0.8750	0.8690	0.8640	0.8580	0.8520	0.8460	0.8400	0.8340	0.8280	0.8220	0.815
0.9220	0.9170	0.9130	0.9080	0.9030	0.8980	0.8920	0.8870	0.8820	0.8760	0.8710	0.8660	0.8600	0.8540	0.8480	0.8420	0.8360	0.8300	0.8230	0.817
0.9240	0.9190	0.9140	0.9100	0.9050	0.9000	0.8940	0.8890	0.8840	0.8780	0.8730	0.8670	0.8620	0.8560	0.8500	0.8440	0.8380	0.8320	0.8250	0.819
0.9260	0.9210	0.9160	0.9120	0.9060	0.9010	0.8960	0.8910	0.8860	0.8800	0.8750	0.8690	0.8640	0.8580	0.8520	0.8460	0.8400	0.8340	0.8270	0.821

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$t^{\circ}\text{C}$ $P$ mbar	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
974	1.008	1.004	1.000	0.996	0.991	0.987	0.983	0.978	0.974	0.970	0.965	0.961	0.956	0.952	0.947	0.942	0.938	0.933
976	1.011	1.006	1.002	0.998	0.993	0.989	0.985	0.980	0.976	0.972	0.967	0.963	0.958	0.954	0.949	0.944	0.940	0.935
978	1.013	1.008	1.004	1.000	0.995	0.991	0.987	0.982	0.978	0.974	0.969	0.965	0.960	0.956	0.951	0.946	0.942	0.937
980	1.015	1.010	1.006	1.002	0.998	0.993	0.989	0.984	0.980	0.976	0.971	0.967	0.962	0.958	0.953	0.948	0.944	0.939
982	1.017	1.012	1.008	1.004	1.000	0.995	0.991	0.986	0.982	0.978	0.973	0.969	0.964	0.960	0.955	0.950	0.946	0.941
984	1.019	1.015	1.010	1.006	1.002	0.997	0.993	0.988	0.984	0.980	0.975	0.971	0.966	0.962	0.957	0.952	0.948	0.943
986	1.021	1.017	1.012	1.008	1.004	0.999	0.995	0.990	0.986	0.982	0.977	0.973	0.968	0.964	0.959	0.954	0.950	0.945
988	1.023	1.019	1.014	1.010	1.006	1.001	0.997	0.993	0.988	0.984	0.979	0.975	0.970	0.966	0.961	0.956	0.951	0.947
990	1.025	1.021	1.016	1.012	1.008	1.003	0.999	0.995	0.990	0.986	0.981	0.977	0.972	0.968	0.963	0.958	0.953	0.949
992	1.027	1.023	1.019	1.014	1.010	1.005	1.001	0.997	0.992	0.988	0.983	0.979	0.974	0.970	0.965	0.960	0.955	0.951
994	1.029	1.025	1.021	1.016	1.012	1.008	1.003	0.999	0.994	0.990	0.985	0.981	0.976	0.972	0.967	0.962	0.957	0.953
996	1.031	1.027	1.023	1.018	1.014	1.010	1.005	1.001	0.996	0.992	0.987	0.983	0.978	0.974	0.969	0.964	0.959	0.955
998	1.034	1.029	1.025	1.020	1.016	1.012	1.007	1.003	0.998	0.994	0.989	0.985	0.980	0.976	0.971	0.966	0.961	0.957
1000	1.036	1.031	1.027	1.022	1.018	1.014	1.009	1.005	1.000	0.996	0.991	0.987	0.982	0.978	0.973	0.968	0.963	0.959
1002	1.038	1.033	1.029	1.024	1.020	1.016	1.011	1.007	1.002	0.998	0.993	0.989	0.984	0.979	0.975	0.970	0.965	0.961
1004	1.040	1.035	1.031	1.027	1.022	1.018	1.013	1.009	1.004	1.000	0.995	0.991	0.986	0.981	0.977	0.972	0.967	0.962
1006	1.042	1.038	1.033	1.029	1.024	1.020	1.015	1.011	1.006	1.002	0.997	0.993	0.988	0.983	0.979	0.974	0.969	0.964
1008	1.044	1.040	1.035	1.031	1.026	1.022	1.017	1.013	1.008	1.004	0.999	0.995	0.990	0.985	0.981	0.976	0.971	0.966
1010	1.046	1.042	1.037	1.033	1.028	1.024	1.019	1.015	1.010	1.006	1.001	0.997	0.992	0.987	0.983	0.978	0.973	0.968
1012	1.048	1.044	1.039	1.035	1.030	1.026	1.022	1.017	1.012	1.008	1.003	0.999	0.994	0.989	0.985	0.980	0.975	0.970
1014	1.050	1.046	1.041	1.037	1.032	1.028	1.024	1.019	1.014	1.010	1.005	1.001	0.996	0.991	0.987	0.982	0.977	0.972
1016	1.052	1.048	1.043	1.039	1.035	1.030	1.026	1.021	1.017	1.012	1.007	1.003	0.998	0.993	0.989	0.984	0.979	0.974
1018	1.054	1.050	1.046	1.041	1.037	1.032	1.028	1.023	1.019	1.014	1.009	1.005	1.000	0.995	0.991	0.986	0.981	0.976
1020	1.057	1.052	1.048	1.043	1.039	1.034	1.030	1.025	1.021	1.016	1.011	1.007	1.002	0.997	0.993	0.988	0.983	0.978
1022	1.059	1.054	1.050	1.045	1.041	1.036	1.032	1.027	1.023	1.018	1.013	1.009	1.004	0.999	0.995	0.990	0.985	0.980
1024	1.061	1.056	1.052	1.047	1.043	1.038	1.034	1.029	1.025	1.020	1.015	1.011	1.006	1.001	0.997	0.992	0.987	0.982
1026	1.063	1.058	1.054	1.049	1.045	1.040	1.036	1.031	1.027	1.022	1.018	1.013	1.008	1.003	0.999	0.994	0.989	0.984
1028	1.065	1.060	1.056	1.051	1.047	1.042	1.038	1.033	1.029	1.024	1.020	1.015	1.010	1.005	1.001	0.996	0.991	0.986
1030	1.067	1.062	1.058	1.054	1.049	1.044	1.040	1.035	1.031	1.026	1.022	1.017	1.012	1.007	1.003	0.998	0.993	0.988

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表 A1

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0.928	0.923	0.918	0.913	0.908	0.903	0.898	0.893	0.888	0.882	0.877	0.871	0.865	0.860	0.854	0.848	0.842	0.835	0.829	0.822
0.930	0.925	0.920	0.915	0.910	0.905	0.900	0.895	0.890	0.884	0.879	0.873	0.867	0.862	0.856	0.850	0.844	0.837	0.831	0.824
0.932	0.927	0.922	0.917	0.912	0.907	0.902	0.897	0.891	0.886	0.880	0.875	0.869	0.863	0.858	0.852	0.845	0.839	0.833	0.826
0.934	0.929	0.924	0.919	0.914	0.909	0.904	0.899	0.893	0.888	0.882	0.877	0.871	0.865	0.859	0.853	0.847	0.841	0.835	0.828
0.936	0.931	0.926	0.921	0.916	0.911	0.906	0.901	0.895	0.890	0.884	0.879	0.873	0.867	0.861	0.855	0.849	0.843	0.836	0.830
0.938	0.933	0.928	0.923	0.918	0.913	0.908	0.903	0.897	0.892	0.886	0.881	0.875	0.869	0.863	0.857	0.851	0.845	0.838	0.832
0.940	0.935	0.930	0.925	0.920	0.915	0.910	0.904	0.899	0.894	0.888	0.882	0.877	0.871	0.865	0.859	0.853	0.846	0.840	0.834
0.942	0.937	0.932	0.927	0.922	0.917	0.912	0.906	0.901	0.896	0.890	0.884	0.879	0.873	0.867	0.861	0.855	0.848	0.842	0.835
0.944	0.939	0.934	0.929	0.924	0.919	0.914	0.908	0.903	0.898	0.892	0.886	0.881	0.875	0.869	0.863	0.856	0.850	0.844	0.837
0.946	0.941	0.936	0.931	0.926	0.921	0.916	0.910	0.905	0.899	0.894	0.888	0.882	0.877	0.871	0.865	0.858	0.852	0.846	0.839
0.948	0.943	0.938	0.933	0.928	0.923	0.917	0.912	0.907	0.901	0.896	0.890	0.884	0.878	0.872	0.866	0.860	0.854	0.848	0.841
0.950	0.945	0.940	0.935	0.930	0.925	0.919	0.914	0.909	0.903	0.898	0.892	0.886	0.880	0.874	0.868	0.862	0.856	0.849	0.843
0.952	0.947	0.942	0.937	0.932	0.927	0.921	0.916	0.911	0.905	0.900	0.894	0.888	0.882	0.876	0.870	0.864	0.858	0.851	0.845
0.954	0.949	0.944	0.939	0.934	0.928	0.923	0.918	0.913	0.907	0.901	0.896	0.890	0.884	0.878	0.872	0.866	0.860	0.853	0.846
0.956	0.951	0.946	0.941	0.936	0.930	0.925	0.920	0.914	0.909	0.903	0.898	0.892	0.886	0.880	0.874	0.868	0.861	0.855	0.848
0.958	0.953	0.948	0.943	0.938	0.932	0.927	0.922	0.916	0.911	0.905	0.900	0.894	0.888	0.882	0.876	0.870	0.863	0.857	0.850
0.960	0.955	0.950	0.945	0.939	0.934	0.929	0.924	0.918	0.913	0.907	0.901	0.896	0.890	0.884	0.878	0.871	0.865	0.859	0.852
0.962	0.957	0.952	0.947	0.941	0.936	0.931	0.926	0.920	0.915	0.909	0.903	0.898	0.892	0.886	0.880	0.873	0.867	0.860	0.854
0.963	0.959	0.954	0.948	0.943	0.938	0.933	0.928	0.922	0.916	0.911	0.905	0.899	0.894	0.888	0.881	0.875	0.869	0.862	0.856
0.965	0.961	0.955	0.950	0.945	0.940	0.935	0.929	0.924	0.918	0.913	0.907	0.901	0.895	0.889	0.883	0.877	0.871	0.864	0.858
0.967	0.962	0.957	0.952	0.947	0.942	0.937	0.931	0.926	0.920	0.915	0.909	0.903	0.897	0.891	0.885	0.879	0.872	0.866	0.859
0.969	0.964	0.959	0.954	0.949	0.944	0.939	0.933	0.928	0.922	0.917	0.911	0.905	0.899	0.893	0.887	0.881	0.874	0.868	0.861
0.971	0.966	0.961	0.956	0.951	0.946	0.941	0.935	0.930	0.924	0.918	0.913	0.907	0.901	0.895	0.889	0.883	0.876	0.870	0.863
0.973	0.968	0.963	0.958	0.953	0.948	0.942	0.937	0.932	0.926	0.920	0.915	0.909	0.903	0.897	0.891	0.884	0.878	0.872	0.865
0.975	0.970	0.965	0.960	0.955	0.950	0.944	0.939	0.934	0.928	0.922	0.916	0.911	0.905	0.899	0.893	0.886	0.880	0.873	0.867
0.977	0.972	0.967	0.962	0.957	0.952	0.946	0.941	0.935	0.930	0.924	0.918	0.913	0.907	0.901	0.894	0.888	0.882	0.875	0.869
0.979	0.974	0.969	0.964	0.959	0.954	0.948	0.943	0.937	0.932	0.926	0.920	0.914	0.909	0.902	0.896	0.890	0.884	0.877	0.870
0.981	0.976	0.971	0.966	0.961	0.956	0.950	0.945	0.939	0.934	0.928	0.922	0.916	0.910	0.904	0.898	0.892	0.886	0.879	0.872
0.983	0.978	0.973	0.968	0.963	0.957	0.952	0.947	0.941	0.936	0.930	0.924	0.918	0.912	0.906	0.900	0.894	0.887	0.881	0.874

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续

P mbar	t/°C																				
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22			
1032	1.069	1.065	1.060	1.056	1.051	1.046	1.042	1.037	1.033	1.028	1.024	1.019	1.014	1.009	1.005	1.000	0.995	0.990			
1034	1.071	1.067	1.062	1.058	1.053	1.049	1.044	1.039	1.035	1.030	1.026	1.021	1.016	1.011	1.007	1.002	0.997	0.992			
1036	1.073	1.069	1.064	1.060	1.055	1.051	1.046	1.041	1.037	1.032	1.028	1.023	1.018	1.013	1.009	1.004	0.999	0.994			
1038	1.075	1.071	1.066	1.062	1.057	1.053	1.048	1.044	1.039	1.034	1.030	1.025	1.020	1.015	1.011	1.006	1.001	0.996			
1040	1.077	1.073	1.068	1.064	1.059	1.055	1.050	1.046	1.041	1.036	1.032	1.027	1.022	1.017	1.013	1.008	1.003	0.998			

表 A2. 气体容量法测定碳的温度、气压修正系数表 (本表用

P mbar	t/°C																				
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22			
750	0.773	0.770	0.767	0.763	0.760	0.757	0.753	0.750	0.747	0.743	0.740	0.737	0.733	0.730	0.726	0.723	0.719	0.716			
752	0.775	0.772	0.769	0.765	0.762	0.759	0.756	0.752	0.749	0.745	0.742	0.739	0.735	0.732	0.728	0.725	0.721	0.717			
754	0.777	0.774	0.771	0.768	0.764	0.761	0.758	0.754	0.751	0.747	0.744	0.741	0.737	0.734	0.730	0.727	0.723	0.719			
756	0.779	0.776	0.773	0.770	0.766	0.763	0.760	0.756	0.753	0.749	0.746	0.743	0.739	0.736	0.732	0.729	0.725	0.721			
758	0.782	0.778	0.775	0.772	0.768	0.765	0.762	0.758	0.755	0.751	0.748	0.745	0.741	0.738	0.734	0.731	0.727	0.723			
760	0.784	0.780	0.777	0.774	0.770	0.767	0.764	0.760	0.757	0.754	0.750	0.747	0.743	0.740	0.736	0.733	0.729	0.725			
762	0.786	0.782	0.779	0.776	0.772	0.769	0.766	0.762	0.759	0.756	0.752	0.749	0.745	0.742	0.738	0.735	0.731	0.727			
764	0.788	0.784	0.781	0.778	0.774	0.771	0.768	0.764	0.761	0.758	0.754	0.751	0.747	0.744	0.740	0.737	0.733	0.729			
766	0.790	0.786	0.783	0.780	0.776	0.773	0.770	0.766	0.763	0.760	0.756	0.753	0.749	0.746	0.742	0.739	0.735	0.731			
768	0.792	0.788	0.785	0.782	0.779	0.775	0.772	0.768	0.765	0.762	0.758	0.755	0.751	0.748	0.744	0.741	0.737	0.733			
770	0.794	0.791	0.787	0.784	0.781	0.777	0.774	0.771	0.767	0.764	0.760	0.757	0.753	0.750	0.746	0.743	0.739	0.735			
772	0.796	0.793	0.789	0.786	0.783	0.779	0.776	0.773	0.769	0.766	0.762	0.759	0.755	0.752	0.748	0.744	0.741	0.737			
774	0.798	0.795	0.791	0.788	0.785	0.781	0.778	0.775	0.771	0.768	0.764	0.761	0.757	0.754	0.750	0.746	0.743	0.739			
776	0.800	0.797	0.793	0.790	0.787	0.783	0.780	0.777	0.773	0.770	0.766	0.763	0.759	0.756	0.752	0.748	0.745	0.741			
778	0.802	0.799	0.796	0.792	0.789	0.785	0.782	0.779	0.775	0.772	0.768	0.765	0.761	0.758	0.754	0.750	0.747	0.743			
780	0.805	0.801	0.798	0.794	0.791	0.788	0.784	0.781	0.777	0.774	0.770	0.767	0.763	0.760	0.756	0.752	0.749	0.745			
782	0.807	0.803	0.800	0.796	0.793	0.790	0.786	0.783	0.779	0.776	0.772	0.769	0.765	0.762	0.758	0.754	0.751	0.747			
784	0.809	0.805	0.802	0.798	0.795	0.792	0.788	0.785	0.781	0.778	0.774	0.771	0.767	0.764	0.760	0.756	0.753	0.749			
786	0.811	0.807	0.804	0.800	0.797	0.794	0.790	0.787	0.783	0.780	0.776	0.773	0.769	0.765	0.762	0.758	0.755	0.751			
788	0.813	0.809	0.806	0.802	0.799	0.796	0.792	0.789	0.785	0.782	0.778	0.775	0.771	0.767	0.764	0.760	0.757	0.753			

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表 A1

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0.985	0.980	0.975	0.970	0.965	0.959	0.954	0.949	0.943	0.938	0.932	0.926	0.920	0.914	0.908	0.902	0.896	0.889	0.883	0.876
0.987	0.982	0.977	0.972	0.967	0.961	0.956	0.950	0.945	0.939	0.934	0.928	0.922	0.916	0.910	0.904	0.898	0.891	0.884	0.878
0.989	0.984	0.979	0.974	0.968	0.963	0.958	0.952	0.947	0.941	0.936	0.930	0.924	0.918	0.912	0.906	0.899	0.893	0.886	0.880
0.991	0.986	0.981	0.976	0.970	0.965	0.960	0.954	0.949	0.943	0.938	0.932	0.926	0.920	0.914	0.908	0.901	0.895	0.888	0.882
0.993	0.988	0.983	0.978	0.972	0.967	0.962	0.956	0.951	0.945	0.939	0.934	0.928	0.922	0.916	0.909	0.903	0.897	0.890	0.883

氯化钠酸性溶液作封闭液      1mbar=0.750 mmHg      (1bar=10<sup>5</sup> Pa)

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0.712	0.708	0.705	0.701	0.697	0.693	0.689	0.685	0.681	0.677	0.673	0.669	0.665	0.660	0.656	0.651	0.647	0.642	0.637	0.631
0.714	0.710	0.706	0.703	0.699	0.695	0.691	0.687	0.683	0.679	0.675	0.671	0.667	0.662	0.658	0.653	0.649	0.643	0.638	0.632
0.716	0.712	0.708	0.705	0.701	0.697	0.693	0.689	0.685	0.681	0.677	0.673	0.668	0.664	0.660	0.655	0.651	0.645	0.640	0.635
0.718	0.714	0.710	0.707	0.703	0.699	0.695	0.691	0.687	0.683	0.679	0.674	0.670	0.666	0.662	0.657	0.652	0.647	0.642	0.637
0.720	0.716	0.712	0.709	0.705	0.701	0.697	0.693	0.689	0.685	0.680	0.676	0.672	0.668	0.663	0.659	0.654	0.649	0.644	0.639
0.722	0.718	0.714	0.710	0.707	0.703	0.699	0.695	0.691	0.687	0.682	0.678	0.674	0.670	0.665	0.661	0.656	0.651	0.646	0.640
0.724	0.720	0.716	0.712	0.708	0.705	0.701	0.697	0.693	0.689	0.684	0.680	0.676	0.672	0.667	0.663	0.658	0.653	0.648	0.642
0.726	0.722	0.718	0.714	0.710	0.707	0.702	0.699	0.695	0.690	0.686	0.682	0.678	0.673	0.669	0.664	0.660	0.655	0.649	0.644
0.728	0.724	0.720	0.716	0.712	0.708	0.704	0.700	0.697	0.692	0.688	0.684	0.680	0.675	0.671	0.666	0.662	0.656	0.651	0.646
0.730	0.726	0.722	0.718	0.714	0.710	0.706	0.702	0.698	0.694	0.690	0.686	0.682	0.677	0.673	0.668	0.663	0.658	0.653	0.648
0.731	0.728	0.724	0.720	0.716	0.712	0.708	0.704	0.700	0.696	0.692	0.688	0.683	0.679	0.675	0.670	0.665	0.660	0.655	0.650
0.733	0.730	0.726	0.722	0.718	0.714	0.710	0.706	0.702	0.698	0.694	0.689	0.685	0.681	0.677	0.672	0.667	0.662	0.657	0.651
0.735	0.732	0.728	0.724	0.720	0.716	0.712	0.708	0.704	0.700	0.696	0.691	0.687	0.683	0.678	0.674	0.669	0.664	0.659	0.653
0.737	0.734	0.730	0.726	0.722	0.718	0.714	0.710	0.706	0.702	0.697	0.693	0.689	0.685	0.680	0.676	0.671	0.666	0.660	0.655
0.739	0.736	0.732	0.728	0.724	0.720	0.716	0.712	0.708	0.704	0.699	0.695	0.691	0.687	0.682	0.678	0.673	0.667	0.662	0.657
0.741	0.737	0.734	0.730	0.726	0.722	0.718	0.714	0.710	0.706	0.701	0.697	0.693	0.688	0.684	0.679	0.675	0.669	0.664	0.659
0.743	0.739	0.736	0.732	0.728	0.724	0.720	0.716	0.712	0.708	0.703	0.699	0.695	0.690	0.686	0.681	0.676	0.671	0.666	0.661
0.745	0.741	0.738	0.734	0.730	0.726	0.722	0.718	0.714	0.709	0.705	0.701	0.697	0.692	0.688	0.683	0.678	0.673	0.668	0.662
0.747	0.743	0.739	0.736	0.732	0.728	0.724	0.720	0.716	0.711	0.707	0.703	0.698	0.694	0.690	0.685	0.680	0.675	0.670	0.664
0.749	0.745	0.741	0.738	0.734	0.730	0.725	0.721	0.717	0.713	0.709	0.705	0.700	0.696	0.691	0.687	0.682	0.677	0.672	0.666

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续

P mbar	t/°C																					
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22				
790	0.815	0.811	0.808	0.805	0.801	0.798	0.794	0.791	0.787	0.784	0.780	0.777	0.773	0.769	0.766	0.762	0.758	0.755				
792	0.817	0.813	0.810	0.807	0.803	0.800	0.796	0.793	0.789	0.786	0.782	0.779	0.775	0.771	0.768	0.764	0.760	0.757				
794	0.819	0.815	0.812	0.809	0.805	0.802	0.798	0.795	0.791	0.788	0.784	0.781	0.777	0.773	0.770	0.766	0.762	0.759				
796	0.821	0.818	0.814	0.811	0.807	0.804	0.800	0.797	0.793	0.790	0.786	0.783	0.779	0.775	0.772	0.768	0.764	0.761				
798	0.823	0.820	0.816	0.813	0.809	0.806	0.802	0.799	0.795	0.792	0.788	0.785	0.781	0.777	0.774	0.770	0.766	0.763				
800	0.825	0.822	0.818	0.815	0.811	0.808	0.804	0.801	0.797	0.794	0.790	0.787	0.783	0.779	0.776	0.772	0.768	0.765				
802	0.827	0.824	0.820	0.817	0.813	0.810	0.806	0.803	0.799	0.796	0.792	0.789	0.785	0.781	0.778	0.774	0.770	0.766				
804	0.829	0.826	0.822	0.819	0.815	0.812	0.808	0.805	0.801	0.798	0.794	0.791	0.787	0.783	0.780	0.776	0.772	0.768				
806	0.832	0.828	0.824	0.821	0.817	0.814	0.811	0.807	0.803	0.800	0.796	0.793	0.789	0.785	0.782	0.778	0.774	0.770				
808	0.834	0.830	0.827	0.823	0.820	0.816	0.813	0.809	0.805	0.802	0.798	0.795	0.791	0.787	0.784	0.780	0.776	0.772				
810	0.836	0.832	0.829	0.825	0.822	0.818	0.815	0.811	0.807	0.804	0.800	0.797	0.793	0.789	0.786	0.782	0.778	0.774				
812	0.838	0.834	0.831	0.827	0.824	0.820	0.817	0.813	0.809	0.806	0.802	0.799	0.795	0.791	0.788	0.784	0.780	0.776				
814	0.840	0.836	0.833	0.829	0.826	0.822	0.819	0.815	0.812	0.808	0.804	0.801	0.797	0.793	0.790	0.786	0.782	0.778				
816	0.842	0.838	0.835	0.831	0.828	0.824	0.821	0.817	0.814	0.810	0.806	0.803	0.799	0.795	0.792	0.788	0.784	0.780				
818	0.844	0.840	0.837	0.833	0.830	0.826	0.823	0.819	0.816	0.812	0.808	0.805	0.801	0.797	0.794	0.790	0.786	0.782				
820	0.846	0.842	0.839	0.835	0.832	0.828	0.825	0.821	0.818	0.814	0.810	0.807	0.803	0.799	0.796	0.792	0.788	0.784				
822	0.848	0.845	0.841	0.837	0.834	0.830	0.827	0.823	0.820	0.816	0.812	0.809	0.805	0.801	0.798	0.794	0.790	0.786				
824	0.850	0.847	0.843	0.840	0.836	0.832	0.829	0.825	0.822	0.818	0.814	0.811	0.807	0.803	0.800	0.796	0.792	0.788				
826	0.852	0.849	0.845	0.842	0.838	0.835	0.831	0.827	0.824	0.820	0.816	0.813	0.809	0.805	0.802	0.798	0.794	0.790				
828	0.854	0.851	0.847	0.844	0.840	0.837	0.833	0.829	0.826	0.822	0.818	0.815	0.811	0.807	0.804	0.800	0.796	0.792				
830	0.856	0.853	0.849	0.846	0.842	0.839	0.835	0.831	0.828	0.824	0.820	0.817	0.813	0.809	0.806	0.802	0.798	0.794				
832	0.859	0.855	0.851	0.848	0.844	0.841	0.837	0.833	0.830	0.826	0.822	0.819	0.815	0.811	0.808	0.804	0.800	0.796				
834	0.861	0.857	0.853	0.850	0.846	0.843	0.839	0.835	0.832	0.828	0.824	0.821	0.817	0.813	0.810	0.806	0.802	0.798				
836	0.863	0.859	0.855	0.852	0.848	0.845	0.841	0.837	0.834	0.830	0.826	0.823	0.819	0.815	0.811	0.808	0.804	0.800				
838	0.865	0.861	0.858	0.854	0.850	0.847	0.843	0.840	0.836	0.832	0.828	0.825	0.821	0.817	0.813	0.810	0.806	0.802				
840	0.867	0.863	0.860	0.856	0.852	0.849	0.845	0.842	0.838	0.834	0.830	0.827	0.823	0.819	0.815	0.812	0.808	0.804				
842	0.869	0.865	0.862	0.858	0.854	0.851	0.847	0.844	0.840	0.836	0.832	0.829	0.825	0.821	0.817	0.814	0.810	0.806				
844	0.871	0.867	0.864	0.860	0.856	0.853	0.849	0.846	0.842	0.838	0.834	0.831	0.827	0.823	0.819	0.816	0.812	0.808				



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表 A2

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0.751	0.747	0.743	0.740	0.735	0.732	0.727	0.723	0.719	0.715	0.711	0.706	0.702	0.698	0.693	0.689	0.684	0.679	0.673	0.668
0.753	0.749	0.745	0.741	0.737	0.733	0.729	0.725	0.721	0.717	0.713	0.708	0.704	0.700	0.695	0.691	0.686	0.680	0.675	0.670
0.755	0.751	0.747	0.743	0.739	0.735	0.731	0.727	0.723	0.719	0.714	0.710	0.706	0.702	0.697	0.692	0.688	0.682	0.677	0.672
0.757	0.753	0.749	0.745	0.741	0.737	0.733	0.729	0.725	0.721	0.716	0.712	0.708	0.703	0.699	0.694	0.689	0.684	0.679	0.674
0.759	0.755	0.751	0.747	0.743	0.739	0.735	0.731	0.727	0.723	0.718	0.714	0.710	0.705	0.701	0.696	0.691	0.686	0.681	0.675
0.761	0.757	0.753	0.749	0.745	0.741	0.737	0.733	0.729	0.725	0.720	0.716	0.712	0.707	0.703	0.698	0.693	0.688	0.683	0.677
0.763	0.759	0.755	0.751	0.747	0.743	0.739	0.735	0.731	0.726	0.722	0.718	0.713	0.709	0.705	0.700	0.695	0.690	0.684	0.679
0.765	0.761	0.757	0.753	0.749	0.745	0.741	0.737	0.733	0.728	0.724	0.720	0.715	0.711	0.706	0.702	0.697	0.691	0.686	0.681
0.767	0.763	0.759	0.755	0.751	0.747	0.743	0.739	0.735	0.730	0.726	0.721	0.717	0.713	0.708	0.704	0.699	0.693	0.688	0.683
0.769	0.765	0.761	0.757	0.753	0.749	0.745	0.741	0.736	0.732	0.728	0.723	0.719	0.715	0.710	0.705	0.701	0.695	0.690	0.685
0.771	0.767	0.763	0.759	0.755	0.751	0.747	0.742	0.738	0.734	0.730	0.725	0.721	0.717	0.712	0.707	0.702	0.697	0.692	0.686
0.772	0.769	0.765	0.761	0.757	0.753	0.748	0.744	0.740	0.736	0.731	0.727	0.723	0.718	0.714	0.709	0.704	0.699	0.694	0.688
0.774	0.770	0.767	0.763	0.759	0.755	0.750	0.746	0.742	0.738	0.733	0.729	0.725	0.720	0.716	0.711	0.706	0.701	0.695	0.690
0.776	0.772	0.769	0.765	0.761	0.757	0.752	0.748	0.744	0.740	0.735	0.731	0.727	0.722	0.718	0.713	0.708	0.703	0.697	0.692
0.778	0.774	0.771	0.767	0.762	0.758	0.754	0.750	0.746	0.742	0.737	0.733	0.729	0.724	0.719	0.715	0.710	0.704	0.699	0.694
0.780	0.776	0.772	0.769	0.764	0.760	0.756	0.752	0.748	0.744	0.739	0.735	0.730	0.726	0.721	0.717	0.712	0.706	0.701	0.696
0.782	0.778	0.774	0.770	0.766	0.762	0.758	0.754	0.750	0.745	0.741	0.737	0.732	0.728	0.723	0.718	0.714	0.708	0.703	0.697
0.784	0.780	0.776	0.772	0.768	0.764	0.760	0.756	0.752	0.747	0.743	0.738	0.734	0.730	0.725	0.720	0.715	0.710	0.705	0.699
0.786	0.782	0.778	0.774	0.770	0.766	0.762	0.758	0.754	0.749	0.745	0.740	0.736	0.731	0.727	0.722	0.717	0.712	0.707	0.701
0.788	0.784	0.780	0.776	0.772	0.768	0.764	0.760	0.756	0.751	0.747	0.742	0.738	0.733	0.729	0.724	0.719	0.714	0.708	0.703
0.790	0.786	0.782	0.778	0.774	0.770	0.766	0.762	0.757	0.753	0.748	0.744	0.740	0.735	0.731	0.726	0.721	0.716	0.710	0.705
0.792	0.788	0.784	0.780	0.776	0.772	0.768	0.763	0.759	0.755	0.750	0.746	0.742	0.737	0.732	0.728	0.723	0.717	0.712	0.707
0.794	0.790	0.786	0.782	0.778	0.774	0.770	0.765	0.761	0.757	0.752	0.748	0.744	0.739	0.734	0.730	0.725	0.719	0.714	0.708
0.796	0.792	0.788	0.784	0.780	0.776	0.771	0.767	0.763	0.759	0.754	0.750	0.745	0.741	0.736	0.731	0.727	0.721	0.716	0.710
0.798	0.794	0.790	0.786	0.782	0.778	0.773	0.769	0.765	0.761	0.756	0.752	0.747	0.743	0.738	0.733	0.728	0.723	0.718	0.712
0.800	0.796	0.792	0.788	0.784	0.780	0.775	0.771	0.767	0.763	0.758	0.753	0.749	0.745	0.740	0.735	0.730	0.725	0.719	0.714
0.802	0.798	0.794	0.790	0.786	0.781	0.777	0.773	0.769	0.764	0.760	0.755	0.751	0.746	0.742	0.737	0.732	0.727	0.721	0.716
0.804	0.800	0.796	0.792	0.788	0.783	0.779	0.775	0.771	0.766	0.762	0.757	0.753	0.748	0.744	0.739	0.734	0.728	0.723	0.718

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P mbar	t/°C																					
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22				
846	0.873	0.869	0.866	0.862	0.859	0.855	0.851	0.848	0.844	0.840	0.836	0.833	0.829	0.825	0.821	0.818	0.814	0.810				
848	0.875	0.871	0.868	0.864	0.861	0.857	0.853	0.850	0.846	0.842	0.838	0.835	0.831	0.827	0.823	0.819	0.816	0.812				
850	0.877	0.874	0.870	0.866	0.863	0.859	0.855	0.852	0.848	0.844	0.840	0.837	0.833	0.829	0.825	0.821	0.817	0.814				
852	0.879	0.876	0.872	0.868	0.865	0.861	0.857	0.854	0.850	0.846	0.842	0.839	0.835	0.831	0.827	0.823	0.819	0.815				
854	0.881	0.878	0.874	0.870	0.867	0.863	0.859	0.856	0.852	0.848	0.844	0.841	0.837	0.833	0.829	0.825	0.821	0.817				
856	0.884	0.880	0.876	0.872	0.869	0.865	0.861	0.858	0.854	0.850	0.846	0.843	0.839	0.835	0.831	0.827	0.823	0.819				
858	0.886	0.882	0.878	0.875	0.871	0.867	0.863	0.860	0.856	0.852	0.848	0.845	0.841	0.837	0.833	0.829	0.825	0.821				
860	0.888	0.884	0.880	0.877	0.873	0.869	0.865	0.862	0.858	0.854	0.850	0.847	0.843	0.839	0.835	0.831	0.827	0.823				
862	0.890	0.886	0.882	0.879	0.875	0.871	0.868	0.864	0.860	0.856	0.852	0.849	0.845	0.841	0.837	0.833	0.829	0.825				
864	0.892	0.888	0.884	0.881	0.877	0.873	0.870	0.866	0.862	0.858	0.854	0.851	0.847	0.843	0.839	0.835	0.831	0.827				
866	0.894	0.890	0.886	0.883	0.879	0.875	0.872	0.868	0.864	0.860	0.856	0.853	0.849	0.845	0.841	0.837	0.833	0.829				
868	0.896	0.892	0.888	0.885	0.881	0.877	0.874	0.870	0.866	0.862	0.858	0.855	0.851	0.847	0.843	0.839	0.835	0.831				
870	0.898	0.894	0.891	0.887	0.883	0.879	0.876	0.872	0.868	0.864	0.860	0.857	0.853	0.849	0.845	0.841	0.837	0.833				
872	0.900	0.896	0.893	0.889	0.885	0.882	0.878	0.874	0.870	0.866	0.862	0.859	0.855	0.851	0.847	0.843	0.839	0.835				
874	0.902	0.898	0.895	0.891	0.887	0.884	0.880	0.876	0.872	0.868	0.865	0.861	0.857	0.853	0.849	0.845	0.841	0.837				
876	0.904	0.900	0.897	0.893	0.889	0.886	0.882	0.878	0.874	0.870	0.867	0.863	0.859	0.855	0.851	0.847	0.843	0.839				
878	0.906	0.903	0.899	0.895	0.891	0.888	0.884	0.880	0.876	0.872	0.869	0.865	0.861	0.857	0.853	0.849	0.845	0.841				
880	0.908	0.905	0.901	0.897	0.893	0.890	0.886	0.882	0.878	0.874	0.871	0.867	0.863	0.859	0.855	0.851	0.847	0.843				
882	0.911	0.907	0.903	0.899	0.895	0.892	0.888	0.884	0.880	0.876	0.873	0.869	0.865	0.861	0.857	0.853	0.849	0.845				
884	0.913	0.909	0.905	0.901	0.897	0.894	0.890	0.886	0.882	0.878	0.875	0.871	0.867	0.863	0.859	0.855	0.851	0.847				
886	0.915	0.911	0.907	0.903	0.900	0.896	0.892	0.888	0.884	0.880	0.877	0.873	0.869	0.865	0.861	0.857	0.853	0.849				
888	0.917	0.913	0.909	0.905	0.902	0.898	0.894	0.890	0.886	0.882	0.879	0.875	0.871	0.867	0.863	0.859	0.855	0.851				
890	0.919	0.915	0.911	0.907	0.904	0.900	0.896	0.892	0.888	0.884	0.881	0.877	0.873	0.869	0.865	0.861	0.857	0.853				
892	0.921	0.917	0.913	0.909	0.906	0.902	0.898	0.894	0.890	0.886	0.883	0.879	0.875	0.871	0.867	0.863	0.859	0.855				
894	0.923	0.919	0.915	0.912	0.908	0.904	0.900	0.896	0.892	0.888	0.885	0.881	0.877	0.873	0.869	0.865	0.861	0.857				
896	0.925	0.921	0.917	0.914	0.910	0.906	0.902	0.898	0.894	0.891	0.887	0.883	0.879	0.875	0.871	0.867	0.863	0.859				
898	0.927	0.923	0.919	0.916	0.912	0.908	0.904	0.900	0.896	0.893	0.889	0.885	0.881	0.877	0.873	0.869	0.865	0.861				
900	0.929	0.925	0.922	0.918	0.914	0.910	0.906	0.902	0.898	0.895	0.891	0.887	0.883	0.879	0.875	0.871	0.867	0.863				

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表 A2

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0.806	0.802	0.798	0.794	0.789	0.785	0.781	0.777	0.773	0.768	0.764	0.759	0.755	0.750	0.746	0.741	0.736	0.730	0.725	0.719
0.808	0.804	0.800	0.796	0.791	0.787	0.783	0.779	0.775	0.770	0.766	0.761	0.757	0.752	0.747	0.743	0.738	0.732	0.727	0.721
0.810	0.806	0.802	0.798	0.793	0.789	0.785	0.781	0.776	0.772	0.767	0.763	0.759	0.754	0.749	0.744	0.739	0.734	0.729	0.723
0.812	0.808	0.804	0.799	0.795	0.791	0.787	0.783	0.778	0.774	0.769	0.765	0.760	0.756	0.751	0.746	0.741	0.736	0.730	0.725
0.814	0.810	0.805	0.801	0.797	0.793	0.789	0.784	0.780	0.776	0.771	0.767	0.762	0.758	0.753	0.748	0.743	0.738	0.732	0.727
0.815	0.811	0.807	0.803	0.799	0.795	0.791	0.786	0.782	0.778	0.773	0.769	0.764	0.760	0.755	0.750	0.745	0.740	0.734	0.729
0.817	0.813	0.809	0.805	0.801	0.797	0.792	0.788	0.784	0.780	0.775	0.770	0.766	0.761	0.757	0.752	0.747	0.741	0.736	0.730
0.819	0.815	0.811	0.807	0.803	0.799	0.794	0.790	0.786	0.781	0.777	0.772	0.768	0.763	0.759	0.754	0.749	0.743	0.738	0.732
0.821	0.817	0.813	0.809	0.805	0.801	0.796	0.792	0.788	0.783	0.779	0.774	0.770	0.765	0.760	0.756	0.751	0.745	0.740	0.734
0.823	0.819	0.815	0.811	0.807	0.803	0.798	0.794	0.790	0.785	0.781	0.776	0.772	0.767	0.762	0.757	0.752	0.747	0.741	0.736
0.825	0.821	0.817	0.813	0.809	0.805	0.800	0.796	0.792	0.787	0.783	0.778	0.774	0.769	0.764	0.759	0.754	0.749	0.743	0.738
0.827	0.823	0.819	0.815	0.811	0.806	0.802	0.798	0.794	0.789	0.784	0.780	0.775	0.771	0.766	0.761	0.756	0.751	0.745	0.740
0.829	0.825	0.821	0.817	0.813	0.808	0.804	0.800	0.795	0.791	0.786	0.782	0.777	0.773	0.768	0.763	0.758	0.752	0.747	0.741
0.831	0.827	0.823	0.819	0.815	0.810	0.806	0.802	0.797	0.793	0.788	0.784	0.779	0.775	0.770	0.765	0.760	0.754	0.749	0.743
0.833	0.829	0.825	0.821	0.816	0.812	0.808	0.804	0.799	0.795	0.790	0.786	0.781	0.776	0.772	0.767	0.762	0.756	0.751	0.745
0.835	0.831	0.827	0.823	0.818	0.814	0.810	0.805	0.801	0.797	0.792	0.787	0.783	0.778	0.774	0.769	0.764	0.758	0.753	0.747
0.837	0.833	0.829	0.825	0.820	0.816	0.812	0.807	0.803	0.799	0.794	0.789	0.785	0.780	0.775	0.770	0.765	0.760	0.754	0.749
0.839	0.835	0.831	0.827	0.822	0.818	0.814	0.809	0.805	0.800	0.796	0.791	0.787	0.782	0.777	0.772	0.767	0.762	0.756	0.751
0.841	0.837	0.833	0.828	0.824	0.820	0.815	0.811	0.807	0.802	0.798	0.793	0.789	0.784	0.779	0.774	0.769	0.764	0.758	0.752
0.843	0.839	0.835	0.830	0.826	0.822	0.817	0.813	0.809	0.804	0.800	0.795	0.790	0.786	0.781	0.776	0.771	0.765	0.760	0.754
0.845	0.841	0.836	0.832	0.828	0.824	0.819	0.815	0.811	0.806	0.801	0.797	0.792	0.788	0.783	0.778	0.773	0.767	0.762	0.756
0.847	0.843	0.838	0.834	0.830	0.826	0.821	0.817	0.813	0.808	0.803	0.799	0.794	0.790	0.785	0.780	0.775	0.769	0.764	0.758
0.849	0.845	0.840	0.836	0.832	0.828	0.823	0.819	0.814	0.810	0.805	0.801	0.796	0.791	0.787	0.782	0.777	0.771	0.765	0.760
0.851	0.847	0.842	0.838	0.834	0.830	0.825	0.821	0.816	0.812	0.807	0.802	0.798	0.793	0.788	0.784	0.778	0.773	0.767	0.762
0.853	0.848	0.844	0.840	0.836	0.831	0.827	0.823	0.818	0.814	0.809	0.804	0.800	0.795	0.790	0.785	0.780	0.775	0.769	0.763
0.855	0.850	0.846	0.842	0.838	0.833	0.829	0.825	0.820	0.816	0.811	0.806	0.802	0.797	0.792	0.787	0.782	0.776	0.771	0.765
0.857	0.852	0.848	0.844	0.840	0.835	0.831	0.826	0.822	0.817	0.813	0.808	0.804	0.799	0.794	0.789	0.784	0.778	0.773	0.767
0.858	0.854	0.850	0.846	0.842	0.837	0.833	0.828	0.824	0.819	0.815	0.810	0.806	0.801	0.796	0.791	0.786	0.780	0.775	0.769

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P mbar	t/°C																					
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22				
902	0.931	0.927	0.924	0.920	0.916	0.912	0.908	0.904	0.900	0.897	0.893	0.889	0.885	0.881	0.877	0.873	0.869	0.865				
904	0.933	0.929	0.926	0.922	0.918	0.914	0.910	0.906	0.903	0.899	0.895	0.891	0.887	0.883	0.879	0.875	0.871	0.866				
906	0.936	0.932	0.928	0.924	0.920	0.916	0.912	0.909	0.905	0.901	0.897	0.893	0.889	0.885	0.881	0.877	0.873	0.868				
908	0.938	0.934	0.930	0.926	0.922	0.918	0.914	0.911	0.907	0.903	0.899	0.895	0.891	0.887	0.883	0.879	0.875	0.870				
910	0.940	0.936	0.932	0.928	0.924	0.920	0.916	0.913	0.909	0.905	0.901	0.897	0.893	0.889	0.885	0.881	0.876	0.872				
912	0.942	0.938	0.934	0.930	0.926	0.922	0.918	0.915	0.911	0.907	0.903	0.899	0.895	0.891	0.887	0.883	0.878	0.874				
914	0.944	0.940	0.936	0.932	0.928	0.924	0.920	0.917	0.913	0.909	0.905	0.901	0.897	0.893	0.889	0.885	0.880	0.876				
916	0.946	0.942	0.938	0.934	0.930	0.926	0.923	0.919	0.915	0.911	0.907	0.903	0.899	0.895	0.891	0.887	0.882	0.878				
918	0.948	0.944	0.940	0.936	0.932	0.929	0.925	0.921	0.917	0.913	0.909	0.905	0.901	0.897	0.893	0.889	0.884	0.880				
920	0.950	0.946	0.942	0.938	0.934	0.931	0.927	0.923	0.919	0.915	0.911	0.907	0.903	0.899	0.895	0.891	0.886	0.882				
922	0.952	0.948	0.944	0.940	0.936	0.933	0.929	0.925	0.921	0.917	0.913	0.909	0.905	0.901	0.897	0.892	0.888	0.884				
924	0.954	0.950	0.946	0.942	0.938	0.935	0.931	0.927	0.923	0.919	0.915	0.911	0.907	0.903	0.899	0.894	0.890	0.886				
926	0.956	0.952	0.948	0.944	0.941	0.937	0.933	0.929	0.925	0.921	0.917	0.913	0.909	0.905	0.901	0.896	0.892	0.888				
928	0.958	0.954	0.950	0.947	0.943	0.939	0.935	0.931	0.927	0.923	0.919	0.915	0.911	0.907	0.903	0.898	0.894	0.890				
930	0.960	0.956	0.953	0.949	0.945	0.941	0.937	0.933	0.929	0.925	0.921	0.917	0.913	0.909	0.905	0.900	0.896	0.892				
932	0.963	0.959	0.955	0.951	0.947	0.943	0.939	0.935	0.931	0.927	0.923	0.919	0.915	0.911	0.907	0.902	0.898	0.894				
934	0.965	0.961	0.957	0.953	0.949	0.945	0.941	0.937	0.933	0.929	0.925	0.921	0.917	0.913	0.909	0.904	0.900	0.896				
936	0.967	0.963	0.959	0.955	0.951	0.947	0.943	0.939	0.935	0.931	0.927	0.923	0.919	0.915	0.911	0.906	0.902	0.898				
938	0.969	0.965	0.961	0.957	0.953	0.949	0.945	0.941	0.937	0.933	0.929	0.925	0.921	0.917	0.912	0.908	0.904	0.900				
940	0.971	0.967	0.963	0.959	0.955	0.951	0.947	0.943	0.939	0.935	0.931	0.927	0.923	0.919	0.914	0.910	0.906	0.902				
942	0.973	0.969	0.965	0.961	0.957	0.953	0.949	0.945	0.941	0.937	0.933	0.929	0.925	0.920	0.916	0.912	0.908	0.904				
944	0.975	0.971	0.967	0.963	0.959	0.955	0.951	0.947	0.943	0.939	0.935	0.931	0.927	0.922	0.918	0.914	0.910	0.906				
946	0.977	0.973	0.969	0.965	0.961	0.957	0.953	0.949	0.945	0.941	0.937	0.933	0.929	0.924	0.920	0.916	0.912	0.908				
948	0.979	0.975	0.971	0.967	0.963	0.959	0.955	0.951	0.947	0.943	0.939	0.935	0.931	0.926	0.922	0.918	0.914	0.910				
950	0.981	0.977	0.973	0.969	0.965	0.961	0.957	0.953	0.949	0.945	0.941	0.937	0.933	0.928	0.924	0.920	0.916	0.912				
952	0.983	0.979	0.975	0.971	0.967	0.963	0.959	0.955	0.951	0.947	0.943	0.939	0.935	0.930	0.926	0.922	0.918	0.914				
954	0.985	0.981	0.977	0.973	0.969	0.965	0.961	0.957	0.953	0.949	0.945	0.941	0.937	0.932	0.928	0.924	0.920	0.915				
956	0.988	0.983	0.979	0.975	0.971	0.967	0.963	0.959	0.955	0.951	0.947	0.943	0.939	0.934	0.930	0.926	0.922	0.917				
958	0.990	0.985	0.981	0.977	0.973	0.969	0.965	0.961	0.957	0.953	0.949	0.945	0.941	0.936	0.932	0.928	0.924	0.919				

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表 A2

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0.860	0.856	0.852	0.848	0.843	0.839	0.835	0.830	0.826	0.821	0.817	0.812	0.807	0.803	0.798	0.793	0.788	0.782	0.776	0.771
0.862	0.858	0.854	0.850	0.845	0.841	0.837	0.832	0.828	0.823	0.818	0.814	0.809	0.804	0.800	0.795	0.790	0.784	0.778	0.773
0.864	0.860	0.856	0.852	0.847	0.843	0.838	0.834	0.830	0.825	0.820	0.816	0.811	0.806	0.802	0.797	0.791	0.786	0.780	0.774
0.866	0.862	0.858	0.854	0.849	0.845	0.840	0.836	0.832	0.827	0.822	0.818	0.813	0.808	0.803	0.798	0.793	0.788	0.782	0.776
0.868	0.864	0.860	0.856	0.851	0.847	0.842	0.838	0.834	0.829	0.824	0.819	0.815	0.810	0.805	0.800	0.795	0.789	0.784	0.778
0.870	0.866	0.862	0.857	0.853	0.849	0.844	0.840	0.835	0.831	0.826	0.821	0.817	0.812	0.807	0.802	0.797	0.791	0.786	0.780
0.872	0.868	0.864	0.859	0.855	0.851	0.846	0.842	0.837	0.833	0.828	0.823	0.819	0.814	0.809	0.804	0.799	0.793	0.788	0.782
0.874	0.870	0.866	0.861	0.857	0.853	0.848	0.844	0.839	0.835	0.830	0.825	0.821	0.816	0.811	0.806	0.801	0.795	0.789	0.784
0.876	0.872	0.868	0.863	0.859	0.854	0.850	0.846	0.841	0.836	0.832	0.827	0.822	0.818	0.813	0.808	0.803	0.797	0.791	0.785
0.878	0.874	0.869	0.865	0.861	0.856	0.852	0.847	0.843	0.838	0.834	0.829	0.824	0.819	0.815	0.810	0.804	0.799	0.793	0.787
0.880	0.876	0.871	0.867	0.863	0.858	0.854	0.849	0.845	0.840	0.835	0.831	0.826	0.821	0.816	0.811	0.806	0.800	0.795	0.789
0.882	0.878	0.873	0.869	0.865	0.860	0.856	0.851	0.847	0.842	0.837	0.833	0.828	0.823	0.818	0.813	0.808	0.802	0.797	0.791
0.884	0.880	0.875	0.871	0.867	0.862	0.858	0.853	0.849	0.844	0.839	0.834	0.830	0.825	0.820	0.815	0.810	0.804	0.799	0.793
0.886	0.882	0.877	0.873	0.869	0.864	0.860	0.855	0.851	0.846	0.841	0.836	0.832	0.827	0.822	0.817	0.812	0.806	0.800	0.795
0.888	0.884	0.879	0.875	0.870	0.866	0.861	0.857	0.853	0.848	0.843	0.838	0.834	0.829	0.824	0.819	0.814	0.808	0.802	0.797
0.890	0.885	0.881	0.877	0.872	0.868	0.863	0.859	0.854	0.850	0.845	0.840	0.836	0.831	0.826	0.821	0.815	0.810	0.804	0.798
0.892	0.887	0.883	0.879	0.874	0.870	0.865	0.861	0.856	0.852	0.847	0.842	0.837	0.833	0.828	0.823	0.817	0.812	0.806	0.800
0.894	0.889	0.885	0.881	0.876	0.872	0.867	0.863	0.858	0.854	0.849	0.844	0.839	0.834	0.830	0.824	0.819	0.813	0.808	0.802
0.896	0.891	0.887	0.883	0.878	0.874	0.869	0.865	0.860	0.855	0.851	0.846	0.841	0.836	0.831	0.826	0.821	0.815	0.810	0.804
0.898	0.893	0.889	0.885	0.880	0.876	0.871	0.867	0.862	0.857	0.852	0.848	0.843	0.838	0.833	0.828	0.823	0.817	0.811	0.806
0.899	0.895	0.891	0.887	0.882	0.878	0.873	0.868	0.864	0.859	0.854	0.850	0.845	0.840	0.835	0.830	0.825	0.819	0.813	0.808
0.901	0.897	0.893	0.888	0.884	0.879	0.875	0.870	0.866	0.861	0.856	0.851	0.847	0.842	0.837	0.832	0.827	0.821	0.816	0.809
0.903	0.899	0.895	0.890	0.886	0.881	0.877	0.872	0.868	0.863	0.858	0.853	0.849	0.844	0.839	0.834	0.828	0.823	0.817	0.811
0.905	0.901	0.897	0.892	0.888	0.883	0.879	0.874	0.870	0.865	0.860	0.855	0.851	0.846	0.841	0.836	0.830	0.825	0.819	0.813
0.907	0.903	0.899	0.894	0.890	0.885	0.881	0.876	0.872	0.867	0.862	0.857	0.852	0.848	0.843	0.837	0.832	0.826	0.821	0.815
0.909	0.905	0.900	0.896	0.892	0.887	0.882	0.878	0.873	0.869	0.864	0.859	0.854	0.849	0.844	0.839	0.834	0.828	0.823	0.817
0.911	0.907	0.902	0.898	0.894	0.889	0.884	0.880	0.875	0.871	0.866	0.861	0.856	0.851	0.846	0.841	0.836	0.830	0.824	0.819
0.913	0.909	0.904	0.900	0.895	0.891	0.886	0.882	0.877	0.872	0.868	0.863	0.858	0.853	0.848	0.843	0.838	0.832	0.826	0.820
0.915	0.911	0.906	0.902	0.897	0.893	0.888	0.884	0.879	0.874	0.869	0.865	0.860	0.855	0.850	0.845	0.840	0.834	0.828	0.822

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P mbar	t/°C																					
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22				
960	0.992	0.988	0.983	0.979	0.975	0.971	0.967	0.963	0.959	0.955	0.951	0.947	0.943	0.938	0.934	0.930	0.926	0.921				
962	0.994	0.990	0.986	0.982	0.977	0.973	0.969	0.965	0.961	0.957	0.953	0.949	0.945	0.940	0.936	0.932	0.928	0.923				
964	0.996	0.992	0.988	0.984	0.979	0.976	0.971	0.967	0.963	0.959	0.955	0.951	0.946	0.942	0.938	0.934	0.930	0.925				
966	0.998	0.994	0.990	0.986	0.982	0.978	0.973	0.969	0.965	0.961	0.957	0.953	0.948	0.944	0.940	0.936	0.932	0.927				
968	1.000	0.996	0.992	0.988	0.984	0.980	0.975	0.971	0.967	0.963	0.959	0.955	0.950	0.946	0.942	0.938	0.934	0.929				
970	1.002	0.998	0.994	0.990	0.986	0.982	0.977	0.973	0.969	0.965	0.961	0.957	0.952	0.948	0.944	0.940	0.936	0.931				
972	1.004	1.000	0.996	0.992	0.988	0.984	0.980	0.975	0.971	0.967	0.963	0.959	0.954	0.950	0.946	0.942	0.937	0.933				
974	1.006	1.002	0.998	0.994	0.990	0.986	0.982	0.977	0.973	0.969	0.965	0.961	0.956	0.952	0.948	0.944	0.939	0.935				
976	1.008	1.004	1.000	0.996	0.992	0.988	0.984	0.980	0.975	0.971	0.967	0.963	0.958	0.954	0.950	0.946	0.941	0.937				
978	1.010	1.006	1.002	0.998	0.994	0.990	0.986	0.982	0.977	0.973	0.969	0.965	0.960	0.956	0.952	0.948	0.943	0.939				
980	1.012	1.008	1.004	1.000	0.996	0.992	0.988	0.984	0.979	0.975	0.971	0.967	0.962	0.958	0.954	0.950	0.945	0.941				
982	1.015	1.010	1.006	1.002	0.998	0.994	0.990	0.986	0.981	0.977	0.973	0.969	0.964	0.960	0.956	0.952	0.947	0.943				
984	1.017	1.012	1.008	1.004	1.000	0.996	0.992	0.988	0.983	0.979	0.975	0.971	0.966	0.962	0.958	0.954	0.949	0.945				
986	1.019	1.014	1.010	1.006	1.002	0.998	0.994	0.990	0.985	0.981	0.977	0.973	0.968	0.964	0.960	0.956	0.951	0.947				
988	1.021	1.017	1.012	1.008	1.004	1.000	0.996	0.992	0.987	0.983	0.979	0.975	0.970	0.966	0.962	0.958	0.953	0.949				
990	1.023	1.019	1.014	1.010	1.006	1.002	0.998	0.994	0.989	0.985	0.981	0.977	0.972	0.968	0.964	0.960	0.955	0.951				
992	1.025	1.021	1.017	1.012	1.008	1.004	1.000	0.996	0.991	0.987	0.983	0.979	0.974	0.970	0.966	0.962	0.957	0.953				
994	1.027	1.023	1.019	1.014	1.010	1.006	1.002	0.998	0.993	0.989	0.985	0.981	0.976	0.972	0.968	0.964	0.959	0.955				
996	1.029	1.025	1.021	1.017	1.012	1.008	1.004	1.000	0.996	0.991	0.987	0.983	0.978	0.974	0.970	0.966	0.961	0.957				
998	1.031	1.027	1.023	1.019	1.014	1.010	1.006	1.002	0.998	0.993	0.989	0.985	0.980	0.976	0.972	0.968	0.963	0.959				
1000	1.033	1.029	1.025	1.021	1.016	1.012	1.008	1.004	1.000	0.995	0.991	0.987	0.982	0.978	0.974	0.969	0.965	0.961				
1002	1.035	1.031	1.027	1.023	1.018	1.014	1.010	1.006	1.002	0.997	0.993	0.989	0.984	0.980	0.976	0.971	0.967	0.963				
1004	1.037	1.033	1.029	1.025	1.021	1.016	1.012	1.008	1.004	0.999	0.995	0.991	0.986	0.982	0.978	0.973	0.969	0.964				
1006	1.040	1.035	1.031	1.027	1.023	1.018	1.014	1.010	1.006	1.001	0.997	0.993	0.988	0.984	0.980	0.975	0.971	0.966				
1008	1.042	1.037	1.033	1.029	1.025	1.020	1.016	1.012	1.008	1.003	0.999	0.995	0.990	0.986	0.982	0.977	0.973	0.968				
1010	1.044	1.039	1.035	1.031	1.027	1.022	1.018	1.014	1.010	1.005	1.001	0.997	0.992	0.988	0.984	0.979	0.975	0.970				
1012	1.046	1.041	1.037	1.033	1.029	1.025	1.020	1.016	1.012	1.007	1.003	0.999	0.994	0.990	0.986	0.981	0.977	0.972				
1014	1.048	1.043	1.039	1.035	1.031	1.027	1.022	1.018	1.014	1.009	1.005	1.001	0.996	0.992	0.988	0.983	0.979	0.974				

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表 A2

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0.917	0.913	0.908	0.904	0.899	0.895	0.890	0.886	0.881	0.876	0.871	0.867	0.862	0.857	0.852	0.847	0.841	0.836	0.830	0.824
0.919	0.915	0.910	0.906	0.901	0.897	0.892	0.887	0.883	0.878	0.873	0.868	0.864	0.859	0.854	0.849	0.843	0.837	0.832	0.826
0.921	0.917	0.912	0.908	0.903	0.899	0.894	0.889	0.885	0.880	0.875	0.870	0.866	0.861	0.856	0.850	0.845	0.839	0.834	0.828
0.923	0.919	0.914	0.910	0.905	0.900	0.896	0.891	0.887	0.882	0.877	0.872	0.867	0.863	0.857	0.852	0.847	0.841	0.835	0.830
0.925	0.921	0.916	0.912	0.907	0.903	0.898	0.893	0.889	0.884	0.879	0.874	0.869	0.864	0.859	0.854	0.849	0.843	0.837	0.831
0.927	0.922	0.918	0.914	0.909	0.904	0.900	0.895	0.890	0.886	0.881	0.876	0.871	0.866	0.861	0.856	0.851	0.845	0.839	0.833
0.929	0.924	0.920	0.916	0.911	0.906	0.902	0.897	0.892	0.888	0.883	0.878	0.873	0.868	0.863	0.858	0.853	0.847	0.841	0.835
0.931	0.926	0.922	0.917	0.913	0.908	0.904	0.899	0.894	0.890	0.885	0.880	0.875	0.870	0.865	0.860	0.854	0.849	0.843	0.837
0.933	0.928	0.924	0.919	0.915	0.910	0.905	0.901	0.896	0.891	0.886	0.882	0.877	0.872	0.867	0.862	0.856	0.850	0.845	0.839
0.935	0.930	0.926	0.921	0.917	0.912	0.907	0.903	0.898	0.893	0.888	0.883	0.879	0.874	0.869	0.863	0.858	0.852	0.846	0.841
0.937	0.932	0.928	0.923	0.919	0.914	0.909	0.905	0.900	0.895	0.890	0.885	0.881	0.876	0.871	0.865	0.860	0.854	0.848	0.842
0.939	0.934	0.930	0.925	0.921	0.916	0.911	0.907	0.902	0.897	0.892	0.887	0.882	0.877	0.872	0.867	0.862	0.856	0.850	0.844
0.941	0.936	0.932	0.927	0.922	0.918	0.913	0.908	0.904	0.899	0.894	0.889	0.884	0.879	0.874	0.869	0.864	0.858	0.852	0.846
0.942	0.938	0.934	0.929	0.924	0.920	0.915	0.910	0.906	0.901	0.896	0.891	0.886	0.881	0.876	0.871	0.866	0.860	0.854	0.848
0.944	0.940	0.935	0.931	0.926	0.922	0.917	0.912	0.908	0.903	0.898	0.893	0.888	0.883	0.878	0.873	0.867	0.861	0.856	0.850
0.946	0.942	0.937	0.933	0.928	0.924	0.919	0.914	0.910	0.905	0.900	0.895	0.890	0.885	0.880	0.875	0.869	0.863	0.858	0.852
0.948	0.944	0.939	0.935	0.930	0.926	0.921	0.916	0.911	0.907	0.902	0.897	0.892	0.887	0.882	0.876	0.871	0.865	0.859	0.853
0.950	0.946	0.941	0.937	0.932	0.927	0.923	0.918	0.913	0.908	0.903	0.898	0.894	0.889	0.884	0.878	0.873	0.867	0.861	0.855
0.952	0.948	0.943	0.939	0.934	0.929	0.925	0.920	0.915	0.910	0.905	0.900	0.896	0.891	0.885	0.880	0.875	0.869	0.863	0.857
0.954	0.950	0.945	0.941	0.936	0.931	0.927	0.922	0.917	0.912	0.907	0.902	0.898	0.892	0.887	0.882	0.877	0.871	0.865	0.859
0.956	0.952	0.947	0.943	0.938	0.933	0.928	0.924	0.919	0.914	0.909	0.904	0.899	0.894	0.889	0.884	0.878	0.873	0.867	0.861
0.958	0.954	0.949	0.945	0.940	0.935	0.930	0.926	0.921	0.916	0.911	0.906	0.901	0.896	0.891	0.886	0.880	0.874	0.869	0.863
0.960	0.956	0.951	0.946	0.942	0.937	0.932	0.928	0.923	0.918	0.913	0.908	0.903	0.898	0.893	0.888	0.882	0.876	0.870	0.864
0.962	0.957	0.953	0.948	0.944	0.939	0.934	0.929	0.925	0.920	0.915	0.910	0.905	0.900	0.895	0.890	0.884	0.878	0.872	0.866
0.964	0.959	0.955	0.950	0.946	0.941	0.936	0.931	0.927	0.922	0.917	0.912	0.907	0.902	0.897	0.891	0.886	0.880	0.874	0.868
0.966	0.961	0.957	0.952	0.948	0.943	0.938	0.933	0.929	0.924	0.919	0.914	0.909	0.904	0.899	0.893	0.888	0.882	0.876	0.870
0.968	0.963	0.959	0.954	0.949	0.945	0.940	0.935	0.931	0.926	0.920	0.915	0.911	0.906	0.900	0.895	0.890	0.884	0.878	0.872
0.970	0.965	0.961	0.956	0.951	0.947	0.942	0.937	0.932	0.927	0.922	0.917	0.913	0.907	0.902	0.897	0.891	0.885	0.880	0.874

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	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22				
1016	1.050	1.046	1.041	1.037	1.033	1.029	1.024	1.020	1.016	1.011	1.007	1.003	0.998	0.994	0.990	0.985	0.981	0.976				
1018	1.052	1.048	1.043	1.039	1.035	1.031	1.026	1.022	1.018	1.013	1.009	1.005	1.000	0.996	0.992	0.987	0.983	0.978				
1020	1.054	1.050	1.045	1.041	1.037	1.033	1.028	1.024	1.020	1.015	1.011	1.007	1.002	0.998	0.994	0.989	0.985	0.980				
1022	1.056	1.052	1.048	1.043	1.039	1.035	1.030	1.026	1.022	1.017	1.013	1.009	1.004	1.000	0.996	0.991	0.987	0.982				
1024	1.058	1.054	1.050	1.045	1.041	1.037	1.032	1.028	1.024	1.019	1.015	1.011	1.006	1.002	0.998	0.993	0.989	0.984				
1026	1.060	1.056	1.052	1.047	1.043	1.039	1.035	1.030	1.026	1.021	1.017	1.013	1.008	1.004	1.000	0.995	0.991	0.986				
1028	1.062	1.058	1.054	1.049	1.045	1.041	1.037	1.032	1.028	1.023	1.019	1.015	1.010	1.006	1.002	0.997	0.993	0.988				
1030	1.065	1.060	1.056	1.051	1.047	1.043	1.039	1.034	1.030	1.026	1.021	1.017	1.012	1.008	1.004	0.999	0.995	0.990				
1032	1.067	1.062	1.058	1.054	1.049	1.045	1.041	1.036	1.032	1.028	1.023	1.019	1.014	1.010	1.006	1.001	0.996	0.992				
1034	1.069	1.064	1.060	1.056	1.051	1.047	1.043	1.038	1.034	1.030	1.025	1.021	1.016	1.012	1.008	1.003	0.998	0.994				
1036	1.071	1.066	1.062	1.058	1.053	1.049	1.045	1.040	1.036	1.032	1.027	1.023	1.018	1.014	1.010	1.005	1.000	0.996				
1038	1.073	1.068	1.064	1.060	1.055	1.051	1.047	1.042	1.038	1.034	1.029	1.025	1.020	1.016	1.012	1.007	1.002	0.998				
1040	1.075	1.070	1.066	1.062	1.057	1.053	1.049	1.044	1.040	1.036	1.031	1.027	1.022	1.018	1.014	1.009	1.004	1.000				



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表 A2

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
0.972	0.967	0.963	0.958	0.953	0.949	0.944	0.939	0.934	0.929	0.924	0.919	0.914	0.909	0.904	0.899	0.893	0.887	0.881	0.875
0.974	0.969	0.965	0.960	0.955	0.951	0.946	0.941	0.936	0.931	0.926	0.921	0.916	0.911	0.906	0.901	0.895	0.889	0.883	0.877
0.976	0.971	0.967	0.962	0.957	0.952	0.948	0.943	0.938	0.933	0.928	0.923	0.918	0.913	0.908	0.903	0.897	0.891	0.885	0.879
0.978	0.973	0.968	0.964	0.959	0.954	0.950	0.945	0.940	0.935	0.930	0.925	0.920	0.915	0.910	0.904	0.899	0.893	0.887	0.881
0.980	0.975	0.970	0.966	0.961	0.956	0.951	0.947	0.942	0.937	0.932	0.927	0.922	0.917	0.912	0.906	0.901	0.895	0.889	0.883
0.982	0.977	0.972	0.968	0.963	0.958	0.953	0.948	0.944	0.939	0.934	0.929	0.924	0.919	0.913	0.908	0.903	0.897	0.891	0.885
0.983	0.979	0.974	0.970	0.965	0.960	0.955	0.950	0.946	0.941	0.936	0.931	0.926	0.920	0.915	0.910	0.904	0.898	0.893	0.886
0.985	0.981	0.976	0.972	0.967	0.962	0.957	0.952	0.948	0.943	0.937	0.932	0.928	0.922	0.917	0.912	0.906	0.900	0.894	0.888
0.987	0.983	0.978	0.974	0.969	0.964	0.959	0.954	0.950	0.945	0.939	0.934	0.929	0.924	0.919	0.914	0.908	0.902	0.896	0.890
0.989	0.985	0.980	0.975	0.971	0.966	0.961	0.956	0.951	0.946	0.941	0.936	0.931	0.926	0.921	0.916	0.910	0.904	0.898	0.892
0.991	0.987	0.982	0.977	0.973	0.968	0.963	0.958	0.953	0.948	0.943	0.938	0.933	0.928	0.923	0.917	0.912	0.906	0.900	0.894
0.993	0.989	0.984	0.979	0.975	0.970	0.965	0.960	0.955	0.950	0.945	0.940	0.935	0.930	0.925	0.919	0.914	0.908	0.902	0.896
0.995	0.991	0.986	0.981	0.976	0.972	0.967	0.962	0.957	0.952	0.947	0.942	0.937	0.932	0.927	0.921	0.916	0.910	0.904	0.897

附加说明:

本标准由新余钢铁厂起草。

本标准主要起草人吴太白、廖国华。

自本标准实施之日起, 原冶金工业部部标准 YB 80—65 《锰铁及高炉锰铁化学分析方法》作废。

本标准水平等级标记 GB 7730.6—88 I