

XVI. HEMISPHERICAL TOTAL EMITTANCE

CONTENTS

- A. Aluminum
- B. Copper
- C. Iron

HEMISPHERICAL TOTAL EMITTANCE -- ALUMINUM
DATA TABLE

T (K)	ϵ	T (K)	ϵ	T (K)	ϵ
<u>RECOMMENDED EMISSIVITY</u>		<u>CURVE 4</u>		<u>CURVE 6*</u>	
50	0.01 \pm 0.02	375	0.28	423	0.050
100	0.02	385	0.33	473	0.053
200	0.03	393	0.32	523	0.055
300	0.04	398	0.31	573	0.058
400	0.045	403	0.33	623	0.059
500	0.055	419	0.28	<u>CURVE 7*</u>	
600	0.06	433	0.28	573	0.102
700	0.06	453	0.27	673	0.115
800	0.07	<u>CURVE 5*</u>		773	0.130
850	0.075	384	0.17	873	0.113
<u>CURVE 1*</u>		395	0.18	<u>CURVE 8</u>	
76	0.026	409	0.18	588.72	0.40
<u>CURVE 2*</u>		420	0.18	644.27	0.40
76	0.018	428	0.17	699.83	0.40
<u>CURVE 3*</u>		440	0.17	755.38	0.40
281	0.07	452	0.16	810.94	0.40
266	0.07	466	0.15		
260	0.07				
252	0.07				
244	0.07				
234	0.07				
227	0.07				

* Not shown on figure.

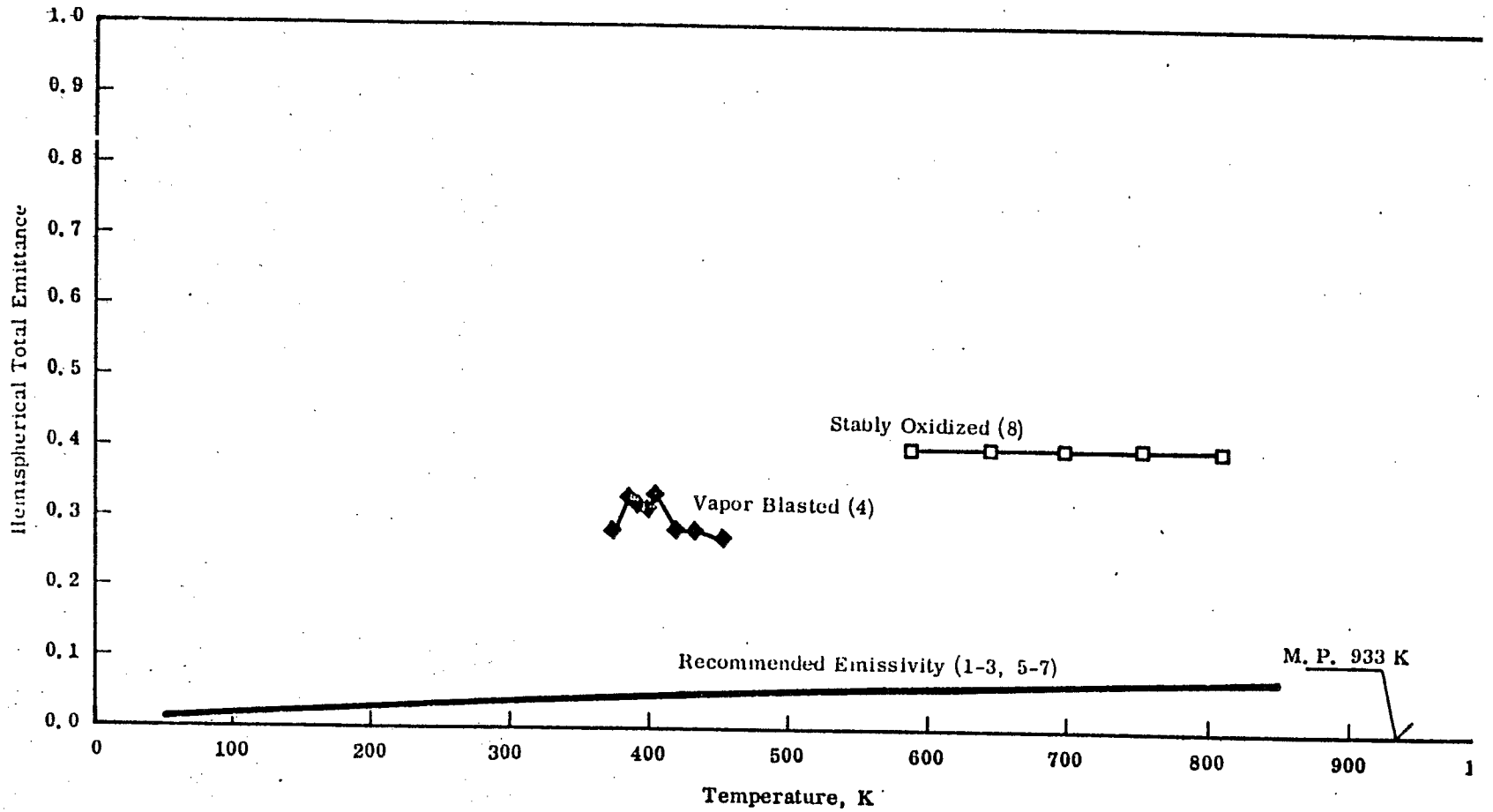
HEMISPHERICAL TOTAL EMITTANCE -- ALUMINUM
SPECIFICATION TABLE

Curve No.	Ref. No.	Temp. Range, K	Reported Error, %	Specimen Characterization and Remarks
1*	1	76	5	Alcoa No. 2 reflector plate; 0.02 in. thick; emittance for 300 K black body radiation; measured in vacuum, 10^{-6} to 10^{-7} torr.
2*	1	76	5	Same as above; unannealed Kaiser foil; 0.001 in. thickness.
3*	2	227-281	± 3	Polished; measured in vacuum.
4	3	375-453	± 3	Vapor (alumina suspended in water) blasted for 2 min; measured in vacuum.
5*	3	384-466	± 3	Polished by fine abrasive papers and polishing compounds; measured in vacuum.
6*	4	423-623	≤ 5	Polished mechanically using metallographic procedures; annealed; measured in vacuum.
7*	5	573-873		99.6% purity; computed from spectral reflectance measurements.
8	6	589-811	≤ 4	AA3003; polished, stably oxidized at 810 K for 30 min; diffuse emitter.

XVI-A-2

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XVI-VIAX



HEMISPHERICAL TOTAL EMITTANCE -- ALUMINUM

HEMISPHERICAL TOTAL EMITTANCE -- COPPER
DATA TABLE

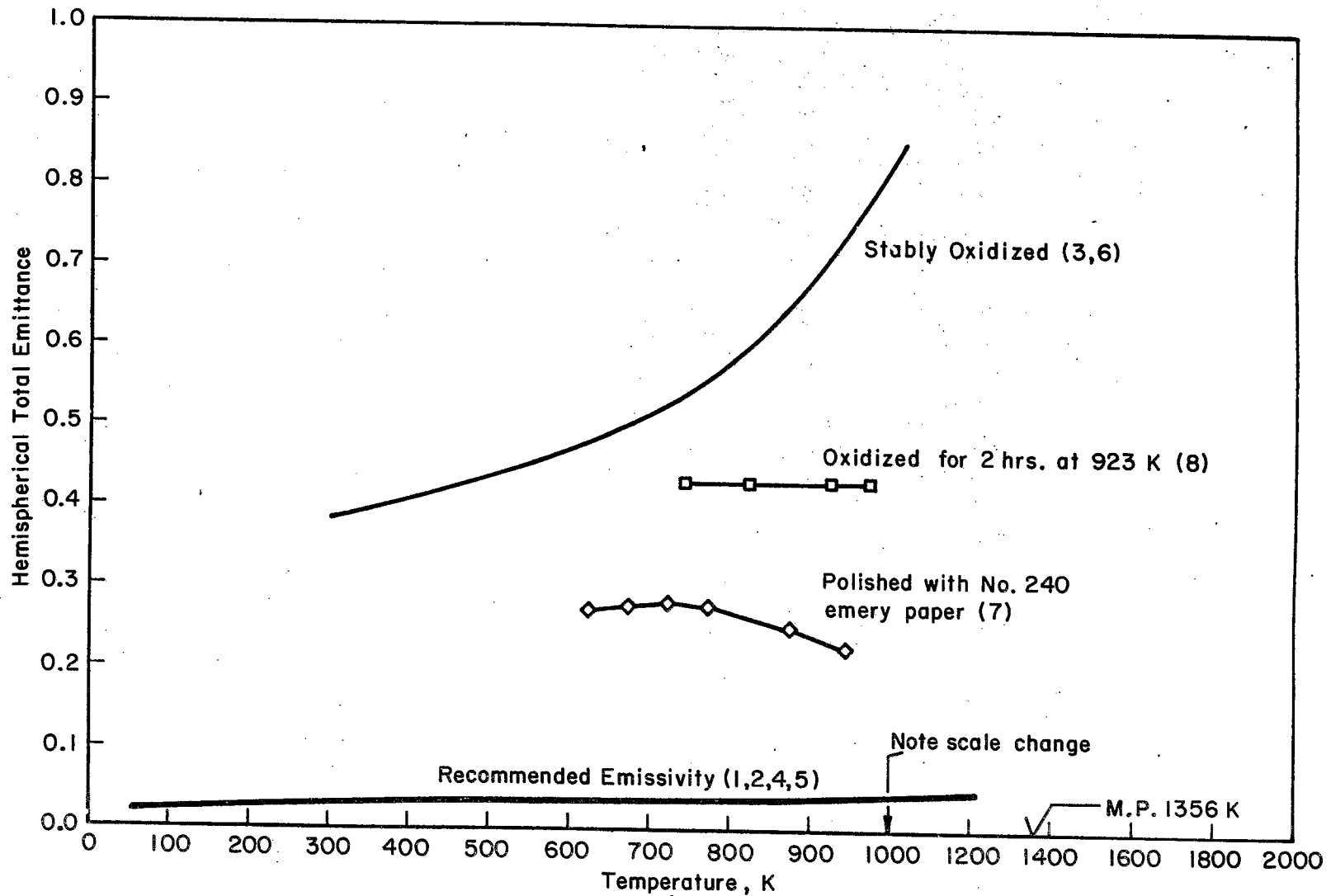
T (K)	ϵ	T (K)	ϵ	T (K)	ϵ
<u>RECOMMENDED EMISSIVITY</u>		<u>CURVE 1*</u>		<u>CURVE 6*</u>	
50	0.02 ±0.01	76	0.015	588.7	0.495
100	0.025			644.3	0.500
200	0.03	<u>CURVE 2*</u>		699.8	0.525
300	0.03	76	0.03	755.4	0.545
400	0.035			810.9	0.595
500	0.035	<u>CURVE 3*</u>		866.5	0.640
600	0.04	300	0.38	922.0	0.710
700	0.04			1033.2	0.855
800	0.04	<u>CURVE 4*</u>		<u>CURVE 7</u>	
900	0.04 ±0.02	323	0.040	623	0.200
1000	0.04	473	0.035	673	0.275
1100	0.045	673	0.036	723	0.280
1200	0.045	873	0.038	773	0.275
		1073	0.045	873	0.250
		1173	0.050	943	0.225
		<u>CURVE 5*</u>		<u>CURVE 8</u>	
		373	0.030	743	0.43
		423	0.030	823	0.43
		473	0.031	923	0.43
		523	0.031	973	0.43
		573	0.032		
		623	0.032		

* Not shown on figure

HEMISPHERICAL TOTAL EMITTANCE -- COPPER
SPECIFICATION TABLE

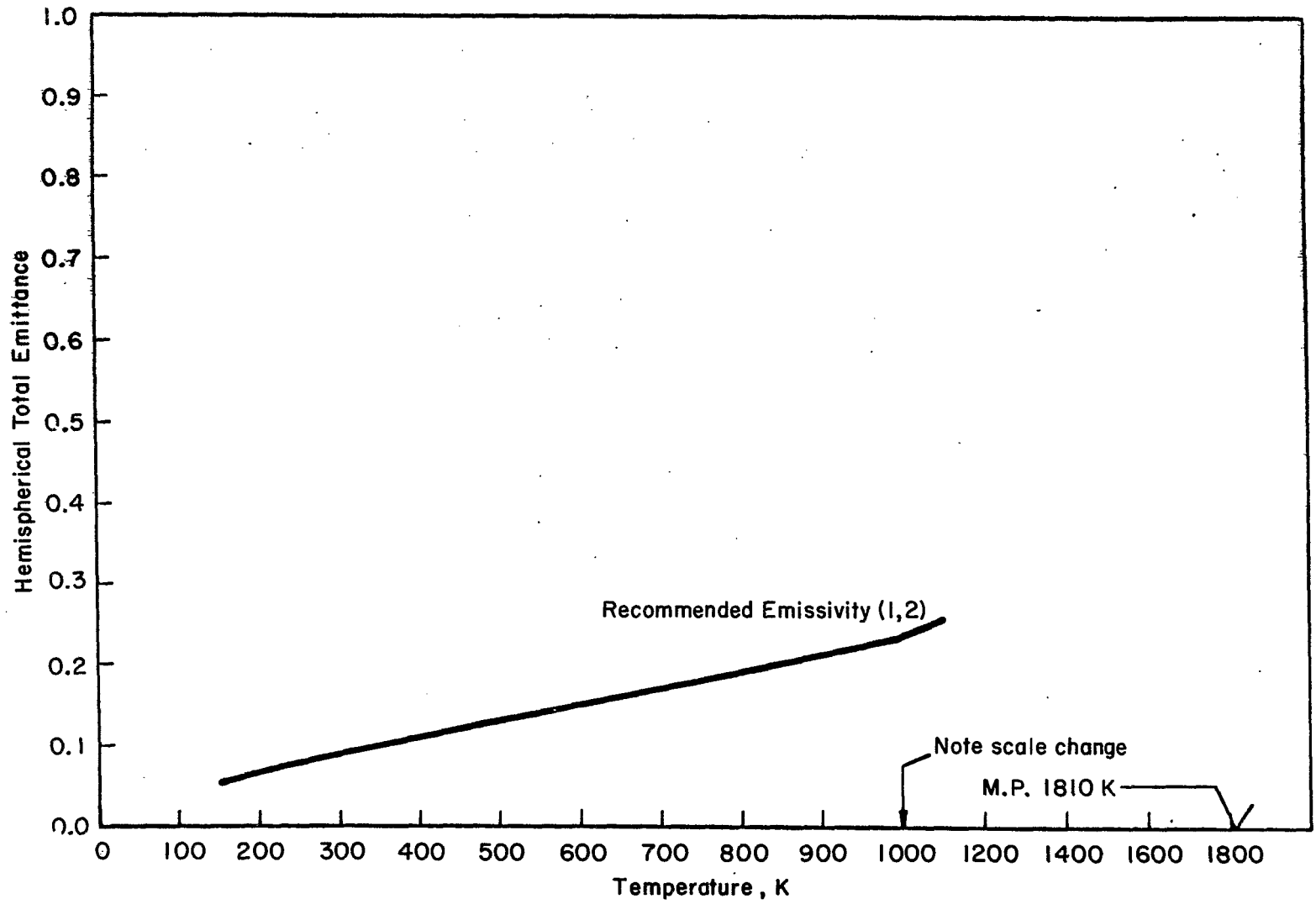
Curve No.	Ref. No.	Temp. Range, K	Reported Error, %	Specimen Characterization and Remarks
1*	1	76	±5	Sheet, 0.005 in. thickness; annealed and cleaned; emittance for 300 K black body radiation; measured in vacuum.
2*	1	76	±5	Same as above; polished.
3*	9	300		Oxidized and corroded.
4*	10	323-1173		Polished; cycled to 1173 K in vacuum several times.
5*	4	373-623	≤5	Polished mechanically; annealed; measured in vacuum.
6*	6	589-1033	≤2	Stably oxidized in quiescent air at 1033 K.
7	11	623-943		Polished with No. 240 grit emery paper; measured in vacuum.
8	11	743-973		Oxidized in air for 2 hrs at 923 K; measured in vacuum.

* Not shown on figure



Hemispherical Total Emittance -- Copper

I-C-1A



Hemispherical Total Emissance -- Iron