DMIC Report 177
Volume 2 of 2
November 15, 1962

THERMAL RADIATIVE PROPERTIES OF SELECTED MATERIALS

DEFENSE METALS INFORMATION CENTER
Battelle Memorial Institute
Columbus 1, Ohio

The Defense Metals Information Center was established at Battelle Memorial Institute at the request of the Office of the Director of Defense Research and Engineering to provide Government contractors and their suppliers technical assistance and information on titanium, beryllium, magnesium, refractory metals, high-strength alloys for high-temperature service, corrosion- and oxidation-resistant coatings, and thermal-protection systems. Its functions, under the direction of the Office of the Secretary of Defense, are as follows:

1. To collect, store, and disseminate technical information on the current status of research and development of the above materials.

2. To supplement established Service activities in providing technical advisory services to producers, melters, and fabricators of the above materials, and to designers and fabricators of military equipment containing these materials.

3. To assist the Government agencies and their contractors in developing technical data required for preparation of specifications for the above materials.

4. On assignment, to conduct surveys, or laboratory research investigations, mainly of a short-range nature, as required, to ascertain causes of troubles encountered by fabricators, or to fill minor gaps in established research programs.

Contract No. AF 33(616)-7747
Project No. 2(8-8975)

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THERMAL RADIATIVE PROPERTIES OF SELECTED MATERIALS

by

W. D. Wood, H. W. Deem, and C. F. Lucks

to

OFFICE OF THE DIRECTOR OF DEFENSE
RESEARCH AND ENGINEERING

DEFENSE METALS INFORMATION CENTER
Battelle Memorial Institute
Columbus 1, Ohio

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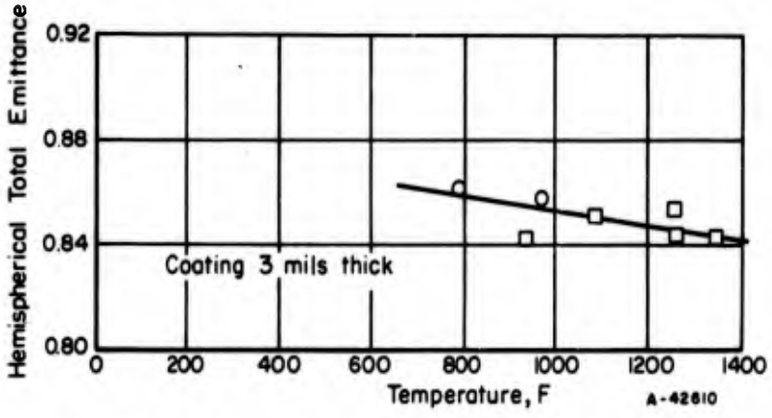
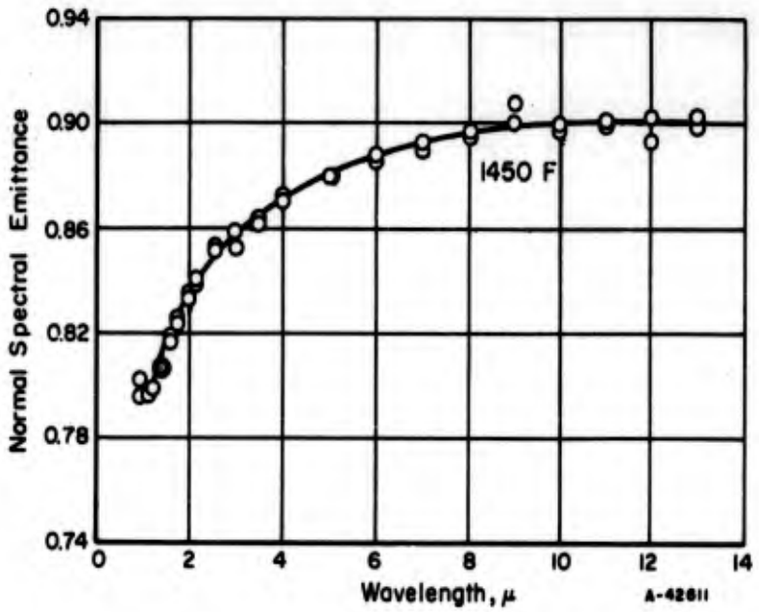


HEMISPHERICAL TOTAL EMITTANCE OF CRYSTALLINE BORON ON COLUMBIUM

HEMISPHERICAL TOTAL EMITTANCE OF CRYSTALLINE BORON ON COLUMBIUM--REFERENCE INFORMATION

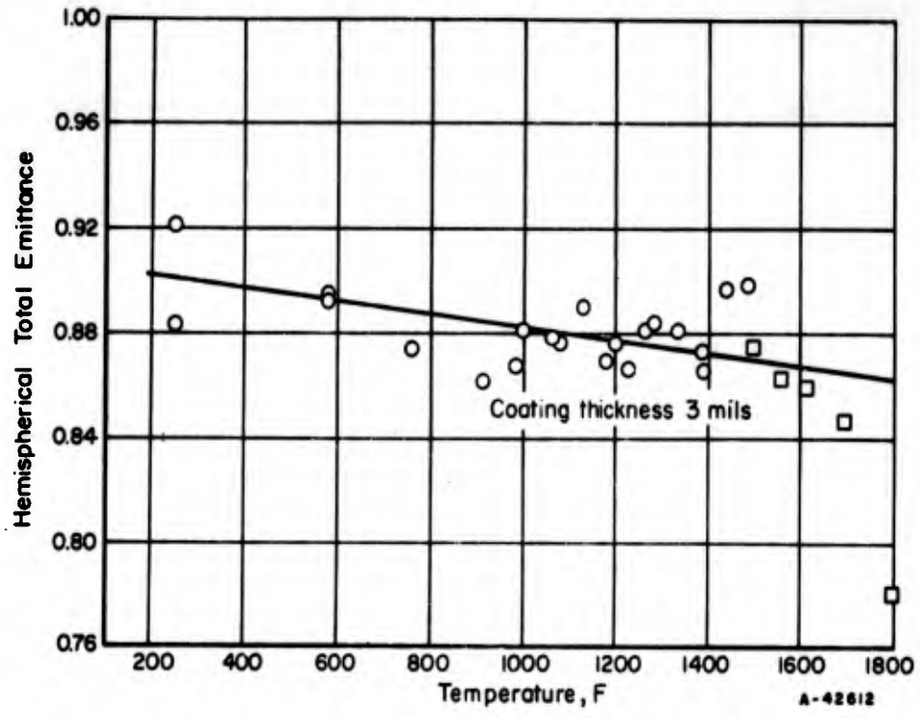
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		3-mil-thick coating prepared by Linde Plasmarc process on columbium tube.	Hemispherical total emittance. Resistance-heated tube specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



NORMAL SPECTRAL EMITTANCE OF CRYSTALLINE BORON ON COLUMBIUM

NORMAL SPECTRAL EMITTANCE OF CRYSTALLINE BORON ON COLUMBIUM--REFERENCE INFORMATION

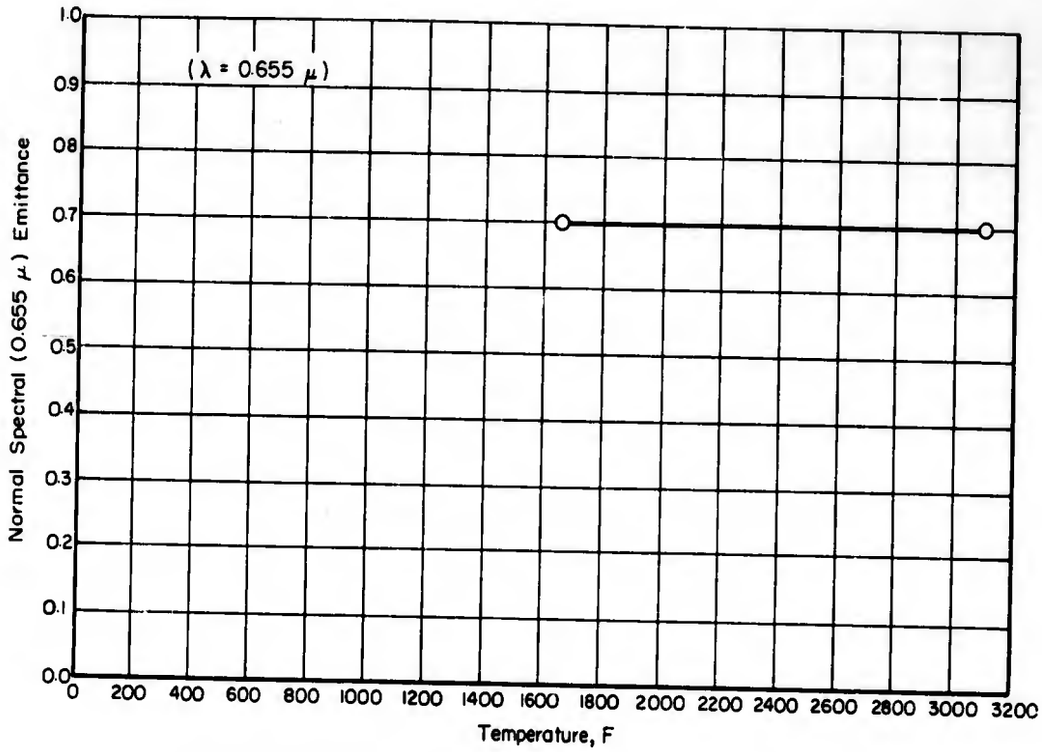
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		3-mil-thick coating prepared by Linde Plasmarc process on columbium tube.	Normal spectral emittance. Electrically Heated tubular coated specimen. Integral blackbody slot in specimen tube. Temperatures measured with thermocouples and optical pyrometer.	Measured in vacuum. Data taken from curve.



HEMISPHERICAL TOTAL EMITTANCE OF CRYSTALLINE BORON ON MOLYBDENUM

HEMISPHERICAL TOTAL EMITTANCE OF CRYSTALLINE BORON ON MOLYBDENUM--REFERENCE INFORMATION

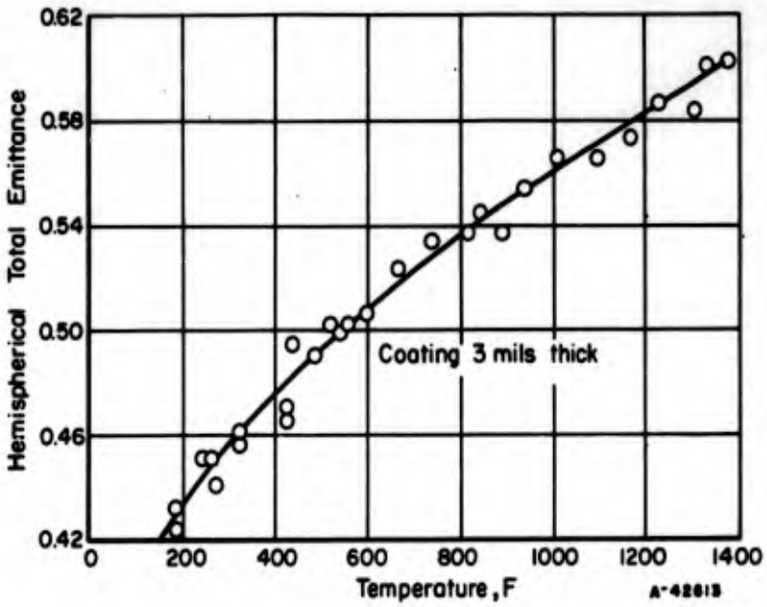
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		Crystalline boron flame sprayed by Linde Plasmarc process on molybdenum strip. Coating 3 mils thick (coated both sides). Note: coating loosened from molybdenum.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



NORMAL SPECTRAL EMITTANCE OF TANTALUM BORIDE ON TUNGSTEN AND TANTALUM

NORMAL SPECTRAL EMITTANCE OF TANTALUM BORIDE ON TUNGSTEN AND TANTALUM--REFERENCE INFORMATION

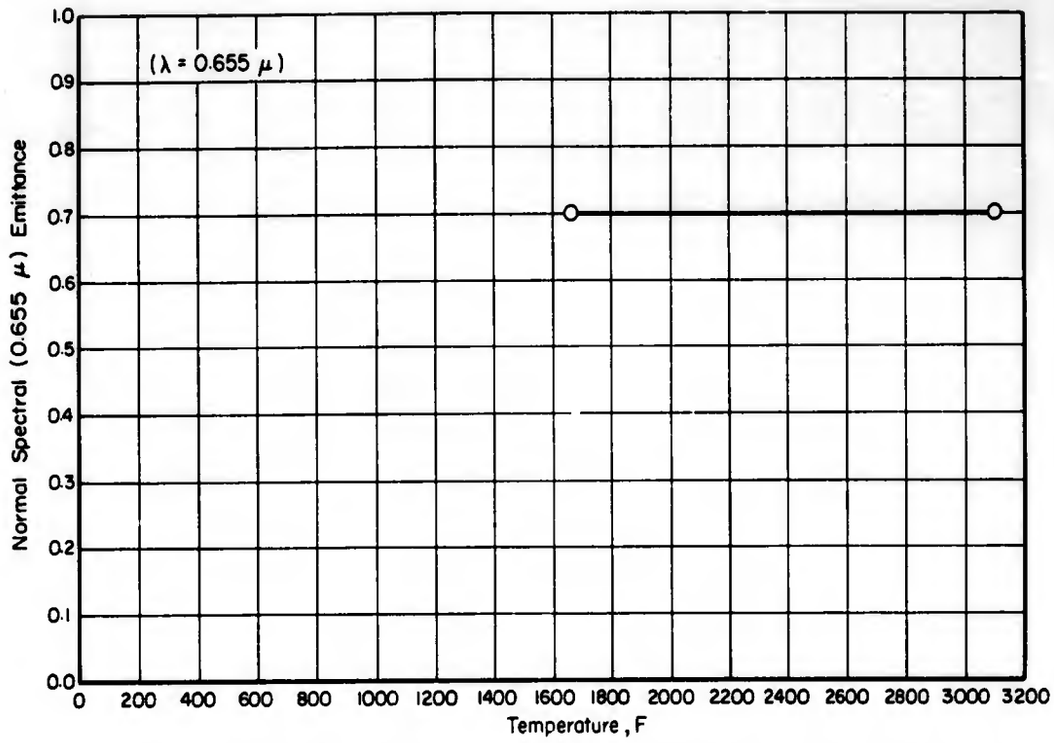
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
6	Morgan, F. H.	o	Purity or coating method not defined. Coating thickness not given.	Two methods used: (1) Coated-tungsten-strip heater. Temperatures measured with thermocouples. Brightness temperatures measured with optical pyrometer. (2) Hole-in-tube method. Tantalum tube coated with test material.	Measured in vacuum. Data taken from table and discussion. Data appear to be average of hole-in-tube and strip heater methods.



HEMISPHERICAL TOTAL EMITTANCE OF ZIRCONIUM BORIDE ON MOLYBDENUM

HEMISPHERICAL TOTAL EMITTANCE OF ZIRCONIUM BORIDE ON MOLYBDENUM--REFERENCE INFORMATION

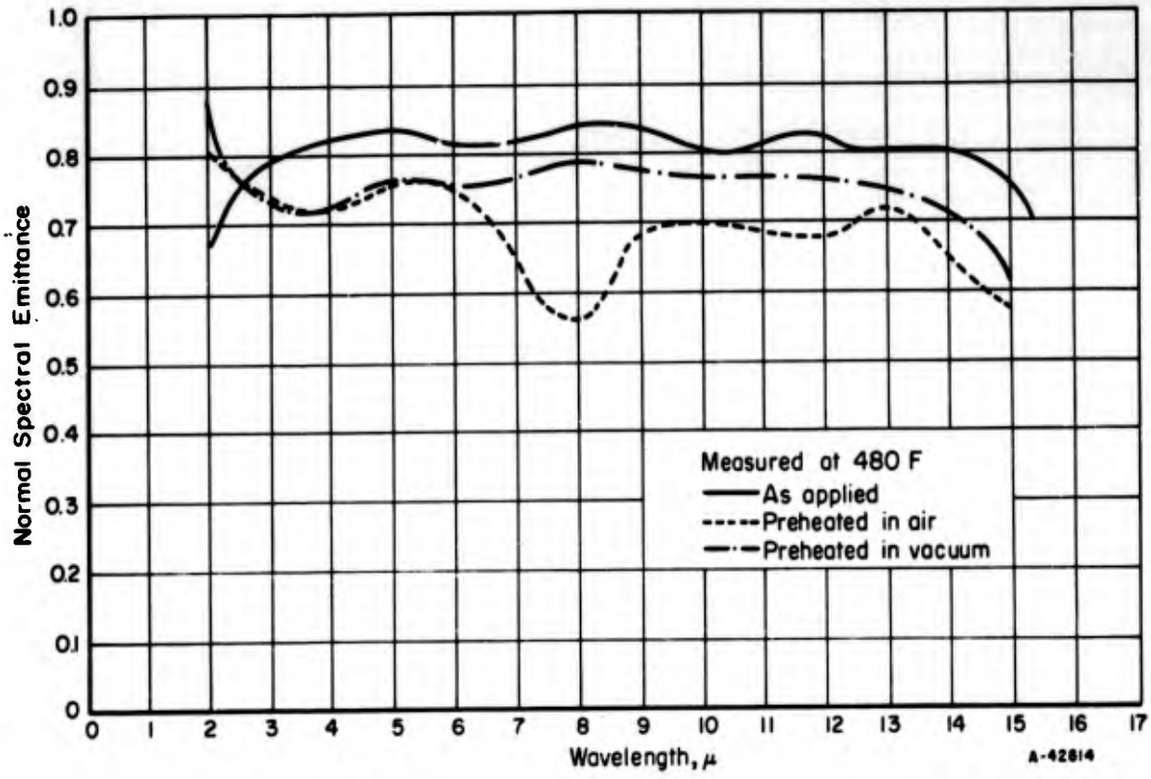
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		3-mil-thick coating of ZrB_2 applied by the Linde Plasmarc process to a molybdenum strip.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM BORIDE ON TANTALUM AND TUNGSTEN

NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM BORIDE ON TANTALUM AND TUNGSTEN--REFERENCE INFORMATION

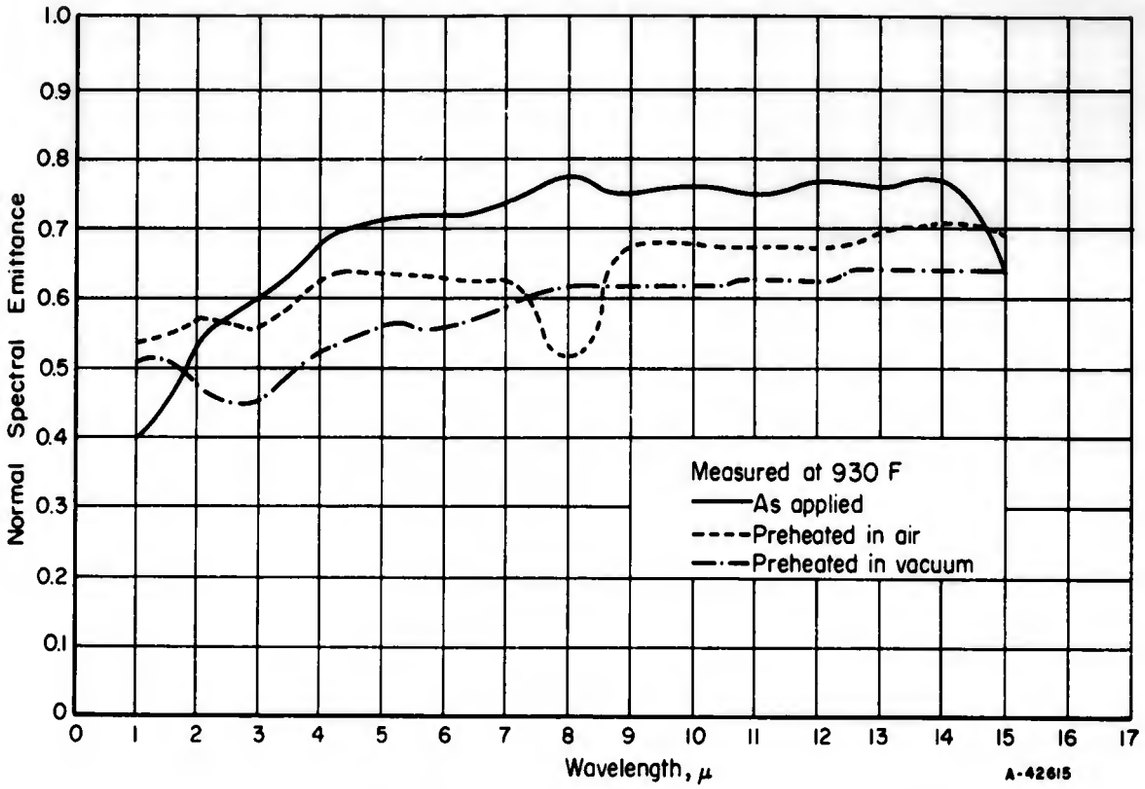
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
6	Morgan, F. H.	o	Purity or coating method not defined. Coating thickness not given.	Two methods used: (1) Coated-tungsten-strip heater. Temperatures measured with thermocouples. Brightness temperatures measured with optical pyrometer. (2) Hole-in-tube method. Tantalum tube coated with test material.	Measured in vacuum. Data taken from table and discussion. Data appear to be average of hole-in-tube and strip heater methods.



NORMAL SPECTRAL EMITTANCE OF BORON CARBIDE ON INCONEL X AT 480 F

NORMAL SPECTRAL EMITTANCE OF BORON CARBIDE ON INCONEL X AT 480 F--REFERENCE INFORMATION

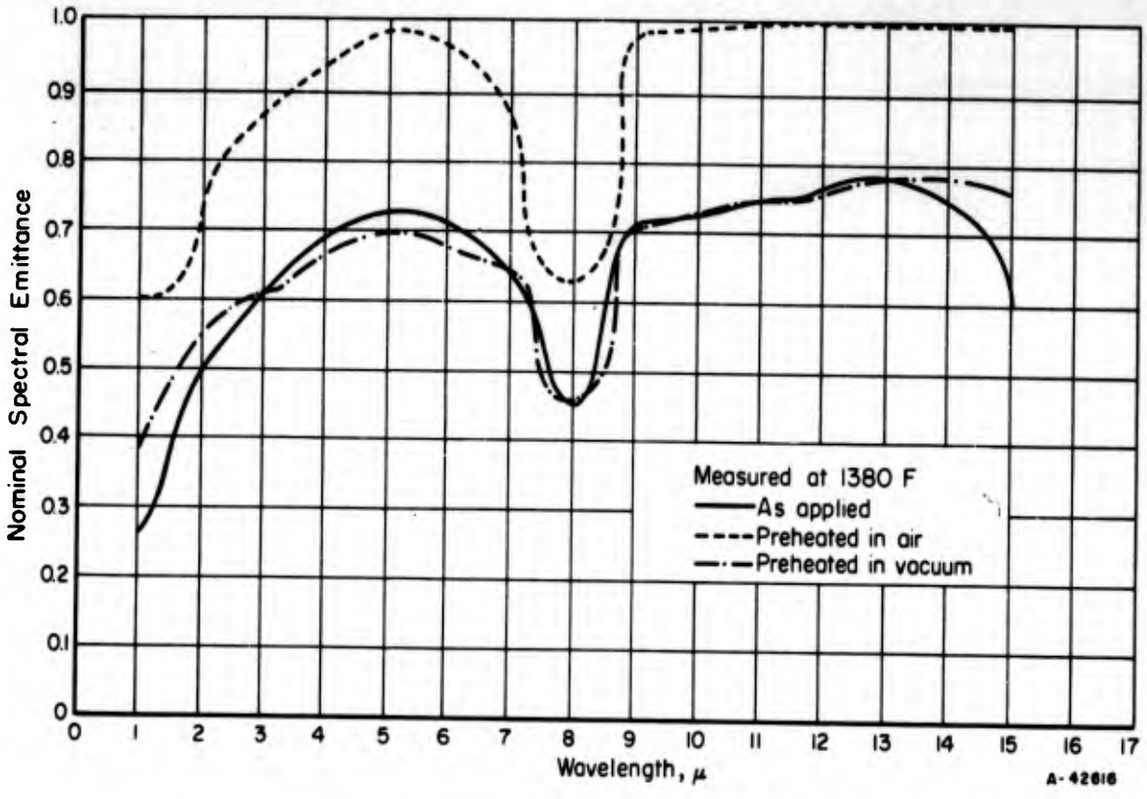
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		Flame sprayed on Inconel X As applied - untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.8 x 10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF BORON CARBIDE ON INCONEL X AT 930 F

NORMAL SPECTRAL EMITTANCE OF BORON CARBIDE ON INCONEL X AT 930 F--REFERENCE INFORMATION

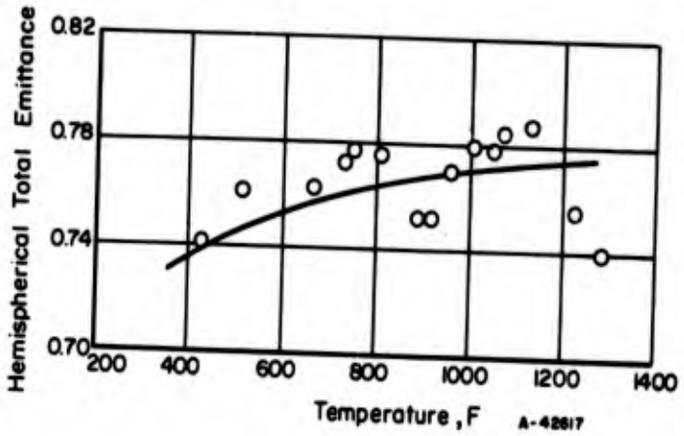
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		Flame sprayed on Inconel X As applied - untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.8×10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF BORON CARBIDE ON INCONEL X AT 1380 F

NORMAL SPECTRAL EMITTANCE OF BORON CARBIDE ON INCONEL X AT 1380 F--REFERENCE INFORMATION

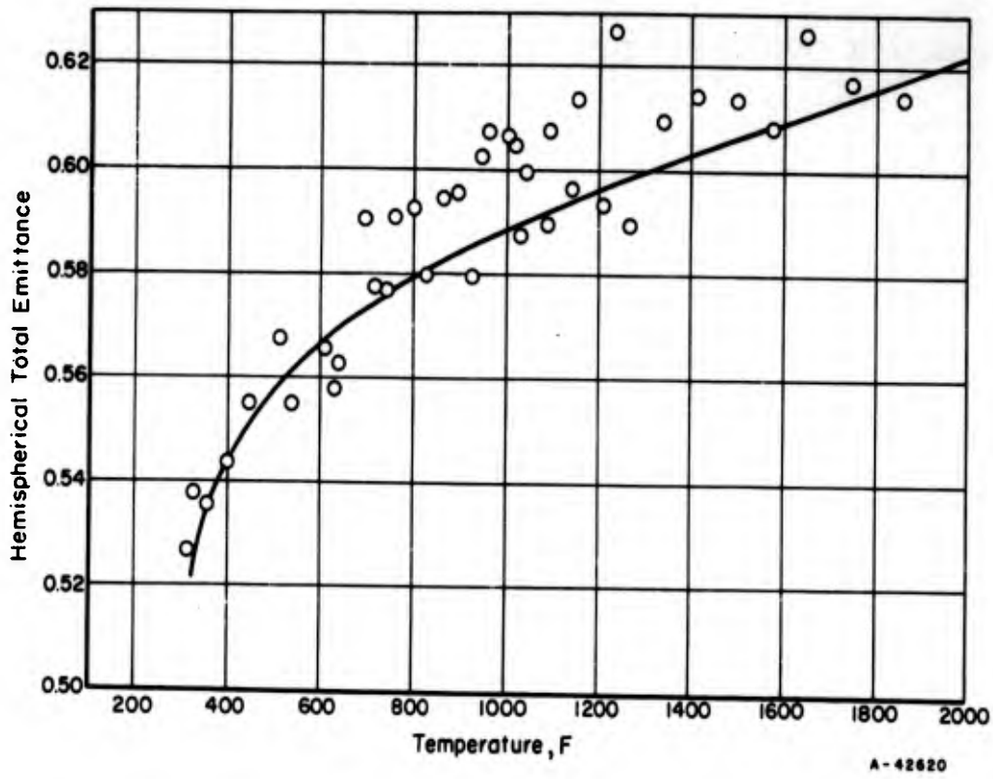
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		Flame sprayed on Inconel X As applied - untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.8 x 10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



HEMISPHERICAL TOTAL EMITTANCE OF BORON CARBIDE ON MOLYBDENUM

HEMISPHERICAL TOTAL EMITTANCE OF BORON CARBIDE ON MOLYBDENUM--REFERENCE INFORMATION

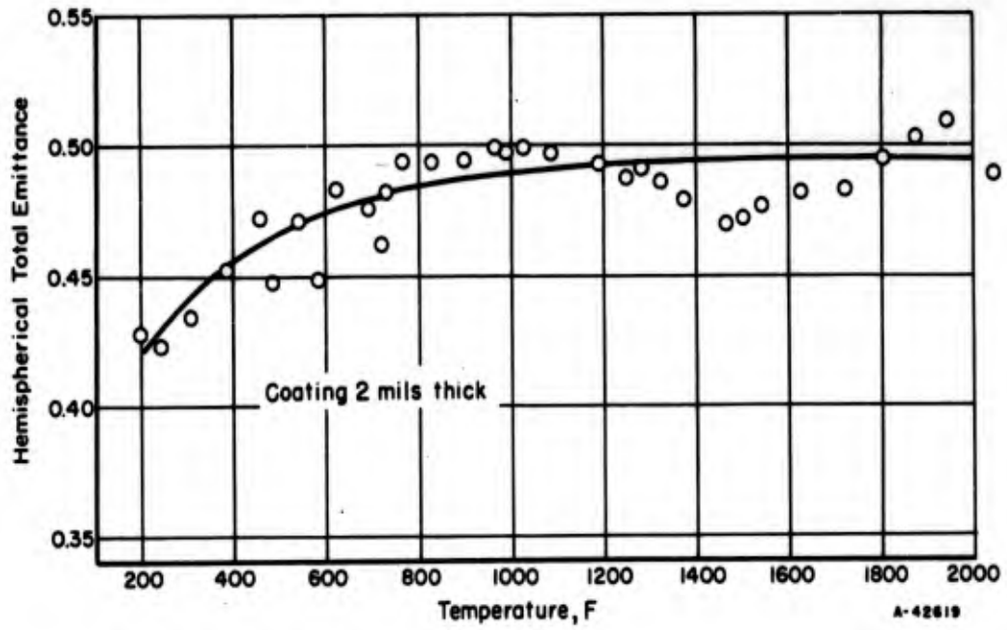
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		2-mil-thick coating applied by the Linde Plasmarc process to both sides of a molybdenum strip.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



HEMISPHERICAL TOTAL EMITTANCE OF HAFNIUM CARBIDE ON MOLYBDENUM

HEMISPHERICAL TOTAL EMITTANCE OF HAFNIUM CARBIDE ON MOLYBDENUM--REFERENCE INFORMATION

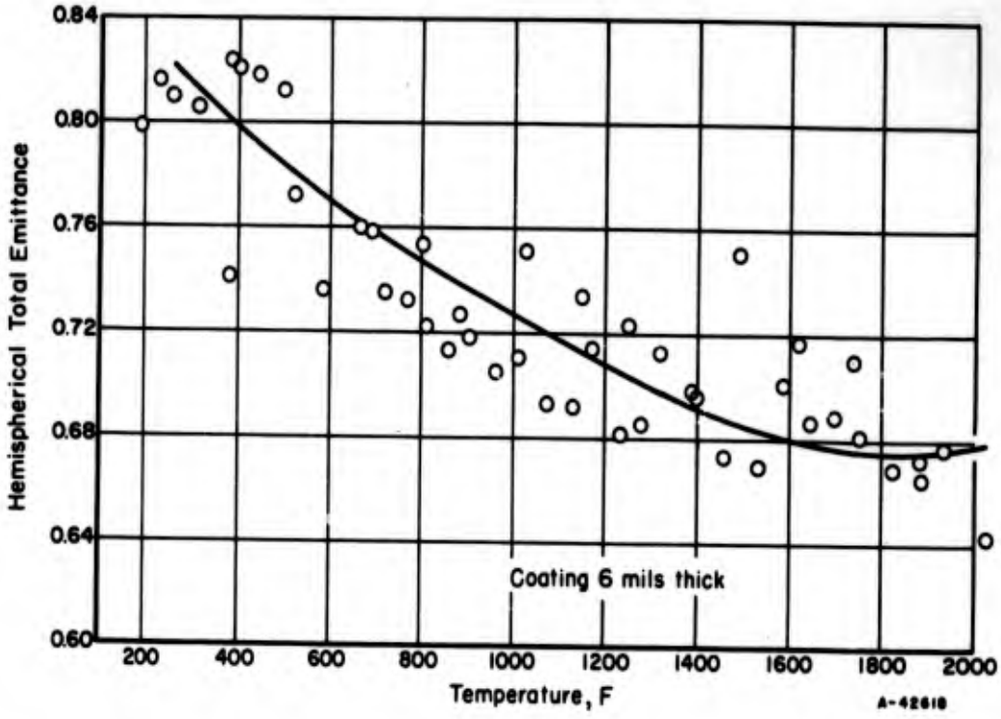
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		3-mil-thick coating applied by the Linde Plasmarc process to both sides of a molybdenum strip.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



HEMISPHERICAL TOTAL EMITTANCE OF MOLYBDENUM CARBIDE ON MOLYBDENUM

HEMISPHERICAL TOTAL EMITTANCE OF MOLYBDENUM CARBIDE ON MOLYBDENUM--REFERENCE INFORMATION

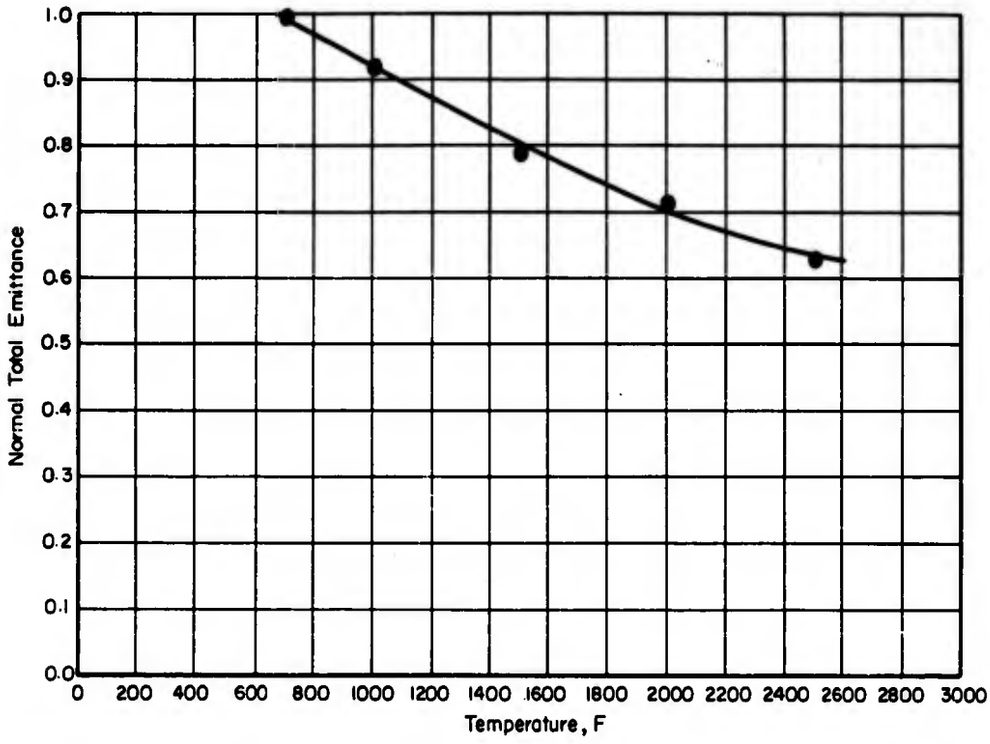
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		2-mil-thick MoC coating applied by the Linde Plasmarc process to both sides of a molybdenum strip.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



HEMISPHERICAL TOTAL EMITTANCE OF SILICON CARBIDE ON MOLYBDENUM

HEMISPHERICAL TOTAL EMITTANCE OF SILICON CARBIDE ON MOLYBDENUM--REFERENCE INFORMATION

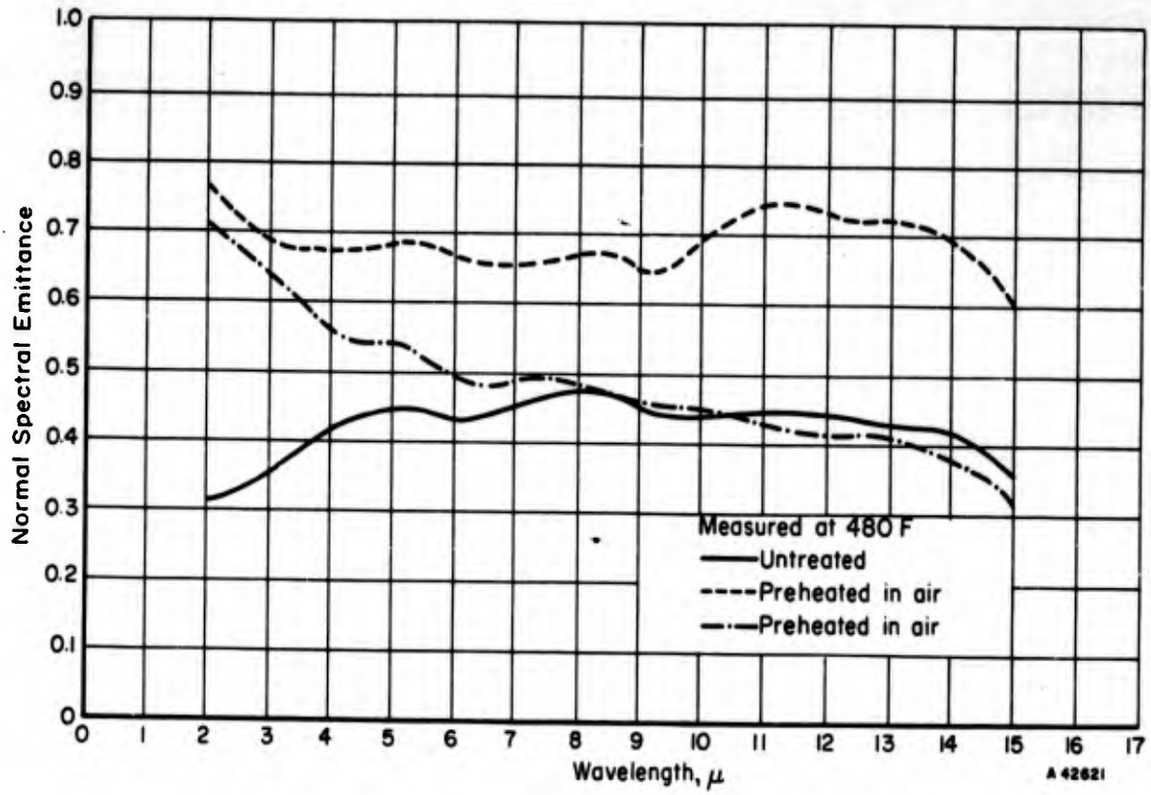
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		6-mil-thick coating applied by an electrophoretic process and coated with an acrylic resin.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



NORMAL TOTAL EMITTANCE OF SILICON CARBIDE ON GRAPHITE

NORMAL TOTAL EMITTANCE OF SILICON CARBIDE ON GRAPHITE--REFERENCE INFORMATION

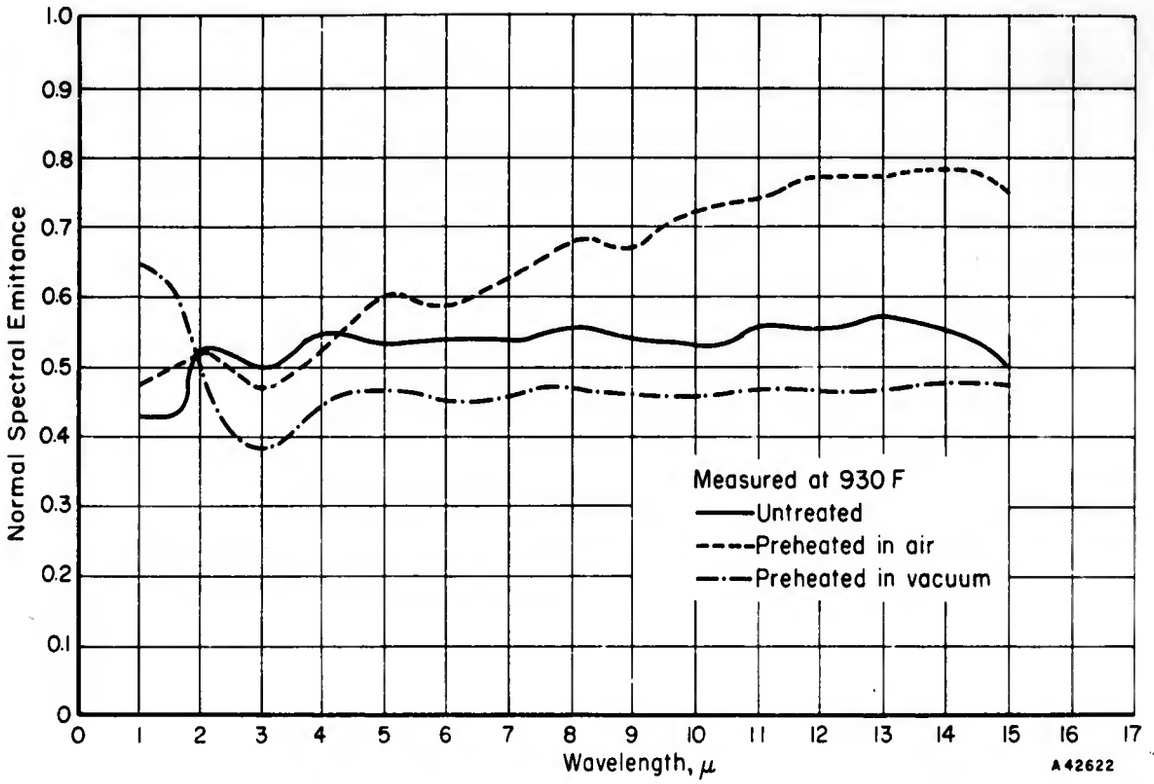
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
7	Anthony and Pearl	●	As received. Coating thickness not given.	Normal total emittance. Induction-heated specimen. Thermopile detector. Comparison blackbody. Temperatures measured with thermocouples and optical pyrometer.	Measured in continuous purge of helium gas.



NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE ON INCONEL X AT 480 F

NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE ON INCONEL X AT 480 F--REFERENCE INFORMATION

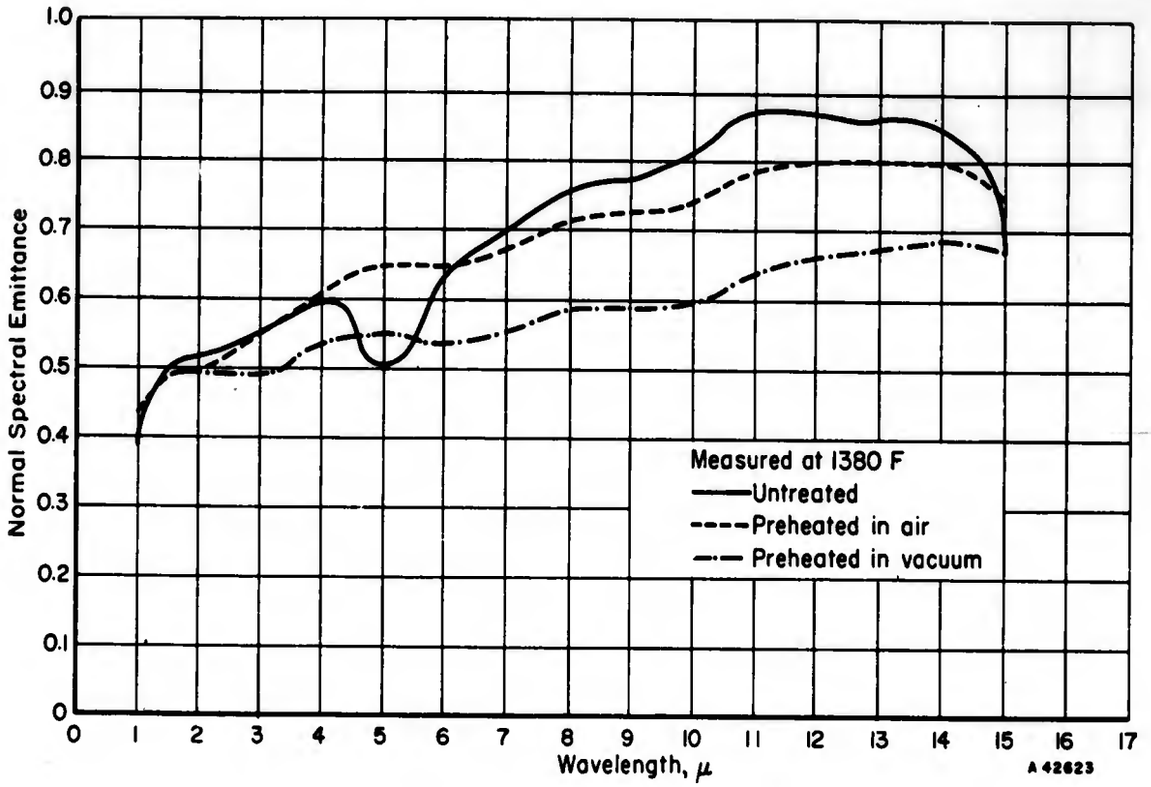
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		Flame sprayed on Inconel X As applied - untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.9 x 10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE ON INCONEL X AT 930 F

NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE ON INCONEL X AT 930 F--REFERENCE INFORMATION

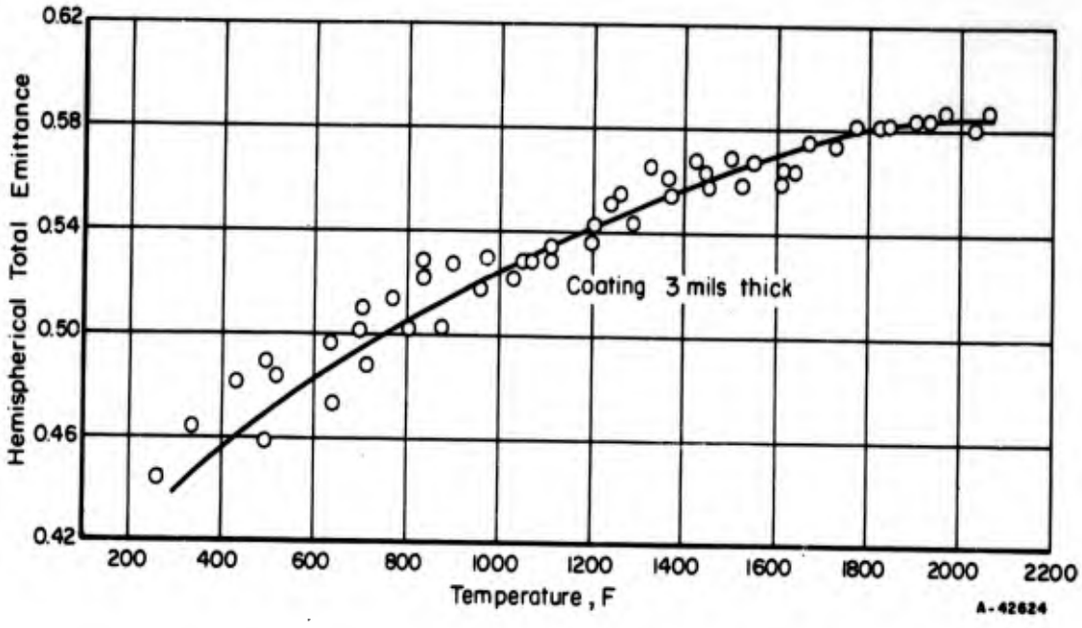
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		Flame sprayed on Inconel X As applied - untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 0.4 x 10-5 mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE ON INCONEL X AT 1380 F

NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE ON INCONEL X AT 1380 F--REFERENCE INFORMATION

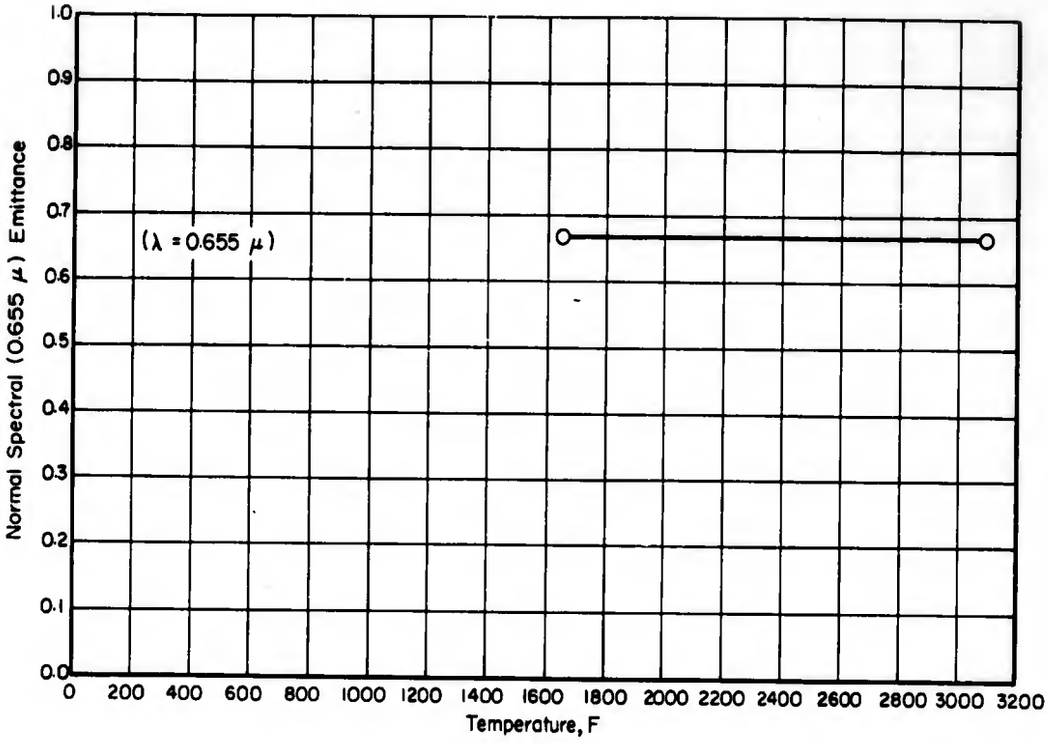
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		Flame sprayed on Inconel X As applied - untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.9 x 10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



HEMISPHERICAL TOTAL EMITTANCE OF TANTALUM CARBIDE ON MOLYBDENUM

HEMISPHERICAL TOTAL EMITTANCE OF TANTALUM CARBIDE ON MOLYBDENUM--REFERENCE INFORMATION

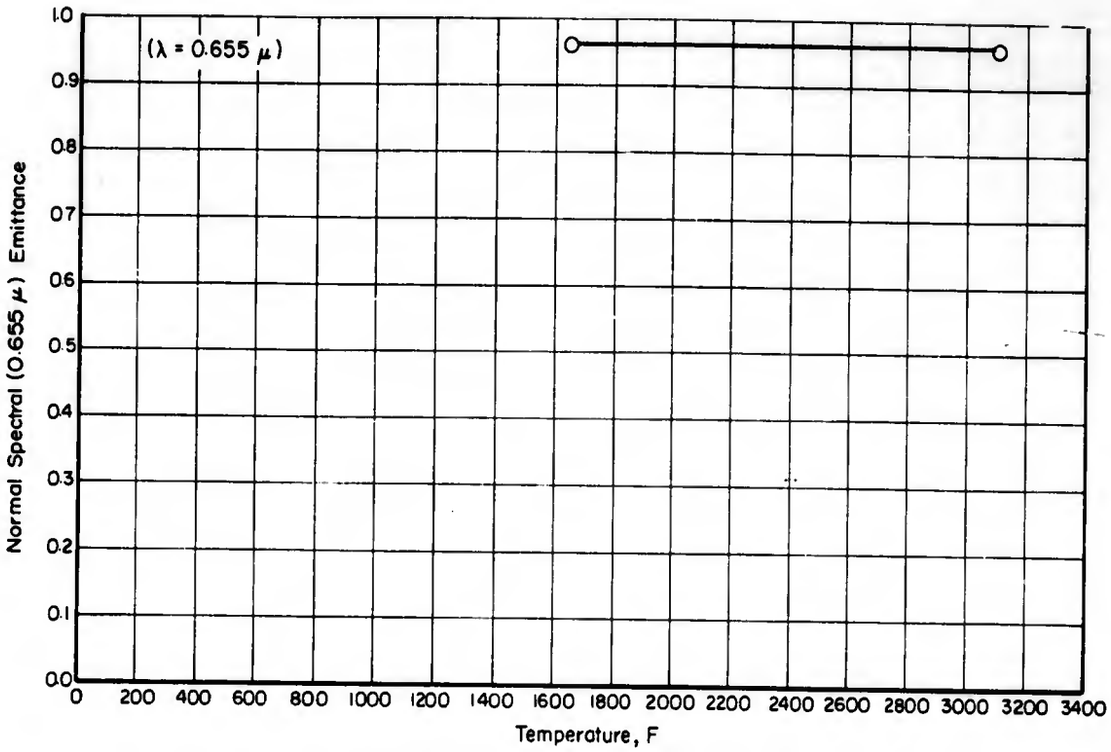
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		3-mil-thick coating applied by the Linde Plasmarc process to a molybdenum strip.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum.



NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE ON TANTALUM AND TUNGSTEN

NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE ON TANTALUM AND TUNGSTEN--REFERENCE INFORMATION

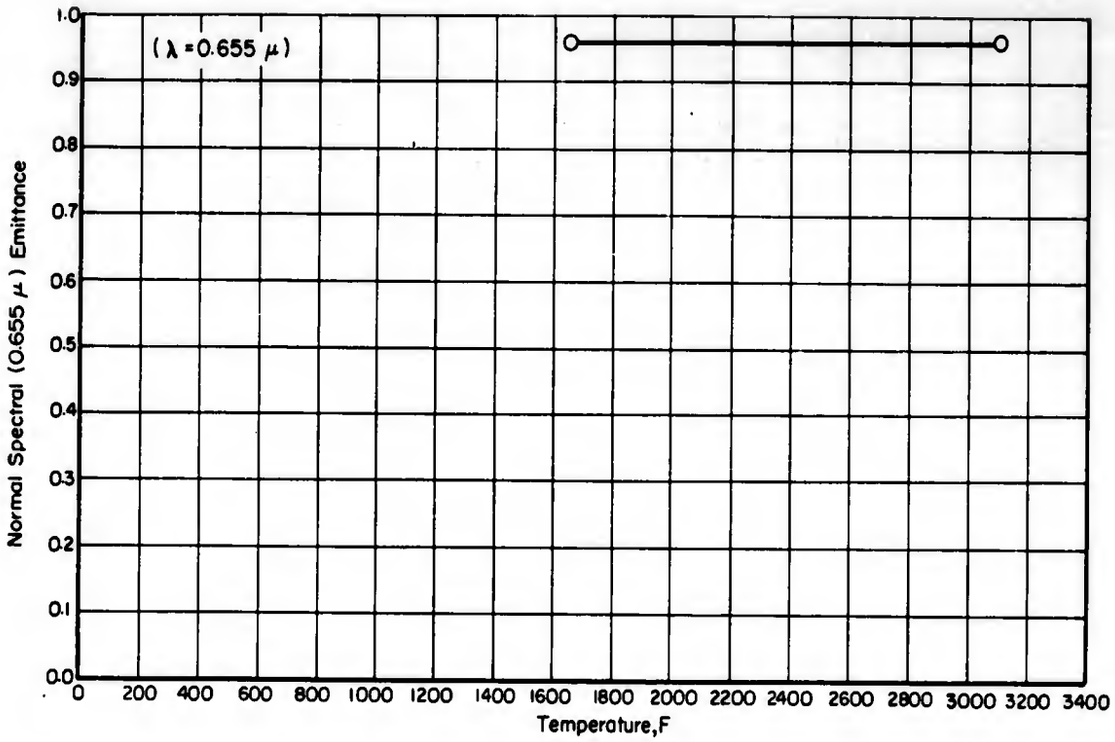
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
6	Morgan, F. H.	o	Purity or coating method not defined. Coating thickness not given.	Two methods used: (1) Coated-tungsten-strip heater. Temperatures measured with thermocouples. Brightness temperatures measured with optical pyrometer. (2) Hole-in-tube method. Tantalum tube coated with test material.	Measured in vacuum. Data taken from table and discussion. Data appear to be average of hole-in-tube and strip heater methods.



NORMAL SPECTRAL EMITTANCE OF TITANIUM CARBIDE ON TANTALUM AND TUNGSTEN

NORMAL SPECTRAL EMITTANCE OF TITANIUM CARBIDE ON TANTALUM AND TUNGSTEN--REFERENCE INFORMATION

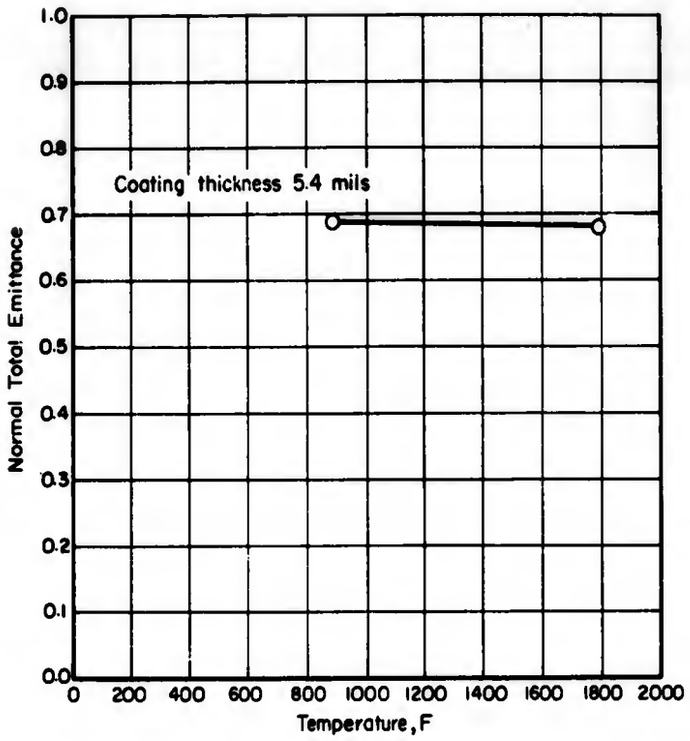
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
6	Morgan, F. H.	o	Purity or coating method not defined. Coating thickness not given.	Two methods used: (1) Coated-tungsten-strip heater. Temperatures measured with thermocouples. Brightness temperature measured with optical pyrometer, and (2) Hole-in-tube method. Tantalum tube coated with test material.	Measured in vacuum. Data taken from table and discussion. Data appear to be average of hole-in-tube and strip heater methods.



NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM CARBIDE ON TANTALUM AND TUNGSTEN

NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM CARBIDE ON TANTALUM AND TUNGSTEN--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
6	Morgan, F. H.	o	Purity or coating method not defined. Coating thickness not given.	Two methods used: (1) Coated-tungsten-strip heater with temperature measured with thermocouples, optical pyrometer for brightness temperatures and (2) Hole-in-tube. Tantalum tube coated with test material.	Measured in vacuum. Data taken from table and discussion. Data appear to be average of hole-in-tube and strip heater methods.



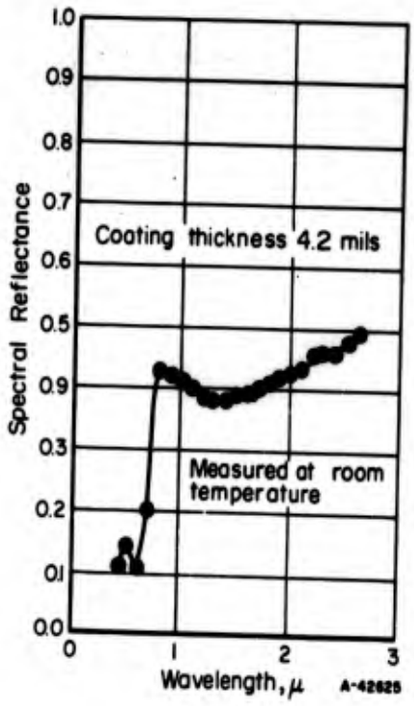
NORMAL TOTAL EMITTANCE OF A-418 ENAMEL ON INCONEL

NORMAL TOTAL EMITTANCE OF A-418 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	o	A-418 Enamel on Inconel. Coating thickness 5.4 mils.	Normal total emittance. Rotating, hollow, cylindrical, Globar heating element. Blackbody hole. Specimen mounted in heating element flush with wall. Temperatures measured with thermocouples. Infrared spectrometer with prism replaced by plane mirror. Thermocouple detector.	Measured in air. Data taken from tables.

Coating Composition by Weight

NBS Frit No. 332 - 70 per cent
Cr_2O_3 - 30 per cent



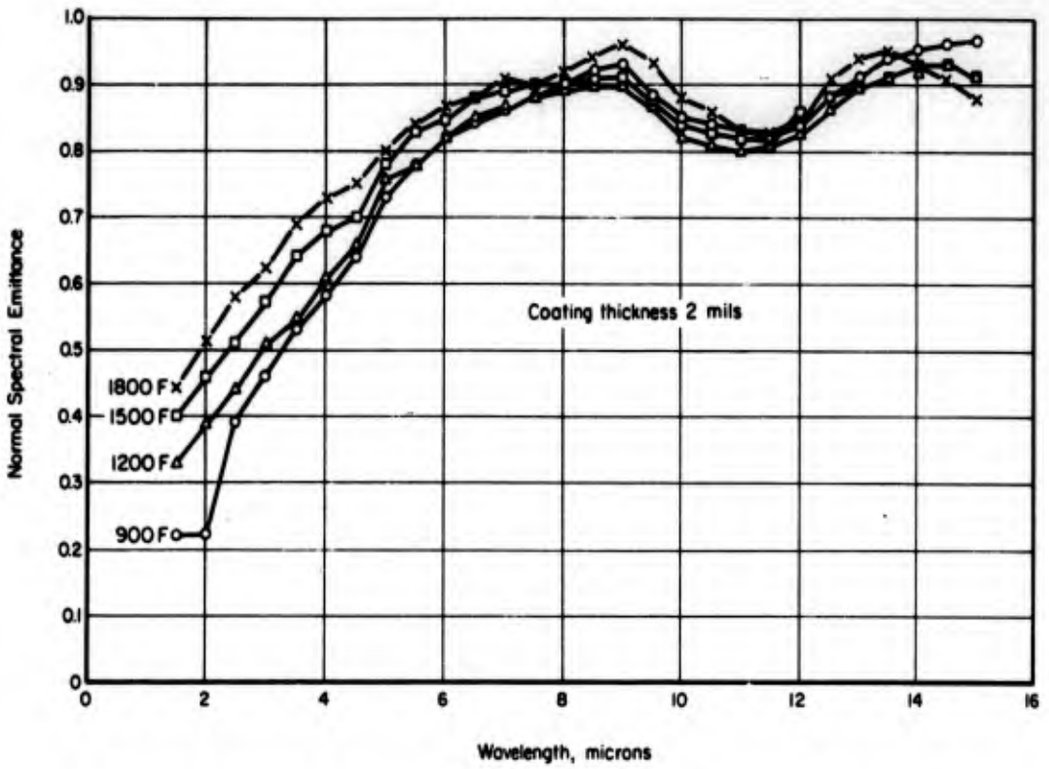
SPECTRAL REFLECTANCE OF A-418 ENAMEL ON INCONEL

SPECTRAL EMITTANCE OF A-418 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	●	Enamel A-418 on Inconel. Coating thickness 4.2 mils.	Spectral reflectance. Commercial reflectometer and spectrophotometer. Quartz prism monochromator. MgO standard. (Normal viewing-diffuse reflection)	Measured in air at room temperature. Data taken from table.

Coating Composition by Weight

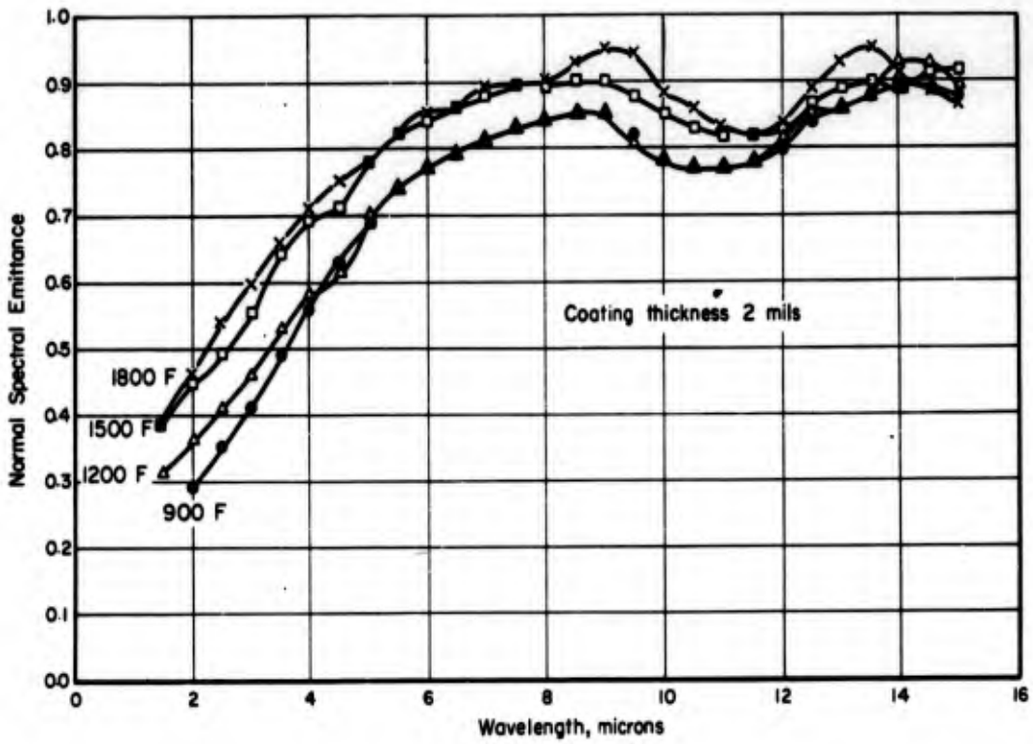
NBS Frit No. 332 - 70 per cent
Cr_2O_3 - 30 per cent



NORMAL SPECTRAL EMITTANCE OF A-418 ENAMEL ON INCONEL

NORMAL SPECTRAL EMITTANCE OF A-418 ENAMEL ON INCONEL--REFERENCE INFORMATION

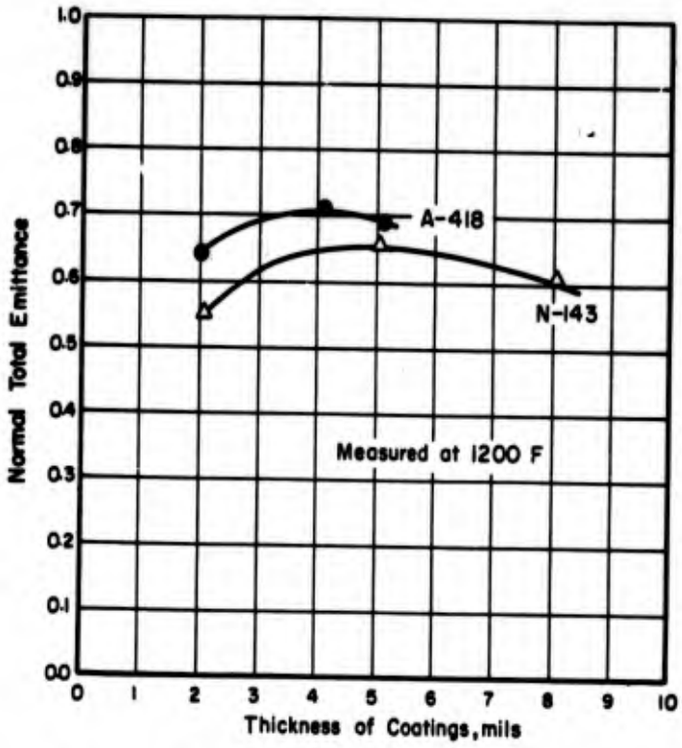
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Richmond and Stewart		A-418 consists of alkali-free barium beryllium silicate frit with addition of chromic oxide. Coating thickness 2 mils. Coated on Inconel. Runs made at the following temperatures:	Normal spectral emittance. Double-beam infrared spectrometer with sodium chloride prism. Secondary standard [silicon carbide (Globar)] calibrated against laboratory blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from table.
		o	900 F		
		Δ	1200 F		
		□	1500 F		
		×	1800 F		



NORMAL SPECTRAL EMITTANCE OF A-418 ENAMEL ON TYPE 321 STAINLESS STEEL

NORMAL SPECTRAL EMITTANCE OF A-418 ENAMEL ON TYPE 321 STAINLESS STEEL--REFERENCE INFORMATION

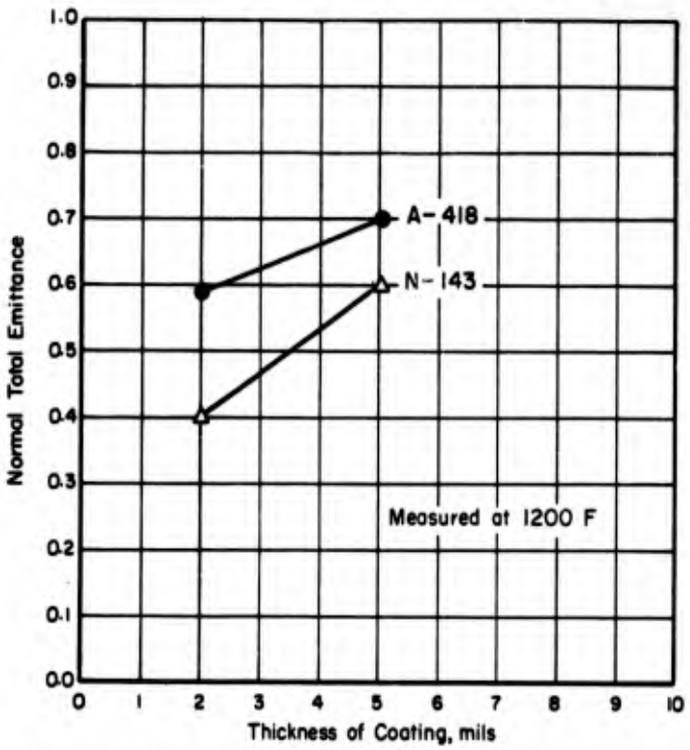
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Richmond and Stewart		A-418 consists of alkali-free barium beryllium silicate frit with addition of chromic oxide. Coating thickness 2 mils. Coated on Inconel. Runs made at the following temperatures:	Normal spectral emittance. Double-beam infrared spectrometer with sodium chloride prism. Secondary standard [silicon carbide (Globar)] calibrated against laboratory blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from table.
		●	900 F		
		△	1200 F		
		□	1500 F		
		×	1800 F		



VARIATION OF NORMAL TOTAL EMITTANCE WITH THICKNESS OF A-418 AND N-143 ENAMELS ON INCONEL AT 1200 F

VARIATION OF NORMAL TOTAL EMITTANCE WITH THICKNESS OF A-418 AND N-143 ENAMELS ON INCONEL AT 1200 F—REFERENCE INFORMATION

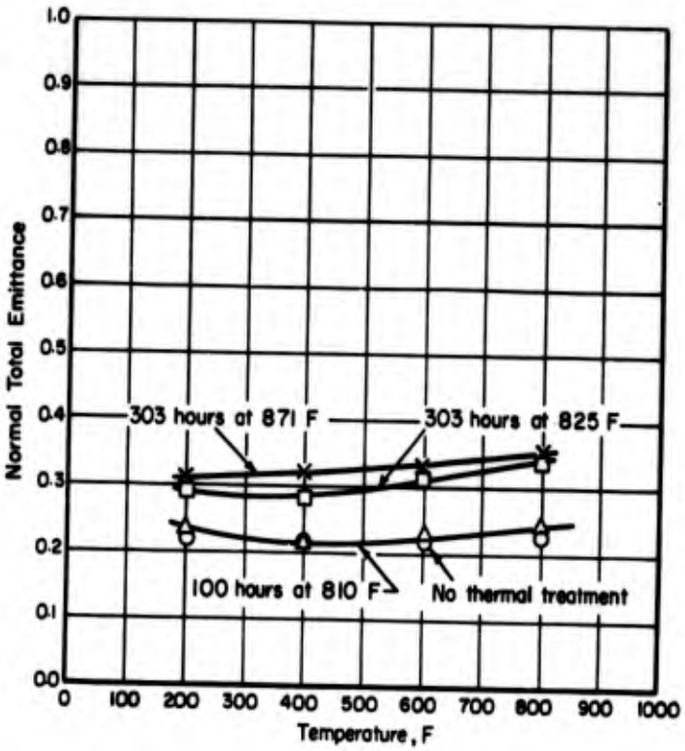
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Richmond and Stewart		Inconel coated with NBS coatings:	Normal total emittance. Thermopile detector. Comparison blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.
		●	A-418		
		△	N-143		



VARIATION OF NORMAL TOTAL EMITTANCE VERSUS COATING THICKNESS OF A-418 AND N-143 ENAMELS ON TYPE 321 STAINLESS STEEL AT 1200 F

VARIATION OF NORMAL TOTAL EMITTANCE VERSUS COATING THICKNESS OF A-418 AND N-143 ENAMELS ON TYPE 321 STAINLESS STEEL AT 1200 F--REFERENCE INFORMATION

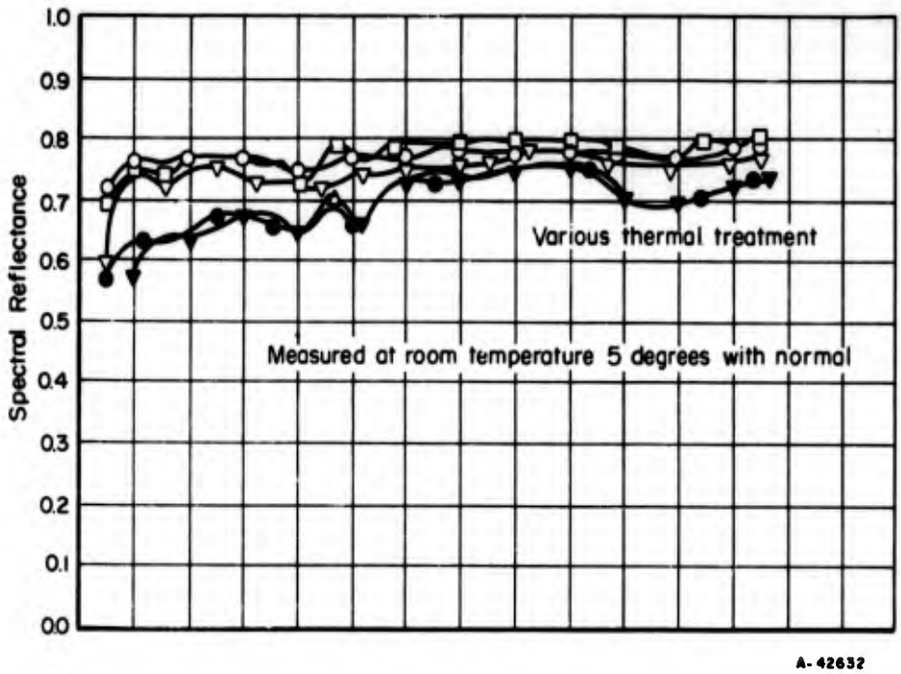
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Richmond and Stewart		Type 321 stainless steel with NBS coatings:	Normal total emittance. Thermopile detector. Comparison blackbody.	Measured in air. Data taken from curves.
		●	A-418	Temperatures measured with thermocouples.	
		△	N-143		



NORMAL TOTAL EMITTANCE OF ALUMINIZED SILICONE PAINT ON Ti-75A TITANIUM

NORMAL TOTAL EMITTANCE OF ALUMINIZED SILICONE PAINT ON Ti-75A TITANIUM--REFERENCE INFORMATION

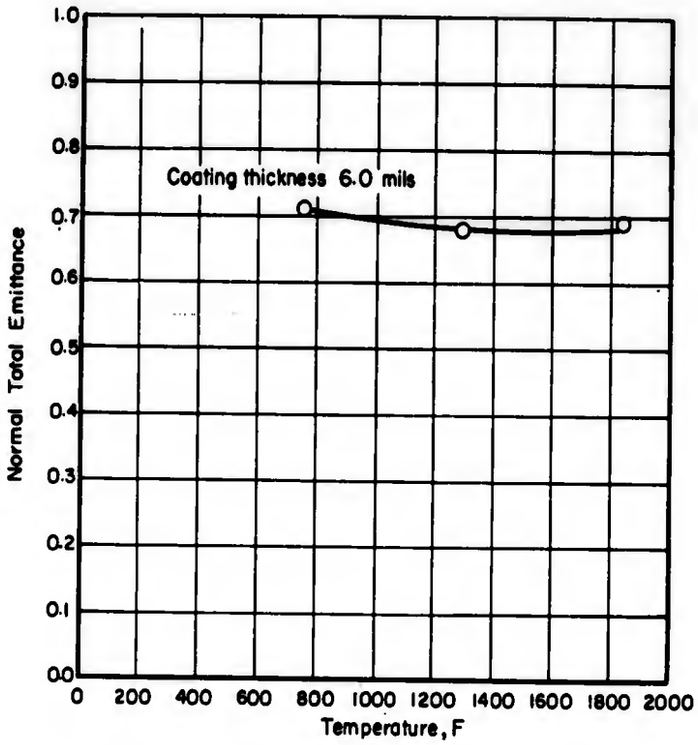
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
3	Bevans, Gier, and Dunkle		Dow-Corning XP-310 aluminized-silicone paint, on Ti-75A titanium (Mat'l. Spec. AMS 4901). No thickness given.	Normal total emittance. Calibrated thermopile detector. Temperatures measured with thermocouples.	Measured in air. Data taken from tables.
		o	No thermal treatment.		
		Δ	100 hours at 810 F.		
		□	303 hours at 825 F.		
		×	303 hours at 871 F.		



SPECTRAL REFLECTANCE OF ALUMINIZED SILICONE PAINT ON Ti-75A TITANIUM

SPECTRAL REFLECTANCE OF ALUMINIZED-SILICONE PAINT ON Ti-75A TITANIUM--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
3	Bevans, Gier, and Dunkle		Dow-Corning XP-310 aluminized-silicone paint on Ti-75A (Mat'l. Spec. AMS 4901). No thickness given.	Spectral reflectance at 5 degrees with normal. Gier-Dunkle reflectometer monochromator. Temperatures measured with thermocouples. (Diffuse illumination-normal viewing)	Measured in air at room temperature. Data taken from tables.
		△	No thermal treatment.		
		○	300 hours at 600 F.		
		□	100 hours at 810 F.		
		●	303 hours at 825 F.		
		▲	303 hours at 871 F.		



NORMAL TOTAL EMITTANCE OF B-1 ENAMEL ON INCONEL

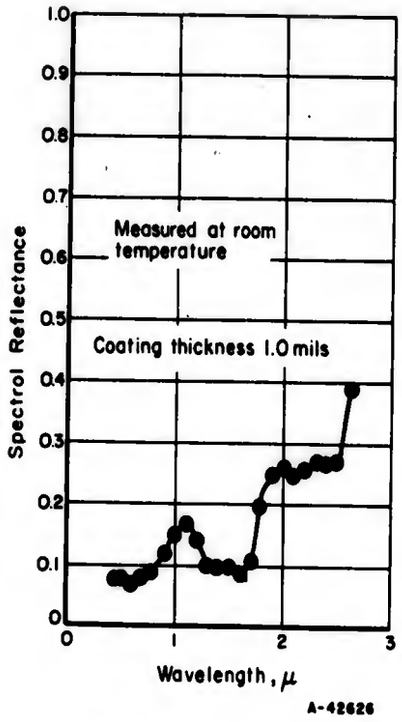
NORMAL TOTAL EMITTANCE OF B-1 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	o	B-1 Enamel on Inconel. Coating thickness 6.0 mils.	Normal total emittance. Rotating, hollow, cylindrical, Globar heating element. Blackbody hole. Specimen mounted in heating element flush with wall. Temperatures measured with thermocouples. Infrared spectrometer with prism replaced by plane mirror. Thermocouple detector.	Measured in air. Data taken from tables.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
Black Stain* - 25 per cent
Cr_2O_3 - 15 per cent

*Co_2O_3, 28 per cent; Fe_2O_3, 37 per cent; Cr_2O_3, 10 per cent; MnO_2, 11 per cent; NiO, 14 per cent.



SPECTRAL REFLECTANCE OF INCONEL COATED WITH B-1 ENAMEL

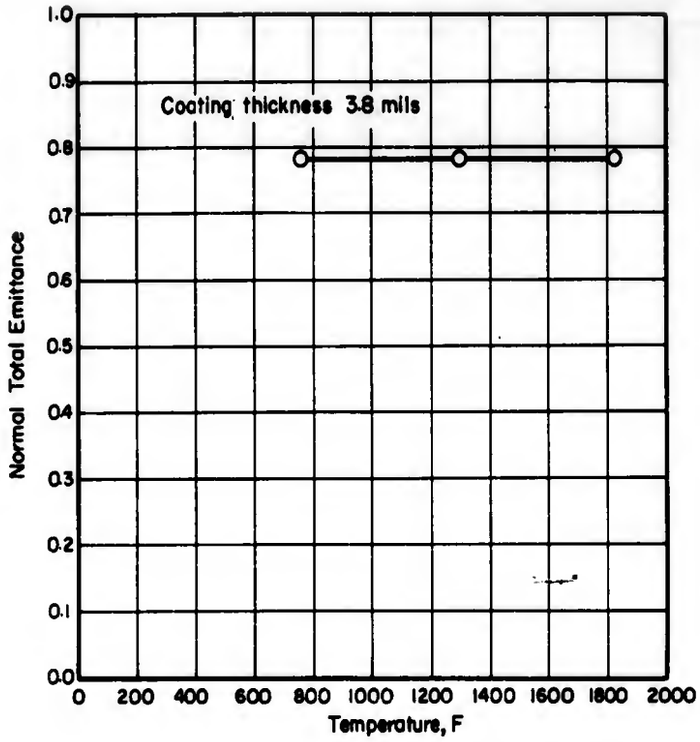
SPECTRAL REFLECTANCE OF INCONEL COATED WITH B-1 ENAMEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	●	Enamel B-1 on Inconel. Coating thickness 1.0 mil.	Spectral reflectance. Commercial reflectometer and spectrophotometer with quartz prism monochromator. MgO standard. (Normal viewing-diffuse reflection)	Measured in air at room temperature. Data taken from table.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
Black Stain* - 25 per cent
Cr_2O_3 - 15 per cent

*Co_2O_3, 28 per cent; Fe_2O_3, 37 per cent; Cr_2O_3, 10 per cent; MnO_2, 11 per cent; NiO, 14 per cent.



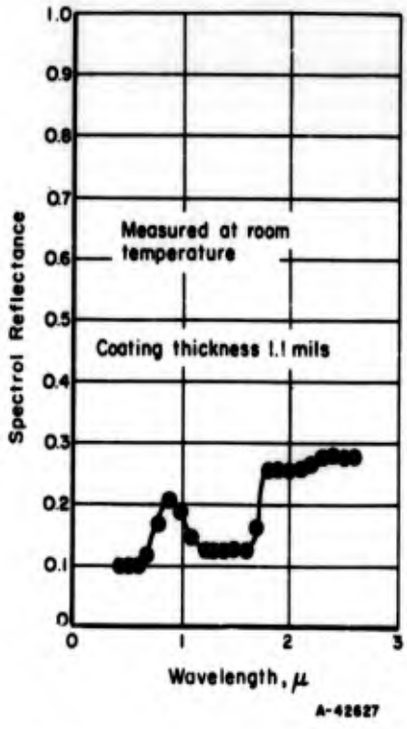
NORMAL TOTAL EMITTANCE OF B-4 ENAMEL ON INCONEL

NORMAL TOTAL EMITTANCE OF B-4 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	o	B-4 Enamel on Inconel. Coating thickness 3.8 mils.	Normal total emittance. Rotating hollow cylindrical Globar heating element. Blackbody hole. Specimen mounted in heating element flush with wall. Temperatures measured with thermocouples. Infrared spectrometer with prism replaced by plane mirror. Thermocouple detector.	Measured in air. Data taken from tables.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
Cr_2O_3 - 5 per cent
CoO - 15 per cent
Fe_2O_3 - 20 per cent



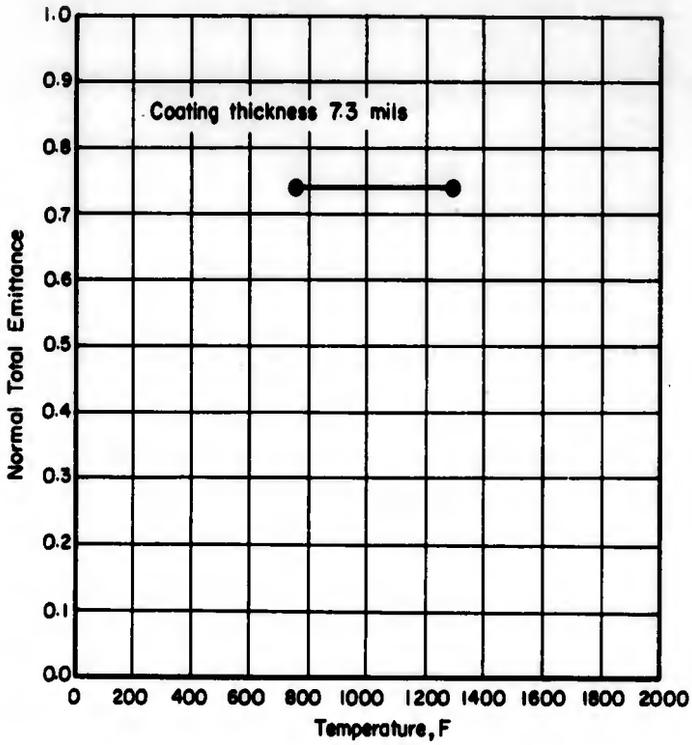
SPECTRAL REFLECTANCE OF B-4 ENAMEL ON INCONEL

SPECTRAL REFLECTANCE OF B-4 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	●	Enamel B-4 on Inconel. Coating thickness 1.1 mils.	Spectral reflectance. Commercial reflectometer with quartz prism monochromator. MgO standard. (Normal viewing-diffuse reflection)	Measured in air at room temperature.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
Cr_2O_3 - 5 per cent
CoO - 15 per cent
Fe_2O_3 - 20 per cent



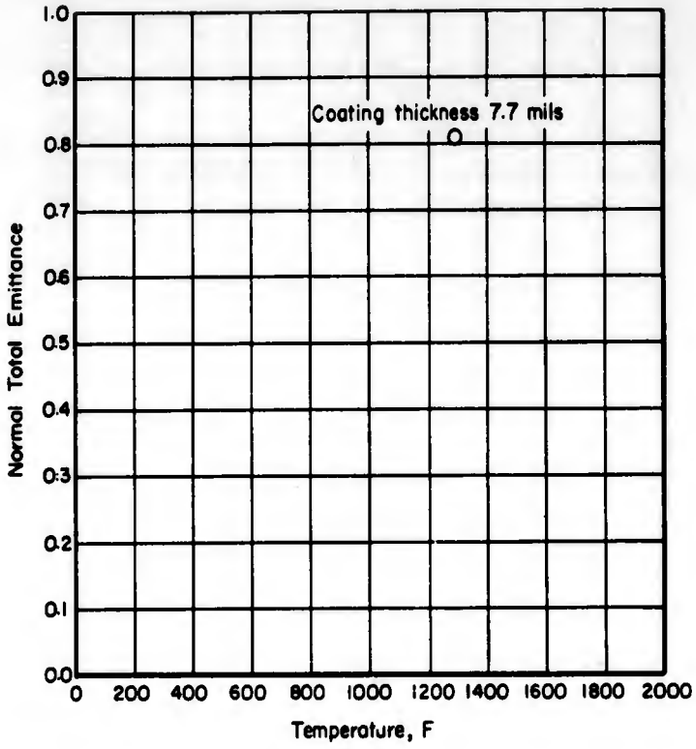
NORMAL TOTAL EMITTANCE OF B-7 ENAMEL ON INCONEL

NORMAL TOTAL EMITTANCE OF B-7 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	●	B-7 Enamel on Inconel. Coating thickness 7.3 mils.	Normal total emittance. Rotating hollow cylindrical Globar heating element. Blackbody hole. Specimen mounted in heating element flush with wall. Temperatures measured with thermocouples. Infrared spectrometer with prism replaced by plane mirror. Thermocouple detector.	Measured in air. Data taken from tables.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
$CoO \cdot Cr_2O_3$ spinel - 40 per cent



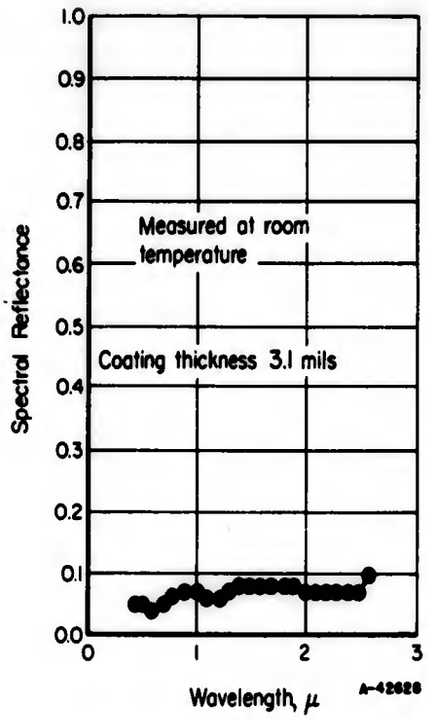
NORMAL TOTAL EMITTANCE OF B-8 ENAMEL ON INCONEL

NORMAL TOTAL EMITTANCE OF B-8 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	O	B-8 Enamel on Inconel. Coating thickness 7.7 mils.	Normal total emittance. Rotating, hollow, cylindrical, Globar heating element. Blackbody hole. Specimen mounted in heating element flush with wall. Temperatures measured with thermocouples. Infrared spectrometer with prism replaced by plane mirror. Thermocouple detector.	Measured in air. Data taken from tables.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
$NiO \cdot Cr_2O_3$ spinel - 40 per cent



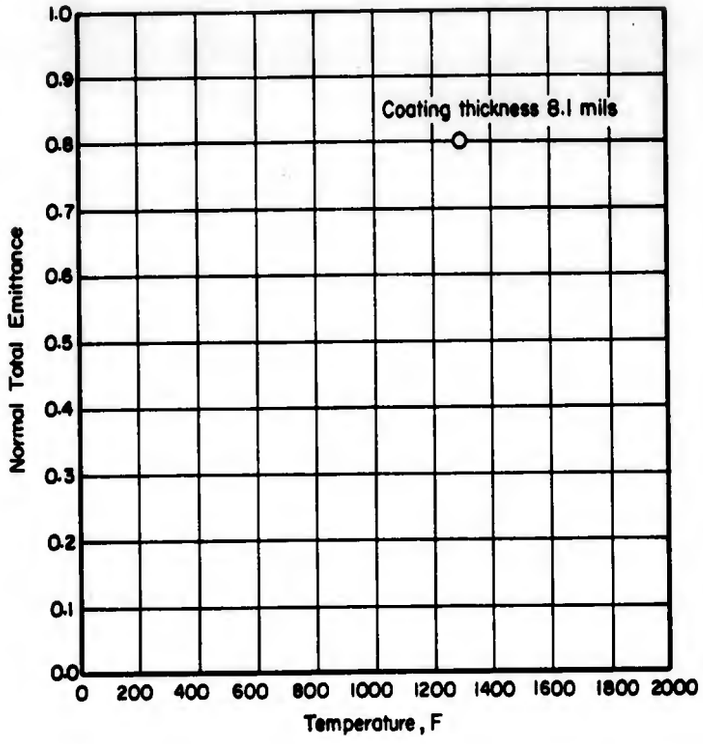
SPECTRAL REFLECTANCE OF B-8 ENAMEL ON INCONEL

SPECTRAL REFLECTANCE OF B-8 ENAMEL ON INCONEL—REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	●	Enamel B-8 on Inconel. Coating thickness 3.1 mils.	Spectral reflectance. Commercial reflectometer with quartz prism monochromator. MgO standard. (Normal viewing-diffuse reflection)	Measured in air at room temperature. Data taken from table.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
$NiO \cdot Cr_2O_3$ - 40 per cent



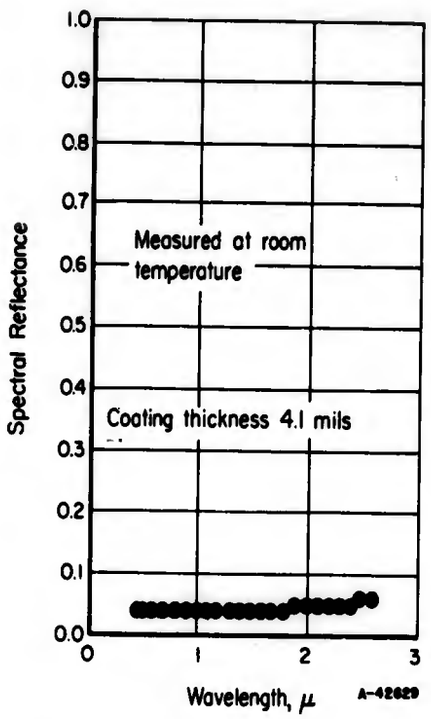
NORMAL TOTAL EMITTANCE OF B-9 ENAMEL ON INCONEL

NORMAL TOTAL EMITTANCE OF B-9 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	o	B-9 Enamel on Inconel. Coating thickness 8.1 mils.	Normal total emittance. Rotating hollow cylindrical Globar heating element. Blackbody hole. Specimen mounted in heating element flush with wall. Temperatures measured with thermocouples.	Measured in air. Data taken from tables.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
$NiO \cdot Fe_2O_3$ spinel - 40 per cent



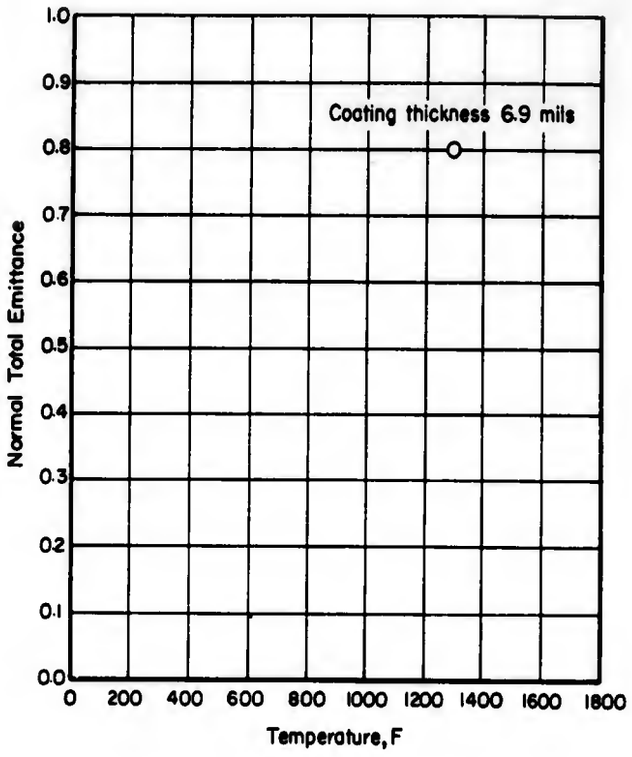
SPECTRAL REFLECTANCE OF B-9 ENAMEL ON INCONEL

SPECTRAL REFLECTANCE OF B-9 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	●	Enamel B-9 on Inconel. Coating thickness 4.1 mils.	Spectral reflectance. Commercial reflectometer with quartz prism monochromator. MgO standard. (Normal viewing-diffuse reflection)	Measured in air at room temperature. Data taken from table.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
$NiO \cdot Fe_2O_3$ - 40 per cent



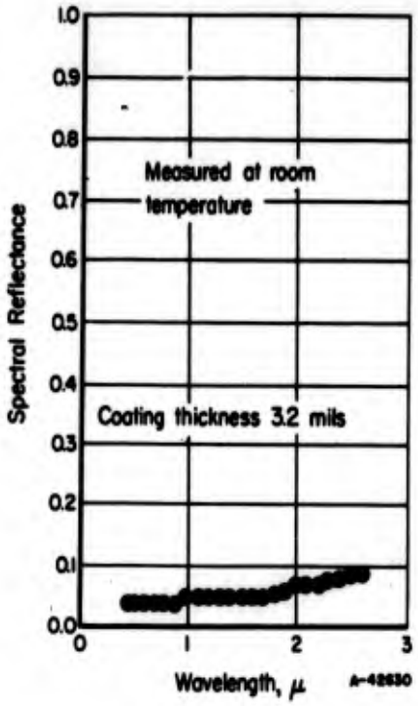
NORMAL TOTAL EMITTANCE OF B-11 ENAMEL ON INCONEL

NORMAL TOTAL EMITTANCE OF B-11 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	o	B-11 Enamel on Inconel. Coating thickness 6.9 mils.	Normal total emittance. Rotating, hollow, cylindrical, Globar heating element. Blackbody hole. Specimen mounted in heating element flush with wall. Temperatures measured with thermocouples. Infrared spectrometer with prism replaced by plane mirror. Thermocouple detector.	Measured in air. Data taken from tables.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
$CoO \cdot Fe_2O_3$ spinel - 40 per cent



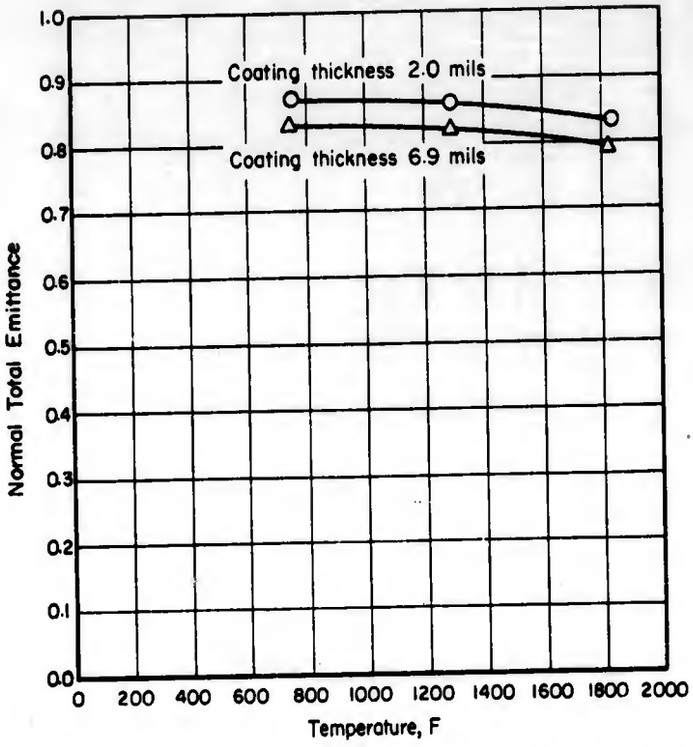
SPECTRAL REFLECTANCE OF B-11 ENAMEL ON INCONEL

SPECTRAL REFLECTANCE OF B-11 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	●	Enamel B-11 on Inconel. Coating thickness 3.2 mils.	Spectral reflectance. Commercial reflectometer and spectrophotometer with quartz prism monochromator. MgO standard. (Normal viewing-diffuse reflection)	Measured in air at room temperature. Data taken from table.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
$CoO \cdot Fe_2O_3$ - 40 per cent



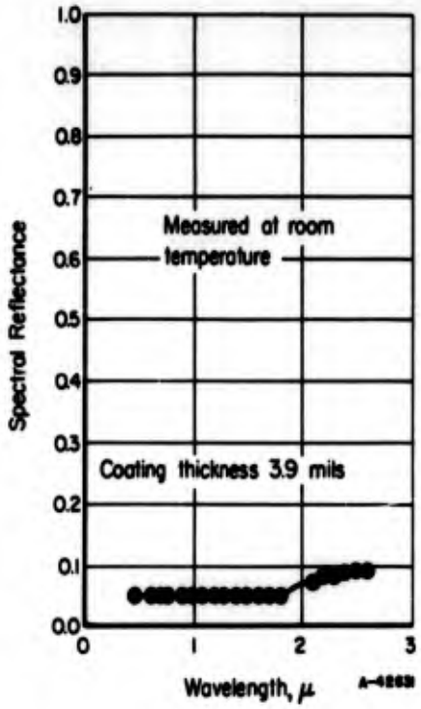
NORMAL TOTAL EMITTANCE OF B-12 ENAMEL ON INCONEL

NORMAL TOTAL EMITTANCE OF B-12 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	○ △	B-12 Enamel on Inconel. Coating thickness 2.0 mils. Coating thickness 6.9 mils.	Normal total emittance. Rotating, hollow, cylindrical, Globar heating element. Blackbody hole. Specimen mounted in heating element flush with wall. Temperatures measured with thermocouples. Infrared spectrometer with prism replaced by plane mirror. Thermocouple detector.	Measured in air. Data taken from tables.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
$CoO \cdot Mn_2O_3$ spinel - 40 per cent



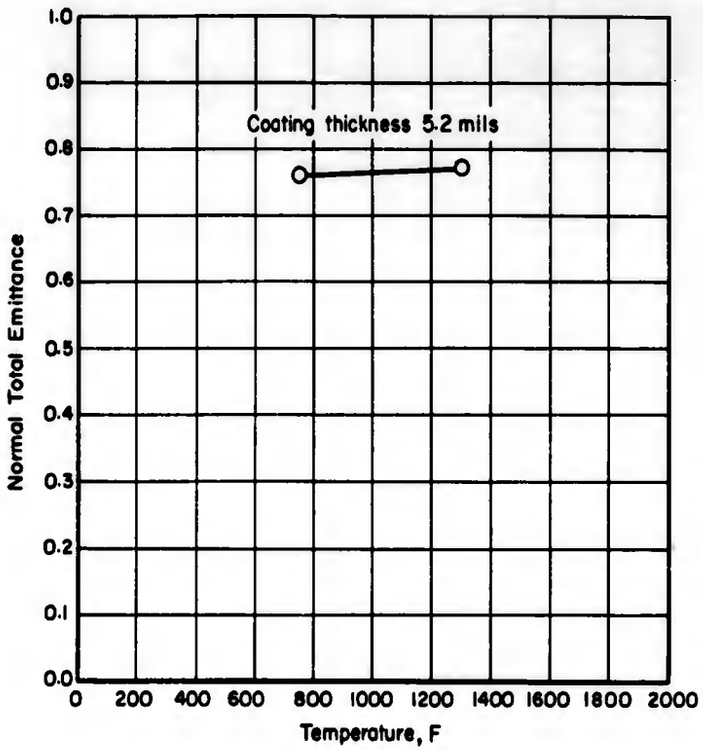
SPECTRAL REFLECTANCE OF B-12 ENAMEL ON INCONEL

SPECTRAL REFLECTANCE OF B-12 ENAMEL ON INCONEL—REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	●	Enamel B-12 on Inconel. Coating thickness 3.9 mils.	Spectral reflectance (normal viewing-diffuse reflection). Commercial reflectometer and spectrophotometer. Quartz prism monochromator. MgO standard.	Measured in air at room temperature. Data taken from table.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
$CoO \cdot Mn_2O_3$ - 40 per cent



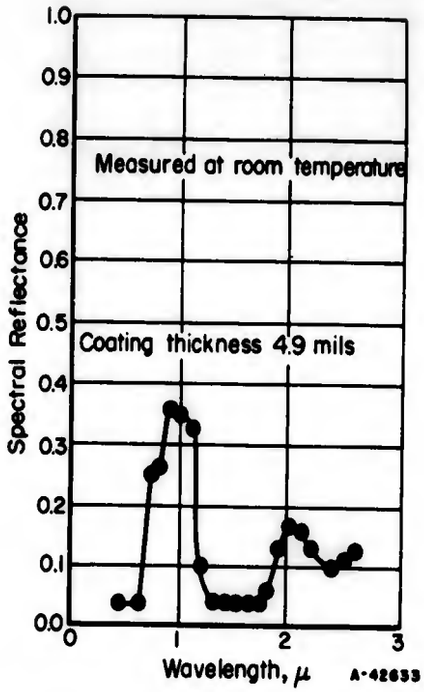
NORMAL TOTAL EMITTANCE OF B-13 ENAMEL ON INCONEL

NORMAL TOTAL EMITTANCE OF B-13 ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	O	B-13 Enamel on Inconel. Coating thickness 5.2 mils.	Normal total emittance. Rotating, hollow, cylindrical, Globar heating element. Blackbody hole. Specimen mounted in heating element flush with wall. Temperatures measured with thermocouples. Infrared spectrometer with prism replaced by plane mirror. Thermocouple detector.	Measured in air. Data taken from tables.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
$CoO \cdot Cr_2O_3$ spinel - 40 per cent



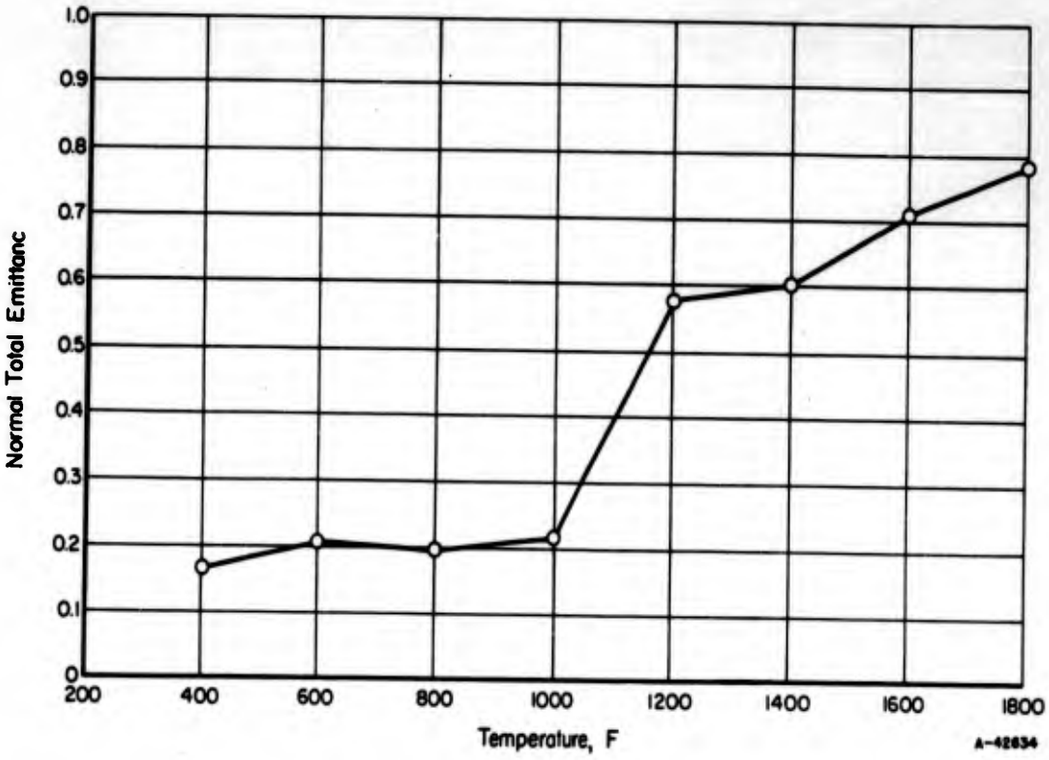
SPECTRAL REFLECTANCE OF B-13 ENAMEL ON INCONEL

SPECTRAL REFLECTANCE OF B-13 ENAMEL ON INCONEL—REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	●	Enamel B-13 on Inconel. Coating thickness 4.9 mils.	Spectral reflectance. (Normal viewing-diffuse reflection.) Commercial reflectometer and spectrophotometer. Quartz prism monochromator. MgO standard.	Measured in air at room temperature. Data taken from table.

Coating Composition by Weight

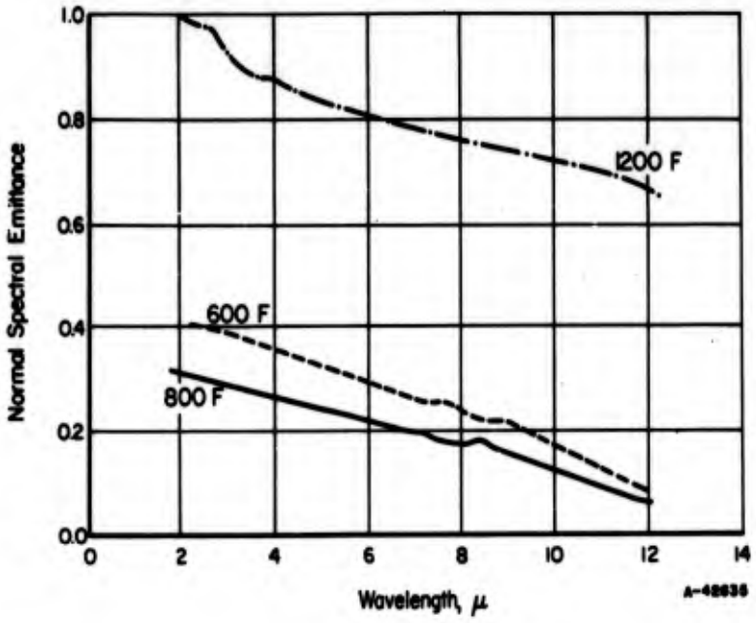
NBS Frit No. 332 - 50 per cent
$CoO \cdot Cr_2O_3$ - 50 per cent



NORMAL TOTAL EMITTANCE OF ALUMINUM PAINT ON A-286 STEEL

NORMAL TOTAL EMITTANCE OF CHEM INDUSTRIES ALUMINUM PAINT ON A-286 STEEL--REFERENCE INFORMATION

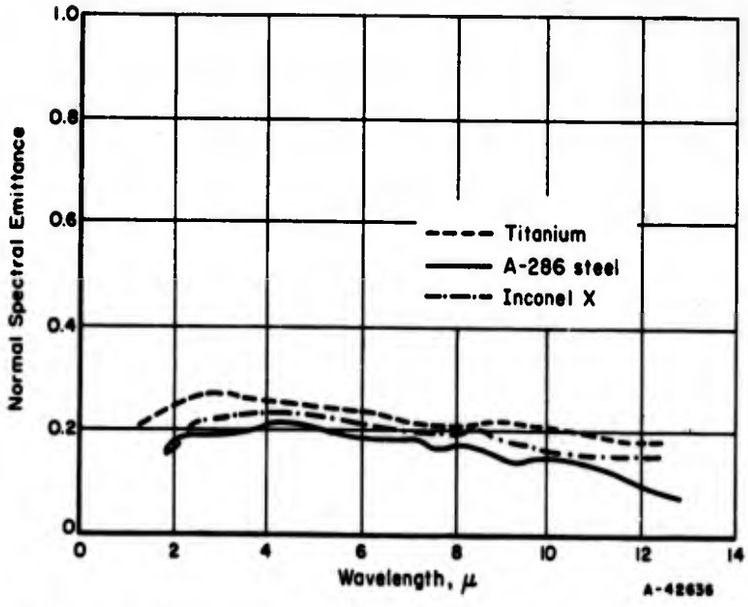
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Chem Industries high-temperature silicone-base aluminum paint. Coating thickness and surface condition not given.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF CHEM INDUSTRIES ALUMINUM PAINT ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF CHEM INDUSTRIES ALUMINUM PAINT ON A-286 STEEL--REFERENCE INFORMATION

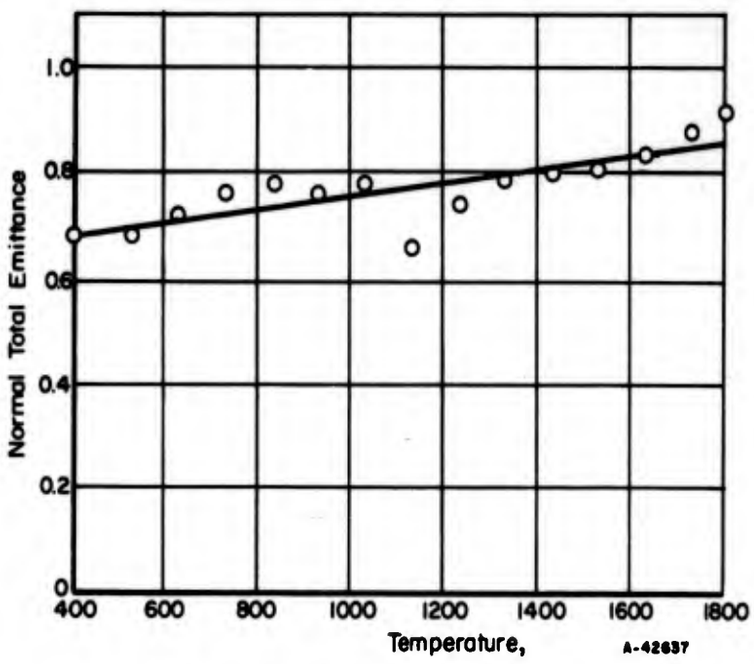
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Chem Industries high-temperature aluminum, silicone-base paint on A-286 steel. Thickness and surface condition not given. Measured at: 600 F 800 F 1200 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF CHEM INDUSTRIES ALUMINUM PAINT ON TITANIUM, STEEL, AND INCONEL X AT 800 F

NORMAL SPECTRAL EMITTANCE OF CHEM INDUSTRIES ALUMINUM PAINT ON TITANIUM, STEEL, AND INCONEL X—REFERENCE INFORMATION

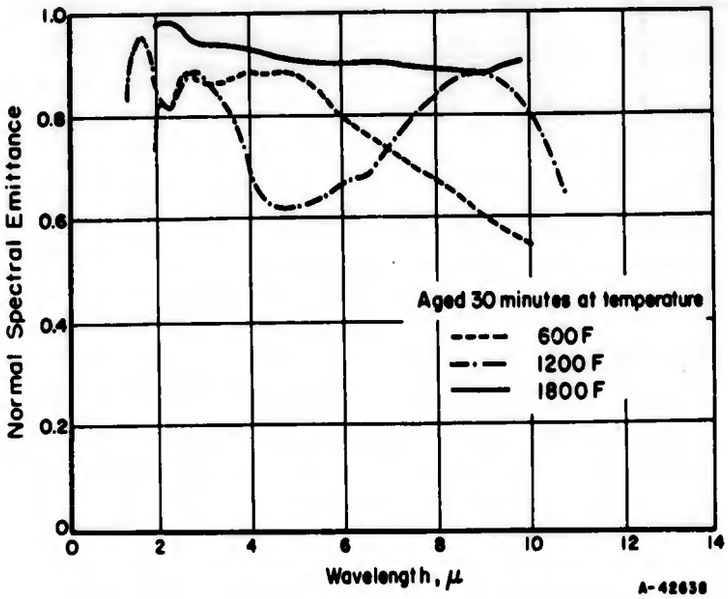
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Chem Industries high-temperature, silicone-base aluminum paint. Thickness and surface condition not given. Coated on: 6Al-4V Titanium Inconel X A-286 steel All measurements at 800 F.	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL TOTAL EMITTANCE OF DU LITE -0 ON A-286 STEEL

NORMAL TOTAL EMITTANCE OF DULITE 3-0 COATING ON A-286 STEEL--REFERENCE INFORMATION

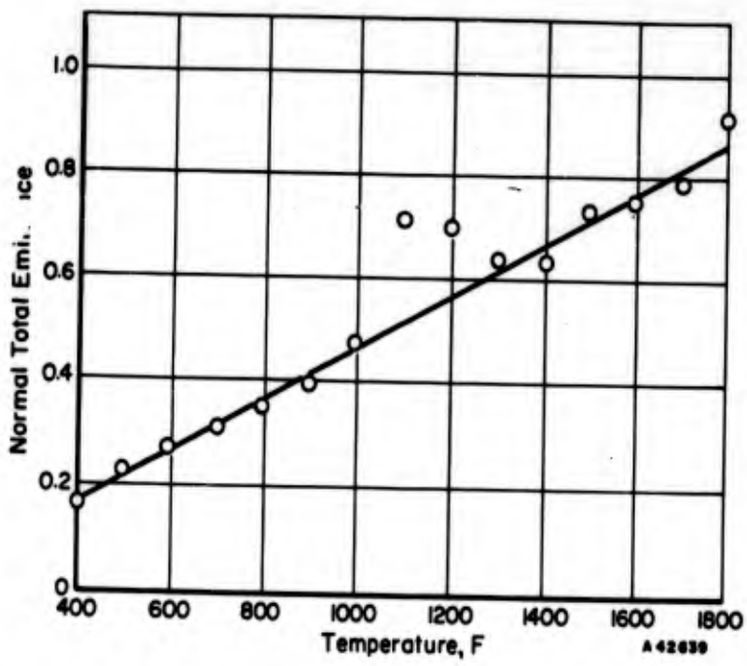
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		DuLite 3-0, an oxide surface conversion coating. Composition or coating thickness not given.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF DU LITE 3-0 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF DULITE 3-0 COATING ON A-286 STEEL—REFERENCE INFORMATION

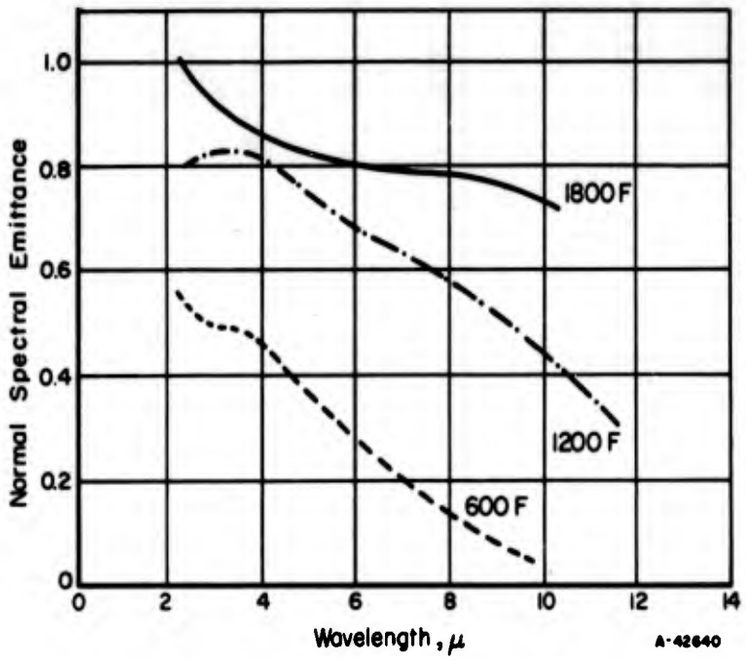
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		DuLite 3-0, an oxide conversion coating. No thickness or composition given. Aged 30 minutes at temperature. Measured at: 600 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL TOTAL EMITTANCE OF DU LITE 3-O ON INCONEL X

NORMAL TOTAL EMITTANCE OF DULITE 3-O COATING ON INCONEL X—REFERENCE INFORMATION

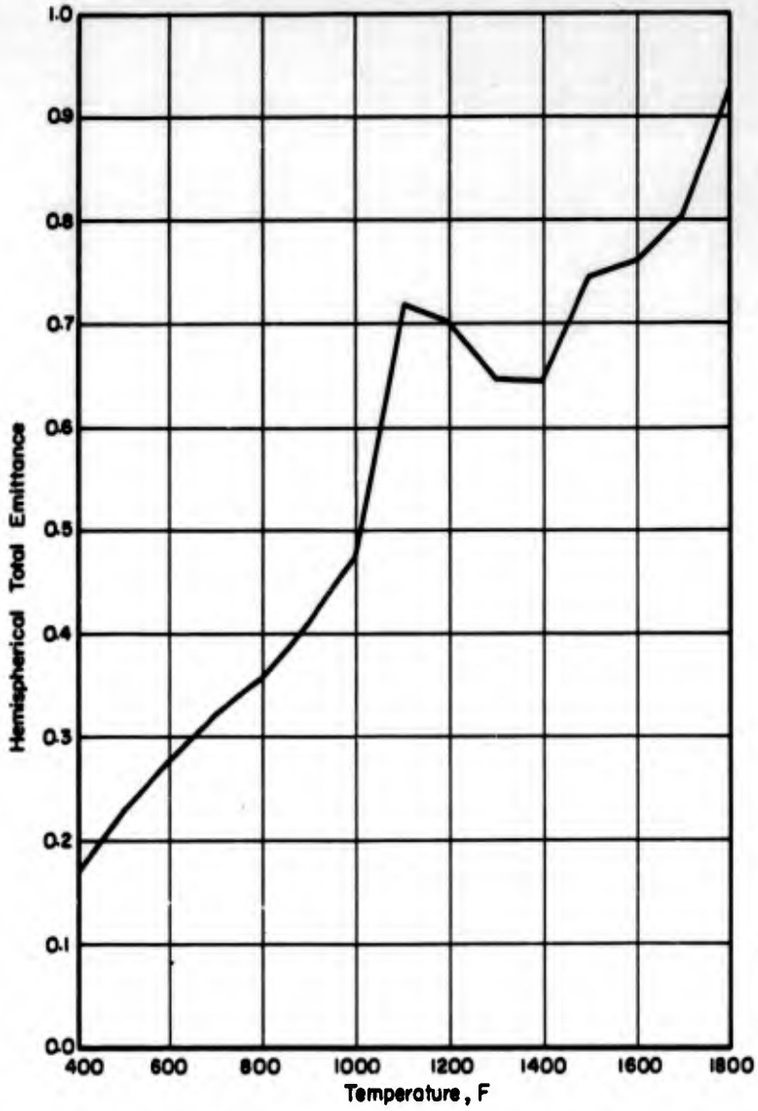
eference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		DuLite 3-O, an oxide surface conversion coating. Composition or coating thickness not given.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF DU LITE 3-O ON INCONEL X

NORMAL SPECTRAL EMITTANCE OF DULITE 3-O ON INCONEL X--REFERENCE INFORMATION

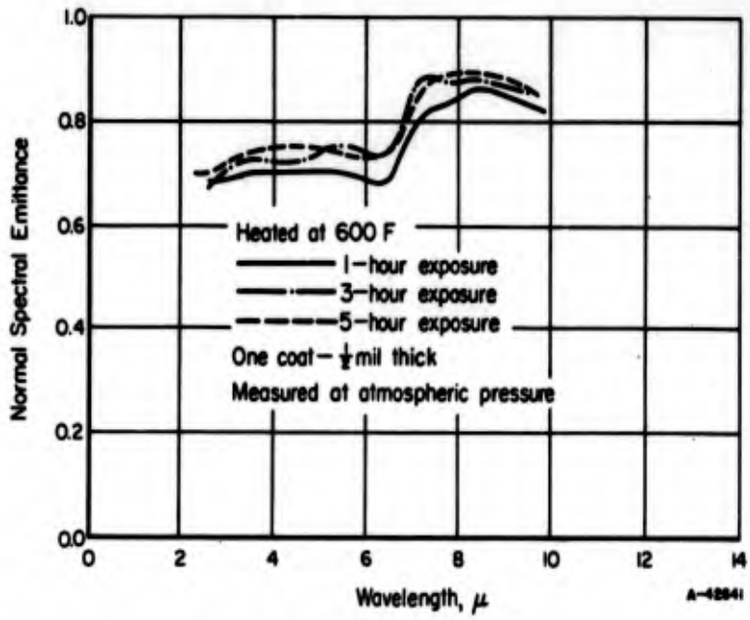
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		DuLite 3-O, an oxide conversion coating of the base metal. Thickness or surface condition not given. Measured at: 600 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF DuLITE 3-O ON TITANIUM

HEMISPHERICAL TOTAL EMITTANCE OF DuLITE 3-O ON TITANIUM--REFERENCE INFORMATION

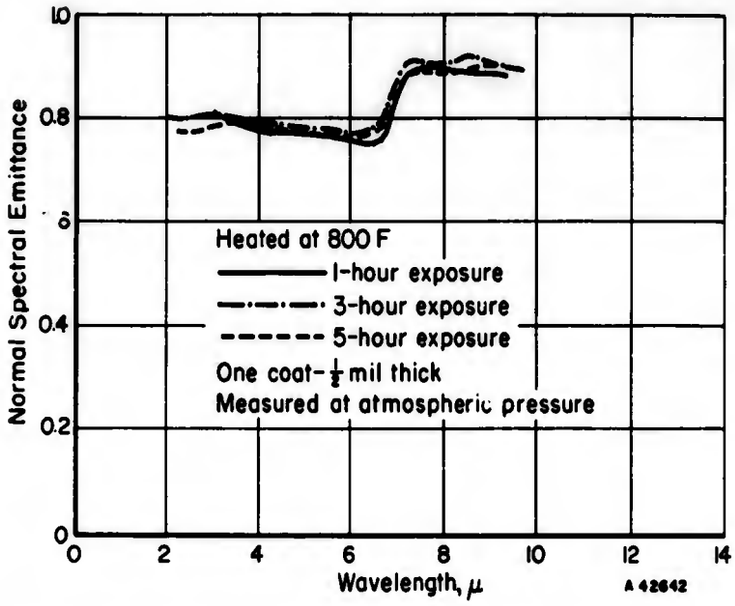
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
4	Dull, R. L.		DuLite 3-O coating on titanium. No thickness given. (DuLite 3-O is an oxide conversion coating of the base metal.) Note: Color of specimen surface changed considerably as the temperature increased. Original color - black.	Hemispherical total emittance. Resistance-heated strip. Specimens coated with test material. Measured power input to test section. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 600 F

NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 600 F--REFERENCE INFORMATION

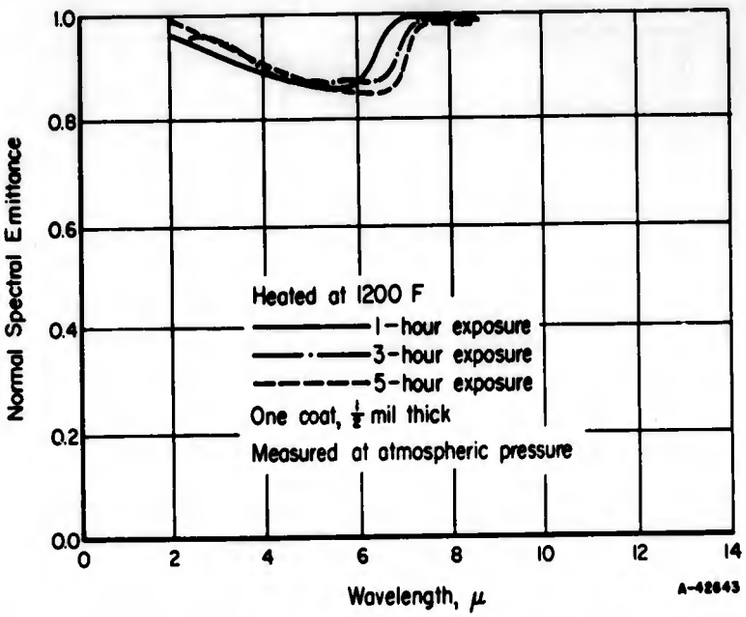
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high chrome-bearing coating. Applied as a slip, dried, and fired. One coat, 1/2-mil thick, continuously heated at 600 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 800 F

NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 800 F--REFERENCE INFORMATION

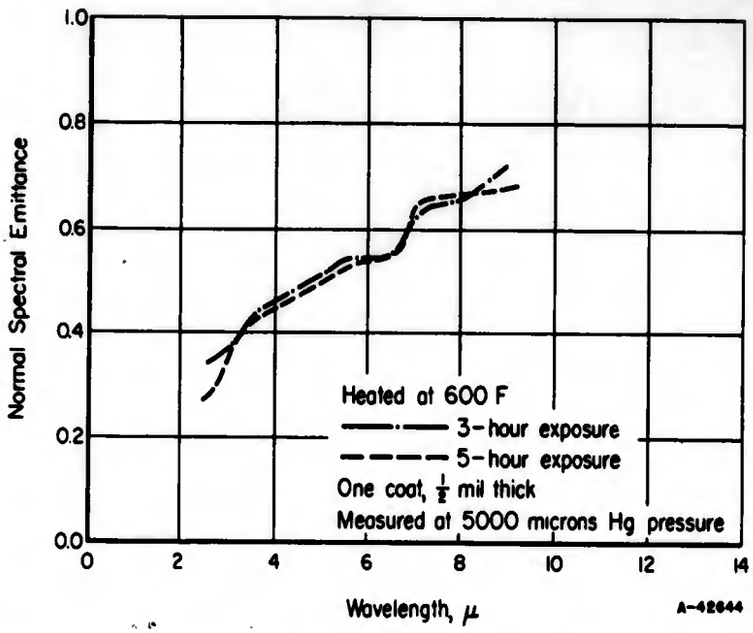
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high chrome-bearing coating. Applied as a slip on sand-blasted A-286 steel, dried, and fired. One coat, 1/2 mil thick, continuously heated at 800 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 1200 F

NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 1200 F--REFERENCE INFORMATION

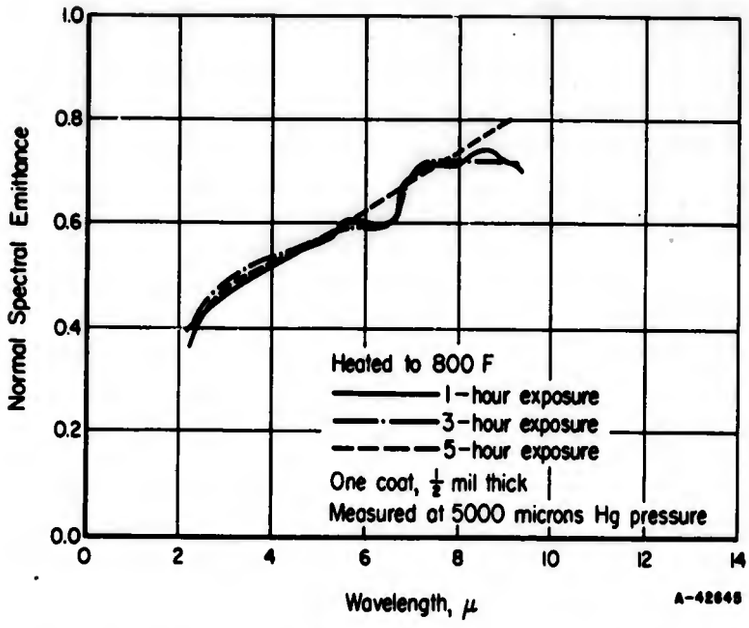
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high-chrome-bearing coating. Applied as a slip on sand-blasted A-286 steel, dried, and fired. 1 coat, 1/2-mil thick, continuously heated at 1200 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 600 F

NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 600 F--REFERENCE INFORMATION

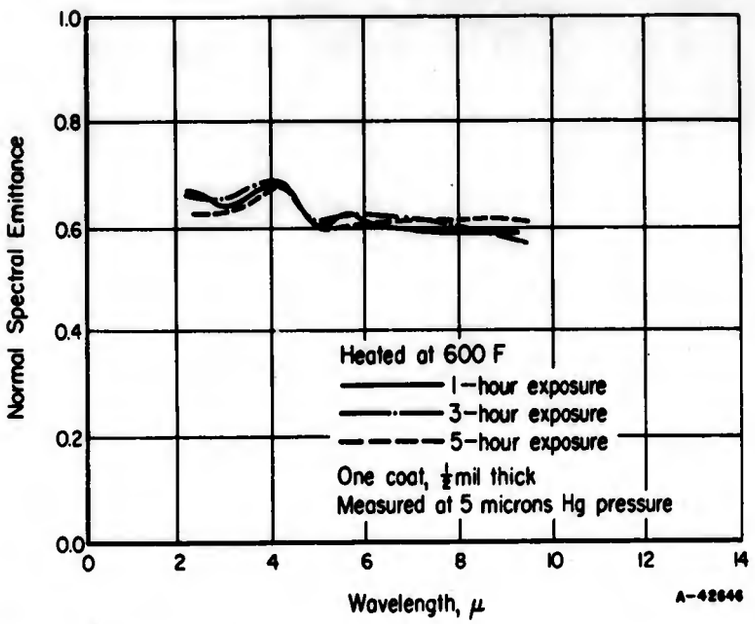
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high-chrome-bearing coating. Applied as a slip on sand-blasted material, dried, and fired. 1 coat, 1/2 mil thick. Heated at 600 F: 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 5000 micron Hg pressure. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 800 F

NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 800 F--REFERENCE INFORMATION

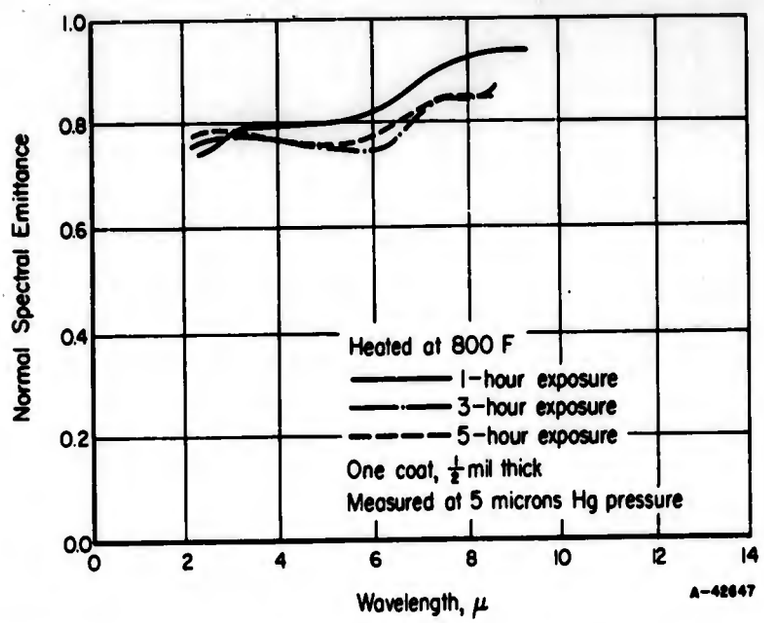
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high-chrome-bearing coating. Applied as a slip on sand-blasted material, dried, and fired. 1 coat, 1/2 mil thick. Heated at 800 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 5000 micron Hg pressure. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 600 F

NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 600 F—REFERENCE INFORMATION

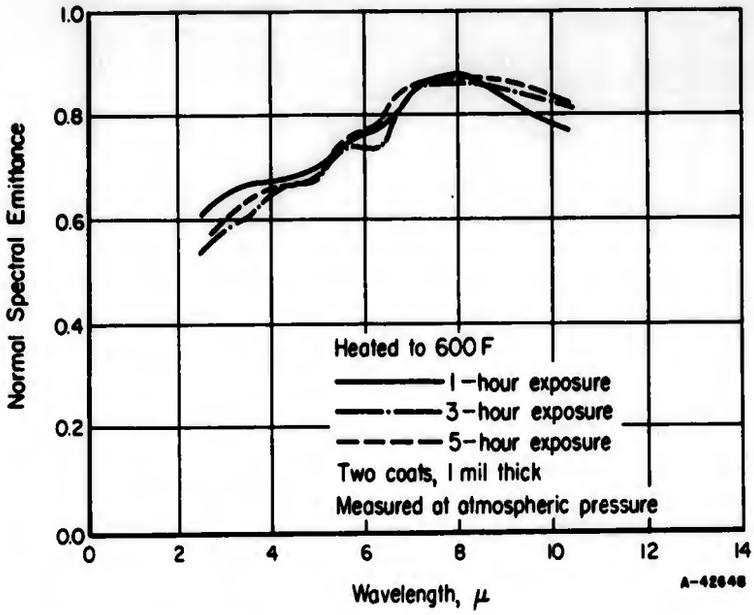
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high-chrome-bearing coating. Applied as a slip on sand-blasted material, dried, and fired. 1 coat, 1/2-mil thick. Heated at 600 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 5 micron Hg pressure. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 800 F

NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 800 F--REFERENCE INFORMATION

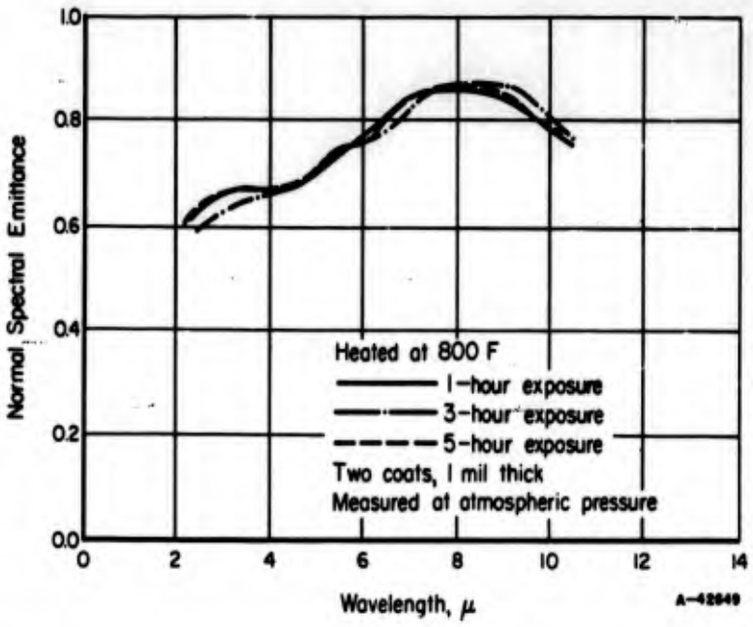
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high-chrome-bearing coating. Applied as a slip on sand-blasted material, dried, and fired. 1 coat, 1/2-mil thick. Heated at 800 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 5 microns Hg pressure. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 600 F

NORMAL SPECTRAL EMITTANCE OF GULTON 6013 CERAMIC COATING ON A-286 STEEL AT 600 F--REFERENCE INFORMATION

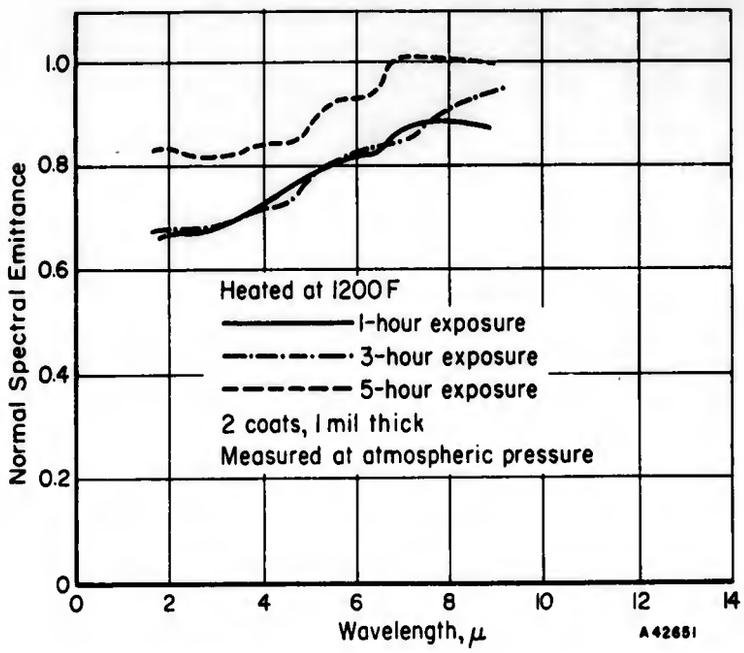
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high-chrome-bearing coating. Applied as a slip to sand-blasted A-286 steel, dried, and fired. 2 coats, 1 mil thick. Continuously heated at 1600 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 800 F

NORMAL SPECTRAL EMITTANCE OF GULTON 6013 CERAMIC COATING ON A-286 STEEL AT 800 F--REFERENCE INFORMATION

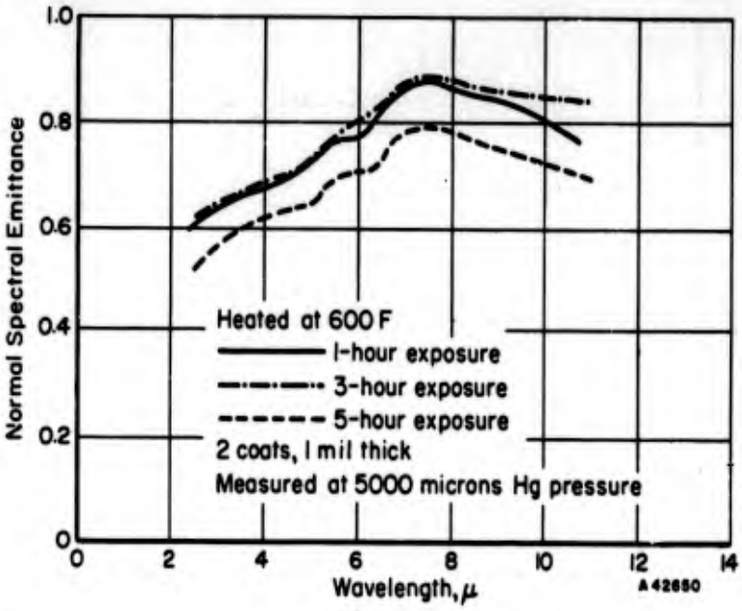
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high-chrome-bearing coating. Applied as a slip on sand-blasted A-286 steel, dried, and fired. 2 coats, 1 mil thick. Continuously heated at 800 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 1200 F

NORMAL SPECTRAL EMITTANCE OF GULTON 6013 CERAMIC COATING ON A-286 STEEL AT 1200 F--REFERENCE INFORMATION

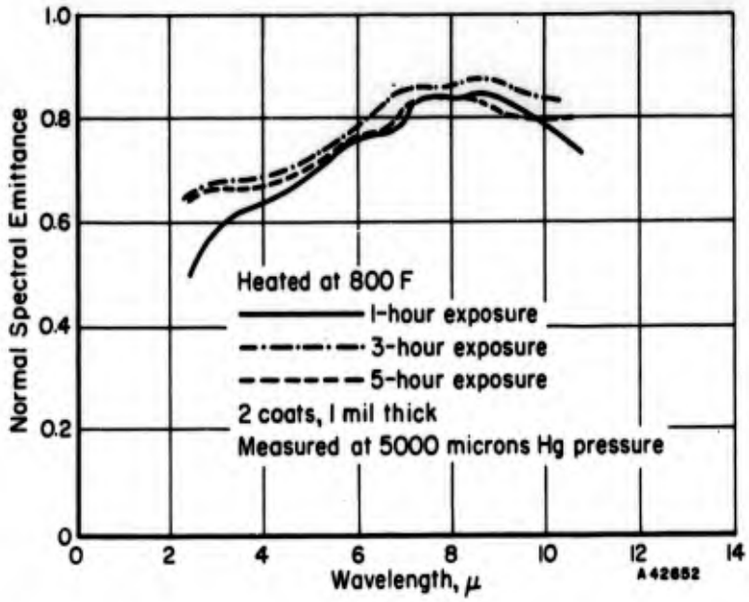
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high-chrome-bearing coating. Applied as a slip on sand-blasted A-286 steel, dried, and fired. 2 coats, 1 mil thick. Heated at 1200 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 600 F

NORMAL SPECTRAL EMITTANCE OF GULTON 6013 CERAMIC COATING ON A-286 STEEL AT 600 F--REFERENCE INFORMATION

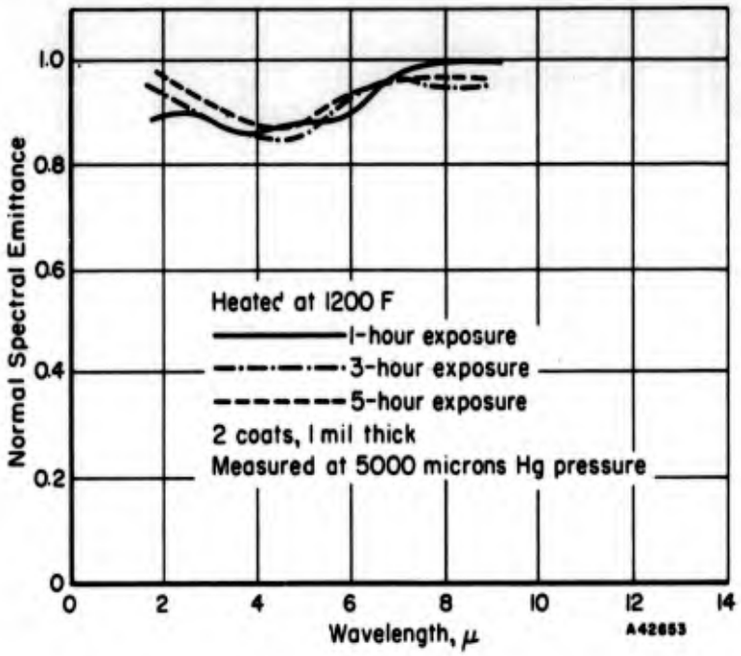
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high-chrome-bearing coating. Applied as a slip on sand-blasted A-286 steel, dried, and fired. 2 coats, 1 mil thick. Heated at 600 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 5000 micron Hg pressure. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 800 F

NORMAL SPECTRAL EMITTANCE OF GULTON 6013 CERAMIC COATING ON A-286 STEEL AT 800 F--REFERENCE INFORMATION

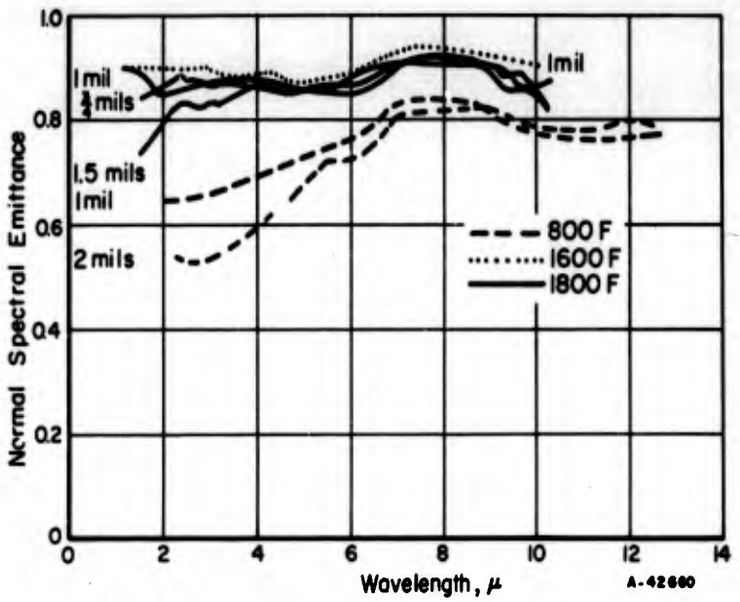
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high-chrome-bearing coating. Applied as a slip on sand-blasted A-286 steel, dried, and fired. 2 coats, 1 mil thick. Heated at 800 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 5000 micron pressure. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON A-286 STEEL AT 1200 F

NORMAL SPECTRAL EMITTANCE OF GULTON 6013 CERAMIC COATING ON A-286 STEEL AT 1200 F--REFERENCE INFORMATION

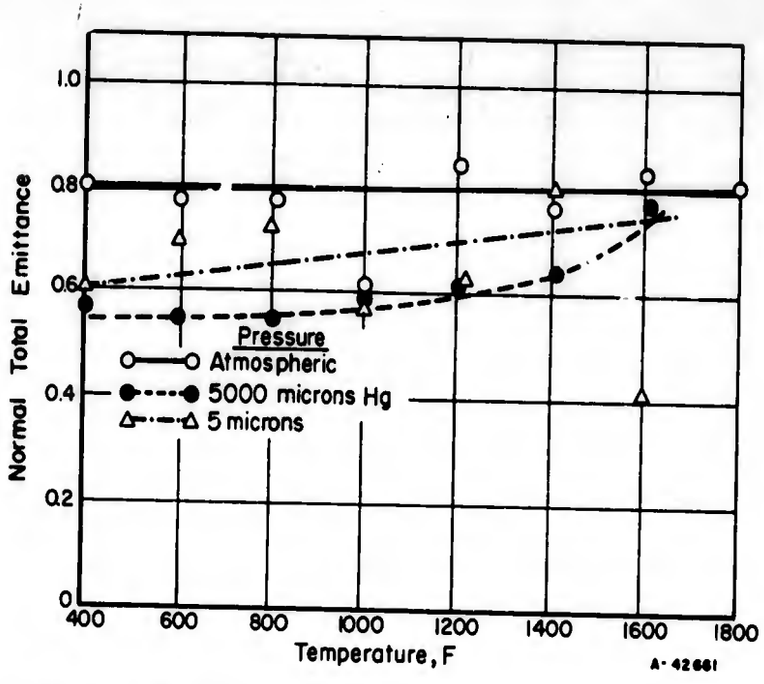
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high-chrome-bearing coating. Applied as a slip on sand-blasted A-286 steel, dried, and fired. 2 coats, 1 mil thick. Heated at 1200 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 5000 micron pressure. Data taken from curves.



VARIATION OF THE NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON INCONEL X WITH COATING THICKNESS AND TEMPERATURE

NORMAL SPECTRAL EMITTANCE OF GULTON CERAMIC COATING 6013 ON INCONEL X--REFERENCE INFORMATION

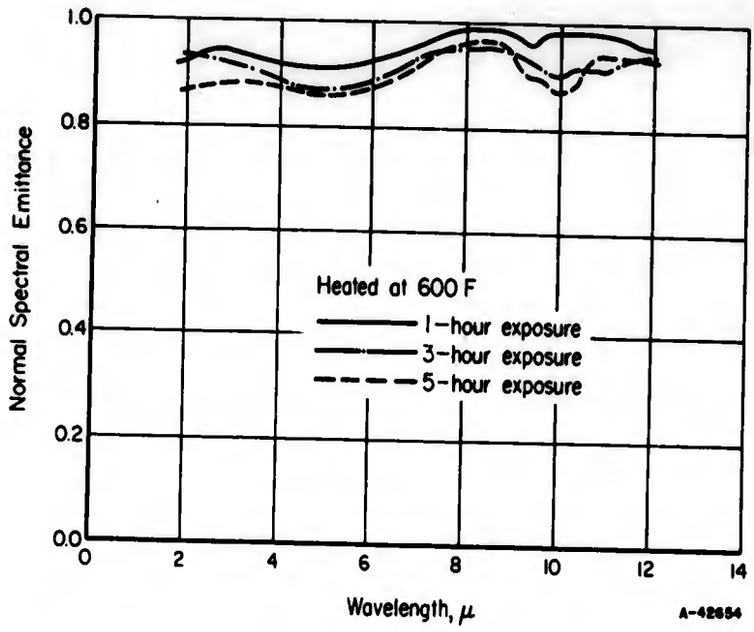
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Gulton ceramic coating 6013. A high-chrome-bearing coating. Applied as a slip on sand-blasted material, dried, and fired. Coating thicknesses, 3/4, 1, 1.5, and 2 mils Measured at: 800 F 1600 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL TOTAL EMITTANCE OF NATIONAL LEAD BLACK PAINT 46H47 ON A-286 STEEL

NORMAL TOTAL EMITTANCE OF NATIONAL LEAD BLACK PAINT 46H47 ON A-286 STEEL--REFERENCE INFORMATION

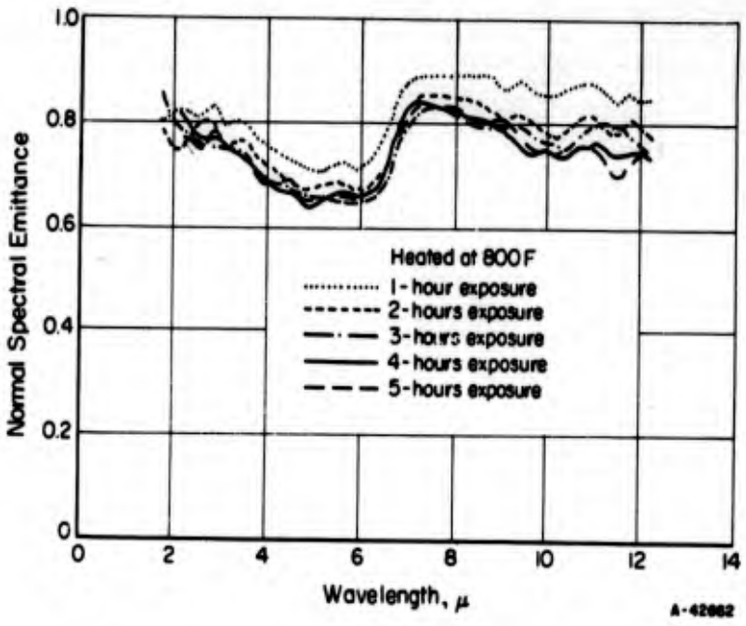
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		National Lead 46H47 black paint. Composition or thickness not given. Measured at: Atmospheric pressure 5000 microns Hg 5 microns Hg.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air and vacuum. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF NATIONAL LEAD BLACK PAINT 46H47 ON A-286 STEEL AT 600 F

NORMAL SPECTRAL EMITTANCE OF NATIONAL LEAD BLACK PAINT 46H47 ON A-286 STEEL AT 600 F--REFERENCE INFORMATION

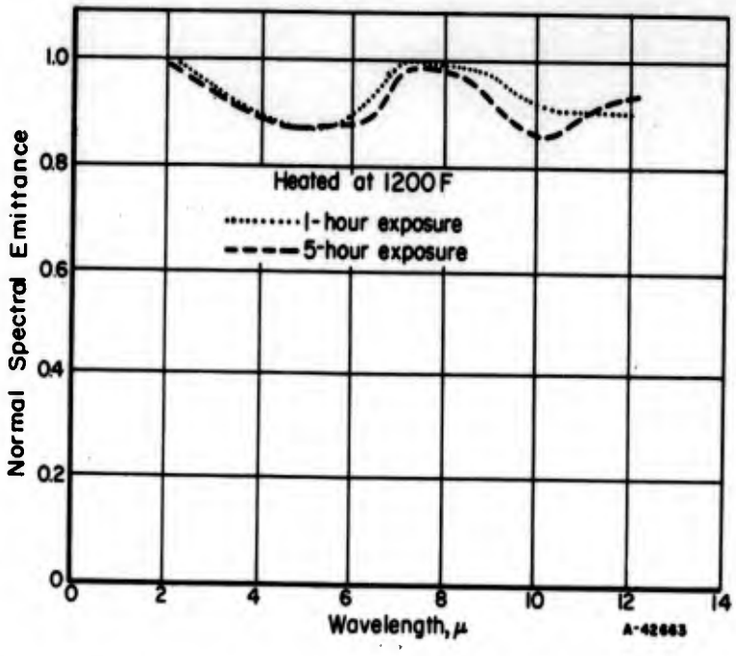
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		National Lead 46H47 "high heat black" paint. Composition or thickness not given. Heated at 600 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF NATIONAL LEAD BLACK PAINT 46H47 ON A-286 STEEL AT 800 F

NORMAL SPECTRAL EMITTANCE OF NATIONAL LEAD BLACK PAINT 46H47 ON A-286 STEELS AT 800 F--REFERENCE INFORMATION

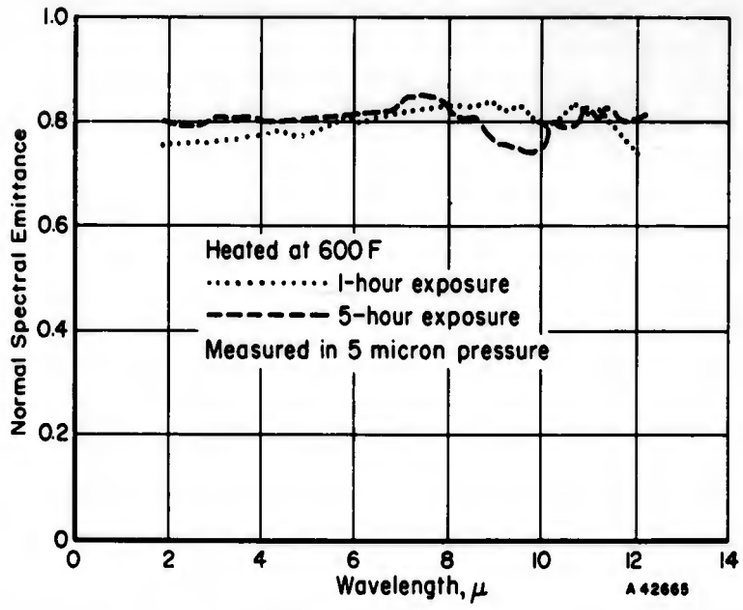
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		National Lead 46H47 "high heat black" paint. Composition or thickness not given. Heated at 800 F: 1 hour 2 hours 3 hours 4 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF NATIONAL LEAD BLACK PAINT 46H47 ON A-286 STEEL AT 1200 F

NORMAL SPECTRAL EMITTANCE OF NATIONAL LEAD BLACK PAINT 46H47 ON A-286 STEEL AT 1200 F--REFERENCE INFORMATION

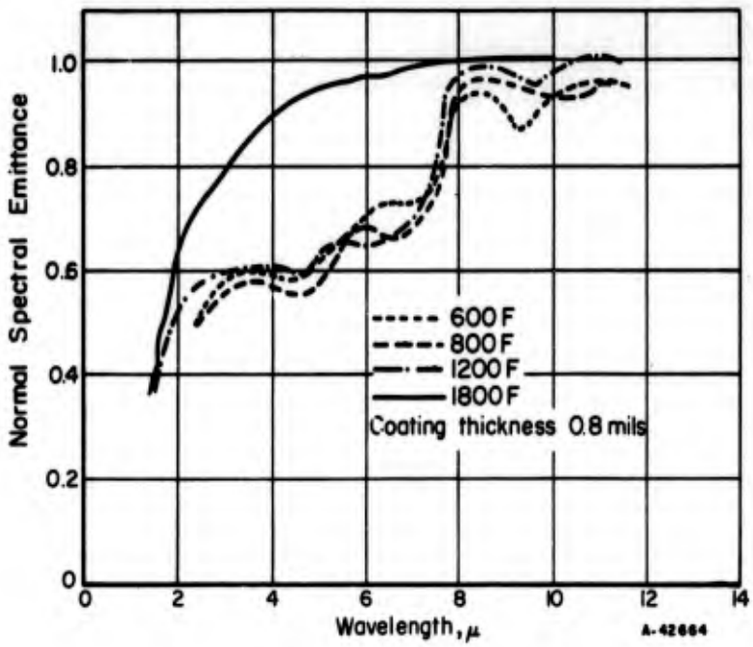
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		National Lead 46H47 "high heat black" paint. Composition or thickness not given. Heated at 1200 F: 1 hour 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF NATIONAL LEAD BLACK PAINT 46H47 ON A-286 STEEL AT 600 F

NORMAL SPECTRAL EMITTANCE OF NATIONAL LEAD BLACK PAINT 46H47 ON A-286 STEEL AT 600 F AND 5 MICRONS PRESSURE--REFERENCE INFORMATION

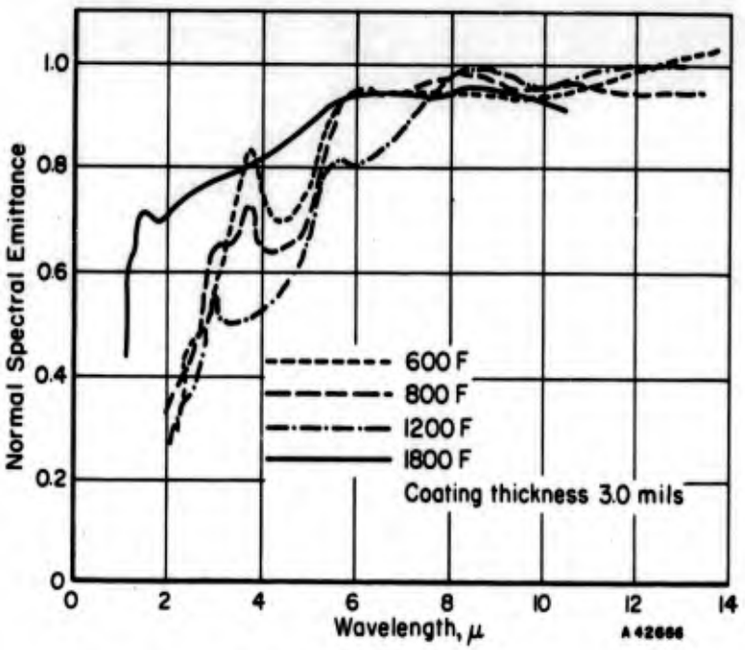
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		National Lead 46H47 "high heat black" paint. Composition or thickness not given. Heated at 600 F: 1 hour 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 5 microns Hg pressure. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF VITA VAR PV100 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF VITA VAR PV 100 PAINT ON A-286 STEEL--REFERENCE INFORMATION

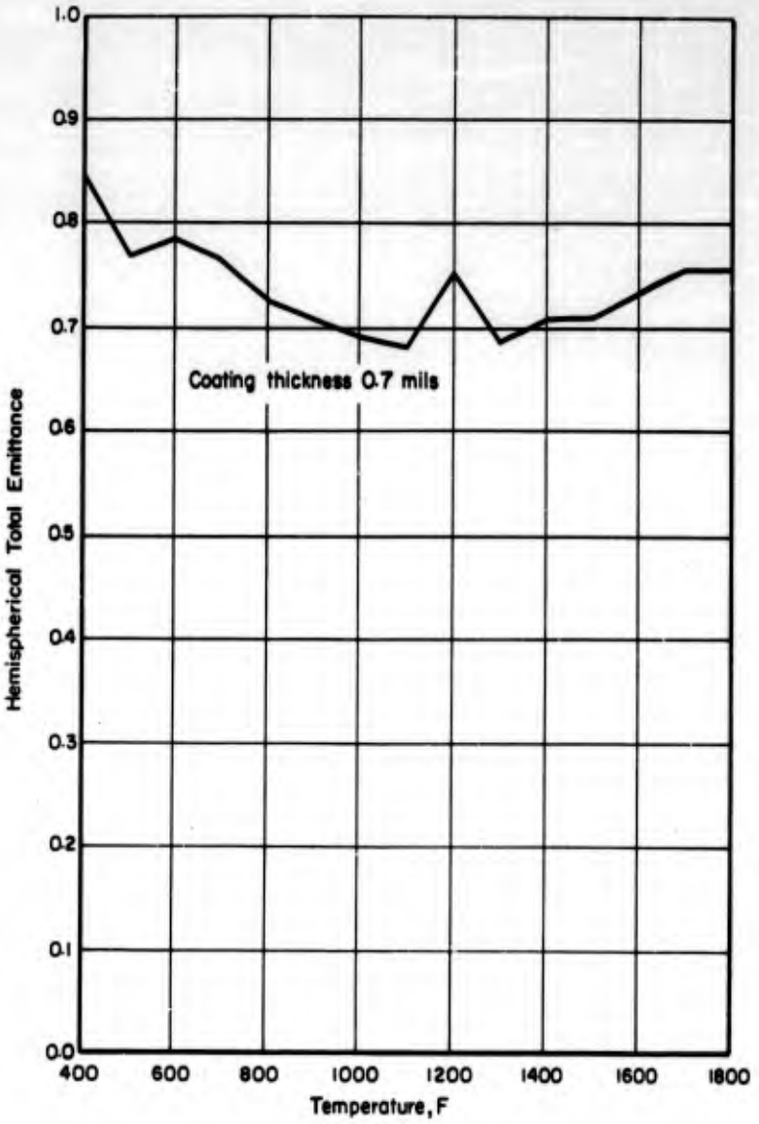
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Vita Var PV 100 paint. A titanium dioxide pigment in silicone vehicle. Coating thickness 0.8 mil. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF VITA VAR PV 100 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF VITA VAR PV 100 PAINT ON A-286 STEEL--REFERENCE INFORMATION

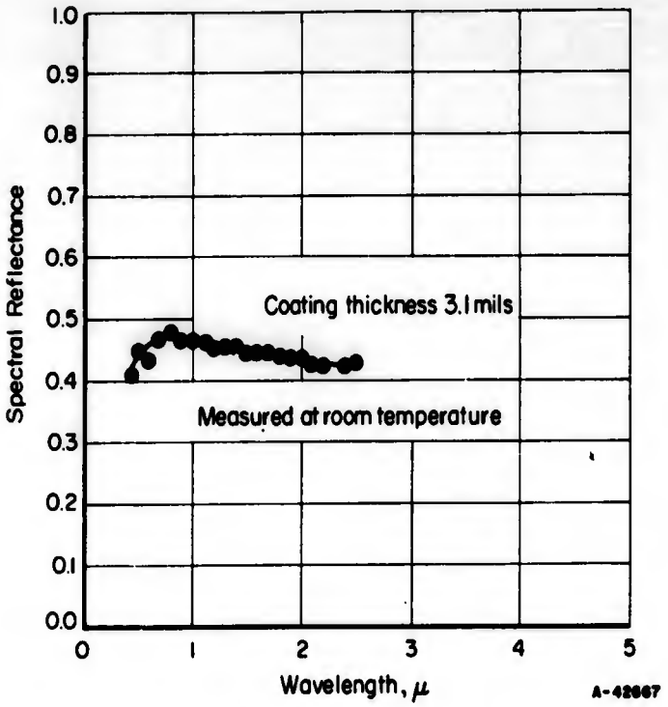
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Vita Var PV 100 paint. A titanium dioxide pigment in silicone vehicle. Coating thickness 3.0 mils. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF VITA VAR PV100 PAINT ON TITANIUM

HEMISPHERICAL TOTAL EMITTANCE OF VITA VAR PV100 PAINT ON TITANIUM--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
4	Dull, R. L.		Vita Var PV100 coating on titanium. Coating thickness 0.7 mil. (Vita Var PV100 is a white paint with a silicone vehicle and titanium dioxide pigment.) Note: Color began to change at 400 F and varied through yellow, tan, white, cream until brown and flaking at 1800 F.	Hemispherical total emittance. Resistance-heated strip specimen coated with test material. Measured power input to test section. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



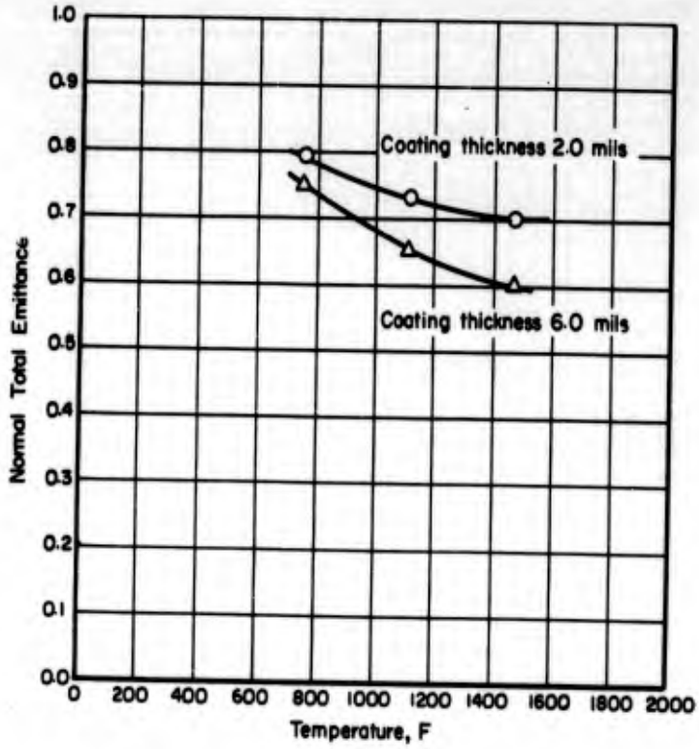
SPECTRAL REFLECTANCE OF W-1 WHITE ENAMEL ON INCONEL

SPECTRAL REFLECTANCE OF W-1 WHITE ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	●	W-1 white enamel on Inconel. Coating thickness 3.1 mils.	Spectral reflectance. Integrating sphere reflectometer. Commercial spectrophotometer, monochromator, lead sulphide detector. Hemispherical viewing. Illumination not clear from description--whether diffuse or normal.	Measured in air at room temperature. Data taken from table.

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
CeO_2 - 30 per cent
MgO - 10 per cent



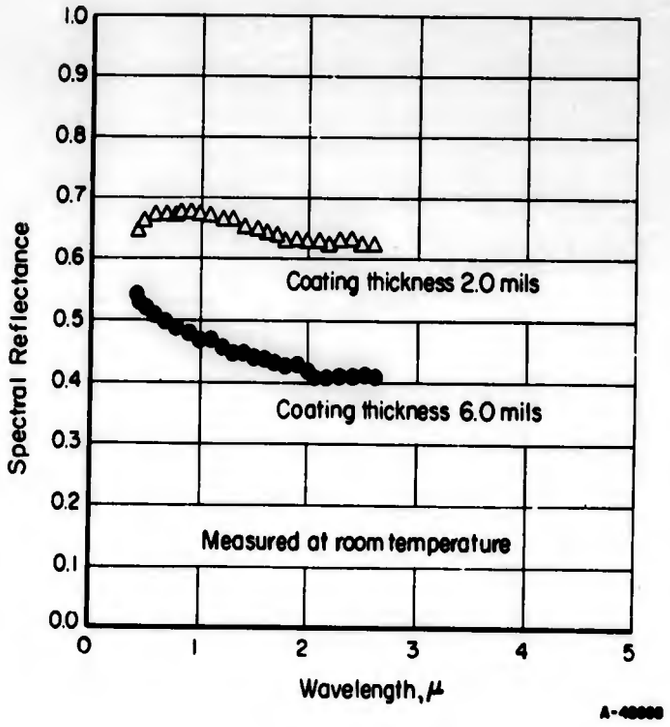
NORMAL TOTAL EMITTANCE OF W-3 WHITE ENAMEL ON INCONEL

NORMAL TOTAL EMITTANCE OF W-3 WHITE ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint		W-3 white enamel on Inconel.	Normal total emittance. Sample recessed (flush) in wall of hollow, cylindrical, Globar heater. Comparison blackbody, hole. Infrared spectrometer with prism replaced by plane mirror. Thermocouple detector. Temperatures measured with thermocouples	Measured in air. Data taken from table.
		o	Coating thickness 2.0 mils.		
		Δ	Coating thickness 6.0 mils.		

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
CeO_2 - 20 per cent
SnO_2 - 20 per cent



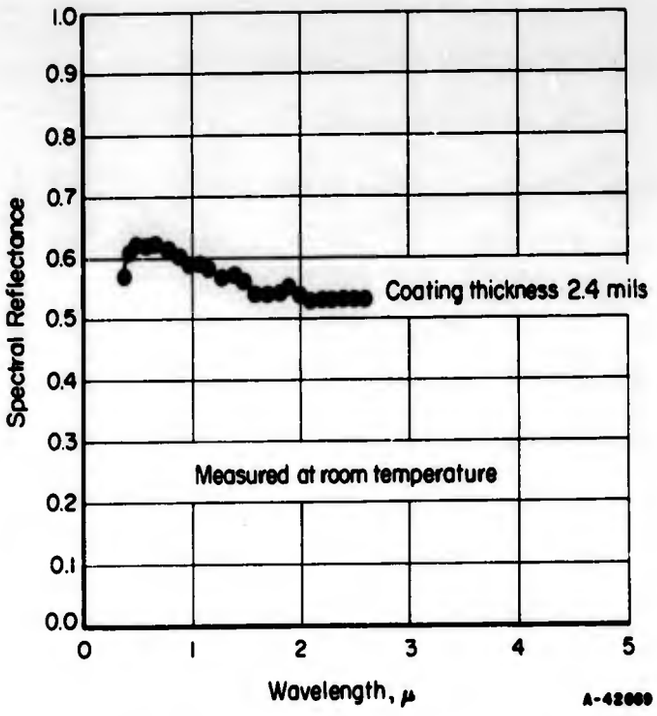
SPECTRAL REFLECTANCE OF W-3 WHITE ENAMEL ON INCONEL

SPECTRAL REFLECTANCE OF W-3 WHITE ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint	●	W-3 white enamel on Inconel. Coating thickness 2.0 mils.	Spectral reflectance. Integrating sphere reflectometer. Commercial spectrophotometer, monochromator, and lead sulphide detector. Hemispherical viewing. Illumination not clear from description--whether diffuse or normal.	Measured in air at room temperature. Data taken from table.
		△	Coating thickness 6.0 mils.		

Coating Composition by Weight

NBS Frit No. 332 - 60 per cent
CeO_2 - 20 per cent
SnO_2 - 20 per cent



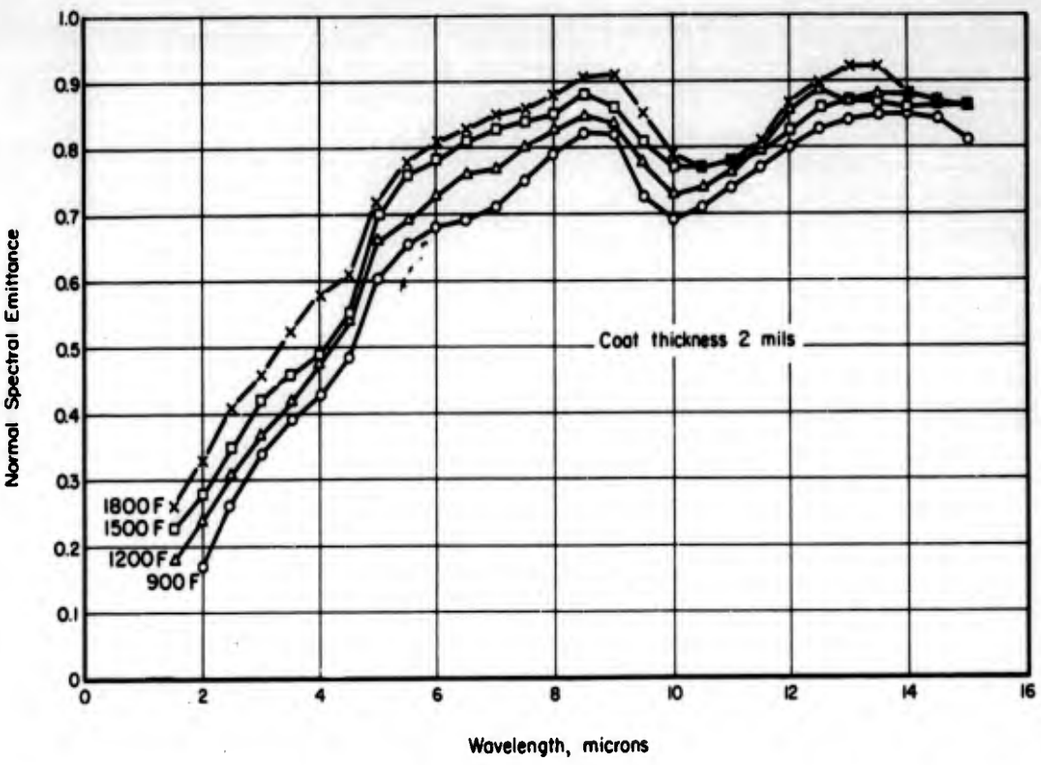
SPECTRAL REFLECTANCE OF W-4 WHITE ENAMEL ON INCONEL

SPECTRAL REFLECTANCE OF W-4 WHITE ENAMEL ON INCONEL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Burgess, Jasperse, Marcus, Martin, and Flint		W-4 white enamel on Inconel. Coating thickness 2.4 mils.	Spectral reflectance. Integrating sphere reflectometer. Commercial spectrophotometer, monochromator, lead sulphide detector. Hemispherical viewing. Illumination not clear from description--whether diffuse or normal.	Measured in air at room temperature. Data taken from table.

Coating Composition by Weight

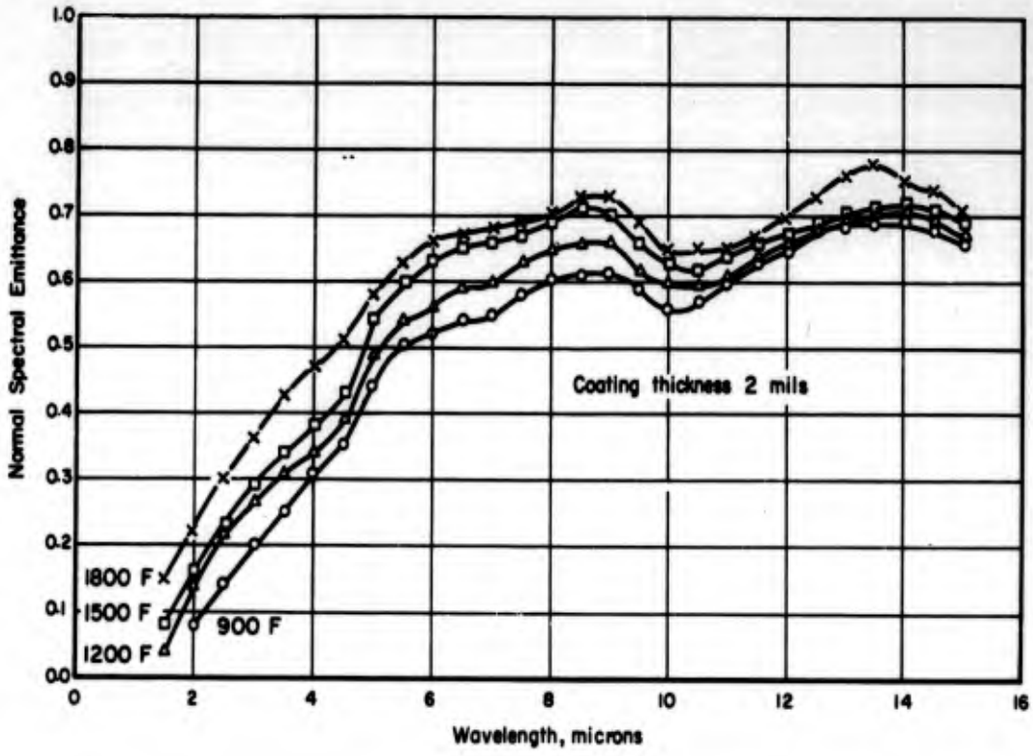
NBS Frit No. 332 - 60 per cent
CeO_2 - 20 per cent
ZrO_2 - 20 per cent



NORMAL SPECTRAL EMITTANCE OF N-143 ENAMEL ON INCONEL

NORMAL SPECTRAL EMITTANCE OF N-143 ENAMEL ON INCONEL--REFERENCE INFORMATION

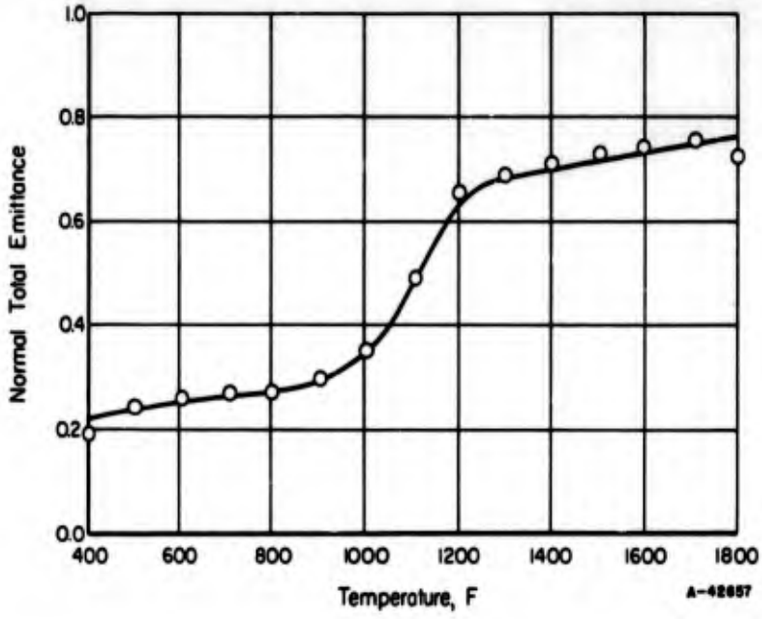
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Richmond and Stewart		N-143 consists of boron-free barium beryllium silicate frit with addition of cerium oxide. Coating thickness 2 mils. Coated on Inconel. Runs made at the following temperatures:	Normal spectral emittance. Double-beam infrared spectrometer with sodium chloride prism. Secondary standard [silicon carbide (Globar)] calibrated against laboratory blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from tables.
		o	900 F		
		Δ	1200 F		
		□	1500 F		
		×	1800 F		



NORMAL SPECTRAL EMITTANCE OF N-143 ENAMEL ON TYPE 321 STAINLESS STEEL

NORMAL SPECTRAL EMITTANCE OF N-143 ENAMEL ON TYPE 321 STAINLESS STEEL-REFERENCE INFORMATION

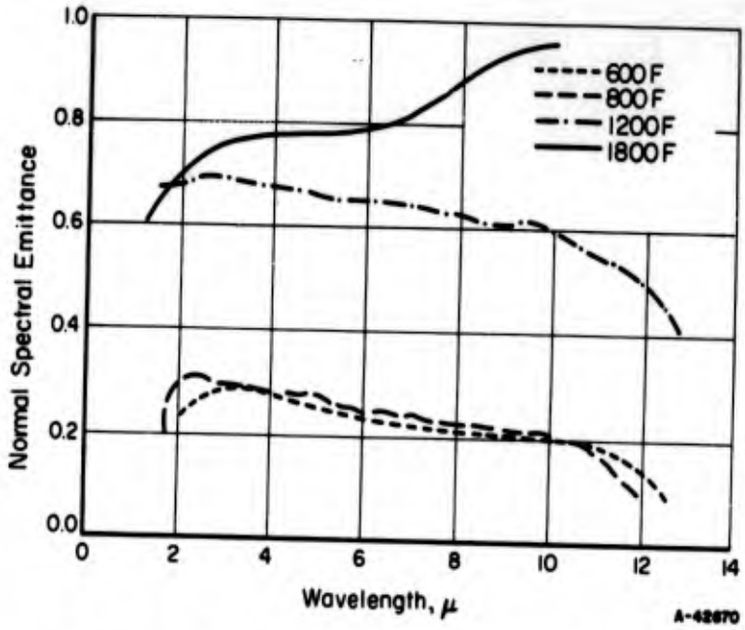
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Richmond and Stewart		N-143 consists of boron-free barium beryllium silicate frit with addition of cerium oxide. Coating thickness 2 mils. Coated on Inconel. Runs made at the following temperatures:	Normal spectral emittance. Double-beam infrared spectrometer with sodium chloride prism. Secondary standard [silicon carbide (Globar)] calibrated against laboratory blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from tables.
		o	900 F		
		Δ	1200 F		
		□	1500 F		
		×	1800 F		



NORMAL TOTAL EMITTANCE FOR PRATT AND LAMBERT 91-1524 PAINT ON INCONEL X

NORMAL TOTAL EMITTANCE OF PRATT AND LAMBERT 91-1524 PAINT ON INCONEL X—REFERENCE INFORMATION

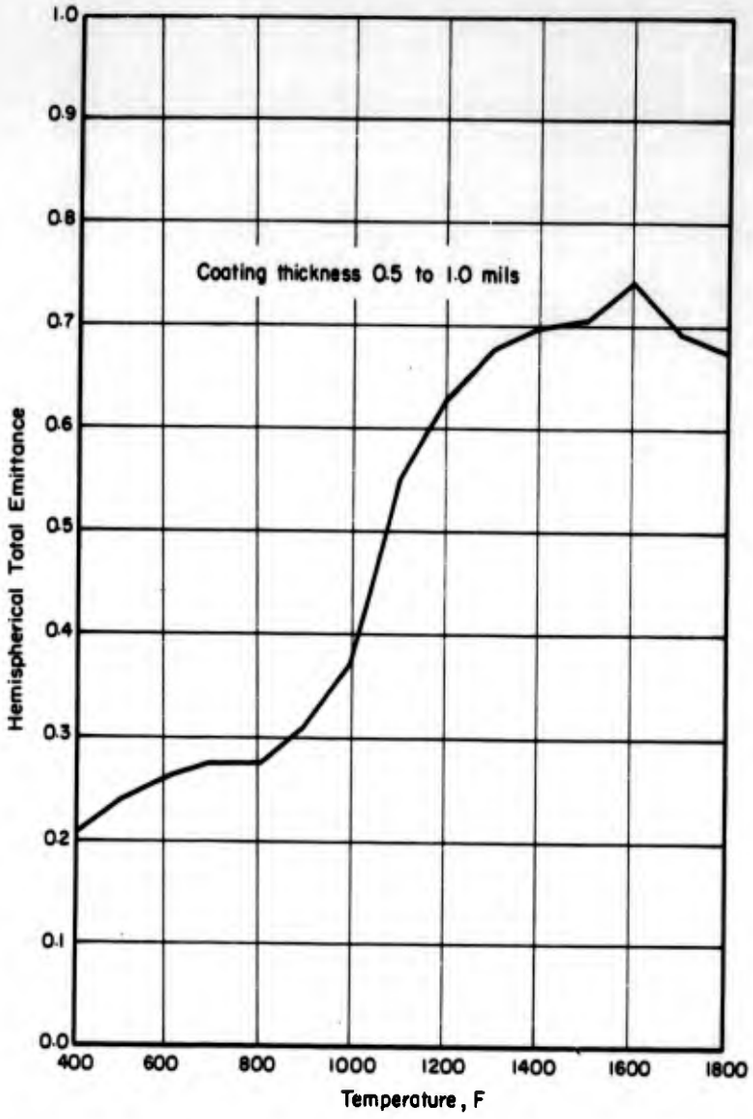
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Pratt and Lambert 91-1524 coating. Butyl titanate paint with aluminum pigment.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF PRATT AND LAMBERT 91-1524 PAINT ON INCONEL X

NORMAL SPECTRAL EMITTANCE OF PRATT AND LAMBERT 91-1524 PAINT ON INCONEL X--REFERENCE INFORMATION

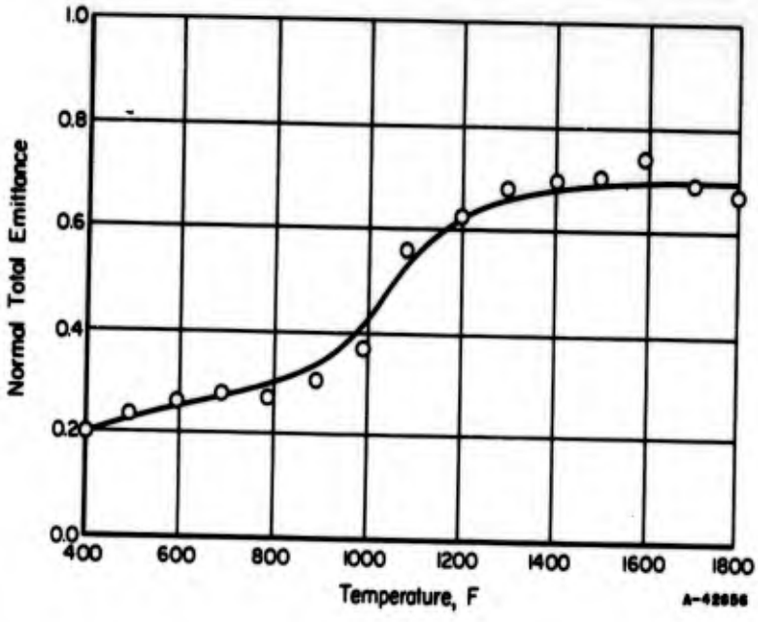
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Pratt and Lambert 91-1524, a butyl titanate paint with aluminum pigment. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF PRATT AND LAMBERT 91-1524 PAINT ON TITANIUM

HEMISPHERICAL TOTAL EMITTANCE OF PRATT AND LAMBERT 91-1524 PAINT ON TITANIUM--REFERENCE INFORMATION

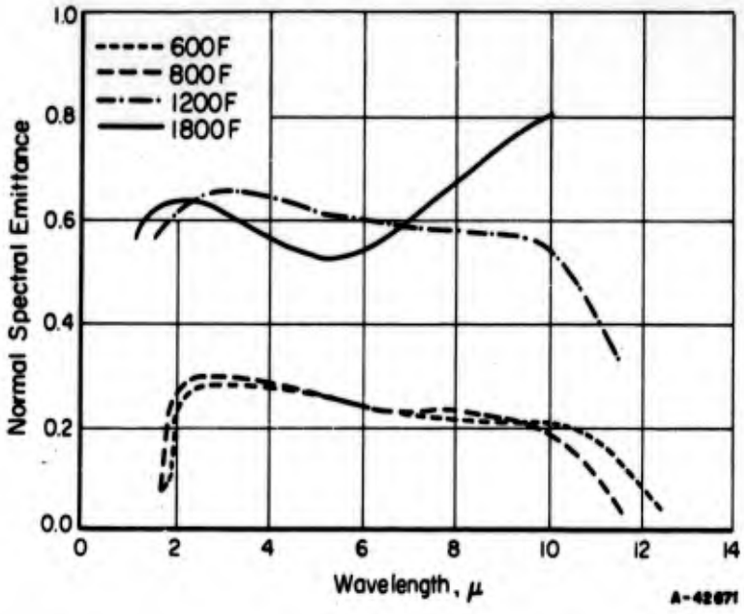
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
4	Dull, R. L.		Pratt and Lambert coating No. 91-1524 on titanium. Coating thickness 0.5 to 1.0 mil. (Coating is a butyl titanate paint with aluminum pigment.) Note: Surface began minute blistering at 1500 F and turned to dark brown, peeling flakes at 1800 F.	Hemispherical total emittance. Resistance-heated strip specimens coated with test material. Measured power input to test section. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL TOTAL EMITTANCE FOR PRATT AND LAMBERT 91-1524 PAINT ON TITANIUM

NORMAL TOTAL EMITTANCE OF PRATT AND LAMBERT 91-1524 PAINT ON TITANIUM--REFERENCE INFORMATION

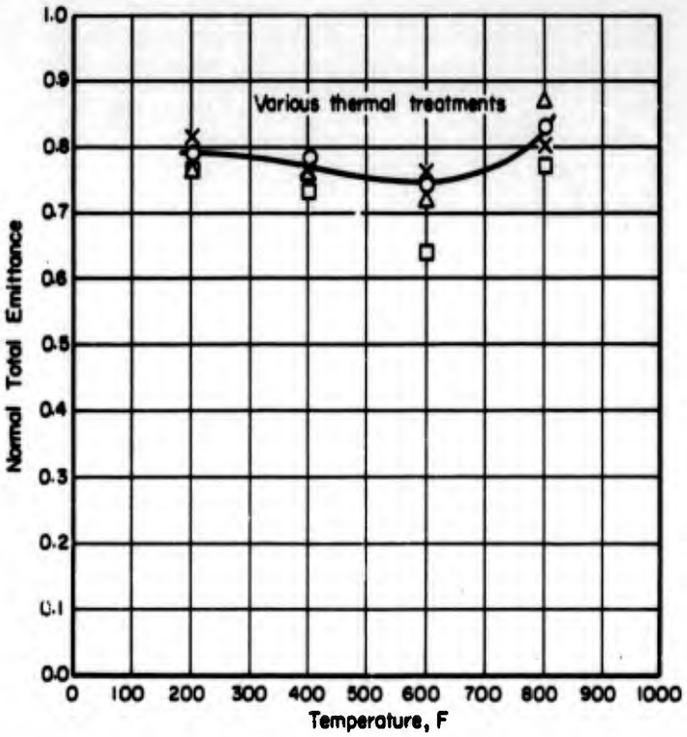
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Pratt and Lambert 91-1524 coating. Butyl titanate paint with aluminum pigment.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF PRATT AND LAMBERT 91-1524 PAINT ON TITANIUM

NORMAL SPECTRAL EMITTANCE OF PRATT AND LAMBERT 91-1524 PAINT ON TITANIUM--REFERENCE INFORMATION

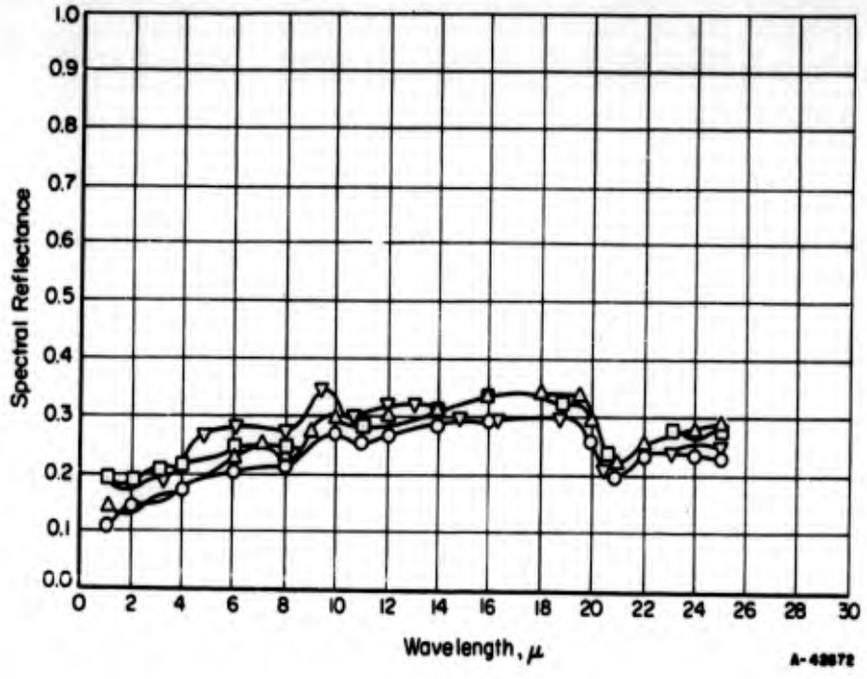
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Pratt and Lambert 91-1524, a butyl titanate paint with aluminum pigment. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL TOTAL EMITTANCE OF RINSHED-MASON H12144 ENAMEL ON TYPE 321 STAINLESS STEEL

NORMAL TOTAL EMITTANCE OF RINSHED-MASON H12144 ENAMEL ON TYPE 321 STAINLESS STEEL--REFERENCE INFORMATION

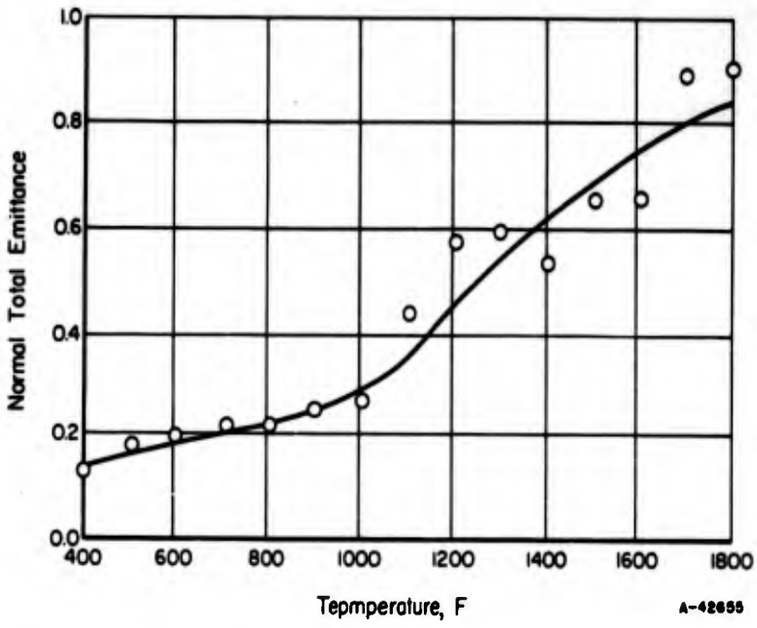
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
3	Bevans, Cier, and Dunkle		Rinshed-Mason black heat-resistant, air-dry enamel H12144, painted on Type 321 stainless steel (Mat'l. Spec. MIS-S-6721.) No thickness given.	Normal total emittance. Calibrated thermopile detector. Temperatures measured with thermocouples.	Measured in air. Data taken from tables.
		o	No thermal treatment.		
		△	300 hours at 497 F.		
		□	307 hours at 690 F.		
		×	1000 hours at 705 F.		



SPECTRAL REFLECTANCE OF RINSHED-MASON H12144 ENAMEL ON TYPE 321 STAINLESS STEEL

SPECTRAL REFLECTANCE OF RINSHED-MASON H12144 ENAMEL ON TYPE 321 STAINLESS STEEL--REFERENCE INFORMATION

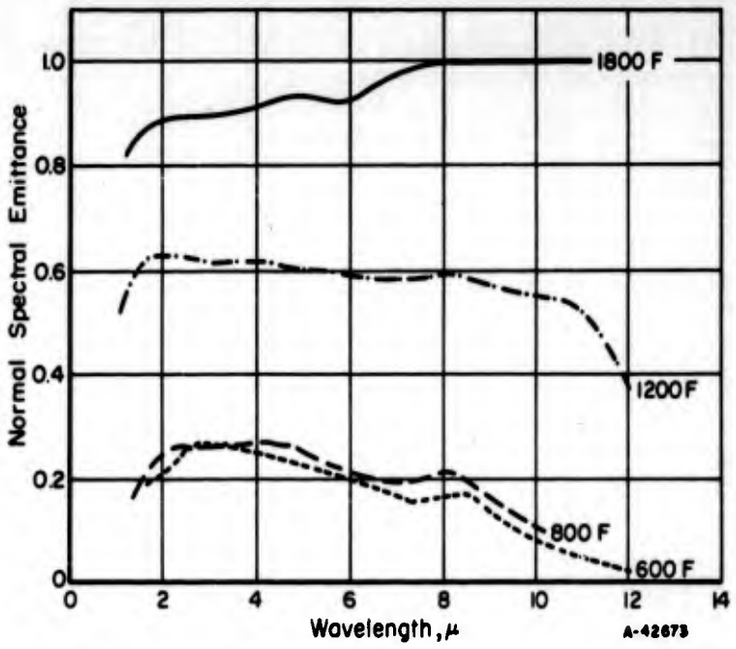
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
3	Bevans, Gier, and Dunkle		Rinshed-Mason black heat-resistant, air-dry Enamel H12144, painted on Type 321 stainless steel (Mat'l. Spec. MIS-S-6721.) No thickness given.	Spectral reflectance at 5 degrees with normal. Gier-Dunkle reflectometer-monochromator. Temperatures measured with thermocouples. (Diffuse illumination-normal viewing.)	Measured in air at room temperature. Data taken from tables.
		○	No thermal treatment.		
		△	300 hours at 497 F.		
		□	307 hours at 690 F.		
		×	1000 hours at 705 F.		



NORMAL SPECTRAL EMITTANCE OF RINSHED-MASON J-15934 PAINT ON A-286 STEEL

NORMAL TOTAL EMITTANCE OF RINSHED-MASON J-15934 PAINT ON A-286 STEEL--REFERENCE INFORMATION

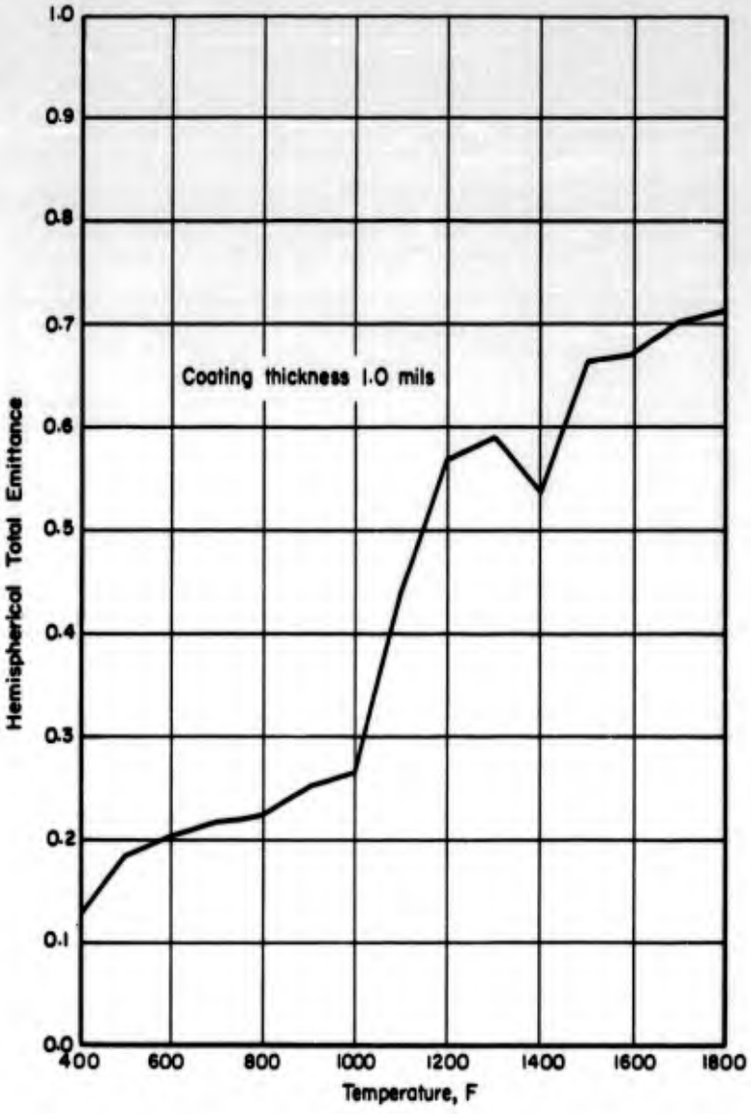
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Rinshed-Mason J-15934, silicone paint with aluminum pigment. Coating thickness not given.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL TOTAL EMITTANCE OF RINSHED-MASON J-15934 PAINT ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF RINSHED-MASON J-15934 PAINT ON A-286 STEEL--REFERENCE INFORMATION

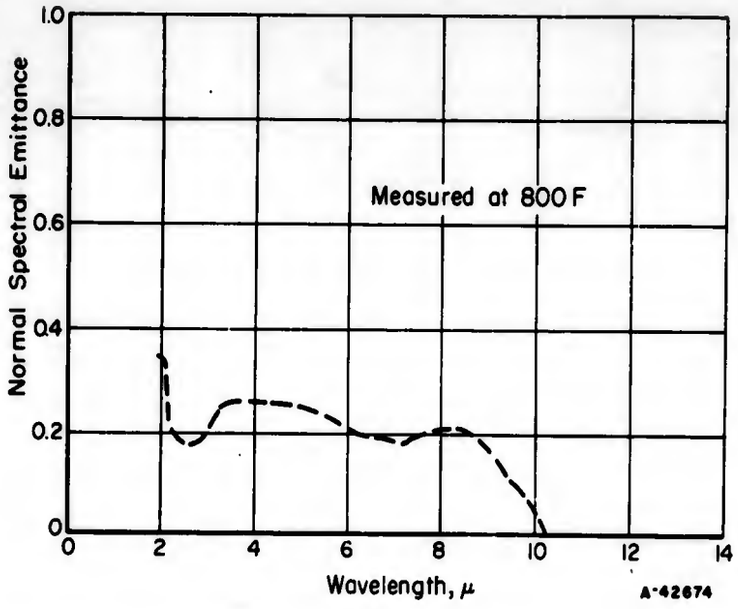
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Rinshed-Mason Paint J-15934, silicone vehicle, aluminum pigment. Coating thickness not given. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF RINSHED-MASON J-15934 PAINT ON TITANIUM

HEMISPHERICAL TOTAL EMITTANCE OF RINSHED-MASON J-15934 PAINT ON TITANIUM--REFERENCE INFORMATION

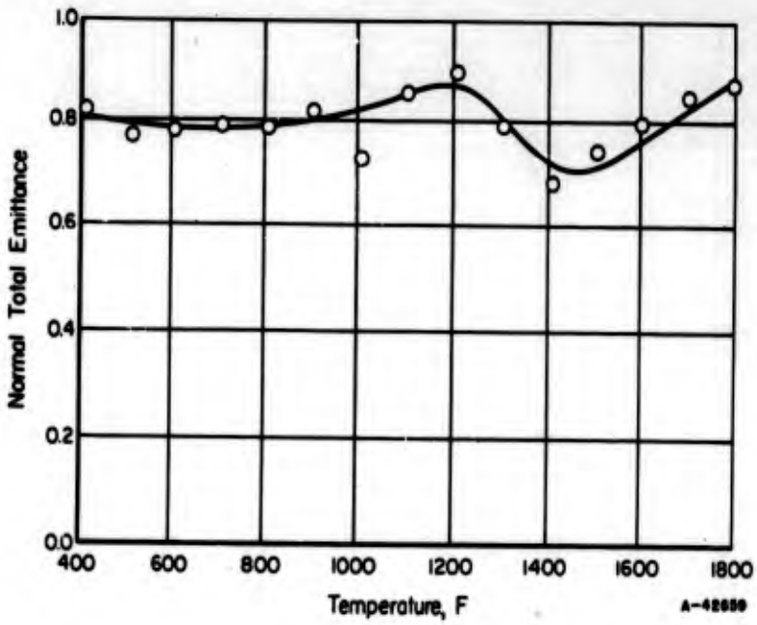
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
4	Dull, R. L.		Rinshed-Mason Coating J-15934 on titanium. Coating thickness 1.0 mil. (A silicone paint with aluminum pigment.) Note: Extensive peeling began at about 1300 F. Nearly all peeled off at 1800 F.	Hemispherical total emittance. Resistance-heated strip specimens coated with test material. Measured power input to test section. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF RINSHED-MASON J-15934 PAINT ON TITANIUM

NORMAL SPECTRAL EMITTANCE OF RINSHED-MASON J-15934 PAINT ON TITANIUM--REFERENCE INFORMATION

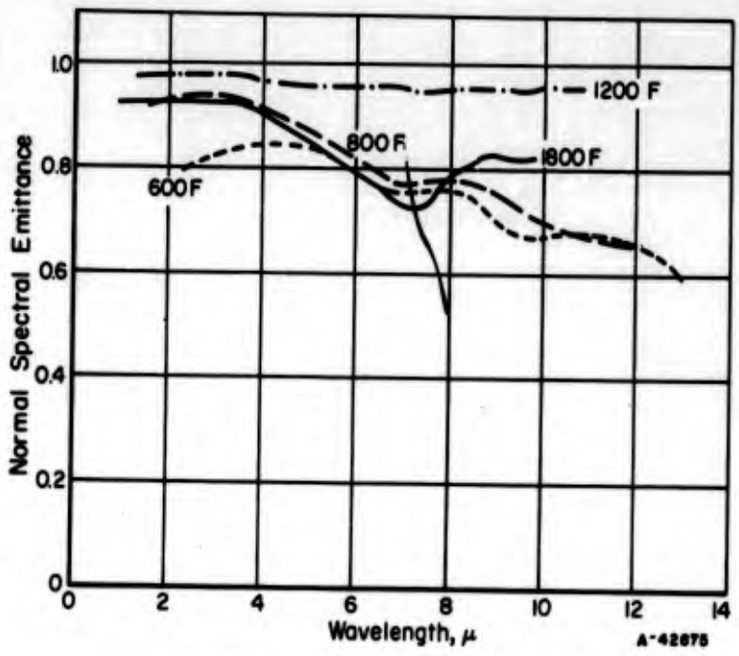
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Rinshed-Mason Paint J-15934, a silicone paint with aluminum pigment. Coating thickness not given. Measured at 800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL TOTAL EMITTANCE OF RINSHED-MASON Q36K802 PAINT ON A-286 STEEL

NORMAL TOTAL EMITTANCE OF RINSHED-MASON Q36K802 PAINT ON A-286 STEEL--REFERENCE INFORMATION

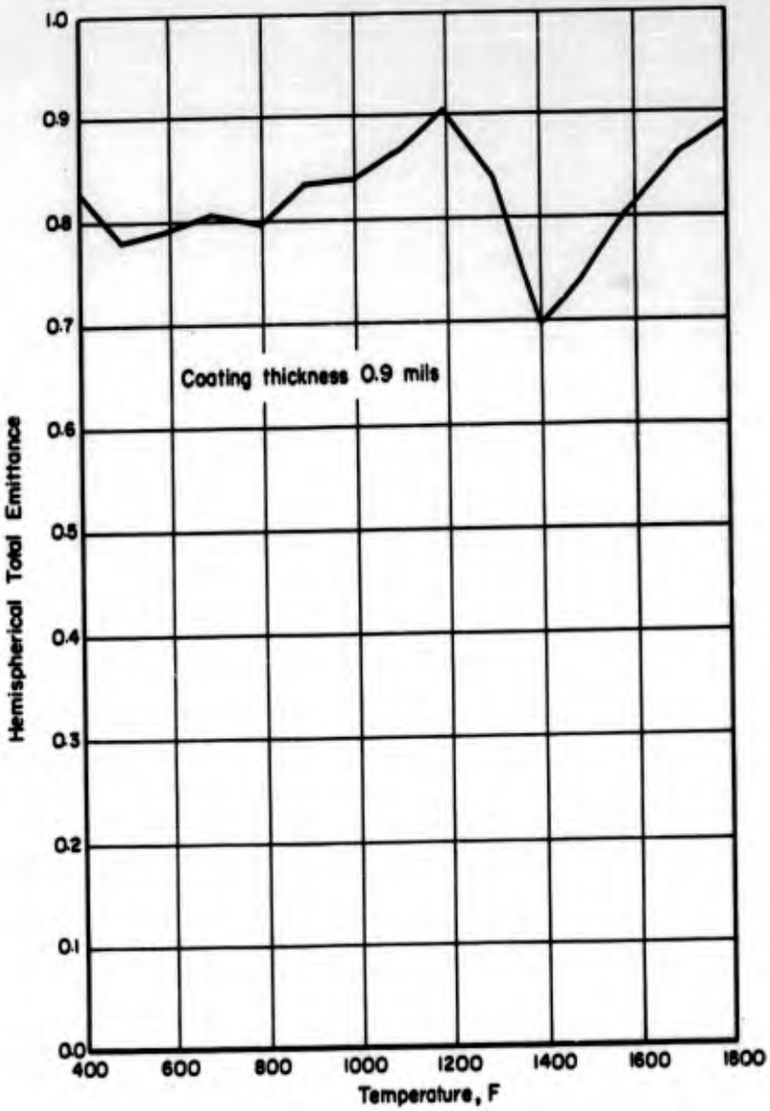
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Rinshed-Mason Q36K802, silicone paint with carbon black pigment. Coating thickness not given.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF RINSHED-MASON Q36K802 PAINT ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF RINSHED-MASON Q36K802 PAINT ON A-286 STEEL--REFERENCE INFORMATION

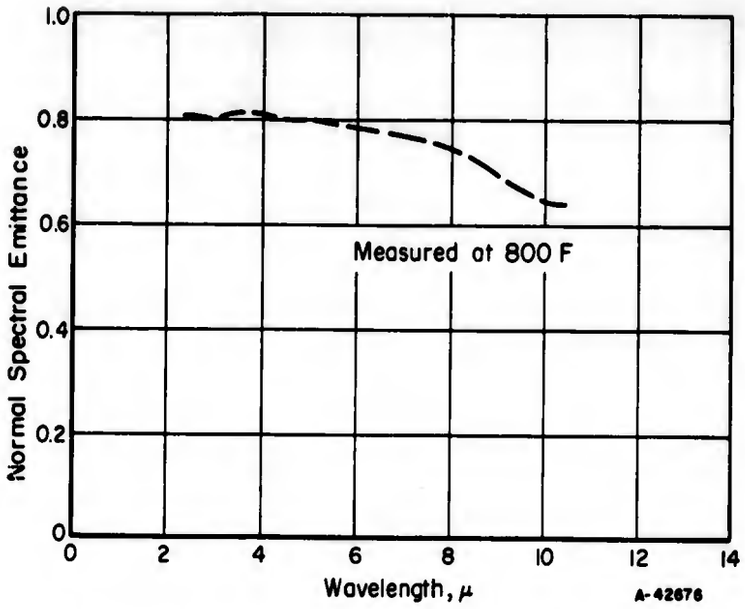
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Rinshed-Mason Q36K802 black paint is a silicone paint with carbon black pigment. Coating thickness not given. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF RINSHED-MASON Q-36K802 PAINT ON TITANIUM

HEMISPHERICAL TOTAL EMITTANCE OF RINSHED-MASON Q-36K802 PAINT ON TITANIUM--REFERENCE INFORMATION

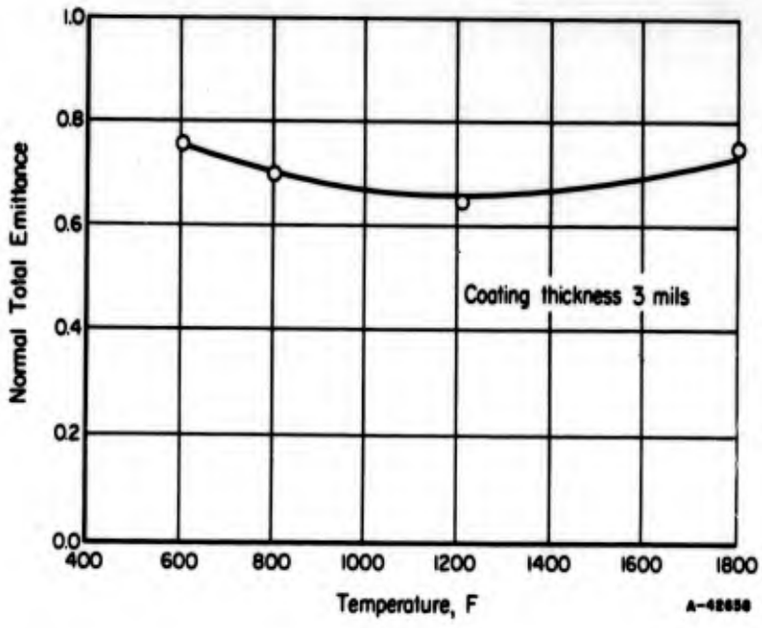
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
4	Dull, R. L.		Rinshed-Mason Q-36K802 coating on titanium. Coating thickness 0.9 mil. (A silicone paint with carbon black pigment.) Note: Discoloration began at 400 F. Blistering began at about 1600 F.	Hemispherical total emittance. Resistance-heated strip. Specimen coated with test material. Measured power input to test section. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF RINSHED-MASON Q36K802 PAINT ON TITANIUM

NORMAL SPECTRAL EMITTANCE OF RINSHED-MASON Q36K802 PAINT ON TITANIUM--REFERENCE INFORMATION

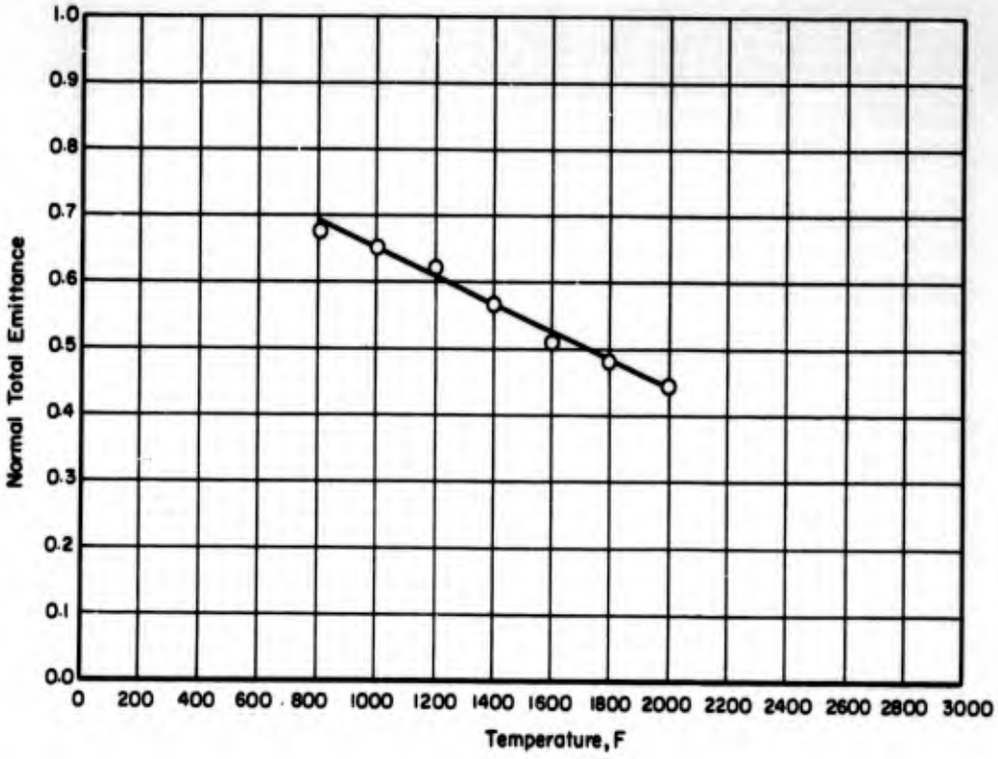
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Rinshed-Mason Q36K802 black paint. A silicone paint with carbon black pigment. Coating thickness not given. Measured at 800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL TOTAL EMITTANCE OF VITA VAR PV100 ON A-286 STEEL

NORMAL TOTAL EMITTANCE OF VITA VAR PV 100 PAINT ON A-286 STEEL--REFERENCE INFORMATION

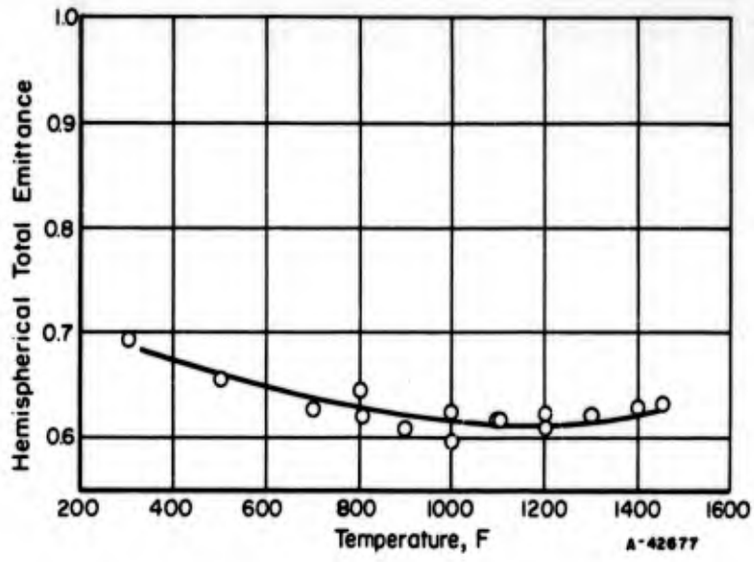
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Vita Var PV 100, silicone paint with titanium dioxide pigment. Coating thickness 3 mils	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL TOTAL EMITTANCE OF ALUMINUM OXIDE ON INCONEL

NORMAL TOTAL EMITTANCE OF ALUMINUM OXIDE ON INCONEL—REFERENCE INFORMATION

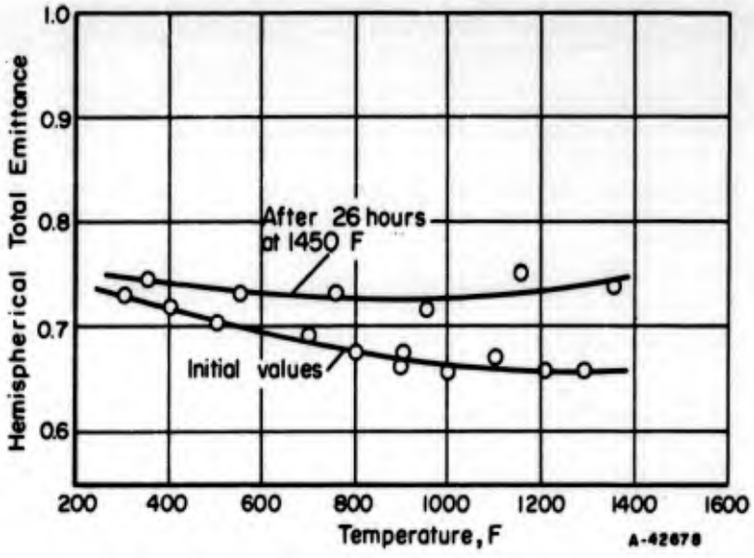
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
10	Wade, W. R.	O	Flame-sprayed alumina on Inconel heater strip. Thickness not given.	Normal total emittance. Thermopile detector. Resistance-heated Inconel strip with test material flame sprayed to "opaque" thickness.	Measured in air. Temperatures given are those of Inconel heater strip. Data taken from curve.



HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM OXIDE ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM OXIDE ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

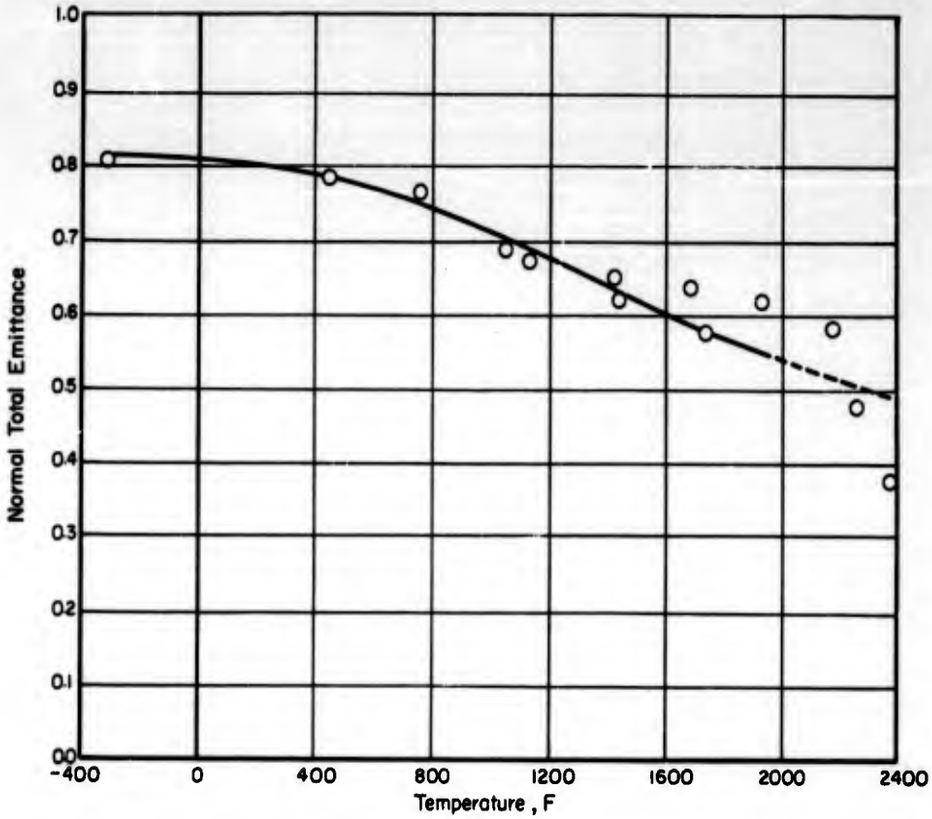
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Pratt & Whitney Aircraft		Plasmadyne powder. Coated on both sides. Flame sprayed on Type 310 stainless strip.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM OXIDE ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM OXIDE ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

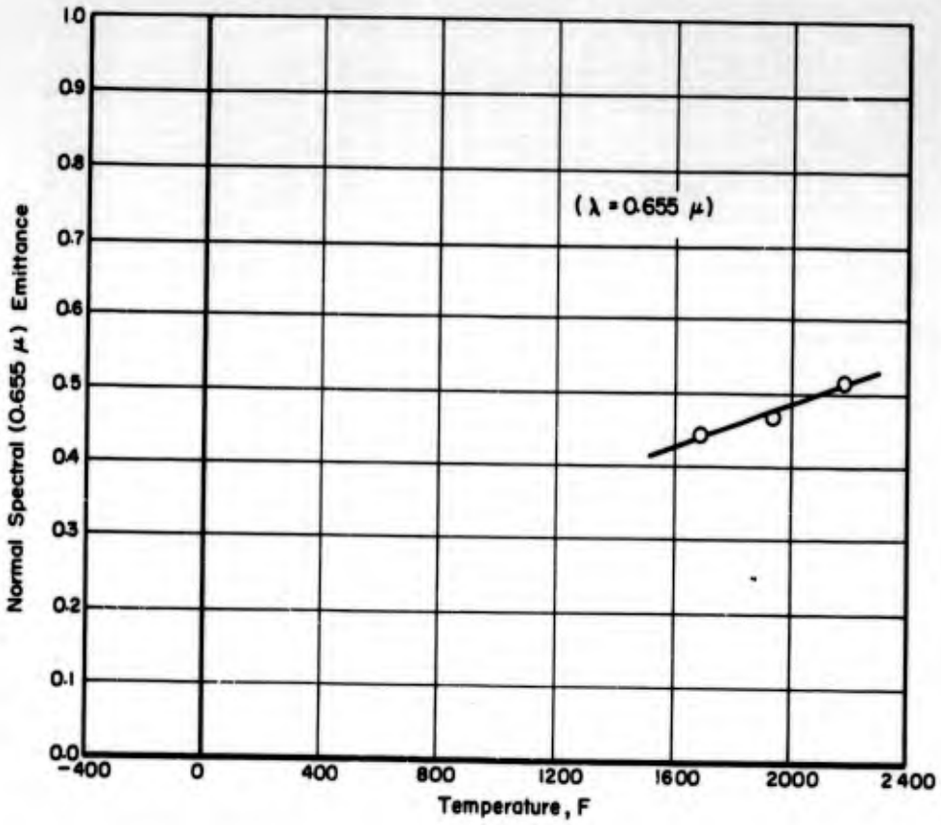
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
17	Pratt & Whitney Aircraft		Metco 101 powder. Coated on both sides. Flame sprayed. Initial runs After 26 hours at 1450 F	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.



NORMAL TOTAL EMITTANCE OF ALUMINUM OXIDE (ROKIDE) ON TYPE 446 STAINLESS STEEL

NORMAL TOTAL EMITTANCE OF ALUMINUM OXIDE (ROKIDE) ON TYPE 446 STAINLESS STEEL--REFERENCE INFORMATION

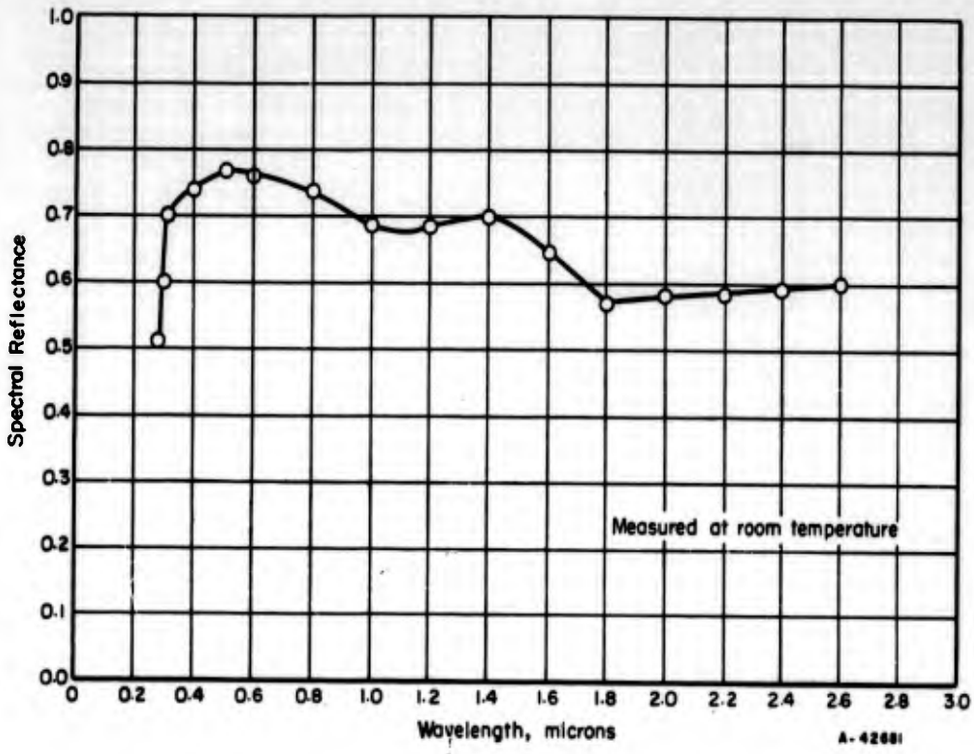
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
11	Olson and Morris	O	As received. Showed purple discoloration after test. Thickness or surface condition not given.	Normal total emittance. Comparison blackbody. Furnace heated specimens. Temperatures measured with thermocouples. Thermistor-bolometer detector.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE (ROKIDE) ON TYPE 446 STAINLESS STEEL

NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE (ROKIDE) ON TYPE 446 STAINLESS STEEL--REFERENCE INFORMATION

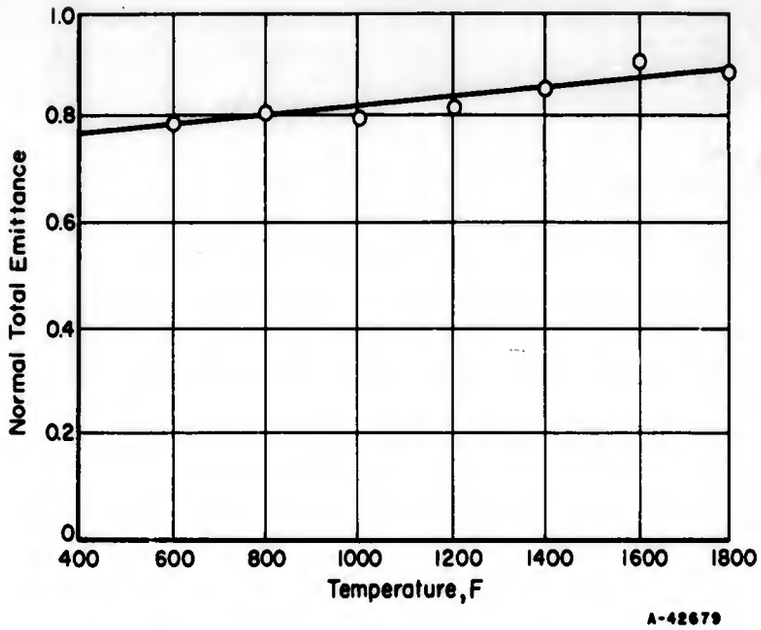
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
11	Olson and Morris	O	Aluminum Oxide (Rokide) on Type 446 stainless steel. Thickness or surface condition not given.	Normal spectral emittance. Furnace-heated specimen. Commercial sensing unit. Appropriate lenses and filters. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



SPECTRAL REFLECTANCE OF ALUMINUM OXIDE (ROKIDE) ON TYPE 446 STAINLESS STEEL

SPECTRAL REFLECTANCE OF ALUMINUM OXIDE (ROKIDE) ON TYPE 446 STAINLESS STEEL--REFERENCE INFORMATION

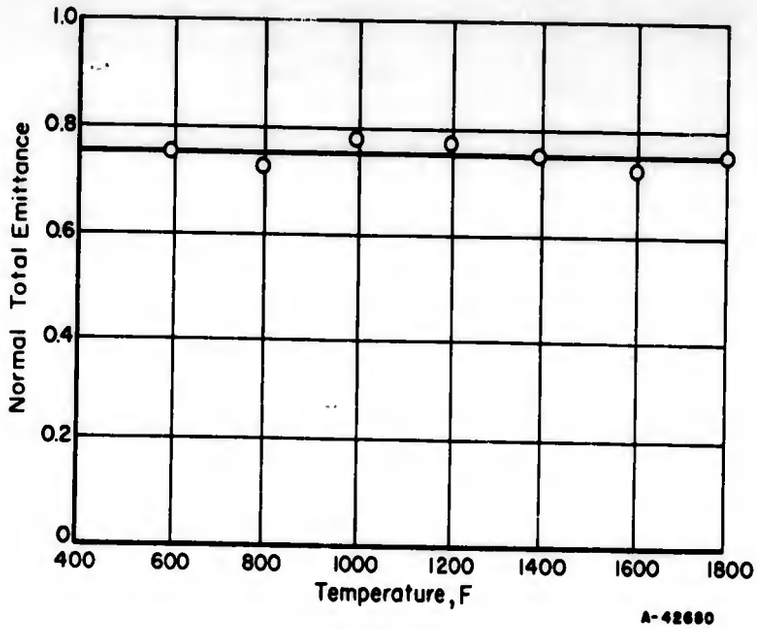
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
11	Olson and Morris	O	Aluminum oxide (Norton Co., Rokide A) on Type 446 stainless steel. Thickness of surface condition not given.	Spectral reflectance at 9 degrees from normal (incident radiation). Recording spectrophotometer, integrating sphere reflectometer, and lead sulphide detector. (Normal illumination--hemispherical viewing)	Measured in air at room temperature. Data taken from curves.



NORMAL TOTAL EMITTANCE OF CERAMCO B-682P ON A-286 STEEL

NORMAL TOTAL EMITTANCE OF CERAMCO B-682P ON A-286 STEEL--REFERENCE INFORMATION

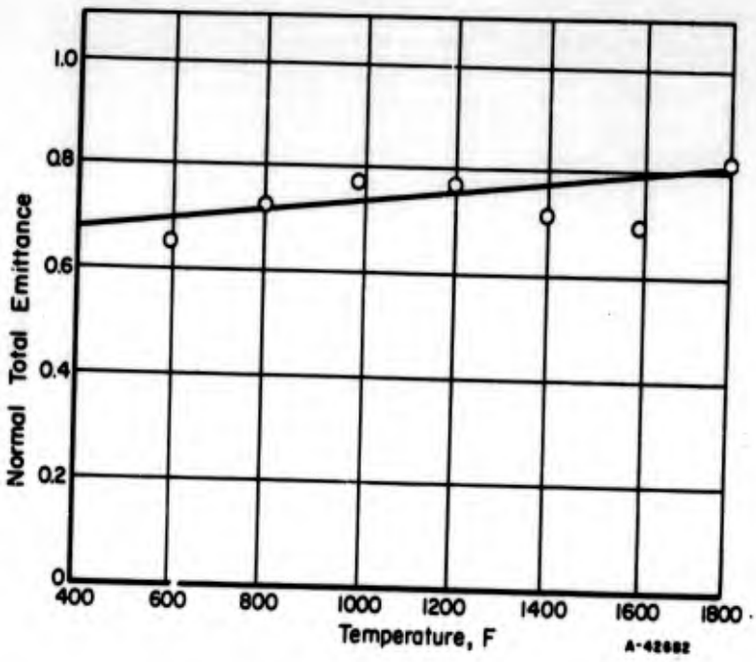
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Ceramco B-682P, a proprietary black oxide.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured at atmospheric pressure. Data taken from curves.



NORMAL TOTAL EMITTANCE OF CERAMCO G-683P ON A-286 STEEL

NORMAL TOTAL EMITTANCE OF CERAMCO G-683P ON A-286 STEEL--REFERENCE INFORMATION

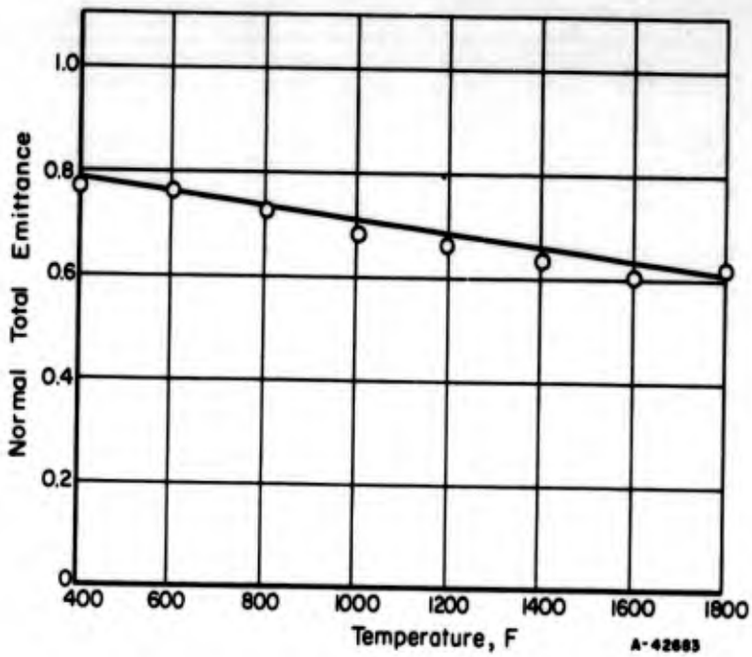
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Ceramco G-683P, a proprietary green oxide. Composition or thickness not given.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured at atmospheric pressure. Data taken from curves.



NORMAL TOTAL EMITTANCE OF CERAMCO G-684tc ON INCONEL X

NORMAL TOTAL EMITTANCE OF CERAMCO G-684tc ON INCONEL X--REFERENCE INFORMATION

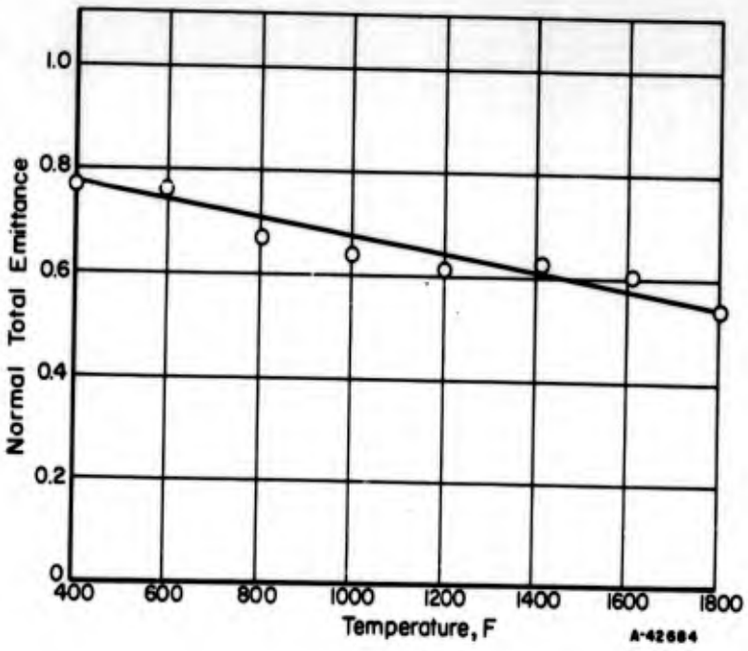
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Ceramco G-684tc, a proprietary green oxide. Composition on thickness not given.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured at atmospheric pressure. Data taken from curves.



NORMAL TOTAL EMITTANCE OF CERAMCO W-683P ON A-286 STEEL

NORMAL TOTAL EMITTANCE OF CERAMCO W-683P ON A-286 STEEL--REFERENCE INFORMATION

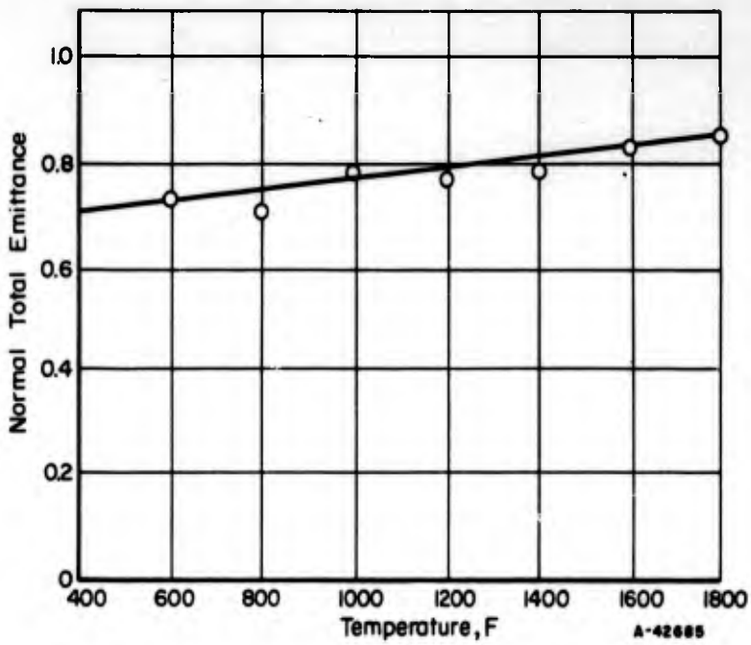
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Ceramco W-683P, a proprietary white oxide.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured at atmospheric pressure. Data taken from curves.



NORMAL TOTAL EMITTANCE OF CERAMCO W-683tc ON INCONEL X

NORMAL TOTAL EMITTANCE OF CERAMCO W-683tc ON INCONEL X--REFERENCE INFORMATION

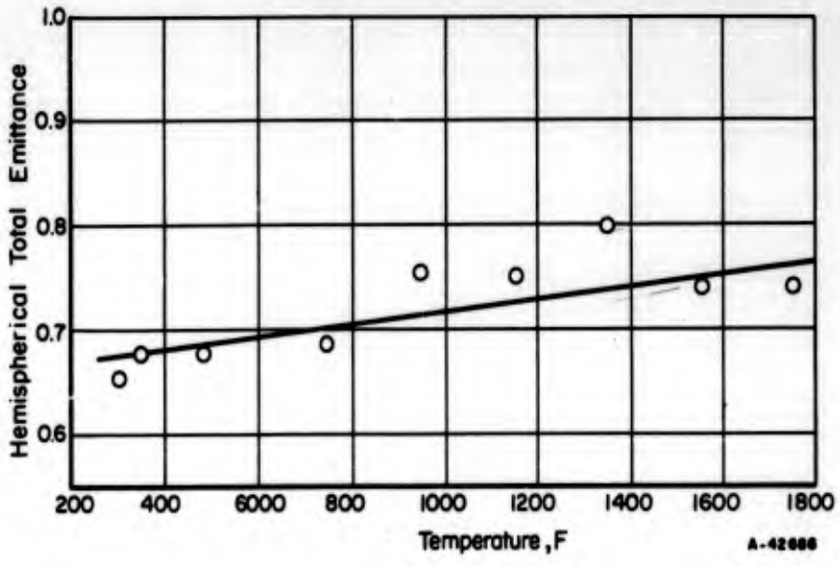
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Ceramco W-683tc, a proprietary white oxide. Composition or thickness not given.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured at atmospheric pressure. Data taken from curves.



NORMAL TOTAL EMITTANCE OF CERAMCO WB-6832 ON A-286 STEEL

NORMAL TOTAL EMITTANCE OF CERAMCO WB-6832 ON A-286 STEEL--REFERENCE INFORMATION

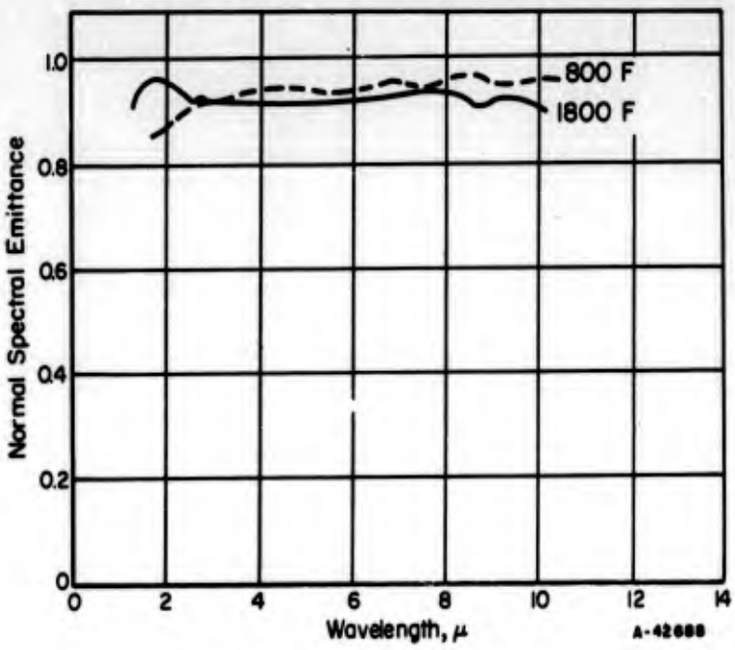
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Ceramco WB-6832, a proprietary brown oxide.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured at atmospheric pressure. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF CERIC OXIDE ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF CERIC OXIDE ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

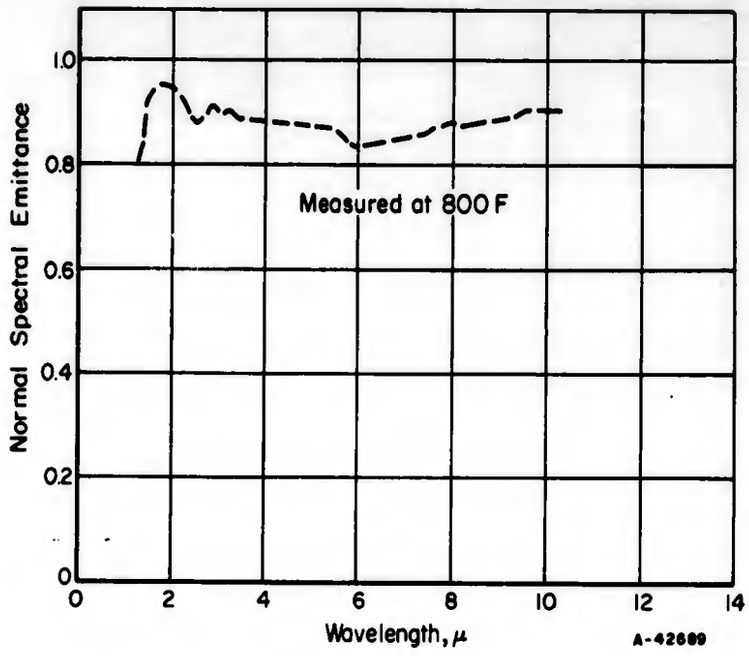
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
16	Pratt & Whitney Aircraft		Metco plasma flame spray powder XP-111.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF NORTON LN 9684 ON INCONEL X

NORMAL SPECTRAL EMITTANCE OF NORTON LN9684 ON INCONEL X--REFERENCE INFORMATION

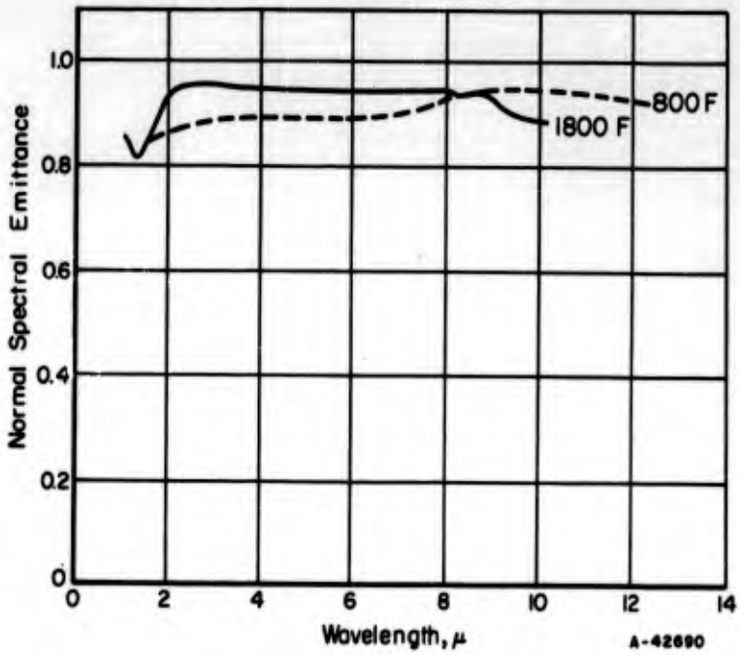
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton LN9684, a very dark nickel oxide. Melting point about 3500 F. Porosity about 2 per cent. Flame sprayed on cleaned, grit-blasted surface coated with 12-mil-thick Nichrome V undercoat. Coating thickness not given. Measured at: 800 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF NORTON LN 9684 ON 6Al-4V TITANIUM

NORMAL SPECTRAL EMITTANCE OF NORTON LN9684 CERAMIC COATING ON 6Al-4V TITANIUM--REFERENCE INFORMATION

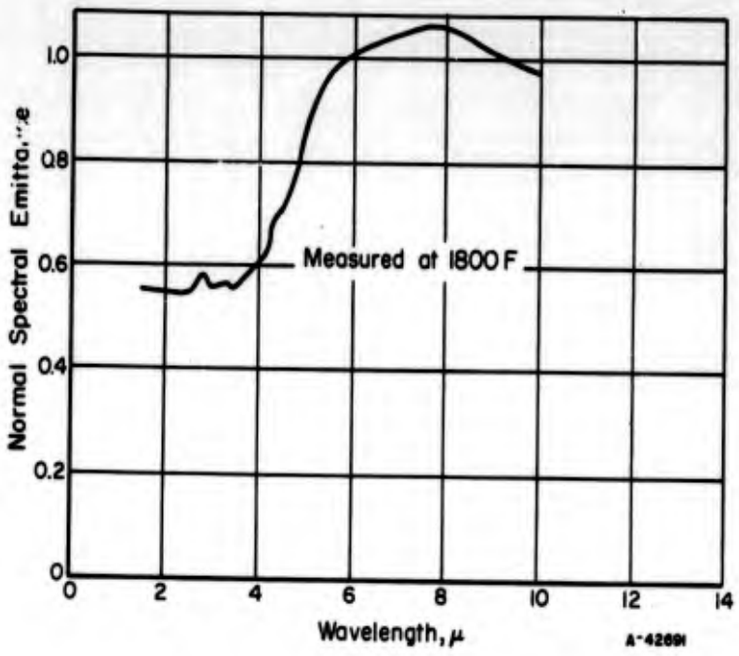
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton LN9684, a very dark nickel oxide. Melting point about 3500 F. Porosity about 2 per cent. Flame sprayed on cleaned, grit-blasted surface coated with 12-mil-thick Nichrome V undercoat. Coating thickness not given. Measured at 800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF NORTON LN 9684 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF NORTON LN9684 CERAMIC COATING ON A-286 STEEL--REFERENCE INFORMATION

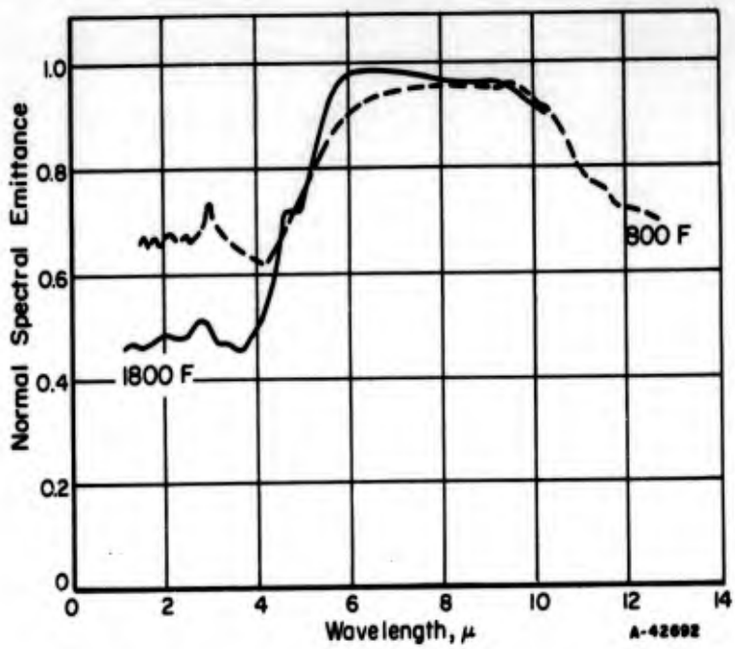
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton LN9684, a very dark nickel oxide. Melting point about 3500 F. Porosity about 2 per cent. Flame sprayed on cleaned, grit-blasted surface coated with 12-mil-thick Nichrome V undercoat. Coating thickness not given. Measured at: 800 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF NORTON LA 9696 ON INCONEL X

NORMAL SPECTRAL EMITTANCE OF NORTON LA-9696 ON INCONEL X--REFERENCE INFORMATION

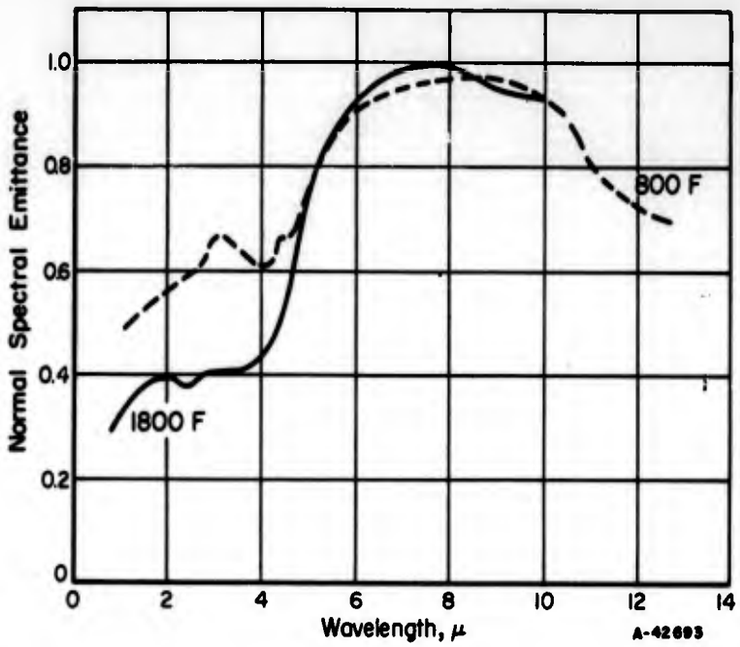
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton ceramic coating LA-9696, a tan alundum, 92 per cent Al_2O_3. Melting point about 3500 F. Porosity about 5 per cent. Flame sprayed on cleaned, grit-blasted surface coated with 12-mil-thick Nichrome V undercoat. Coating thickness not given. Measured at 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF NORTON LA 9683 ON TITANIUM

NORMAL SPECTRAL EMITTANCE OF NORTON LA-9696 ON 6Al-4V TITANIUM--REFERENCE INFORMATION

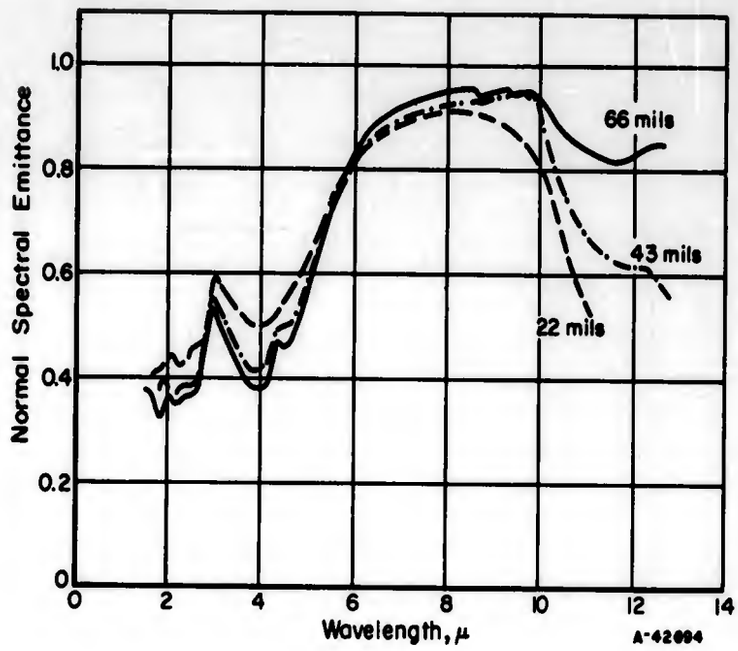
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton ceramic coating LA-9696, a tan alundum, 92 per cent Al_2O_3. Melting point about 3500 F. Porosity about 5 per cent. Flame sprayed on cleaned, grit-blasted surface coated with 12-mil-thick Nichrome V undercoat. Coating thickness not given. Measured at: 800 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF NORTON LA 9696 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF NORTON LA-9696 ON A-286 STEEL—REFERENCE INFORMATION

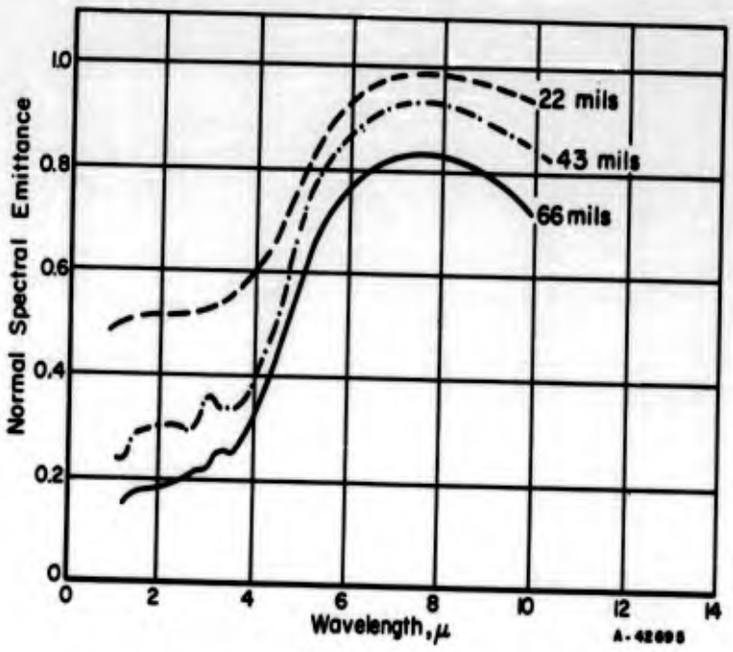
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton ceramic coating LA-9696, a tan alundum, 92 per cent Al_2O_3. Melting point about 3500 F. Porosity about 5 per cent. Flame sprayed on cleaned, grit-blasted surface coated with 12-mil-thick Nichrome V undercoat. Coating thickness not given. Measured at: 800 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ROKIDE A ON INCONEL X AT 800 F

NORMAL SPECTRAL EMITTANCE OF ROKIDE A ON INCONEL X AT 800 F--REFERENCE INFORMATION

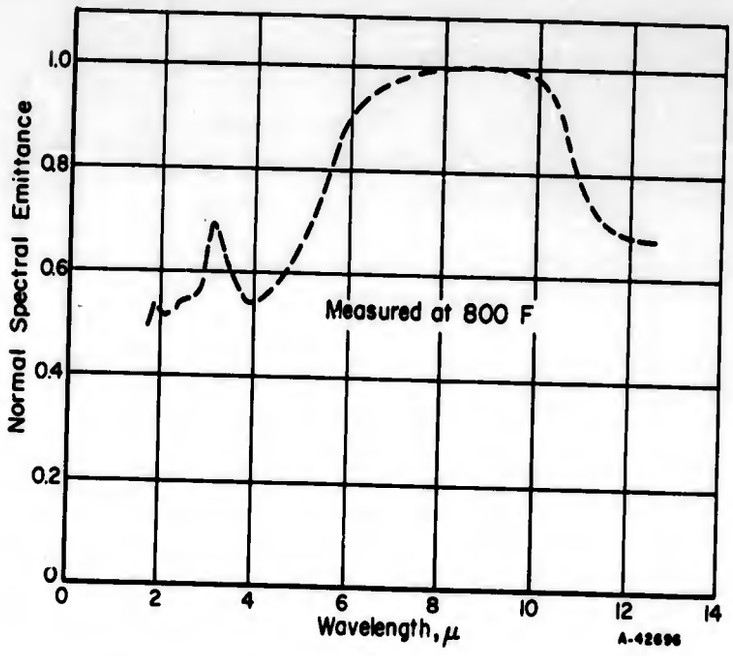
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton Rokide A, white 98.5 per cent alumina. Melting point about 3600 F. Porosity about 4 to 8 per cent. Flame sprayed on degreased, grit-blasted surface coated with 12-mil-thick Nichrome V undercoat. Coating thickness: 66 mils 43 mils 22 mils	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ROKIDE A ON INCONEL X AT 1800 F

NORMAL SPECTRAL EMITTANCE OF ROKIDE A ON INCONEL X AT 1800 F--REFERENCE INFORMATION

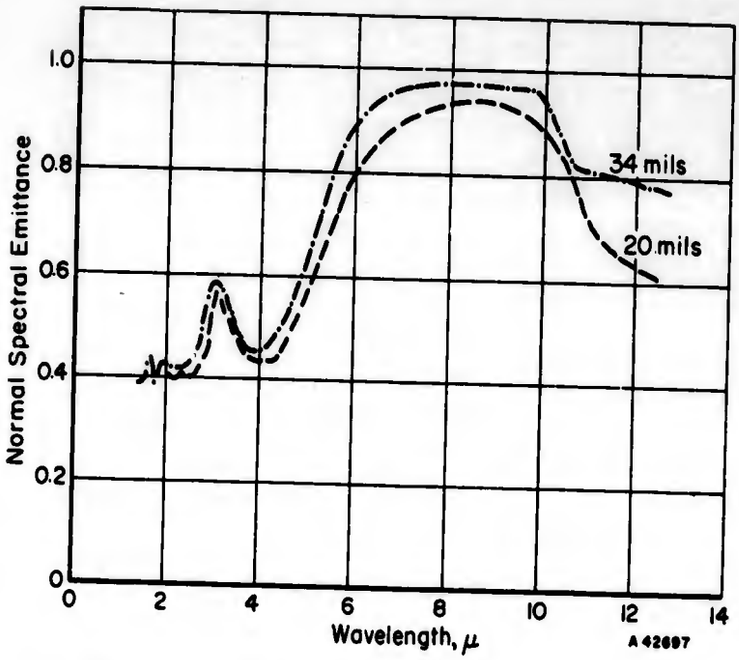
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton Rokide A, white 98.5 per cent alumina. Melting point about 3600 F. Porosity about 4 to 8 per cent. Flame sprayed on degreased, grit-blasted surface coated with 12-mil-thick Nichrome V undercoat. Coating thickness: 66 mils 43 mils 22 mils	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ROKIDE A ON 6Al-4V TITANIUM

NORMAL SPECTRAL EMITTANCE OF ROKIDE A ON 6Al-4V TITANIUM—REFERENCE INFORMATION

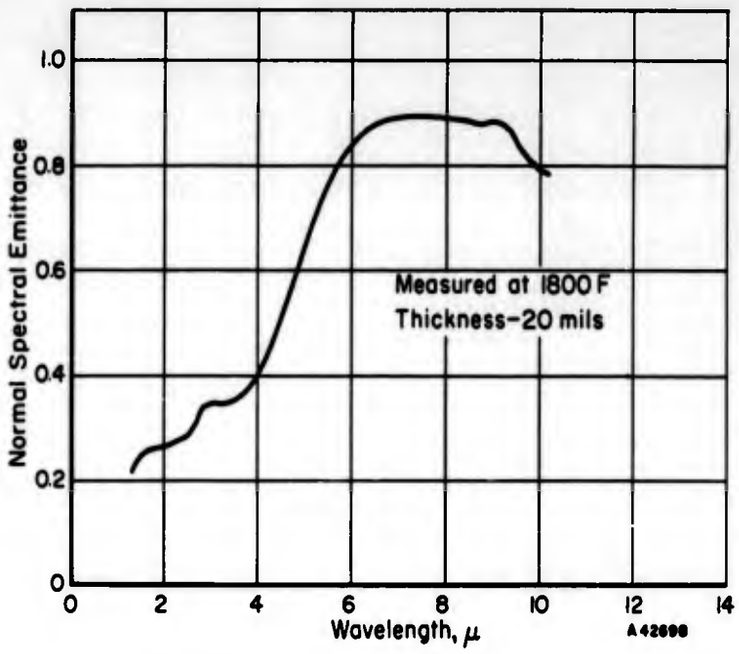
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton Rokide A, white 98.5 per cent alumina. Melting point about 3600 F. Porosity about 4 to 8 per cent. Flame sprayed on degreased, grit-blasted surface coated with 12-mil-thick Nichrome V undercoat. Coating thickness not given. Measured at 800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ROKIDE A ON A-286 STEEL AT 800 F

NORMAL SPECTRAL EMITTANCE OF ROKIDE A ON A-286 STEEL AT 800 F--REFERENCE INFORMATION

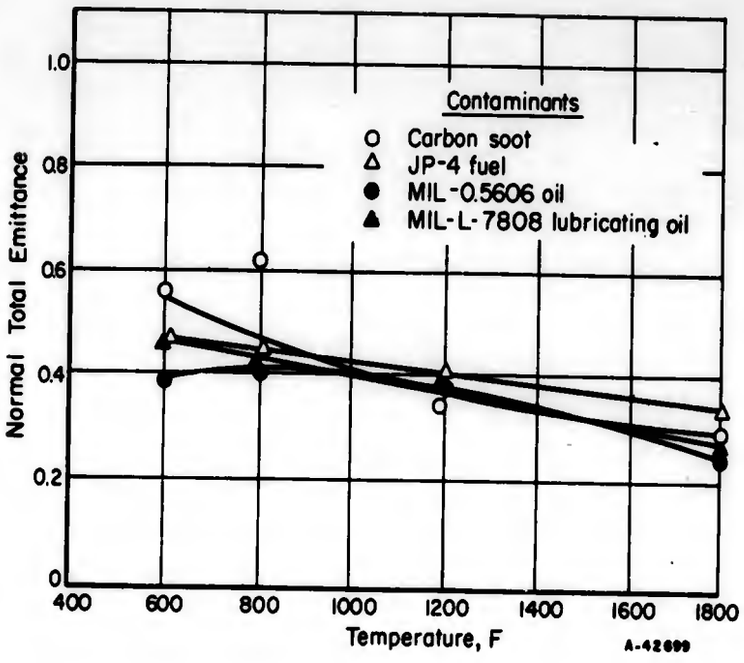
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton Rokide A, white 98.5 per cent alumina. Melting point about 3600 F. Porosity about 4 to 8 per cent. Flame sprayed on degreased, grit-blasted surface coated with 12-mil-thick Nichrome V undercoat. Coating thickness: 34 mils 20 mils	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ROKIDE A ON A-286 STEEL AT 1800 F

NORMAL SPECTRAL EMITTANCE OF ROKIDE A ON A-286 STEEL AT 1800 F--REFERENCE INFORMATION

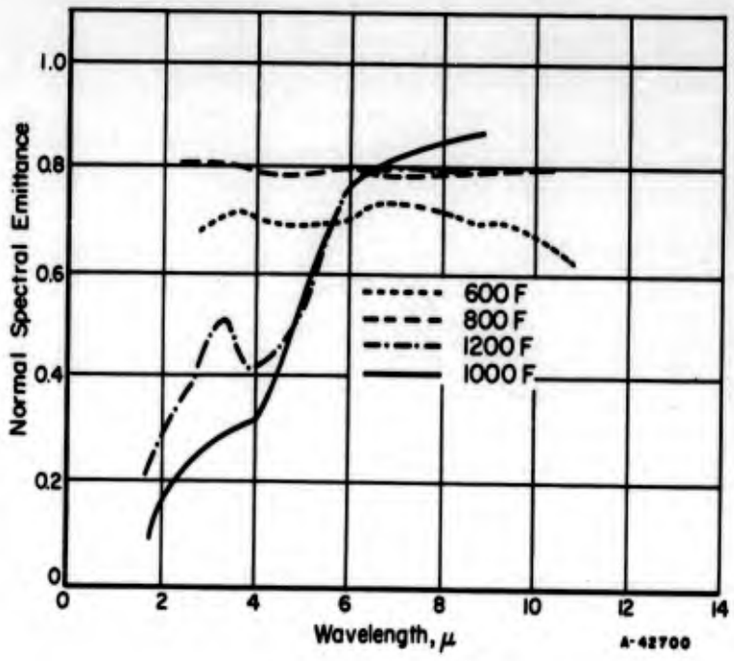
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton Rokide A, white 98.5 per cent alumina. Melting point about 3600 F. Porosity about 4 to 8 per cent. Flame sprayed on degreased, grit-blasted surface coated with 12-mil-thick Nichrome V undercoat. Coating thickness 20 mils.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL TOTAL EMITTANCE OF ROKIDE A (CONTAMINATED) ON A-286 STEEL

NORMAL TOTAL EMITTANCE OF ROKIDE A (CONTAMINATED) ON A-286 STEEL--REFERENCE INFORMATION

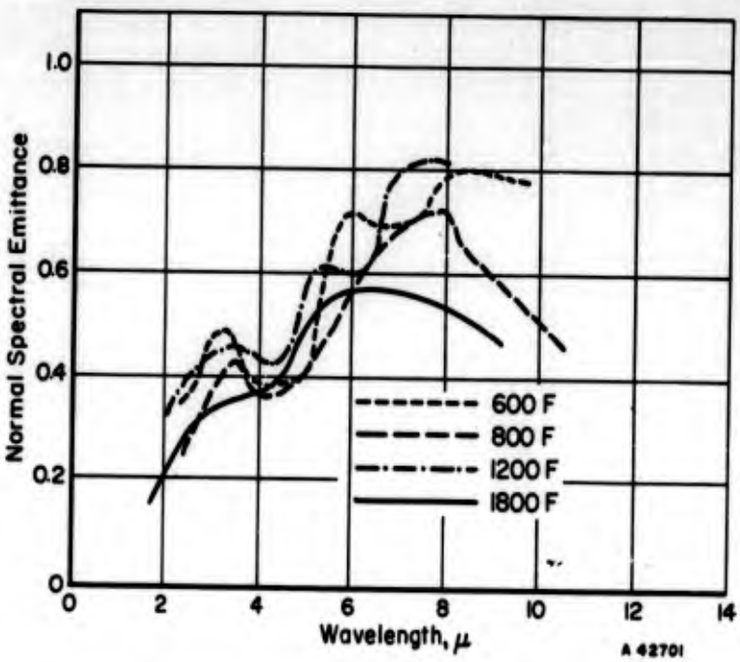
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Rokide A (Norton, 98.5 per cent alumina). Contaminated with carbon soot Contaminated with JP-4 fuel Contaminated with MIL-O-5606 oil Contaminated with MIL-L-7808 lubricating oil.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured at atmospheric pressure. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ROKIDE A (CONTAMINATED) ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF ROKIDE A (CONTAMINATED) ON A-286 STEEL--REFERENCE INFORMATION

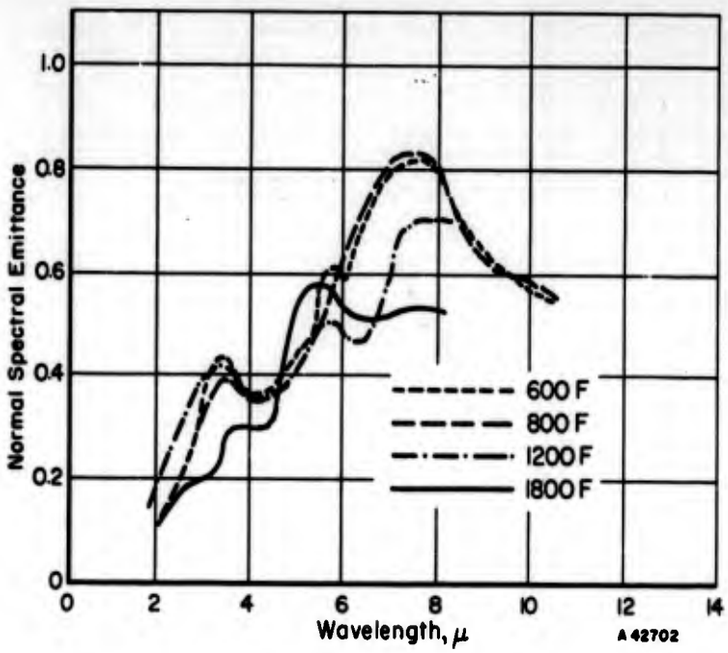
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Rokide A, Norton 98.5 per cent alumina. Flame sprayed onto 12-mil-thick Nichrome V undercoat. Contaminated with carbon deposits. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ROKIDE A (CONTAMINATED) ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF ROKIDE A (CONTAMINATED) ON A-286 STEEL—REFERENCE INFORMATION

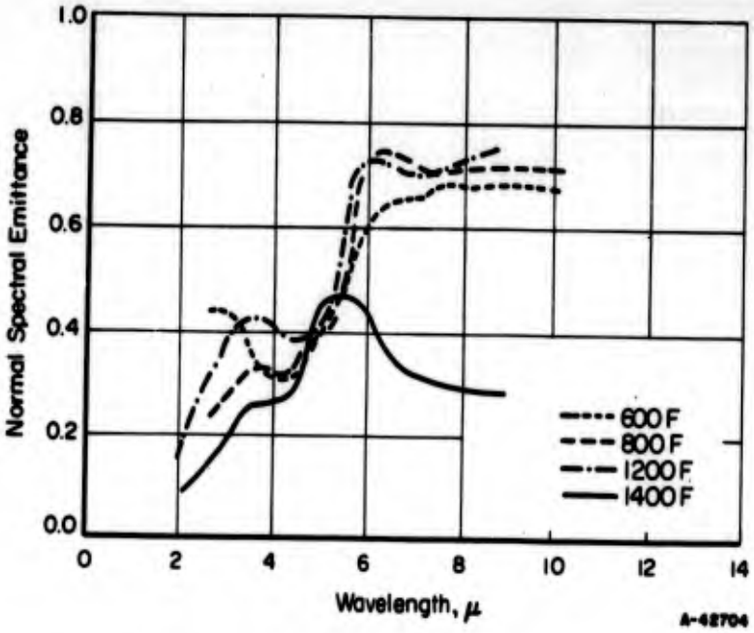
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Rokide A, Norton 98.5 per cent alumina. Flame sprayed onto 12-mil-thick Nichrome V undercoat. Contaminated with JP-4 fuel. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ROKIDE A (CONTAMINATED) ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF ROKIDE A (CONTAMINATED) ON TYPE A-286 STEEL--REFERENCE INFORMATION

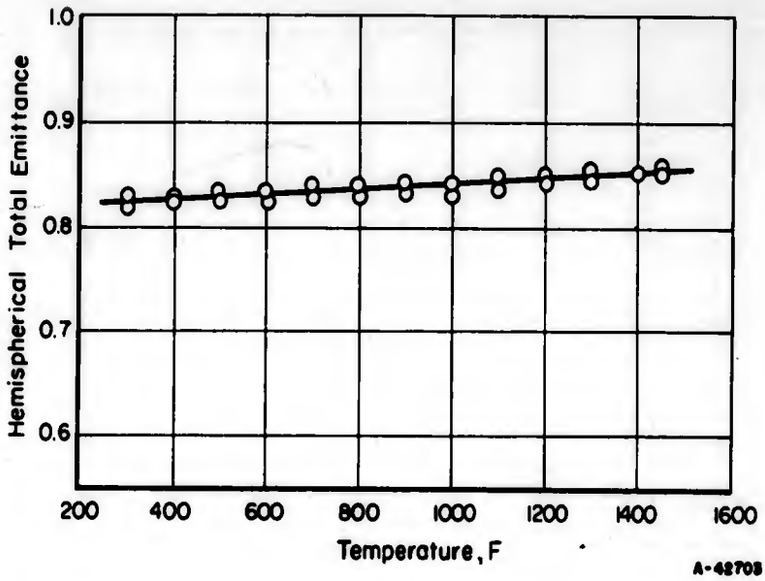
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Rokide A, Norton 98.5 per cent alumina. Flame sprayed onto 12-mil-thick Nichrome V undercoat. Contaminated with MIL-L-7808. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ROKIDE A (CONTAMINATED) ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF ROKIDE A (CONTAMINATED) ON TYPE A-286 STEEL—REFERENCE INFORMATION

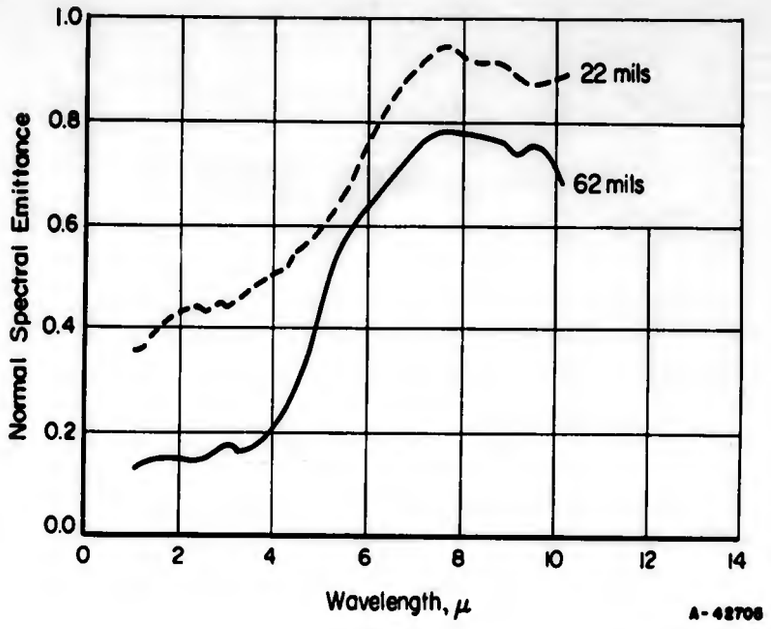
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Rokide A, Norton 98.5 per cent alumina. Flame sprayed onto 12-mil-thick Nichrome V undercoat. Contaminated with MIL-O-5606. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF ROKIDE C ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF ROKIDE C ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

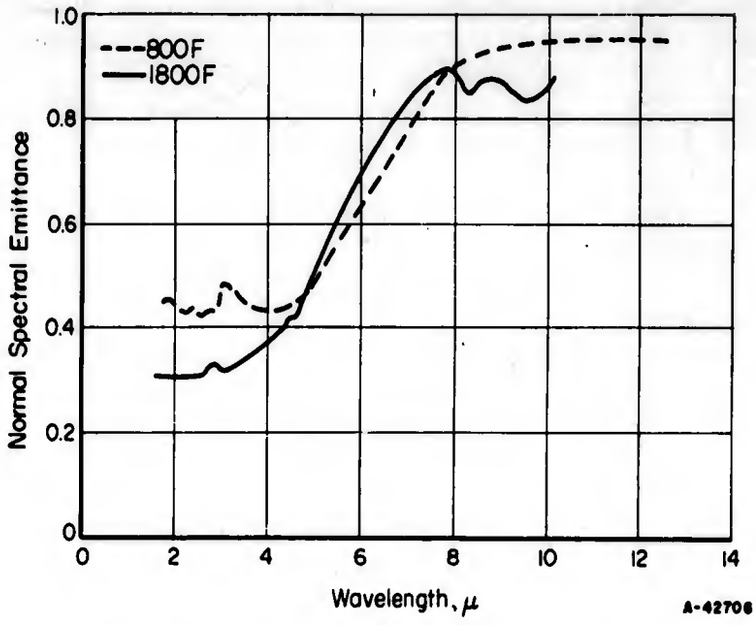
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
16	Pratt & Whitney Aircraft		Rokide C applied to Type 310 stainless steel.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ROKIDE Z ON INCONEL X

NORMAL SPECTRAL EMITTANCE OF ROKIDE Z ON INCONEL X--REFERENCE INFORMATION

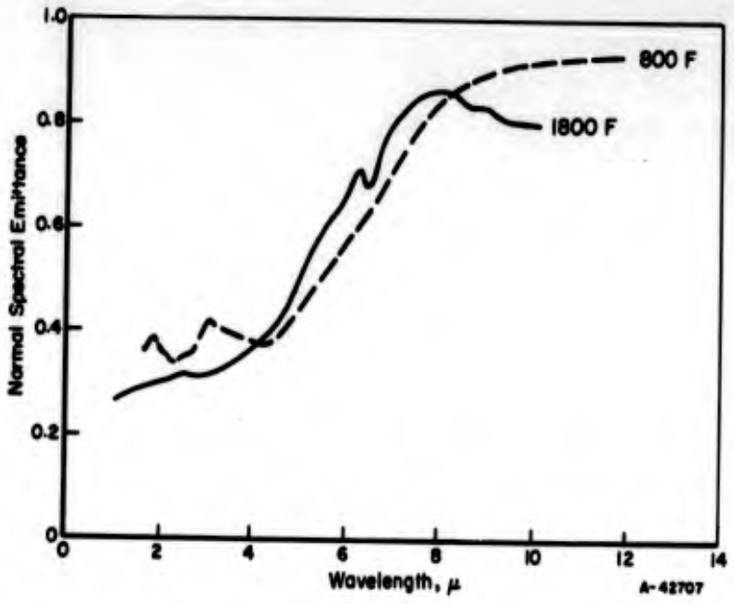
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton Rokide Z, stabilized ZrO_2. Melting point about 4500 F. Porosity-about 8 per cent total pores. Coating thickness: 62 mils 22 mils	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ROKIDE Z ON 6Al-4V TITANIUM

NORMAL SPECTRAL EMITTANCE OF ROKIDE Z ON 6Al-4V TITANIUM--REFERENCE INFORMATION

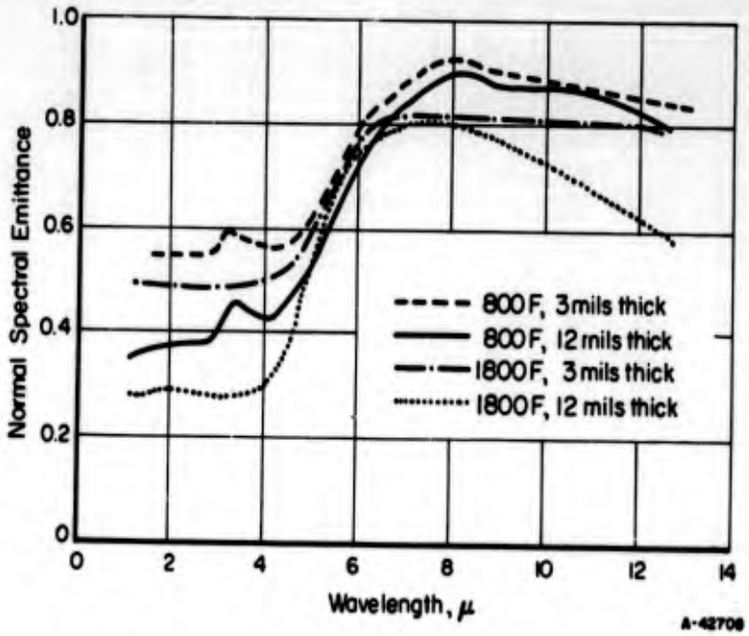
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton Rokide Z, stabilized ZrO_2. Melting point about 4500 F. Porosity about 8 per cent total pores. Measured at: 800 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ROKIDE Z ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF ROKIDE Z ON A-286 STEEL—REFERENCE INFORMATION

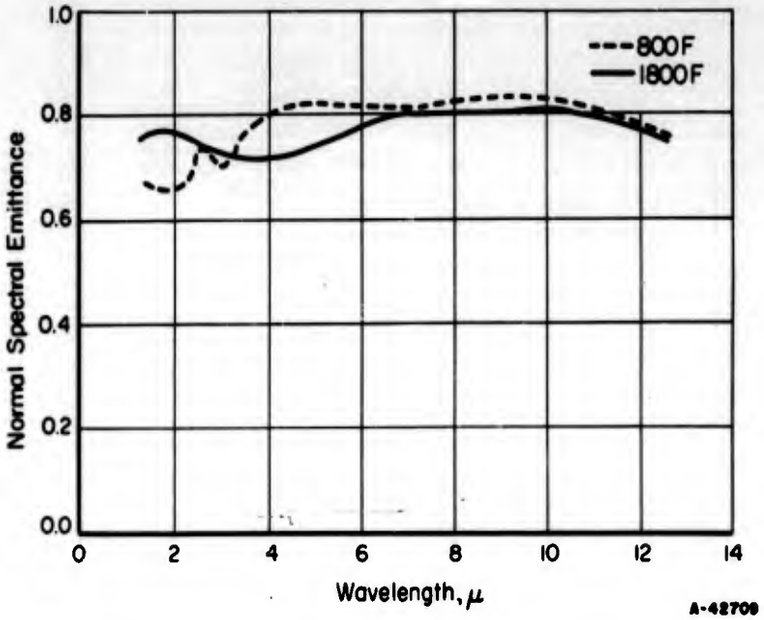
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Norton Rokide Z, stabilized ZrO_2. Melting point about 4500 F. Porosity about 8 per cent total pores. Measured at: 800 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCM-10 ON INCONEL X

NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCM-10 ON INCONEL X--REFERENCE INFORMATION

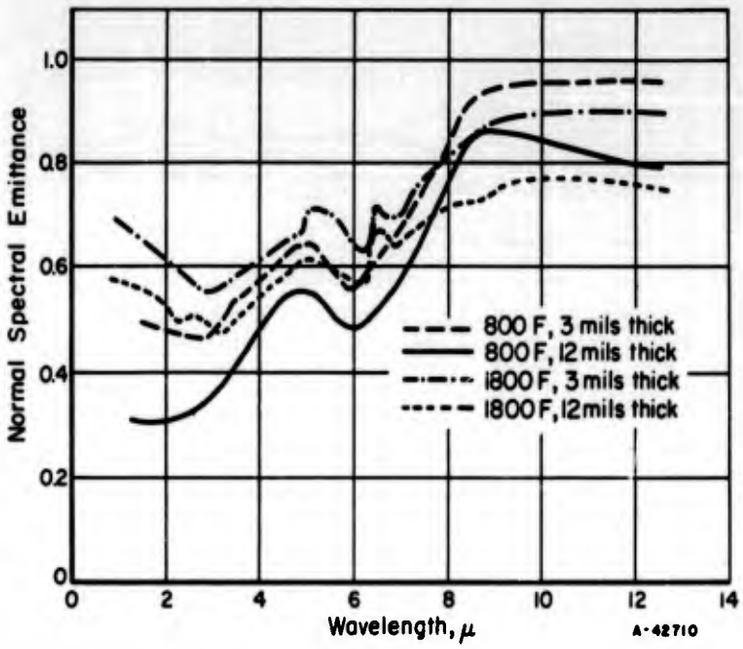
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FCM-10, a dark gray mullite. Flame sprayed on degreased, sand blasted, preheated Inconel X. Surface roughness approximately 180 to 200 microinches. Measured at: 800 F, 3 mils thick 800 F, 12 mils thick 1800 F, 3 mils thick 1800 F, 12 mils thick	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-10 ON INCONEL X

NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-10 ON INCONEL X—REFERENCE INFORMATION

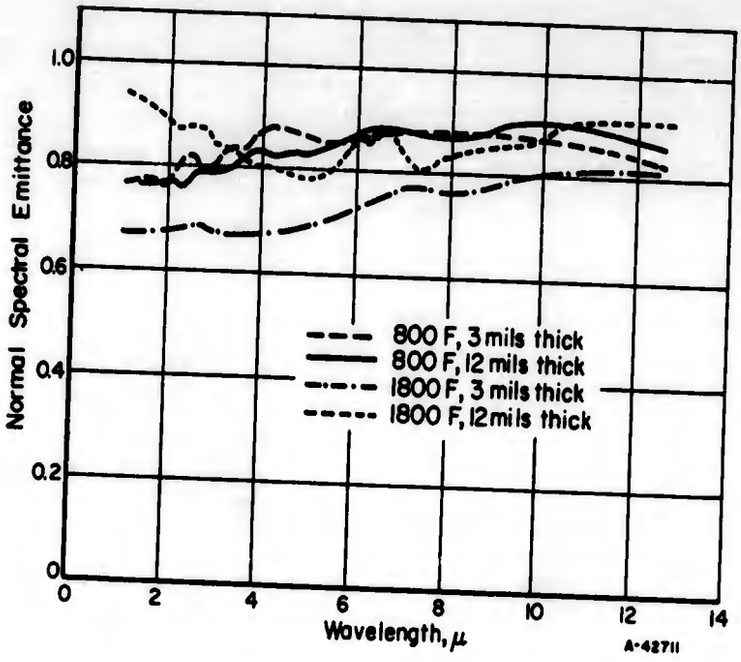
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FCT-10, a light gray titanium dioxide. Flame sprayed on degreased, sand blasted, preheated Inconel X. Surface roughness approximately 180 to 200 micro-inches. Coating thickness not given. Measured at: 800 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCR-11 ON INCONEL X

NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCR-11 ON INCONEL X--REFERENCE INFORMATION

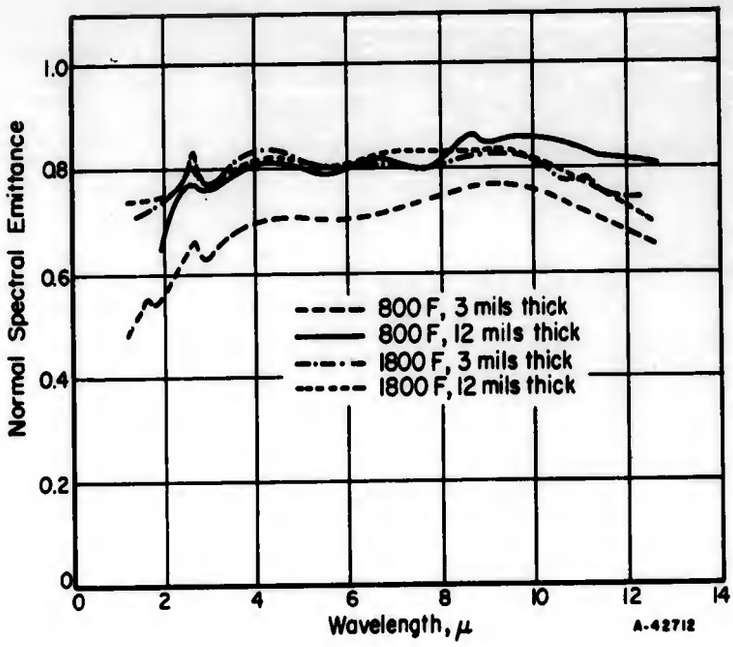
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FCR-11, a dark gray rare-earth oxide mixture, (50 per cent cerium). Flame sprayed on degreased, sand blasted, preheated Inconel X. Surface roughness approximately 180 to 200 micro-inches. Measured at: 800 F, 3 mils thick 800 F, 12 mils thick 1800 F, 3 mils thick 1800 F, 12 mils thick	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-11 ON INCONEL X

SPECTRAL EMITTANCE OF SYLVESTER FCT-11 CERAMIC COATING ON INCONEL X--REFERENCE INFORMATION

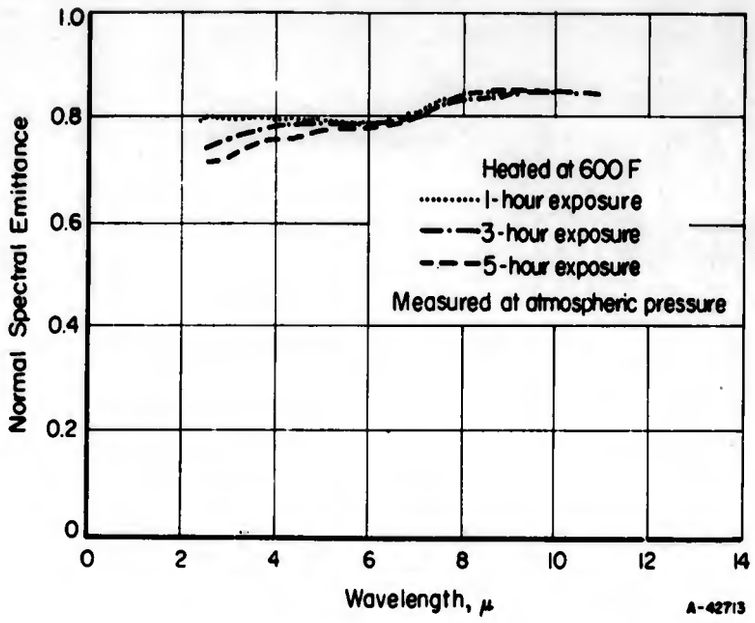
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FCT-11, a dark gray sillimanite. Flame sprayed on degreased, sand blasted, preheated Inconel X. Surface roughness approximately 180 to 200 microinches. Measured at: 800 F, 3 mils thick 800 F, 12 mils thick 1800 F, 3 mils thick 1800 F, 12 mils thick	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL—REFERENCE INFORMATION

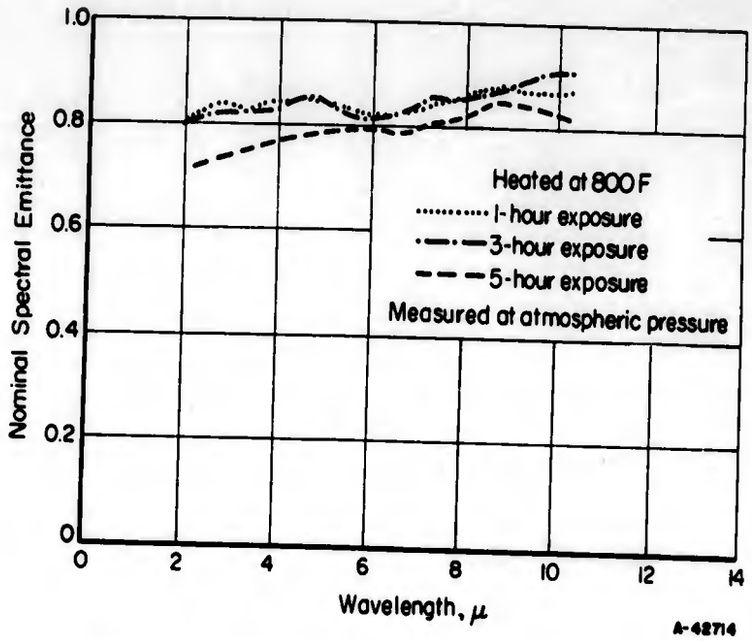
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FCT-12, a black sillimanite. Flame sprayed on degreased, sand blasted, preheated material. Surface roughness approximately 180 to 200 microinches. Measured at: 800 F, 3 mils thick 800 F, 12 mils thick 1800 F, 3 mils thick 1800 F, 12 mils thick	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL AT 600 F--REFERENCE INFORMATION

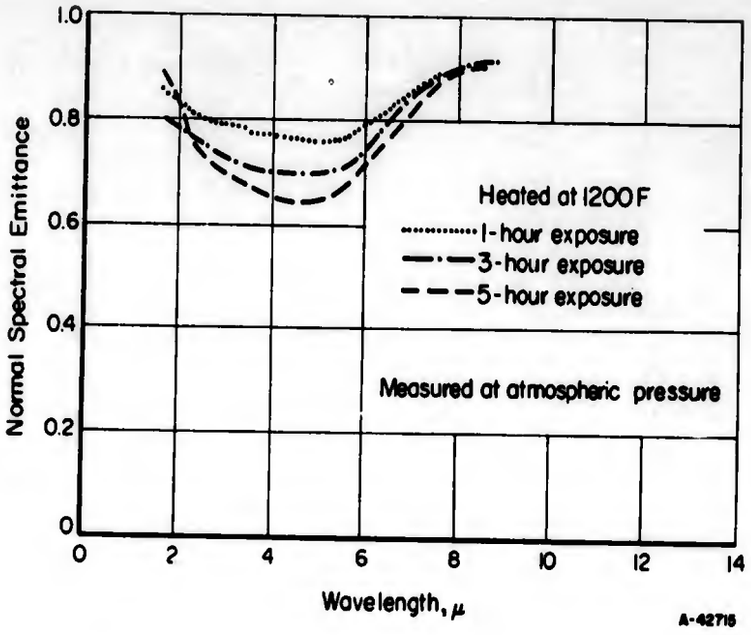
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FCT-12, a black sillimanite. Flame sprayed on degreased, sand blasted, preheated material. Surface roughness approximately 180 to 200 microinches. Heated at 600 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 CERAMIC COATING ON A-286 STEEL AT 800 F--REFERENCE INFORMATION

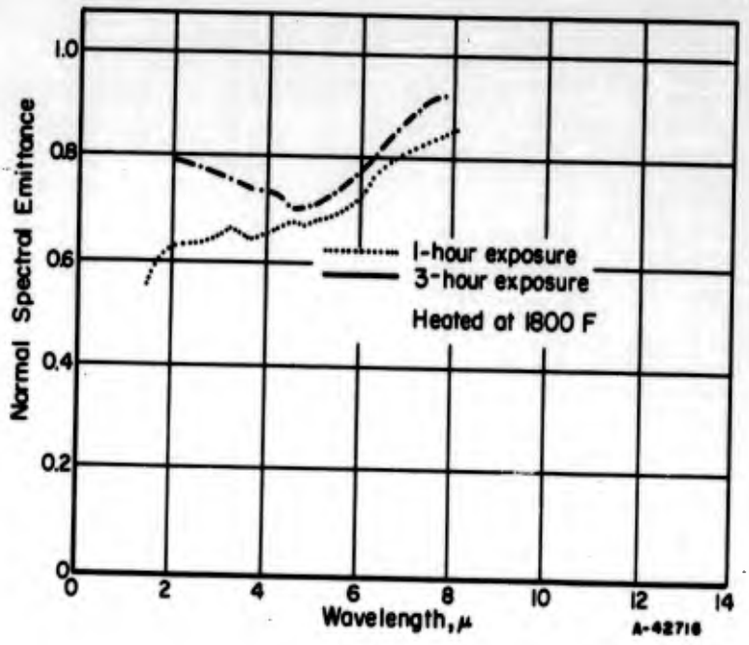
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FCT-12, a black sillimanite. Flame sprayed on degreased, sand blasted, preheated material. Surface roughness approximately 180 to 200 microinches. Heated at 800 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL AT 1200 F--REFERENCE INFORMATION

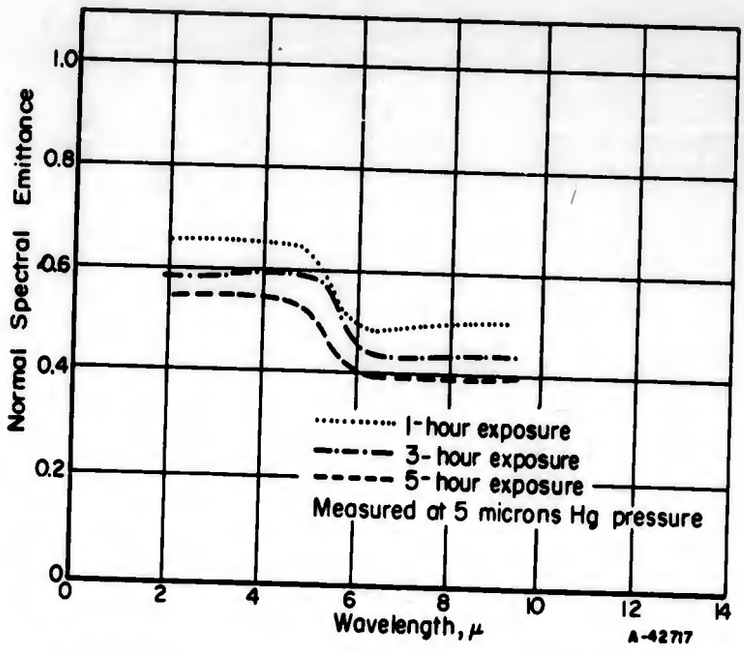
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FCT-12, a black sillimanite. Flame sprayed on degreased, sand blasted, preheated material. Surface roughness approximately 180 to 200 microinches. Heated at 1200 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 CERAMIC COATING ON A-286 STEEL AT 1800 F--REFERENCE INFORMATION

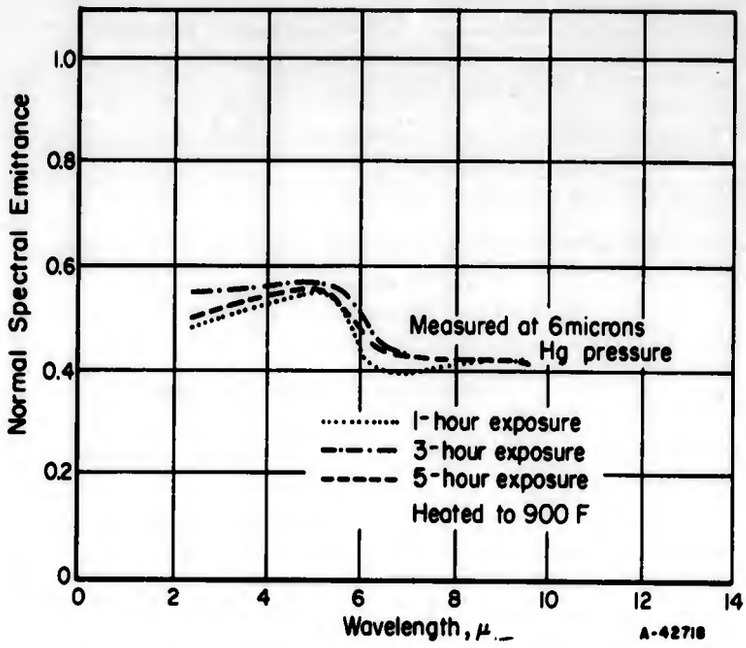
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FCT-12, a black sillimanite. Flame sprayed on degreased, sand blasted, preheated material. Surface roughness approximately 180 to 200 micro-inches. Heated at 1800 F: 1 hour 3 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL AT 600 F--REFERENCE INFORMATION

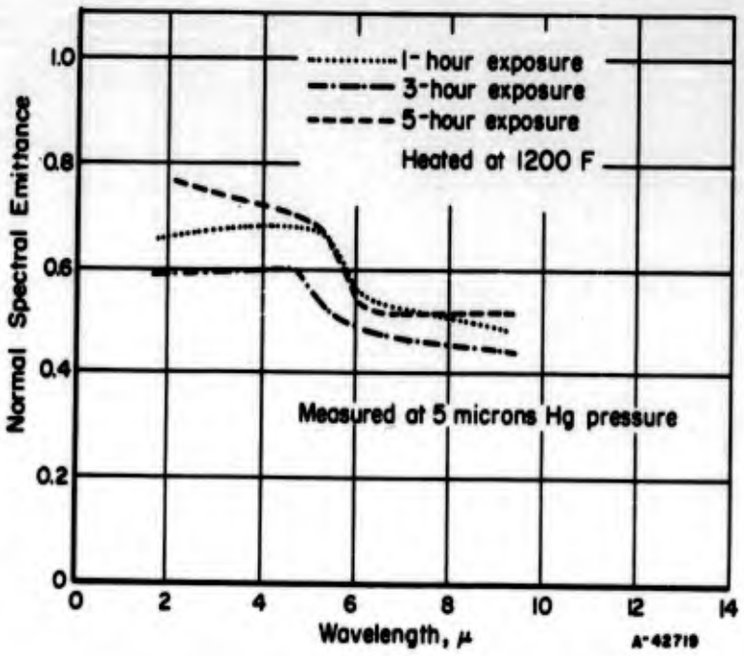
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FCT-12, a black sillimanite. Flame sprayed on degreased, sand blasted, preheated material. Surface roughness approximately 180 to 200 microinches. Heated at 600 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 5 microns Hg pressure. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL AT 800 F--REFERENCE INFORMATION

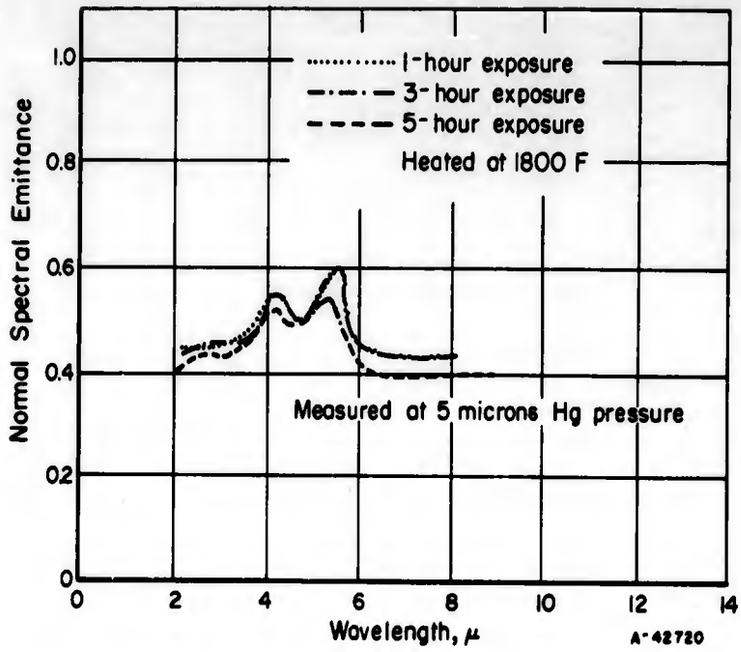
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FC-12, a black sillimanite. Flame sprayed on degreased, sand blasted, preheated material. Surface roughness approximately 180 to 200 micro-inches. Heated at 800 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 6 microns Hg pressure Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL AT 1200 F--REFERENCE INFORMATION

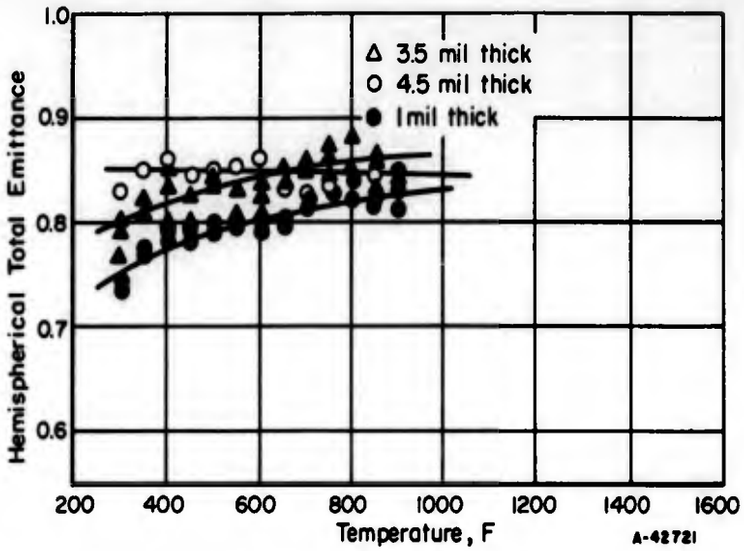
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FCT-12, a black sillimanite. Flame sprayed on degreased, sand blasted, preheated material. Surface roughness approximately 180 to 200 micro-inches. Heated at 1200 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 5 microns Hg pressure. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF SYLVESTER FCT-12 ON A-286 STEEL AT 1800 F--REFERENCE INFORMATION

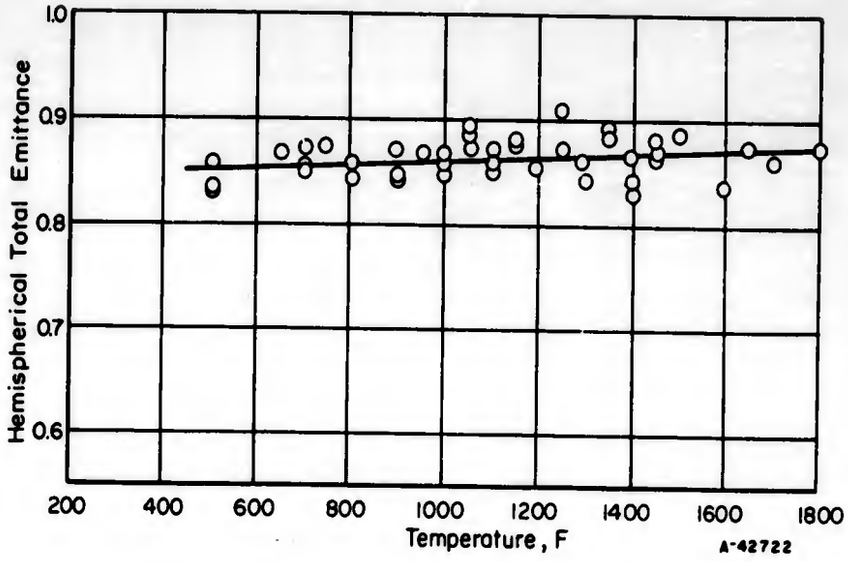
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Sylvester ceramic coating FCT-12, a black sillimanite. Flame sprayed on degreased, sand blasted, preheated material. Surface roughness approximately 180 to 200 micro-inches. Heated at 1800 F: 1 hour 3 hours 5 hours	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 5 microns Hg pressure. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF TITANIUM OXIDE ON ALUMINUM

HEMISPHERICAL TOTAL EMITTANCE OF TITANIUM OXIDE ON ALUMINUM--REFERENCE INFORMATION

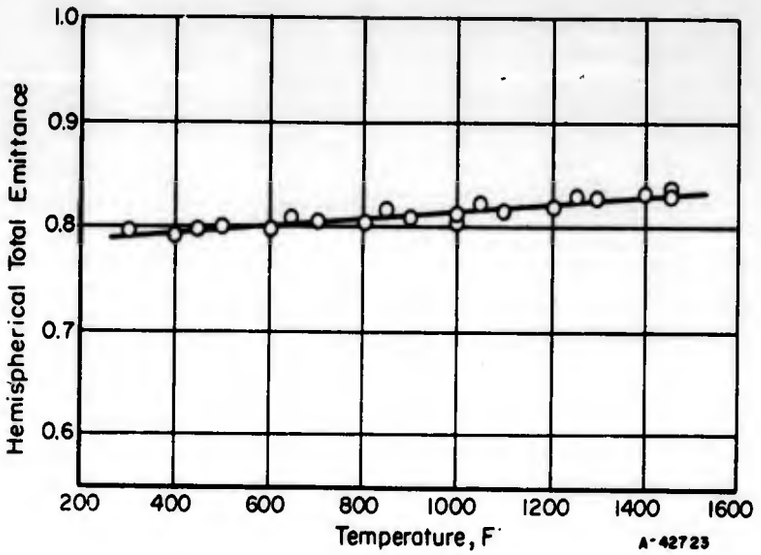
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
16	Pratt & Whitney Aircraft		Metco plasma flame spray powder XP-1114. Flame sprayed on aluminum strip. Coating thickness: 1 mil 4.5 mils 3.5 mils	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF "TITANIA BASE" POWDER ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF TITANIA BASE POWDER ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

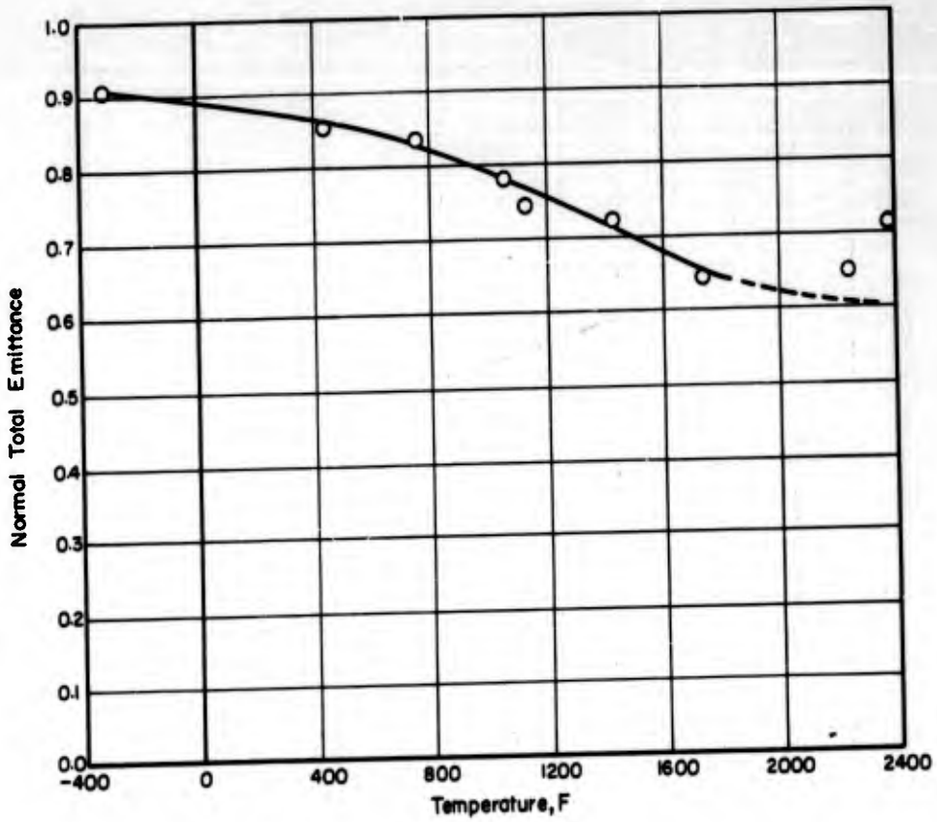
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
16	Pratt & Whitney Aircraft		Plasmadyne powder. Flame sprayed on Type 310 stainless steel	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



HEMISPHERICAL TOTAL EMITTANCE OF 50% TITANIUM OXIDE-50% ALUMINUM OXIDE ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF 50% TITANIUM OXIDE-50% ALUMINUM OXIDE ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

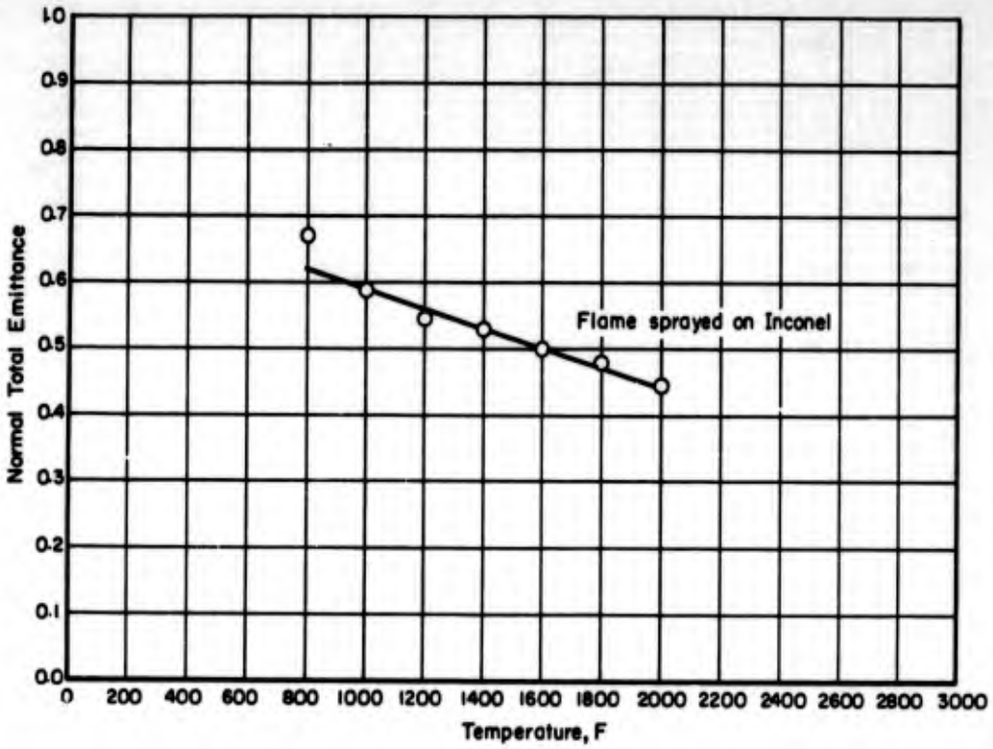
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
16	Pratt & Whitney Aircraft		Metco plasma flame spray powder XP-1121.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



NORMAL TOTAL EMITTANCE OF ZIRCONIUM OXIDE ON INCONEL

NORMAL TOTAL EMITTANCE OF ZIRCONIUM OXIDE ON INCONEL--REFERENCE INFORMATION

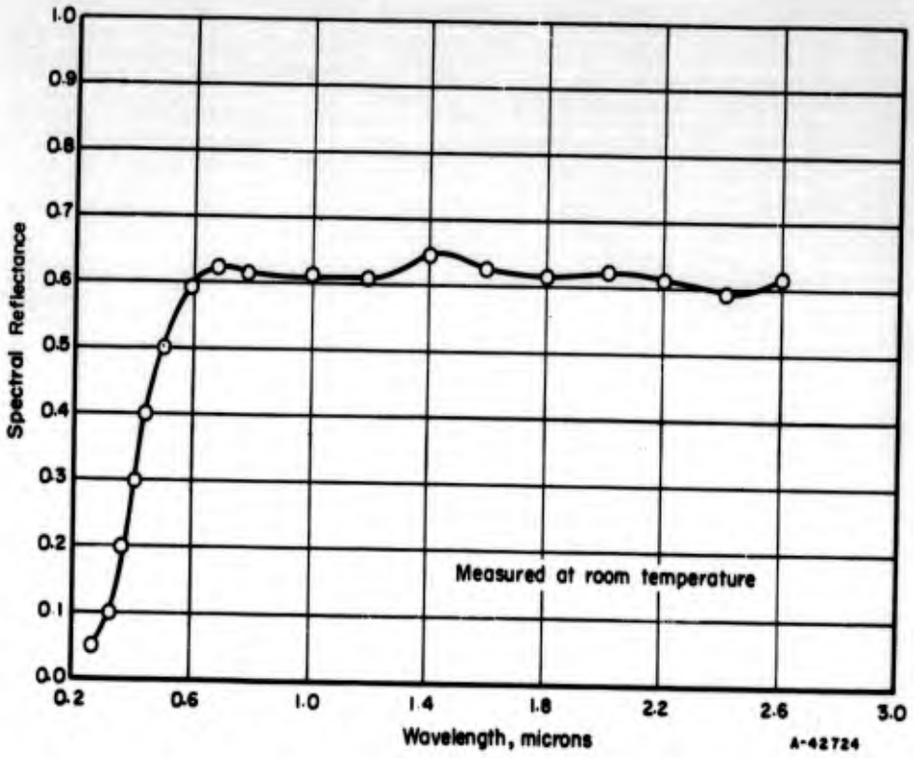
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
11	Olson and Morris	o	Zirconium oxide on Inconel. Thickness or surface condition not given. (Coating burned off-- probably near 2000 F.)	Normal total emittance. Comparison blackbody. Furnace heated specimens. Temperatures measured with thermocouples. Thermistor-bolometer detector.	Measured in air. Data taken from curve.



NORMAL TOTAL EMITTANCE OF ZIRCONIUM OXIDE ON INCONEL

NORMAL TOTAL EMITTANCE OF ZIRCONIUM OXIDE ON INCONEL--REFERENCE INFORMATION

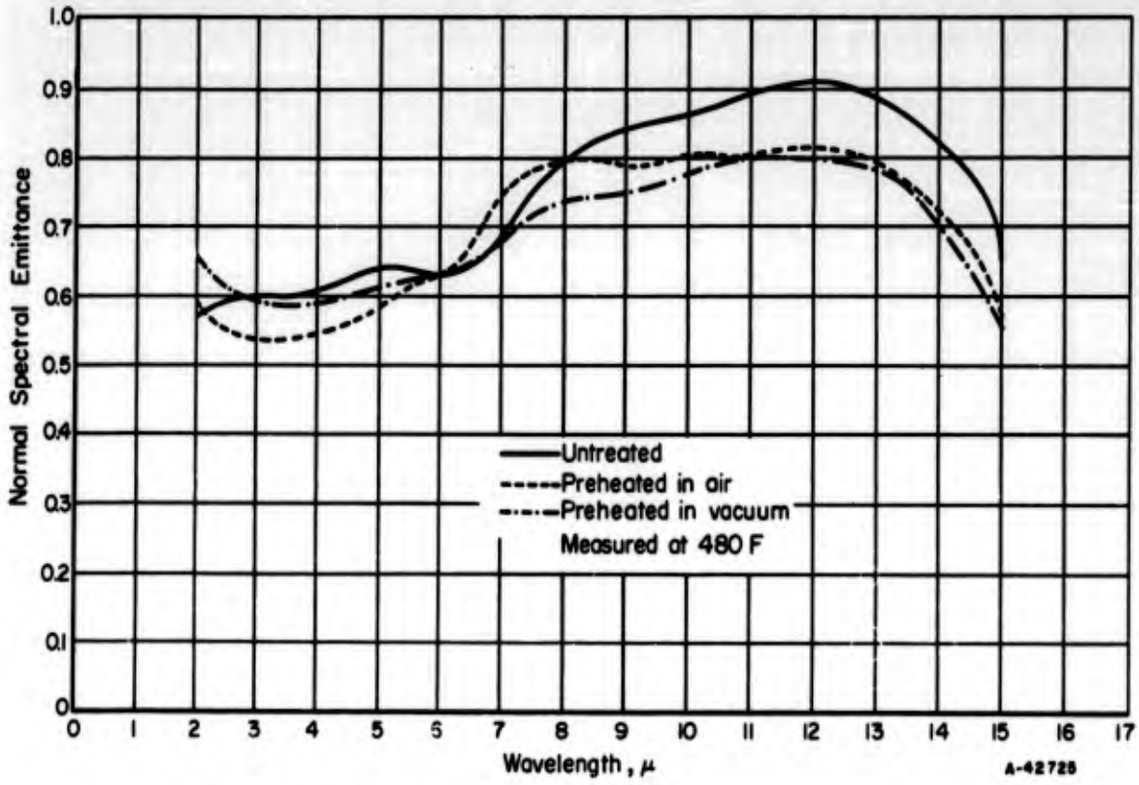
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
10	Wade, W. R.	O	Flame-sprayed zirconia on Inconel heater strip. Coating thickness not given.	Normal total emittance. Thermopile detector. Resistance-heated Inconel strip with test material flame sprayed to "opaque" thickness. Comparison blackbody. Temperatures measured with thermocouples.	Measured in air. Temperatures given are those of Inconel heater strip. Data taken from curve.



SPECTRAL REFLECTANCE OF ZIRCONIUM OXIDE ON INCONEL

SPECTRAL REFLECTANCE OF ZIRCONIUM OXIDE ON INCONEL--REFERENCE INFORMATION

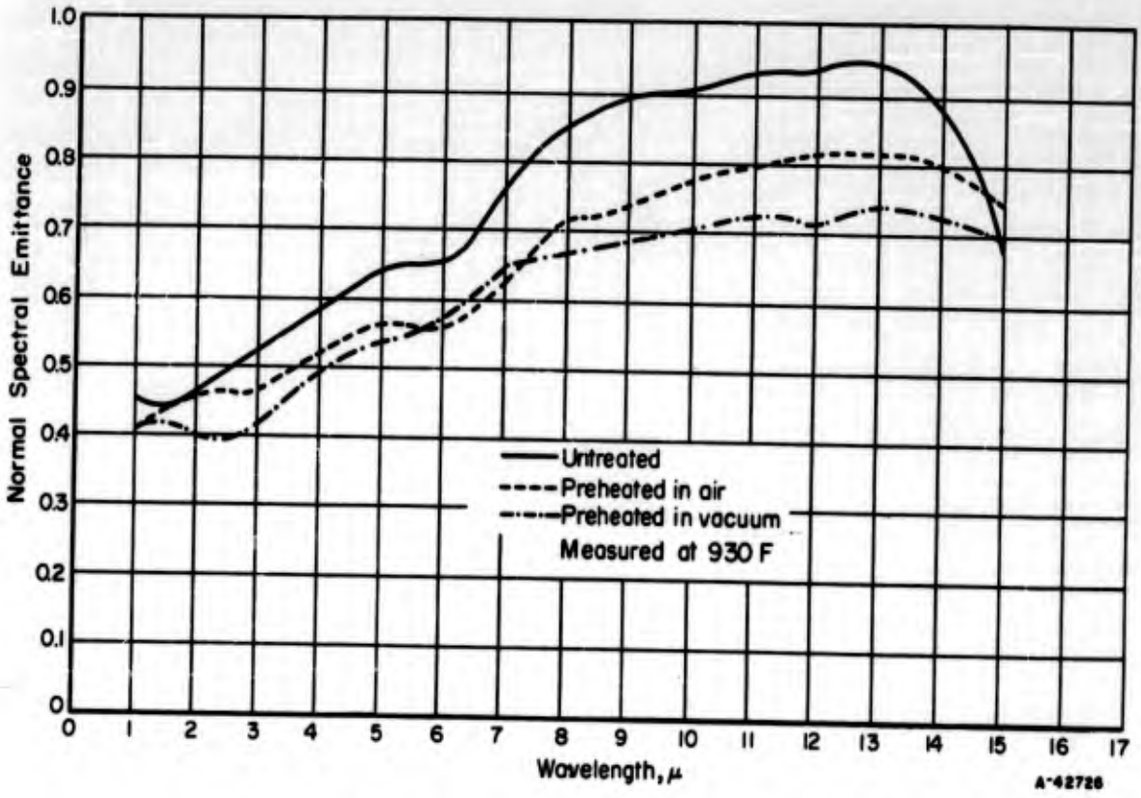
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
11	Olson and Morris	O	Zirconium oxide flame sprayed on Inconel. Thickness or surface condition not given.	Spectral reflectance at 9 degrees from normal (incident radiation). Recording spectrophotometer. Integrating sphere. Lead sulphide detector. (Normal illumination--hemispherical viewing.)	Measured in air at room temperature. Data taken from curve.



NORMAL SPECTRAL EMITTANCE OF ZIRCONIA ON INCONEL X AT 480 F

NORMAL SPECTRAL EMITTANCE OF ZIRCONIA ON INCONEL X AT 480 F--REFERENCE INFORMATION

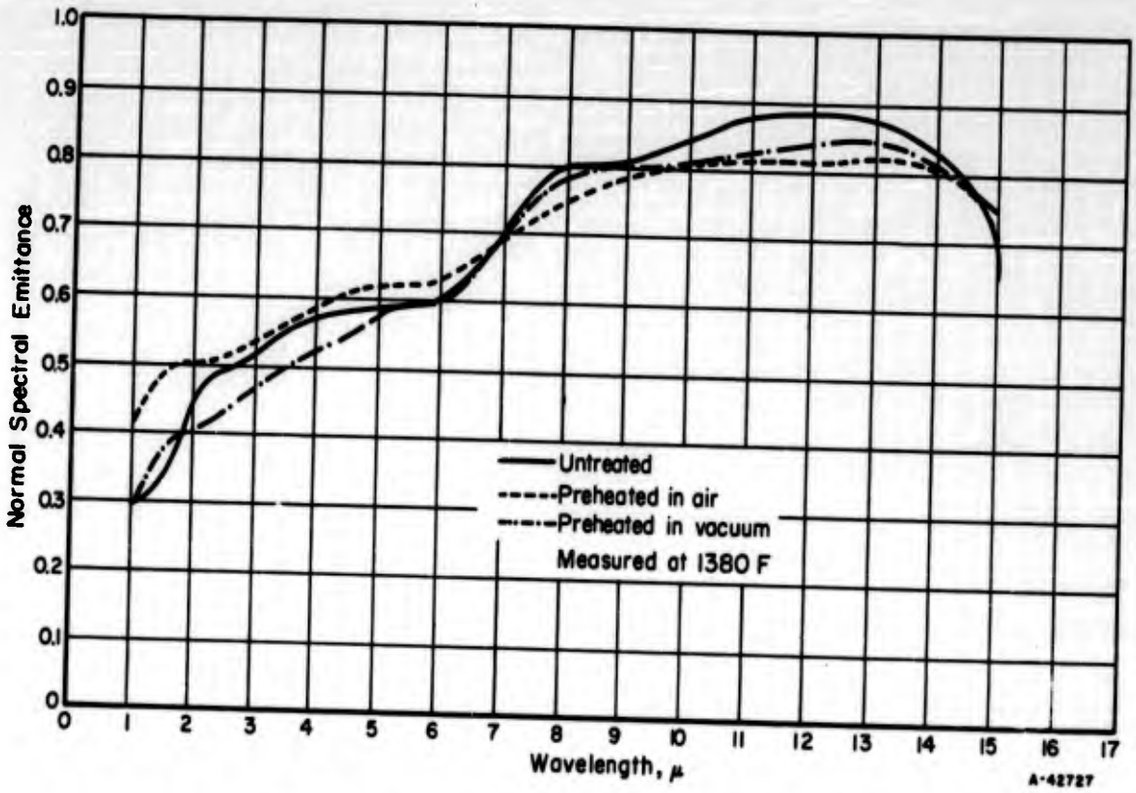
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		Flame sprayed on Inconel X (untreated). Heated 30 minutes in air at 1500 F. Heated 30 minutes in 6.2 x 10^{-5} mm Hg pressure at 1500 F.	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF ZIRCONIA ON INCONEL X AT 930 F

NORMAL SPECTRAL EMITTANCE OF ZIRCONIA ON INCONEL X AT 930 F--REFERENCE INFORMATION

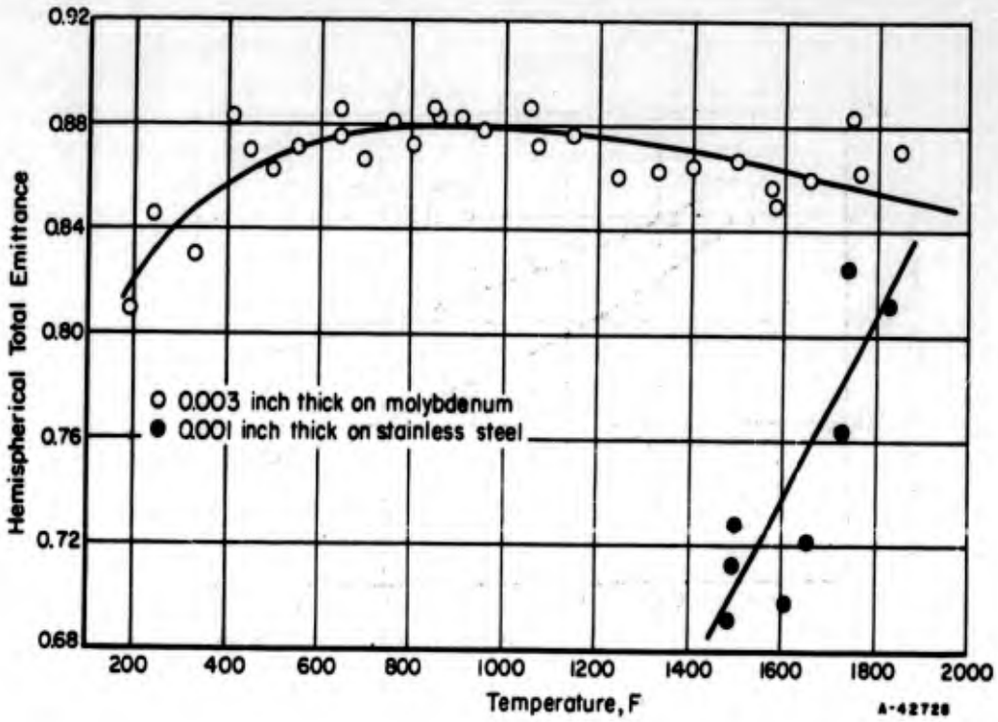
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		Flame sprayed on Inconel X. Untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.2 x 10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF ZIRCONIA ON INCONEL X AT 1380 F

NORMAL SPECTRAL EMITTANCE OF ZIRCONIA ON INCONEL X AT 1380 F--REFERENCE INFORMATION

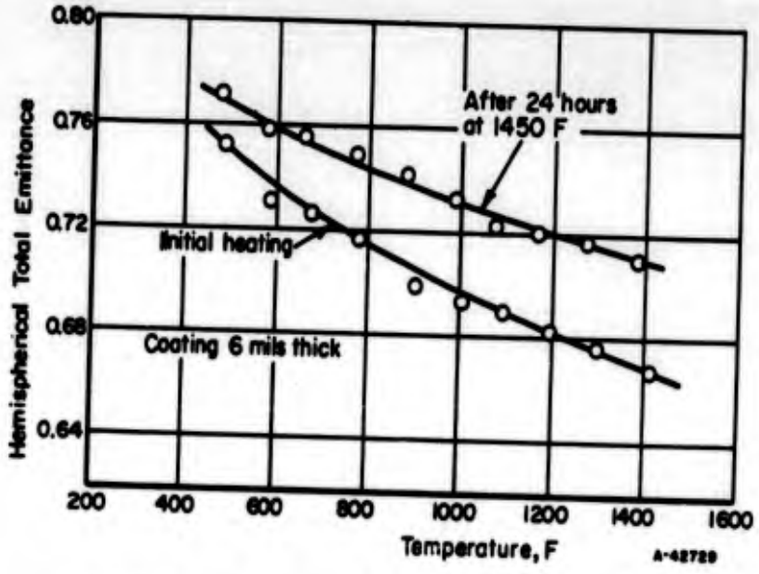
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		Flame sprayed on Inconel X. Untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.2 x 10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



HEMISPHERICAL TOTAL EMITTANCE OF TWO ZIRCONIUM OXIDE COATED SPECIMENS

HEMISPHERICAL TOTAL EMITTANCE OF ZIRCONIUM OXIDE ON MOLYBDENUM AND TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

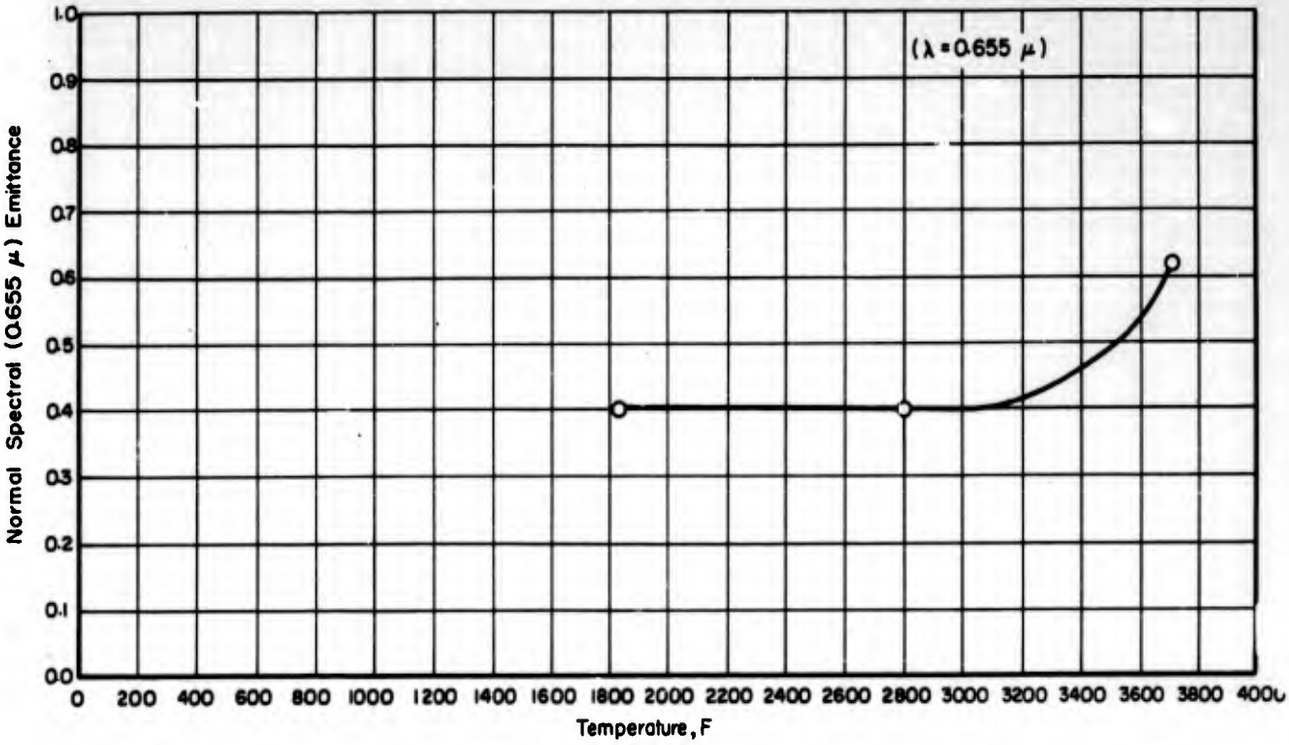
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		3-mil-thick coating applied by Linde Plasmarc process to molybdenum strip. 1-mil-thick coating flame sprayed by Metco process on Type 310 stainless steel strip.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF ZIRCONIA ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF ZIRCONIA ON TYPE 310 STAINLESS STEEL—REFERENCE INFORMATION

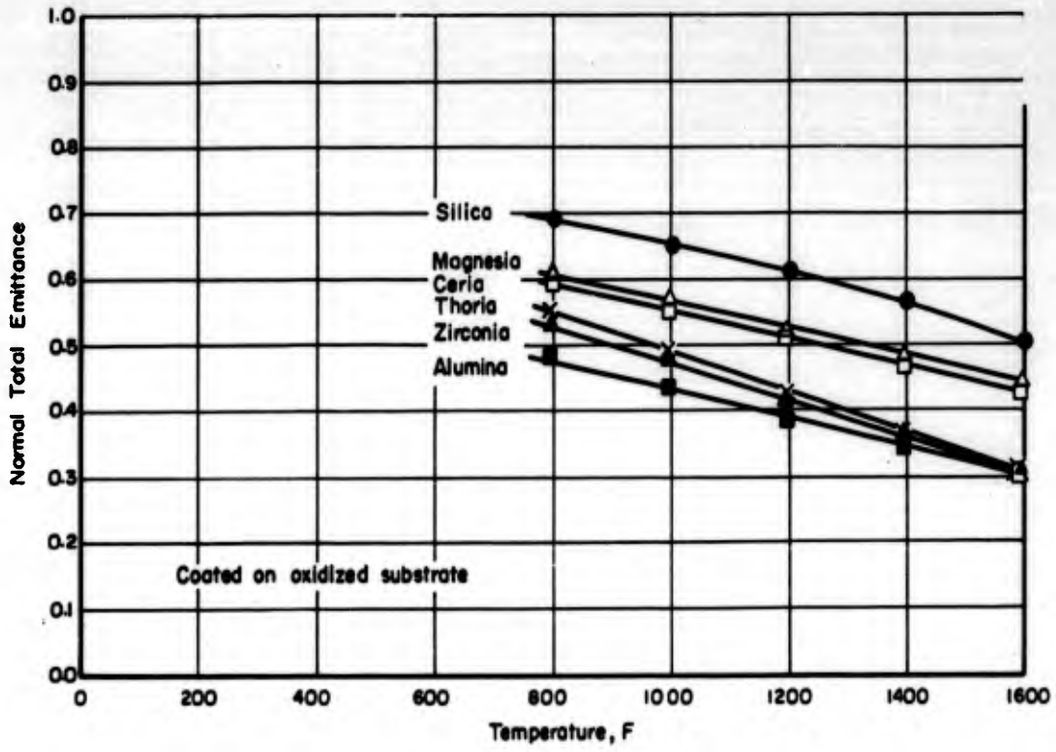
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
18	Pratt & Whitney Aircraft		6-mil-thick coating applied by Metco plasma flame spray process on Type 310 stainless steel tube. Initial heating After 24 hours at 1450 F (cooling and heating show change to be permanent)	Hemispherical total emittance. Resistance-heated tube specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF THORIUM OXIDE ON TUNGSTEN AND MOLYBDENUM

NORMAL SPECTRAL EMITTANCE OF THORIUM OXIDE ON TUNGSTEN AND MOLYBDENUM--REFERENCE INFORMATION

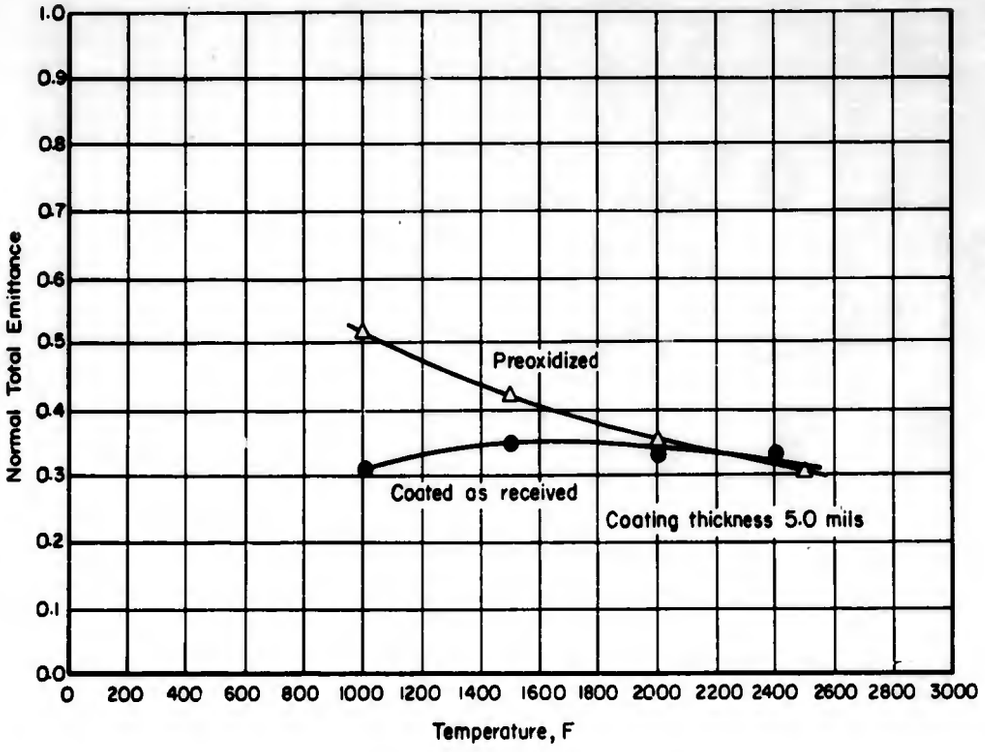
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
6	Morgan, F. H.	O	Purity or coating thickness not given. Thoria cataphoretically coated on tungsten (or molybdenum) ribbon previously flashed in hydrogen.	Resistance-heated, coated ribbon. Temperatures measured with thermocouples. Brightness temperature measured with optical pyrometer.	Measured in vacuum. Coatings on tungsten and molybdenum gave identical results. Data taken from curve and discussion.



NORMAL TOTAL EMITTANCE OF VARIOUS REFRACTORY OXIDES ON NIMONIC 75

NORMAL TOTAL EMITTANCE OF VARIOUS REFRACTORY OXIDES ON NIMONIC 75--REFERENCE INFORMATION

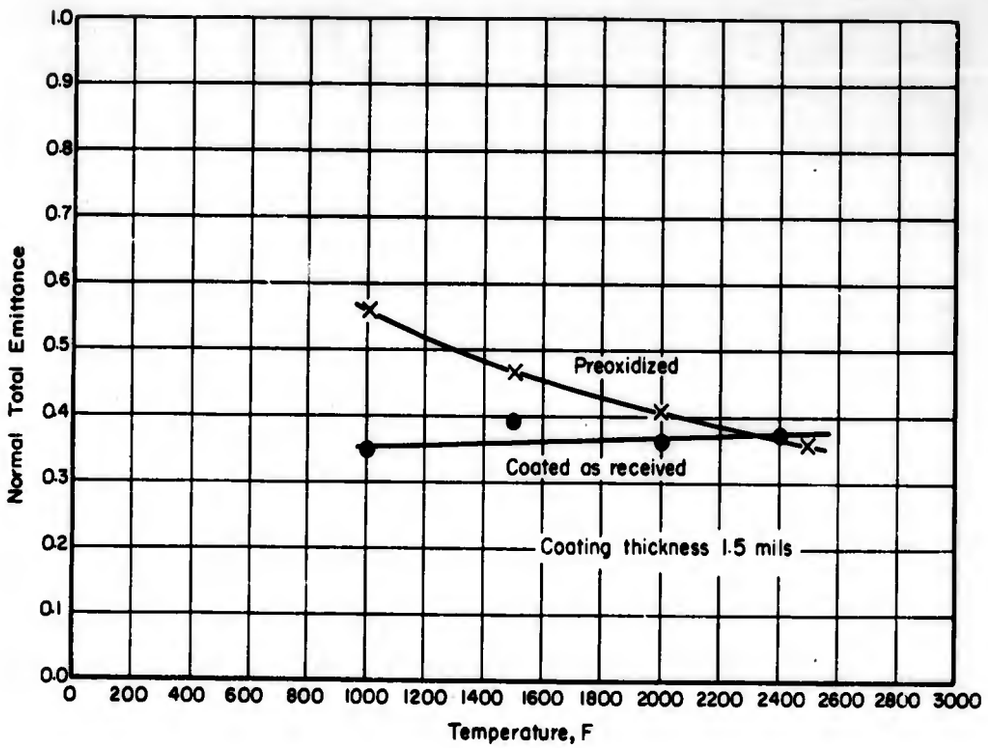
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
12	Sully, Brandes, and Waterhouse		Purest commercially available materials. Applied to oxidized Nimonic 75 strip as water suspension. Coating thickness not given.	Normal total emittance. Resistance-heated metal-strip specimens with ceramic coated surface. Comparison blackbody. Temperatures measured with thermocouples. Thermopile detector.	Measured in air. Data taken from curves. Hemispherical total emittance found to equal normal total emittance for the alumina coated specimen. (Should hold true for the others also.)
		●	Silica		
		△	Magnesia		
		□	Ceria		
		×	Thoria		
		▲	Zirconia		
		■	Alumina		



NORMAL TOTAL EMITTANCE OF Al-Si ON MOLYBDENUM

NORMAL TOTAL EMITTANCE OF Al-Si ON MOLYBDENUM--REFERENCE INFORMATION

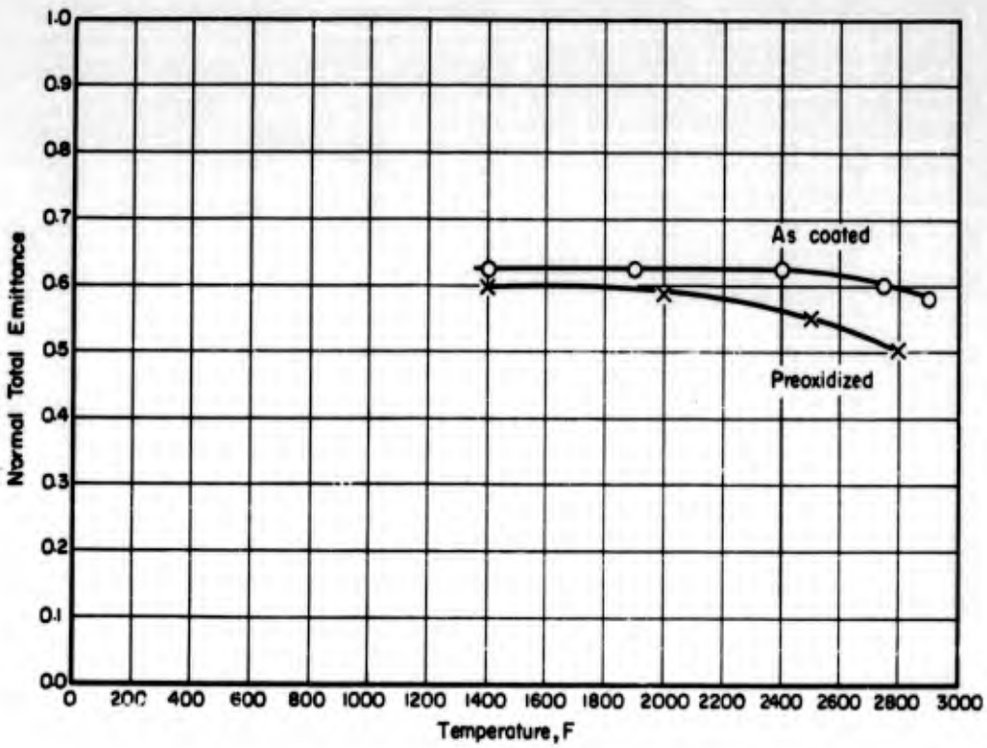
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
7	Anthony and Pearl	●	N.R.C. Al-Si on molybdenum. Coated as received.	Normal total emittance. Induction heated specimen. Thermopile detector. Comparison blackbody. Temperatures measured with thermocouples and optical pyrometer.	Measured in continuous purge of helium gas.
		△	Preoxidized, then coated. Coating thickness 5 mils.		



NORMAL TOTAL EMITTANCE OF DURAK-MG ON MOLYBDENUM

NORMAL TOTAL EMITTANCE OF DURAK-MG ON MOLYBDENUM--REFERENCE INFORMATION

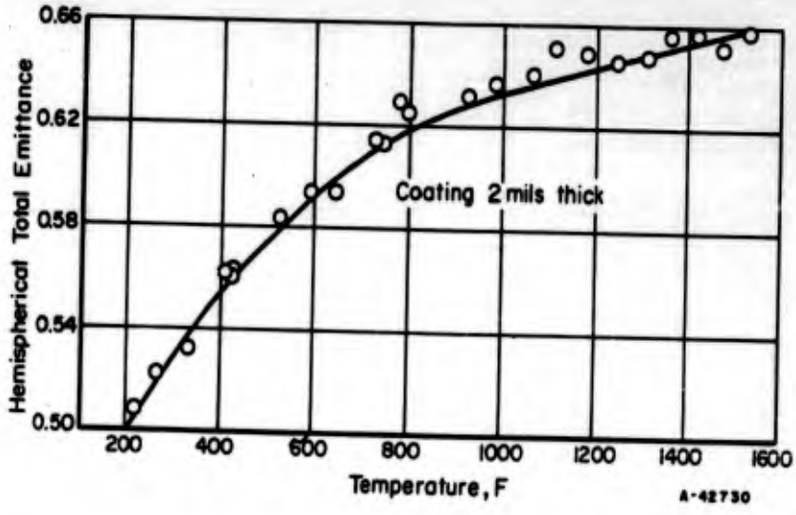
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
7	Anthony and Pearl		Durak-MG coating on molybdenum.	Normal total emittance. Induction-heated specimen. Thermopile detector. Comparison blackbody. Temperatures measured with thermocouples and optical pyrometer.	Measured in continuous purge of helium gas. Data taken from tables.
		●	Coated as received.		
		×	Preoxidized, then coated.		
			Coating thickness 1.5 mils, nominal.		



NORMAL TOTAL EMITTANCE OF DURAK-MG ON MOLYBDENUM-0.5 TITANIUM ALLOY

NORMAL TOTAL EMITTANCE OF DURAK-MG ON MOLYBDENUM-0.5 TITANIUM ALLOY--REFERENCE INFORMATION

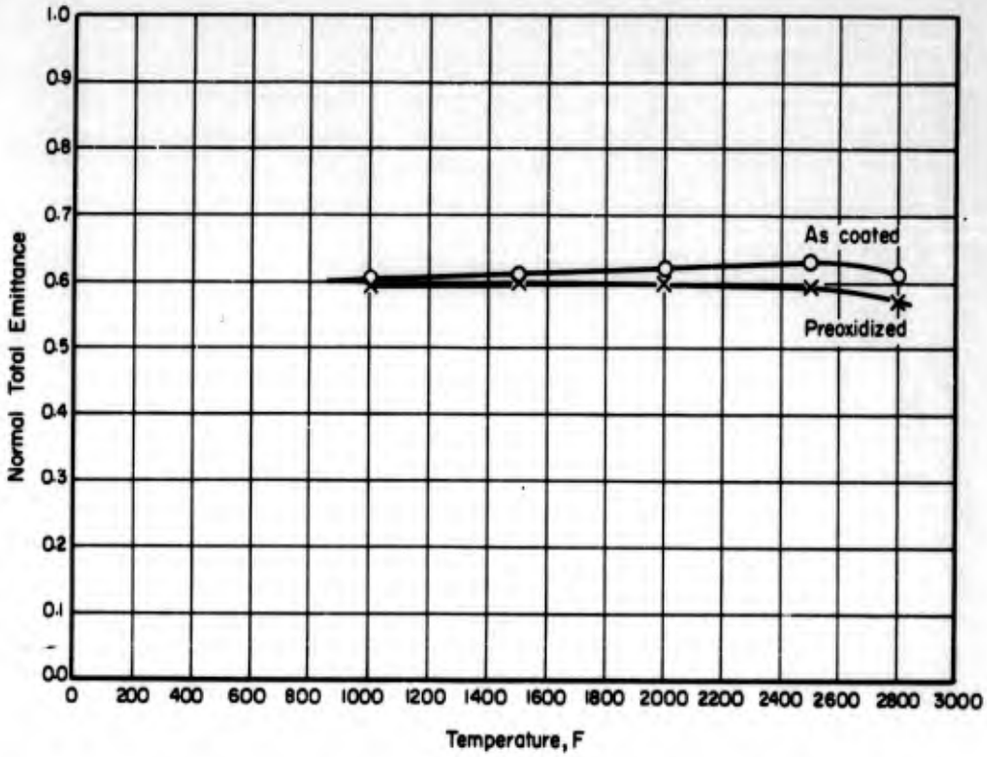
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
8	Fieldhouse, Lang, and Blau		Durak-MG coating on molybdenum-0.5 per cent titanium alloy.	Normal and angular total emittance. Induction heated specimen.	Measured in 90 per cent argon, 10 per cent H_2 gas. Measurements made at angles of 0, 30, 45, and 60 degrees with normal to specimen surface. Normal total emittance equals hemispherical total emittance within reported experimental error of ± 5 per cent. Data taken from curves.
		o	As coated.	Spectrometer with prism replaced by plane mirror.	
		×	Preoxidized at 2000 F for 1 hour.	Thermocouple detector.	
			Specimens "flat and smooth" (coating thickness not given).	Blackbody hole in specimen.	
				Temperature calibration with blackbody and optical pyrometer.	



HEMISPHERICAL TOTAL EMITTANCE OF MOLYBDENUM DISILICIDE ON MOLYBDENUM

HEMISPHERICAL TOTAL EMITTANCE OF MOLYBDENUM DISILICIDE ON MOLYBDENUM—REFERENCE INFORMATION

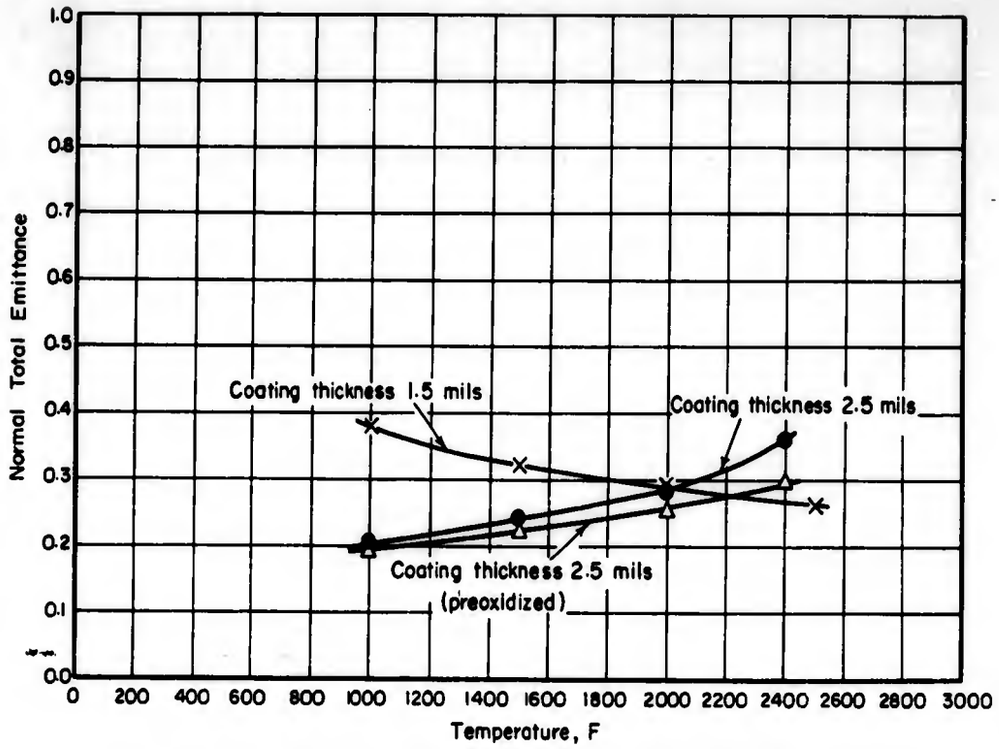
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt and Whitney Aircraft		2-mil-thick coating of $MoSi_2$ applied by the Linde Plasmarc process to both sides of a molybdenum strip.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



NORMAL TOTAL EMITTANCE OF W-2 ON MOLYBDENUM-0.5 TITANIUM ALLOY

NORMAL TOTAL EMITTANCE OF W-2 ON MOLYBDENUM-0.5 TITANIUM ALLOY--REFERENCE INFORMATION

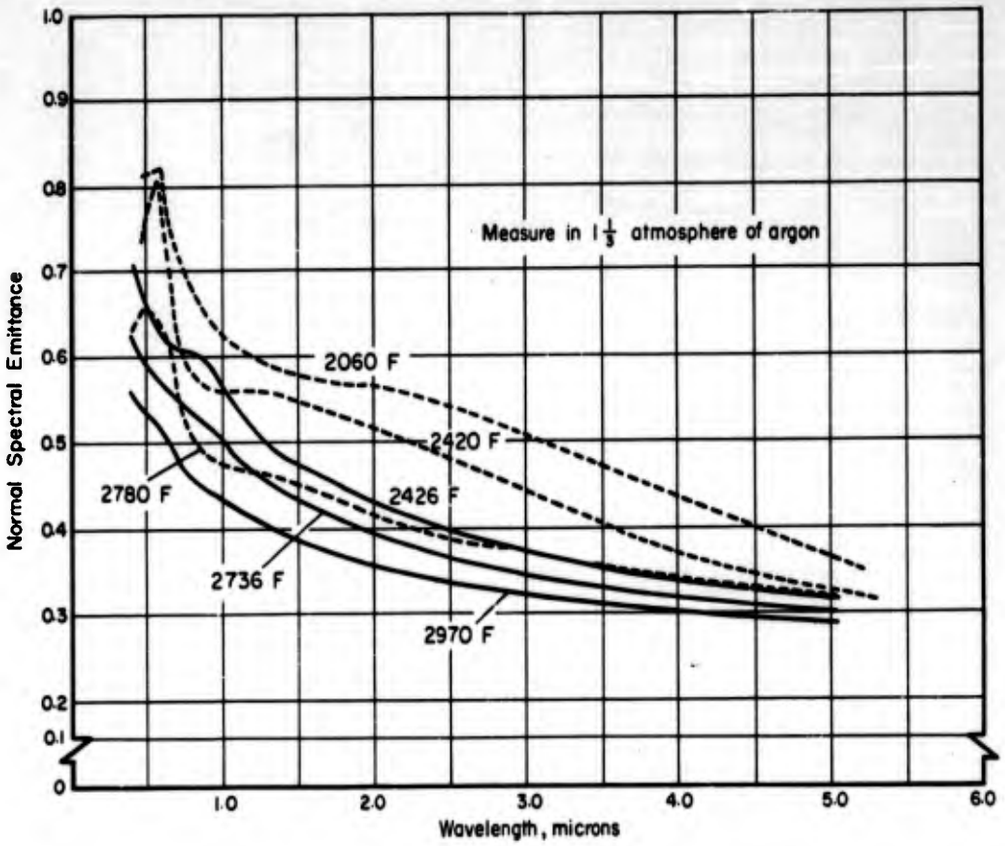
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
8	Fieldhouse, Lang, and Blau		Chromalloy W-2 coating on molybdenum-0.5 per cent titanium alloy.	Normal and angular total emittance. Induction heated specimen. Spectrometer with prism replaced by plane mirror. Thermocouple detector. Blackbody hole in specimen. Temperature calibration with blackbody and optical pyrometer.	Measured in 90 per cent argon, 10 per cent H_2 atmosphere. Measurements made at angles of 0, 30, 45, and 60 degrees with the normal to the specimen surface. Normal total emittance equals hemispherical total emittance within reported experimental error of ± 5 per cent. Data taken from curves.
		o	As coated.		
		×	Preoxidized, at 2000 F for 1 hour.		
			Coating thickness not given.		
			Specimen "flat and smooth".		
			(W-2 coating thought to be molybdenum disilicide.)		



NORMAL TOTAL EMITTANCE OF W-2 ON MOLYBDENUM-0.5 TITANIUM ALLOY

NORMAL TOTAL EMITTANCE OF W-2 ON MOLYBDENUM-0.5 TITANIUM ALLOY--REFERENCE INFORMATION

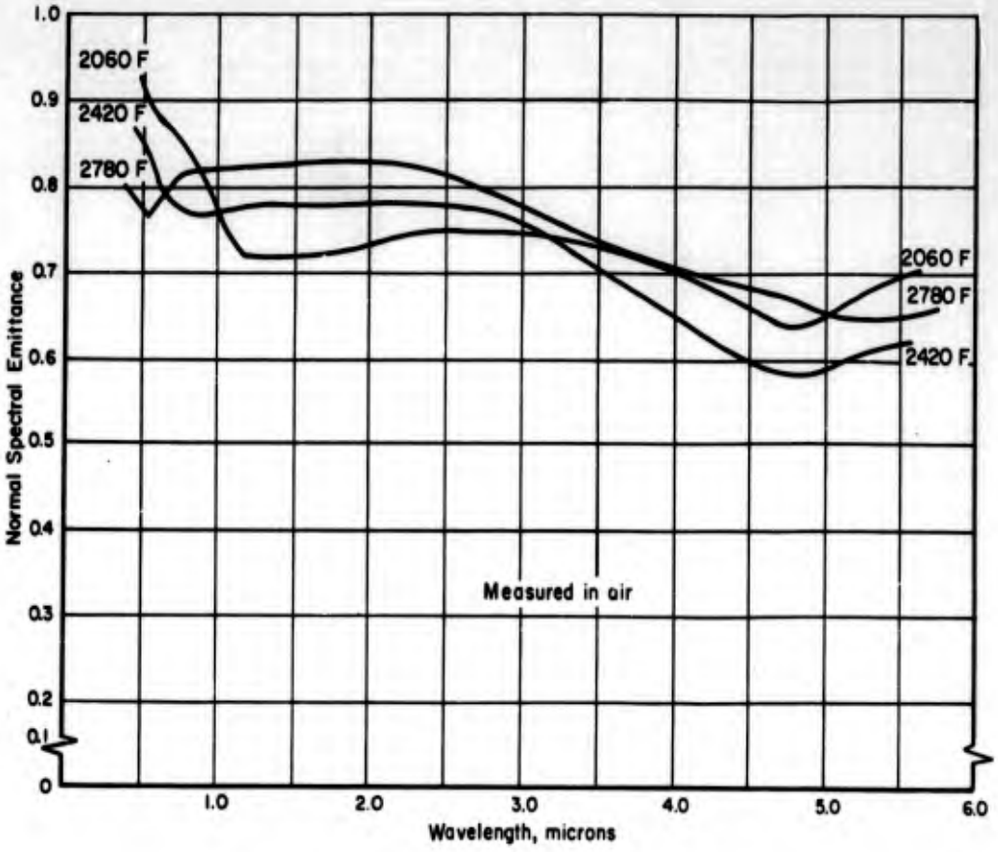
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
7	Anthony and Pearl		Molybdenum-0.5 per cent titanium alloy coated with W-2.	Normal total emittance. Induction-heated specimen.	Measured in continuous purge of helium gas.
		△	Coating thickness 1.5 mils.	Thermopile detector.	
		●	Coating thickness 2.5 mils.	Comparison blackbody.	
		×	Preoxidized, then 2.5-mil thick coating applied. (Alloy not defined.) (W-2 coating thought to be molybdenum disilicide.)	Temperatures measured with thermocouples and optical pyrometer.	



NORMAL SPECTRAL EMITTANCE OF W-2 ON MOLYBDENUM-0.5 TITANIUM ALLOY

NORMAL SPECTRAL EMITTANCE OF W-2 ON MOLYBDENUM-0.5 TITANIUM ALLOY--REFERENCE INFORMATION

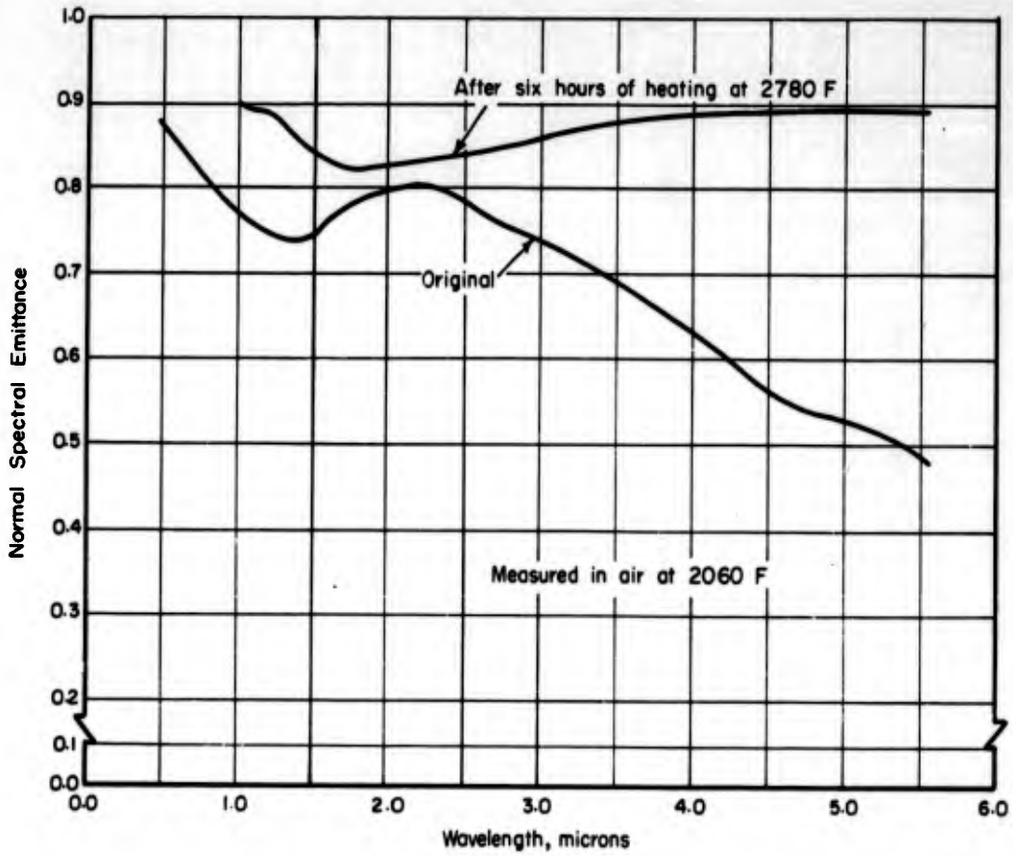
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
9	Coffman, Kibler, and Riethof		Surface condition: as received. Coating thickness not given. Specimen No. 4 - measured at 2426, 2736, and 2970 F. Specimen No. 5 - measured at 2060, 2420, and 2780 F. (W-2 coating thought to be molybdenum disilicide.)	Normal spectral emittance. Induction-heated specimen. Spectrometer-monochromator. Comparison blackbody.	Measured in 1-1/3 atmosphere of argon. Results not reproducible at lower temperatures after heating to higher temperature.



NORMAL SPECTRAL EMITTANCE OF W-2 ON MOLYBDENUM-0.5 TITANIUM ALLOY

NORMAL SPECTRAL EMITTANCE OF W-2 ON MOLYBDENUM-0.5 TITANIUM ALLOY--REFERENCE INFORMATION

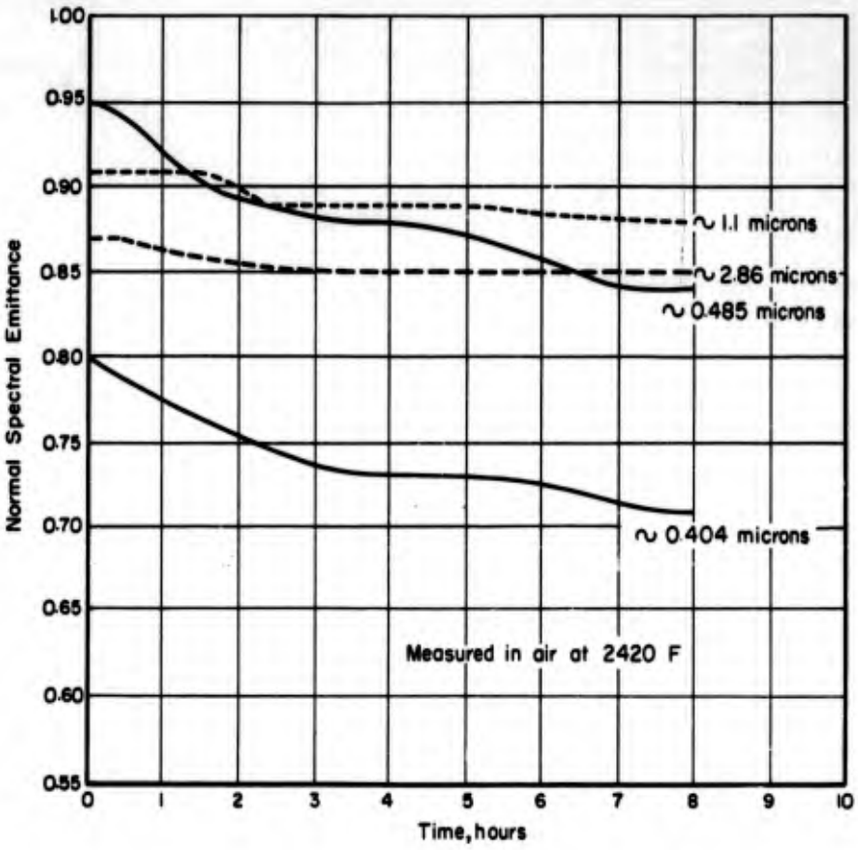
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
9	Coffman, Kibler, and Riethof		Surface condition--as received. Coating thickness not given. (W-2 coating thought to be molybdenum disilicide.)	Normal spectral emittance. Induction-heated specimens. Spectrometer-monochromator. Comparison blackbody.	Measured in air. Data taken from curves. Note: Specimens run at 2060 F, held for 2 hours and rerun; run at 2420 F, held for 2 hours and rerun; run at 2780 F, held for 2 hours and rerun. First run at each temperature is shown. The final run at 2780 F showed no further change.



NORMAL SPECTRAL EMITTANCE OF W-2 ON MOLYBDENUM-0.5 TITANIUM ALLOY

NORMAL SPECTRAL EMITTANCE OF W-2 ON MOLYBDENUM-0.5 TITANIUM ALLOY--REFERENCE INFORMATION

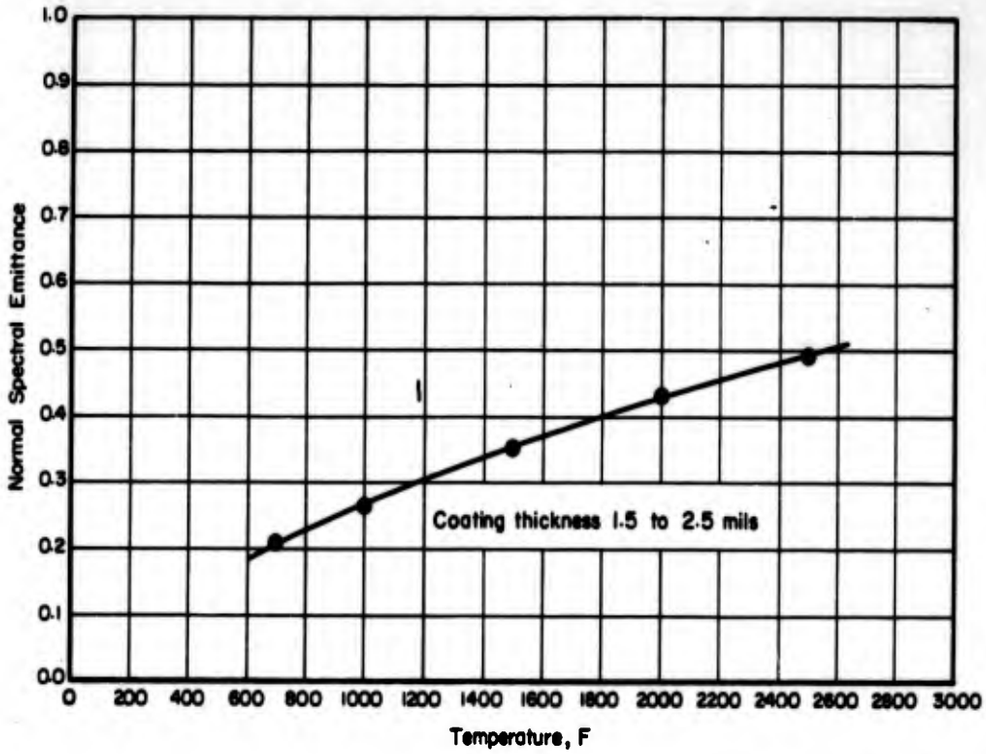
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
9	Coffman, Kibler, and Riethof		Surface condition--as received. Coating thickness not given. (W-2 coating thought to be molybdenum disilicide.)	Normal spectral emittance. Inductively heated specimen. Spectrometer-monochromator. Comparison blackbody.	Measured in air. Variation with thermal treatment. Data taken from curves.



VARIATION OF NORMAL SPECTRAL EMITTANCE OF W-2 ON MOLYBDENUM-0.5 TITANIUM ALLOY WITH HEATING TIME IN AIR

VARIATION OF NORMAL SPECTRAL EMITTANCE OF W-2 ON MOLYBDENUM-0.5 TITANIUM ALLOY WITH HEATING TIME IN AIR--REFERENCE INFORMATION

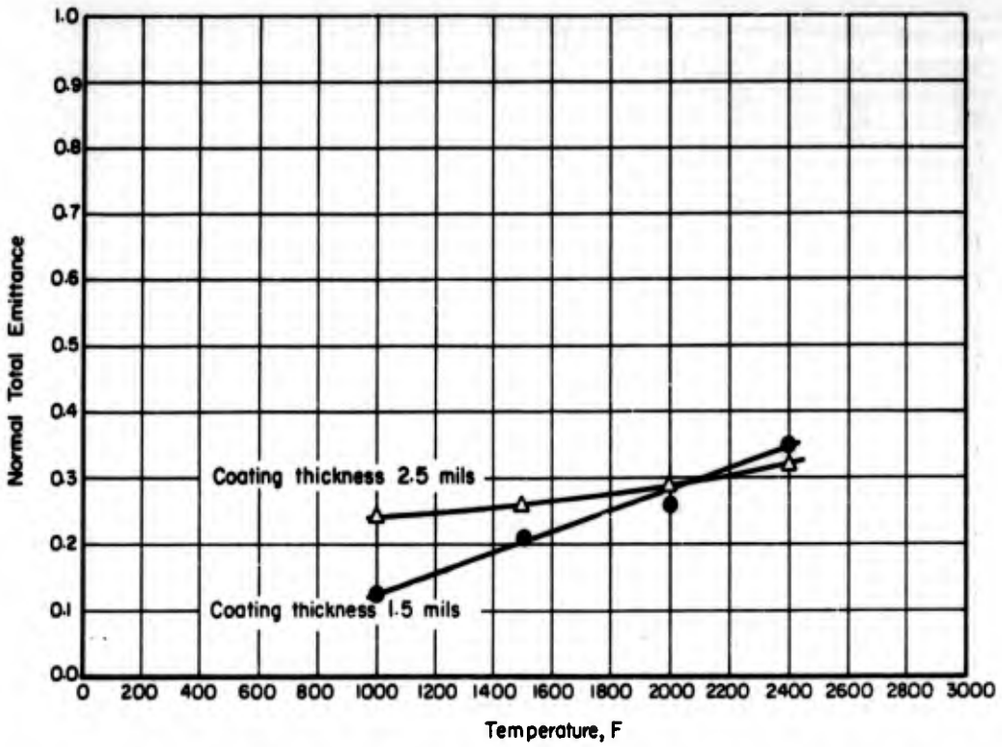
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
9	Coffman, Kibler, and Riethof		Surface condition--as received. Coating thickness not given. (W-2 coating thought to be molybdenum disilicide.)	Normal spectral emittance. Inductively heated specimen. Spectrometer-monochromator. Comparison blackbody.	Measured in air at 2420 F. Data taken from curves. Measured at wavelengths of 0.404, 0.485, 1.1 and 2.86 microns.



NORMAL TOTAL EMITTANCE OF MODIFIED W-2 ON COLUMBIUM ALLOY

NORMAL TOTAL EMITTANCE OF MODIFIED W-2 ON COLUMBIUM ALLOY--REFERENCE INFORMATION

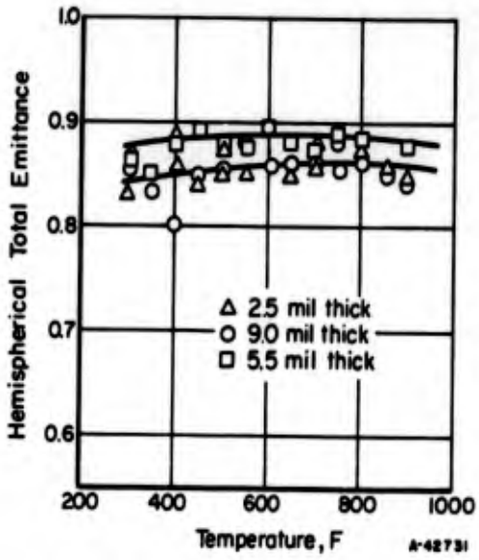
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
7	Anthony and Pearl	●	Columbium-10Ti - 10Mo. As received. Coating: T-1 modified W-2, 1.5 to 2.5 mils nominal thickness.	Normal total emittance. Induction-heated specimen. Thermopile detector. Comparison blackbody. Temperatures measured with thermocouples and optical pyrometer.	Measured in continuous purge of helium gas.



NORMAL TOTAL EMITTANCE OF MODIFIED W-2 ON TUNGSTEN

NORMAL TOTAL EMITTANCE OF MODIFIED W-2 ON TUNGSTEN--REFERENCE INFORMATION

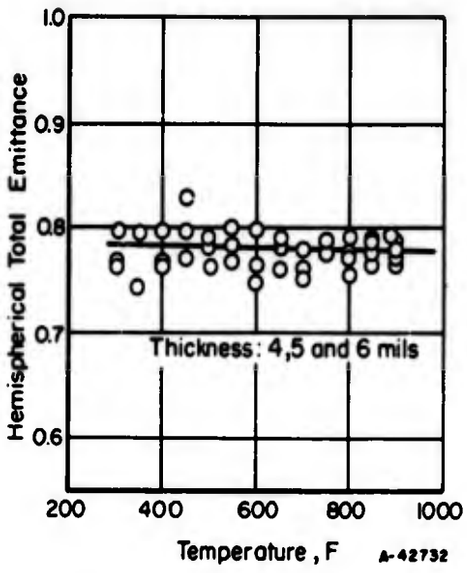
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
7	Anthony and Pearl		Modified W-2 coating on tungsten.	Normal total emittance. Induction-heated specimen. Thermopile detector. Comparison blackbody. Temperatures measured with thermocouples and optical pyrometer.	Measured in continuous purge of helium gas.
		●	Coating thickness 1.5 mils.		
		△	Coating thickness 2.5 mils.		



HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM PHOSPHATE BONDED COATING ON ALUMINUM

HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM PHOSPHATE BONDED COATING ON ALUMINUM--REFERENCE INFORMATION

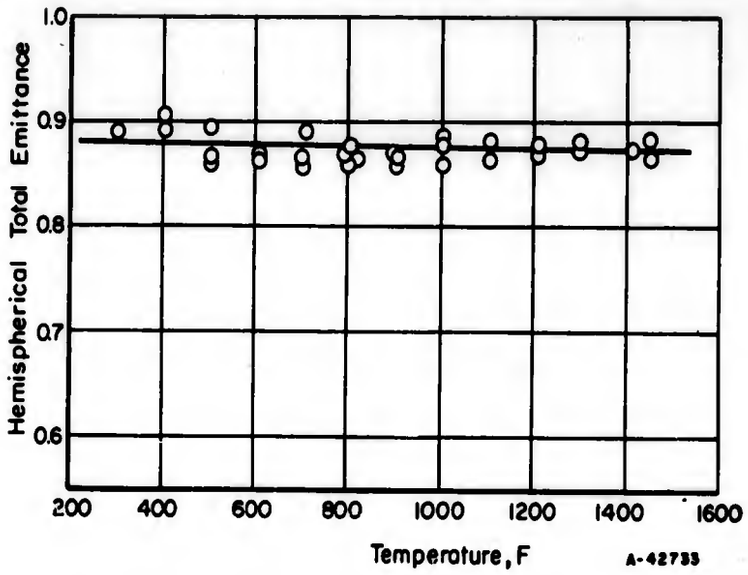
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
16	Pratt & Whitney Aircraft		Silicon carbide and silicon dioxide filler. 2.5 mils thick 9.0 mils thick 5.5 mils thick	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM PHOSPHATE BONDED COATING ON ALUMINUM

HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM PHOSPHATE COATING ON ALUMINUM--REFERENCE INFORMATION

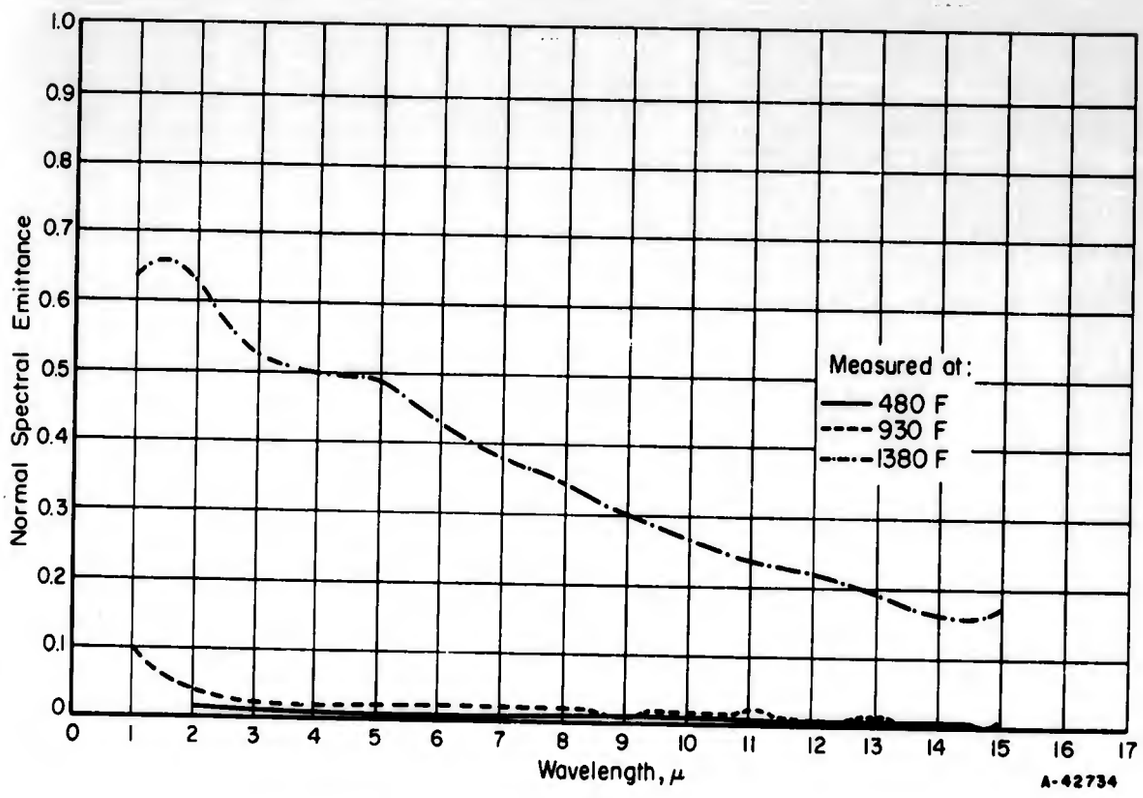
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
16	Pratt & Whitney Aircraft		Boron and silicon dioxide filler applied to aluminum strip.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM PHOSPHATE COATING ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM PHOSPHATE COATING ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

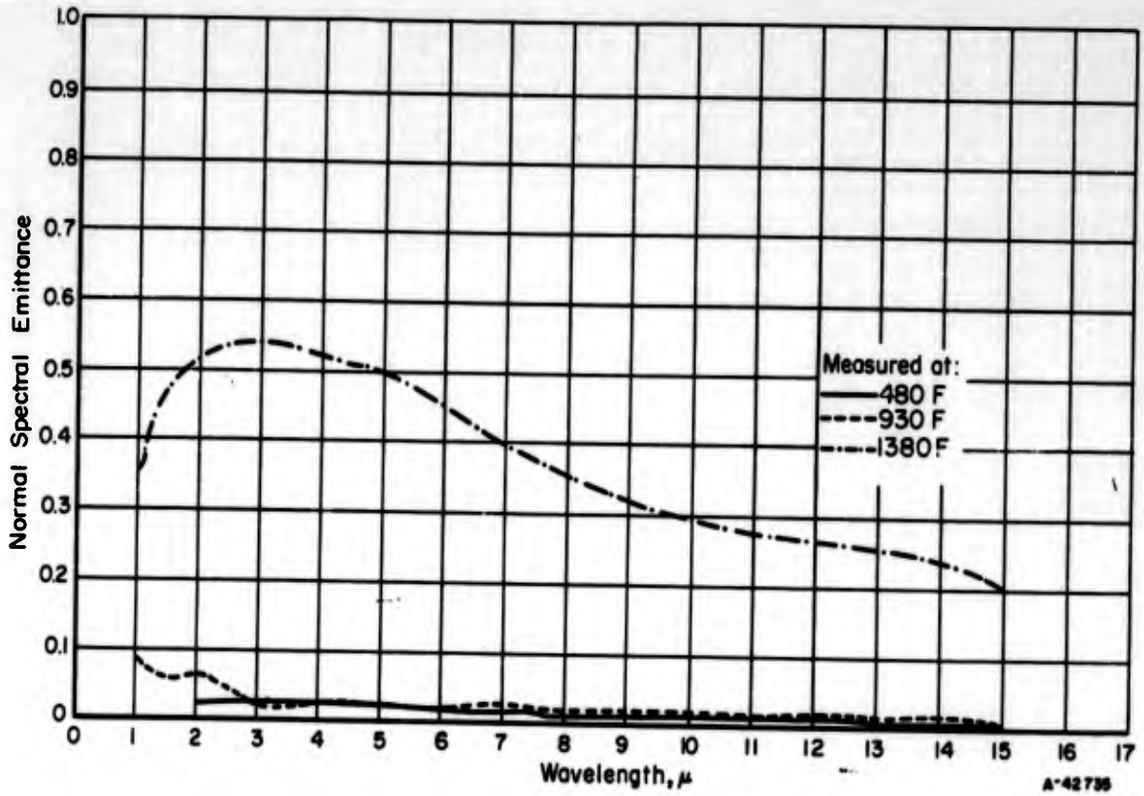
:eference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
17	Pratt & Whitney Aircraft		Aluminum phosphate with nickel chrome spinel and silicon dioxide filler. Coated both sides.	Hemispherical total emittance. Resistance-heated strip and tube specimens. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



NORMAL SPECTRAL EMITTANCE OF CERAMIC GOLD ON TITANIUM (SHINY FINISH)

NORMAL SPECTRAL EMITTANCE OF CERAMIC GOLD ON TITANIUM--REFERENCE INFORMATION

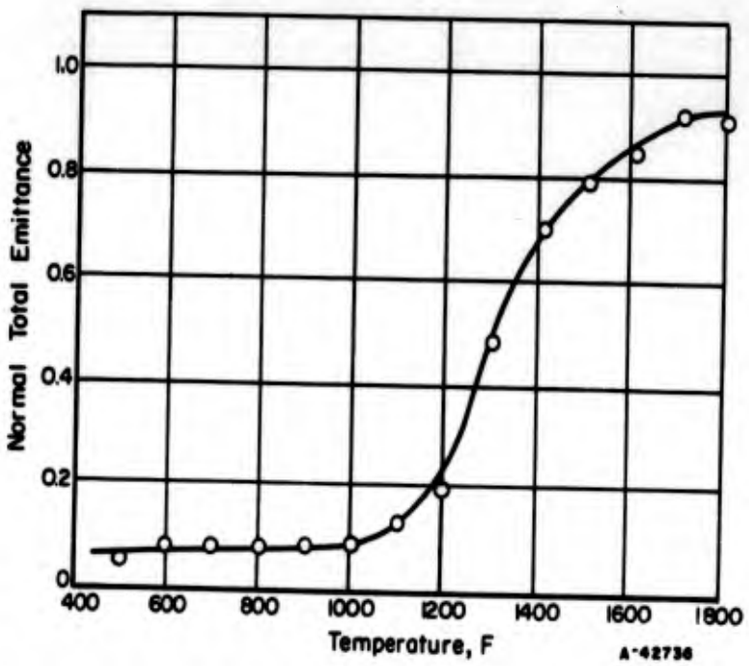
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		As received - shiny finish. Engelhard Industries Bright Gold No. 6854. Applied by spray and fired at 600 C for 5 minutes. Measured at: 480 F 930 F 1380 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF CERAMIC GOLD ON TITANIUM (MATTE FINISH)

NORMAL SPECTRAL EMITTANCE OF CERAMIC GOLD ON TITANIUM (MATTE FINISH)--REFERENCE INFORMATION

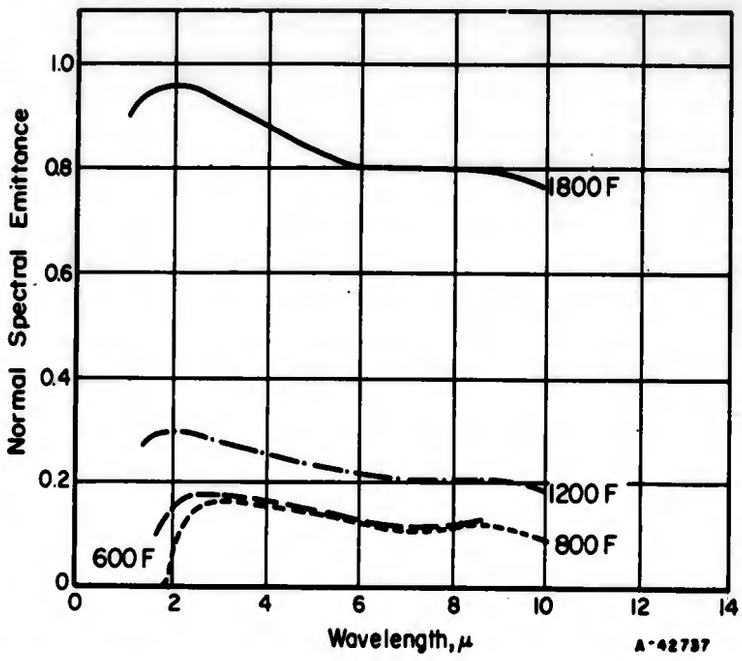
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		As received - matte finish. Engelhard Industries Bright Gold No. 6854. Applied by spray and fired at 600 C for 5 minutes. Measured at: 480 F 930 F 1380 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL TOTAL EMITTANCE OF HANOVIA LIQUID GOLD NO. 6896 ON A-286 STEEL

NORMAL TOTAL EMITTANCE OF HANOVIA LIQUID GOLD NO. 6896 ON A-286 STEEL--REFERENCE INFORMATION

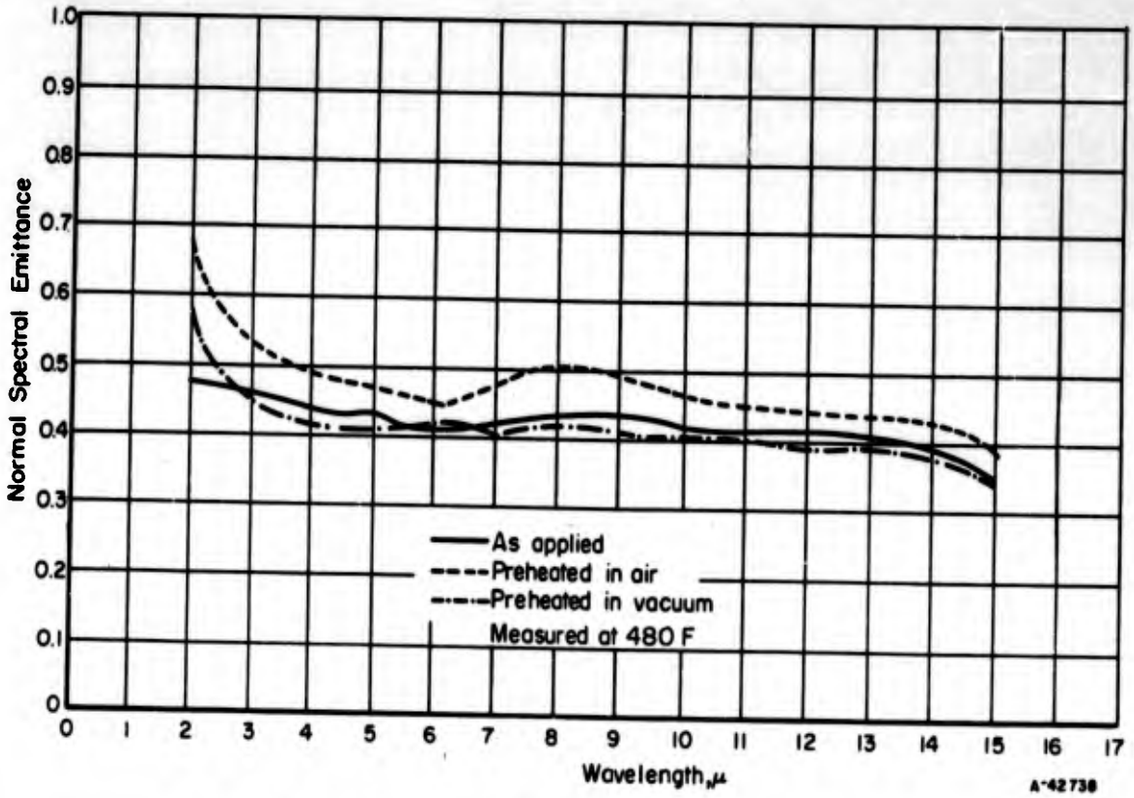
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Hanovia Liquid Gold No. 6896, resinous gold compound dissolved in essential oils. Coating thickness not given.	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF HANOVIA LIQUID GOLD NO. 6896 ON A-286 STEEL AT 600, 800, 1200 AND 1800

NORMAL SPECTRAL EMITTANCE OF HANOVIA LIQUID GOLD NO. 6896 ON A-286 STEEL--REFERENCE INFORMATION

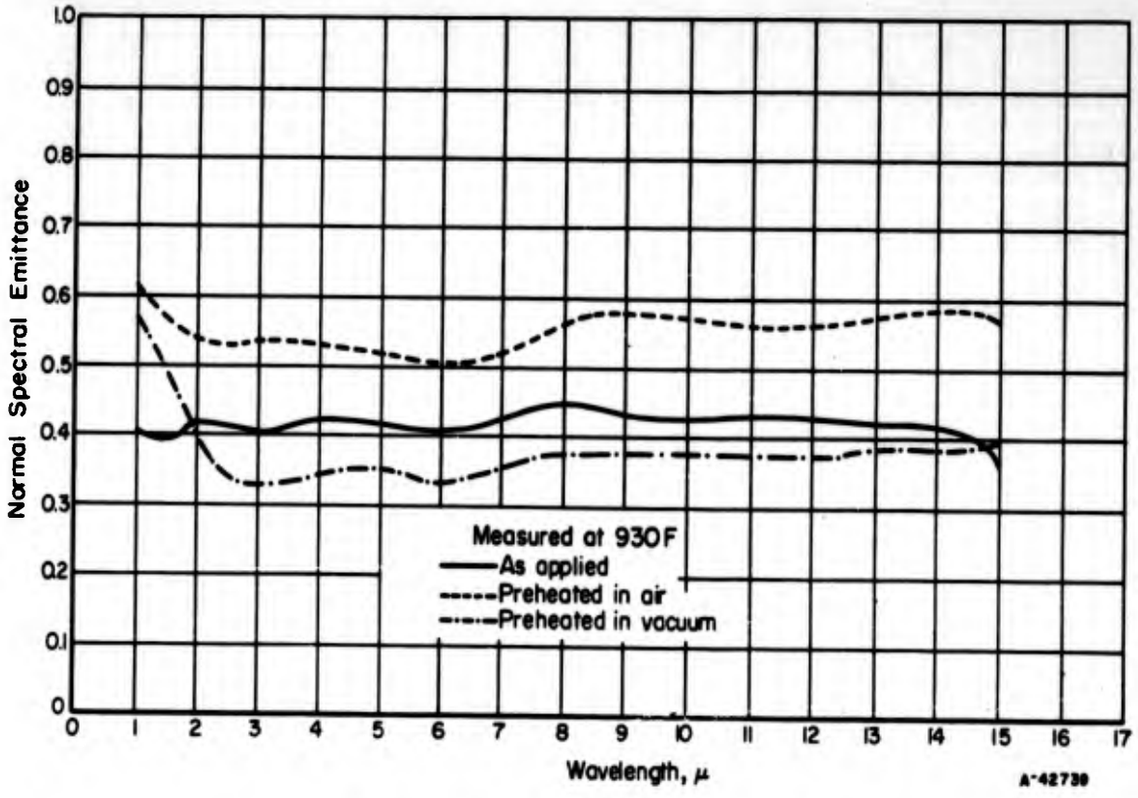
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Hanovia Liquid Bright Gold No. 6896, a resinous gold compound dissolved in essential oils. Gold content 8 to 20 per cent. Coating thickness not given. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF CHROMIUM NICKEL ON INCONEL X AT 480 F

NORMAL SPECTRAL EMITTANCE OF CHROMIUM-NICKEL ON INCONEL X AT 480 F--REFERENCE INFORMATION

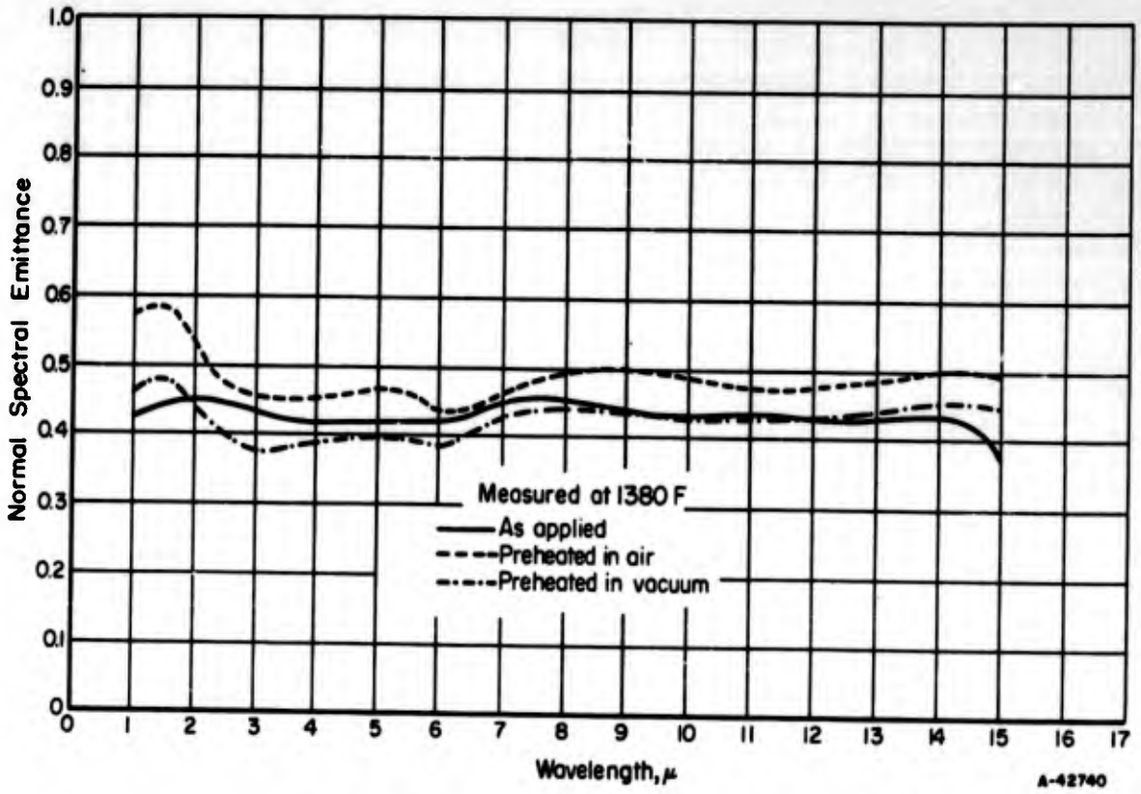
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		20 per cent chromium - 80 per cent nickel. Flame sprayed on Inconel X. As applied - untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.8 x 10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF CHROMIUM-NICKEL AT 930 F

NORMAL SPECTRAL EMITTANCE OF CHROMIUM-NICKEL ON INCONEL X AT 930 F--REFERENCE INFORMATION

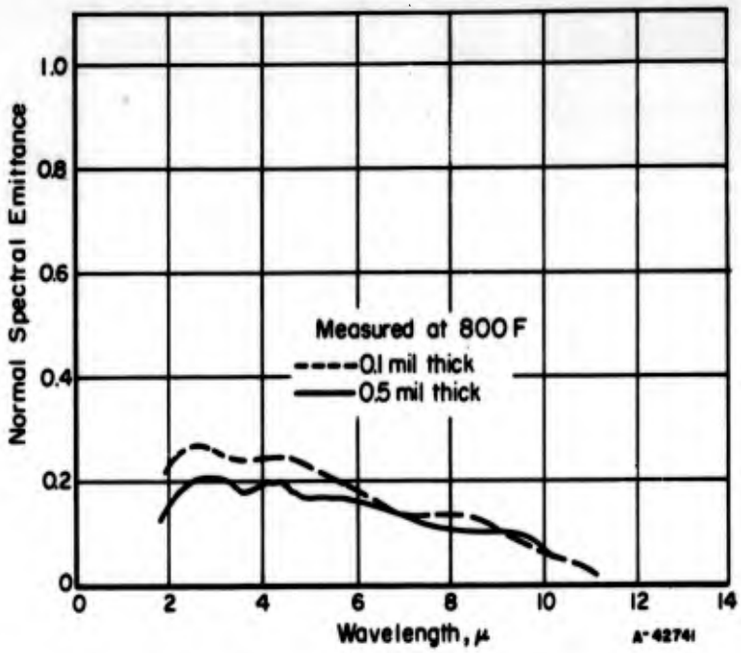
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		20 per cent chromium - 80 per cent nickel. Flame sprayed on Inconel X. As applied - untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.8 x 10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF CHROMIUM-NICKEL ON INCONEL X AT 1380 F

NORMAL SPECTRAL EMITTANCE OF CHROMIUM-NICKEL ON INCONEL X AT 1380 F--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		20 per cent chromium - 80 per cent nickel. Flame sprayed on Inconel X. As applied - untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.8 x 10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF KANIGEN NICKEL COATING ON A-286 STEEL

NORMAL SPECTRAL EMITTANCE OF KANIGEN NICKEL COATING ON A-286 STEEL--REFERENCE INFORMATION

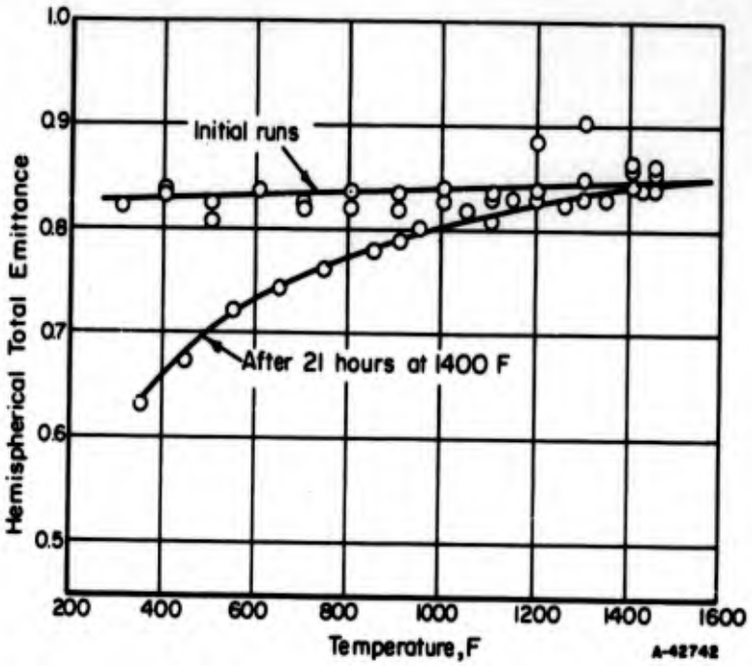
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Chemically deposited nickel alloy. Composition given below. Coating thickness: 0.1 mil 0.5 mil	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.

Composition, per cent

Ni 90-92
P 8-10
C .0400
O_2 .0023
N_2 .0047
H_2 .0016

Trace impurities of:

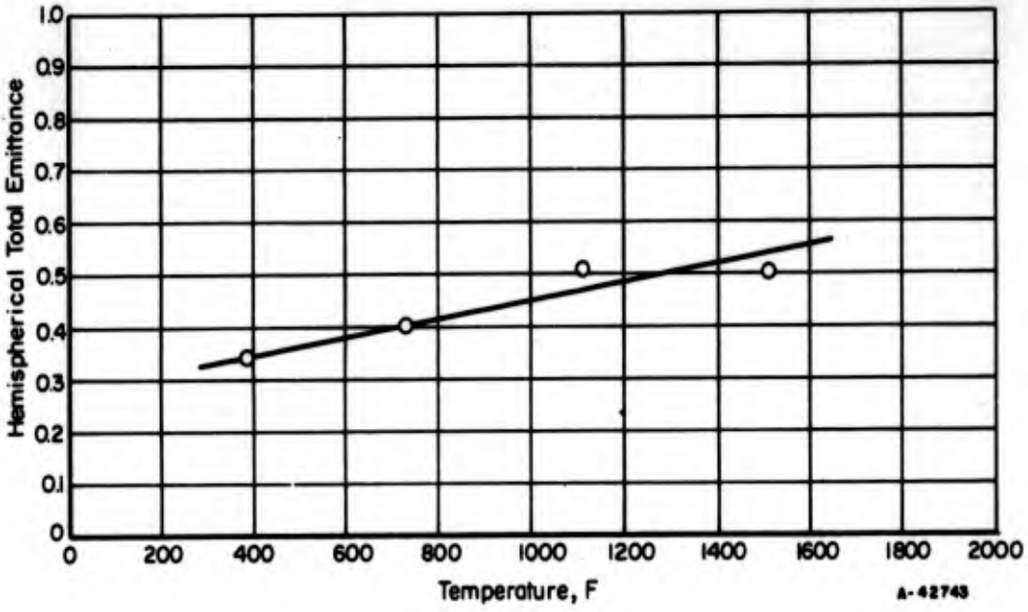
Co, Al, Cu, Mn, Fe, Pb, and Si.



HEMISPHERICAL TOTAL EMITTANCE OF SINTERED NICKEL "C" ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF SINTERED NICKEL "C" ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

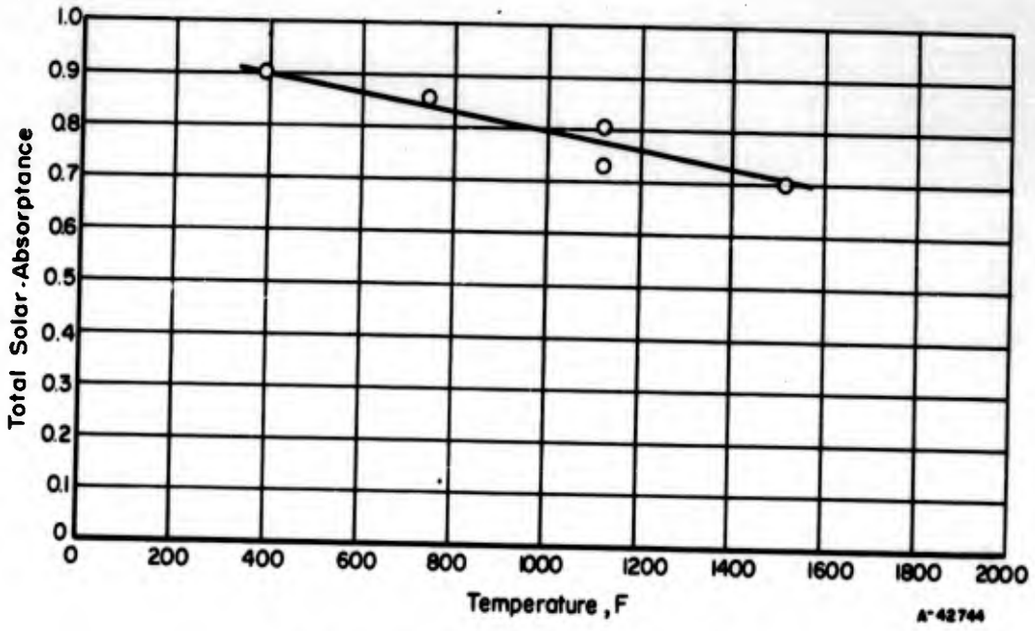
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
17	Pratt & Whitney Aircraft	--	Sintered Nickel "C", lithiated and oxidized. Nickel "C" slurry sprayed on Type 310 stainless steel, sintered in H_2, lithiated, and oxidized. Initial runs After 21 hours at 1450 F	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF TUNGSTEN ON ARMCO IRON

HEMISPHERICAL TOTAL EMITTANCE OF TUNGSTEN ON ARMCO IRON--REFERENCE INFORMATION

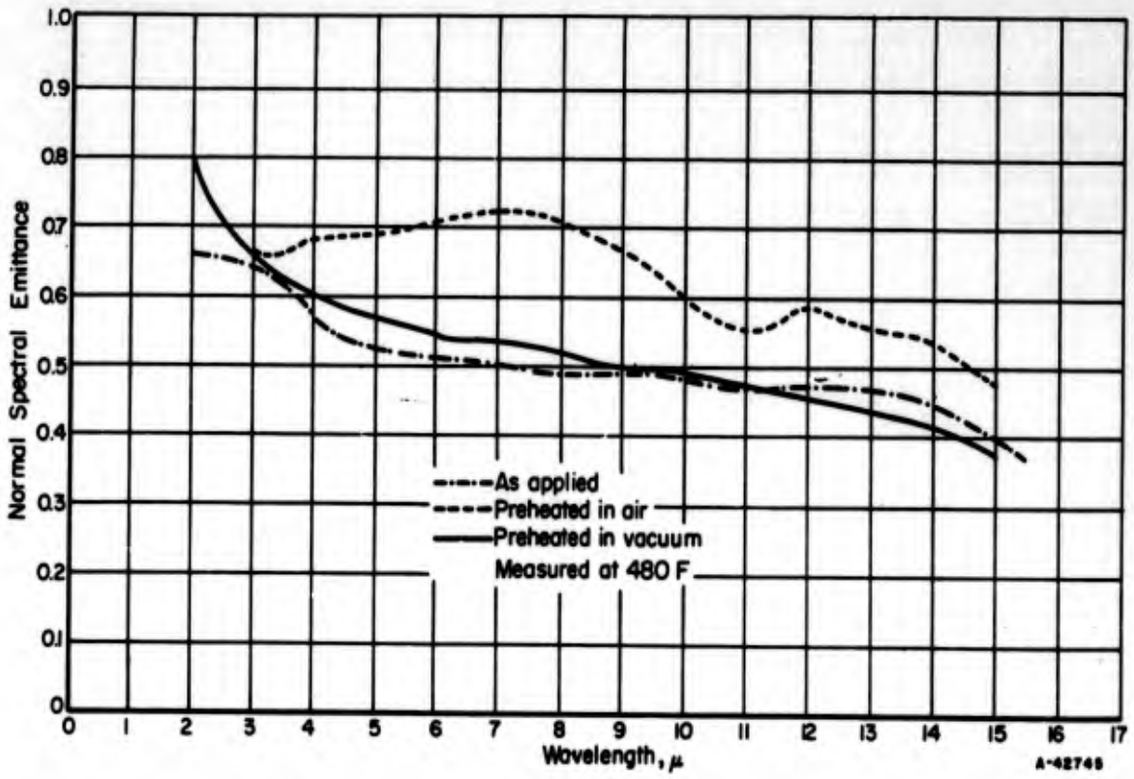
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
6	Butler, Jenkins, Rudkin, and Laughridge		Metco XP-1106 crystalline tungsten (-200 mesh + 30 micron) plasma flame sprayed on Armco iron. Surface uniformity judged by eye only. Coating thickness not given.	Hemispherical total emittance. Disk specimen. Temperature measured with thermocouples. Emittance calculated from mass, specific heat, and rate of change of temperature of the specimen.	Measured in vacuum. Data taken from curve.



TOTAL SOLAR ABSORPTANCE OF TUNGSTEN ON ARMCO IRON

TOTAL SOLAR ABSORPTANCE OF TUNGSTEN ON ARMCO IRON--REFERENCE INFORMATION

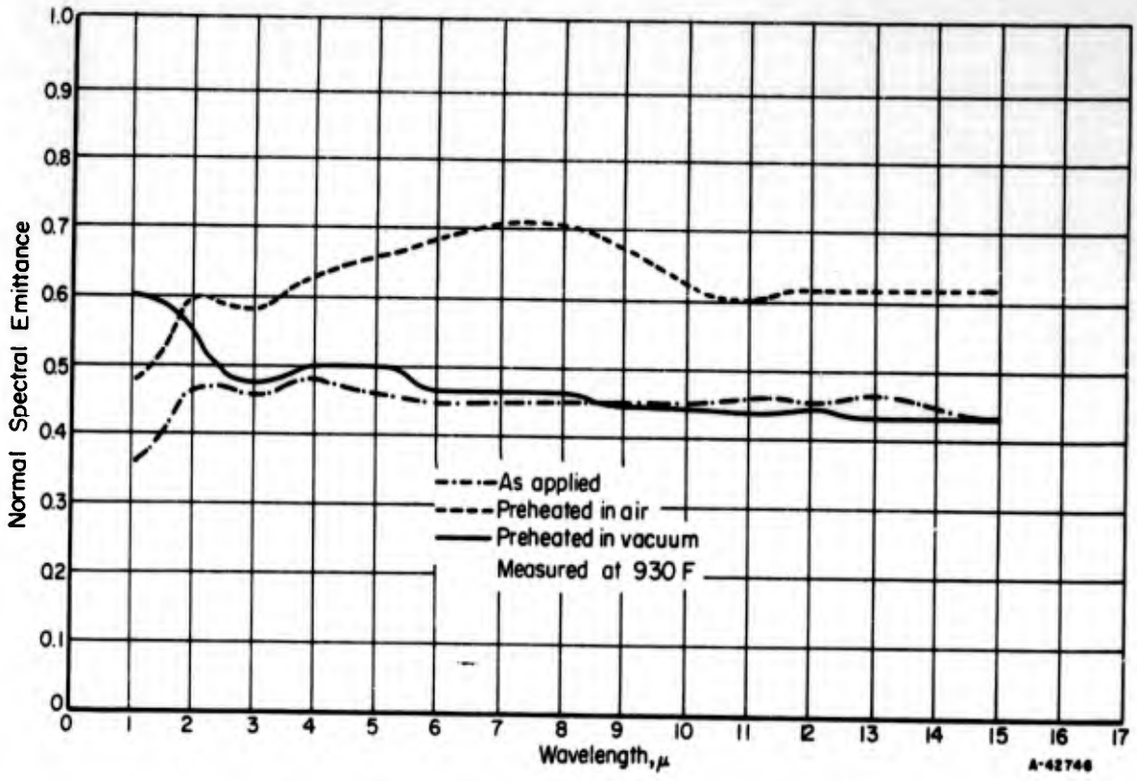
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
6	Butler, Jenkins, Rudkin, and Laughridge		Metco XP-1106 crystalline tungsten (-200 mesh + 30 micron). Plasma flame sprayed on Armco iron. Surface uniformity judged by eye only. Coating thickness not given.	Total solar absorptance. Carbon-arc-image furnace. Disk specimen. Temperatures measured with thermocouples. Absorptance calculated from mass, specific heat, rate of change of temperature, and known irradiance of the surface. (Solar spectrum simulated by carbon arc)	Measured in vacuum. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF TUNGSTEN ON INCONEL X AT 480 F

NORMAL SPECTRAL EMITTANCE OF TUNGSTEN ON INCONEL X AT 480 F--REFERENCE INFORMATION

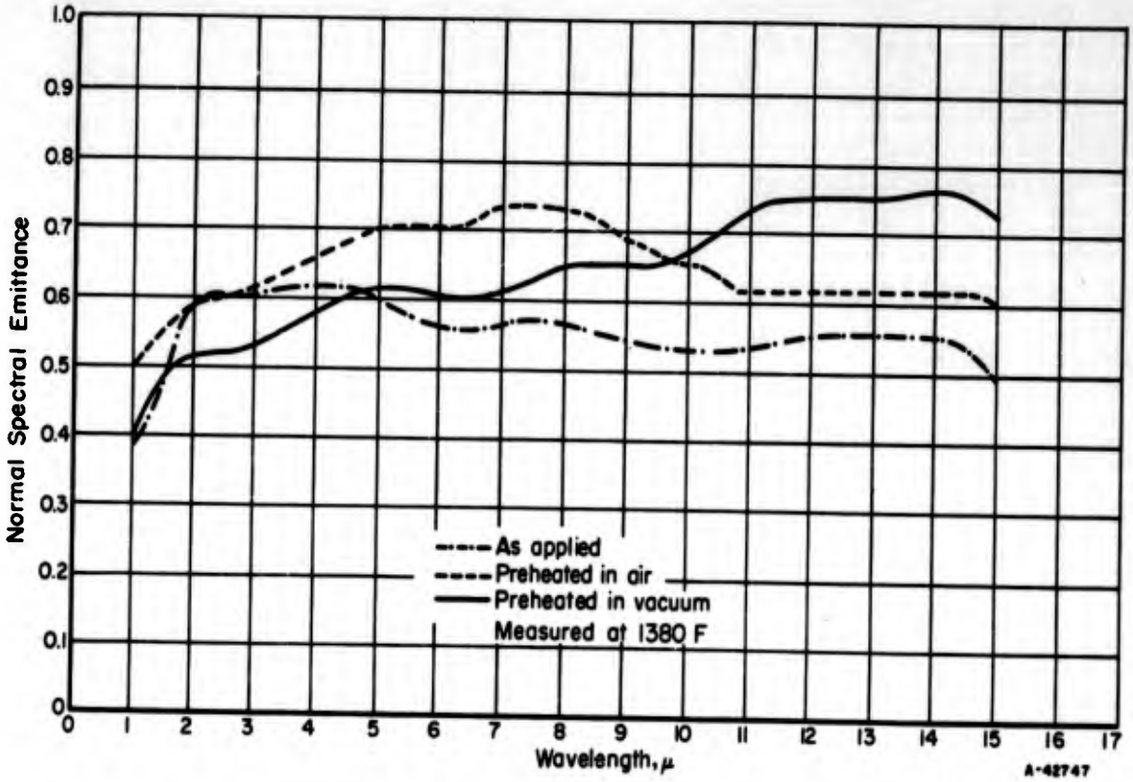
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		Flame sprayed on Inconel X. Heated 30 minutes in 6.8×10^{-5} mm Hg pressure at 1500 F Heated 30 minutes in air at 1500 F As applied - untreated	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF TUNGSTEN ON INCONEL X AT 930 F

NORMAL SPECTRAL EMITTANCE OF TUNGSTEN ON INCONEL X AT 930 F--REFERENCE INFORMATION

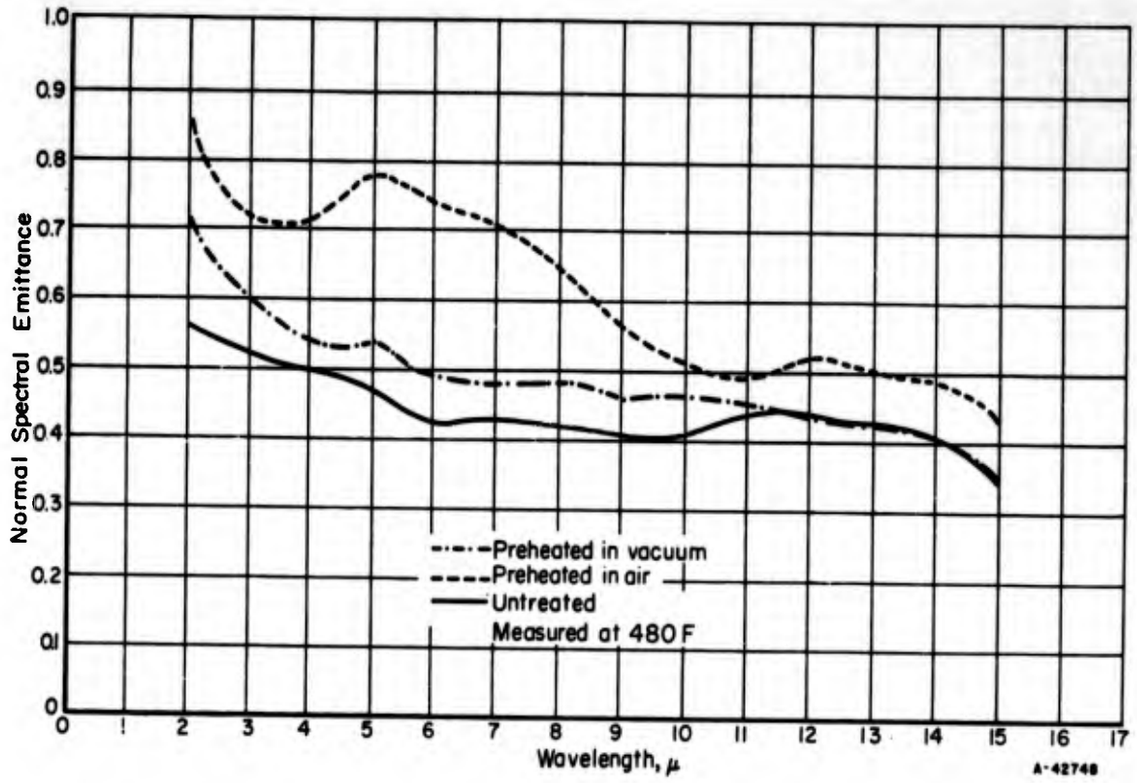
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		Flame sprayed on Inconel X. Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.8 x 10^{-5} mm Hg pressure at 1500 F As applied - untreated	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF TUNGSTEN ON INCONEL X AT 1380 F

NORMAL SPECTRAL EMITTANCE OF TUNGSTEN ON INCONEL X AT 1380 F--REFERENCE INFORMATION

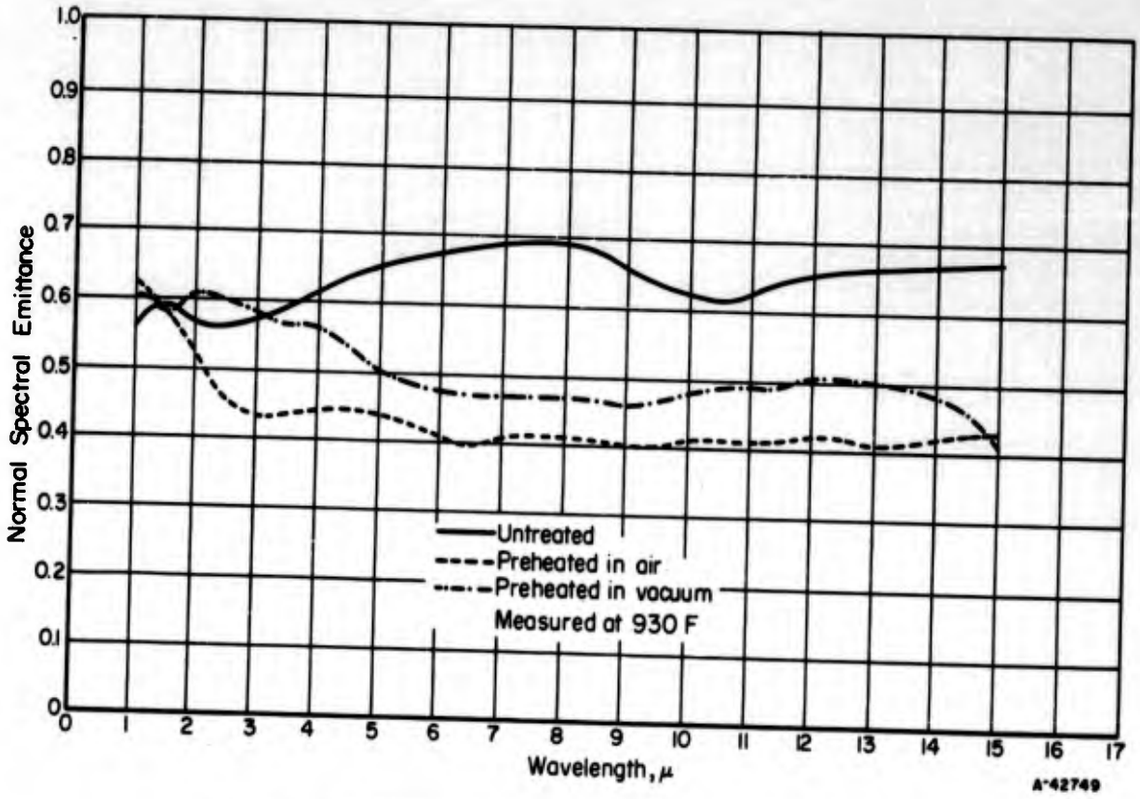
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		Flame sprayed on Inconel X. As applied - untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.8×10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF TUNGSTEN-50 PER CENT COBALT ON INCONEL X AT 480 F

NORMAL SPECTRAL EMITTANCE OF TUNGSTEN - 50 PER CENT COBALT ON INCONEL X AT 480 F---REFERENCE INFORMATION

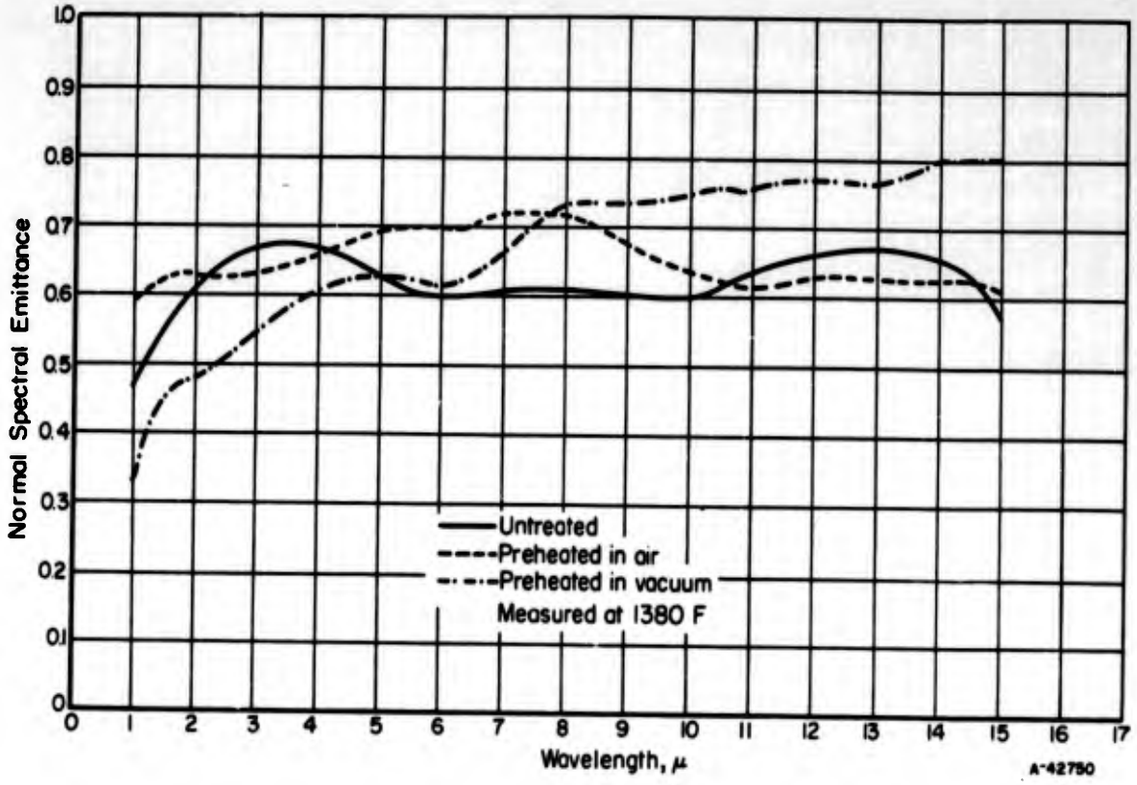
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		50 per cent tungsten - 50 per cent cobalt. Flame sprayed on Inconel X. Untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.8 x 10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF TUNGSTEN-50% COBALT ON INCONEL X AT 930 F

NORMAL SPECTRAL EMITTANCE OF TUNGSTEN - 50 PER CENT COBALT ON INCONEL X AT 930 F--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		50 per cent tungsten - 50 per cent cobalt. Flame sprayed on Inconel X. Untreated - as sprayed Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.8 x 10^{-5} mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.



NORMAL SPECTRAL EMITTANCE OF TUNGSTEN-50% COBALT ON INCONEL X AT 1380 F

NORMAL SPECTRAL EMITTANCE OF TUNGSTEN - 50 PER CENT COBALT ON INCONEL X AT 1380 F--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
14	Adams, J. G.		50 per cent tungsten - 50 per cent cobalt. Flame sprayed on Inconel X. As sprayed - untreated Heated 30 minutes in air at 1500 F Heated 30 minutes in 6.8 x 10-5 mm Hg pressure at 1500 F	Normal spectral emittance. Furnace-heated disk specimen. Comparison blackbody (Hohlraun). Spectrometer-monochromator with photomultiplier, lead sulphide, and thermocouple detectors. Temperatures measured with thermocouples.	Measured in air.

NORMAL TOTAL EMITTANCE OF HIGH EMITTANCE COATINGS AT 1200 AND 1500 F

Material	Coating	Coating Thickness, mils	Normal Total Emittance 1200 F	1500 F
25-52 base with 200-mesh overspray coatings of:				
	Ferrosilicon	2	0.93	0.95
	Chrome oxide	1 1/2	0.95	0.95
	Mild steel scale	2 1/2	0.97	0.98
	Chromite ore No. 1	1 1/2	0.86	0.88
	Chromite ore No. 2 (high Cr_2O_3)	1 1/2	0.85	0.89
	Manganese dioxide	3/4	0.92	0.94
	Iron manganate spinel	1 1/2	0.88	0.95
	Nickel oxide	1 1/2	0.92	0.95
25-52 base with 200-mesh Chromite No. 1 as a blend containing:				
	20% Chromite No. 1	1	0.91	0.93
	30% Chromite No. 1	2	0.93	0.95
	30% Chromite No. 1	1 1/4	0.97	0.96
	40% Chromite No. 1	3	0.95	0.96
	40% Chromite No. 1	1 1/4	0.95	0.98
	50% Chromite No. 1	1 3/4	0.93	0.93
Overspray of nickel oxide on mild steel 25-52 base with overspray of:				
	Minus 100 and 200-mesh Chromite No. 1	2 1/2	0.85	0.87
	Minus 200 and 325-mesh Chromite No. 1	2 1/2	0.89	0.91
	Minus 325 mesh Chromite No. 1	2 1/2	0.92	0.93
25-52 base with 325-mesh:	Chromite No. 1 overspray	1/2	0.90	0.94
	Chromite No. 1 overspray	3/4	0.96	0.96
	Chromite No. 1 overspray	1 1/2	0.86	0.88
	Chromite No. 1 overspray	2	0.73	0.79

NORMAL TOTAL EMITTANCE OF HIGH EMITTANCE COATINGS--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
5	Douglass, E. A.			Normal total emittance. Total radiation pyrometer. Coatings on rotating steel cylinder containing blackbody hole. Temperatures measured with thermocouples.	Measured in air. Data taken from table.

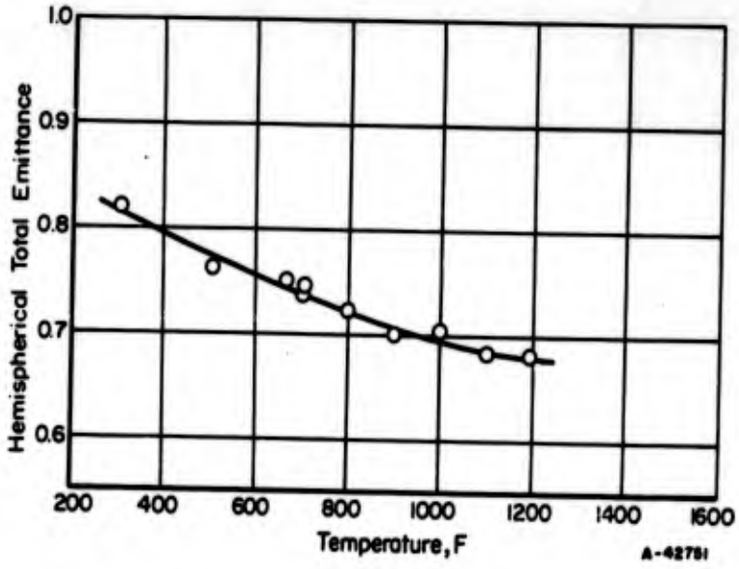
NORMAL TOTAL EMITTANCE OF VARIOUS COATINGS AT 1200 AND 1500 F

Top-Coat Oxide	Thickness, mils				Normal Total Emittance	
	Base(1)	Cover(2)	Top	Total	1200 F	1500 F
*Feldspar	5.0	13.0	2.0	20.0	0.32	0.27
*Treopax	5.0	11.0	3.0	19.0	0.27	0.23
*Quartz	4.0	15.0	2.0	21.0	0.49	0.34
*Zirconium spinel	4.5	13.0	3.0	20.5	0.23	0.22
*Alumina	5.0	12.5	2.0	19.5	0.42	0.35
Black Label clay	5.0	14.0	3.0	22.0	0.67	0.60
*Uverite	5.0	12.5	3.0	20.5	0.45	0.33
Zircon	4.0	15.0	2.0	21.0	0.61	0.52
Antimony oxide	5.0	11.0	4.0	20.0	0.62	0.57
Calcium carbonate	4.0	13.0	2.0	19.0	0.62	0.68
*Fused magnesia	5.0	11.5	2.0	18.5	0.57	0.63
*Zinc oxide	4.5	15.5	2.0	22.0	0.51	0.60
*Tin oxide	4.5	13.0	1.5	19.0	0.34	0.35
*Zirconia	5.0	13.0	1.5	19.5	0.40	0.34
*Diaspore clay	4.5	11.5	2.0	18.0	0.49	0.42
*Cerium oxide	5.0	13.0	2.0	20.0	0.35	0.37
*Calcium metaphosphate	4.5	13.5	2.0	20.0	0.42	0.65
*Vanadium pentoxide	4.5	13.5	2.0	20.0	0.74	0.68
Chrome oxide	4.0	13.0	1.5	18.5	0.79	0.79
XM-1	5.0	15.0	-	20.0	0.69	0.69

*Indicates oxides with 5 per cent water glass added as a binder.

NORMAL TOTAL EMITTANCE OF VARIOUS COATINGS--REFERENCE INFORMATION

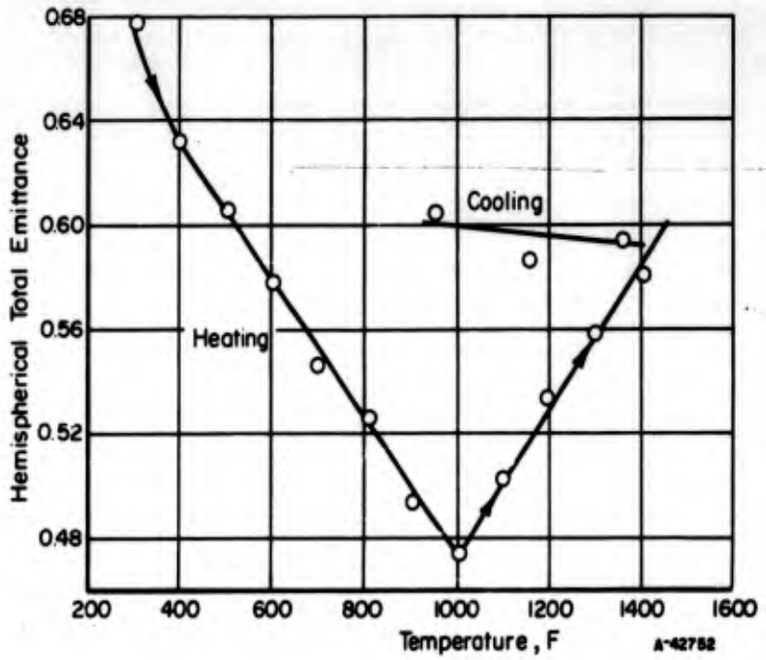
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
5	Douglass, E. A.			Normal total emittance. Total radiation pyrometer. Coatings on rotating steel cylinder containing blackbody hole. Temperatures measured with thermocouples.	Measured in air. Data taken from table.



HEMISPHERICAL TOTAL EMITTANCE OF BORON NITRIDE ON TANTALUM

HEMISPHERICAL TOTAL EMITTANCE OF BORON NITRIDE ON TANTALUM--REFERENCE INFORMATION

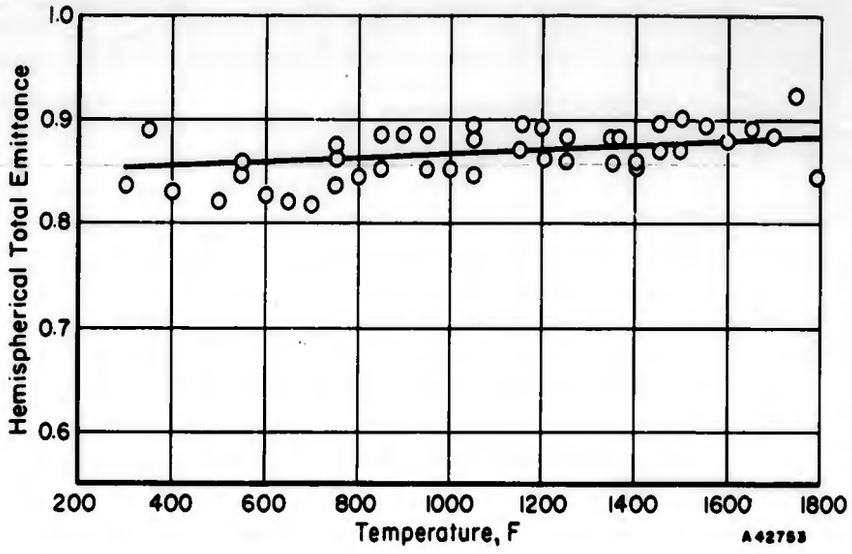
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
17	Pratt & Whitney Aircraft		Boron nitride with Synar binder. Coated on both sides of tantalum strip	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



HEMISPHERICAL TOTAL EMITTANCE OF CALCIUM FLUORIDE ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF CALCIUM FLUORIDE ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

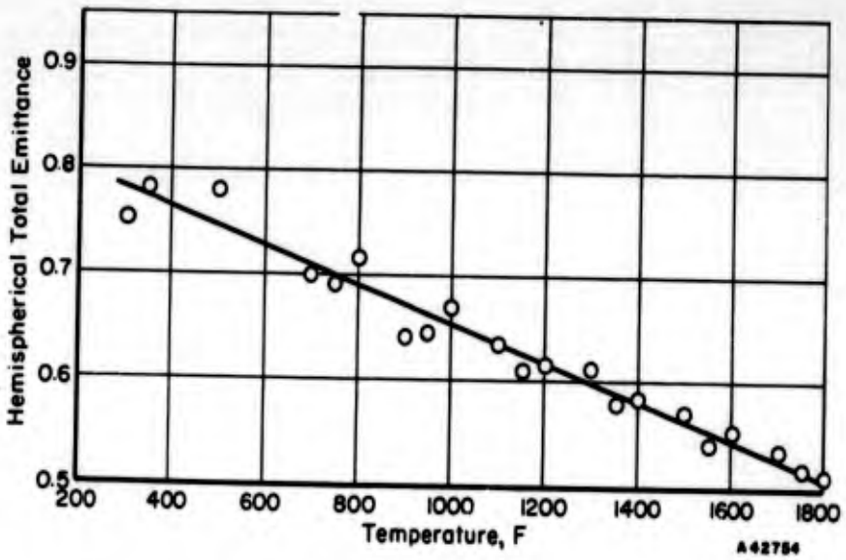
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
18	Pratt & Whitney Aircraft		A dispersion of calcium fluoride (Acheson Colloid Co. DAG EC 1789). Coated on both sides of a Type 310 stainless strip. Note: cooling change shown after 20 hours at 1450 F.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF STRONTIUM TITANATE ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF STRONTIUM TITANATE ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

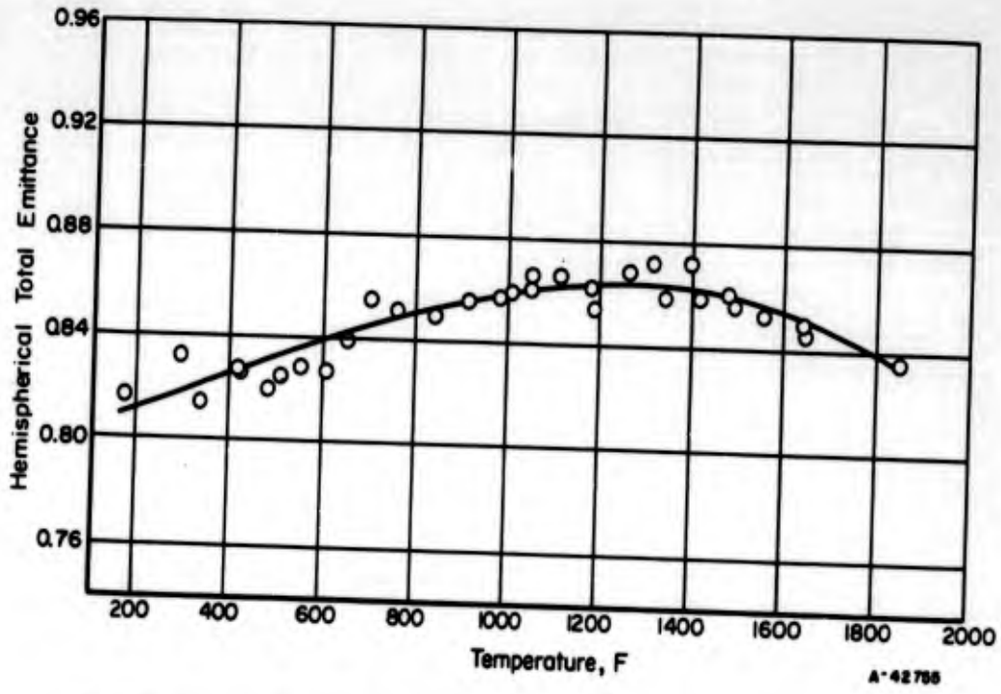
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
16	Pratt & Whitney Aircraft		Metco plasma flame spray powder.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



HEMISPHERICAL TOTAL EMITTANCE OF ZIRCONIUM SILICATE ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF ZIRCONIUM SILICATE ON TYPE 310 STAINLESS STEEL—REFERENCE INFORMATION

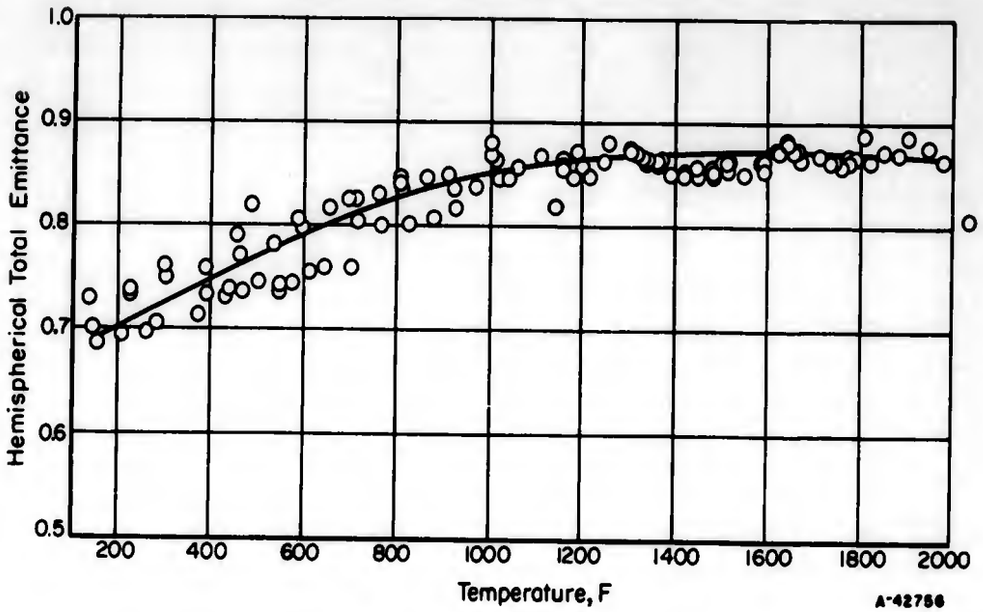
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
16	Pratt & Whitney Aircraft		Metco plasma flame spray powder XP-1116. Flame sprayed on Type 310 stainless steel strip.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



HEMISPHERICAL TOTAL EMITTANCE OF ACETYLENE BLACK AND XYLOL ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF ACETYLENE BLACK AND XYLOL ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

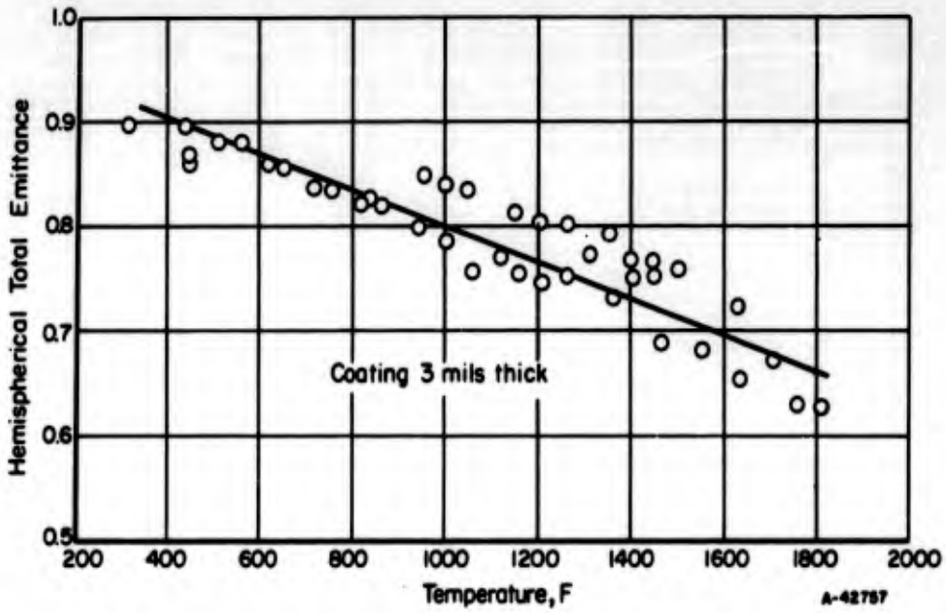
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		Colloidal suspension of acetylene black in xylol (Acheson Colloid Co. DAG EC 1652) sprayed on Type 310 stainless steel strip.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



HEMISPHERICAL TOTAL EMITTANCE OF CHROMIUM BLACK ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF CHROMIUM BLACK ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

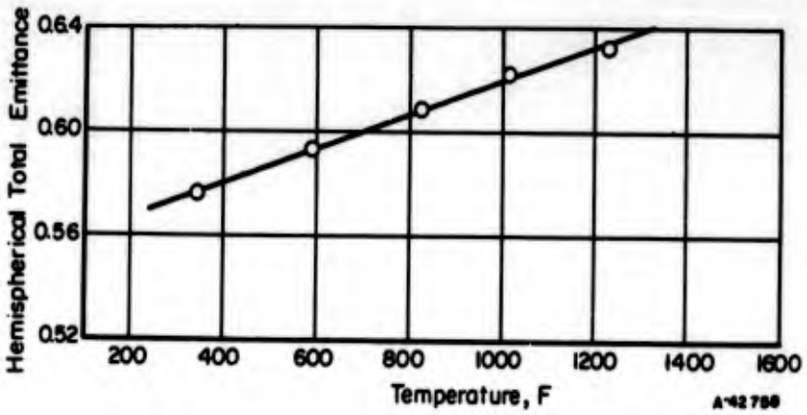
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		Chromium black deposited by a variation of the Solvay process on Type 310 stainless steel strip.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



HEMISPHERICAL TOTAL EMITTANCE OF KRYLON BLACK ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF KRYLON BLACK ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

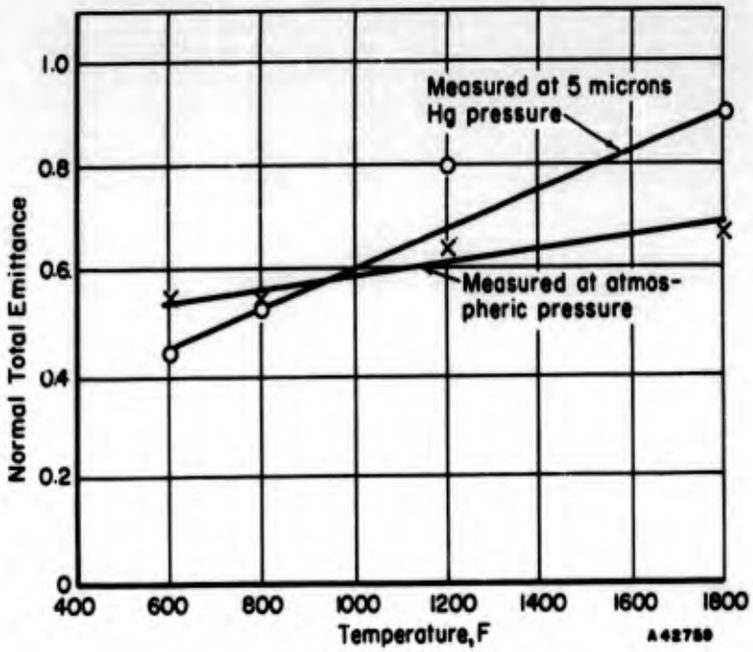
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
18	Pratt & Whitney Aircraft		Commercial Krylon Black, a mixture of carbon black and silicates in a lacquer carrier.	Hemispherical total emittance. Resistance-heated strip specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



HEMISPHERICAL TOTAL EMITTANCE OF GRAPHITE VARNISH ON TYPE 310 STAINLESS STEEL

HEMISPHERICAL TOTAL EMITTANCE OF GRAPHITE VARNISH ON TYPE 310 STAINLESS STEEL--REFERENCE INFORMATION

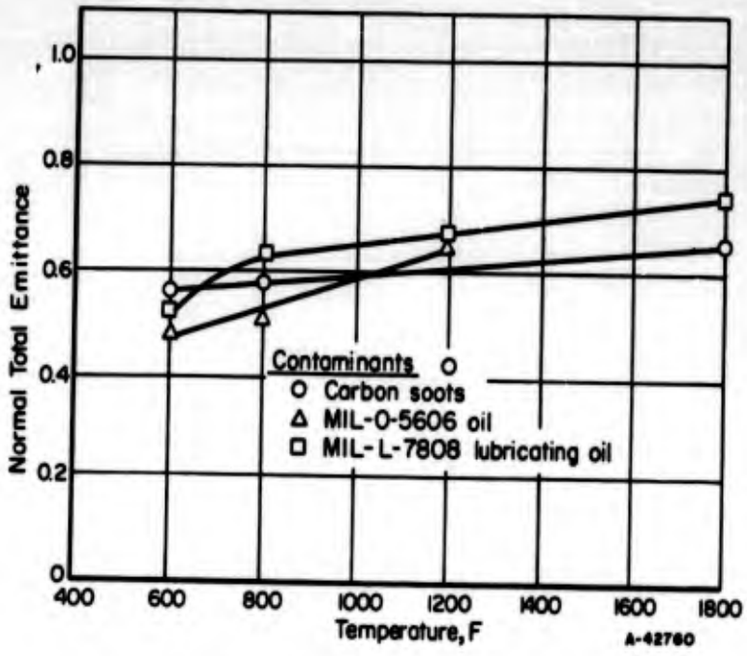
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
15	Pratt & Whitney Aircraft		Spray coated graphite varnish on Type 310 stainless steel. Note: coating flaked off near 1500 F.	Hemispherical total emittance. Resistance-heated wedge specimen. Power dissipated in measured area. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curve.



NORMAL TOTAL EMITTANCE OF OXIDIZED A-286 STEEL (CONTAMINATED)

NORMAL TOTAL EMITTANCE OF OXIDIZED A-286 STEEL (CONTAMINATED)--REFERENCE INFORMATION

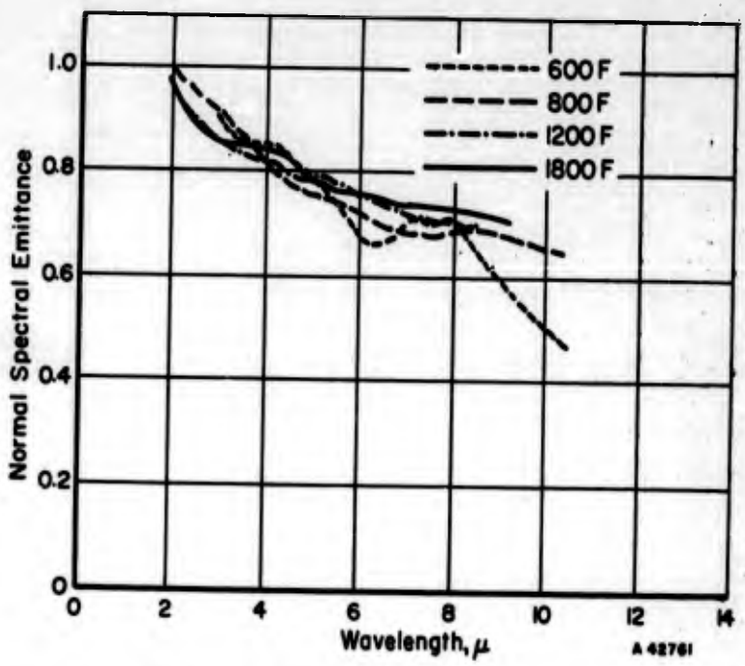
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Surface oxidized and contaminated with JP-4 fuel. At 5 microns (Hg) pressure At atmospheric pressure	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured in air and vacuum. Data taken from curves.



NORMAL TOTAL EMITTANCE OF OXIDIZED A-286 STEEL CONTAMINATED

NORMAL TOTAL EMITTANCE OF OXIDIZED TYPE A-286 STEEL (CONTAMINATED)--REFERENCE INFORMATION

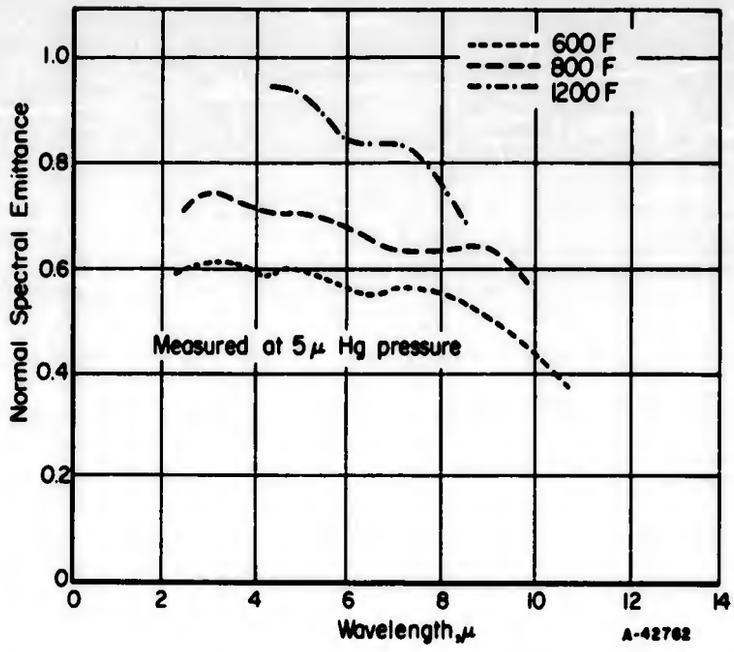
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Type A-286 steel, oxidized and contaminated with: carbon soot MIL-O-5606 oil MIL-L-7808 lubricating oil	Normal total emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Reference blackbody. Temperatures measured with thermocouples.	Measured at atmospheric pressure. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF OXIDIZED A-286 STEEL CONTAMINATED WITH JP-4 FUEL

NORMAL SPECTRAL EMITTANCE OF OXIDIZED A-286 STEEL (CONTAMINATED)—REFERENCE INFORMATION

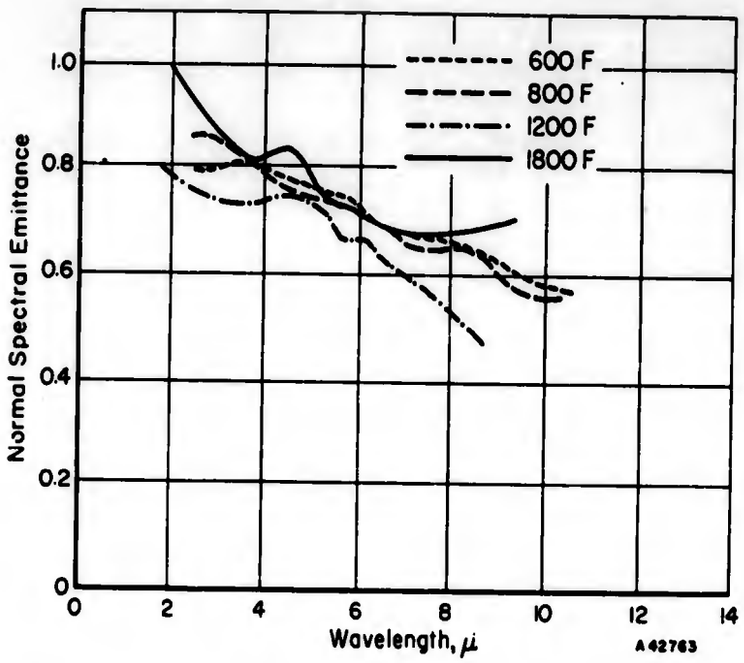
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Air oxidized A-286 steel contaminated with JP-4 fuel. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF OXIDIZED A-286 STEEL CONTAMINATED WITH JP-4 FUEL

NORMAL SPECTRAL EMITTANCE OF OXIDIZED A-286 STEEL (CONTAMINATED)--REFERENCE INFORMATION

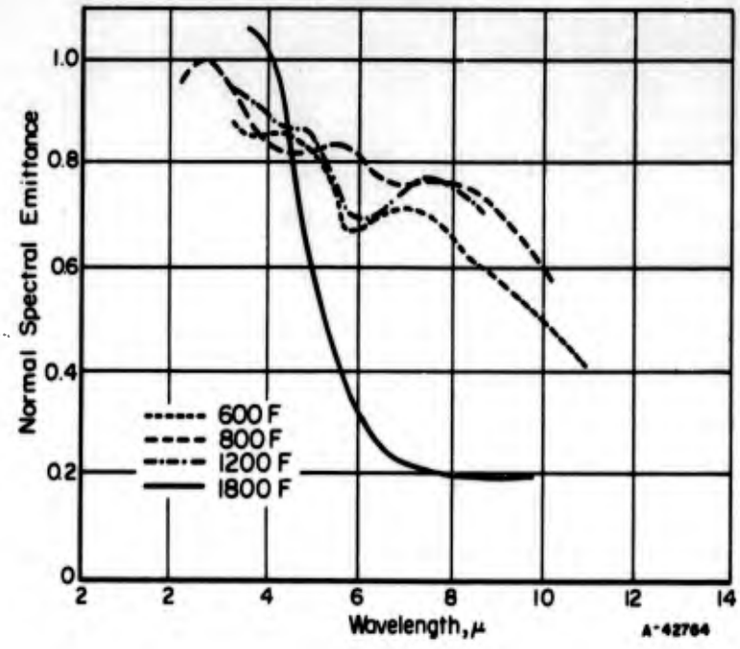
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Air oxidized type A-286 steel contaminated with JP-4 fuel. Measured at: 600 F 800 F 1200 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in 5 micron Hg pressure. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF OXIDIZED A-286 STEEL CONTAMINATED WITH CARBON DEPOSITS

NORMAL SPECTRAL EMITTANCE OF OXIDIZED A-286 STEEL (CONTAMINATED)—REFERENCE INFORMATION

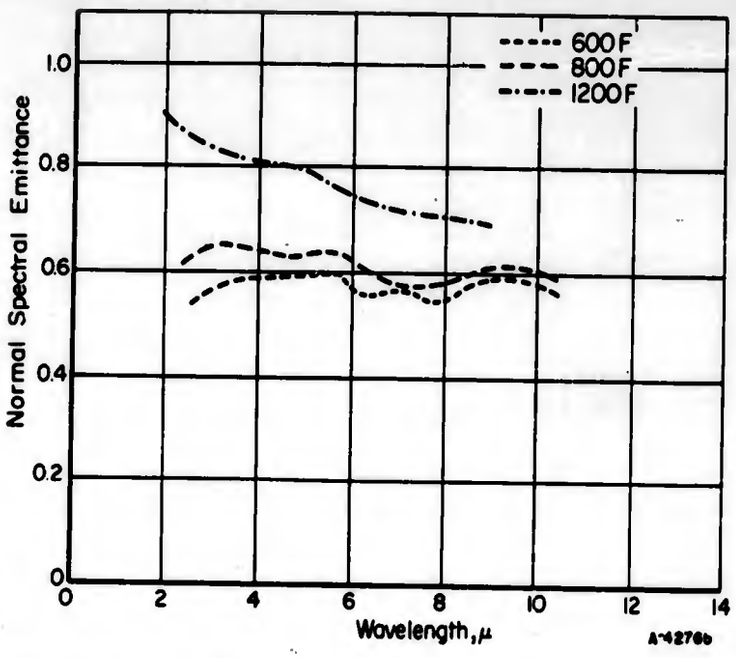
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Air oxidized type A-286 steel contaminated with carbon deposits. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF OXIDIZED A-286 STEEL CONTAMINATED WITH MIL-L-7808

NORMAL SPECTRAL EMITTANCE OF OXIDIZED A-286 STEEL (CONTAMINATED)--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Air oxidized type A-286 steel contaminated with MIL-L-7808. Measured at: 600 F 800 F 1200 F 1800 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF OXIDIZED A-286 STEEL CONTAMINATED WITH MIL-O-5606

NORMAL SPECTRAL EMITTANCE OF OXIDIZED A-286 STEEL (CONTAMINATED)--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
13	Gravina and Katz		Air oxidized type A-286 steel contaminated with MIL-O-5606. Tested at: 600 F 800 F 1200 F	Normal spectral emittance. Resistance-heated strip specimen. Thermistor-bolometer detector. Monochromator. Reference blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.

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(1) Burgess, D. G., Jasperse, J. R., Marcus, L., Martin, W. S., and Flint, E. P., "Research on Ceramic Coatings With Controlled Reflective and Emissive Properties", WADC TR 60-317 (July, 1960).

(2) Richmond, J. C., and Stewart, J. E., "Spectral Emittance of Uncoated and Ceramic-Coated Inconel and Type 321 Stainless Steel", NASA Memorandum 4-9-59 W.

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(5) Douglass, E. A., "Investigation Directed Toward the Development of Ceramic Coatings With High Reflectivities and Emissivities for Use in Aircraft Power Plants", WADC TR 56-110 (February, 1956), Contract No. AF 33(616)-2376.

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(7) Anthony, F. M., and Pearl, H. A., "Investigation of Feasibility of Utilizing Available Heat-Resistant Materials for Hypersonic Leading Edge Applications", WADC TR 59-744, Vol III (July, 1960).

(8) Fieldhouse, I. B., Lang, J. I., and Blau, H. H., Jr., "Investigation of Feasibility of Utilizing Available Heat Resistant Materials for Hypersonic Leading Edge Applications", WADC TR 59-744, Vol IV (October, 1960).

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(10) Wade, W. R., "Measurements of Total Hemispherical Emissivity of Several Stably Oxidized Metals and Some Refractory Oxide Coatings", NASA Memo 1-20-59L (January, 1959).

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(13) Gravina, A., and Katz, M., "Investigation of High Emittance Coatings to Extend the Mach Number Range of Application of Structural Materials", WADD TR 60-102 (December, 1960).

(14) Adams, J. G., "The Determination of Spectral Emissivities, Reflectivities, and Absorptivities of Materials and Coatings", Northrop Corporation Report No. NOR-61-189 (Aug. 3, 1961).

(15) Pratt and Whitney Aircraft, "Measurement of Spectral and Total Emittance of Materials and Surfaces Under Simulated Space Conditions", Report No. PWA-1863 (July 1, 1959 through June 30, 1960) Contract No. NASW-4.

(16) Pratt and Whitney Aircraft, "Determination of the Emissivity of Materials", Report PWA-2043.

(17) Pratt and Whitney Aircraft, "Determination of the Emissivity of Materials", Report PWA-1994.

(18) Pratt and Whitney Aircraft, "Determination of the Emissivity of Materials", Report PWA-1966.

RADIATIVE PROPERTY DATA

Ceramics and Graphite

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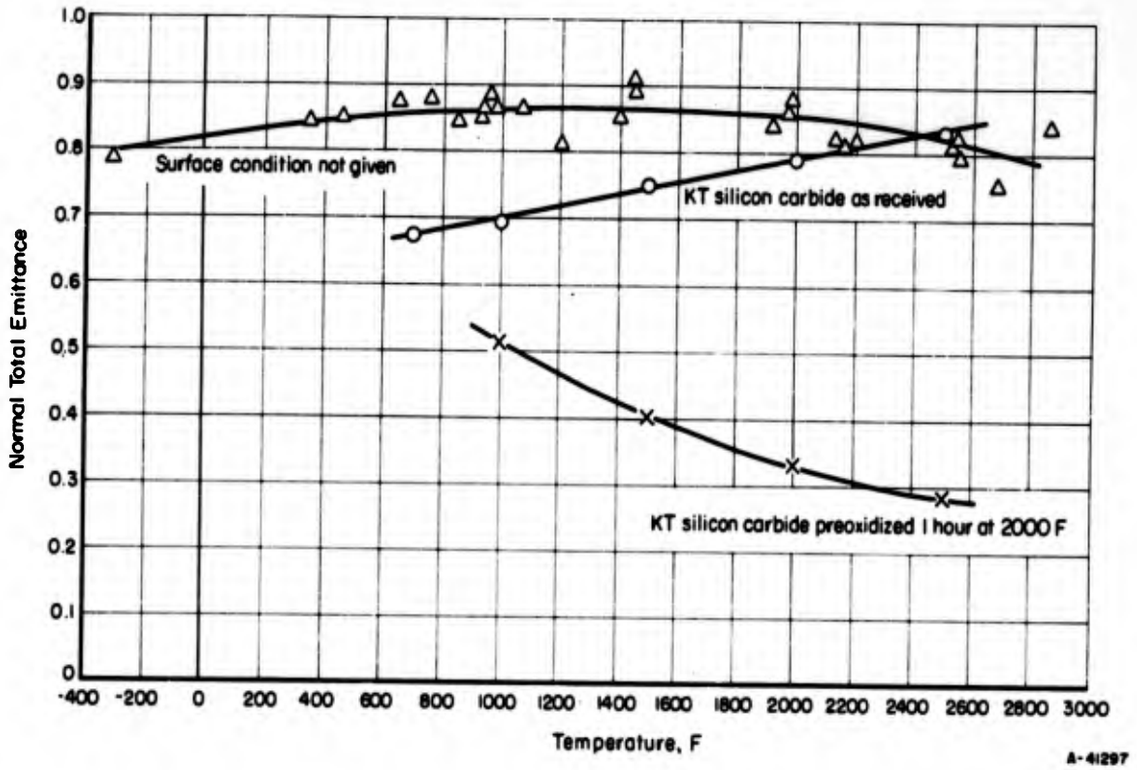
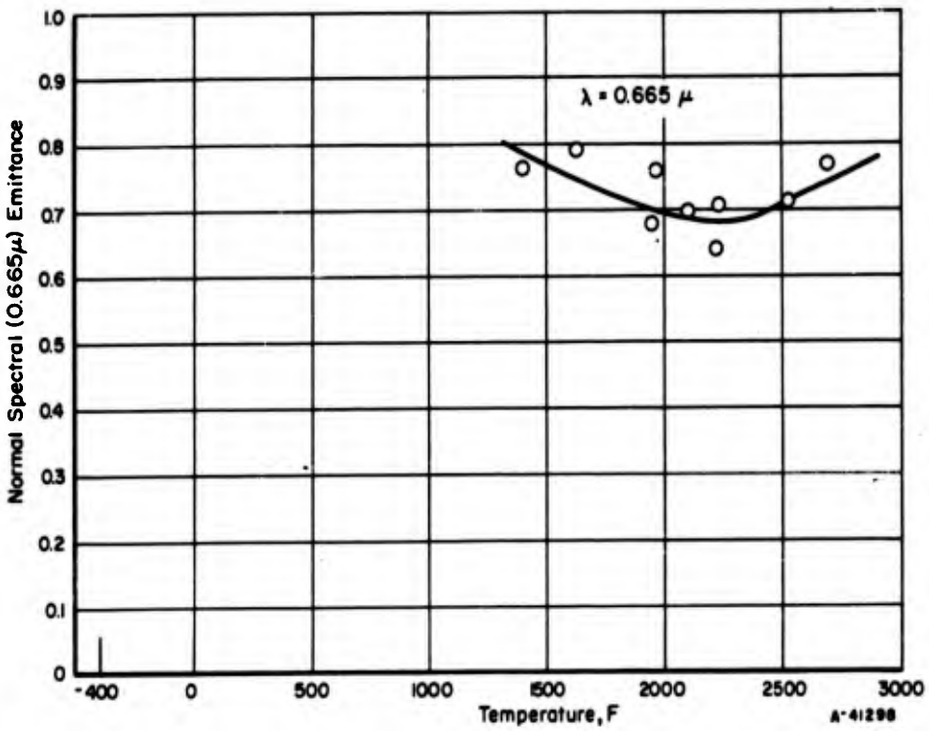
SILICIDES



NORMAL TOTAL EMITTANCE OF SILICON CARBIDE

NORMAL TOTAL EMITTANCE OF SILICON CARBIDE--REFERENCE INFORMATION

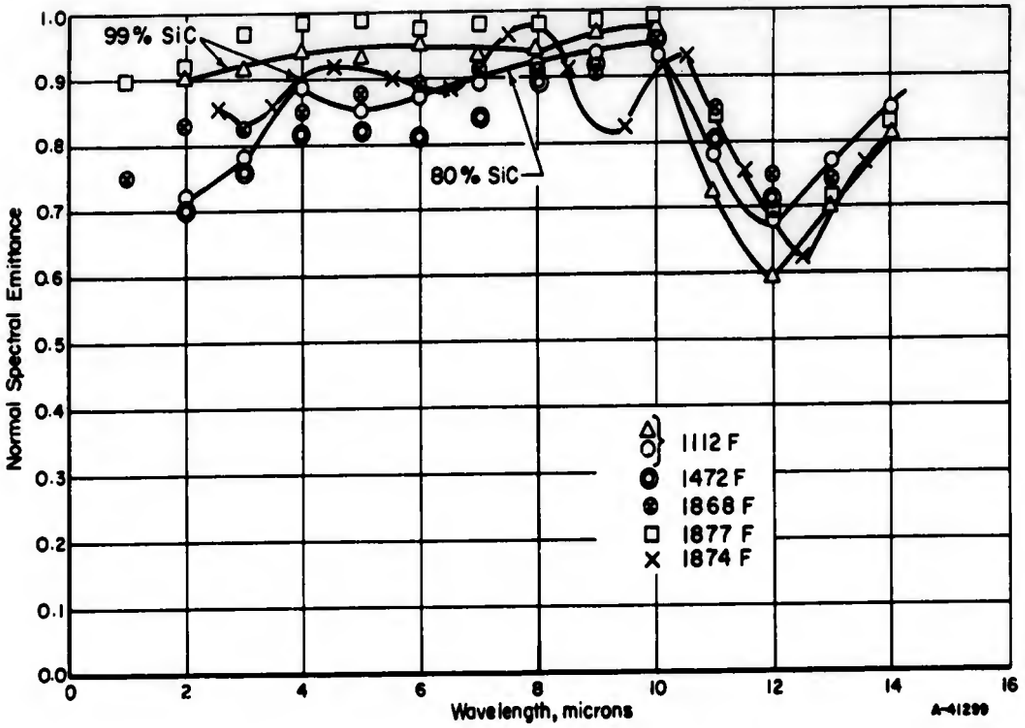
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Anthony and Pearl		KT Silicon carbide	Normal total emittance. Induction-heated specimen. Comparison blackbody. Thermopile detector. Temperatures measured with thermocouples.	Measured in purge of dry helium gas. Data taken from table.
		O	As received		
		X	Pre-oxidized in air 1 hour at 2000 F		
2	Olson and Morris	Δ	Silicon carbide Surface condition not given	Normal total emittance. Furnace-heated specimen. Comparison blackbody. Thermistor detector. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF SILICON CARBIDE

NORMAL SPECTRAL EMITTANCE OF SILICON CARBIDE--REFERENCE INFORMATION

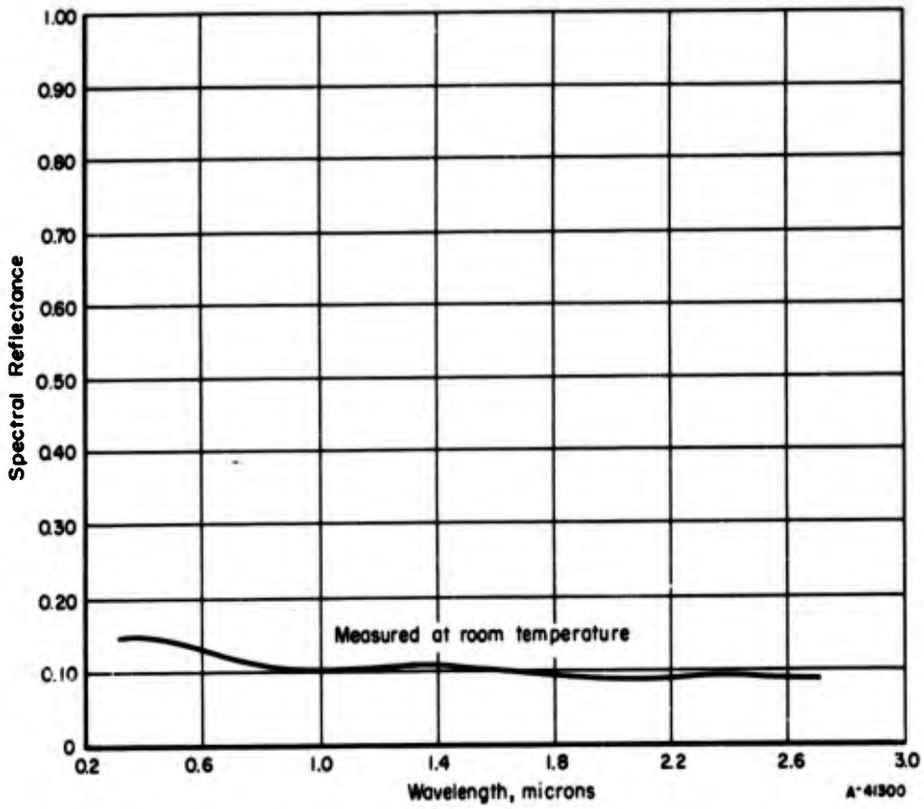
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris	O	Silicon carbide Surface condition not given	Normal spectral emittance. Furnace-heated specimen. Comparison blackbody. Commercial detector and filter system for peak response at 0.665μ. Temperatures measured with thermocouples.	Measured in air. Data taken from curves. (λ= 0.665μ)



NORMAL SPECTRAL EMITTANCE OF SILICON CARBIDE

NORMAL SPECTRAL EMITTANCE OF SILICON CARBIDE--REFERENCE INFORMATION

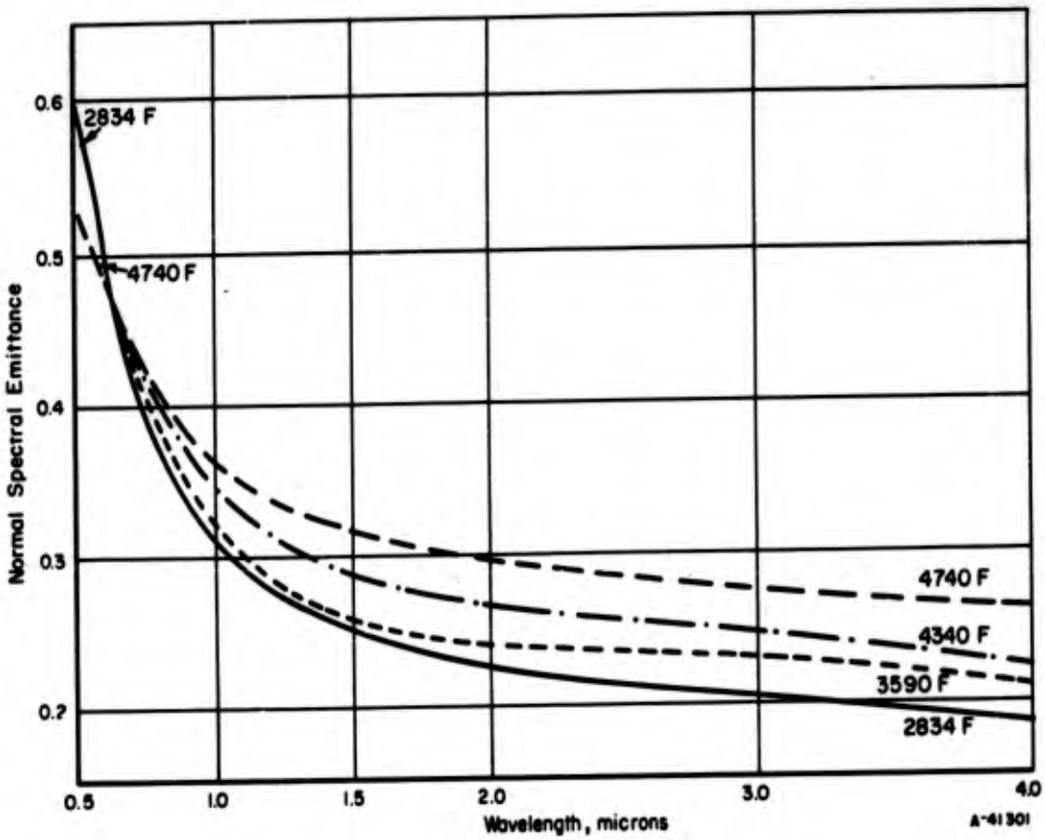
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
3	Blau, Marsh, Martin, Jasperse, and Chaffee		Silicon carbide Diamond wheel finish as supplied by manufacturer Crystolon R (Norton) 99% + pure	Normal spectral emittance. Specimen mounted in wall of cylindrical Globar (SiC) heater. Comparison blackbody hole also in heater wall. Temperatures measured with thermocouples. Monochromator and thermocouple detector.	Measured in air. Data taken from curves. (Curves are drawn through the 1112 F points only.)
		△	Measured at 1112 F		
		□	Measured at 1877 F		
			RC4237 (Norton) 80% pure		
		○	Measured at 1112 F		
		◎	Measured at 1472 F		
		⊗	Measured at 1868 F		
4	Blau, Chaffee, Jasperse, and Martin	×	99 per cent silicon carbide (Norton Crystalon R) Flat smooth surface from diamond wheel cutting. The minima at about 9 and 12 microns are attributed to a thin SiO_2 surface film. Measured at 1874 F	Normal spectral emittance. Induction-heated specimen. Comparison blackbody. Monochromator and thermocouple detector. Temperatures measured with micro-optical pyrometer.	Measured in 90% argon, 10% hydrogen atmosphere. Data taken from curve.



SPECTRAL REFLECTANCE OF SILICON CARBIDE

SPECTRAL REFLECTANCE OF SILICON CARBIDE—REFERENCE INFORMATION

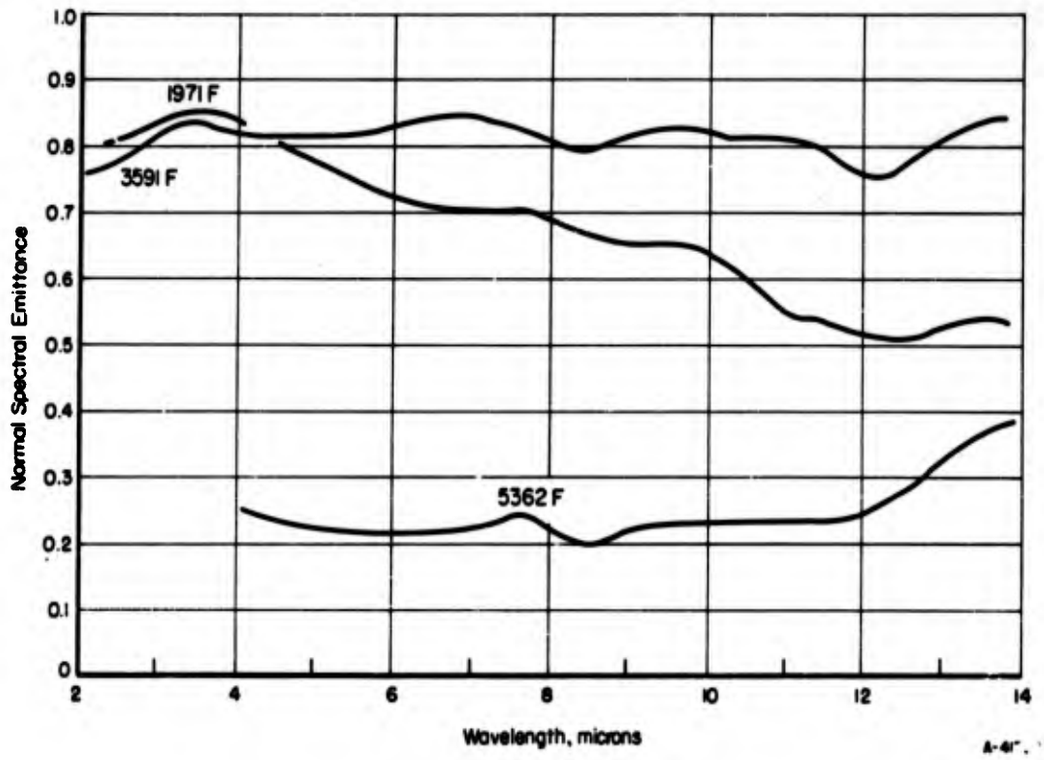
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris		Silicon carbide, purity and surface condition not given	Spectral reflectance. Incident radiation 9 degrees from normal to specimen surface. Integrating sphere reflectometer. Monochromator and lead sulphide detector. Normal (9 degrees) illumination Diffuse reflection.	Measured in air at room temperature. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE (0.5 TO 4 MICRONS)

NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE (0.5 TO 4 MICRONS)—REFERENCE INFORMATION

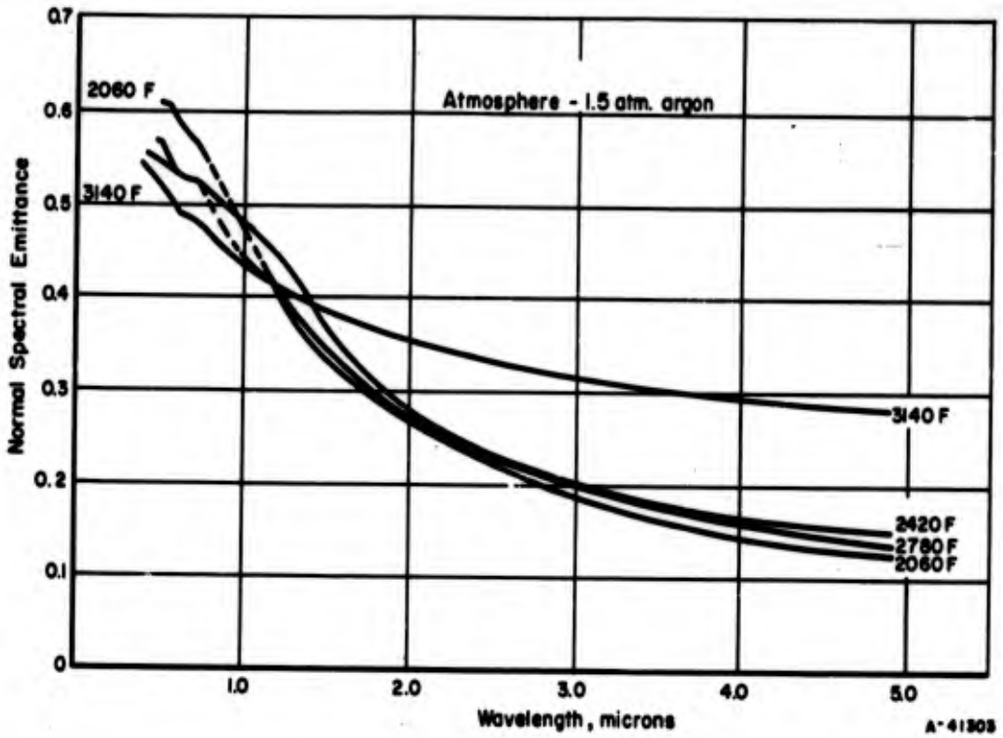
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
6	Riethof		Tantalum carbide Composition or surface condition not given Measured at 2834, 3590, 4340, and 4740 F	Normal spectral emittance. Induction-heated specimen. Blackbody hole in specimen surface. Thermocouple detector. Monochromator. Temperatures measured with optical pyrometer.	Measured in argon. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE (2 TO 14 MICRONS)

NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE (2 TO 14 MICRONS)--REFERENCE INFORMATION

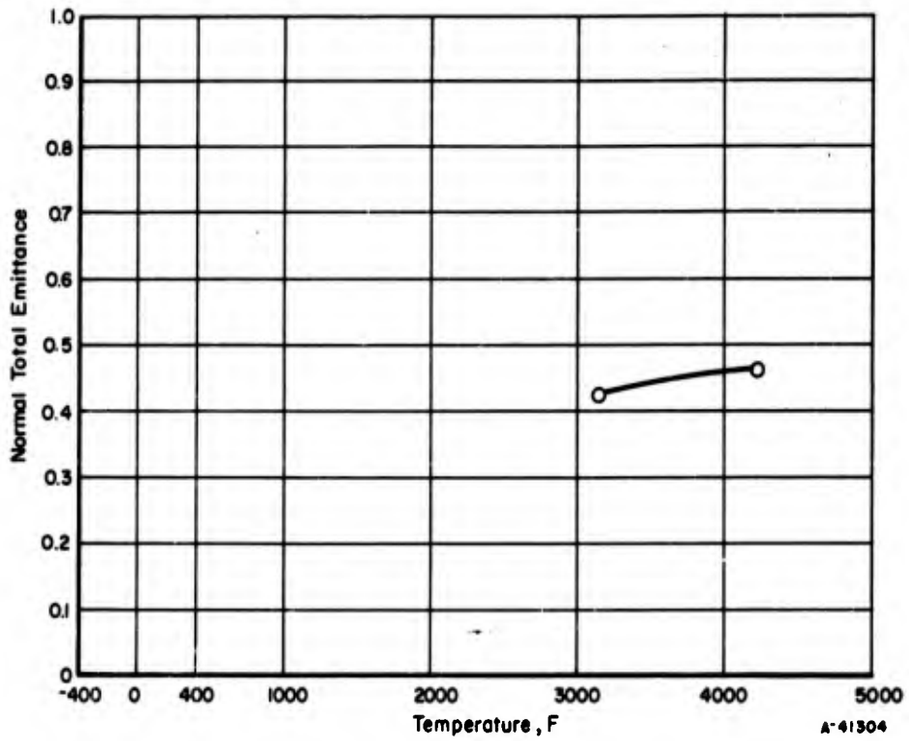
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
4	Blau, Chaffee, Jasperse, and Martin		Tantalum carbide Purity not given Surface flat and smooth but not polished (Note: Surface analysis after 3234 K (5362 F) run showed thin tantalum oxide film)	Normal spectral emittance. Induction-heated specimen. Comparison blackbody. Monochromator and thermocouple detector. Temperatures measured with optical pyrometer.	Measured in 90% argon 10% hydrogen atmosphere. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF TUNGSTEN CARBIDE

NORMAL SPECTRAL EMITTANCE OF TUNGSTEN CARBIDE--REFERENCE INFORMATION

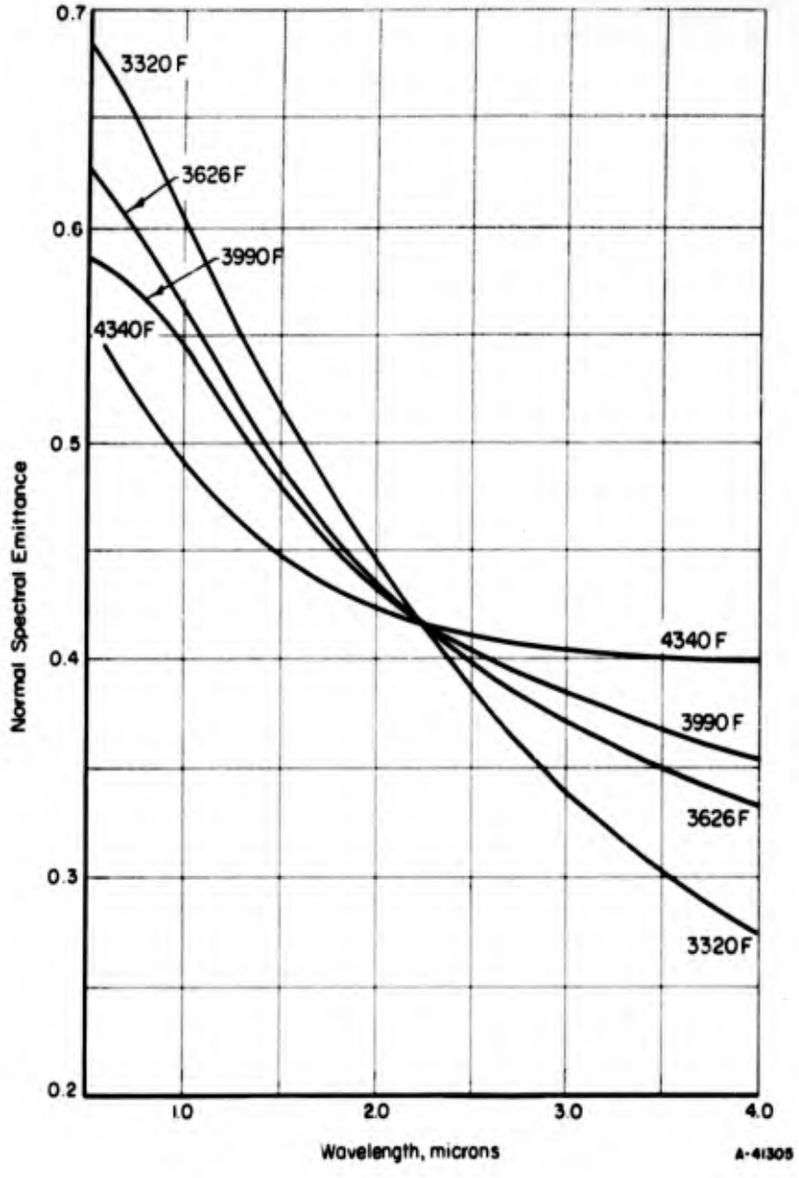
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
5	Coffman, Coulson, and Kibler		Tungsten carbide (WC) Surface condition or purity not given Note: Surface transformation from WC to W_2C at 3140 F Measured at 2060, 2780, 2420, and 3140 F	Normal spectral emittance. Induction-heated specimen. Blackbody hole in specimen surface. Thermocouple detector. Monochromator. Temperatures measured with optical pyrometer.	Measured in 1.5 atmosphere of argon. Data taken from curves.



NORMAL TOTAL EMITTANCE OF ZIRCONIUM CARBIDE

NORMAL TOTAL EMITTANCE OF ZIRCONIUM CARBIDE--REFERENCE INFORMATION

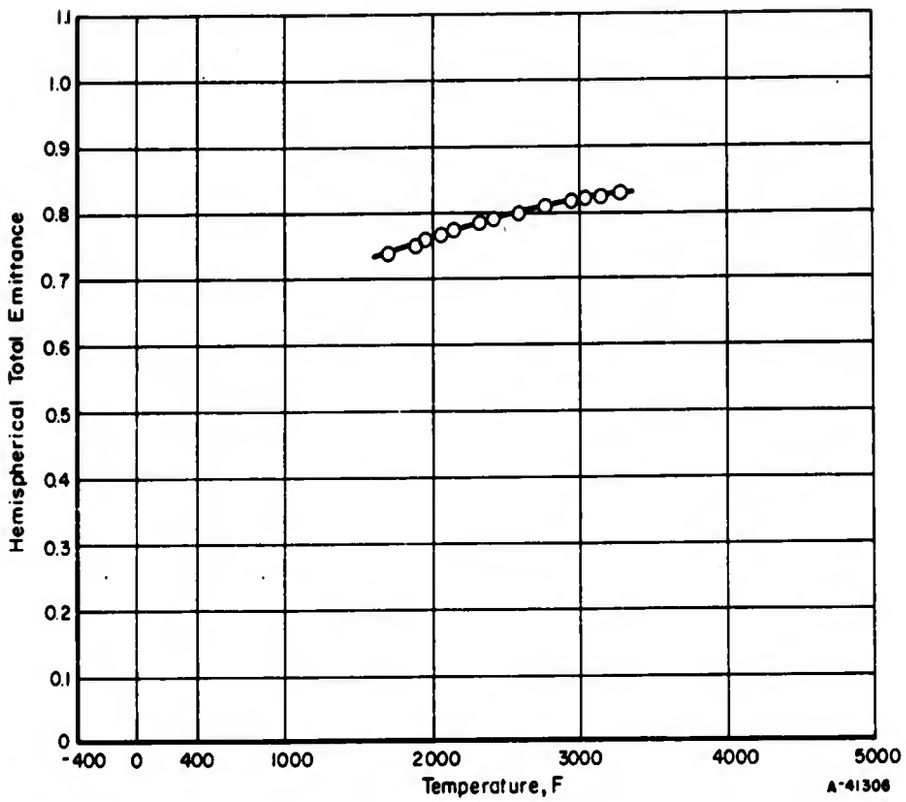
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
5	Coffman, Coulson, and Kibler	O	Formed into "toadstool" shaped specimen Composition and surface condition not given	Normal total emittance. Induction-heated specimen. Comparison blackbody. Temperatures measured with optical pyrometer.	Measured in 1.5 atmosphere of dry, pure, argon. Data taken from curve.



NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM CARBIDE

NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM CARBIDE--REFERENCE INFORMATION

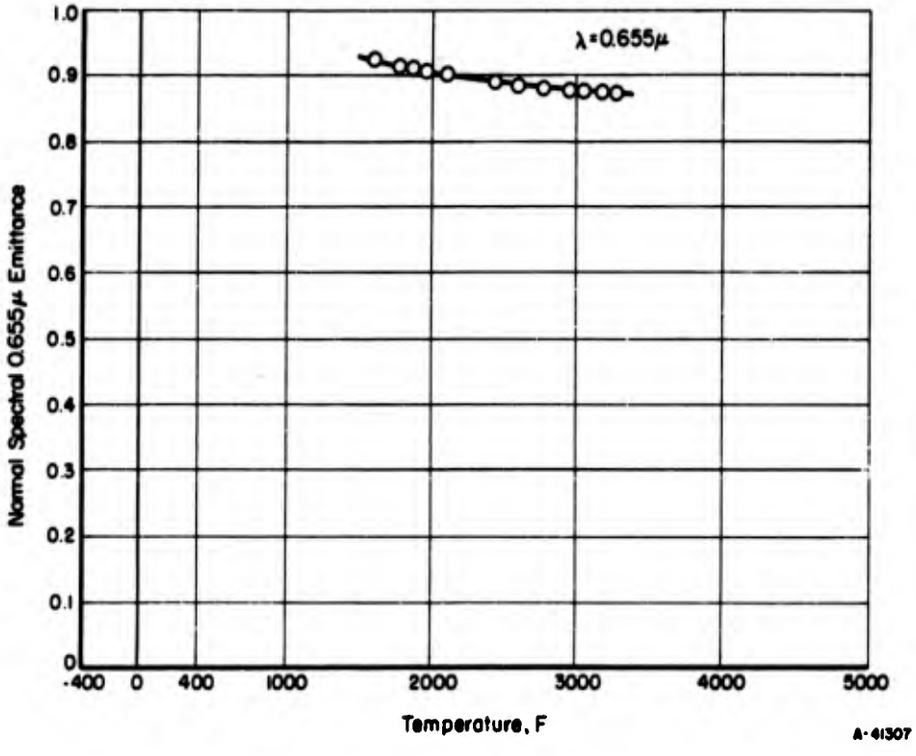
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
6	Riethof		Zirconium carbide Composition or surface condition not given Measured at 3320, 3626, 3990, and 4340 F	Normal spectral emittance. Induction-heated specimen. Blackbody hole in specimen surface. Thermocouple detector. Monochromator. Temperatures measured with optical pyrometer.	Measured in argon. Data taken from curves.



HEMISPHERICAL TOTAL EMITTANCE OF ACHESON GRAPHITE

HEMISPHERICAL TOTAL EMITTANCE OF ACHESON GRAPHITE--REFERENCE INFORMATION

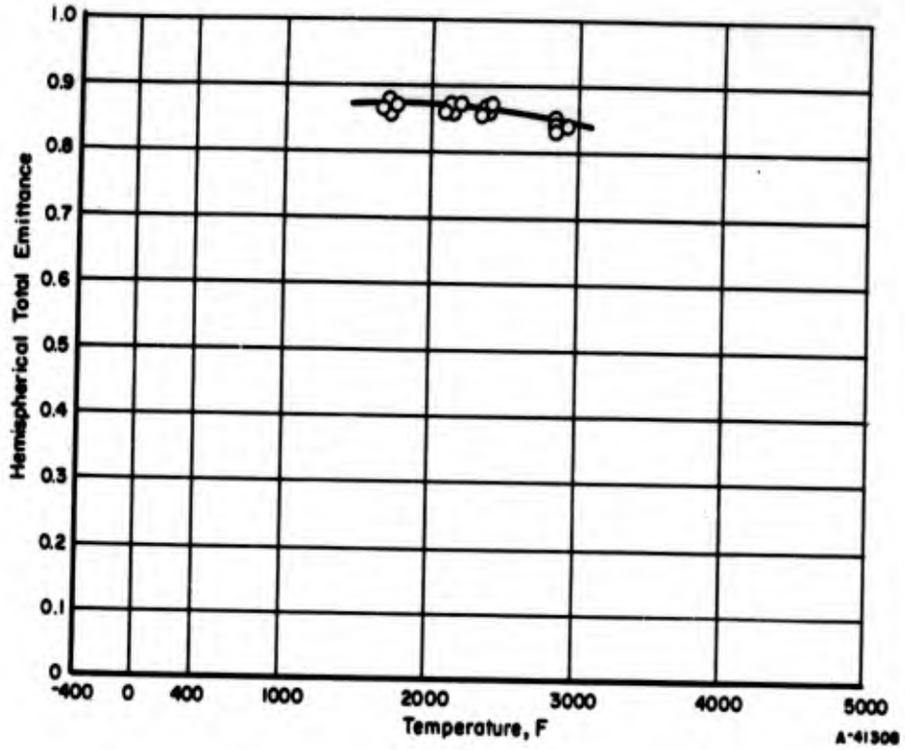
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
9	Jain and Krishnan	O	Acheson graphite Sample held at 2000 K for 1 hour in vacuum, until emittance became steady and reproducible	Hemispherical total emittance. Hole-in-tube method. Correction of inside blackbody temperature to surface temperature made using known thermal conductivity and wall thickness. Blackbody temperature measured with optical pyrometer.	Measured in vacuum. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF ACHESON GRAPHITE

NORMAL SPECTRAL EMITTANCE OF ACHESON GRAPHITE--REFERENCE INFORMATION

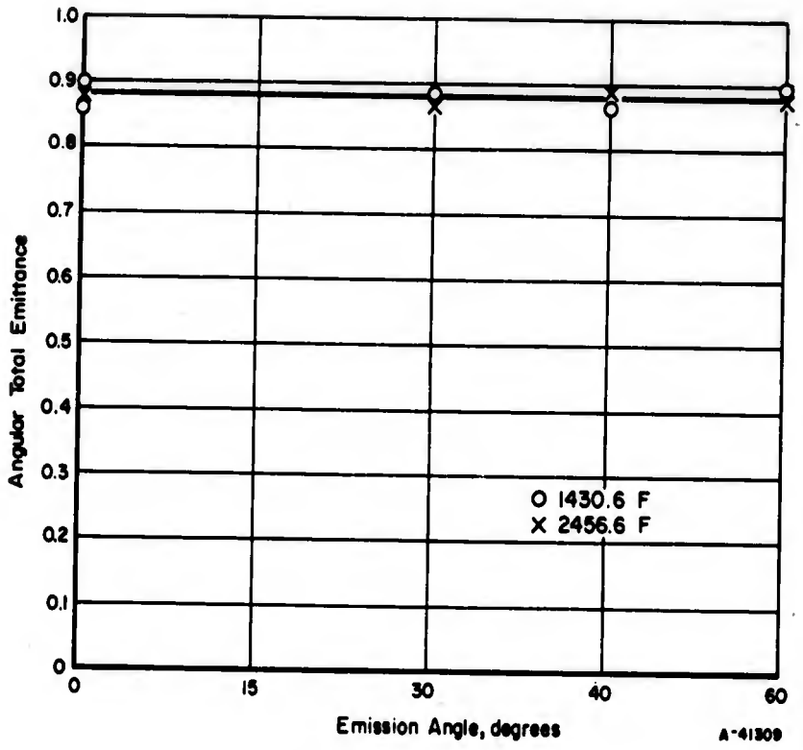
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
9	Jain and Krishnan	O	Acheson graphite Specimen held at 2000 K for 1 hour in vacuum until emittance became steady and reproducible	Normal spectral emittance. Hole-in-tube method. Temperatures measured with optical pyrometer.	Measured in vacuum. Data taken from curves. (λ = 0.665μ)



HEMISPHERICAL TOTAL EMITTANCE OF ATJ GRAPHITE

HEMISPHERICAL TOTAL EMITTANCE OF ATJ GRAPHITE--REFERENCE INFORMATION

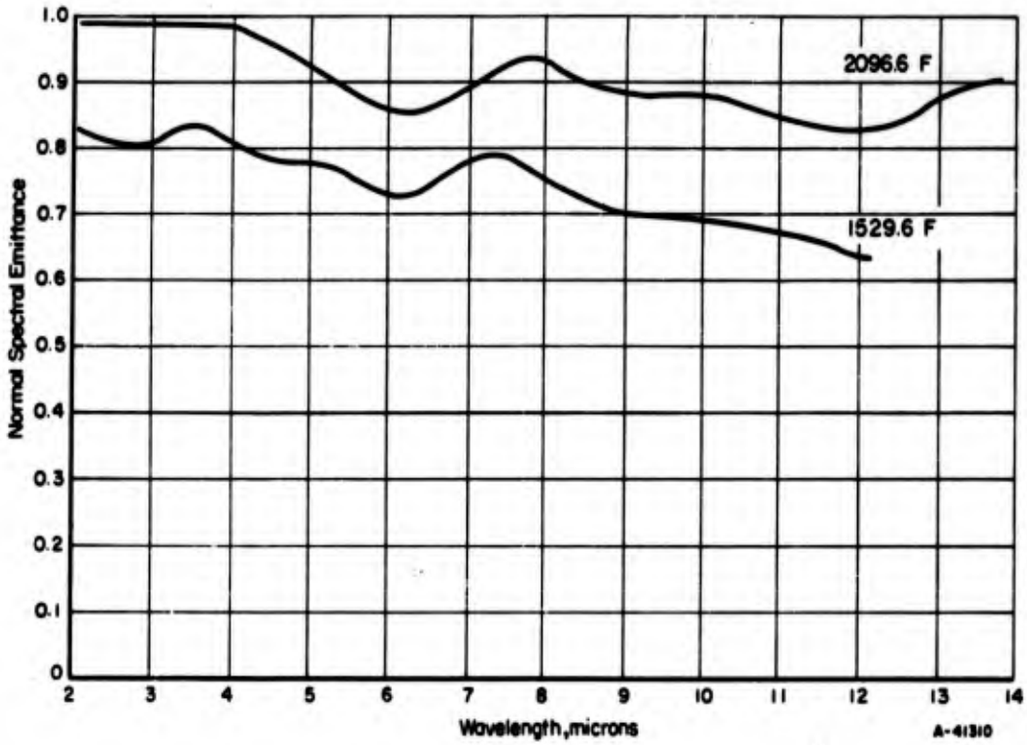
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
4	Blau, Chaffee, Jasperse, and Martin	O	ATJ graphite Surface condition not given	Normal total emittance. (Hemispherical emittance equals normal emittance for this specimen.) Induction-heated specimen. Monochromator with prism replaced by plane mirror. Thermocouple detector. Blackbody hole drilled in specimen surface. Temperatures measured with micro-optical pyrometer.	Measured in 90% argon - 10% hydrogen atmosphere. Data taken from curves.



TOTAL EMITTANCE VERSUS EMISSION ANGLE OF ATJ GRAPHITE

TOTAL EMITTANCE VERSUS EMISSION ANGLE OF ATJ GRAPHITE--REFERENCE INFORMATION

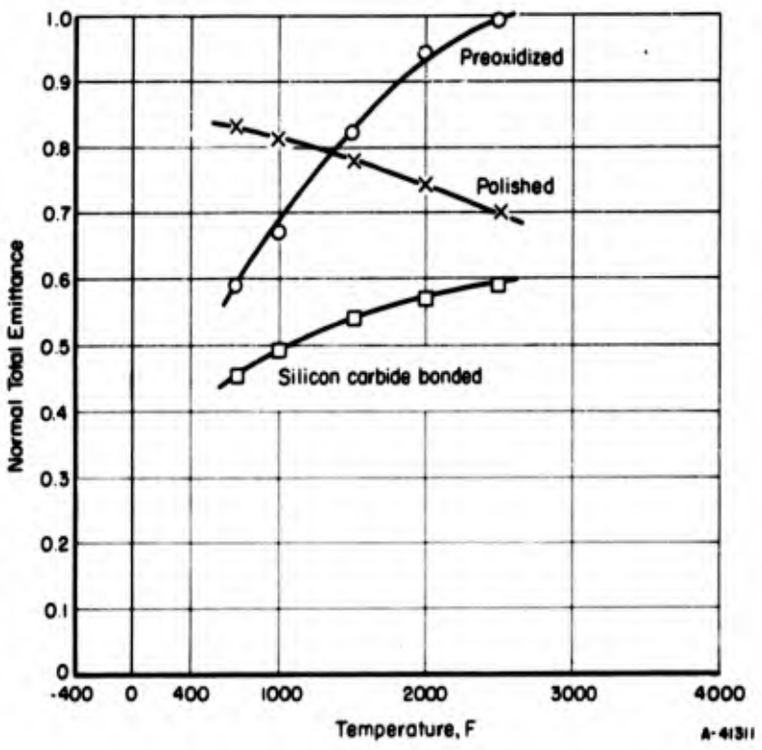
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
4	Blau, Chaffee, Jasperse, and Martin		ATJ graphite Surface smooth and flat, but not polished.	Total emittance measured normally and at 30, 45, and 60 degrees from the normal. Induction-heated specimen. Monochromator with prism replaced by plane mirror. Thermocouple detector. Blackbody hole drilled in specimen surface. Temperatures measured with micro-optical pyrometer.	Measured in 90% argon - 10% hydrogen atmosphere. Data taken from curves. Normal emittance equals hemispherical emittance for this specimen.
		O	Measured at 1431 F		
		X	Measured at 2457 F		



NORMAL SPECTRAL EMITTANCE OF ATJ GRAPHITE

NORMAL SPECTRAL EMITTANCE OF ATJ GRAPHITE--REFERENCE INFORMATION

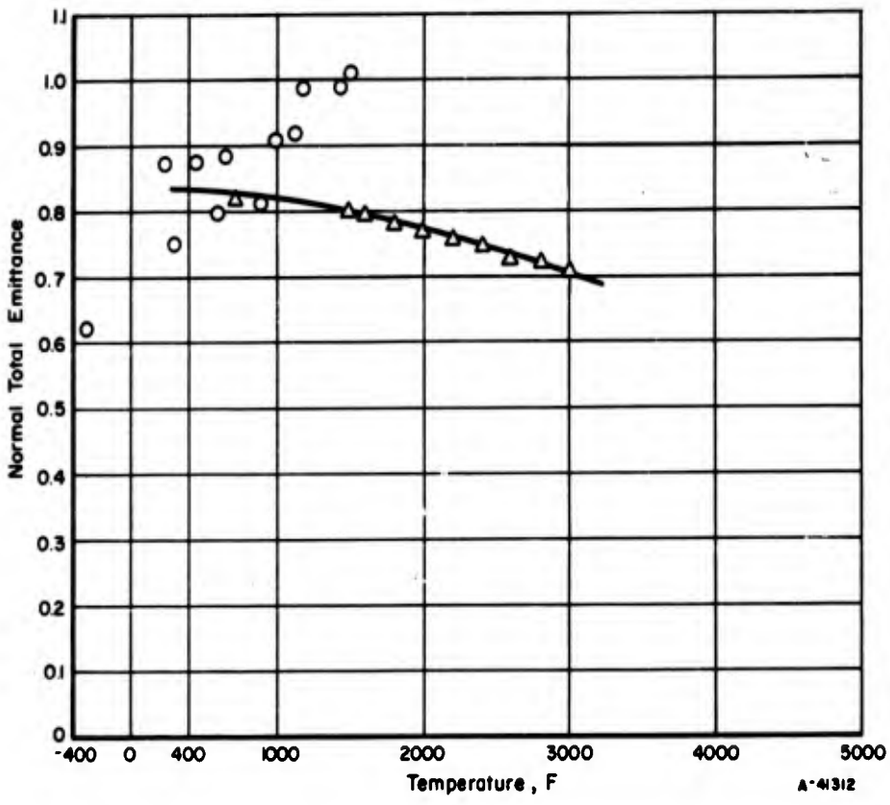
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
4	Blau, Chaffee, Jasperse, and Martin		ATJ graphite Surface smooth and flat but not polished	Normal spectral emittance. Induction-heated specimen. Monochromator and thermocouple detector. Blackbody hole drilled in specimen surface. Temperatures measured with micro-optical pyrometer.	Measured in 90% argon - 10% hydrogen atmosphere. Data taken from curves.



NORMAL TOTAL EMITTANCE OF ELECTRODE GRAPHITE

NORMAL TOTAL EMITTANCE OF ELECTRODE GRAPHITE--REFERENCE INFORMATION

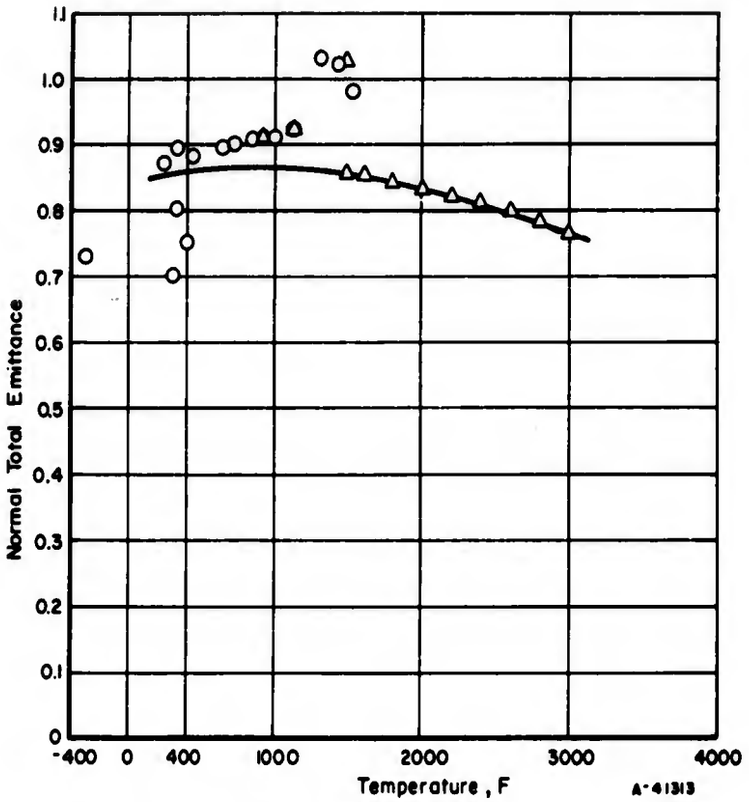
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Anthony and Pearl		Electrode graphite	Normal total emittance. Induction-heated specimen. Comparison blackbody. Thermopile detector. Temperatures measured with thermocouples.	Measured in purge of helium gas. Data taken from table.
		O	Preoxidized		
		X	Polished		
		□	Silicon carbide bonded		



NORMAL TOTAL EMITTANCE OF GBE GRAPHITE

NORMAL TOTAL EMITTANCE OF GBE GRAPHITE--REFERENCE INFORMATION

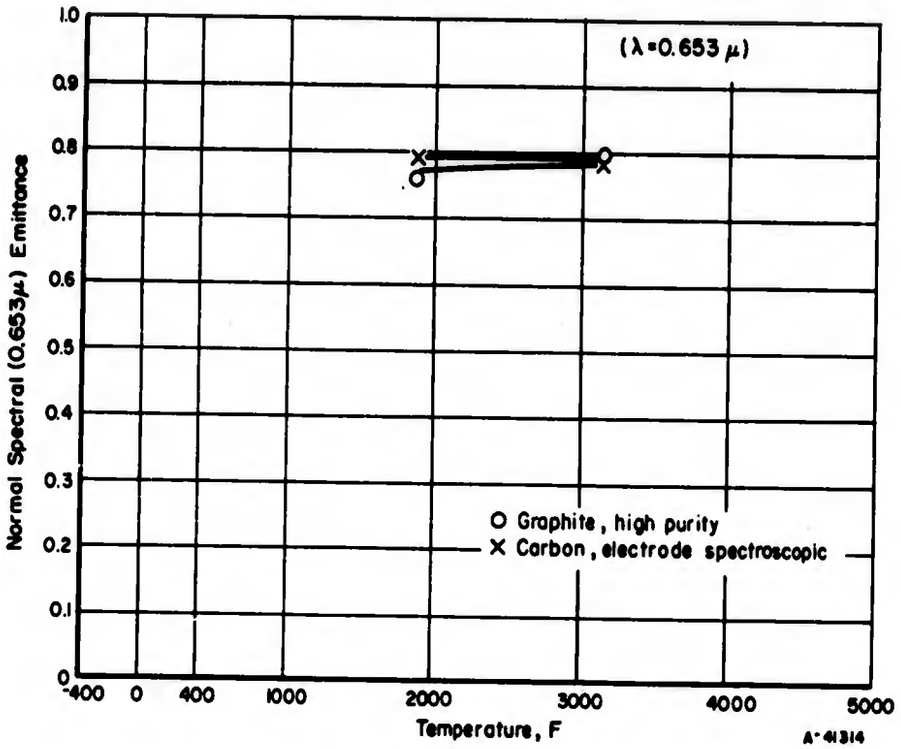
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
8	Olson and Morris	O	National GBE graphite Surface condition not given	Normal total emittance. Resistance-heated strip specimen. Comparison blackbody. Temperatures measured with thermocouples. Thermistor detector.	Measured in vacuum. Data taken from curves.
7	Betz, Olson, Schurin, and Morris	Δ	Same as above	Same as above.	Same as above.



NORMAL TOTAL EMITTANCE OF TYPE GBH GRAPHITE

NORMAL TOTAL EMITTANCE OF TYPE GBH GRAPHITE--REFERENCE INFORMATION

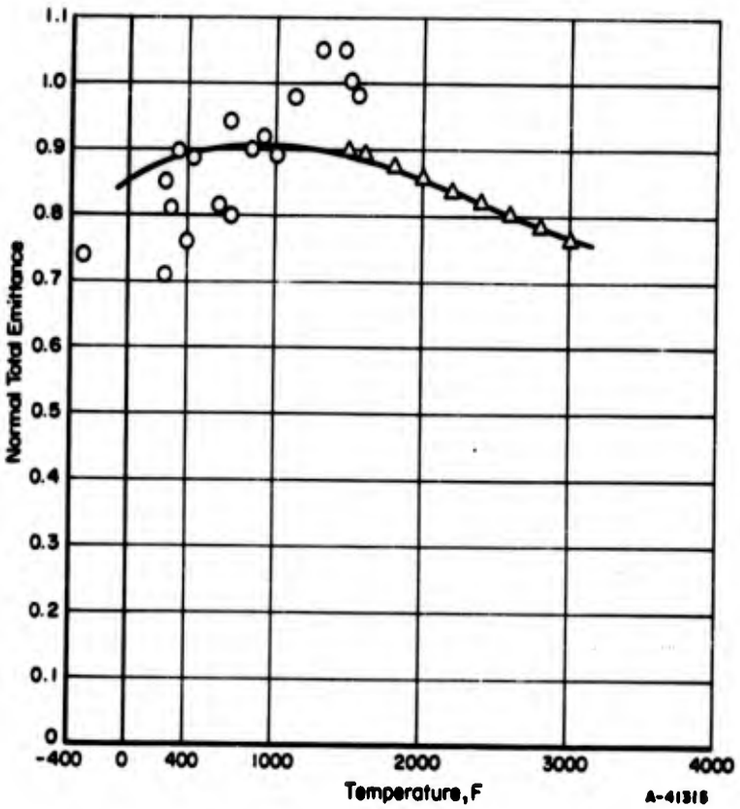
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
8	Olson and Morris	O	National GBH graphite Surface condition not given Note: Changed with cycling	Normal total emittance. Resistance-heated strip specimen. Comparison blackbody. Thermistor detector. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.
7	Betz, Olson, Schurin, and Morris	Δ	Surface condition not given	Same as above.	Measured in vacuum. Data taken from table.



NORMAL SPECTRAL EMITTANCE OF GRAPHITE AND CARBON

NORMAL SPECTRAL EMITTANCE OF GRAPHITE AND CARBON--REFERENCE INFORMATION

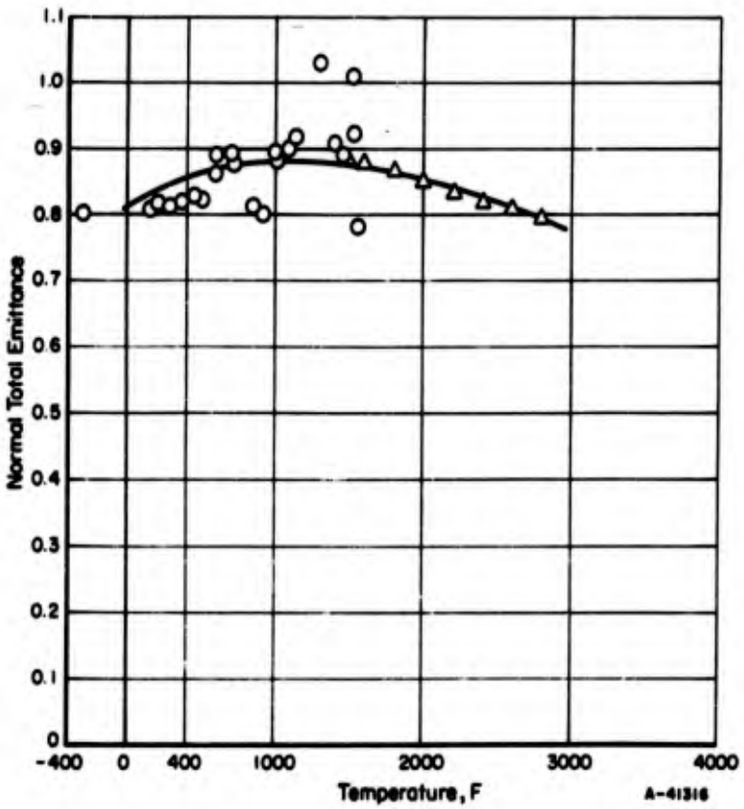
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
10	Thorn and Simpson	O	High-purity, medium-density graphite	Normal spectral emittance. Modified hole-in-tube method.	Measured in vacuum. Data taken from curves.
		X	Spectroscopic electrode carbon	Temperatures measured with calibrated optical pyrometer.	(λ = 0.653 μ)
			Surface condition, polished and then heated to 1800 K in vacuum for 3 hours		



NORMAL TOTAL EMITTANCE OF TYPE 3474D GRAPHITE

NORMAL TOTAL EMITTANCE OF TYPE 3474D GRAPHITE--REFERENCE INFORMATION

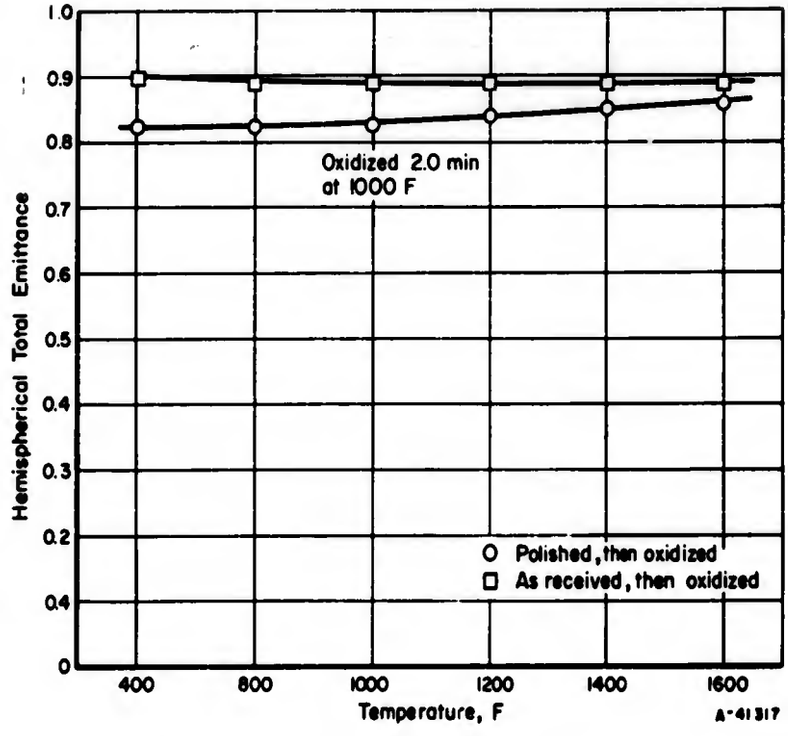
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
8	Olson and Morris	O	Speer 3474D graphite Surface condition not given Note: Changed with cycling	Normal total emittance. Resistance-heated strip specimen. Comparison blackbody. Thermistor detector. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.
7	Betz, Olson, Schurin, and Morris	Δ	Surface condition not given	Same as above.	Measured in vacuum. Data taken from table.



NORMAL TOTAL EMITTANCE OF TYPE 7087 GRAPHITE

NORMAL TOTAL EMITTANCE OF TYPE 7087 GRAPHITE--REFERENCE INFORMATION

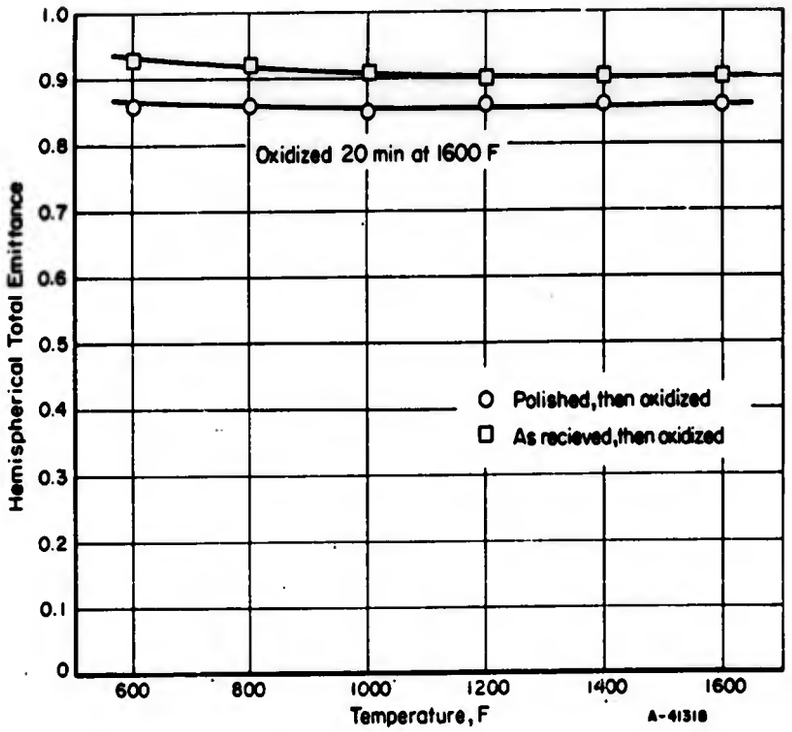
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
8	Olson and Morris	O	Speer 7087 graphite Surface condition not given Note: Changed with cycling	Normal total emittance. Resistance-heated strip specimen. Comparison blackbody. Thermistor detector. Temperatures measured with thermocouples.	Measured in vacuum. Data taken from curves.
7	Betz, Olson, Schurin, and Morris	Δ	Surface condition not given	Same as above.	Measured in vacuum. Data taken from table.



HEMISPHERICAL TOTAL EMITTANCE OF OXIDIZED K150A Ni-TiC HARD METAL

HEMISPHERICAL TOTAL EMITTANCE OF OXIDIZED K150A Ni-TiC HARD METAL--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
11	Wade and Casey		Composition: 10Ni, 80TiC, 10CbC	Hemispherical total emittance. (Total emittance measured normally and at various angles. Normal emittance equals hemispherical emittance.) Thermopile total ratiation detector. Resistance-heated specimen. Comparison blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.
		□	As received, then oxidized		
		O	Polished: Hand lapped with 3 micron and 1 micron diamond paste, then oxidized		

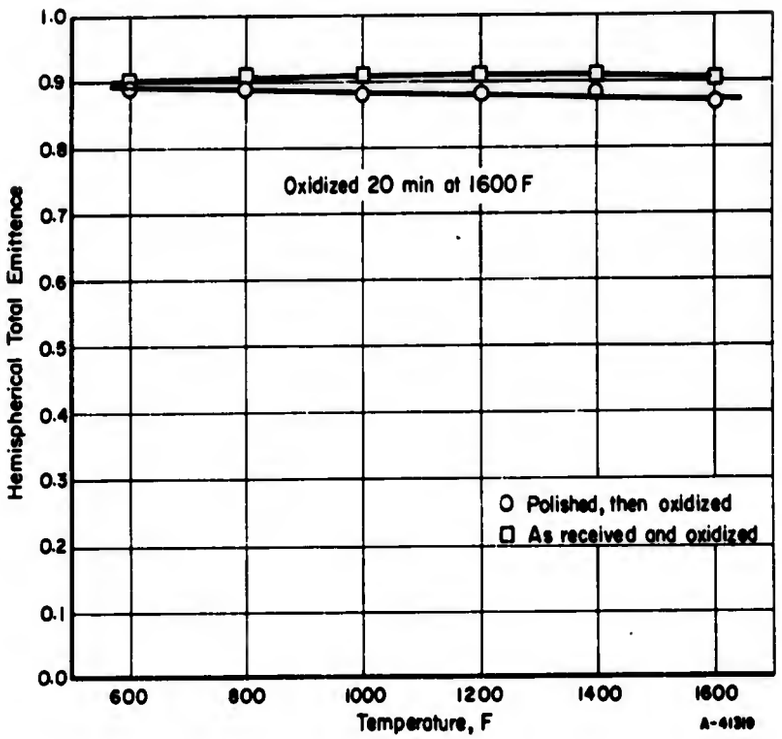


HEMISPHERICAL TOTAL EMITTANCE OF OXIDIZED K151A Ni-TiC HARD METAL

HEMISPHERICAL TOTAL EMITTANCE OF OXIDIZED K151A Ni-TiC HARD METAL—REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
11	Wade and Casey		Composition: 20Ni, 70TiC, 10CbC	Hemispherical total emittance. (Total emittance measured normally and at various angles. Normal emittance equals hemispherical emittance.) Thermopile total radiation detector. Resistance-heated specimen. Comparison blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.
		□	As received, then oxidized		
		O	Polished; hand lapped with 3-micron and 1-micron diamond paste, then oxidized		

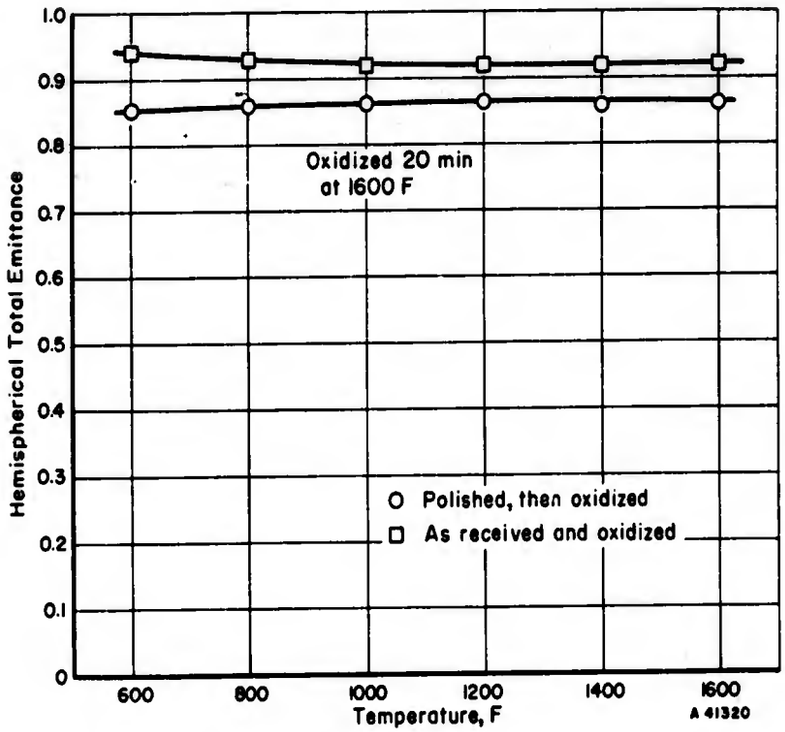
Composition: 20Ni, 70TiC, 10CbC



HEMISPHERICAL TOTAL EMITTANCE OF OXIDIZED K152B Ni-TiC HARD METAL

HEMISPHERICAL TOTAL EMITTANCE OF OXIDIZED K152B Ni-TiC HARD METAL--REFERENCE INFORMATION

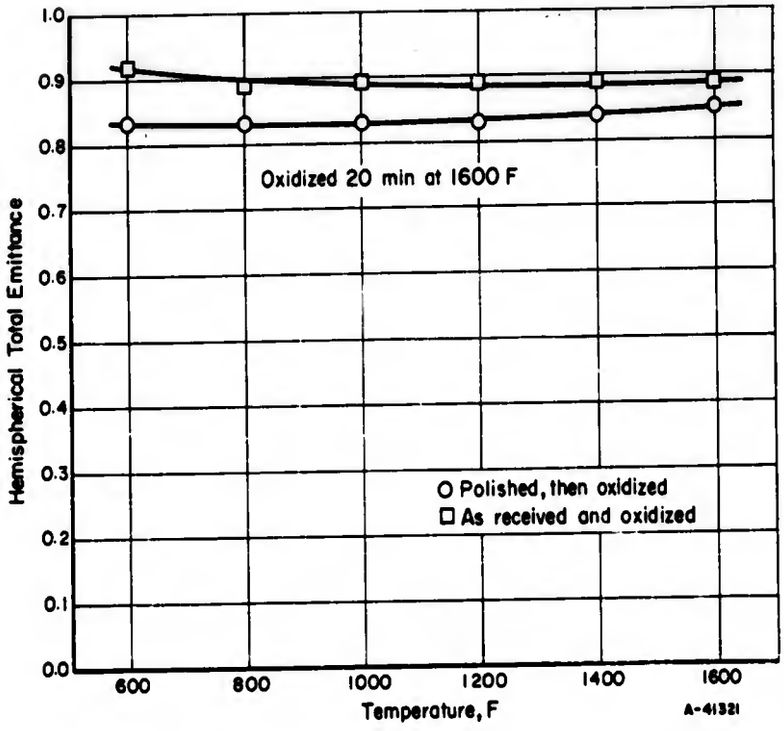
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
11	Wade and Casey		Composition: 30Ni, 65TiC, 5CbC	Hemispherical total emittance. (Total emittance measured normally and at various angles. Normal emittance equals hemispherical emittance.) Thermopile total radiation detector. Resistance-heated specimen. Comparison blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.
		□	As received, then oxidized		
		O	Polished; hand lapped with 3-micron and 1-micron diamond paste, then oxidized		



HEMISPHERICAL TOTAL EMITTANCE OF OXIDIZED K153B Ni-TiC HARD METAL

HEMISPHERICAL TOTAL EMITTANCE OF OXIDIZED K153B Ni-TiC HARD METAL--REFERENCE INFORMATION

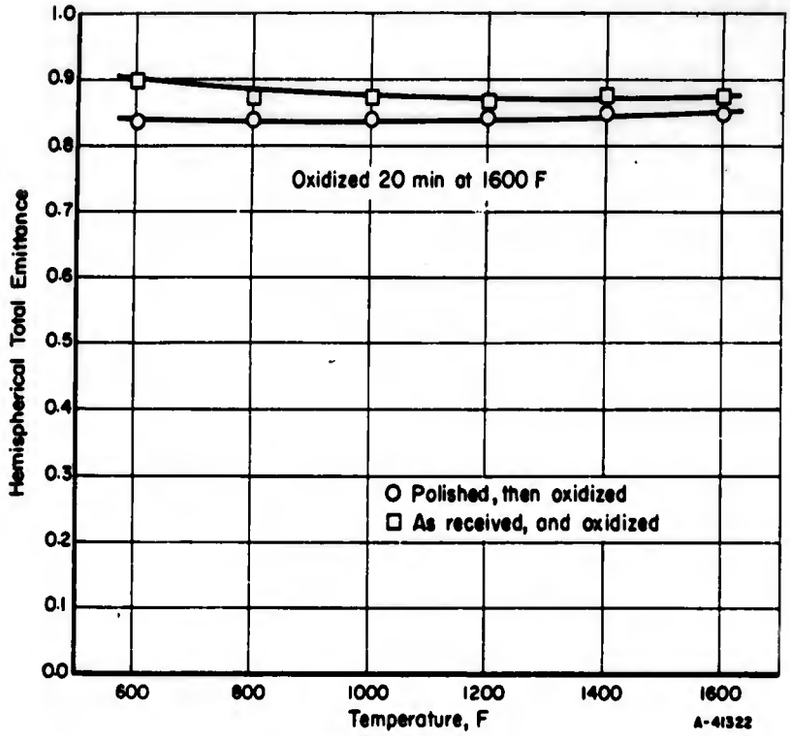
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
11	Wade and Casey		Composition: 40Ni, 54TiC, 6CbC	Hemispherical total emittance. (Total emittance measured normally and at various angles. Normal emittance equals hemispherical emittance.) Thermopile total radiation detector. Resistance-heated specimen. Comparison blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.
		□	As received, then oxidized 20 minutes at 1600 F		
		O	Polished; lapped with 3-micron and 1-micron diamond paste, then oxidized 20 minutes at 1600 F		



HEMISPHERICAL TOTAL EMITTANCE OF OXIDIZED K163B1 Ni-TiC HARD METAL

HEMISPHERICAL TOTAL EMITTANCE OF OXIDIZED K163B1 Ni-TiC HARD METAL--REFERENCE INFORMATION

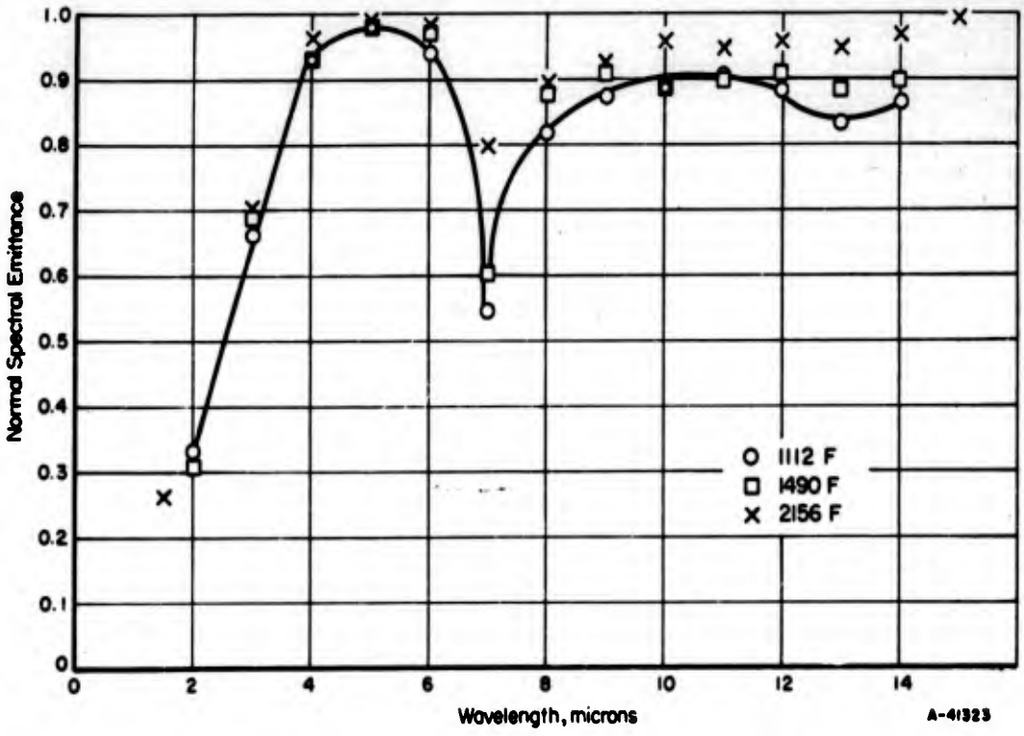
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
11	Wade and Casey		Composition: 33.3Ni, 54TiC, 6.7Mo, 6CbC	Hemispherical total emittance. (Total emittance measured normally and at various angles. Normal emittance equals hemispherical emittance.) Thermopile total radiation detector. Resistance-heated specimen. Comparison blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.
		□	As received, then oxidized 20 minutes at 1600 F		
		O	Polished; lapped with 3-micron and 1-micron diamond paste, then oxidized 20 minutes at 1600 F		



HEMISPHERICAL TOTAL EMITTANCE OF OXIDIZED K184B Ni-TiC HARD METAL

HEMISPHERICAL TOTAL EMITTANCE OF OXIDIZED K184B Ni-TiC HARD METAL--REFERENCE INFORMATION

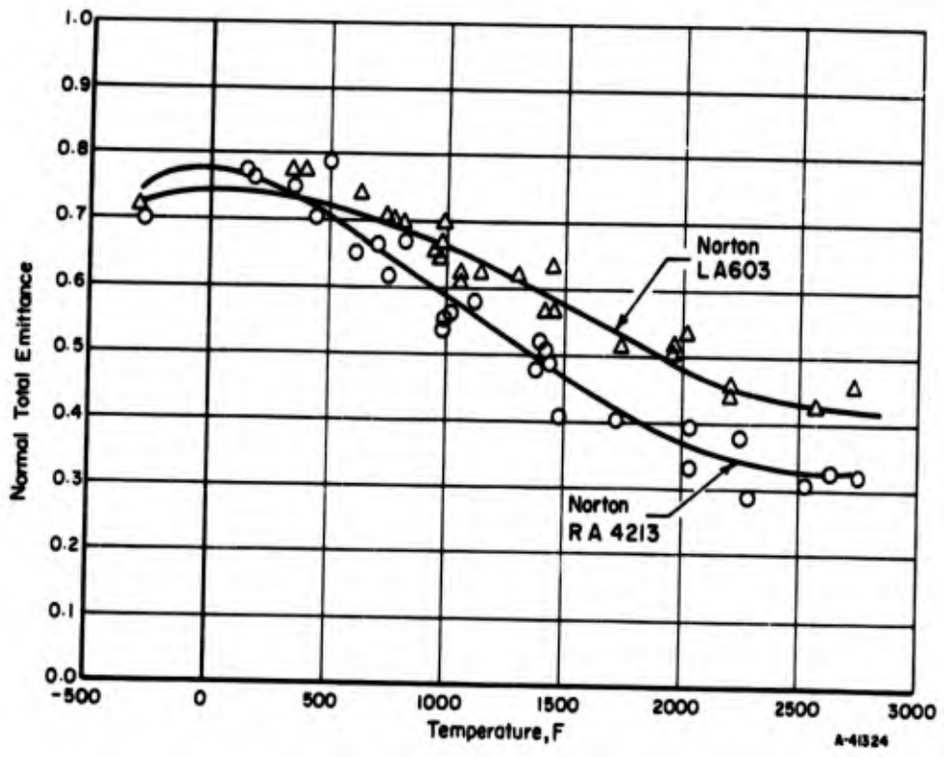
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
11	Wade and Casey		Composition: 40Ni, 40TiC, 10CbC, 4Mo, 3Al, 3Cr	Hemispherical total emittance. (Total emittance measured normally and at various angles. Normal emittance equals hemispherical emittance.) Thermopile total radiation detector. Resistance-heated specimen. Comparison blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.
		□	As received, then oxidized 20 minutes at 1600 F		
		O	Polished; lapped with 3-micron and 1-micron diamond paste, then oxidized 20 minutes at 1600 F		



NORMAL SPECTRAL EMITTANCE OF BORON NITRIDE

NORMAL SPECTRAL EMITTANCE OF BORON NITRIDE--REFERENCE INFORMATION

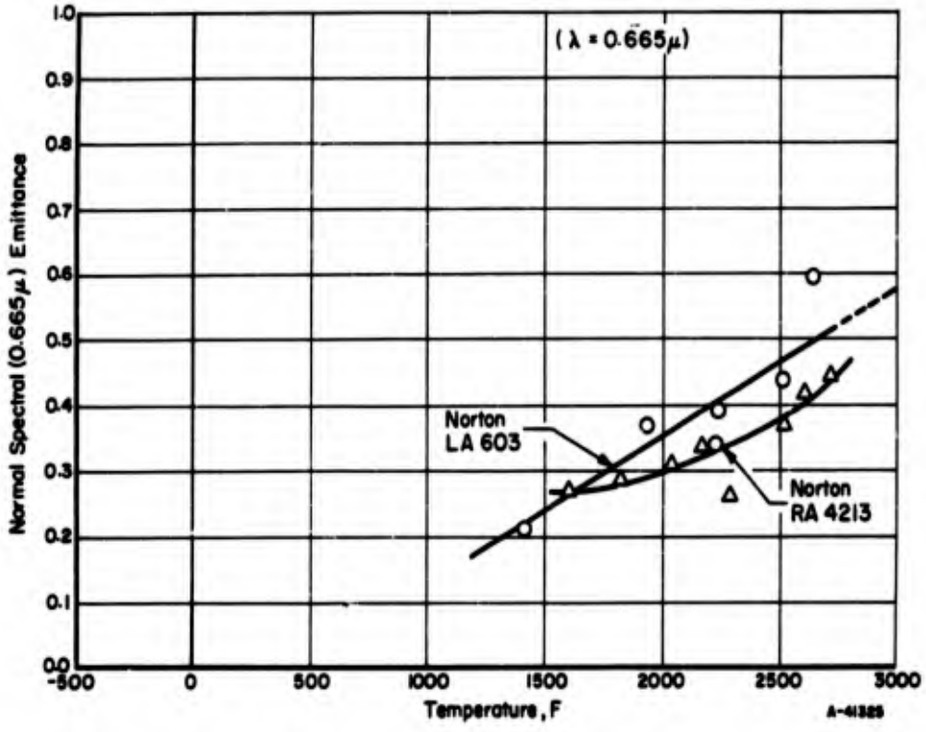
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
3	Blau, Marsh, Martin, Jasperse, and Chaffee		Boron nitride Purity and surface condition not given	Normal spectral emittance. Specimen mounted in wall of cylindrical Globar (SiC) heater. Comparison blackbody hole in heater wall. Monochromator and thermocouple detector. Temperatures measured with thermocouples.	Measured in air. Data taken from curves. (Curve drawn through 1112 F points only.)
		O	Measured at 1112 F		
		□	Measured at 1490 F		
		×	Measured at 2156 F		



NORMAL TOTAL EMITTANCE OF ALUMINUM OXIDE

NORMAL TOTAL EMITTANCE OF ALUMINUM OXIDE--REFERENCE INFORMATION

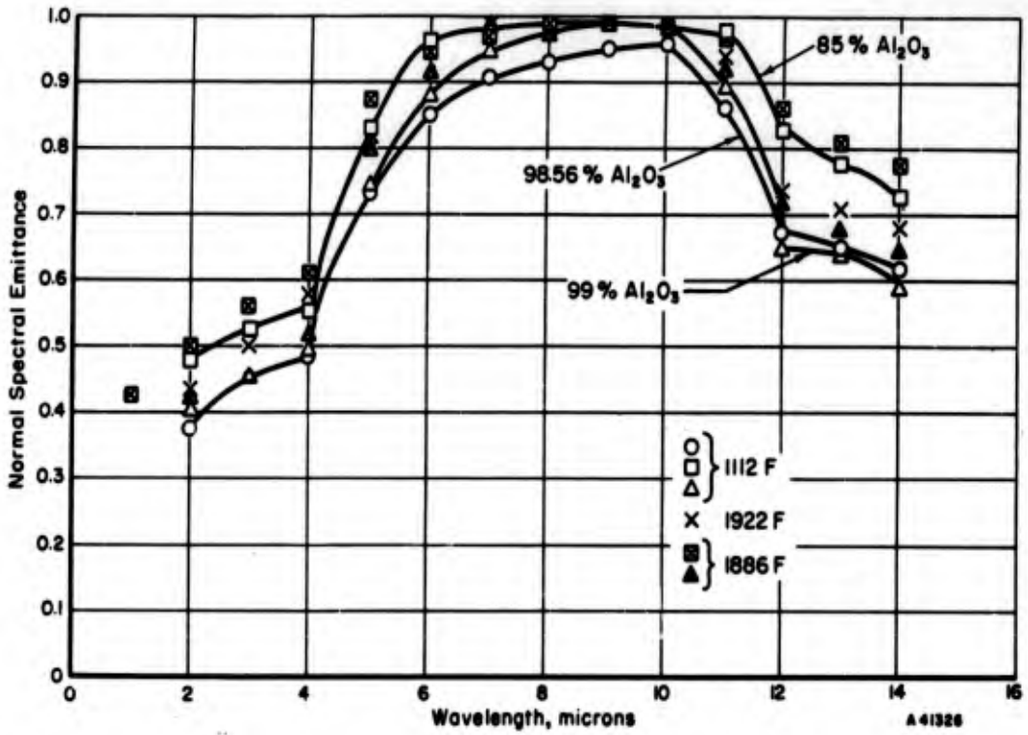
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris	Δ	Norton LA603 Aluminum oxide	Normal total emittance. Furnace-heated specimen. Comparison blackbody. Temperatures measured with thermocouples Thermistor detector.	Measured in air. Data taken from curves.
		O	Norton RA4213 Aluminum oxide		
			Surface condition not given		



NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE

NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE--REFERENCE INFORMATION

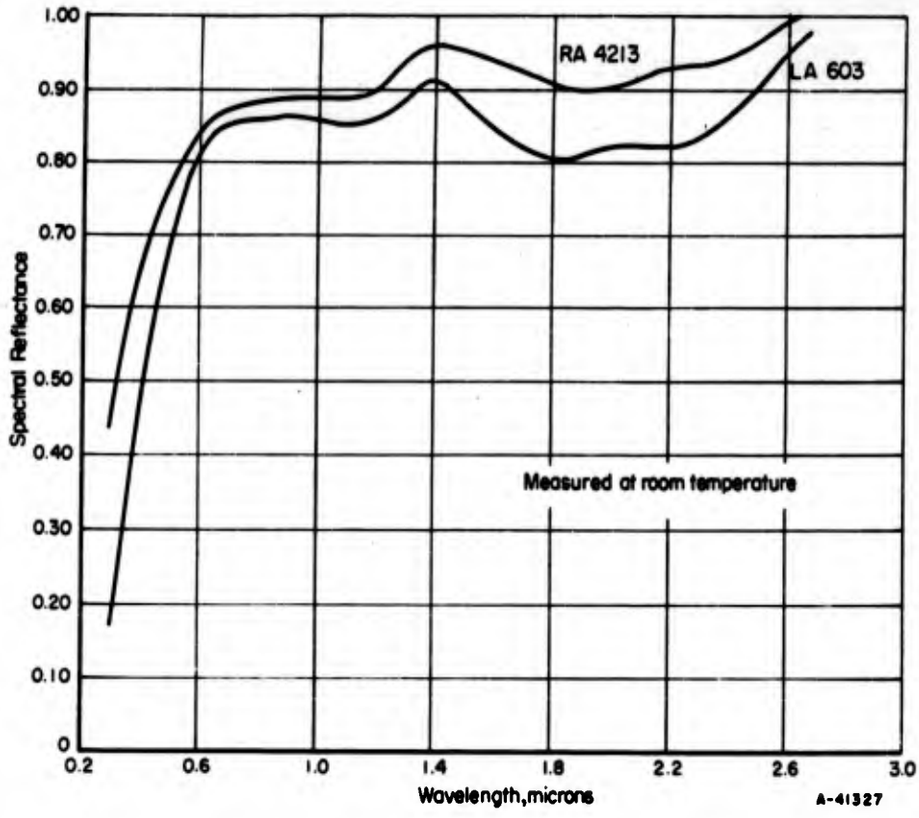
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris	O	Norton LA603 Aluminum oxide	Normal spectral emittance. Furnace-heated specimen. Comparison blackbody. Commercial radiation detector and filter system for peak response at 0.665μ. Temperatures measured with thermocouples.	Measured in air. Data taken from curves. (λ = 0.665μ)
		Δ	Norton RA4213 Aluminum oxide		



NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE

NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE--REFERENCE INFORMATION

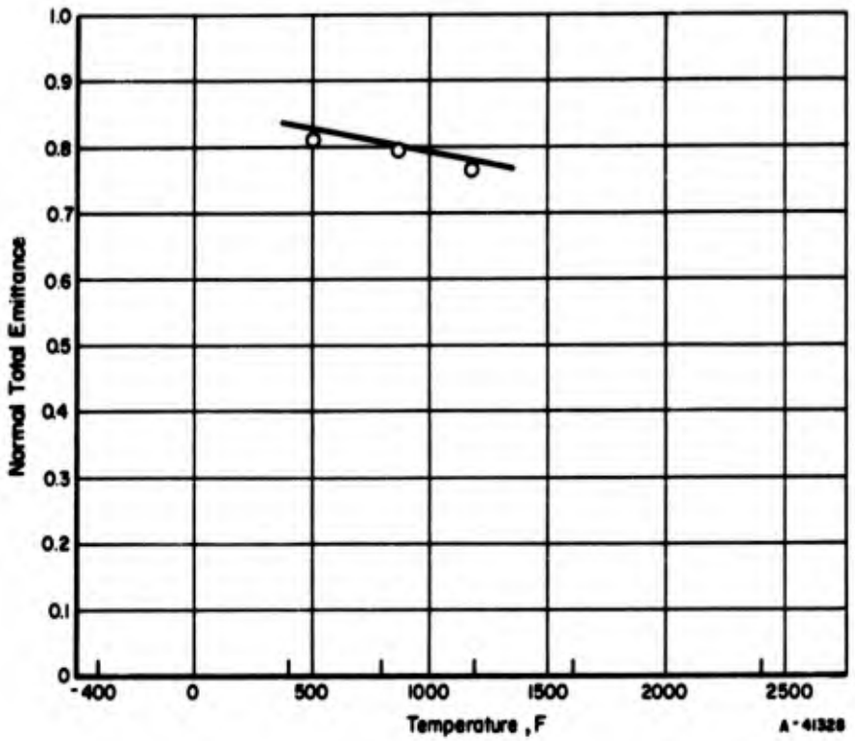
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
3	Blau, Marsh, Martin, Jasperse, and Chaffee		Aluminum oxide Diamond wheel finish as supplied by manufacturer TWA No. 2 (Norton A 402) 98.56% Al_2O_3	Normal spectral emittance. Specimen mounted in wall of cylindrical Globar (SiC) heater. Comparison blackbody hole also in heater. Temperatures measured with thermocouples. Monochromator and thermocouple detector.	Measured in air. Data taken from curves. (Curves are drawn through the 1112 F points only.)
		O	Measured at 1112 F		
		X	Measured at 1922 F		
			Coors AD85 85% Al_2O_3		
		□	Measured at 1112 F		
		⊠	Measured at 1886 F		
			Coors AD99 99% Al_2O_3		
		△	Measured at 1112 F		
		▲	Measured at 1886 F		



SPECTRAL REFLECTANCE OF ALUMINUM OXIDE

SPECTRAL REFLECTANCE OF ALUMINUM OXIDE--REFERENCE INFORMATION

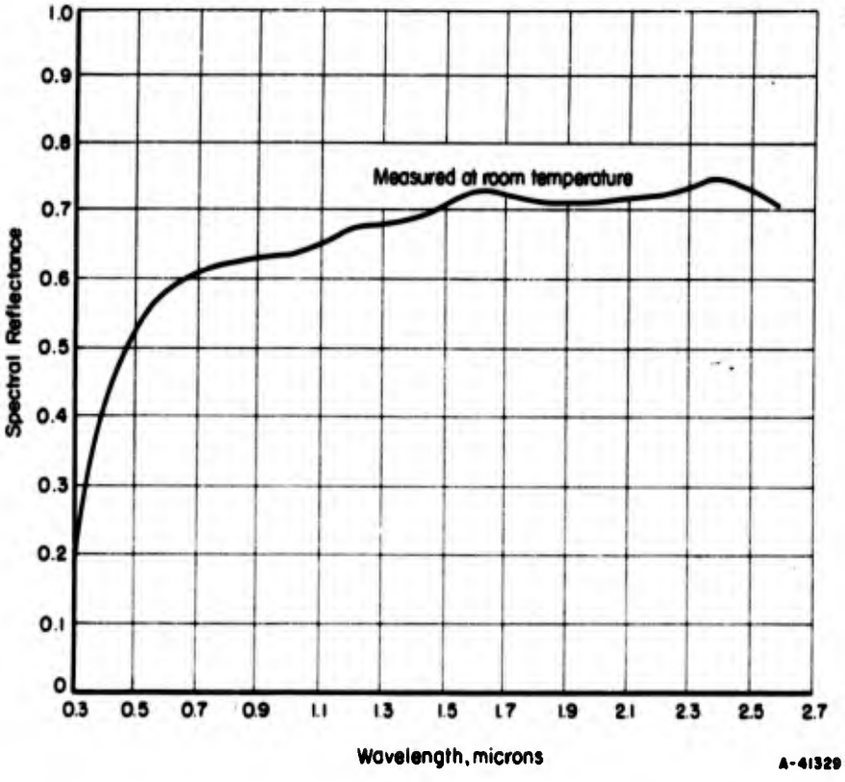
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris		Aluminum oxide Norton RA4213 and LA603 Surface condition not given	Spectral reflectance. Incident radiation 9 degrees from normal to specimen surface. Integrating sphere reflectometer. Monochromator and lead sulphide detector. Normal (9 degrees) illumination diffuse reflection.	Measured in air at room temperature. Data taken from curves.



NORMAL TOTAL EMITTANCE OF BERYLLIUM OXIDE

NORMAL TOTAL EMITTANCE OF BERYLLIUM OXIDE--REFERENCE INFORMATION

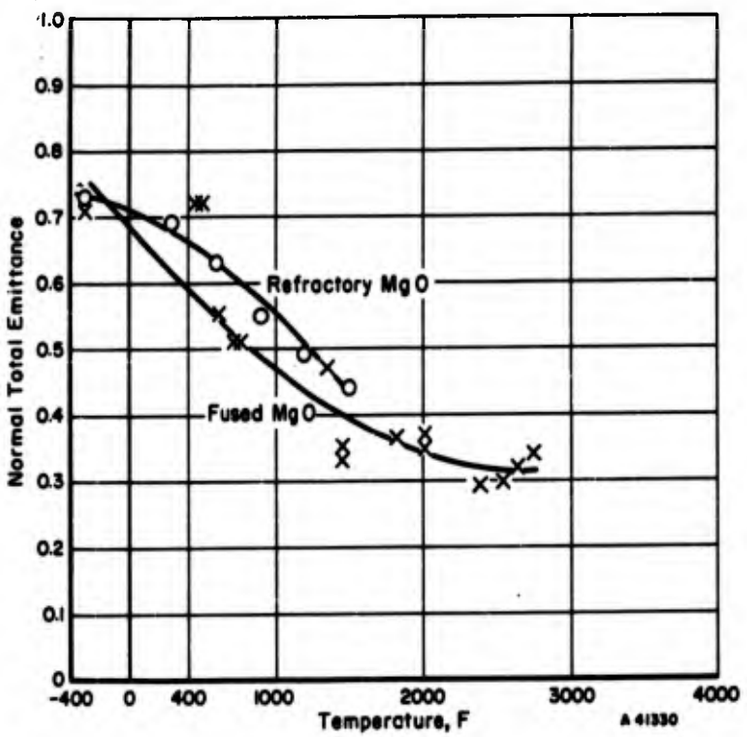
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris	O	Beryllium oxide	Normal total emittance. Furnace-heated specimen. Comparison blackbody. Thermistor detector. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



SPECTRAL REFLECTANCE OF BERYLLIUM OXIDE

SPECTRAL REFLECTANCE OF BERYLLIUM OXIDE--REFERENCE INFORMATION

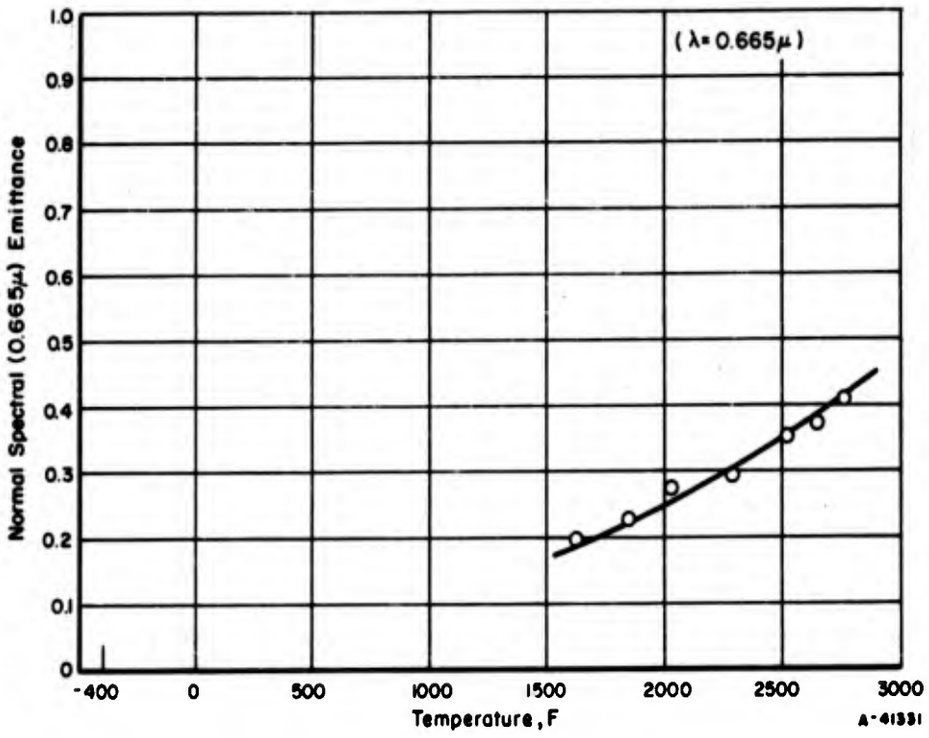
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
7	Betz, Olson, Schurin, and Morris		Beryllium oxide Purity not given As received condition	Spectral reflectance. Incident radiation 9 degrees from normal to specimen surface. Integrating sphere reflectrometer. Monochromator, and lead sulphide detector. Normal (9 degrees) illumination and diffuse reflection.	Measured in air at room temperature. Data taken from curves.



NORMAL TOTAL EMITTANCE OF MAGNESIUM OXIDE

NORMAL TOTAL EMITTANCE OF MAGNESIUM OXIDE--REFERENCE INFORMATION

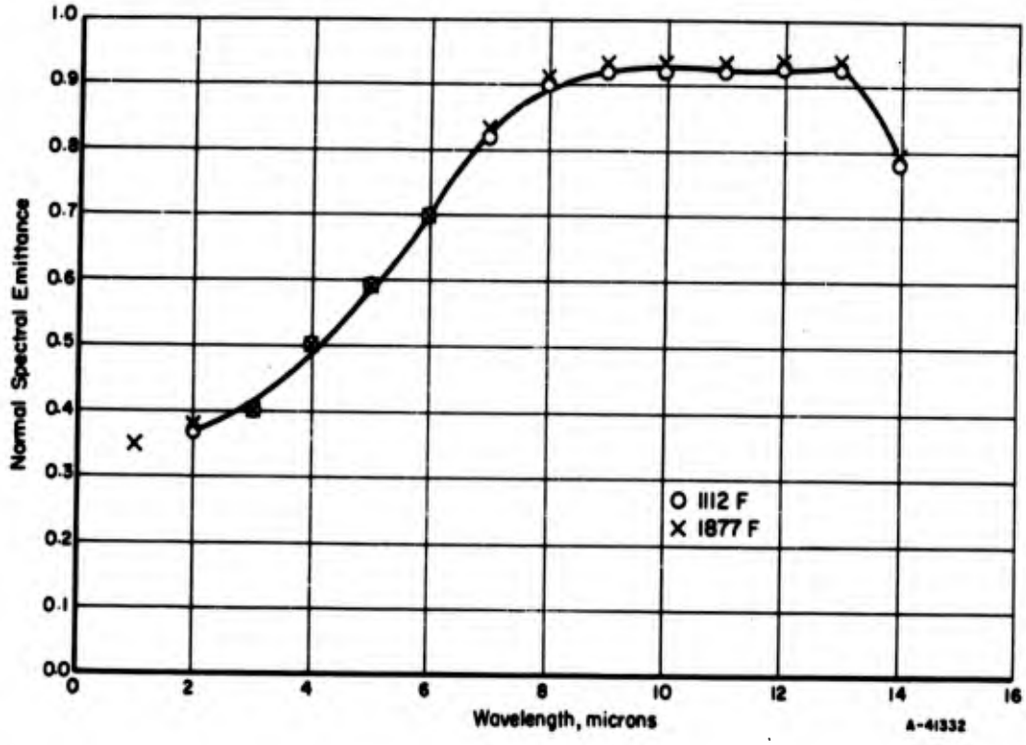
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris	×	Fused magnesium oxide obtained from the National Bureau of Standards. Surface condition not given	Normal total emittance. Furnace-heated specimen. Thermistor detector. Comparison blackbody. Temperatures measured with thermocouples.	Measured in air. Data taken from curve.
8	Olson and Morris	O	Refractory magnesium oxide Composition and surface condition not given	(Same as above.)	(Same as above.)



NORMAL SPECTRAL EMITTANCE OF MAGNESIUM OXIDE

NORMAL SPECTRAL EMITTANCE OF MAGNESIUM OXIDE--REFERENCE INFORMATION

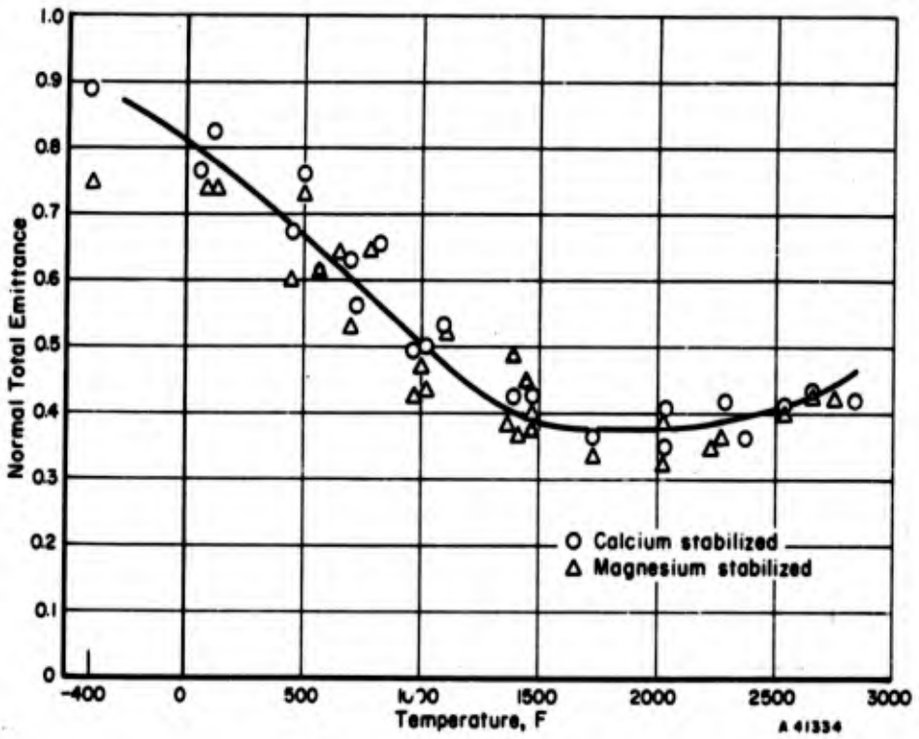
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris	O	Fused magnesium oxide obtained from National Bureau of Standards. Surface condition not given	Normal spectral emittance. Furnace-heated specimen. Comparison blackbody. Commercial detector and filter system for peak response at 0.665μ. Temperatures measured with thermocouples.	Measured in air. Data taken from curves. (λ= 0.665μ)



NORMAL SPECTRAL EMITTANCE OF MAGNESIUM OXIDE

NORMAL SPECTRAL EMITTANCE OF MAGNESIUM OXIDE--REFERENCE INFORMATION

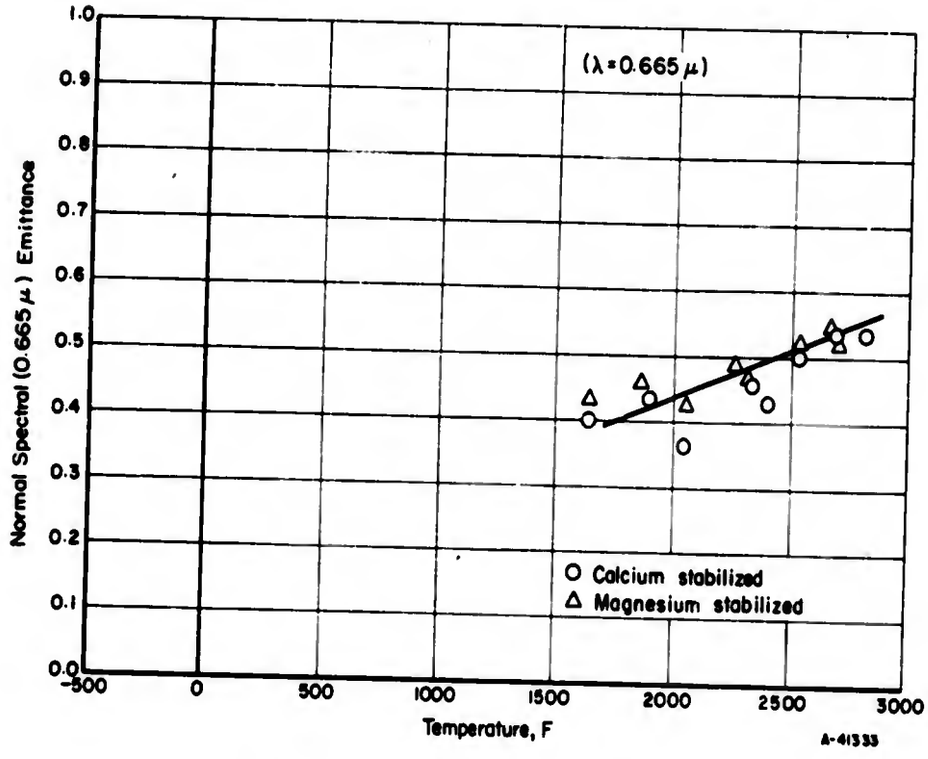
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
3	Blau, Marsh, Martin, Jasperse and Chaffee		Magnesia (MgO) Norton RM4473 Purity: 97% MgO, 1.3-1.5% CaO Surface condition not given	Normal spectral emittance. Specimen mounted in wall of cylindrical Globar (SiC) heater. Comparison blackbody hole in heater wall. Monochromator and thermocouple detector. Temperatures measured with thermocouples.	Measured in air. Data taken from curves. (Curve drawn through 1112 F points only.)
		O	Measured at 1112 F		
		X	Measured at 1877 F		



NORMAL TOTAL EMITTANCE OF ZIRCONIUM OXIDE

NORMAL TOTAL EMITTANCE OF ZIRCONIUM OXIDE--REFERENCE INFORMATION

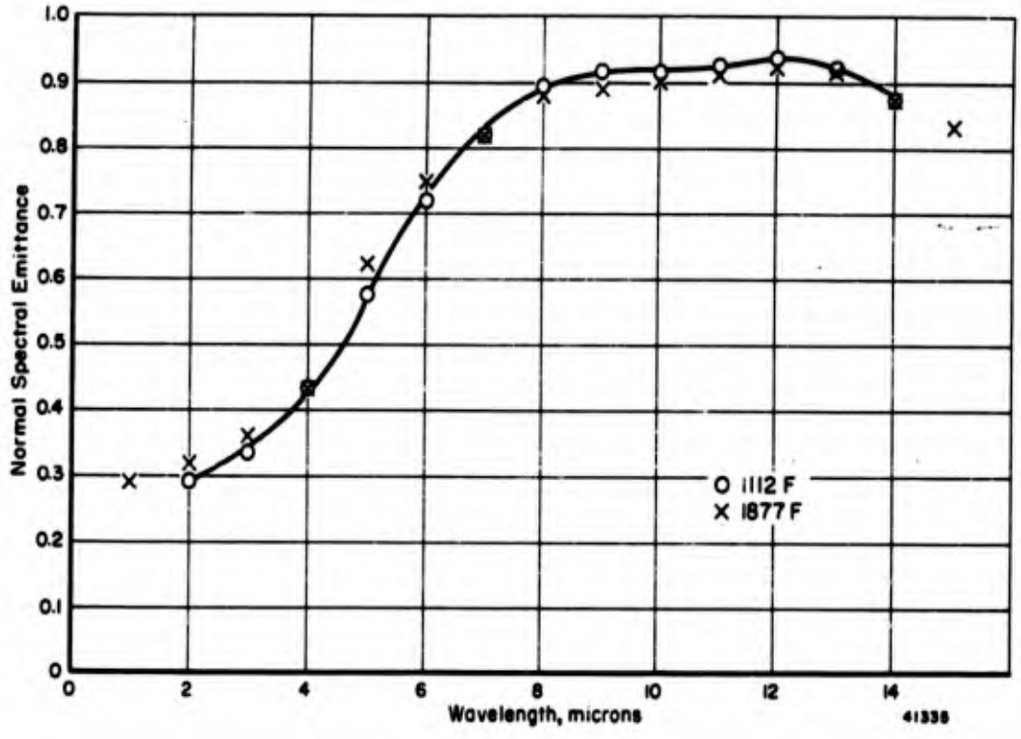
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris		Zirconium oxide	Normal total emittance. Furnace-heated specimen. Comparison blackbody. Thermistor detector. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.
		O	Calcium stabilized		
		Δ	Magnesium stabilized		



NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM OXIDE

NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM OXIDE--REFERENCE INFORMATION

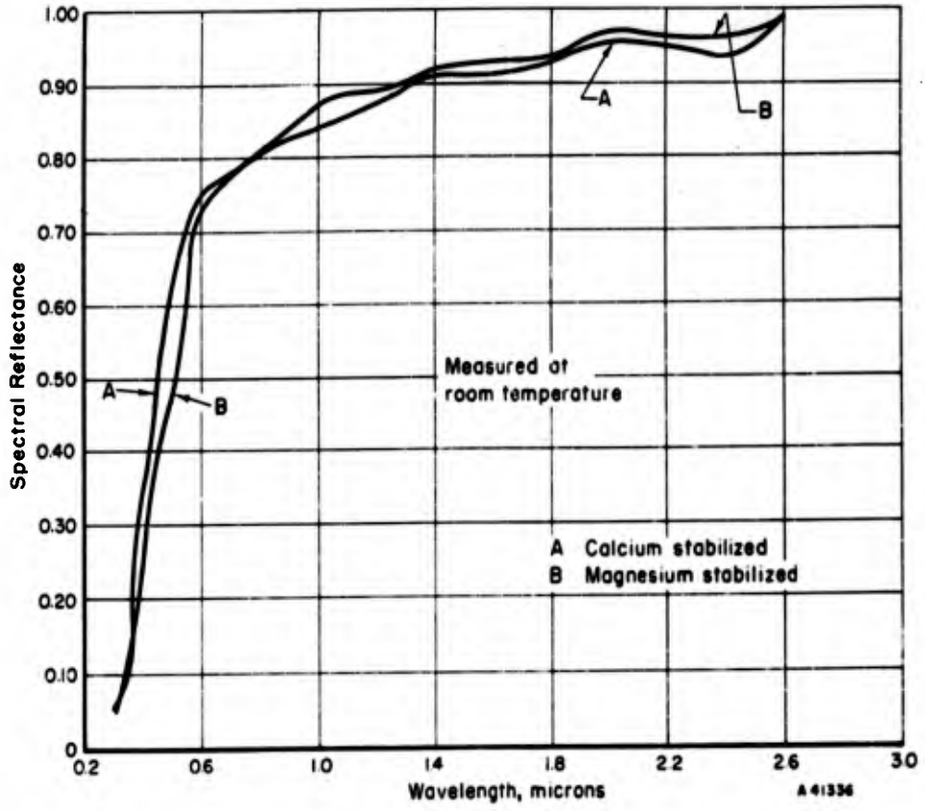
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris		Zirconium oxide	Normal spectral emittance. Furnace-heated specimen. Comparison blackbody. Commercial detector and filter system for peak response at 0.665μ. Temperatures measured with thermocouples.	Measured in air. Data taken from curves. (λ= 0.665μ)
		O	Calcium stabilized		
		Δ	Magnesium stabilized		



NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM OXIDE

NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM OXIDE--REFERENCE INFORMATION

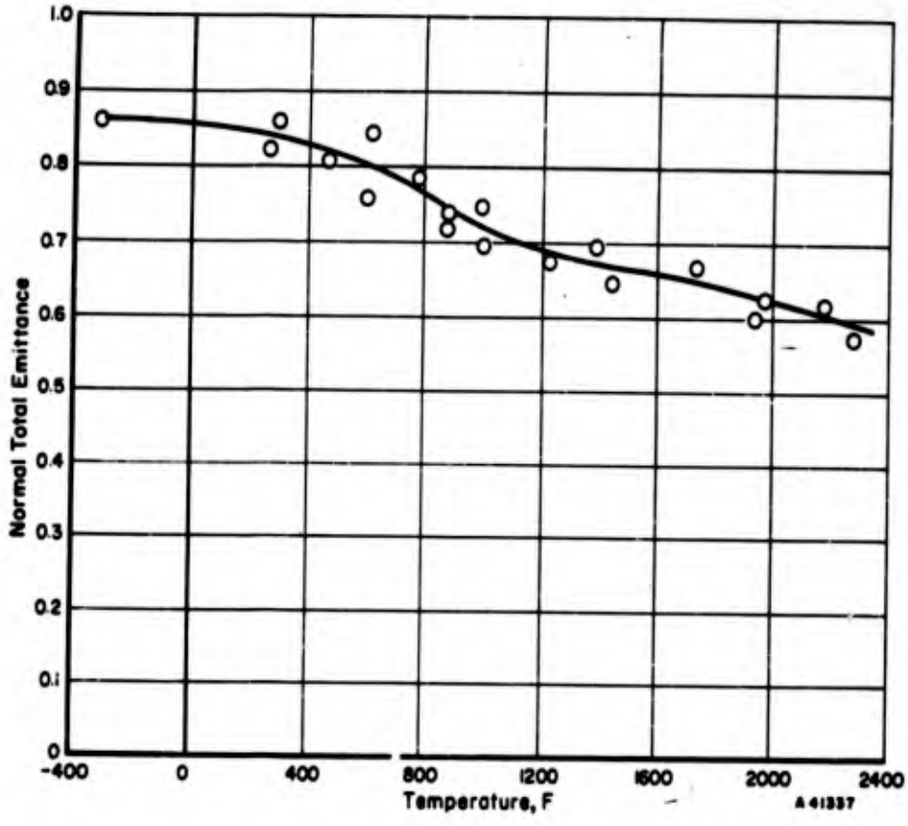
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
3	Blau, Marsh, Martin, Jasperse, and Chaffee		Zirconia (ZrO_2) Norton RZ 5601 Purity: 92% ZrO_2, 4.5% CaO Surface condition not given	Normal spectral emittance. Specimen mounted in wall of cylindrical Globar (SiC) heater. Comparison blackbody hole in heater wall. Monochromator and thermocouple detector. Temperatures measured with thermocouples.	Measured in air. Data taken from curves. (Curves drawn through 1112 F points only.)
		O	Measured at 1112 F		
		X	Measured at 1877 F		



SPECTRAL REFLECTANCE OF ZIRCONIUM OXIDE

SPECTRAL REFLECTANCE OF ZIRCONIUM OXIDE--REFERENCE INFORMATION

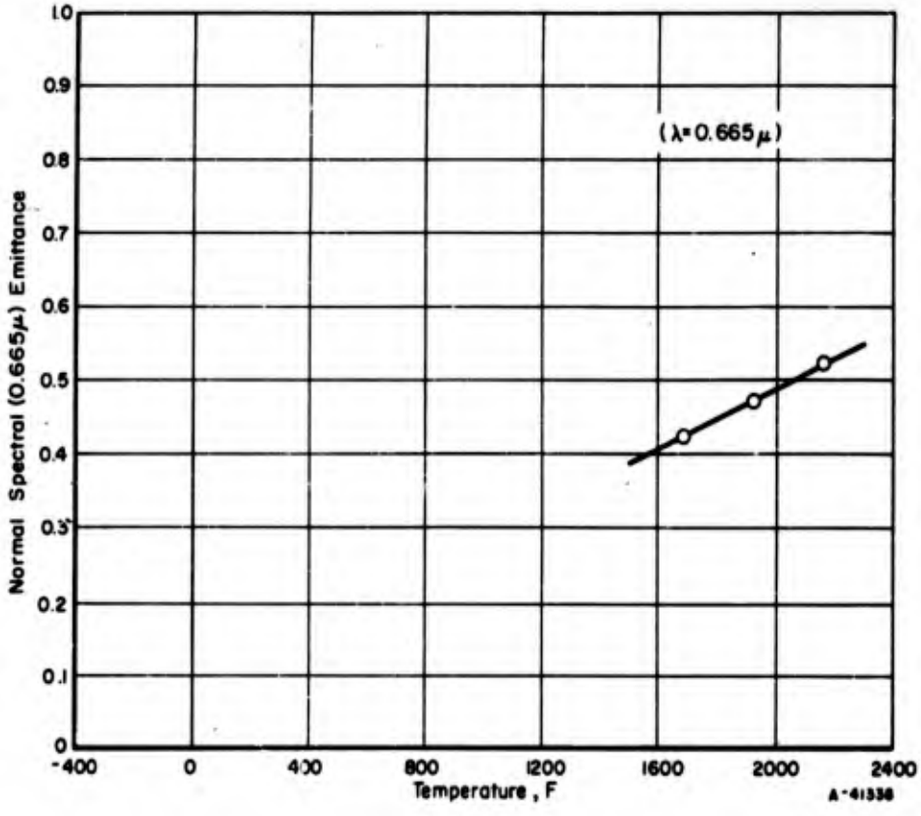
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris		Zirconium oxide Calcium stabilized and magnesium stabilized Purity and surface condition not given	Spectral reflectance. Incident radiation 9 degrees from normal to specimen surface. Integrating sphere reflectometer. Monochromator and lead sulphide detector. Normal (9 degrees) illumination. Diffuse reflection.	Measured in air at room temperature. Data taken from curves.



NORMAL TOTAL EMITTANCE OF PYROCERAM 9606

NORMAL TOTAL EMITTANCE OF PYROCERAM 9606--REFERENCE INFORMATION

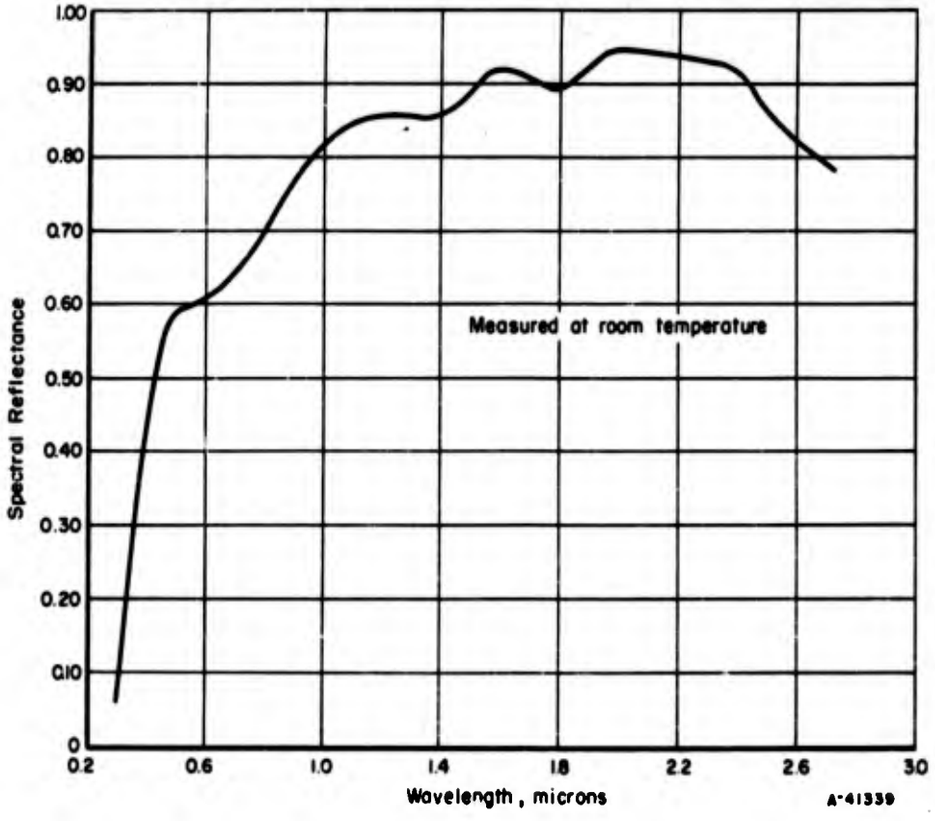
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris	O	Pyroceram 9606, surface condition not given	Normal total emittance. Furnace-heated specimen. Comparison blackbody. Thermistor detector. Temperatures measured with thermocouples.	Measured in air. Data taken from curves.



NORMAL SPECTRAL EMITTANCE OF PYROCERAM 9606

NORMAL SPECTRAL EMITTANCE OF PYROCERAM 9606--REFERENCE INFORMATION

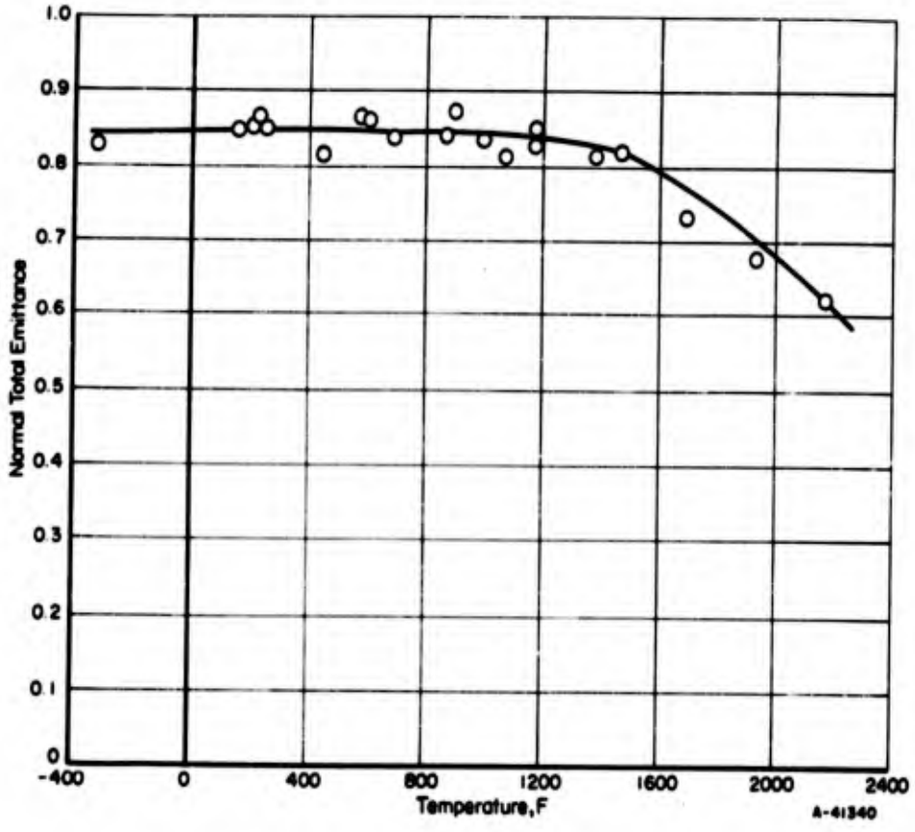
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris	O	Pyroceram 9606 Surface condition not given	Normal spectral emittance. Furnace-heated specimens. Comparison blackbody. Commercial detector and filter system for peak response at 0.665μ. Temperatures measured with thermocouples.	Measured in air. Data taken from curves. (λ= 0.665μ)



SPECTRAL REFLECTANCE OF PYROCERAM 9606

SPECTRAL REFLECTANCE OF PYROCERAM 9606--REFERENCE INFORMATION

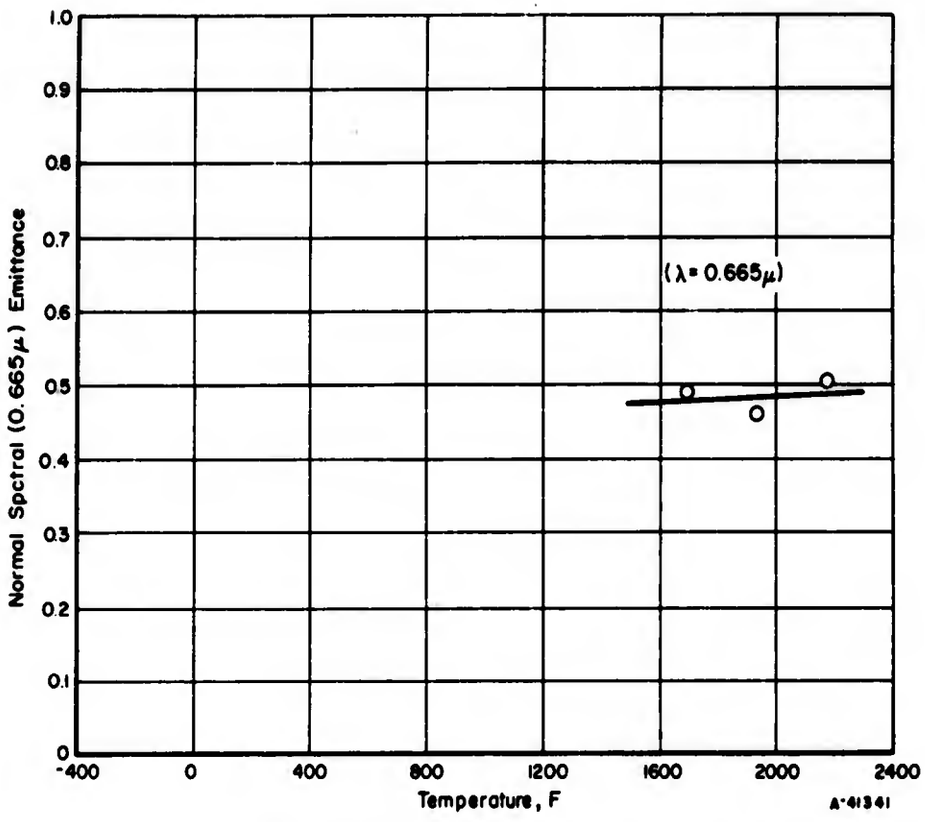
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris		Pyroceram 9606 Surface condition not given	Spectral reflectance. Incident radiation 9 degrees from normal to specimen surface. Integrating sphere reflectometer. Monochromator and lead sulphide detector. Normal (9 degrees) illumination. Diffuse reflection.	Measured in air at room temperature. Data taken from curves.



NORMAL TOTAL EMITTANCE OF PYROCERAM 9608

NORMAL TOTAL EMITTANCE OF PYROCERAM 9608--REFERENCE INFORMATION

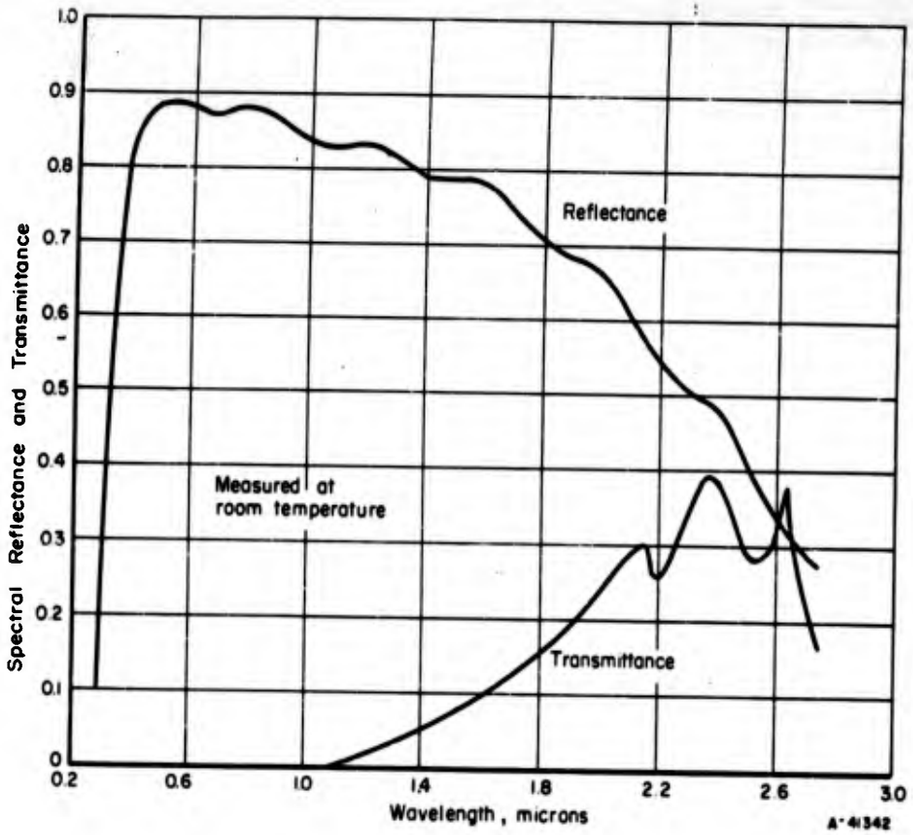
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris	O	Pyroceram 9608 Surface condition not given	Normal total emittance. Furnace-heated specimen. Comparison blackbody. Thermistor detector. Temperatures measured with thermocouples.	Measured in air. Data taken from curve.



NORMAL SPECTRAL EMITTANCE OF PYROCERAM 9608

NORMAL SPECTRAL EMITTANCE OF PYROCERAM 9608--REFERENCE INFORMATION

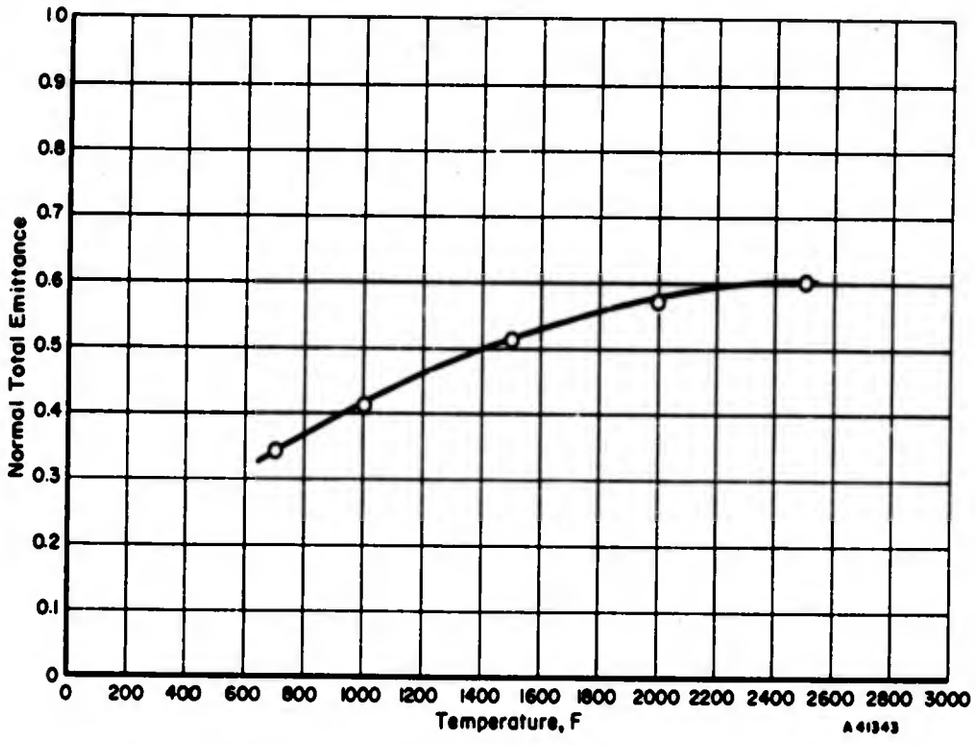
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris	O	Pyroceram 9608 Surface condition not given	Normal spectral emittance. Furnace-heated specimen. Comparison blackbody. Commercial detector and filter system for peak response at 0.665μ. Temperatures measured with thermocouples.	Measured in air. Data taken from curves. (λ= 0.665μ)



SPECTRAL REFLECTANCE AND TRANSMITTANCE OF PYROCERAM 9608

SPECTRAL REFLECTANCE AND TRANSMITTANCE OF PYROCERAM 9608--REFERENCE INFORMATION

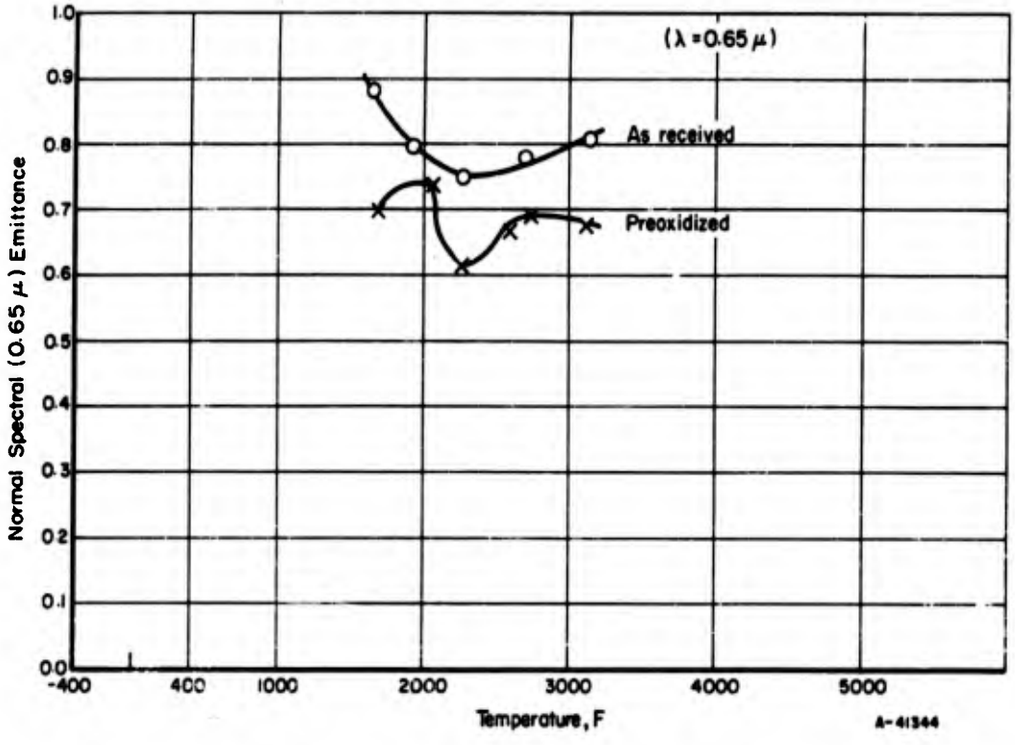
Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
2	Olson and Morris		Pyroceram 9608 Surfaces reasonably flat and parallel	Spectral reflectance. Incident radiation 9 degrees from normal to specimen surface. Integrating sphere reflectometer. Monochromator and lead sulphide detector. Normal (9 degrees) illumination. Diffuse reflection. Spectral Transmittance. Normal specimen position filled by $MgCO_3$ or MgO block. Specimen placed in entrance beam to sphere. Diffuse transmission.	Measured in air at room temperature. Data taken from curves.



NORMAL TOTAL EMITTANCE OF MOLYBDENUM DISILICIDE

NORMAL TOTAL EMITTANCE OF MOLYBDENUM DISILICIDE--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
1	Anthony and Pearl	O	As received	Normal total emittance. Induction-heated specimen. Thermopile detector. Comparison blackbody. Temperatures measured with thermocouples and optical pyrometer.	Measured in continuous purge of helium gas.



NORMAL SPECTRAL EMITTANCE OF MOLYBDENUM DISILICIDE

NORMAL SPECTRAL EMITTANCE OF MOLYBDENUM DISILICIDE--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
4	Blau, Chaffee, Jasperse, and Martin	O	Molybdenum disilicide Surface clean and smooth	Normal spectral emittance. Induction-heated specimen. Blackbody hole drilled in specimen surface. Temperatures measured with micro-optical pyrometer.	Measured in 90% argon - 10% hydrogen atmosphere. Data taken from curves. (λ = 0.65μ)
		X	Preoxidized (Lower emittance for the preoxidized surface attributed to SiO_2 surface layer)		

TOTAL SOLAR ABSORPTANCES AT SEA LEVEL AND ABOVE THE ATMOSPHERE

	Finish	Above Atmosphere	Sea Level
Graphite-National GBE	(F)	0.850	0.863
Graphite-National GBE	(B)	0.869	0.877
Graphite-National GBH	(M)	0.881	0.887
Graphite-National GBH	(R)	0.885	0.891
Graphite-Speer 3474D	(M)	0.853	0.858
Graphite-Speer 3474D	(R)	0.866	0.871
Graphite-Speer 7087	(M)	0.908	0.911
Graphite-Speer 7087	(R)	0.916	0.918
Beryllium Oxide (Refractory)	(R)	0.421	0.405
Magnesium Oxide (Refractory)	(R)	0.168	0.14.

TOTAL SOLAR ABSORPTANCE OF BERYLLIUM OXIDE, MAGNESIUM OXIDE AND THREE GRAPHITES--REFERENCE INFORMATION

Reference	Investigator	Symbol	Composition and Surface Condition	Test Method	Remarks
	Betz, Olson, Schurin, and Morris		Surface finishes: B* back F* front M fine milling machine cut R as received from supplier. * back and front surfaces arbitrarily assigned to graphite sample. Sides appeared different to the eye.	Solar absorptance calculated by method of truncated weighted ordinate integration using spectral reflectance vs wavelength curves and solar energy distribution curves over the limits of 0.3 to 2.4 microns. Above atmosphere values corrected for 3 per cent of energy lying outside these limits.	Calculated. Data obtained from table.

REFERENCES

(1) Anthony, F. M., and Pearl, Harry A., "Investigations of Feasibility of Utilizing Available Heat Resistant Materials for Hypersonic Leading Edge Applications", Vol III – Screening Test Results and Selection of Materials, WADC TR 59-744 (July, 1960).

(2) Olson, O. H., and Morris, J. C., "Determination of Emissivity and Reflectivity Data on Aircraft Structural Materials", Part III – Techniques for Measurement, WADC TR 56-222, ASTIA AD 239302 (April, 1960).

(3) Blau, H. H., Jr., Marsh, J. B., Martin, W. S., Jasperse, J. R., and Chaffee, E., "Infrared Spectral Emittance Properties of Solid Materials", AFCRL-TR-60-416, ASTIA AD 248276 (October, 1960).

(4) Blau, H. H., Jr., Chaffee, E., Jasperse, J. R., and Martin, W. S., "High Temperature Thermal Radiation Properties of Solid Materials", AFCRC-TN-60-165, ASTIA AD 236394 (March 31, 1960).

(5) Coffman, J. A., Coulson, K. L., and Kibler, T. M., General Electric Company, Cincinnati, Ohio, preliminary information under an Air Force contract.

(6) Riethof, T. R., "High Temperature Spectral Emissivity Studies", General Electric Company MSVD, Space Sciences Laboratory, R61SD004 (January, 1961).

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(8) Olson, O. H., and Morris, J. C., "Determination of Emissivity and Reflectivity Data on Aircraft Structural Materials", WADC TR 56-222, Part II, Supplement I, ASTIA 202494 (October, 1958).

(9) Jain, S. C., and Krishnan, Sir F.R.S., "The Distribution of Temperature Along a Thin Rod Electrically Heated in Vacuo", Proc. Royal Soc. London, 225, 7-19 (1954).

(10) Thorn, R. J., and Simpson, O. C., "Spectral Emissivities of Graphite and Carbon", Jour. Applied Physics, 24 (5), 633-639 (May, 1953).

(11) Wade, W. R., and Casey, F. W., Jr., "Measurements of Total Hemispherical Emissivity of Several Stably Oxidized Nickel-Titanium Carbide Cemented Hard Metals From 600°F to 1600°F", NASA Memo 5-13-59L.

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46F	Department of Defense Titanium Sheet-Rolling Program Status Report No. 4, March 20, 1959 (PB 151065 $2.25)
46G	Department of Defense Titanium Sheet-Rolling Program – Time-Temperature-Transformation Diagrams of the Titanium Sheet-Rolling Program Alloys, October 19, 1959 (PB 151075 $2.25)
46H	Department of Defense Titanium Sheet-Rolling Program, Status Report No. 5, June 1, 1960 (PB 151087 $2.00)
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110	The All-Beta Titanium Alloy (Ti-13V-11Cr-3Al), April 17, 1959 (PB 151066 $3.00)
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178	Steels for Large Solid-Propellant Rocket-Motor Cases, November 20, 1962.

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Thermal radiative data (emittance, reflectance, and absorptance) are included for the following materials: titanium and its alloys; stainless steels; iron-, nickel-, and cobalt-base superalloys; the refractory metals (chromium, columbium, molybdenum, tantalum, and tungsten) and their alloys; coated materials for elevated-temperature service; and ceramics and graphite.

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Thermal radiative data (emittance, reflectance, and absorptance) are included for the following materials: titanium and its alloys; stainless steels; iron-, nickel-, and cobalt-base superalloys; the refractory metals (chromium, columbium, molybdenum, tantalum, and tungsten) and their alloys; coated materials for elevated-temperature service; and ceramics and graphite.

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