Papers

CONTENTS

1. General Radiometry

1.1 Standards, Sources, and Detectors in Radiation Measurements.	3
1.2 On the Use of Thermopiles for Absolute Radiometry in the Far Ultraviolet.	18
1.3 A New Radiometric Equation and its Application.	25
1.4 Comparison of an Ionization Chamber and a Thermopile as Absolute Detectors in the Extra	emen
Ultraviolet	26
2.1 On Kirchhoff's Law and Its Generalized Application to Absorption and Emission by	
Cavities.	31
2.2 A Note on the Numerical Evaluation of Thermal Radiation Characteristics of Diffuse	
Cylindrical of Diffuse Cylindrical and Conical Cavities.	38
2.3 An Equation for the Local Thermal Emissivity at the Vertyex of A Diffuse Conical or V-Gr	oove
Cavity	47
2.4 The Apparent Thermal Radiation Properties of an Isothermal V-Groove with Specularly	
Reflecting Walls.	50
2.5 An Approach to Thermal Emittance Standards.	56
2.6 A Test of Analytical Expressions for the Thermal Emissivity of Shallow Cylindrical Cavitie	es.77
2.7 Investigation of Shallow Reference Cavities for High-Temperature Emittance Measurement	ts. 87
2. Emissivity (Emittance) Standards-Continued	
2.8 Instructions for Handling Emittance Standards.	99
2.9 Certificate of Normal Spectral Emittance, Standard Reference Materials 1402 to 1409	100
2.10 Certificate of Normal Spectral Emittance, Standard reference Materials 1420-1428	107
2.11 Certificate of Normal Spectral Emittance Standard Reference Materials 1440 to 1447	
Oxidized Inconel.	111
3. Emissivity and Emittance Measurements and Techniques	
Papers	
3.1 Standardization of Thermal Emittance Measurements Part IV: Normal Spectral Emittance	
800-1400 K.	119
3.2 Equipment and Procedures for Evaluation of Total Hemispherical Emittance.	134
3.3 Method of Measuring Emissivities of Metals in the Infrared.	140
3.4 Comments on the Surface Characterization of Real Metals.	145
3. Emissivity and Emittrance Measurements and Techniques-Continued	
3.5 Importance of Surface Fillms.	149
3.6 A Rotating Cylinder Method for Measuring Normal Spectral Emittance of Ceramic Oxide	
Specimens from 1200 to 1600 K	151
3.7 Apparatus for the Measurement of the Normal Spectral Emissivity in the Infrared	174

3.8 Approximate Normal Emissivity in the Infrared at Elevated Temperatures of Single-Crystal and Polycrystalline Calcium Fluoride.	178
3.9 Periodic Heat Flow in a Hollow Cylinder Rotating in a Furnace with a Viewing Port.	184
3.10 Survey of Infrared Measurement Techniques and Computational Methods of Radiant Heat	
Transfer.	195
3. Emissivity and Emittance Measuremets and Techniques Continud	
Abstracts	
3.11 Thermal Radiation Property Measurement Techniques.	210
3.12 Procedures for Precise Determination Thermal Radiation Properties, November 1962	
to October 1963.	211
3.13 Procedures for Precise Determination of Thermal Radiation Properties, November 1963 to	
October 1964	216
3.14 Procedures for Precise Determination of Thermal Radiation Properties, November 1964 to	
October 1965.	217
4 Material Properties	
Papers	
4.1 Effect of Surface Roughness on Emittance of Nonmetals.	221
4.2 Thermal Radiation Properties of Ceramic Materials.	223
4.3 Relation of Emittance to Other Optical Properties.	236
4.4 Total Hemispherical Emittance of Coated and Uncoated inconel and Types 321 and 430	
Stainless Steel.	246
4.5 Spectral Emittance of Ceramic-Coated and Uncoated Specimens of Inconel and Stainless	
Steel.	255
Abstract	
4.6 Theory and Measurement of the Thermal Radiative Properties of Metals.	262
5. Irradiance Standards	
Papers	
5.1 Memorandum on a Procedure for Obtaining Spectral Radiant Intensities of Tungsten-Filame	nt
Lamps, 400-700 mu.	265
5.2 The New Tungsten-Filament Lamp Standards of Total Irradiance.	266
5.3 Instructions for Using the NBS Tungsten-Filament Lamp Standards of Total Irradiance,	
(March 1966)	271
5. Irradiance Standards-Continued	
Papers	
5.4 A New Standard of Spectral Irradiance.	274
5.5 Instructions for Using the NBS 1000-Watt Quartz-Iodine Lamp Standards of Spectral	
Irradiance, (Nov. 1964).	278
5.6 A Standard for Extremely Low Values of Spectral Irradiance.	280
5.7 A One-Solar-Constant Irradiance Standard.	285

6. Radiometric Measurement Techniques

Papers

6.1 Spectral Irradiance as Determined Through the Use of Prism and Filter Spectroradiometric	
Techniques.	289
6.2 The Measurement of Solar Radiation with Principal Emphasis on the Ultraviolet Componen	t.297
6.3 Some Factors Affecting the Sensitivity and Spectral Response of Thermoelectric	
(Radiometric) Detectors.	328
6.4 Radiometric Methods for Measuring Laser Output.	336
6. Radiometric Measurement Techniques-Continued	
Papers	
6.5 Effects Upon Radiant Intensity Measurements due to Secattering by Optical Elements.	351
7. Radiance Standards	
Papers	
7.1 Standard of Spectral Radiance for the Region of 0.25 to 2.6 Micros.	361
7.2 Spectral Radiance of a Low Current Graphite Are.	367
7.3 High-Accuracy Spectral Radiance Calibration of Tungsten-Strip Lamps.	373
7.4 The NBS Photoelectric Pyrometer and its Use in Realizing the International Practical	
Temperature Scale above 1063 C.	390
Abstracts	
7.5 Construction and Operation of a Simple High-Precision Copper Point Blackbody and Furnad	ce.403
7.6 Radiance Temperature at 6550A of the Graphite Arc.	403
7. Radiance Standards-Continued	
Abstract	
7.7 Theory and methods of Optical Pyrometry.	404
8. Flux Measurement	
Papers	
8.1 Theory, Construction, and Use of the Photometric integrating Sphere.	409
8.2 Application of Sulfur Coatings to Integrating Spheres.	455
Abstracts	
8.3 Flux Averaging Devices for the Infrared.	456
8.4 A 5-Meter Integrating Sphere.	456
9. Reflectometry	
Papers	
9.1 Terms, Definitions and Symbols in Reflectometry.	459
9.2 Use of an Auxiliary Sphere with a Spectroreflectometer to Obtain Absolute Reflectance.	467
9. Reflectometry-Continued	
9.3 Generalized Integrating-Sphere Theory.	473
9.4 Effect of Surface Texture on Diffuse Spectral Reflectance: A. Diffuse Spectral Reflectance	
of Metal Surfaces	477
9.5 Ellipsoidal Mirror Reflectometer.	490
9.6 High Purity Powdered Csi as a High Reflectance Infrared Diffuser	504

9.7 Preparation and Colorimetric Properties of a Magnesium Oxide Reflectance Standard.	505
Abstract	
9.8 A Laser-Source Integrating Sphere Reflectometer.	509
10. Laser Radiometry	
10.1 Calorimetric Measurement of Pulsed Laser Output Energy.	513
10.2 Radiometric Methods for Measuring Laser Output.	517
10.3 Laser Power Meter for Large Beams.	518
10.4 Laser Power and Energy Measurements.	521
11. General Photometry	
Papers	
11.1 The Waidner-Burgess Standard of Light	525
11.2 Announcement of Changes in Electrical and Photometric Units.	541
11.3 Vertical Distribution of Light from Gas Filled Candlepower Standards.	544
11.4 Concepts. Terminology. and Notation for Optical Modulation.	548
11.5 The Metric System in Illuminating Engineering.	560
11.6 Optical Resorce Letter on Radiometry.	563
11.7 Introduction of the International Practical Temperature Scale 1968: some effects in relation	ı to
light sources, colour temperature, and colorimetry.	569
11.8 Photmetric Unit Chart.	572
Abstracts	
11.9 Filters for the Reproduction of Sunlight and Daylight and the Determination of Color	
Temperature	573
11.10 A Physical Photometer.	574
11.11 New Principle of Absolute Photometry.	576
11.12 Changes in the U.S. Unit of Luminous Flux.	576
12. Applied Photometry	
Papers	
12.1 The Use of Zonal Constants in the Calculation of Beam Flux.	579
12.2 Versatile Goniometer for Projection Photometry.	582
12.3 Photmetry of Projectors at the National Bureau of Standards.	587
12.4 Review of Elementary Theory of the Photmetry of Projection Apparatus.	617
12.5 Photometer for Measurement of Effective Intensity of Condenser-Discharge Lights.	625
12.6 Effective Intensity of Flashing Lights.	629
12.7 Computation of the Effective Intensity of Flashing Lights.	640
12.8 Photometer for Luminescent Materials.	646
12.9 On the Standard Source for Low Level Photometry.	651
12.10 The Photometry of Colored Light.	652
Abstracts	
12.11 Absolute Light-Scattering Photometer: I, Design and Operation.	656
12.12 Absolute Light-Scattering Photometer: II, Direct Determination of Scattered Light from	

Solutions.	656
Author index	657
Subject index	664
SI physical units (inside back cover)	