NIST Calibration Program
Calibration Services Users Guide
SP 250 Appendix
Fee Schedule – February 11, 2019

Calibration Services:

Dimensional
Mechanical
Thermodynamic
Optical Radiation
Ionizing Radiation
Electromagnetic
Time and Frequency

National Institute of
Standards and Technology
U.S. Department of Commerce

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CHAPTER 1
POLICIES

A. Introduction

The calibration services of the National Institute of Standards and Technology (NIST) are designed to help the makers and users of precision instruments achieve the highest possible levels of measurement quality and productivity. The services listed in this Fee Schedule constitute the highest order of calibration services available in the United States. They directly link a customer's precision equipment or transfer standards to national and international measurement standards. These services are offered to public and private organizations and individuals alike.

For more specific information, the NIST Calibration Services Users Guide, SP 250, contains data on uncertainty and other technical references. Copies are available upon request or consult our website (see Section L of this chapter).

B. ProForma Invoice

Please be advised that for non-U.S. government agencies, starting 01 January 2013, a new legal document (Calibration Service Pro Forma Invoice) containing the NIST calibration service terms and conditions are required for all calibration services. This document is a Calibration Cooperative Research and Development Agreement (C-CRADA) between your company and NIST. In general, this C-CRADA protects your calibration information as well as providing you with a firm price quote, explaining invoicing information, and information on the NIST quality system and traceability. In addition to the legal terms and conditions, the Calibration Service Pro Forma Invoice is used in two primary ways: 1) to create a firm price quote prior to submission of a company purchase order or 2) to create a firm price quote after receipt of a company purchase order. In either case, a signed copy of the Calibration Service Pro Forma Invoice by the authorized company representative is required by NIST. The terms and conditions of the Calibration Service Pro Forma Invoice supersede any conflicting and/or additional terms and conditions contained in a company's purchase order.

For U.S. government agencies, an agreement is required in lieu of the Calibration Service Pro Forma Invoice. Please contact Nancy Selepak (nancy.selepak@nist.gov) for assistance.

C. Types of Calibration Services

- Calibration Services
- Special Tests
- Measurement Assurance Programs (MAPs)

NIST provides Calibration Services using well-characterized, stable and predictable measurement processes. NIST calibrates instruments and devices that are metrologically suitable as reference or transfer standards.

Special Tests are so designated for one or more of the following reasons: (1) the specific type of calibration is seldom requested, thus precluding the maintenance of a large statistical base for characterizing the measurement process; (2) the test requested is unique; or (3) the service is still under development – meaning the measurement or calibration methods are still being perfected, or all the quality-control documentation has not been completed.

Measurement Assurance Programs are quality control programs for calibrating a customer's entire measurement system. In a typical MAP, a stable artifact or set of artifacts called transfer standards are first measured by NIST and then sent to a customer's laboratory for a series of measurements. The transfer standards are then returned to NIST for re-measurement, along with the participating laboratory's results. NIST reports its comparative findings to the customer and, when necessary, offers guidance on achieving and maintaining measurement quality. Successful use of a NIST MAP requires that the customer make periodic measurements of in-house check standards to estimate their measurement process uncertainty and to ensure that the measurement process remains in a state of statistical control. Unless a laboratory has a measurement quality assurance program to monitor its own measurement process parameters continuously, there is no value in

participating in a MAP. In fact, NIST recommends that its customers establish and use a measurement quality assurance program to monitor their measurement parameters, whether or not they participate in a MAP.

D. Criteria for Quality Assurance

All the measurement services listed in this document meet rigorous criteria for quality assurance. Calibration Services and MAPs satisfy the most demanding and explicit requirements in that they are carried out regularly under pre-established and well-defined conditions; the measurement processes involved are well-characterized, stable, and statistically controlled; and quality-control procedures are well-defined and strictly followed. Furthermore, each Calibration Service or MAP is planned and documented to permit continuity of service over time.

E. Quality

NIST has implemented a quality system for its measurement services. The NIST Quality System, www.nist.gov/qualitysystem/ (NIST QS) comprises policies and procedures that are documented in the NIST Quality Manual (NIST QM). NIST commits that the NIST QS be, to the extent allowed by statute and regulation, in conformity with the international standard ISO/IEC 17025 and the relevant requirements of ISO Guide 34 as they apply to the Standard Reference Materials® (SRMs) and related services that NIST delivers. In general, the scope of the NIST quality system for measurement services encompasses all services listed in the NIST Special Publication (SP) 250, NIST Calibration Services Users Guide and the NIST Special Publication (SP) 260, Standard Reference Materials Catalog.

Fees

NIST recovers the cost of providing calibration services by charging a fee for each calibration performed. The costs of services are published in the Fee Schedule, which is updated and published annually to reflect changes in prices and services. Even so, the cost of many services varies according to your exact calibration specifications; you must therefore provide the technical contact with an exact description of work before receiving a price quote.

NOTE: Fees for NIST services do not include shipping costs or insurance.

F. Reports of Calibration/Test Results

Reports on calibrations or other services are the property of the customer. Copies are supplied to other parties only as required by federal law or requested in writing by the customer. The results of calibrations and tests performed by NIST apply only to the specific instrument or standard at the time of test unless otherwise clearly stated.

G. Traceability

The primary purpose of the NIST Policy on Traceability is to state the NIST role with respect to traceability. The Policy presents the definition of measurement traceability used by NIST, and clarifies the roles of NIST and others in achieving traceability of measurement results for measurements both internal and external to NIST.

The NIST Policy on Traceability also addresses the role of NIST in providing its customers with the tools they need (a) to assist them in establishing traceability of their measurement results, and (b) to assess the claims of traceability made by others. This is achieved directly through the provision of NIST measurement-related products and services, through collaboration with relevant organizations, through development and dissemination of technical information on traceability, and through conducting coordinated outreach programs.

Merely having an instrument or artifact calibrated at NIST is not enough to make the measurement result traceable to reference standards developed and maintained by NIST. To establish traceability to such reference standards, there must be an unbroken chain of comparisons and each provided measurement must be accompanied by a statement of uncertainty. The measurement system by which values are transferred must be clearly understood and under control. The dates and details of each link in the chain must also be provided.

Although NIST supports making the user aware of traceability and provides the user with details as to how traceability is established, NIST does not allow the prominent display of its name on proprietary products or in the advertising of them (See Section J of this chapter).

H. Reporting Measurement Uncertainty

To ensure that NIST uncertainty statements are consistent across the organization and with international practice, NIST policy requires that all NIST measurements be accompanied by statements of uncertainty as discussed in NIST Technical Note 1297[1].

NIST reports its calibration results, with the measurement values accompanied by the uncertainties associated with the methods, operators, and environment at NIST. Users of these calibration services will make their own measurements with the calibrated instruments or artifacts. In addition to the uncertainty indicated by NIST, other uncertainties are inherent in the instrument, associated with the method or protocol in using the instrument, with the operator of the instrument, and with the physical environment (pressure, temperature, humidity, etc.) in which the measurements are made. Thus, the measurements made with the calibrated instruments or artifacts by organizations outside of NIST have total uncertainty budgets associated with them, only one component of which is the uncertainty reported to them by NIST.

I. Use of Metric (SI) Units

In accordance with the Metric Conversion Act of 1975 as amended by Section 5164 of the Omnibus Trade and Competitiveness Act of 1988 and as required by related provisions of the Code of Federal Regulations, the National Institute of Standards and Technology (NIST) uses the modern metric system of measurement units (International System of Units–SI) in all publications. When the field of application or the special needs of users of NIST publication require the use of non-SI units, the values of quantities are first stated in the SI units and the corresponding values expressed in non-SI units follow in parentheses. Copies of NIST SP 811[3] are available upon request (see Section L) or on the web site: www.nist.gov/pml/pubs/

J. Reference to NIST in Advertisements

The NIST measurement/test results or reports shall not be used to indicate or imply that NIST approves, recommends, or endorses the manufacturer, supplier, or user of any instruments or standards or that NIST in any way guarantees or predicts the future performance of items after calibration or test. No reference shall be made to NIST or to reports or results furnished by NIST in any advertising or sales promotions, which would indicate or imply that NIST approves, recommends, or endorses any proprietary product or proprietary material.

K. Disclaimer

Commercial products, materials, and instruments, are identified in our communications and documents for the sole purpose of adequately describing experimental or test procedures. In no event does such identification imply recommendation or endorsement by NIST of a particular product; nor does it imply that a named material or instrument is necessarily the best available for the purpose it serves.

L. Questions and Inquires

The NIST Calibration Services website is intended to make the task of selecting and ordering an appropriate calibration service as quick and easy as possible. Nevertheless, when questions arise you should contact NIST for immediate clarification.

General inquiries about the NIST calibration services, assistance in determining the availability of services, and requests for complimentary copies of the Guide for the International System of Units (SP 811), and Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results (TN 1297) are to be addressed to:

PML Calibration Services
National Institute of Standards and Technology
100 Bureau Drive, Stop 8363
Gaithersburg, MD 20899-8363
United States of America
Telephone: (301) 975-2200
Fax: (301) 975-2950
Email: calibrations@nist.gov
Internet: www.nist.gov/calibrations/

For technical questions concerning a specific service, directly contact the NIST staff member responsible for that calibration area.

M. Contracts and Signed Statements

As an agency of the United States Federal Government, Department of Commerce, the National Institute of Standards and Technology attests solely to the provisions described above. Receipt of orders by NIST does not imply acceptance of any provisions set forth in the order that are contrary to the policy, practice, or regulations of NIST or the U.S. Government. In general, NIST will not sign any affidavits, acknowledgement forms, or other documents that may be required by any domestic or foreign entity for policy governing procurement of goods and services.

N. Use of NIST Instrumentation at a User's Facility

The delivery of certain measurement services requires that NIST equipment be loaned to the customer for on-site measurements and/or calibrations. The customer agrees to be responsible for the equipment once it leaves NIST until it is returned to NIST's possession. The User will obtain appropriate liability insurance, including property damage insurance, and will be required to present evidence of insurance coverage for the equipment in an amount not less than $100,000, or alternatively, not less than the amount specified by NIST in the documentation accompanying the equipment.

CHAPTER 2
ORDERING INSTRUCTIONS FOR DOMESTIC CUSTOMERS

A. Customer Inquires

General customer inquiries for information or clarifications about the NIST calibration services should be directed as follows:

PML Calibration Services
National Institute of Standards and Technology
100 Bureau Drive, Stop 8363
Gaithersburg, MD 20899-8363
301-975-2200 phone
301-975-2950 fax
calibrations@nist.gov

B. Prearrangements and Scheduling

Services should be arranged in advance, beginning with direct contact with a NIST technical staff member responsible for the desired service. Use the appropriate technical section of the Users Guide or Fee Schedule to determine whom to contact. This advance communication may answer your questions, clarify the policies and procedures briefly described here, and will permit you to schedule a tentative calibration date. Following the initial communication, you must complete and submit a purchase order and prepare to ship the item according to the procedures described below or agreed upon with the technical contact. If a calibration is scheduled far in advance, the item should not be shipped until shortly before the scheduled date; you must submit the purchase order (complete with the name and number of the desired service) before a firm calibration date can be assigned. When NIST receives your purchase order and assigns a firm service date, your order will be confirmed by the technical contact.

C. Purchase Orders

Before you ship an item for calibration, send a purchase order to the address listed in the appropriate technical section. The purchase order must:

1. State both the name and number of the NIST service (listed in this Fee Schedule as the "Service ID Number") being requested. **FAILURE TO INCLUDE THE SERVICE ORDER NUMBER WILL SERIOUSLY IMPEDE SCHEDULING AND SERVICE.**

2. Clearly identify the item(s) being sent for calibration, including any serial number(s) or model number(s).

3. Give the name, address, and telephone number of your company's procurement officer, purchasing agent or other administrative/financial authority.

4. Give the name, address, and telephone number of your company's technical contact, if different from above.

5. List separately the instructions and address for return shipment, insurance, mailing address for the calibration/test report, and billing address. (Federal or state agency requests for calibration services should be accompanied by a document authorizing that the cost of the service be billed to the agency).

6. Clearly state any special or necessary conditions of test, such as operating frequency or temperature.

7. Clearly state the customer identification number; i.e., customer's employer identification number (EIN) for individuals; tax identification number (TIN) for organizations; or agency location code (ALC) for government customers.

8. If the calibration or test report is to be handled in a special manner, give instructions on the purchase order.

NOTE: Receipt of orders by NIST does not imply acceptance of any provisions set forth in the order that are contrary to the policy, practice, or regulations of NIST or the U.S. Government. In general, NIST will not sign any affidavits, acknowledgement forms, or other documents that may be required by company policy governing the procurement of goods and services.

D. Remit to

Payment Terms: Net 30 days

No discounts are allowed for early payment.

PAY.GOV

For NIST invoices, electronic payments can be submitted through Pay.gov by ACH, VISA, MasterCard, Discover, American Express or debit card. Go to www.pay.gov. Bypass the user id and password section; you do not need to be registered with Pay.gov to make a payment against our invoices. To locate the payment forms click on "by Agency Name" on the left hand side of the menu bar. Find and select the National Institute of Standards and Technology. Choose the appropriate NIST payment form that best fits your invoice. Complete all required fields and submit you payment.

Note: For ACH payments, please verify with your banking institution that your account is set up to have ACH payments processed.

Remit to address:

NIST Lockbox accepts check payments for NIST. Please use the following address for all NIST payments:

NIST
P.O. Box 301505
Los Angeles, CA 90030-1505

Please remember that all checks must be drawn on a United States bank and made payable in US dollars. In addition, please continue to reference the NIST invoice/receivable number on the check stub.

Other Forms of Payment

In addition to checks, NIST also accepts VISA, MasterCard, Discover, and American Express. Customers can supply their credit card information and fax a copy of the invoice to Accounts Receivable at 310/975-8943 or mail the information to:

NIST
Mail Stop 1624
100 Bureau Drive
Gaithersburg, MD 20899-1624

NIST Federal Identification Number: 530-20-5706

NIST DUNS Number: 929956050

W-9 Mail to:
NIST
Accounts Receivable
Stop 1624
Gaithersburg, MD 20899-1624

E. Shipping, Insurance, and Risk of Loss

Ship the instrument or standard to the mailing address of the technical group providing the service. Please take note that the mailing address is not the same for every technical group.

Please adhere rigorously to the following procedures:

1. Ship only items in good repair. Apparatus in disrepair will not be calibrated. If defects are found, after calibration has begun, the procedure will be terminated, a report issued, and a charge levied for work completed.

2. Use strong, reusable packing materials and containers marked clearly and indelibly on the outside with the requestor's name, address and the following notation: **REUSABLE CONTAINER, DO NOT DESTROY.**

3. Follow any special shipping procedures given in the technical sections of the Calibration Services Users Guide, particularly those sections covering radiation and dosimetry measurements.

4. Insure the shipments to and from NIST and clearly state the method of return shipment. NIST will not assume liability for loss or damage unless such loss and damage result solely from the negligence of NIST personnel. If return shipment by parcel post is requested or is suitable, NIST will prepay the return shipment but will not insure it. When no shipping or insurance instructions are furnished, NIST will return the shipment by common carrier, collect and uninsured.

5. Shipments to NIST must be at FOB destinations (customer pays for shipping).

6. Return shipments are sent FOB origin (customer pays for shipping).

NOTE: Fees for NIST services do not include shipping cost or insurance.

F. Turnaround Time

Normal turnaround time for NIST calibration services varies greatly−usually from several weeks to several months depending on the type of service requested, and the service schedule. Some services are only scheduled once or twice a year with appointments made months in advance of the service date. To avoid unnecessary scheduling or administrative delays in the calibration process, always make arrangements with the technical contact for the service you wish to utilize prior to shipping your instrument or artifact to us.

G. Customer Checklist

Please refer to last page of this chapter for a Customer Checklist which is intended to assist you in developing the basic information required to process an order for calibration services at NIST.

Customer Checklist for Ordering NIST Calibration Services

Information Obtained from NIST Technical Contact	**Comments**
NIST Contact (name/telephone)	Provide this information on your purchase order (PO)
Is the service available?	Please make sure customer's technical contact discusses service with NIST technical contact before proceeding.
NIST Service Identification Number	Provide this information on your PO
Estimated cost of services	Provide this information on your PO
Estimated turnaround time	Many calibration services are batched. Find out when to send the instrument.
Special instructions	
Packaging instructions	
Shipping instructions	
Other Precautions	
Information Supplied by the Customer on Purchase Order	
Purchase order number	
Purchase order date	
Customer's tax identification number	
Customer's mailing address	
Customer's billing address	
Name, telephone number, fax number, email address of administrative or procurement contact point at customer's location	
Name, telephone number, fax number, email address of technical contact point at customer's location	
Ship-to address (including NIST technical contact name)	
Return address (for shipment back to customer)	
NIST Service Identification Number	
Estimated cost	
Shipping terms (no FOB destination on return shipment)	
Special instructions from customer's technical contact	

CHAPTER 3
SPECIAL INSTRUCTIONS FOR FOREIGN CUSTOMERS

A. Foreign Inquires

Foreign customers should address all inquiries to:

PML Calibration Services
National Institute of Standards and Technology
100 Bureau Drive, Stop 8363
Gaithersburg, MD 20899-8363
United States of America
Telephone: (301) 975-2200
Fax: (301) 975-2950
Email: calibrations@nist.gov
Internet: www.nist.gov/calibrations/

NOTE: Please clearly indicate your **city** and **country** on all correspondence so that we may promptly respond to your request.

B. Criteria for Providing Service

Under certain circumstances, NIST is authorized to provide measurement service, including calibration services, for organizations or individuals located outside the United States. However, the Calibration Program must review each request for calibration services to determine if services are available to the requestor's organization in the requestor's country. Foreign customers must provide the following information, in writing, to the Calibration Program (see address above):

1. Identification of the item(s) to be calibrated, including serial and model numbers.

2. A detailed description of the measurements that are needed, or indicate the service identification number.

3. A description of any special requirement/circumstance that might affect the decision to provide the service. For example, will adjustments have to be made to the instrument, or will the time period be restricted in which the device is available for calibration?

4. A complete name and address of the requestor's organization.

C. Special Instructions

If the request for calibration service is accepted by NIST, the requesting organization will be notified of the cost of service and will be given the contact information for the NIST technical unit that will perform the measurements. The requesting organization must then complete the following steps:

1. Contact the NIST technical staff that will perform the service to determine the time schedule.

2. Send a purchase order to the Calibration Program. Provide complete addresses, including country, for returning the instrument and for mailing the calibration or test report.

3. NIST policy requires prepayment for all NIST calibration services requested by non-U.S. organizations. Before proceeding with any service(s), we will need a check, money order or a bank wire transfer. The prepayment must be for the full amount and be drawn on a U.S. bank. The prepayment methods are as follows:

Money Orders & Prepayment Checks

All foreign checks must be drawn on a United States Bank and made payable in US Dollars. All foreign checks must be mailed to the Receivables officer for deposit. In addition, please reference the NIST invoice/receivable number on the check stub. Checks made payable to the National Institute of Standards and Technology (NIST) should be mailed to:

NIST
Mail Stop 1624
100 Bureau Drive
Gaithersburg, MD 20899-1624

Prepayment by credit card

Please contact NIST Accounts Receivable Office at 301-975-3880, by email: billing@nist.gov, or by Fax: 301-975-8943.

Bank Wire Transfers

Payments may also be sent by wire using the US Department of Treasury FEDWIRE system and it can be done so to the following bank:

Treas NYC (Account is with the Federal Reserve Bank of New York)
U.S. Dept. of Treasury
33 Liberty Street
New York, NY 10045
Phone: 001-202-874-7132

In Payment Details field, CL329930001
ABA# 021030004
Account # 13060001
Account Name: TREAS NYC/CTR/BNF=/NIST/AC-13060001

Reference "Calibrations" to enable us to identify your payment. In addition, please be sure to pay any fees assessed for your bank wire transfers; otherwise, they will deduct it from your prepayment wire.

We cannot accept wire payment make through the Swift system only FEDWIRE. Therefore, we do not have a Swift code.

PLEASE NOTE: Our account number and name are of critical importance and must be referenced in order for NIST to be properly credited with your payment. It must appear in the precise manner shown to allow for the automated processing and classification of the funds transfer message. In addition, please refer to the NIST invoice number, your purchase order number, your country, and any other pertinent information that would help us identify you payment.

The transfer of funds can only be accomplished by your company going through a U.S. correspondent bank or by having your country's central bank send a swift telecommunication system message to the Federal Reserve Bank. **Be sure to cover any processing fees your bank may charge you.** Questions on bank wiring can be directed to the NIST Accounts Receivable Office at 301-975-3880, email: billing@nist.gov, or fax at 301-975-8943.

D. Shipping Charges

The calibration costs quoted ***do not*** include shipping, insurance, or the services of a customs broker. You must arrange and pay for these services separately. For your information, NIST currently uses the following customs brokers:

Gaithersburg, Maryland
Laing International
P.O. Box 16144
Washington, DC 20041
Phone: (703) 471-9279
Fax: (703) 471-8436

Boulder, Colorado
FedEx Trade Networks
4725 Paris Street, Suite 200
Denver, CO 80239
Phone: (303) 371-9550
Fax: (303) 373-0850

You are **not required** to use these customs brokers, but may select a broker of your choice.

CHAPTER 4
DIMENSIONAL MEASUREMENTS

A. Length Measurements
A.1 Gage Blocks

Technical Contacts:	Telephone:	Email:	Mailing Address:
Eric Stanfield (Long blocks)	(301) 975-4882	eric.stanfield@nist.gov	NIST 100 Bureau Drive, Stop 8211
Beverly Connelly (Short blocks)	(301) 975-2485	beverly.connelly@nist.gov	Gaithersburg, MD 20899-8211
Theodore Doiron	(301) 975-3472	theodore.doiron@nist.gov	

Please contact the technical staff before shipping instruments or standards to the address listed above.

A.1 Gage Blocks		
Service ID Number	Description of Services	Fee ($)
10010C	Gage Blocks: Set Up Charge, per order	254
10011C	Mechanical Comparisons, per Block (100 mm and shorter)	146
10012C	Mechanical Comparisons, per Block (over 100 mm)	365
10013C	Interferometry, per Block (100 mm and shorter), Maximum 25 Blocks per Order	419
10014S	Interferometry, per Block (over 100 mm)	At Cost
10015S	Non-standard size Gage Blocks	At Cost

Fees are subject to change without notice.

A.2 Line Standards

Technical Contact:	Telephone:	Email:	Mailing Address:
Ted Doiron	(301) 975-3472	dorion@nist.gov	NIST 100 Bureau Drive, Stop 8211 Gaithersburg, MD 20899-8211

Please contact the technical staff before shipping instruments or standards to the address listed above.

A.2 Line Standards		
Service ID Number	Description of Service	Fee ($)
10020C	Line Standards: Scales, < 1 m (40 inches), 4 Passes	9942
10021C	Line Standards: Scales, < 1 m (40 inches), 8 Passes	15230
10022S	Line Standards: Stage Micrometer, Per Scale, 30 Intervals, 2 Passes	At Cost
10023S	Line Standards: Stage Micrometer, Per Scale, 30 Intervals, 4 Passes	At Cost

10024C	Line Standards: End Standards, < 1 m	10149
10025S	Line Standards: Grid Plates, Less than 60 Intervals, 1 D Linear Calibration	At Cost

Fees are subject to change without notice.

A.3 Metal Tapes/Scales and Long Length Artifacts

Technical Contact:	**Telephone:**	**Email:**	**Mailing Address:**
Chris Blackburn	(301) 975-6413	chris.blackburn@nist.gov	NIST
Daniel S. Sawyer	(301) 975-5863	daniel.sawyer@nist.gov	100 Bureau Drive, Stop 8211 Gaithersburg, MD 20899-8211

Please contact the technical staff before shipping instruments or standards to the address listed above.

A.3 Metal Tapes/Scales and Long Length Artifacts		
Service ID Number	Description of Services	Fee ($)
10030S	Metal Tapes: Surveying, Oil Gaging, and General Purpose; Metal Scales	At Cost
10040S	Special Tests of Long Length Artifacts	At Cost

B. Diameter and Roundness Measurements

Technical Contacts:	Telephone:	Email:	Mailing Address:
Eric S. Stanfield	(301) 975-4882	eric.stanfield@nist.gov	NIST
Theodore Doiron	(301) 975-3472	theodore.doiron@nist.gov	100 Bureau Drive, Stop 8211 Gaithersburg, MD 20899-8211

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
11010C	Cylindrical Diameter Standards (i.e. Plug and Pin Gages): Set Up Charge, per order	249
11011C	Mechanical comparison, per Gage (25 mm and smaller)	146
11012C	Interferometry, per Gage (50 mm and smaller)	339
11013C	Per Gage (over 50 mm)	908
11014C	Roundness trace, per trace	497
11020C	Measuring Wires for Threads and Gears: Set Up Charge, per order	254
11021C	Single Wire, per wire	146
13020C	Special Tests of Roundness (Sphere and Hemisphere Types) Reversal Method: Radial Deviations from Best Fit Least−Squares Circle at 360 positions	1408
13030S	Special Tests of Roundness Calibration Specimens	At Cost
11030C	Spherical Diameter Standards; Balls: Set Up Charge, per order (applies to mechanical comparison and interferometry)	254
11031C	Mechanical Comparison (51 mm or smaller), Average Diameter, per ball, Expanded Uncertainty, U ~ ± 89 nm to 115 nm	146
11032S	Mechanical Comparison (over 51 mm), Average Diameter, per ball	At Cost
11033C	Interferometry (25 mm or smaller) Average Diameter, per ball, Expanded Uncertainty, U ~ ± 30 nm	700
11034C	Ball Out-of-Roundness: Least-Squares Out-of-Roundness and Polar Plots, price per trace (Typically three orthogonal traces for spheres and five traces for CMM calibration spheres) price per trace	497
Special Tests of Internal Diameter Standards: Ring Gages		
11040C	Plain Ring Gages, per ring	908
11050S	Special Tests of Diameter	At Cost
11060S	Step Gages	At Cost

Fees are subject to change without notice.

C. Complex Dimensional Standards

C.1 API Threaded Plug and Ring Gages

Technical Contacts:	Telephone:	Email:	Mailing Address:
Dennis Everett (12010C–12070S)	(301) 975-5272	dennis.everett@nist.gov	NIST 100 Bureau Drive, Stop 8211
Eric Stanfield (11050S)	(301) 975-4882	eric.stanfield@nist.gov	Gaithersburg, MD 20899-8211
John Stoup (12060S)	(301) 975-3476	john.stoup@nist.gov	
Theodore Doiron	(301) 975-3472	theodore.doiron@nist.gov	

Please contact the technical staff before shipping instruments or standards to the address listed above.

C.1 API Threaded Plug and Ring Gages		
Service ID Number	Description of Services	Fee ($)
12010C	Spec 5, 1.005 inches to 7 5/8 inches	2760
12011C	Spec 5, 8 5/8 inches to 20 inches	4140
12012C	Buttress Casing, 4 1/2 inches to 9 5/8 inches	3106
12013C	Buttress Casing, 10 inches to 13 3/8 inches	3796
12014C	Buttress Casing, 16 inches to 20 inches	4140
12015C	Line Pipe, 1/8 inch to 6 inches (New)	2760
12016C	Line Pipe, 8 inches to 20 inches (New)	3450
12017C	Extreme Line Casing, 5 inches to 7 inches (New)	4832
12018C	Extreme Line Casing, 5 inches to 7 inches (Used)	1811
12019C	Extreme Line Casing, 7 5/8 inches to 10 inches (New)	5522
12021C	Extreme Line Casing, 7 5/8 inches to 10 inches (Used)	2329
12022C	Spec 7 (Rotary), NC 23 - NC 61 (New)	3450
12023C	Spec 7 (Rotary), NC 70 (New)	3624
12024C	Spec 7 (Rotary), 1 inch to 4 1/2 inches, Reg. (New)	3450
12025C	Spec 7 (Rotary), 5 1/2 inches to 8 5/8 inches, Reg. (New)	3796
12026C	Spec 7 (Rotary), Any Type (Used)	1587
12027C	Spec 11B (Sucker Rods) P1, P2 Pin Go P7, P8 Pin Go B1, B2 Box Go (**NEW)**	1726/per set

12028C	Spec 11B (Sucker Rods) P1, P2 Pin Go P7, P8 Pin Go B1, B2 Box Go **(USED)**	949/per set
12029C	Spec 11B (Sucker Rods) P3, P4 Pin Cone B3, B4 Box Cone **(NEW)**	2157/per set
12031C	Spec 11B (Sucker Rods) P3, P4 Pin Cone B3, B4 Box Cone **(USED)**	828/per set
12032C	Spec 11B (Sucker Rods) P5, P6 Pin Cone B5, B6 Box Cone **(NEW)**	1466/per set
12033C	Spec 11B (Sucker Rods) P5, P6 Pin B5, B6 Box Cone **(USED)**	724/per set
12050S	Special Tests of Threaded Plug and Ring Gages	At Cost
12060S, 11050S	Special Tests of Two– and Three–Dimensional Gages	At Cost
12070S	Special Complex Dimensional Test, by Prearrangement	At Cost

Fees are subject to change without notice.

C.2 Sieves

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Theodore Doiron	(301) 975-3472	theodore.doiron@nist.gov	NIST 100 Bureau Drive, Stop 8211 Gaithersburg, MD 20899-8211

Please contact the technical staff before shipping instruments or standards to the address listed above..

C.3 Algorithms Testing and Evaluation Program for Coordinate Measuring Systems

Technical Contact:	**Telephone:**	**Email:**	**Mailing Address:**
Craig M. Shakarji	(301) 975-3545	shakarji@nist.gov	NIST 100 Bureau Drive, Stop 8211 Gaithersburg, MD 20899-8211

Please contact the technical staff before shipping instruments or standards to the address listed above.

C.3 Algorithms Testing and Evaluation Program for Coordinate Measuring Systems		
Service ID Number	Description of Services	Fee ($)
10070C	CMS Software: NIST-generated data sets (basic service)	2303
10071S	Special Test of CMS Software: NIST-generated data sets (per geometry evaluated)	At Cost
10072C	CMS Software: NIST-generated data sets, standard level (per geometry evaluated)	995
10080S	Special Test of CMS Software: Customer-generated data sets (basic service)	At Cost
10081S	Special Test of CMS Software: Customer-generated data sets (per geometry evaluated)	At Cost
10082S	Special Test of CMS Software: Customer-generated data sets, standard level (per geometry evaluated)	At Cost

Fees are subject to change without notice.

E. Optical Reference Planes and Roundness Standards

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Eric S. Stanfield	(301) 975-4882	eric.stanfield@nist.gov	NIST
Theodore Doiron	(301) 975-3472	theodore.doiron@nist.gov	100 Bureau Drive, Stop 8211 Gaithersburg, MD 20899-8211

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
13010C	Optical Reference Planes (Flats): Optical Flat, ≤152 mm (6”), Per Surface	2070
13011C	Optical Reference Planes (Flats): Optical Flat, 152 mm to 203 mm (8”)	2731
13012C	Optical Reference Planes (Flats): Optical Flat, 203 mm to 304 mm	3612
13013C	Optical Reference Planes (Flats): Optical Flat, ≥ 304 mm (12”)	4405
13014S	Optical Reference Planes (Flats): Three Flat Calibration	At Cost

Fees are subject to change without notice.

F. Angular Measurements

Technical Contacts:	Telephone:	Email:	Mailing Address:
Bryon S. Faust	(301) 975-4351	bryon.faust@nist.gov	NIST
Theodore Doiron	(301) 975-3472	theodore.doiron@nist.gov	100 Bureau Drive, Stop 8211 Gaithersburg, MD 20899-8211

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
14010C	Angle Gage Blocks: Set Up Charge, per order	261
14011C	Angle Gage Blocks, per block	306
14020C	Optical Polygons	209/per face
14030C	Rotary and Indexing Tables: Every 30°	3529
14031C	Rotary and Indexing Tables: (30°, 5°, 1°) Calibration	7043
14040C	Optical Wedges: Fixed-Angle Wedge	1206
14041S	Optical Wedges: Variable-Angle Wedge	At Cost
14050S	Special Angular Measurements, by Prearrangement	At Cost

Fees are subject to change without notice.

G. Laser Measurements

Technical Contact:	Telephone:	Email:	Mailing Address:
Jack Stone	(301) 975-5638	jack.stone@nist.gov	NIST 100 Bureau Drive, Stop 8211 Gaithersburg, MD 20899-8211

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
14510C	Laser Frequency/Wavelength, Full Calibration	3647
14511C	Quick Check of Frequency/Wavelength at Laboratory Conditions	1929

Fees are subject to change without notice.

H. Surface Texture

Technical Contact:	**Telephone:**	**Email:**	**Mailing Address:**
T. Brian Renegar	(301) 975-4274	brenegar@nist.gov	NIST 100 Bureau Drive, Stop 8212 Gaithersburg, MD 20899-8212

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
15010C	Roughness Calibration Specimens	2158
15030C	Step Height Measurements	2158
15040S	Surface Roughness and Topography Special Tests	At Cost

Fees are subject to change without notice.

I. Nanostructures

Technical Contact:	**Telephone:**	**Email:**	**Mailing Address:**
Kris Bertness	(301) 975-5069	kris.bertness@nist.gov	NIST 100 Bureau Drive, Stop 8212 Gaithersburg, MD 20899-8212

Service ID Number	Description of Services	Fee ($)
15510S	Nanostructures with scanning electron microscopy	601

CHAPTER 5
MECHANICAL MEASUREMENTS

A. Hydrometers

Technical Contacts:	Telephone:	Email:	Mailing Address:
Sherry Sheckels	(301) 975-5940	sherry.sheckels@nist.gov	NIST
John D. Wright	(301) 975-5937	john.wright@nist.gov	100 Bureau Drive, Stop 8361 Gaithersburg, MD 20899-8361

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
16010C	Reference Standard Hydrometers	1454
16020S	Hydrometers Special Tests	At Cost

Fees are subject to change without notice.

B. Volume and Density

Technical Contacts:	Telephone:	Email:	Mailing Address:
Sherry Sheckels	(301) 975-5940	sherry.sheckels@nist.gov	NIST
John D. Wright	(301) 975-5937	john.wright@nist.gov	100 Bureau Drive, Stop 8361 Gaithersburg, MD 20899-8361

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
17010C	Volume Standards < 380 L	2419
17020C	Volume Standards > 380 L, 2 points	3380
17030C	Volume Standards > 380 L, 5 points	4821
17040S	Volume Special Tests	At Cost

Fees are subject to change without notice.

C. Flow Measurements

Technical Contacts:	Telephone:	Email	Mailing Address:
Gina Kline (Gas Flow)	(301) 975-4813	gina.kline@nist.gov	NIST 100 Bureau Drive, Stop 8361
John D. Wright (Gas Flow)	(301) 975-5937	john.wright@nist.gov	Gaithersburg, MD 20899-8361
Iosif Shinder (Water Flow)	(301) 975-5943	iosif.shinder@nist.gov	
Aaron Johnson (Gas Flow and Hydrocarbon Flow)	(301) 975-5954	aaron.johnson@nist.gov	
Sherry Sheckels (Hydrocarbon Flow)	(301) 975-5940	sherry.sheckels@nist.gov	

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
18010C	Gas Flow Meters	5750
18015C	Natural Gas Flow Calibration	At Cost
18020C	Water Flow Meters	5095
18040C	Transfer Standards	At Cost
18050S	Gas Flow Special Tests	At Cost
18060S	Water Flow Special Tests	At Cost
18070S	Hydrocarbon Liquid Flow Special Tests	At Cost

Fees are subject to change without notice.
See 30063S Special Tests for Low-Gas-Flow Instrumentation

D. Flow Measurements at Cryogenic Temperatures

Technical Contact:	Telephone:	Email	Mailing Address:
Michael Lewis	(303) 497-3458	mlewis@boulder.nist.gov	NIST
Keith Gillis	(301) 975-2468	keith.gillis@nist.gov	325 Broadway, MC 838.09 Boulder, CO 80305-3328

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
18800S	Special Tests of Cryogenic Liquid Flow – Calibrations of customer supplied cryogenic liquid flow meters in liquid nitrogen from 0.95 kg/s to 9.5 kg/s.	At Cost

A. Air Speed Measurements

Technical Contacts:	Telephone:	Email:	Mailing Address:
Iosif Shinder	(301) 975-5943	iosif.shinder@nist.gov	NIST 100 Bureau Drive, Stop 8361 Gaithersburg, MD 20899-8361

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
19010C	High Air Speed Instruments 1.3 m/s to 67 m/s (3 mph to 150 mph)	4208
19030S	High Air Speed Special Tests	At Cost

Fees are subject to change without notice.

F. Mass Standards

Technical Contacts:	Telephone:	Email:	Mailing Address:
Patrick Abbott	(301) 975-4218	patrick.abbott@nist.gov	NIST
Zeina J. Kubarych	(301) 975-4468	zeina.kubarych@nist.gov	100 Bureau Drive, Stop 8221 Gaithersburg, MD 20899-8221

IMPORTANT NOTES TO OUR CUSTOMERS:

1. Please contact the technical staff for correct Fee and appropriate Service ID Number for your equipment.

2. Please do not send purchase orders and equipment to NIST without scheduling a calibration.

3. Calibrations for variations of complete standard weight sets are available. These may require fewer (or more) than the number of measurement series required for the calibration of a complete standard weight set. These variations will affect pricing of the service. Contact the technical staff for details.

4. If you request a calibration estimate (which includes cost and turnaround time estimates and start date of calibration), please note that we need to receive a confirmation from you to reserve the calibration start date. If no confirmation is received within 30 days, the reservation will be cancelled and the start date given to the next customer.

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
22011C	Weight cleaning	384
22021C	Single or two equal weights 1 kg or 100 g	3336
22023C	Combination of 5,2,2,1 in the range of 1 kg - 1 mg	3336
22032C	Single or two equal weights 10 kg to 50 kg	3393
22110S	Single Weights > 50 kg to 1200 kg	At Cost
22120S	Single Weights 1200 kg to 28000 kg	At Cost

22160C	Single Weights for Dead Weight Pressure Testers < 10 kg	1329
22140C	Single Weights for Dead Weight Pressure Testers > 22.7 kg (> 50 lb)	At Cost
22161C	Single Weights for Dead Weight Pressure Testers > 10 kg to 50 kg	1704
22170S	Special Mass Measurement Services	At Cost

Fees are subject to change without notice.

G. Force Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Rick L. Seifarth	(301) 975-6652	ricky.seifarth@nist.gov	NIST
Samuel L. Ho	(301) 975-6648	samuel.ho@nist.gov	100 Bureau Drive, Stop 8222
Kevin L. Chesnutwood	(301) 975-6653	kchesnut@nist.gov	Gaithersburg, MD 20899-8222

Administrative and Logistics:

June Eckley (301) 975-5866 june.eckley@nist.gov

Fax: (301) 417-0514

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
23010C	Force Transducers to 112 540 N (25 300 lbf) 1 mode	4276
23020C	Extra observation	84
23030C	Additional bridges	1158
23040C	Force Transducers to 112 540 N (25 300 lbf) 2 modes	7045
23050C	Extra observation	84
23060C	Additional bridges	1153
23070C	Force Transducers 112 540 N to 498 201 N (25 300 lbf to 112 000 lbf) 1 mode	4897
23080C	Extra observation	84
23090C	Additional bridges	1309
23100C	Force Transducers 112 540 N to 498 201 N (25 300 lbf to 112 000 lbf) 2 modes	9631
23110C	Extra observation	250
23120C	Additional bridges	2649
23130C	Force Transducers 498 205 N to 1 334 467 N (112 000 lbf to 300 000 lbf) 1 mode	10020
23140C	Extra observation	250
23150C	Additional bridges	1646

23160C	Force Transducers 498 205 N to 1 334 467 N (112 000 lbf to 300 000 lbf) 2 modes	15779
23170C	Extra observation	348
23180C	Additional bridges	2961
23190C	Force Transducers 1 334 471 N to 4 448 222 N (300 00 lbf to 1 000 000 lbf) 1 mode	11941
23200C	Extra observation	250
23210C	Additional bridges	2306

23220C	Force Transducers 1 334 471 N to 4 448 222 N (300 00 lbf to 1 000 000 lbf) 2 modes	18615
23230C	Extra observation	327
23240C	Additional bridges	4129
23250S	Force Transducers over 4 448 222 N (1 000 000 lbf) compression only	At Cost
23260S	Special Tests of Force Transducers	At Cost

Fees are subject to change without notice.

H. Vibration Measurements

Technical Contacts: Richard A. Allen

Telephone: (301) 975-5026

Email: richard.allen@nist.gov

Mailing Address:
NIST
100 Bureau Drive, Stop 8223
Sound Bldg. (233) Rm. B102
Gaithersburg, MD 20899-8223

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
24110C	Accelerometer Sensitivity, Sinusoidal, 10 Hz to 20 kHz, for accelerometer mass ≤ 350 g	2466
24130S	Accelerometer Special Test	At Cost

Fees are subject to change without notice.

I. Acoustic Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Randall P. Wagner	(301) 975-6619	randall.wagner@nist.gov	NIST 100 Bureau Drive, Stop 8221 Gaithersburg, MD 20899-8221

Administrative and Logistics:
Beverly Connelly (301) 975-2485 beverly.connelly@nist.gov
Fax: (301) 990-8291

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
25010C	Pressure Response: WE Type 640AA microphones or equivalent (e.g., Tokyo Riko Type ECL MR103; Bruel & Kjaer Type 4160, Bruel & Kjaer Types 4144 or 4132 with DB0111 adapter), 50 Hz to 10 000 Hz	7619
25020C	Pressure Response: WE Type 640AA microphones or equivalent (e.g., Tokyo Riko Type ECL MR103; Bruel & Kjaer Type 4160; Bruel & Kjaer Types 4144 or 4132 with DB0111 adapter), 50 Hz to 20 000 Hz	9189
25030C	Pressure Response: Tokyo Riko Type ECL MR112, Bruel & Kjaer Type 4134, or equivalent half-inch microphones, 50 Hz to 10 000 Hz	8875
25040C	Pressure Response: Tokyo Riko Type EC MR112, Bruel & Kjaer Type 4134, or equivalent half-inch microphones, 50 Hz to 20 000 Hz	11206
25060S	Special Tests of Acoustic Devices	At Cost

Fees are subject to change without notice.

CHAPTER 6
THERMODYNAMIC QUANTITIES

A. Pressure Measurements

Technical Contacts:	Telephone:	Email:	Mailing Address:
Christopher Meyer (All Services)	(301) 975-4825	christopher.meyer@nist.gov	NIST 100 Bureau Drive, Stop 8364 Gaithersburg, MD 20899-8364

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
29010C	Deadweight Piston Gages	11298
29020S	Controlled Clearance Piston Gages	At Cost
29030S	Pressure Gages and Transducers	At Cost
29035S	Non-mercurial Barometers and Manometers	At Cost
29040S	Special Tests of Pressure Gages	At Cost

Fees are subject to change without notice.

B. Vacuum, Low Pressure and Leak Measurements

Technical Contacts:	Telephone:	Email:	Mailing Address:
Jacob Ricker (30005C) (30010C–30025C, 30040S)	(301) 975-4475	jacob.ricker@nist.gov	NIST 100 Bureau Drive, Stop 8364 Gaithersburg, MD 20899-8364
Jay H. Hendricks (30005C–30025C, 30040S)	(301) 975-4836	jay.hendricks@nist.gov	
James A. Fedchak (30029C–30032S, 30034C-30038C, 30050S)	(301) 975-8962	james.fedchak@nist.gov	
C. Dawn Cross (30060S-30063S, 30062C)	(301) 975-4832	christina.cross@nist.gov	

Please contact the technical staff before shipping instruments or standards to the address listed above.

NOTE: 1 Torr = 133.322 Pa

Service ID Number	Description of Services	Fee ($)
30005C	Vacuum, Comparison Calibration	1434
30010C	One Low-Pressure Transducer Absolute or Differential Relative to Vacuum	5157
30025S	Piston Gauges versus an Ultrasonic Interferometer Manometer	At Cost
30029C	Spinning Rotor Gages, below 0.1 Pa, Nitrogen Gas with NIST Controller	6810
30030C	Spinning Rotor Gages, below 0.1 Pa, Nitrogen Gas Customer Controller with IEEE-488	6810

30031C	Spinning Rotor Gages, below 0.1 Pa, Additional Gas	8072
30032S	Special Test of Spinning Rotor Gages, Transition Range (above 0.1 Pa)	At Cost
30036C	Ionization Gages, 10^{-7} Pa to 10^{-1} Pa, Nitrogen Gas	10442
30037S	Ionization Gages, Additional Filament or Gas for Above Tests	At Cost
30040S	Special Tests of Low-Pressure Gages	At Cost
30050S	Special Tests of Vacuum Gages	At Cost
30060S	Special Tests of Leak Artifacts (10^{-13} mol/s to 10^{-6} mol/s)	At Cost
30061C	Helium Leaks, Primary Calibration (10^{-13} mol/s to 10^{-6} mol/s)	3745
30062C	Helium Leaks, Comparison Calibration (10^{-13} mol/s to 10^{-9} mol/s)	2836
30063S	Special Tests of Low-Gas-Flow Instruments	At Cost

Fees are subject to change without notice.

NOTE: Due to the time and effort required preparing vacuum instrumentation for calibration it is particularly important that they be known to be in proper operating condition when they are submitted to NIST. Equipment will be inspected upon receipt and the customer notified of any obvious damage. If the schedule permits, we will cooperate with the customer's efforts to repair or replace damaged equipment so that the calibration of their equipment can proceed. However, concealed damage or operational deficiencies most likely will not be detected before the instrument is operating on the vacuum system or the calibration has started; in such cases, **if the equipment cannot be calibrated, we will charge 20 % of the regular calibration fee for low-pressure transducers and 30 % of the regular fee for spinning rotor and ionization gages.**

C. Laboratory and Industrial-Grade Thermometers

Technical Contact:	**Telephone:**	**Email:**	**Mailing Address:**
C. Dawn Cross	(301) 975-4822	dawn.cross@nist.gov	NIST 100 Bureau Drive, Stop 8363 Gaithersburg, MD 20899-8363

Please contact the technical staff before shipping instruments or standards to the address listed above.

NOTE: NIST no longer calibrates mercury in glass thermometers as of March 1, 2011. Fahrenheit ranges are not direct conversions of the Celsius ranges.

Service ID Number	Description of Services	Fee ($)
31010C	Organic Liquid in Glass Thermometers (0 °C to 200 °C) (32 °F to 392 °F)	520/pt
31040C	Organic Liquid in Glass Thermometers (–1 °C to –110 °C) (31 °F to –166 °F)	752/pt
31050C	Organic Liquid in Glass Thermometers (Liquid N_2) (–196 °C or –321 °F)	520/pt
31100S	Quantity Tests of Liquid-In-Glass Thermometers	At Cost
31110C	Special Tests of Industrial Platinum Resistance Thermometers, Thermistor Thermometers, Digital Thermometers and Other Types of Thermometers (0 °C to 150 °C) (32 °F to 300 °F)	286/pt
31200S	Preliminary Examination of Ineligible Thermometer	At Cost
31260S	Special Thermometry Services, by Prearrangement	At Cost

Fees are subject to change without notice.

D. Thermocouples, Thermocouple Materials, Thermometer Indicators

Technical Contacts:	Telephone:	Email:	Mailing Address:
Karen Garrity (32010C–32101C)	(301) 975-4818	kgarrity@nist.gov	NIST 100 Bureau Drive, Stop 8363
C. Dawn Cross (32110C–32120C)	(301) 975-4822	dawn.cross@nist.gov	Gaithersburg, MD 20899-8363

Please contact the technical staff before shipping instruments or standards to the address listed above.

Comparison Calibrations, Temperature Measured with Thermocouple (TC)						
Service ID Number	TC Type	Temp Range °C	Points	Min. Length (mm)	Temp. (°C)	Fee ($)
32010C	S	0 to 1450	1 °C or 1 °F Interv. Table	700	0 to 1100 1450	1762
32020C	R	0 to 1450	1 °C or 1 °F Interv. Table	700	0 to 1100 1450	1762
32030C	B	0 to 1750	1 °C or 1 °F Interv. Table	1000	0 to 800 800 to 1100 1450 1750	2554
32031C	B	800 to 1750	1 °C or 1 °F Interv. Table	1000	800 to 1100 1450 1750	2184
32040C	E	0 to 1000	4 to 15	700	0 to 1000	1762
32041C	J	0 to 760	4 to 15	700	0 to 760	1762
32042C	K	0 to 1100	4 to 15	700	0 to 1100	1762
32043C	N	0 to 1100	4 to 15	700	0 to 1100	1762
32044C	T	0 to 400	4 to 15	700	0 to 400	1762
32050C	Comparison calibration, two point minimum, per point, for all items above					1025/pt
32060C	Each additional table of results at 1 °C or 1 °F intervals, for type S, R, or B at later date					1284
32070C	Thermocouple materials tested against Pt Thermoelectric standard, 4 to 15 points, 700 mm minimum lengths					2227

Calibration at Metal Freezing Points, Minimum TC Wire Diameter 0.4 mm, Freezing Point Determination at Au, Ag, Al, and Zn						
Service ID Number	TC Type	Temp Range °C	Points	Min. Length (mm)	Temp. (°C)	Fee ($)
32090C	S or R	0 to 1450	Table 1 °C or 1 °F Interv. and equations to generate table	1000	at freezing points 0 to 1100 1450	3656
32091C	Type S or T, freezing point determination, per point, two point minimum					1349
Calibration of Digital Thermometer Indicator or Portable Potentiometer						
32100C	Indicator or Potentiometer, first dial or range					2569
32101C	Indicator or Potentiometer, each additional dial or range					1605
Comparison Calibration of Thermocouples or Thermocouple Materials Tested against Pt Thermoelectric Standard, Temperature Measured with Standard Platinum Resistance Thermometer, Minimum TC Wire Length 1.0 m, 2 Point Minimum						
32110C	Range –110 °C to 315 °C and Liquid N_2 (–196 °C) or –166 °F to 600 °F and Liquid N_2 (–321 °F), Expanded Uncertainty 0.4 °C					737/pt
Table at one degree intervals for Type T thermocouple for any of the following options: (The cost of the table will be in addition to the calibration per point covered under fee schedule services numbered 32110C–32120C).						

Fees are subject to change without notice.

NOTE: Due to the extra time involved in calibrating sheathed thermocouples, a surcharge of 20 % of the cost of calibrating bare-wire thermocouples will be added to the relevant fees listed above.

E. Resistance Thermometry

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Weston L. Tew (0.65 K to 84 K)	(301) 975-4811	wtew@nist.gov	NIST 100 Bureau Drive, Stop 8363
Michal J. Chojnacky (83 K to 962 °C)	(301) 975-4821	michalc@nist.gov	Gaithersburg, MD 20899-8363

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
33010C	Capsule SPRT (13.8 K to 30 °C) e-H_2 to Ga	18233
33020C	Capsule SPRT (13.8 K to 157 °C) e-H_2 to In	19031
33030C	Capsule SPRT (13.8 K to 232 °C) e-H_2 to Sn	19829
33031C	Capsule SPRT (24.5 K to 30 °C) Ne to Ga	13486
33032C	Capsule SPRT (24.5 K to 157 °C) Ne to In	14396

33033C	Capsule SPRT (24.5 K to 232 °C) Ne to Sn	15220
33040C	Capsule SPRT(54 K to 30 °C) O_2 to Ga	11821
33050C	Capsule SPRT (54 K to 157 °C) O_2 to In	12732
33060C	Capsule SPRT (54 K to 232 °C) O_2 to Sn	13642
33065S	Capsule SPRT (83 K to 0.01 °C) Ar to TPW	At Cost
33070C	Capsule SPRT (83 K to 30 °C) Ar to Ga	6196
33080C	Capsule SPRT (83 K to 157 °C) Ar to In	6652
33090C	Capsule SPRT (83 K to 232 °C) Ar to Sn	7447
33100C	Capsule SPRT (0 °C to 30 °C) TPW to Ga	1980
33110C	Capsule SPRT (0 °C to 157 °C) TPW to In	3458
33120C	Capsule SPRT (0 °C to 232 °C) TPW to Sn	4777
33130C	Capsule SPRT (234 K to 30 °C) Hg to Ga	4589
33140C	Rhodium-Iron or Platinum-Cobalt Resistance Thermometers (0.65 K to 24.6 K)	20697
33141C	Rhodium-Iron or Platinum-Cobalt Resistance Thermometers (0.65 K to 83.8 K)	24791
33142C	n-Type Germanium Resistance Thermometers (0.65 K to 24.6 K)	20985
33150C	Long Stem SPRT (83 K to 0.01 °C) Ar to TPW	4945
33160C	Long Stem SPRT (83 K to 30 °C) Ar to Ga	5628
33170C	Long Stem SPRT (83 K to 157 °C) Ar to In	6174
33180C	Long Stem SPRT (83 K to 232 °C) Ar to Sn	6721
33190C	Long Stem SPRT (83 K to 420 °C) Ar to Zn	7267
33200C	Long Stem SPRT (83 K to 661 °C) Ar to Al	9155
33210C	Long Stem SPRT (234 K to 30 °C) Hg to Ga	4316
33220C	Long Stem SPRT (234 K to 157 °C) Hg to In	4861
33230C	Long Stem SPRT (234 K to 232 °C) Hg to Sn	5408
33240C	Long Stem SPRT (234 K to 420 °C) Hg to Zn	5954
33250C	Long Stem SPRT (234 K to 661 °C) Hg to Al	7842
33260C	Long Stem SPRT (0 °C to 30 °C) TPW to Ga	1820
33270C	Long Stem SPRT (0 °C to 157 °C) TPW to In	2367
33280C	Long Stem SPRT (0 °C to 232 °C) TPW to Sn	2913
33290C	Long Stem SPRT (0 °C to 420 °C) TPW to Zn	3458
33300C	Long Stem SPRT (0 °C to 661 °C) TPW to Al	5346

33310C	Long Stem SPRT (0 °C to 962 °C) TPW to Ag	14152
33330C	Additional Copy of Table from Results of 33010C–33310C at a Later Date	501
33340C	Minimum Charge for Unsuitable Thermometer	2320
33350S	Special Tests of Resistance Thermometers	At Cost
33355S	Special Tests of Cryogenic Resistance Thermometers	At Cost
33360S	Special Tests of Thermometric Fixed-Point Devices	At Cost
33370M	Measurement Assurance Program for Temperature 83 K to 420 °C (Ar to Zn)	24566
33380M	Measurement Assurance Program for Temperature 83 K to 661 °C (Ar to Al)	29532

Fees are subject to change without notice.

F. Radiance Temperature Measurements

Technical Contact: Charles E. Gibson

Telephone: (301) 975-2329

Fax: (301) 869-5700

Email: cgibson@nist.gov

Mailing Address:
NIST
100 Bureau Drive, Stop 8441
Gaithersburg, MD 20899-8441

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
Calibration reports are issued giving the radiance temperature of the lamp at 655.48 nm versus the lamp current		
35050C	Radiance Temperature Standard, Tungsten Strip Lamp (800 °C to 2300 °C, 6 to 16 points)	12212
35051C	Recalibration of Tungsten Strip Lamp (800 °C to 2300 °C, 6 to 16 points)	10187
35060C	Radiance Temperature Standard, Tungsten Strip Lamp (800 °C to 2300 °C, 5 or fewer points)	7728
35061C	Recalibration of Tungsten Strip Lamp (800 °C to 2300 °C, 5 or fewer points)	6138
Calibration reports are issued giving the radiance temperature of the reference blackbody at 655.48 nm, 900 nm or 1000 nm versus the display reading, output current, or output voltage		
35070S	Special Tests of Radiation Thermometers (800 °C to 2700 °C)	At Cost
35071C	Radiance Temperature Standard, Radiation Thermometer (800 °C to 2700 °C, 6 to 20 points)	10187
35072C	Radiance Temperature Standard, Radiation Thermometer (800 °C to 2700 °C, 5 or fewer points)	5126
Calibration reports are issued giving the thermodynamic temperature of the reference blackbody versus the radiation thermometer display reading, output current, or output voltage.		
35080S	Special Tests of Radiation Thermometers (-46 ºC to 900 ºC)	At Cost

35085C	Radiance Temperature Standard, Radiation Thermometer (-46 ºC to 900 ºC, 3 points)	5014
35086C	Radiance Temperature Standard, Radiation Thermometer (-46 ºC to 900 ºC, Each additional point when ordered with 35085C)	688/point
Calibration reports are issued giving the thermodynamic temperature of the reference blackbody versus the test blackbody source display reading.		
35090S	Special Tests of Blackbody Sources (-46 ºC to 900 ºC)	At Cost
Calibration reports are issued giving heat flux at the sensor surface versus the output voltage.		
35100S	Special Tests of Radiative Heat Flux Sensors	At Cost
35101C	Radiative Heat Flux Sensors (1 W/cm^2 to 5 W/cm^2, 9 points, Gardon and Schmidt-Boelter type sensors)	3390
35102C	Additional Radiative Heat Flux Sensor (same model as 35101C)	2378

Fees are subject to change without notice.

Calibration Schedule: Requests for calibration services are scheduled after receipt of a purchase order.

G. Humidity Measurements

Technical Contacts:	**Telephone:**	**Email**	**Mailing Address:**
Tobias Herman	(301) 975-4808 (301) 975-2626	tobias.herman@nist.gov	NIST 100 Bureau Drive, Stop 8363
Gregory E. Scace	(301) 975-2626	gregory.scace@nist.gov	Gaithersburg, MD 20899-8363 **Fax:** (301) 548-0206

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
36070S	Special Tests of Humidity	At Cost

Fees are subject to change without notice.

H. Thermal Resistance Measurements

Technical Contact:	**Telephone:**	**Email:**	**Mailing Address:**
Robert Zarr	(301) 975-6436	robert.zarr@nist.gov	NIST 100 Bureau Drive, Stop 8632 Gaithersburg, MD 20899-8632 **Fax:** (301) 975-5433

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Material	Specimen Thickness (mm)	Mean Temp. (K)	Temp. Difference (K)	Relative Expanded Uncertainty *k = 2* (%)	Fee ($)

36110C	Fibrous glass blanket	25	297	22 or 28	1.0	3598/pt
36120C	Fibrous glass blanket	75	297	22 or 28	1.5	3598pt
36130C	Fibrous glass blanket	150	297	22 or 28	2.5	3598/pt
36140C	Fibrous glass blanket	225	297	22 or 28	3.0	3598/pt
36150C	Quantity Tests of Fibrous glass blanket		297	22 or 28		At Cost
36199S	Special Tests of Thermal Insulation		280 to 330	22 or 28		At Cost

Fees are subject to change without notice.

CHAPTER 7
OPTICAL RADIATION MEASUREMENTS

A. Photometric Measurements

Technical Contact:	Telephone:	Email:	Mailing Address:
Yuqin Zong	(301) 975-2332	yuqin.zong@nist.gov	NIST
Maria Nadal	(301) 975-4632	maria.nadal@nist.gov	100 Bureau Drive, Stop 8442
Cameron Miller	(301) 975-4713	cameron.miler@nist.gov	Gaithersburg, MD 20899-8442
			Fax: (301) 840-8551

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
37010C	Luminous Intensity and Color Temperature Standard Lamps	4864
37020S	Special Tests for luminous Intensity and Color Temperature of Submitted Lamps	At Cost
37030C	Color Temperature Standard Lamps	3996
37040C	Each Additional Color Temperature for 37030C	642
37050S	Special Tests for Color Temperature of Submitted Lamps	At Cost
37060S	Special Tests for Total Luminous Flux of Submitted Incandescent Lamps and Florescent Lamps	At Cost
37070C	Opal Glass Luminance Coefficient Standards	3358
37080S	Special Tests for Submitted Luminance Sources and Transmitting Diffusers	At Cost
37090S	Special Tests for Photometers, Illuminance Meters and Luminance Meters	At Cost
37091S	Special Test for Submitted Illuminance Head or Illuminance Meter for Illuminance Responsivity	At Cost
37092S	Special Test for Submitted Luminance Head or Luminance Meter for Luminance Responsivity	At Cost
37100S	Special Photometric Tests	At Cost
37110S	Special Tests for Submitted Flashing-Light Photometers	At Cost
37130S	Special Tests for Luminous Intensity and Luminous Flux of LEDs	At Cost
37131S	Special Test for Submitted LED for Luminous and/or Radiant Intensity and Color (Optional)	At Cost
37132S	Special Test for Submitted LED for total Luminous Flux and/or Total Radiant Flux and Color (Optional)	At Cost
37140C	NIST Issued New Incandescent Standard Lamps for Total Spectral Raidant Flux	8511
37150S	Special Test for Submitted Incandescent Lamps for Total Spectal Radiant Flux	At Cost
37220M	Luminous Intensity Measurement Assurance Program	3952

37230M	Solid-state Lighting Measurement Assurance Program	4531
37240M	Solid-state Lighting and Compact Fluorescent Lamp Measurement Assurance Program	5977
37250M	Total Radiant Flux Measurement Assurance Program	5044

Fees are subject to change without notice.

B. Ozone Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
James Norris	(301) 975-3936	james.norris@nist.gov	NIST 100 Bureau Drive, Stop 8393 Gaithersburg, MD 20899-8393

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
37510C	Ozone Instrument Calibrations	3974
37515S	Additional Special Tests for Ozone Instruments	At Cost
37525S	NIST Standard Reference Photometer Maintenance	At Cost
37530C	Validation of NIST Standard Reference Photometer (NIST SRP)	8468
37540C	Certification of Mercury Calibration Gas Generator	7828
37535S	Additional Special Tests for Validation of NIST Standard Reference Photometer (NIST SRP)	At Cost

Fees are subject to change without notice.

C. Optical Properties of Materials Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Catherine Cooksey (38020C-38061S)	(301) 975-6208	catherine.cooksey@nist.gov	NIST 100 Bureau Drive, Stop 8442 Gaithersburg, MD 20899-8442
Melody Smith (38065C–38070S)	(301) 975-8533	melody.smith@nist.gov	Fax: (301) 840-8551

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
38020C	Spectral Transmittance Filters (Copper Green Glass)	4687
38060S	Special Tests of Spectral Reflectance (250 nm to 2500 nm)	At Cost
38061S	Special Tests of Spectral Transmittance and Index of Refraction (120 nm to 2500 nm)	At Cost

38065C	Recertification of NIST photometric Standard Reference Materials SRM 930, SRM 1930, or SRM 2930	1889
38066C	Recertification of NIST photometric Standard Reference Material SRM 2031	2628
38067C	Recertification of NIST photometric Standard Reference Material SRM 2030	1477
38068C	Replacement filter for NIST photometric Standard Reference Materials SRM 930, SRM 1930, SRM 2030 or SRM 2930	1384
38069C	Replacement filter for NIST photometric Standard Reference Material SRM 2031	1814
38070S	Special tests of transmittance and special requests/handling of UV/visible	At Cost

Fees are subject to change without notice.

D. Surface Color and Appearance

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Maria E. Nadal (38090S and 38091S)	(301) 975-4632	maria.nadal@nist.gov	NIST 100 Bureau Drive, Stop 8442
Martin Wilson (38100C–38130C)	(301) 975-2356	martin.wilson@nist.gov	Gaithersburg, MD 20899-8442 **Fax:** (301) 840-8551

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
38090S	Specular Gloss	At Cost
38091S	Special Test of 0°/45° Surface Color	At Cost
38100C	X-Ray Film Step Tablet Transmission Density Standard (Replacement for SRM 1001)	4729
38110C	Recalibration of an X-Ray Film Step Tablet Transmission Density Standard	4209
38120C	Photographic Film Step Tablet Transmission Density Standard (Replacement for SRM 1008)	4729
38130C	Recalibration of a Photographic Film Step Tablet Transmission Density Standard	4209

Fees are subject to change without notice.

E. Spectroradiometric Measurements

E.1 Spectroradiometric Source Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing/Shipping Address:**
Charles E. Gibson (39010C–39060S)	(301) 975-2329	cgibson@nist.gov	NIST 100 Bureau Drive, Stop 8441
Jeanne M. Houston (39071C–39081S)	(301) 975-2327	jeanne.houston@nist.gov	Gaithersburg, MD 20899-8441 **Fax:** (301) 869-5700
Thomas C. Larason (39080S, 39081S, 39100S, 39300S, 39310C)	(301) 975-2334	tlarason@nist.gov	
George Eppeldauer (39090S)	(301) 975-2338	geppeldauer@nist.gov	

Please contact the technical staff before shipping instruments or standards to the address listed above.

E.1 Spectroradiometric Source Measurements		
Service ID Number	Description of Services	Fee ($)
NIST calibrates and issues a type 30A/T24/13 tungsten strip lamp with a mogul bi-post base.		
39010C	Spectral Radiance Standard, Tungsten Strip Lamp (225 nm to 2400 nm) (other spectral ranges are available under no. 39060S)	17596
NIST calibrates customer supplied integrating sphere sources and maps the source aperture.		
39020C	Spectral Radiance Standard, Integrating Sphere Source (300 nm to 1000 nm in 25 nm steps)	8452
39021C	Spectral Radiance Standard, Integrating Sphere Source (300 nm to 2400 nm in 25 nm steps)	13078
NIST calibrates and issues an 1000 W, tungsten quartz-halogen lamp mounted in a medium bi-post base. The calibrations are performed at 50 cm.		
39030C	Spectral Irradiance Standard, 1000 W Tungsten Quartz-Halogen Lamp (250 nm to 450 nm)	10715
39031C	Recalibration of 1000 W Tungsten Quartz-Halogen Lamp (250 nm to 450 nm)	6427
39032C	Spectral Irradiance Standard, 1000 W Tungsten Quartz-Halogen Lamp (350 nm to 800 nm)	10715
39033C	Recalibration of 1000 W Tungsten Quartz-Halogen Lamp (350 nm to 800 nm)	6427
39040C	Spectral Irradiance Standard, 1000 W Tungsten Quartz-Halogen Lamp (250 nm to 1600 nm)	13173
39041C	Recalibration of 1000 W Tungsten Quartz-Halogen Lamp (250 nm to 1600 nm)	9030
39045C	Spectral Irradiance Standard, 1000 W Tungsten Quartz-Halogen Lamp (250 nm to 2400 nm)	16265
39046C	Recalibration of 1000 W Tungsten Quartz-Halogen Lamp (250 nm to 2400 nm)	12212
NIST calibrates and issues a 30 W deuterium arc lamp mounted in a medium bi-post base.		
39050C	Spectral Irradiance Standard, 30W Deuterium Arc Lamp (200 nm to 400 nm)	12474
39051C	Recalibration of 30 W Deuterium Arc Lamp (200 nm to 400 nm)	8369
39060S	Special Tests of Radiometric Sources	At Cost
E.2 Spectroradiometric Detector Measurements		
39071C	UV Silicon Photodiodes	1936
39072C	Recalibration of UV Silicon Photodiodes	1714
39073C	Visible to NIR Silicon Photodiodes	5308
39074C	Recalibration of Visible to NIR Silicon Photodiodes	3535
39075S	Special Tests of NIR Photodiodes	At Cost

39077C	UV to Near-Infrared Silicon Photodiodes (Hamamatsu S2281)	6277
39078C	Recalibration of UV to Near-Infrared Silicon Photodiodes (Hamamatsu S1337–1010BQ or S2281)	4691
39080S	Special Tests of Radiometric Detectors	At Cost
39081S	Special Tests of Photodetector Responsivity Spatial Uniformity	At Cost
39090S	Special Tests of IR Detectors	At Cost
39100S	Special Tests of Irradiance Detectors	At Cost
39200S	Special Tests of Aperture Area	At Cost
39300S	Special Tests of Current-to-Voltage Converters	At Cost
39310C	Gain and Linearity of Current-to-Voltage Converters	1976

Fees are subject to change without notice.

F. Radiometric Standards in the Ultraviolet

Technical Contact:	**Telephone:**	**Email:**	**Mailing Address:**
Robert E. Vest	(301) 975-3992	rvest@nist.gov	NIST 100 Bureau Drive, Stop 8411 Gaithersburg, MD 20899-8411
Charles S. Tarrio	(301) 975-3737	ctarrio@nist.gov	NIST
Steven Grantham	(301) 975-5528	grantham@nist.gov	100 Bureau Drive, Stop 8410
Thomas B. Lucatorto	(301) 975-3734	tlucatorto@nist.gov	Gaithersburg, MD 20899-8410

Please contact the technical staff before shipping instruments or standards to the address listed above.

Standard Detectors in the Far Ultraviolet		
Service ID Number	Description of Services	Fee ($)
40602S	Special Tests of VUV and EUV Optics	At Cost
40710C	EUV Detector Calibration	751
40711C	Detector Responsivity Calibration (5 nm to 17 nm)	1663
40712C	Detector Responsivity Calibration (18 nm to 49 nm)	1663
40713C	Detector Responsivity Calibration (52 nm to 122 nm)	964
40714C	Detector Responsivity Calibration (116 nm to 254 nm)	964
40790C	New Al_2O_3 Photoemissive Transfer Standard Detector	567
40791C	New Si Transfer Standard Photodiode	1282
40799S	Special Test in the Extreme Ultraviolet	At Cost

Fees are subject to change without notice.

G. Laser and Optoelectronic Components Used with Lasers

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Marla Dowell	(303) 497-7455	marla.dowell@nist.gov	NIST
(General Technical Inquiries)			325 Broadway, MC 815.01
Paul D. Hale	(303) 497-5367	hale@boulder@nist.gov	Boulder, CO 80305-3328
(High Speed Measurements)			
Paul Williams	(303) 497-3805	paul.williams@nist.gov	
(Laser Radiometry)			
Bill Swann	(303) 497-7381	william.swann@nist.gov	
(Optical Fiber and Component Measurements - other than Fiber Power)			

Administrative and Logistics:

John Lomax (303) 497-3842 john.lomax@boulder.nist.gov

FAX: (303) 497-4286

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
	Laser Power and Energy Meter (or Detector) Calibrations at a Single Standard Wavelength and Power (See Table 4)	
42110C	CW Laser Power below 2 Watts	5563
42230C	Pulsed Laser Energy (Q-switched YAG) at 1064 nm	5058
42240C	CW Laser Power at 1064 nm above 2 Watts and 10.6 μm	6941
42250C	Pulsed Laser Energy (Excimer) at 248 nm and 193 nm	5855
	Same as 42110C, Additional Standard Wavelengths or Powers (See Table 4)	
42111C	CW Laser Power below 2 Watts	1769
42231C	Pulsed Laser Energy (Q-switched YAG) at 1064 nm	3288
42241C	CW Laser Power at 1064 nm above 2 Watts and 10.6 μm above 1 Watt	5205
42251C	Pulsed Laser Energy (Excimer) at 248 nm and 193 nm	4085
42120M	Laser Power and Energy Measurement Assurance Program (MAP)	At Cost
42130C	Optical Fiber Power Meter (or Detectors Used with Lasers) Calibrations at a Single Standard Wavelength and Connector Type (See Table 5)	3957
42131C	Same as 42130C, Additional Standard Wavelengths or Connector Types (See Table 5)	1319
42140M	Optical Fiber Power Meter Measurement Assurance Program (MAP)	At Cost
42150M	Low-Level Laser Measurement Assurance Program (MAP)	At Cost
42151S	Low-Level Laser Radiometer Calibration	At Cost
42155C	Calibration Service of Optoelectronic Frequency Response for Combined Photodiode/RF Power Sensor Transfer Standards	At Cost

42161S	Special Test for Impulse Response Measurements of Detectors Used with Lasers	At Cost
42162S	Special Test for High Accuracy Laser and Optical Fiber Power Measurements	At Cost
42164C	Spectral Responsivity Measurements of Laser and Optical Fiber Power Meters (or Detectors Used with Lasers)	3471
42165S	Special Test for Spatial Uniformity of Laser and Optical Fiber Power Meters and Detectors Used with Lasers	At Cost
42166C	Calibration for Linearity Measurements of Optical Fiber Power Meters (or Detectors Used with Lasers)	2638
42167C	Special Test for Linearity Measurements of High-Power Laser Power Meters (or Detectors Used with Lasers)	4742
42170S	Special Test for General Laser Measurements, by Prearrangement	At Cost
42180S	Special Test for General Optical Fiber Power Measurements, by Prearrangement	At Cost
42190S	Special Test for Optical Fiber and Fiber Component Measurements (other than Fiber Power), by Prearrangement	At Cost
42210C	Spectral Responsivity Measurements with Curve Fitting of Laser and Optical Meters (or Detectors used with Lasers)	4338
42220S	Calibration Service for Instruments that Measure Laser Beam Diameter	At Cost

Fees are subject to change without notice.

CHAPTER 8
IONIZING RADIATION MEASUREMENTS

A. Radioactivity Sources

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Lisa R. Karam (All Services)	(301) 975-5561	lisa.karam@nist.gov	NIST 100 Bureau Drive, Stop 8462
M.P. Unterweger (43030C, 43040C, 43070S, 43090S)	(301) 975-5536	munterweger@nist.gov	Gaithersburg, MD 20899-8462 Attn: Jeffrey Cessna
Jeffrey T. Cessna (43010C, 43020C, 43060C, 43070S)	(301) 975-5539	jcessna@nist.gov	
Lynne King (43030C, 43040C, 43070S, 43090S)	(301) 975-5544	lynne.king@nist.gov	

Administrative and Logistics:
Jeffrey Cessna (301) 975-5539 jcessna@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
43010C	Gamma-Ray-Emitting Radionuclides in Solution (Half Lives Greater than 15 Days)	4095
43020C	Gamma-Ray-Emitting Radionuclides in Solution (Half Lives Less than 15 Days)	6622
43030C	Alpha- and Beta-Particle-Emitting Solid Sources, NIST 2 πα/β Proportional Counter	3077
43040C	Beta-Particle-Emitting Solid Sources (Activity), NIST 2 πα/β Proportional Counter	4521
43050C	Mixed Alpha-Emitting Solid Sources, NIST 2 πα/β Proportional Counter in Conjunction with a Solid State Detector	4877
43060S	Beta-Particle-Emitting Solution Sources, Liquid Scintillation Counting	At Cost
43070S	Special Tests of Beta-Particle-Emitting Solution Sources, Other Techniques	At Cost
43090S	Special Tests of Alpha-Particle-Emitting Solid Sources	At Cost

Fees are subject to change without notice.

B. Neutron Sources and Neutron Dosimetry

Technical Contacts:	Telephone:	Email:	Mailing Address:
M. Scott Dewey (All Services Except 44060C and 44100S)	(301) 975-4843	mdewey@nist.gov	NIST 100 Bureau Drive, Stop 8461
Alan K. Thompson (44060C, 44100S)	(301) 975-4666	alan.thompson@nist.gov	Gaithersburg, MD 20899-8461

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
44010C	Radioactive Neutron Sources Emission Rates (10^5 s^{-1} to 10^9 s^{-1})	9330
44020C	Radioactive Neutron Sources Emission Rates (10^8 s^{-1} to 10^{10} s^{-1})	9330
44060C	Personnel Protection Instrumentation, Californium Source Bare and Moderated	At Cost
44070S	Activation Detector Dosimetry, Thermal Neutrons	At Cost
44080S	Activation Detector Dosimetry, Californium Fission Neutrons	At Cost
44090C	Activation Detector Dosimetry, ^{235}U Cavity Fission Sources	At Cost
44100S	Special Tests of Neutron Sources and Dosimeters	At Cost

Fees are subject to change without notice.

C. Dosimetry of X-Rays, Gamma-Rays, and Electrons

C.1 X-Ray and Gamma-Ray Measuring Instruments

Technical Contacts:	Telephone:	Email:	Mailing Address:
Michelle O'Brien (46010C-46050S)	(301) 975-2014	michelle.obrien@nist.gov	NIST 100 Bureau Drive, Stop 8460
Ronaldo Minniti (46010C-46110C)	(301) 975-5586	ronaldo.minniti@nist.gov	Gaithersburg, MD 20899-8460 **Fax:** (301) 869-7682
Michael G. Mitch (46010C-47040S)	(301) 975-5491	michael.mitch@nist.gov	

Please contact the technical staff before shipping instruments or standards to the address listed above.

C.1 X-Ray and Gamma-Ray Measuring Instruments		
Service ID Number	Description of Services	Fee ($)
Air-Kerma (Exposure)		
46010C	Radiation Detectors—Calibration in ^{60}Co and ^{137}Cs Gamma-Ray Beams, per Detector, per Set-Up, per Beam Code	3016
46011C	Radiation Detectors—Calibration in X-Ray Beams (see Tables 6, 7 and 8), per Detector, per Set-Up, per Beam Code	2661
46012C	Well-ionization Chamber for one Model S700 Electronic Brachytherapy Source	7460

46013C	Each Additional Model S700 Electronic Brachytherapy Source Submitted With Same Well-ionization Chamber for 46012C	3912
46020C	Passive Dosimeters—Irradiation of Up to Six, One Beam Quality at One Set-up	3253
46021C	Up to Six Additional Dosimeters at Same Set-up and Beam Quality	2044
46030C	High-Gain Electrometers - Charge Sensitivity, One Set of Switch Positions, with 46010C/46011C, by Prearrangement	2096
46040S	Special Tests of kV Measuring Devices	At Cost
46050S	Special Tests of X-Ray and Gamma-Ray Measuring Instruments	At Cost
Absorbed Dose to Water From ^{60}Co Beam		
46110C	Radiation Detectors - Calibration in a ^{60}Co Gamma-Ray Beam	3821
C.2 Sealed Gamma-Ray Sources or Beta-Particle Sources, and Measuring Instruments		
47010C	Gamma-Ray Sources Similar to NIST Standards - ^{60}Co to ^{137}Cs, Having Air-Kerma Strengths 10 μGy m^2/h to 1500 μGy m^2/h; and ^{192}Ir Sources of the Same Type Used to Calibrate Reentrant Chamber, Having Air-Kerma Strengths 0.1 μGy m^2/h to 30 μGy m^2/h	6601
47011C	Each Additional Gamma-Ray Source of Same Radionuclide	6310
47020C	^{125}I or ^{103}Pd Sources: Seeds Having Air-Kerma Strengths 0.5 μGy m^2/h to 100 μGy m^2/h	5091
47021C	Each Additional ^{125}I or ^{103}Pd Source of Same Radionuclide/Design Submitted with Above	4921
47035C	Beta-Particle Sources Calibrated for Radiation Protection	1836
47036C	Ionization Chamber Calibrated with Beta-Particle Sources for Radiation Protection	1836
47040S	Special Tests of Gamma-Ray and Beta-Particle Sources	At Cost

Fees are subject to change without notice.

D. Dosimetry for High-Dose Applications

D.1 Dosimetry of High-Energy Electron Beams

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Lonnie Cumberland	(301) 975-6869	lonnie.cumberland@nist.gov	NIST
Michael G. Mitch	(301) 975-5491	michael.mitch@nist.gov	100 Bureau Drive, Stop 8460 Gaithersburg, MD 20899-8460

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
D.1 Dosimetry of High-Energy Electron Beams		
48020S	Special Tests of Electron-Beam Dosimeters	At Cost

D.2 Dosimetry of Photon Beams		
49010C	First Irradiation of a Customer Supplied Dosimeter with ^{60}Co Gamma-Rays	1627
49011C	Each Additional Irradiation at Ambient (20 °C to 30 °C) Temperatures	266
49015C	Setup for Each Non-Ambient Irradiation Temperature (–77 °C to +19 °C and +31 °C to +70 °C)	530
49016C	Each Additional Irradiation at Non-Ambient Temperature Under 49015C	266
49020C	Dose Measurement Session of 1 NIST Transfer Dosimeter and Certificate	1725
49021C	Additional Measurement Session of 1 NIST Transfer Dosimeter, Same Certificate with 49020C	736
49022C	Additional Measurement of 1 NIST Transfer Dosimeter, Same Session	266
49030C	Dose Measurement Session of 1 Dosimeter and 90 Day Summary Certificate	1397
49031C	Additional Measurement Session of 1 Dosimeter, Same Certificate with 49030C	411
49032C	Additional Measurement of 1 Dosimeter, Same Session	132
49050S	Special Measurement Services for Dosimeter Response and Dose Distributions	At Cost

Fees are subject to change without notice.

CHAPTER 9
ELECTROMAGNETIC MEASUREMENTS

A. Resistance Measurements

A.1 DC Resistance Standards and Measurements

Technical Contacts:	Telephone:	Email:	Mailing Address:
Dean G. Jarrett	(301) 975-4240	dean.jarrett@nist.gov	NIST
Shamith Payagala	(301) 975-5331	shamith.payagala@nist.gov	100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:
Denise D. Prather (301) 975-4221 dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Calibration fees are the most critical element in funding the metrology services that we provide, and represent the direct cost of providing calibration services for dc resistors and shunts. These services often reach beyond traceability to include detailed consultation. Currently our fees also must recover some of the rapidly increasing costs of providing year-round, readily accessible services and maintaining state-of-the-art traceability through the quantum Hall effect standard. Customers of our most critical calibration services, NIST Service ID numbers 51130C and 51131C, have benefited the most from our efforts to reduce turn-around time through automation, and to provide the world's best level of uncertainty, while keeping these test fees at a reasonable level.

Service ID Number	Description of Services	Fee ($)
51100S	Special Resistance Measurements Services, by Prearrangement	At Cost
51110M	Measurement Assurance Program for Resistance	At Cost
51130C	Standard Resistor, Thomas-Type, 1 Ω	3728
51131C	Standard Resistor, Evanohm Wirewound High Precision, 10 kΩ	3848
51132C	Standard Resistor, Four-Terminal 0.0001 Ω	2736
51133C	Standard Resistor, Four-Terminal 0.001 Ω	2277
51134C	Standard Resistor, Four-Terminal 0.01 Ω	2303
51135C	Standard Resistor, Four-Terminal 0.1 Ω	1790
51136C	Standard Resistor, Four-Terminal 1 Ω	1790
51137C	Standard Resistor, Four-Terminal 10 Ω	1790
51138C	Standard Resistor, Four-Terminal 100 Ω	1790
51139C	Standard Resistor, Four-Terminal 1 kΩ	1790
51140C	Standard Resistor, 10 kΩ	2249
51141C	Standard Resistor, 100 kΩ	2629
51142C	Standard Resistor, 1 MΩ	2629

51143C	Standard Resistor, 10 MΩ	3361
51144C	Additional Voltage, 10 MΩ	2684
51145C	Standard Resistor, 100 MΩ	3361
51146C	Additional Voltage, 100 MΩ	2684
51147C	Standard Resistor, 1 GΩ	3361
51148C	Additional Voltage, 1 GΩ	2684
51149C	Standard Resistor, 10 GΩ	4063
51150C	Additional Voltage, 10 GΩ	3144
51151C	Standard Resistor, 100 GΩ	4063
51152C	Additional Voltage, 100 GΩ	3144
51153C	Standard Resistor, 1 TΩ	4063
51154C	Additional Voltage, 1 TΩ	3144
51160C	Standard Resistor for Current Measurements (Shunts) with all determinations at 300 A or Below, One Range, One Current Level	2039
51161C	Standard Resistor for Current Measurements (Shunts), with At Least One Determination Above 300 A (maximum current 2000 A), One Range, One Current Level	2039
51162C	Standard Resistor for Current Measurements (Shunts), Additional Range of a Multi-Range Resistor	634
51163C	Standard Resistor for Current Measurements (Shunts), Additional Determination at Another Current Level	634

Fees are subject to change without notice.

A.2 High-Voltage Standard Resistors

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Gerald J. FitzPatrick	(301) 975-8922	gfitzpatrick@nist.gov	NIST 100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:
Denise D. Prather (301) 975-4221 dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
51210C	High-Voltage Standard Resistors	4937

B. Impedance Measurements (Except Resistors)

B.1 Low-Frequency Capacitance and Inductance Measurements and Standards

Technical Contacts:	Telephone:	Email:	Mailing Address:
Andrew D. Koffman	(301) 975-4518	akoffman@nist.gov	NIST 100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:

Denise D. Prather (301) 975-4221 dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
52100S	Special Four Terminal-Pair (4TP) Capacitance and Dissipation Factor Characterization	At Cost
52110S	Special LF Capacitance Measurements, by Prearrangements	At Cost
52120S	Special Measurement Assurance Program for Standard Capacitors (100 pF and 1000 pF, at a Frequency of 1000 Hz)	At Cost
52130C	Fixed, Fused-Silica Dielectric Standard Capacitors (1, 10, and 100) pF, at a Frequency of (100, 400, or 1000) Hz	4729
52131C	Additional Measurement at One of the Above Frequencies	494
52140C	Fixed Three-Terminal, High-Precision Nitrogen Dielectric Standard Capacitors with Coaxial Connectors, Small Uncertainty, (10, 100 and 1000) pF, at a Frequency of (100, 400, or 1000) Hz	3103
52141C	Additional Measurement at One of the Above Frequencies	439
52150C	Physical Tests for Three-Terminal Standard Capacitors with Coaxial Connectors, Large Uncertainty (0.001 pF to 10 000 pF) at a Frequency of (100, 400, or 1000) Hz	2862
52160C	Fixed Three-Terminal Standard Capacitors with Coaxial Connectors, Large Uncertainty (0.001 pF to 10 000 pF) at a Frequency of (100, 400, or 1000) Hz	1964
52161C	Additional Measurement at One of the Above Frequencies	439
52170C	Two- or Three- Terminal Mica Dielectric Standard Capacitors with Binding Post Connectors (0.001 μF to 1 μF), at a Frequency of (66, 100, 400, 1000 or 10 000) Hz	3374
52171C	Additional Measurement at One of the Above Frequencies	2771
52176C	Two-Terminal Standard Capacitors with Precision High Frequency (HF) Coaxial Connectors (0.001 pF to 10 000 pF), at a Frequency of 1000 Hz	439
52180C	Fixed Standard Inductors (0.00005 H to 10 H), at a Frequency of (100, 400, 1000, or 10 000) Hz	2018
52181C	Additional Measurement at One of the Above Frequencies	1795
52190S	Special LF Inductance Measurements, by Prearrangement	At Cost

Fees are subject to change without notice.

B.2 High-Frequency Standard Capacitors and Inductors

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Ronald A. Ginley	(303) 497-3634	rginley@boulder.nist.gov	NIST M.C. 818.01 325 Broadway Boulder, CO 80305-3325

Administrative and Logistics:

Puanani L. DeLara	(303) 497-3753	calibration@boulder.nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
52210S	Two-Terminal Low-Loss Standard Capacitors - 10 kHz to 250 MHz; 1 pF to 20 pF	At Cost
52211S	Two-Terminal Low-Loss Standard Capacitors (High Accuracy) - 10 kHz to 30 MHz, (50, 100, 200, 500, and 1000) pF	At Cost
52221S	Three-Terminal Low-Loss Standard Capacitors (High Accuracy) - 10 kHz to 10 MHz, (10^{-2},10^{-1}, 1, 10, 10^{2}, and 10^{3}) pF	At Cost
52310S	Two-Terminal, High-*Q* Standard Inductors (10^{-2} µH to 1 H)	At Cost

B.3 Power-Frequency Capacitors

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Gerald J. FitzPatrick	(301) 975-8922	gfitzpatrick@nist.gov	NIST 100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:

Denise D. Prather	(301) 975-4221	dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

B.4 Q-Standard

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Ronald A. Ginley	(303) 497-3634	rginley@boulder.nist.gov	NIST M.C. 818.01 325 Broadway Boulder, CO 80305-3325

Administrative and Logistics:

Puanani L. DeLara	(303) 497-3753	calibration@boulder.nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)

52710S	Inductive *Q*-Standards; 50 kHz to 45 MHz, 0.25 µH to 25 mH	At Cost
52711S	Each Additional Frequency for 52710C	At Cost

C. Voltage Measurements

C.1 DC Voltage Measurements and Standards

Technical Contacts: Yi-Hua Tang
Telephone: (301) 975-4691
Email: ytang@nist.gov
Mailing Address: NIST, 100 Bureau Drive, Stop 8170, Gaithersburg, MD 20899-8170

Administrative and Logistics:
Denise D. Prather (301) 975-4221 dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
53110S	Special DC Voltage Measurements, by Prearrangement	At Cost
53160C	Tests of Solid-State Voltage Reference Standard (1 Output, 1 V to 10 V)	2536
53161C	Each Additional Output	1615
53180S	Special Handling (Equipment Pickup or Delivery)	293
53190S	Special Handling (Cleaning, Minor Repair, Return Service Charge)	595

Fees are subject to change without notice.

C.2 AC Voltage Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Bryan C. Waltrip	(301) 975-2438	bwaltrip@nist.gov	NIST
Richard L. Steiner	(301) 975-4226	richard.steiner@nist.gov	100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:		
Denise D. Prather	(301) 975-4221	dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
53200S	Special Tests of High-Accuracy Digital Multimeters, Multifunction Calibrators, by Prearrangement	At Cost
53201S	Special Tests of Low-Voltage AC-DC Transfer Standards, by Prearrangement	At Cost
53202S	25-Point Test of Digital Multimeters (DMMs), by Prearrangement	At Cost
53203S	Each Additional DMM Test Point for 53202S	At Cost

Fees are subject to change without notice.

C.3 AC-DC Thermal Voltage and Current Converters (to 1 MHz)

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Thomas E. Lipe	(301) 975-4251	tlipe@nist.gov	NIST Building 220, Room B146 100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:		
Denise D. Prather	(301) 975-4221	dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
53310S	Special AC-DC Measurement Services, by Prearrangement	At Cost
53350C	Set-up Charge (No Test Points Included) for a Standard or Standards Set for AC-DC Difference (Voltage or Current)	2889
53351C	First Point for Each Applied Voltage or Current	1199
53352C	Additional Points for Each Applied Voltage and Current Level (Additional Frequency/Voltage or Frequency/Current Points)	87

Fees are subject to change without notice.

D. Precision Ratio Measurements

D.1 Inductive Dividers

Technical Contact:	**Telephone:**	**Email:**	**Mailing Address:**
Scott Shields	(301) 975-4232	scott.shields@nist.gov	NIST 100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:
Denise D. Prather (301) 975-4221 dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
54110S	Special Ratio Measurements and Tests of Inductive Voltage Dividers, by Prearrangement	At Cost
54120C	Inductive Voltage Dividers – (Single Frequency, Voltage to be Specified, Each Setting of 3 Most Significant Dials)	5646
54121C	Additional Frequency Points	5646
54130C	Inductive Voltage Dividers – (Single Frequency, Voltage to be Specified, Each Setting of Most Significant Dial Only)	3537
54131C	Additional Frequency Points	3537

Fees are subject to change without notice.

D.2 Resistive Dividers

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Gerald J. FitzPatrick	(301) 975-8922	gfitzpatrick@nist.gov	NIST 100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:
Denise D. Prather (301) 975-4221 dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
54210C	Resistor and Resistive Dividers, Total Resistance or Voltage Ratio, Two Direct Voltage Levels Between 10 kV and 150 kV	5058
54211S	Special Tests of Resistor and Resistive Dividers at Direct Voltage Levels, by Prearrangement	At Cost
54213S	Special Tests of Resistor and Resistive Dividers at 60 Hz, by Prearrangement	At Cost

Fees are subject to change without notice.

D.3 Capacitive Dividers

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Gerald J. FitzPatrick	(301) 975-8922	gfitzpatrick@nist.gov	NIST 100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:
Denise D. Prather (301) 975-4221 dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
54310S	Special Test of Capacitive Dividers at 60 Hz, by Prearrangement	At Cost

D.4 Voltage and Current Transformers

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Gerald J. FitzPatrick	(301) 975-8922	gfitzpatrick@nist.gov	NIST
Thomas L. Nelson	(301) 975-2986	tnelson@nist.gov	100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:
Denise D. Prather (301) 975-4221 dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
54520C	Current Transformer, Ratio & Phase Angle, 1 Range at 1 Frequency, 1 Burden, Secondary Currents (0.5, 1, 2, 3, 4, 5) A, Primary Current Not Over 12 000 A	5133
54521C	Current Transformer, Ratio & Phase Angle, 1 Secondary Current, Additional Combination of Range, Frequency, and Burden, Primary Current Not Over 12 000 A	484
54522C	Current Transformer, Ratio & Phase at Each Additional Secondary Current, Same Combination of Range, Frequency, and Burden as 54520C or 54521C	392
54600S	Special Tests of Dividers and Transformers, by Prearrangement	At Cost

Fees are subject to change without notice.

E. Phase Meters and Standards and VOR Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Bryan C. Waltrip	(301) 975-2438	bwaltrip@nist.gov	NIST 100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:
Denise D. Prather (301) 975-4221 dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
55110S	Special Tests of Phase Standards and Related Instruments, by Prearrangement	At Cost
55120C	Phase Meters – One Combination of Input Voltages (0.5 V to 120 V) at One Frequency (2 Hz to 100 kHz) – the Input Voltage Ratio Shall Not Exceed 10	3322
55121C	Phase Meters – Each Additional Combination of Input Voltages (0.5 V to 120 V) at the Same or at a Different Frequency (2 Hz to 100 kHz) – the Input Voltage Ratio Shall Not Exceed 10	1057
55130C	Phase Meters – One Additional Combination of One Input Voltage (0.5 V to 120 V) and One Input Current (1 A to 5 A) at One Frequency (2 Hz to 4 kHz)	4469
55131C	Phase Meters – Each Additional Combination of One Input Voltage (0.5 V to 120 V) and One Input Current (0.5 A to 5 A)	1208
55140C	Phase Meters – One Input Voltage (120 V to 240 V) and Another Input Voltage (120 V to 240 V) at One Frequency (2 Hz to 5 kHz)	4469
55141C	Phase Meters – Each Additional Combination of One Input Voltage (120 V to 240 V) and Another Input Voltage (120 V to 240 V) at the Same or at a Different Frequency (2 Hz to 5 kHz)	1208

Fees are subject to change without notice.

F. Power and Energy Measurements, Low-Frequency

Technical Contacts:	Telephone:	Email:	Mailing Address:
Thomas L. Nelson	(301) 975-2986	tnelson@nist.gov	NIST
Gerald J. FitzPatrick	(301) 975-8922	gfitzpatrick@nist.gov	100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:
Denise D. Prather (301) 975-4221 dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
56110S	Special Test of AC-DC Wattmeters, by Prearrangement	At Cost
56200C	Watt, Watthour, Var, Varhour Meter, Initial Two Determinations of Same Meter at 60 Hz	4651
56201C	Each Additional Determination, Same Meter at 50 Hz	277
56202C	Initial Two Determinations of One or Two Meters Run Simultaneously with the First (56200C)	4259
56210M	Measurement Assurance Program for Watthour Meters	6040
56220C	Watthour Meter with Pulse Output; 120 Volts, 5 Amperes, 60 Hz at 0.5 Lag, Unity and 0.5 Lead Power Factors	1964
56230S	Special Test of Phasor Measurement Units, PMUs	At Cost

Fees are subject to change without notice.

G. RF, Microwave and Millimeter-Wave Measurements

G.1 Thermistor Detectors

Technical Contacts:	Telephone:	Email:	Mailing Address:
Ronald A. Ginley	(303) 497-3634	rginley@boulder.nist.gov	NIST
Thomas P. Crowley	(303) 497-4133	crowley@boulder.nist.gov	325 Broadway, MC 818.01
			Boulder, CO 80305-3328

Administrative and Logistics:

Puanani L. DeLara (303) 497-3753 calibration@boulder.nist.gov

Fax: (303) 497-3970

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
The following tests are for 50 Ω thermistor and thermoelectric detectors with coaxial connectors.		
61100C	Measurement setup charge (applies to all coaxial power measurements—one setup charge for multiple detectors with the same connectors and frequencies[1])	2874
61110C	Coaxial Detectors in the Frequency Range from 0.1 MHz to 10 MHz	3290
61120C	Coaxial Detectors at user Selected Frequencies in the appropriate Frequency Range for the Connector Type [2]. Up to 20 Frequency Points	3541
61121C	Coaxial Detectors at user Selected Frequencies in the appropriate Frequency Range for the Connector Type [2]. From 20 to 40 Frequency Points	4085
61122C	Coaxial Detectors at user Selected Frequencies in the appropriate Frequency Range for the Connector Type [2]. From 40 to 120 Frequency Points	4358
61123C	Coaxial Detectors at user Selected Frequencies in the appropriate Frequency Range for the Connector Type [2]. More than 120 Frequency Points	4902
61137C	NIST Model CN Coaxial Detectors at 21 Frequencies within the Frequency Range of 50 MHz to 18 GHz	7984
61138C	NIST Model CN Coaxial Detectors at Single Customer Selected Frequency within the Frequency Range of 50 MHz to 18 GHz	50
The following tests are for thermistor detectors with waveguide flanges.		
61140C	Measurement setup charge (applies to all waveguide power measurements EXCEPT WR15—one charge for multiple detectors with the same connectors and frequencies[1])	5328
61141C	Measurement setup charge (applies to all WR15 waveguide power measurements—one charge for multiple detectors with the same connectors and frequencies[1])	4237
61142C	Rectangular Waveguide Detectors with WR90 Flanges[2]	3649
61143C	Rectangular Waveguide Detectors with WR62 Flanges[2]	3649
61144C	Rectangular Waveguide Detectors with WR42 Flanges[2]	3649

61145C	Rectangular Waveguide Detectors with WR28 Flanges[2]	4041
61146C	Rectangular Waveguide Detectors with WR22 Flanges[2]	4041
61147C	Rectangular Waveguide Detectors with WR15 Flanges[2]	6494
61148C	Rectangular Waveguide Detectors with WR10 Flanges[2]	6494
Miscellaneous Tests		
61190S	Special Microwave and RF Power Measurement Services, by Prearrangement	At Cost

Fees are subject to change without notice.

[1] Only one setup charge is necessary for multiple detectors sent in at the same time with the same connector type and measurement frequencies.

[2] Measurement Frequencies

G.2 Scattering Parameters of Passive One and Two-Port Devices

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Ronald A. Ginley	(303) 497-3634	rginley@boulder.nist.gov	NIST 325 Broadway, MC 818.01 Boulder, CO 80305-3328

Administrative and Logistics:

Puanani L. DeLara	(303) 497-3753	calibration@boulder.nist.gov
	Fax: (303) 497-3970	

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
61290S	Special Microwave and RF Scattering-Parameter Measurement Services, by Prearrangement	At Cost

Fees are subject to change without notice.

G.3 Thermal Noise Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
David Walker	(303) 497-5490	dwalker@boulder.nist.gov	NIST
James Randa	(303) 497-3150	randa@boulder.nist.gov	325 Broadway, MC 818.01 Boulder, CO 80305-3328

Administrative and Logistics:

Puanani L. DeLara	(303) 497-3753	calibration@boulder.nist.gov
	Fax: (303) 497-3970	

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Freq.	Connector Type	Device Requirements/Service	Fee ($)

61410C	30 MHz 60 MHz	*Coaxial* N Precision (PIN) GPC 3.5 (PIN) GPC 7 14 mm	Temperature < 15 000 K (ENR < 17 dB) VSWR < 1.2	
	Set Up Charge, per order			3107
	Per Frequency			3558
61420C	1.0 GHz to 12.4 GHz Continuous Frequencies	*Coaxial* 14 mm (1 to 4 GHz) GPC 7 N Precision (PIN) GPC 3.5 (PIN) GPC 2.4 (PIN) (8 GHz to 12.4 GHz)	Temperature < 15 000 K (ENR < 17 dB) Reflection Coefficient < 0.2	
	Set Up Charge, per order			6443
	Per Frequency			890
61425C	12.4 GHz to 18.0 GHz Continuous Frequencies	*Coaxial* GPC 7 N Precision (PIN) GPC 3.5 (PIN) GPC 2.4 (PIN)	Temperature < 15 000 K (ENR < 17 dB) Reflection Coefficient < 0.2	
	Set Up Charge, per order			5554
	Per Frequency			2447
61430C	18.0 GHz to 26 GHz Continuous Frequencies	*Coaxial* GPC 3.5 (PIN) GPC 2.4 (PIN)	Temperature < 15 000 K (ENR < 17 dB) Reflection Coefficient < 0.2	
	Set Up Charge, per order			5554
	Per Frequency			2447

61435C	26.5 GHZ to 40 GHz Continuous Frequencies	*Coaxial* GPC 2.4 (PIN)	Temperature < 15 000 K (ENR < 17 dB) Reflection Coefficient < 0.2	
	Set Up Charge, per order			6443
	Per Frequency			3558
61450C	8.2 GHz to 12.4 GHz Continuous Frequencies	*Waveguide* WR 90	Temperature <15 000 K (ENR < 17 dB) Reflection Coefficient < 0.2	
	Set Up Charge, per order			3774
	Per Frequency			890
61455C	12.4 GHz to 18.0 GHz Continuous Frequencies	*Waveguide* WR 62	Temperature < 15 000 K (ENR < 17 dB) Reflection Coefficient < 0.2	
	Set Up Charge, per order			5109
	Per Frequency			2447
61460C	18.0 GHz to 26.0 GHz Continuous Frequencies	*Waveguide* WR 42	Temperature < 15 000 K (ENR < 17 dB) Reflection Coefficient < 0.2	
	Set Up Charge, per order			5109
	Per Frequency			2447
61465C	26.5 GHz to 40.0 GHz Continuous Frequencies	*Waveguide* WR 28	Temperature < 15 000 K (ENR < 17 dB) Reflection Coefficient < 0.2	
	Set Up Charge, per order			6000
	Per Frequency			3114
61470C	33.0 GHz to 50.0 GHz Continuous Frequencies	*Waveguide* WR 22	Temperature <15 000 K (ENR < 17 dB) Reflection Coefficient <0.2	
	Set Up Charge, per order			7310
	Per Frequency			3870
61475C	50.0 GHz to 65.0 GHz Continuous Frequencies	*Waveguide* WR 15	Temperature < 15 000 K (ENR , 17 dB) Reflection Coefficient < 0.2	
	Set Up Charge, per order			9423
	Per Frequency			6316
61495S	Special Noise Temperature Measurements, by Prearrangement			At Cost

Fees are subject to change without notice.

H. Electromagnetic Field Strength and Antenna Measurements

H.1 Microwave Antenna Parameter Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Perry F. Wilson (63100S–63400S)	(303) 497-3406	pfw@boulder.nist.gov	NIST 325 Broadway, MC 818.02
Jeff Guerrieri (63100S)	(303) 497-3863	jeff.guerrieri@nist.gov	Boulder, CO 80305-3328
Michael H. Francis (63200S)	(303) 497-5873	mfrancis@boulder.nist.gov	

Administrative and Logistics:

Puanani L. Delara	(303) 497-3753	calibration@boulder.nist.gov
Fax:	(303) 497-3970	

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
63100S	Gain and Polarization Calibrations of Standard Antennas Using Extrapolation Range	At Cost
63200S	Measurement of Pattern, Gain, and Polarization of Arbitrary Antennas Using Near-Field Scanning Techniques	At Cost
63400S	Special Consulting, Advisory, and Other Services	At Cost

H.2 Field Strength Parameter Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Dennis G. Camell	(303) 497-3214	camell@boulder.nist.gov	NIST
Perry F. Wilson	(303) 497-3406	pfw@boulder.nist.gov	325 Broadway, MC 818.02 Boulder, CO 80305-3328

Administrative and Logistics:

Puanani L. DeLara	(303) 497-3753	calibration@boulder.nist.gov
Fax:	(303) 497-3970	

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
64100S	Special Test Services for Antenna/Field Strength/Measurement, Using the Transverse Electromagnetic (TEM) Cell Method (10 kHz to 300 MHz)	At Cost
64300S	Special Test Services for Antenna/Field Strength/Reflectivity Measurements, Utilizing the Anechoic Chamber and Standard Field Method	At Cost

I. High-speed Repetitive Waveform Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Paul Hale	(303) 497-5367	hale@boulder.nist.gov	NIST 325 Broadway, MC 815.01 Boulder, CO 80305-3328

Administrative and Logistics:

John Lomax	(303) 497-3842	john.lomax@nist.gov
Fax:	(303) 497-4286	

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
65200S	Fast Repetitive Waveforms	At Cost
65400S	Fiber-optic time delay (formerly Pulse Time Delay Interval)	At Cost

J. Pulse Waveform Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Thomas Nelson	(301) 975-2986	thomas.nelson@nist.gov	NIST
Fax:	(301) 926-3972		100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics:

Denise Prather	(301) 975-4221	dprather@nist.gov

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
65250S	Repetitive Pulse Waveform Measurements, Including Settling Parameters	At Cost
65500S	Peak-to-Peak Detector Calibration at One Frequency Selected from Those Give in Table 9.23 at 1.2V	At Cost
65501S	Additional Frequency for Peak-to-Peak Detector in 65500S	At Cost

CHAPTER 10
TIME AND FREQUENCY MEASUREMENTS

A. Broadcast and Measurement Services

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Michael A. Lombardi (Frequency)	(303) 497-3212	lombardi@boulder.nist.gov	NIST 325 Broadway, MC 847.40
Marc A. Weiss (Time)	(303) 497-3261	mweiss@boulder.nist.gov	Boulder, CO 80305-3328
John Lowe	(303) 497-5453	lowe@boulder.nist.gov	
Stefania Romisch	(303) 497-3446	stefania.romisch@nist.gov	

Administrative and Logistics:

Trudi Peppler	(303) 497-3338	tpeppler@boulder.nist.gov
Fax:	(303) 497-6461	

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
Broadcast Services (WWW, WWVH, WWVB, GOES, ACTS, and NTS)		
76100C	Frequency Measurement and Analysis Service (FMAS), Frequency Delivered to User's Site	Initial One-Time Fee: 600 Monthly Charge: 300
76101C	Time Measurement and Analysis Service (TMAS)	Initial One-Time Fee: 900 Monthly Charge: 300
76102C	Time Measurement and Analysis Service (TMAS) with NIST disciplined rubidium oscillator	Initial One-Time Fee: 300 Monthly Charge: 300
76103C	Time Measurement and Analysis Service (TMAS) with NIST disciplined cesium oscillator	Initial One-Time Fee: 300 Monthly Charge: 300
76120S	Characterization of Global Positioning System (GPS) Satellite Receivers	At Cost

B. Calibration and Characterization of Oscillators and Amplifiers

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
David Howe	(303) 497-3277	dhowe@boulder.nist.gov	NIST
Stefania Romisch	(303) 497-3446	stefania.romisch@nist.gov	325 Broadway, MC 847 Boulder, CO 80305-3328

Administrative and Logistics:

Trudi Peppler	(303) 497-3338	tpeppler@boulder.nist.gov
Fax:	(303) 497-6461	

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
77110C	Characterization of Atomic Frequency Standards	At Cost
77120C	Characterization of Oscillators: Time Domain	At Cost

C. Test of PM/AM Noise Measurement Systems

Technical Contact:	**Telephone:**	**Email:**	**Mailing Address:**
David Howe	(303) 497-3277	dhowe@boulder.nist.gov	NIST 325 Broadway, MC 847.30 Boulder, CO 80305-3328

Administrative and Logistics:

Trudi Peppler	(303) 497-3338	tpeppler@boulder.nist.gov
Fax:	(303) 497-6461	

Please contact the technical staff before shipping instruments or standards to the address listed above.

Service ID Number	Description of Services	Fee ($)
77135C	Tests of RF PM/AM Noise Measurement Systems: On-Site Tests	At Cost
77136C	Tests of Microwave PM/AM Noise Measurement Systems: On-Site Tests	At Cost
77140S	Special Time/Frequency Measurements: Oscillators and Other Components	At Cost

CHAPTER 11
Biomedical

A. Magnetic Resonance Measurements for MRI Biomarkers

Technical Contacts:	Telephone:	Email:	Mailing Address:
Kathryn Keenan	(303) 497-3665	kathryn.keenan@nist.gov	NIST
Stephen Russek	(303) 497-5097	stephen.russek@nist.gov	325 Broadway, MC 686.08 Boulder, CO 80305

Service ID Number	Description of Services	Fee ($)
80010C	Proton spin relaxation times for MRI reference solutions (First Sample)	3872
80011C	Proton spin relaxation times for MRI reference solutions (Subsequent Samples)	1346
80100S	Special test of relaxation times for solutions	At Cost
80110S	Special test of water self-diffusion for solutions	At Cost
80500M	Measurement Assurance Program for Relaxation times in solution	At Cost

B. Voltage-to-Deflection (Sensor)

Technical Contacts:	Telephone:	Email:	Mailing Address:
Martin Chiang	(301) 975-5186	martin.chaing@nist.gov	NIST 100 Bureau Drive, Stop 8543 Gaithersburg, MD 20899-8543

Service ID Number	Description of Services	Fee ($)
81000C	Voltage-to-Deflection Calibration for Polymerization Stress Tensometer	2270

CHAPTER 12
Seminars

The following announcements concern notification of changes in services and information about future NIST Measurement Seminars. General policy questions regarding NIST measurement services should be referred to the Calibration Program.

NIST MEASUREMENT SEMINARS

NIST holds seminars and workshops that provide advice and assistance on measurements and calibrations. This affords laboratories outside NIST an opportunity to learn how to make measurements consistent with national standards which NIST maintains. Participation is open to a limited number of people who have the appropriate education, work experience, and current profession in measurement and standards laboratory activities.

Each seminar lasts from one to five days and is devoted to lectures, group discussions, and laboratory demonstrations. A course may be cancelled if registration is insufficient. However, in the past, requests for enrollment have nearly always exceeded the numbers that could be accommodated.

Acceptance letters will be mailed no later than 4 weeks prior to the scheduled date of the course. Detailed information on schedules and housing will be included. Those accepted will be expected to study the assigned reading material before coming to the course and should be prepared to discuss their own experiences with related problems.

See the Weights and Measures Program web site www.nist.gov/pml/wmd/index.cfm for the National Conference on Weights and Measures (NCWM) Calendar of Events for other training not listed here.

NIST offers conferences and workshops throughout the year. To see the latest listing go to www.nist.gov for upcoming NIST Conferences and Events.