NIST Calibration Program
Calibration Services Users Guide
SP 250 Appendix
Fee Schedule 2008

Calibration Services:

Dimensional
Mechanical
Thermodynamic
Optical Radiation
Ionizing Radiation
Electromagnetic
Time and Frequency

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

Table of Contents

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 web site (see Section L).

B. 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 either unique or seldom-performed calibrations or measurements requested by the customer.

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 remeasurement, 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.

C. Other NIST Measurement Transfer Services

National Voluntary Laboratory Accreditation Program (NVLAP)

NIST does not audit or regulate metrology laboratories as part of MAP or other calibration services. Calibration laboratories and testing facilities may be accredited by NIST under the National Voluntary Accreditation Program (NVLAP). The basic procedures and general accreditation requirements of NVLAP are described in NIST Handbook 150. A participating laboratory may voluntarily take steps to improve or assess its measurement process. For further information about NVLAP, contact:

National Voluntary Laboratory Accreditation Program (NVLAP)	Telephone:	(301) 975-4016
National Institute of Standards and Technology	Fax:	(301) 926-2884
100 Bureau Drive, Stop 2140	Email:	NVLAP@nist.gov
Gaithersburg, MD 20899-2140	Internet:	www.ts.nist.gov/nvlap

Standard Reference Materials Group (SRM)

Calibration assistance and alternative paths for traceability are provided by NIST's Standard Reference Materials Group. Chemical measurement instruments are not calibrated at NIST, but NIST provides suites of Standard Reference Materials (SRMs) for the calibration of the instrument by the user. In addition, NIST provides SRMs for dimensional measurements, thermodynamic property and photometric measurements. For further information about SRMs, contact:

Standard Reference Materials Group (SRM)	Telephone:	(301) 975-6776
National Institute of Standards and Technology	Fax:	(301) 948-3730
100 Bureau Drive, Stop 2300	Email:	srminfo@nist.gov
Gaithersburg, MD 20899-2300	Internet:	www.nist.gov/srm

Standard Reference Data Group (SRD)

Very few calibrations can be conducted without additional quantitative information related to measurement of physical or chemical properties. NIST develops and publishes evaluated data for technical and scientific applications called Standard Reference Data. For further information about SRD, contact:

Standard Reference Data Group (SRD)	Telephone:	(301) 975-2208
National Institute of Standards and Technology	Fax:	(301) 926-0416
100 Bureau Drive, Stop 2300	Internet:	www.nist.gov/srd
Gaithersburg, MD 20899-2300		

Weights and Measures Division (W&M)

The NIST Weights and Measures Division (W&M) provides measurement services to State and local governments responsible for marketplace transactions involving measurements. State weights and measures laboratories provide alternative sources for calibration services in mass, length, volume, and certain other measurement areas. For further information contact:

Weights and Measures Division (W&M)	Telephone:	(301) 975-4004
National Institute of Standards and Technology	Fax:	(301) 926-0647
100 Bureau Drive, Stop 2600	Email:	owm@nist.gov
Gaithersburg, MD 20899-2600	Internet:	www.nist.gov/owm

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.

A Special Test is 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 request is unique; or (3) the service is still under development–meaning the measurement or calibration methods are still being perfected, or all quality-control documentation not been completed.

E. 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 International Vocabulary of Basic and General Terms in Metrology (VIM; 1993) defines traceability as:

> The property of the result of measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties.

Many government regulations and commercial contracts require regulated organizations or contractors to verify that the measurements they are "traceable" and to support the claim of traceability by keeping records that their own measuring equipment has been calibrated by laboratories or testing facilities whose measurements are part of this "unbroken chain." The purpose of requiring traceability is to ensure that measurements are accurate representations of the specific quantity subject to measurement, within the uncertainty of the measurement.

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.

NIST often receives calls to verify the authenticity of a NIST Report of Test number appearing on another organization's report. Although NIST can verify the authenticity of its report numbers, having an authentic number does not provide complete assurance or evidence that the measurement value provided by another organization is traceable. Not only should there be an unbroken chain of comparisons, each provided measurement should be accompanied by a statement of uncertainty associated with farthest link in the chain from NIST, that is, the last facility providing the measurement value. NIST does not have that information; only the facilities that provided the measurement values to the customer can provide the associated uncertainties and describe the traceability chain.

In summary, to adequately establish an audit trail for traceability, a proper calibration result should include: the assigned value, a stated uncertainty, identification of the standards used in the calibration, and the specification of any environmental conditions of the calibration where correction factors should be applied, if the standard or equipment were to be used under different environmental conditions.

NIST does not define nor enforce traceability except in its NVLAP laboratory accreditation program. Moreover, NIST is not legally required to comply with traceability requirements of other federal agencies; nor do we determine what must be done to comply with another party's contract or regulation calling for such traceability. However, NIST can and does provide technical advice on making measurements consistent with national standards.

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).

H. NIST Policy on 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]. That publication is based on the approach to expressing uncertainty in measurements recommended by the International Committee on Weights and Measures (CIPM)[2]. That committee established general rules for evaluating and expressing uncertainty in measurements that are intended to be applicable to a broad spectrum of measurements. Copies of NIST TN 1297 are available upon request (see Section L) or on the web site: www.physics.nist.gov/Pubs/guidelines/contents.html.

The American National Standard for Expressing Uncertainty-U.S. Guide to the Expression of Uncertainty of Measurement (ANSI/NCSL Z540-2-1997) is available from the

NCSL International
2995 Wilderness Place, Suite 107
Boulder, CO 80301-5404
303/440-3339
www.ncsli.org

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. NIST Policy Regarding 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.physics.nist.gov/Pubs/SP811/sp811.html

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[1]Guideline for Evaluating and Expressing the Uncertainty of NIST Measurement Results, NIST Technical Note 1297, 1994 Edition.

[2]Guide to the Expression of Uncertainty in Measurement, International Standards Organization (ISO), 1993 Edition.

[3]Guide for the Use of the International System of Units (SI), NIST Special Publication 811, 1995 Edition.

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

This Fee Schedule 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 inquires about the NIST calibration services, assistance in determining the availability of services, and requests for complimentary copies of the Calibration Services Users Guide, the Fee Schedule, 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:

Calibration Program
National Institute of Standards and Technology
100 Bureau Drive, Stop 2300
Gaithersburg, MD 20899-2300
Telephone: (301) 975-2092
Fax: (301) 869-3548
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.

CHAPTER 2
ORDERING INSTRUCTIONS FOR DOMESTIC CUSTOMERS

A. Customer Inquires

General customer inquires for information or clarifications about the NIST calibration services may be directed as indicated in Section L of Chapter 1.

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 of the Users Guide or Fee Schedule. 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 send 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., social security 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. 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.

E. 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.

F. Customer Checklist

Please refer to page 11 in 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 Supplies 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:

Calibration Program
National Institute of Standards and Technology
100 Bureau Drive, Stop 2300
Gaithersburg, MD 20899-2300
United States of America
Telephone: (301) 975-2092
Fax: (301) 869-3548
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 Check

Checks made payable to the National Institute of Standards and Technology (NIST) should be mailed to:

Calibration Program
National Institute of Standards and Technology
100 Bureau Drive, Stop 2300
Gaithersburg, MD 20899-2300

Bank Wire Transfers

Treas NYC (Account is with the Federal Reserve Bank of New York)
U.S. Dept. of Treasury
FMS-Banking Operations Branch
3700 East West Highway, Room 5A05
Hyattsville, MD 20782
Phone: 001 (202) 874-6617

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.

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.

This 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.

4. Before shipping the instrument or standard to the appropriate NIST technical unit, you must arrange with a customs broker for entry of the instrument into the U.S. with transportation to and from the port of entry to NIST prepaid. Air freight is most satisfactory. Entry bond is required for instruments not manufactured in the U.S. If arrangements are made with a broker in the country of origin, that broker should, in turn, have a U.S. customs broker in or near the port of entry to arrange for the entry of the instrument and its transportation to NIST. Direct arrangements can be made with customs brokers located in the Washington, DC/Baltimore, Maryland, metropolitan area or in the Denver, Colorado, area, as appropriate. These brokers must arrange for transportation to the port of exit after testing/calibration is completed.

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	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

A.1 Gage Blocks

Service ID Number	Description of Services	Fee ($)
10010C	Gage Blocks: Set Up Charge, per order	164
10011C	Mechanical Comparisons, per Block (100 mm and shorter)	99
10012C	Mechanical Comparisons, per Block (over 100 mm)	237
10013C	Interferometry, per Block (100 mm and shorter), Maximum 25 Blocks per Order	279
10014C	Interferometry, per Block (over 100 mm), by Special Arrangement	At Cost
10015C	Non-standard size Gage Blocks, by Special Arrangement	At Cost

Fees are subject to change without notice.

A.2 Line Standards

Technical Contact:	Telephone:	Email:	Mailing Address:
William B. Penzes	(301) 975-3477	wpenzes@nist.gov	NIST
Thomas W. LeBrun	(301) 975-4256	thomas.lebrun@nist.gov	100 Bureau Drive, Stop 8212 Gaithersburg, MD 20899-8212

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

A.2 Line Standards

Service ID Number	Description of Service	Fee ($)
10020C	Line Standards: Scales, < 1 m (40 inches), 4 Passes	8211
10021C	Line Standards: Scales, < 1 m (40 inches), 8 Passes	12590
10022C	Line Standards: Stage Micrometer, Per Scale, 30 Intervals, 2 Passes	1368
10023C	Line Standards: Stage Micrometer, Per Scale, 30 Intervals, 4 Passes	1715

10024C	Line Standards: End Standards, < 1 m	8211
10025C	Line Standards: Grid Plates, Less than 60 Intervals, 1 D Linear Calibration	13684

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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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

A.4 Step Gages

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
John Stoup	(301) 975-3476	john.stoup@nist.gov	NIST
Theodore Doiron	(301) 975-3472	theodore.doiron@nist.gov	100 Bureau Drive, Stop 8211 Gaithersburg, MD 20899-8211

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

A.4 Step Gages		
Service ID Number	Description of Services	Fee ($)
11060S	Special Tests of Step Gages	At Cost

A.5 Other Length Standards

Technical Contacts:	Telephone:	Email:	Mailing Address:
John Stoup	(301) 975-3476	john.stoup@nist.gov	NIST
Theodore Doiron	(301) 975-3472	theodore.doiron@nist.gov	100 Bureau Drive, Stop 8211 Gaithersburg, MD 20899-8211

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

A.5 Other Length Standards		
Service ID Number	Description of Services	Fee ($)
10050S	Special Tests of Length Standards	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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
11010S	Special Tests of Cylindrical Diameter Standards (i.e. Plug and Pin Gages): Set Up Charge, per order	164
11011S	Mechanical comparison, per Gage (25 mm and smaller)	99
11012S	Interferometry, per Gage (50 mm and smaller)	225
11013S	Per Gage (over 50 mm)	At Cost
11014S	Roundness trace, per trace	184
11020C	Measuring Wires for Threads and Gears: Set Up Charge, per order	164
11021C	Single Wire, per wire	102
13020S	Special Tests of Roundness (Sphere and Hemisphere Types) Reversal Method: Radial Deviations from Best Fit Least−Squares Circle at 360 positions	1143
13030S	Special Tests of Roundness Calibration Specimens	At Cost
11030S	Special Tests of Spherical Diameter Standards; Balls: Set Up Charge, per order (applies to mechanical comparison and interferometry)	164
11031S	Mechanical Comparison (51 mm or smaller), Average Diameter, per ball, Expanded Uncertainty, U ~ ± 89 nm to 115 nm	95
11032S	Mechanical Comparison (over 51 mm), Average Diameter, per ball	At Cost
11033S	Interferometry (25 mm or smaller) Average Diameter, per ball, Expanded Uncertainty, U ~ ± 30 nm	488

11034S	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)	92/per trace
Special Tests of Internal Diameter Standards: Ring Gages		
11040S	Plain Ring Gages, per ring	775
11050S	Special Tests of Diameter	At Cost

Fees are subject to change without notice.

C. Complex Dimensional Standards

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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
C.1 API Threaded Plug and Ring Gages		
12010C	Spec 5, 1.005 inches to 7 5/8 inches	1811
12011C	Spec 5, 8 5/8 inches to 20 inches	2829
12012C	Buttress Casing, 4 ½ inches to 9 5/8 inches	2166
12013C	Buttress Casing, 10 inches to 13 3/8 inches	2621
12014C	Buttress Casing, 16 inches to 20 inches	2843
12015C	Line Pipe, 1/8 inch to 6 inches (New)	1813
12016C	Line Pipe, 8 inches to 20 inches (New)	2409
12017C	Extreme Line Casing, 5 inches to 7 inches (New)	3011
12018C	Extreme Line Casing, 5 inches to 7 inches (Used)	1139
12019C	Extreme Line Casing, 7 7/8 inches to 10 inches (New)	3512
12021C	Extreme Line Casing, 7 7/8 inches to 10 inches (Used)	1439
12022C	Spec 7 (Rotary), NC 23-NC 61 (New)	2349
12023C	Spec 7 (Rotary), NC 70 (New)	2596
12024C	Spec 7 (Rotary), 2 3/8 inches to 4 ½ inches, Reg. (New)	2361
12025C	Spec 7 (Rotary), 5 ½ inches to 8 5/8 inches, Reg. (New)	2596
12026C	Spec 7 (Rotary), Any Type (Used)	1055

12027C	Spec 11B (Sucker Rods) P1, P2 Pin Go P7, P8 Pin Go B1, B2 Box Go (**NEW)**	1230/per set
12028C	Spec 11B (Sucker Rods) P1, P2 Pin Go P7, P8 Pin Go B1, B2 Box Go **(USED)**	619/per set
12029C	Spec 11B (Sucker Rods) P3, P4 Pin Cone B3, B4 Box Cone **(NEW)**	1473/per set
12031C	Spec 11B (Sucker Rods) P3, P4 Pin Cone B3, B4 Box Cone **(USED)**	569/per set
12032C	Spec 11B (Sucker Rods) P5, P6 Pin Cone B5, B6 Box Cone **(NEW)**	998/per set
12033C	Spec 11B (Sucker Rods) P5, P6 Pin B5, B6 Box Cone **(USED)**	514/per set
12050S	Special Test 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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

A.5 Sieves		
Service ID Number	Description of Services	Fee ($)
10060S	Special Test of Sieves	195

Fees are subject to change without notice.

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 8260 Gaithersburg, MD 20899-8260

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

A.6 Algorithms Testing and Evaluation Program for Coordinate Measuring Systems

Service ID Number	Description of Services	Fee ($)
10070S	Special Test of CMS Software: NIST-generated data sets (basic service)	1789
10071S	Special Test of CMS Software: NIST-generated data sets (per geometry evaluated)	At Cost
10072S	Special Test of CMS Software: NIST-generated data sets, standard level (per geometry evaluated)	909
10080S	Special Test of CMS Software: Customer-generated data sets (basic service)	2366
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)	975

Fees are subject to change without notice.

D. 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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
13010S	Special Tests of Optical Reference Planes (Flats): Optical Flat, ≤152 mm (6”), Per Surface	1378
13011S	Special Tests of Optical Reference Planes (Flats): Optical Flat, 152 mm to 203 mm (8”)	1791
13012S	Special Tests of Optical Reference Planes (Flats): Optical Flat, 203 mm to 304 mm	2349
13013S	Special Tests of Optical Reference Planes (Flats): Optical Flat, ≥ 304 mm (12”)	2965
13014S	Special Tests of Optical Reference Planes (Flats): Three Flat Calibration	At Cost
13040S	Special Optical Tests of Complex Forms (coming soon)	

Fees are subject to change without notice.

E. 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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
14010C	Angle Gage Blocks: Set Up Charge, per order	164
14011C	Angle Block, per block	161
14020S	Special Tests of Optical Polygons	At Cost
14030S	Special Tests of Rotary and Indexing Tables: Every 30°	2281
14031S	Special Tests of Rotary and Indexing Tables: (30°, 5°, 1°) Calibration	4441
14040S	Special Tests of Optical Wedges: Fixed-Angle Wedge	786
14041S	Special Tests of Optical Wedges: Variable-Angle Wedge	At Cost
14050S	Special Angular Measurements, by Prearrangement	At Cost

Fees are subject to change without notice.

F. 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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
14510S	Laser Frequency/Wavelength, Full Calibration	2505
14511S	Quick Check of Frequency/Wavelength at Laboratory Conditions	1331
14020S	Laser Trackers, B89.4.19 Ranging Test (coming soon)	

Fees are subject to change without notice.

G. 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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
15010C	Roughness Calibration Specimens	1509
15030C	Step Height Measurements	1509
15040S	Surface Roughness and Topography Special Tests	At Cost

Fees are subject to change without notice.

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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
16010C	Reference Standard Hydrometers	1506
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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
17010C	Volume Standards	1927
17020C	Volume Standards > 380 L, 2 points	2874
17030C	Volume Standards > 380 L, 5 points	5751
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 and Hydrocarbon Flow)	(301) 975-4813	gina.kline@nist.gov	NIST 100 Bureau Drive, Stop 8361
John D. Wright (Gas Flow and Water Flow)	(301) 975-5937	john.wright@nist.gov	Gaithersburg, MD 20899-8361
Sherry Sheckels (Hydrocarbon Flow)	(301) 975-5940	sherry.sheckels@nist.gov	
T. T. Yeh (Hydrocarbon Flow)	(301) 975-5953	ttyeh@nist.gov	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
18010C	Gas Flow Meters	4673
18020C	Water Flow Meters	4517
18030C	Hydrocarbon Flow Meters	4671
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
	Fax: (303) 497-5224		325 Broadway, MC 838.09
			Boulder, CO 80305-3328

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
18800S	Special Tests of Cryogenic Liquid Flow	At Cost

E. Air Speed Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
J. Michael Hall	(301) 975-5947	j.hall@nist.gov	NIST
John D. Wright	(301) 975-5937	john.wright@nist.gov	100 Bureau Drive, Stop 8361
T. T. Yeh	(301) 975-5953	ttyeh@nist.gov	Gaithersburg, MD 20899-8361

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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)	2684
19020C	Low Air Speed Instruments 0.3 m/s to 10.2 m/s (15 fpm to 2,000 fpm)	2684
19030S	High Air Speed special Tests	At Cost
19040S	Low Air Speed Special Tests	At Cost

Fees are subject to change without notice.

F. Mass Standards

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Vincent Lee	(301) 975-6453	vincent.lee@nist.gov	NIST
Zeina J. Jabbour	(301) 975-4468	zeina.jabbour@nist.gov	100 Bureau Drive, Stop 8221 Gaithersburg, MD 20899-8221

Administrative and Logistics:
Tel: (301) 975-6624
Fax: (301) 417-0514

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.

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
22010C	Weight Set (1 mg to 100 g)	12979
22020C	Weight Set (1 mg to 1 kg)	14871
22030C	Weight Set (2 kg to 30 kg)	6513
22040C	Single Weights (1 mg to 1 kg)	1600
22060C	Single Weights (2 kg to 30 kg)	2114
22080C	Single Weights (> 30 kg to 1200 kg, 2 double substitution weighings)	At Cost
22100C	Single Weights (> 1200 kg to 30,000 kg)	At Cost
22110C	Single Weights (> 30 kg to 1200 kg, calibrated in a weighing design)	At Cost
22130C	Single Weights for Dead Weight Pressure Testers 5.9 kg to 22.7 kg (13 lb to 50 lb)	1112
22140C	Single Weights for Dead Weight Pressure Testers > 22.7 kg (> 50 lb)	At Cost
22150C	Single Weights for Dead Weight Pressure Testers < 5.9 kg (< 13 lb)	847
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
Thomas W. Bartel	(301) 975-6461	tbartel@nist.gov	100 Bureau Drive, Stop 8222
Kevin L. Chesnutwood	(301) 975-6653	kchesnut@nist.gov	Gaithersburg, MD 20899-8222

Administrative and Logistics:

Jeanne Bruins (301) 975-6624 jeanne.bruins@nist.gov

Fax: (301) 417-0514

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
23010C	Force Transducers to 112 540 N (25 300 lbf) 1 mode	2956
23020C	Extra observation	59
23030C	Additional bridges	818
23040C	Force Transducers to 112 540 N (25 300 lbf) 2 modes	4835
23050C	Extra observation	59
23060C	Additional bridges	733
23070C	Force Transducers 112 540 N to 498 201 N (25 300 lbf to 112 000 lbf) 1 mode	3388
23080C	Extra observation	59
23090C	Additional bridges	838
23100C	Force Transducers 112 540 N to 498 201 N (25 300 lbf to 112 000 lbf) 2 modes	6597
23110C	Extra observation	176
23120C	Additional bridges	1869
23130C	Force Transducers 498 205 N to 1 334 467 N (112 000 lbf to 300 000 lbf) 1 mode	6805
23140C	Extra observation	157
23150C	Additional bridges	1169
23160C	Force Transducers 498 205 N to 1 334 467 N (112 000 lbf to 300 000 lbf) 2 modes	10984
23170C	Extra observation	245
23180C	Additional bridges	2104
23190C	Force Transducers 1 334 471 N to 4 448 222 N (300 00 lbf to 1 000 000 lbf)	8231
23200C	Extra observation	176
23210C	Additional bridges	1466

23220C	Force Transducers 1 334 471 N to 4 448 222 N (300 00 lbf to 1 000 000 lbf) 2 modes	13249
23230C	Extra observation	233
23240C	Additional bridges	2618
23250C	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:	**Telephone:**	**Email:**	**Mailing Address:**
David J. Evans	(301) 975-6637	david.evans@nist.gov	NIST
Kari Harper	(301) 975-6612	kari.harper@nist.gov	100 Bureau Drive, Stop 8220
Toni Savoy	(301) 975-6613	toni.savoy@nist.gov	Gaithersburg, MD 20899-8220

Administrative and Logistics:

Myriam Parra (301) 975-6602 myriam.parra@nist.gov
Fax: (301) 990-3851

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Freq. Range	Peak Accel.	Fee ($)
24010C	Transducer Sensitivity	2 Hz to 160 Hz	0.2 g_n to 2 g_n	3350
24020C	Transducer Sensitivity	10 Hz to 3500 Hz	2 g_n to 10 g_n	5651
24030C	Transducer Sensitivity	10 Hz to 10 kHz	2 g_n to 10 g_n	9281
24040S	Shock Measurement	250 Hz to 10 kHz	20 g_n to 10 000 g_n	At Cost
24050S	Transducer Sensitivity	3 kHz to 20 kHz	4 g_n to 200 g_n	At Cost
24060S	Special Vibration Tests, by Prearrangement			At Cost

Fees are subject to change without notice.

I. Acoustic Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Victor Nedzelnitsky	(301) 975-6638	vnedzelnitsky@nist.gov	NIST
Randall P. Wagner	(301) 975-6619	randall.wagner@nist.gov	100 Bureau Drive, Stop 8221
David J. Evans	(301) 975-6637	david.evans@nist.gov	Gaithersburg, MD 20899-8221

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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	6215

Service ID Number	Description of Services	Fee ($)
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	7451
25030C	Pressure Response: Tokyo Riko Type ECL MR112, Bruel & Kjaer Type 4134, or equivalent half-inch microphones, 50 Hz to 10,000 Hz	7158
25040C	Pressure Response: Tokyo Riko Type EC MR112, Bruel & Kjaer Type 4134, or equivalent half-inch microphones, 50 Hz to 20,000 Hz	8960
25050C	Free-Field Response: Tokyo Riko Type ECL MR112, Bruel & Kjaer Types 4133, 4134, 4165, 4166, 4180, or equivalent half-inch microphones, 2,500 Hz to 20,000 Hz	6983
25060S	Special Test of Acoustic Devices	At Cost
25070S	Special Tests of Earphones	5970

Fees are subject to change without notice.

CHAPTER 6
THERMODYNAMIC QUANTITIES

A. Pressure Measurements

Technical Contacts:	Telephone:	Email:	Mailing Address:
Douglas A. Olson (All Services)	(301) 975-2956	dolson@nist.gov	NIST
R. Gregory Driver (pneumatic gages) (29010C,29030C, 29035C, 29040S)	(301) 975-4832	rdriver@nist.gov	100 Bureau Drive, Stop 8364 Gaithersburg, MD 20899-8364

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
29010C	Deadweight Piston Gages	6841
29020C	Controlled Clearance Piston Gages	At Cost
29030C	Pressure Gages and Transducers	At Cost
29035C	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:
Jay Hendricks (30010C-30025C, 30040S)	(301) 975-4836	jay.hendricks@nist.gov	NIST 100 Bureau Drive, Stop 8364 Gaithersburg, MD 20899-8364
Robert F. Berg (30029C-30032S, 30050S, 30063S)	(301) 975-2466	robert.berg@nist.gov	
Dana R. Defibaugh (30034C-30038C, 30050S, 30060S-30062C)	(301) 975-2471	dana.defibaugh@nist.gov	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

NOTE: 1 Torr = 133.322 Pa

Service ID Number	Description of Services	Fee ($)
30010C	One Low-Pressure Transducer Absolute or Differential Relative to Vacuum	4618
30011C	Additional Transducer (Cost per Unit)	4402
30020C	One Differential Low-Pressure Transducer Relative to near Atmospheric Pressure	5181
30021C	Additional Transducers (Cost per Unit)	4641
30025C	Piston Gauges versus and Ultrasonic Interferometer Manometer	At Cost
30029C	Spinning Rotor Gages, below 0.1 Pa, Nitrogen Gas with NIST Controller	4483
30030C	Spinning Rotor Gages, below 0.1 Pa, Nitrogen Gas Customer Controller with IEEE-488	4483
30031C	Spinning Rotor Gages, below 0.1 Pa, Additional Gas	5565

30032S	Special Test of Spinning Rotor Gages, Transition Range (above 0.1 Pa)	At Cost
30034C	Ionization Gages, 10^{-4} Pa to 10^{-1} Pa, Nitrogen Gas	5155
30035C	Ionization Gages, 10^{-5} Pa to 10^{-1} Pa, Nitrogen Gas	6251
30036C	Ionization Gages, 10^{-7} Pa to 10^{-1} Pa, Nitrogen Gas	7121
30037C	Ionization Gages, Additional Filament or Gas for Above Tests	At Cost
30038C	Ionization Gages, NIST Supplied Gage Tube for Above Tests	303
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)	6078
30062C	Helium Leaks, Comparison Calibration (10^{-13} mol/s to 10^{-9} mol/s)	4731
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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

NOTE: The minimum number of test points per thermometer is two. Fahrenheit ranges are not direct conversions of the Celsius ranges.

Service ID Number	Description of Services	Fee ($)
31010C	Laboratory Thermometers (0 °C to 150 °C) (32 °F to 300 °F)	452/pt
31020C	Laboratory Thermometers (151 °C to 315 °C) (301 °F to 600 °F)	555/pt
31030C	Laboratory Thermometers (316 °C to 550 °C) (601 °F to 1022 °F)	555/pt
31040C	Laboratory Thermometers (-1 °C to -110 °C) (31 °F to -166 °F)	555/pt
31050C	Laboratory Thermometers (Liquid N_2) (-196 °C or -321 °F)	452/pt
31100C	Quantity Tests of Liquid-In-Glass Thermometers	At Cost
31110S	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)	452/pt
31120S	Special Tests of Industrial Platinum Resistance Thermometers, Thermistor Thermometers, Digital Thermometers and Other Types of Thermometers (151 °C to 315 °C) (301 °F to 600 °F)	555/pt
31130S	Special Tests of Industrial Platinum Resistance Thermometers, Thermistor Thermometers, Digital Thermometers and Other Types of Thermometers (316 °C to 550 °C) (601 °F to 1022 °F)	555/pt
31140S	Special Tests of Industrial Platinum Resistance Thermometer, Thermistor Thermometers, Digital Thermometers and Other Types of Thermometers (-1 °C to -110 °C) (31 °F to -166 °F)	555/pt
31150S	Special Tests of Industrial Platinum Resistance Thermometers, Thermistor Thermometers, Digital Thermometers and Other Types of Thermometers (Liquid N_2) (-196 °C or -321 °F)	452/pt
31170S	Special Tests of Calorimetric Thermometers	1768
31180S	Special Test of Beckmann Thermometers	1829
31190S	Additional copy of Table from Results of 31110S-31150S at a Later Date	392
31200S	Preliminary Examination of Ineligible Thermometer	88
31250S	Additional Copy of Report	88
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:**
Christopher W. Meyer (32010C-32150S)	(301) 975-4825	cmeyer@nist.gov	NIST
Karen Garrity (32010C-32101C, 32150S)	(301) 975-4818	kgarrity@nist.gov	100 Bureau Drive, Stop 8363 Gaithersburg, MD 20899-8363
C. Dawn Cross (32110C-32147C)	(301) 975-4822	dawn.cross@nist.gov	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

COMPARED CALIBRATIONS, TEMPERATURE MEASURED WITH THERMOCOUPLE

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	1199
32020C	R	0 to 1450	1 °C or 1 °F Interv. Table	700	0 to 1100 1450	1199
32030C	B	0 to 1750	1 °C or 1 °F Interv. Table	1000	0 to 800 800 to 1100 1450 1750	1803
32031C	B	800 to 1750	1 °C or 1 °F Interv. Table	1000	800 to 1100 1450 1750	1199
32040C	E	0 to 1000	4 to 15	700	0 to 1000	1199
32041C	J	0 to 760	4 to 15	700	0 to 760	1199
32042C	K	0 to 1100	4 to 15	700	0 to 1100	1199
32043C	N	0 to 1100	4 to 15	700	0 to 1100	1199
32044C	T	0 to 400	4 to 15	700	0 to 400	1199
32050C	Comparison calibration, two point minimum, per point, for all items above					556/pt
32060C	Each additional table of results at 1 °C or 1 °F intervals, for type S, R, or B at later date					308
32061C	Each additional table of results at 1 °C or 1 °F intervals, for type S, R, or B at time of test					184
32070C	Thermocouple materials tested against Pt Thermoelectric standard, 4 to 15 points, 700 mm minimum lengths					1199

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	3031
32091C	Type S or T, freezing point determination, per point, two point minimum					1076
CALIBRATION OF DIGITAL THERMOMETER INDICATOR OR PORTABLE POTENTIOMETER						
32100C	Indicator or Potentiometer, first dial or range					911
32101C	Indicator or Potentiometer, each additional dial or range					507
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, TWO 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					644/pt
32120C	316 °C to 550 °C or 601 °F to 1022 °F, Expanded Uncertainty 0.5 °C					644/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).						
32141C	Option 1: Table from -196 °C to + 300°C (-321 °F to +572 °F), calibration points at (-196, -110, 250, +100, +200, +300) °C					540
32142C	Option 2: Table from -196 °C to +100 °C (-321 °F to +212 °F), calibration points at (-196, -110, 250, +50, +100) °C					540
32143C	Option 3: Table from -110 °C to +300 °C (-166 °F to +572 °F), calibration points at (-110, 250, +100, +200, +300) °C					540
32144C	Option 4: Table from -110 °C to +100 °C (-166 °F to +212 °F), calibration points at (-110, 250, +50, +100) °C					540
32145C	Option 5: Table from 0 °C to 300 °C (32 °F to +572 °F), calibration points at (+100, +200, +300) °C					540
32146C	Option 6: Table from -110 °C to 0 °C (-166 °F to +32 °F), calibration points at (-110, 250) °C					540
32147C	Option 7: Table from -196 °C to 0 °C (-321 °F to +32 °F), calibration points at (-196, -110, 250) °C					540
32150S	Special Tests of Thermocouples and Thermocouple Materials					At Cost

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
Gregory F. Strouse (83K to 962 °C)	(301) 975-4803	gstrouse@nist.gov	100 Bureau Drive, Stop 8363 Gaithersburg, MD 20899-8363

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
33010C	Capsule SPRT (13.8 K to 30 °C) e-H_2 to Ga	11223
33020C	Capsule SPRT (13.8 K to 157 °C) e-H_2 to In	11223
33030C	Capsule SPRT (13.8 K to 232 °C) e-H_2 to Sn	12193
33031C	Capsule SPRT (24.5 K to 30 °C) Ne to Ga	8708
33032C	Capsule SPRT (24.5 K to 157 °C) Ne to Ga	9095
33033C	Capsule SPRT (24.5 K to 232 °C) Ne to Sn	10065
33040C	Capsule SPRT(54 K to 30 °C) 0_2 to Ga	7782
33050C	Capsule SPRT (54 K to 157 °C) 0_2 to In	8171
33060S	Capsule SPRT (54 K to 232 °C) 0_2 to Sn	10110
30065S	Capsule SPRT (83 K to 0.01 °C) Ar to TPW	At Cost
30070C	Capsule SPRT (83 K to 30 °C) Ar to Ga	7600
33080C	Capsule SPRT (83 K to 157 °C) Ar to In	7600
33090C	Capsule SPRT (83 K to 232 °C) Ar to Sn	9543
33100C	Capsule SPRT (0 °C to 30 °C) TPW to Ga	2891
33110C	Capsule SPRT (0 °C to 157 °C) TPW to In	3375
33120C	Capsule SPRT (0 °C to 232 °C) TPW to Sn	5122
33130C	Capsule SPRT (234 K to 30 °C) Hg to Ga	5295
33140C	Rhodium-Iron or Platinum-Cobalt Resistance Thermometers (0.65 K to 24.6 K)	11844
33141C	Rhodium-Iron or Platinum-Cobalt Resistance Thermometers (0.65 K to 83.8 K)	14564
33142C	n-Type Germanium Resistance Thermometers (0.65 K to 24.6 K)	13393
33150C	Long Stem SPRT (83 K to 0.01 °C) Ar to TPW	3820
33160C	Long Stem SPRT (83 K to 30 °C) Ar to Ga	4499
33170C	Long Stem SPRT (83 K to 157 °C) Ar to In	5178
33180C	Long Stem SPRT (83 K to 232 °C) Ar to Sn	5857
33190C	Long Stem SPRT (83 K to 420 °C) Ar to Zn	6922

33200C	Long Stem SPRT (83 K to 661 °C) Ar to Al	7989
33210C	Long Stem SPRT (234 K to 30 °C) Hg to Ga	3162
33220C	Long Stem SPRT (234 K to 157 °C) Hg to In	4131
33230C	Long Stem SPRT (234 K to 232 °C) Hg to Sn	5005
33240C	Long Stem SPRT (234 K to 420 °C) Hg to Zn	5975
33250C	Long Stem SPRT (234 K to 661 °C) Hg to Al	7333
33260C	Long Stem SPRT (0 °C to 30 °C) TPW to Ga	1533
33270C	Long Stem SPRT (0 °C to 157 °C) TPW to In	2212
33280C	Long Stem SPRT (0 °C to 232 °C) TPW to Sn	2890
33290C	Long Stem SPRT (0 °C to 420 °C) TPW to Zn	3861
33300C	Long Stem SPRT (0 °C to 661 °C) TPW to Al	5122
33310C	Long Stem SPRT (0 °C to 962 °C) TPW to Ag	10558
33320C	Additional Copy of Table from Results of 33010C-33310C at Time of Test	114
33330C	Additional Copy of Table from Results of 33010C-33310C at a Later Date	385
33340C	Minimum Charge for Unsuitable Thermometer	638
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)	23976
33380M	Measurement Assurance Program for Temperature 83 K to 661 °C (Ar to Al)	26740

Fees are subject to change without notice.

F. Radiance Temperature Measurements

Technical Contact:	**Telephone:**	**Email:**	**Mailing Address:**
Charles E. Gibson	(301) 975-2329	cgibson@nist.gov	NIST 100 Bureau Drive, Stop 8441 Gaithersburg, MD 20899-8441 **Fax:** (301) 869-5700

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
Calibration reports are issued giving the radiance temperature of the blackbody at 655.48 nm versus the scale reading, output current, or output voltage		
35010C	Radiance Temperature Standard, Disappearing Filament Optical Pyrometer (800 °C to 2400 °C, 4 to 12 points, 1 range)	8551
35020C	Radiance Temperature Standard, Disappearing Filament Optical Pyrometers (each additional range up to 4200 °C, only available with 35010C)	6176
35040C	Radiance Temperature Standard, Disappearing Filament Optical Pyrometer (800 °C to 4200 °C, 1 range 3 or fewer points)	4275
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)	11877
35051C	Recalibration of Tungsten Strip Lamp (800 °C to 2300 °C, 6 to 16 points)	9976
35060C	Radiance Temperature Standard, Tungsten Strip Lamp (800 °C to 2300 °C, 5 or fewer points)	7602
35061C	Recalibration of Tungsten Strip Lamp (800 °C to 2300 °C, 5 or fewer points)	5701
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)	9026
35072C	Radiance Temperature Standard, Radiation Thermometer (800 °C to 2700 °C, 5 or fewer points)	4751
Calibration reports are issued giving the thermodynamic temperature of the reference blackbody versus the display reading, output current, or output voltage.		
35080S	Special Tests of Radiation Thermometers (15 °C to 900 °C)	At Cost
35081C	Radiance Temperature Standard, Radiation Thermometer (15 °C to 70 °C, 3 points)	4751
35082C	Radiance Temperature Standard, Radiation Thermometer (70 °C to 170 °C, 3 points)	4751

35083C	Radiance Temperature Standard, Radiation Thermometer (400 °C to 700 °C, 3 points)	4751
35084C	Radiance Temperature Standard, Radiation Thermometer (700 °C to 900 °C, 3 points)	4751
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 (15 °C to 900 °C)	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)	3800
35102C	Additional Radiative Heat Flux Sensor (same model as 35101C)	2850

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:**
Peter H. Huang	(301) 975-2621 or 2626	phuang@nist.gov	NIST
Joseph T. Hodges	(301) 975-2605	jhodges@nist.gov	100 Bureau Drive, Stop 8363
Gregory E. Scace	(301) 975-2626	gregory.scace@nist.gov	Gaithersburg, MD 20899-8363
			Fax: (301) 548-0206

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
36010C	Dew-Point Hygrometers (+25 °C to –15 °C)	6208
36020C	Dew-Point Hygrometers (-70 °C to –15 °C)	11706
36030C	Electric Hygrometers	At Cost
36040C	Electrolytic Hygrometers	At Cost
36050C	Aspirated Hygrometers	At Cost
36060C	Pneumatic Bridge Hygrometers	At Cost
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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Material	Specimen Thickness (mm)	Mean Temp. (K)	Temp. Thickness (mm)	Relative Expanded Uncertainty *k=2* (%)	Fee ($)
36110C	Fibrous glass blanket	25	297	22 or 28	1.0	2661
36120C	Fibrous glass blanket	75	297	22 or 28	1.5	2661
36130C	Fibrous glass blanket	150	297	22 or 28	2.5	2661
36140S	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:**
Cameron Miller	(301) 975-4713	c.miller@nist.gov	NIST 100 Bureau Drive, Stop 8442 Gaithersburg, MD 20899-8442 **Fax:** (301) 840-8551

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
37010C	Luminous Intensity and Color Temperature Standard Lamps	4900
37020S	Special Tests for luminous Intensity and Color Temperature of Submitted Lamps	At Cost
37030C	Color Temperature Standard Lamps	3950
37040C	Each Additional Color Temperature for 37030C	951
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	3636
37080S	Special Tests for Submitted Luminance Sources and Transmitting Diffusers	At Cost
37090S	Special Tests for Photometers, Illuminance Meters and Luminance Meter	At Cost
37100S	Special Photometric Tests	At Cost
37110S	Special Tests for Submitted Flashing-Light Photometers	At Cost
37120S	Special Tests for Color Measuring Instruments for Displays	At Cost
37130S	Special Tests for Luminous Intensity and Luminous Flux of LEDs	At Cost

Fees are subject to change without notice.

B. Optical Properties of Materials Measurements

Technical Contacts:	Telephone:	Email:	Mailing Address:
David W. Allen	(301) 975-3680	david.allen@nist.gov	NIST 100 Bureau Drive, Stop 8442 Gaithersburg, MD 20899-8442 **Fax:** (301) 840-8551

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
38010C	Spectral Transmittance Filters (Cobalt Blue Glass)	4593
38020C	Spectral Transmittance Filters (Copper Green Glass)	4593
38030C	Spectral Transmittance Filters (Carbon Yellow Glass)	4593
38040C	Spectral Transmittance Filters (Selenium Orange Glass)	4593
38050C	Wavelength Standards (Holmium Oxide Glass)	3751
38051C	Wavelength Standards	3751
38060S	Special Tests of Spectral Reflectance	At Cost
38061S	Special Tests of Spectral Transmittance	At Cost

Fees are subject to change without notice.

C. 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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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)	951
38110C	Recalibration of an X-Ray Film Step Tablet Transmission Density Standard	1378
38120C	Photographic Film Step Tablet Transmission Density Standard (Replacement for SRM 1008)	1163
38130C	Recalibration of a Photographic Film Step Tablet Transmission Density Standard	1568

Fees are subject to change without notice.

D. Spectroradiometric 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)	(301) 975-2334	tlarason@nist.gov	
George Eppeldauer (39090S)	(301) 975-2338	geppeldauer@nist.gov	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

D.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)	16462
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)	9304
39021C	Spectral Radiance Standard, Integrating Sphere Source (300 nm to 2400 nm in 25 nm steps)	13105
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)	12201
39031C	Recalibration of 1000 W Tungsten Quartz-Halogen Lamp (250 nm to 450 nm)	8631
39032C	Spectral Irradiance Standard, 1000 W Tungsten Quartz-Halogen Lamp (350 nm to 800 nm)	12201
39033C	Recalibration of 1000 W Tungsten Quartz-Halogen Lamp (350 nm to 800 nm)	8631
39040C	Spectral Irradiance Standard, 1000 W Tungsten Quartz-Halogen Lamp (250 nm to 1600 nm)	15226
39041C	Recalibration of 1000 W Tungsten Quartz-Halogen Lamp (250 nm to 1600 nm)	11761
39045C	Spectral Irradiance Standard, 1000 W Tungsten Quartz-Halogen Lamp (250 nm to 2400 nm)	17760
39046C	Recalibration of 1000 W Tungsten Quartz-Halogen Lamp (250 nm to 2400 nm)	14587
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)	15537
39051C	Recalibration of 30 W Deuterium Arc Lamp (200 nm to 400 nm)	11483
39060S	Special Tests of Radiometric Sources	At Cost

D.2 Spectroradiometric Detector Measurements		
39071C	UV Silicon Photodiodes	5180
39072C	Recalibration of UV Silicon Photodiodes	4047
39073C	Visible to NIR Silicon Photodiodes	5272
39074C	Recalibration of Visible to NIR Silicon Photodiodes	4047
39075S	Special Tests of NIR Photodiodes	At Cost
39077C	UV to Near-Infrared Silicon Photodiodes (Hamamatsu S2281)	6283
39078C	Recalibration of UV to Near-Infrared Silicon Photodiodes (Hamamatsu S1337-1010BQ or S2281)	5057
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

Fees are subject to change without notice.

E. 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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Standard Detectors in the Far Ultraviolet		
Service ID Number	Description of Services	Fee ($)
40510C	Detector Standard, Windowless Photodiode (5 nm to 122 nm)	4107
40511C	Recalibration of Detector Standard (5 nm to 122 nm)	3715
40520C	Detector Standard, Windowless Photodiode (18 nm to 122 nm)	2932
40521C	Recalibration of Detector Standard (18 nm to 122 nm)	2540
40530C	Detector Standard, Windowless Photodiode (52 nm to 122 nm)	1757
40531C	Recalibration of Detector Standard (52 nm to 122 nm)	1365
40540C	Uncalibrated Windowless Photodiode	752
40560C	Detector Standard, Windowless Photodiode (116 nm to 254 nm)	12384
40561C	Recalibration of Detector Standard (116 nm to 254 nm)	1365
40599S	Special Tests on Detectors from the Ultraviolet (254 nm) to the Soft X-Ray Region (5 nm)	At Cost

Fees are subject to change without notice.

F. Laser and Optoelectronic Components Used with Lasers

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
John H. Lehman	(303) 497-3654	lehman@boulder.nist.gov	NIST
(CW Laser Radiometry)			325 Broadway, MC 815.01
Paul D. Hale	(303) 497-5367	hale@boulder.nist.gov	Boulder, CO 80305-3328
(High Speed Measurements)			
Christopher L. Cromer	(303) 497-5620	cromer@boulder.nist.gov	
(Pulsed-Laser Radiometry)			
Timothy Drapela	(303) 497-5858	drapela@boulder.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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
42110C	Laser Power and Energy Meter (or Detector) Calibrations at a Single Standard Wavelength and Power (See Table 4)	
	CW Laser Power below 2 Watts	3951
	Pulsed Laser Energy (Q-switched YAG) at 1064 nm	3931
	CW Laser Power at 1064 nm above 2 Watts and 10.6 μm	4913
	Pulsed Laser Energy (Excimer) at 248 nm and 193 nm	4437
42111C	Same as 42110C, Additional Standard Wavelengths or Powers (See Table 4)	
	CW Laser Power below 2 Watts	1976
	Pulsed Laser Energy (Q-switched YAG) at 1064 nm	2948
	CW Laser Power at 1064 nm above 2 Watts and 10.6 μm above 1 Watt	3931
	Pulsed Laser Energy (Excimer) at 248 nm and 193 nm	3365
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)	2773
42131C	Same as 42130C, Additional Standard Wavelengths or Connector Types (See Table 5)	1110
42140M	Optical Fiber Power Meter Measurement Assurance Program (MAP)	At Cost
42150M	Low-Level Laser Measurement Assurance Program (MAP)	At Cost
42151C	Low-Level Laser Radiometer Calibration	At Cost
42155C	Calibration Service of Optoelectronic Frequency Response for Combined Photodiode/RF Power Sensor Transfer Standards	At Cost
42160S	Special Test for Frequency Response Measurements of Detectors Used with Lasers	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)	2567
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)	At Cost
42167S	Special Test for Linearity Measurements of High-Power Laser Power Meters (or Detectors Used with Lasers)	At Cost
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)	3358

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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
43010C	Gamma-Ray-Emitting Radionuclides in Solution (Half Lives Greater than 15 Days)	2425
43020C	Gamma-Ray-Emitting Radionulcides in Solution (Half Lives Less than 15 Days)	4039
43030C	Alpha-Particle-Emitting Solid Sources, NIST 2 $\pi\propto$ Proportional Counter	1758
43040C	Alpha-Particle-Emitting Solid Sources, NIST 0.8 $\pi\propto$ Defined-Solid-Angle Counter	1731
43050C	Alpha-Particle-Emitting Solid Sources, Using Both Counting Systems	3312
43060S	Special Tests of Beta-Particle-Emitting Solution Sources, Liquid Scintillation Counting	4959
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)	(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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
44010C	Radioactive Neutron Sources Emission Rates (10^{5} s^{-1} to 10^{9} s^{-1})	5269
44020C	Radioactive Neutron Sources Emission Rates (10^{8} s^{-1} to 10^{10} s^{-1})	5269
44060C	Personnel Protection Instrumentation, Californium Source Bare and Moderated	At Cost
44070C	Activation Detector Dosimetry, Thermal Neutrons	At Cost
44080C	Activation Detector Dosimetry, Californium Fission Neutrons	At Cost
44090C	Activation Detector Dosimetry, ^{235}U Cavity Fission Sources	At Cost
44100S	Special Test of Neutron Sources and Dosimeters	At Cost

Fees are subject to change without notice.

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

Technical Contacts:	Telephone:	Email:	Mailing Address:
Stephen M. Seltzer (All Services)	(301) 975-5552	s.seltzer@nist.gov	NIST
Michael Mitch (46010C-47040S)	(301) 975-5491	mmitch@nist.gov	100 Bureau Drive, Stop 8460 Gaithersburg, MD 20899-8460
Michelle O'Brien (46010C-46050S)	(301) 975-2014	michelle.obrien@nist.gov	**Fax:** (301) 869-7682
Ronaldo Minniti (46010C-46110C)	(301) 975-5586	ronaldo.minniti@nist.gov	
Heather Chen-Mayer (46110C)	(301) 975-5595	heather.chen-mayer@nist.gov	
Christopher G. Soares (47030C-47040S)	(301) 975-5589	csoares@nist.gov	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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	1825
46011C	Radiation Detectors—Calibration in X-Ray Beams (see Tables 6, 7 and 8), per Detector, per Set-Up, per Beam Code	1482
46020C	Passive Dosimeters—Irradiation of Up to Six, One Beam Quality at One Set-up	1842

46021C	Up to Six Additional Dosimeters at Same Set-up and Beam Quality	1172
46030S	Special Tests of High-Gain Electrometers—Charge Sensitivity, One Set of Switch Positions, with 46010C/46011C, by Prearrangement	1214
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	2123
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	3359
47011C	Each Additional Gamma-Ray Source of Same Radionuclide	3247
47020C	^{125}I or ^{103}Pd Sources: Seeds Having Air-Kerma Strengths 0.5 μGy m^2/h to 100 μGy m^2/h	3329
47021C	Each Additional ^{125}I or ^{103}Pd Source of Same Radionuclide/Design Submitted with Above	3257
47030C	Beta-Particle Source Calibrated for Surface Dose Rate	2217
47035C	Beta-Particle Source Calibrated for Radiation Protection	1794
47036C	Ionization Chamber Calibrated with Beta-Particle Sources for Radiation Protection	1794
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

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Stephen M. Seltzer	(301) 975-5552	s.seltzer@nist.gov	NIST
Marc D. Desrosiers	(301) 975-5639	mdesrosiers@nist.gov	100 Bureau Drive, Stop 8460
James M. Puhl	(301) 975-5581	jpuhl@nist.gov	Gaithersburg, MD 20899-8460
Sarenee L. Cooper	(301) 975-5054	sarenee.cooper@nist.gov	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
D.1 Dosimetry of High-Energy Electron Beams		
48010M	Dose Interpretation of NIST-Packaged Dosimeters Irradiated by Customer—Two Dosimeters	1012
48011M	Each Additional Dosimeter	539
48020S	Special Tests of Electron-Beam Dosimeters	At Cost

D.2 Dosimetry of Photon Beams		
49010C	Calibration Irradiations of Customer Supplied Dosimeters with ^{60}Co Gamma-Rays	447
49020C	Dose Interpretation of NIST Transfer Dosimeters Irradiated by Customer, Three Dosimeters Plus Control(s)	1410
49030C	Dose Interpretation of Each NIST Transfer Dosimeter Package in Addition to Those Supplied Under 49020C	344
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:
George R. Jones	(301) 975-4225	george.jones@nist.gov	NIST
Randolph E. Elmquist	(301) 975-6591	relmquist@nist.gov	100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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	1842
51131C	Standard Resistor, Evanohm Wirewound High Precision, 10 kΩ	1794
51132C	Standard Resistor, Four-Terminal 0.0001 Ω	2173
51133C	Standard Resistor, Four-Terminal 0.001 Ω	1869
51134C	Standard Resistor, Four-Terminal 0.01 Ω	1869
51135C	Standard Resistor, Four-Terminal 0.1 Ω	1411
51136C	Standard Resistor, Four-Terminal 1 Ω	1411
51137C	Standard Resistor, Four-Terminal 10 Ω	1411
51138C	Standard Resistor, Four-Terminal 100 Ω	1411
51139C	Standard Resistor, 1 kΩ	1411
51140C	Standard Resistor, 10 kΩ	1811
51141C	Standard Resistor, 100 kΩ	1811
51142C	Standard Resistor, 1 MΩ	2012
51143C	Standard Resistor, 10 MΩ	2243
51144C	Additional Voltage, 10 MΩ	1845
51145C	Standard Resistor, 100 MΩ	2243
51146C	Additional Voltage, 100 MΩ	1845
51147C	Standard Resistor, 1 GΩ	2243
51148C	Additional Voltage, 1 GΩ	1845

51149C	Standard Resistor, 10 GΩ	2854
51150C	Additional Voltage, 10 GΩ	2454
51151C	Standard Resistor, 100 GΩ	2854
51152C	Additional Voltage, 100 GΩ	2454
51153C	Standard Resistor, 1 TΩ	3007
51154C	Additional Voltage, 1 TΩ	2607
51160C	Standard Resistor for Current Measurements (Shunts) with all determinations at 300 A or Below, One Range, One Current Level	2797
51161C	Standard Resistor for Current Measurements (Shunts), with At Least One Determination Above 300 A (maximum current 2000 A), One Range, One Current Level	4016
51162C	Standard Resistor for Current Measurements (Shunts), Additional Range of a Multi-Range Resistor	1717
51163C	Standard Resistor for Current Measurements (Shunts), Additional Determination at Another Current Level	1717

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	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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

A.3 High-Frequency Standard Resistors

Technical Contact:	**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		

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
51310S	High-Frequency Standard Resistors; Two-Terminal	At Cost

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	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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	3030
52131C	Additional Measurement at One of the Above Frequencies	317
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	1927
52141C	Additional Measurement at One of the Above Frequencies	304
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	1889
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	1267

52161C	Additional Measurement at One of the Above Frequencies	304
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	1267
52171C	Additional Measurement at One of the Above Frequencies	304
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	At Cost
52180C	Fixed Standard Inductors (0.00005 H to 10 H), at a Frequency of (100, 400, 1000, or 10 000) Hz	1267
52181C	Additional Measurement at One of the Above Frequencies	1204
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 Contact: Ronald A. Ginley
Telephone: (303) 497-3634
Email: rginley@boulder.nist.gov
Mailing Address: 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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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
52221C	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

Fees are subject to change without notice.

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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
52400C	Power-Frequency Capacitors	At Cost

B.4 *Q*-Standards

Technical Contact:	**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		

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
52710C	Inductive *Q*-Standards; 50 kHz to 45 MHz, 0.25 μH to 25 mH	At Cost
52711C	Each Additional Frequency for 52710C	At Cost

Fees are subject to change without notice.

C. Voltage Measurements

C.1 DC Voltage Measurements and Standards

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
June E. Sims	(301) 975-4238	june.sims@nist.gov	NIST
Yi-hua Tang	(301) 975-4691	ytang@nist.gov	100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
53110S	Special DC Voltage Measurements, by Prearrangement	At Cost
53130C	First Saturated Standard Cell in a Group	2101
53131C	Each Additional Cell	1413
53140C	Platinum Resistance Thermometer Temperature Determination for Standard Cell Calibration	511
53150C	Unsaturated Standard Cells	1198
53160C	Tests of Solid-State Voltage Reference Standard (1 Output, 1 V to 10 V)	1843
53161C	Each Additional Output	1198
53180S	Special Handling (Equipment Pickup or Delivery)	223
53190S	Special Handling (Cleaning, Minor Repair, Return Service Charge)	451

Fees are subject to change without notice.

C.2 AC Voltage Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Mark E. Parker	(301) 975-2413	mparker@nist.gov	NIST
Bryan C. Waltrip	(301) 975-2438	bwaltrip@nist.gov	100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

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

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	Special 25-Point Test of Digital Multimeters (DMMs), by Prearrangement	1656
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:**
Joseph R. Kinard	(301) 975-4250	jkinard@nist.gov	NIST
Thomas E. Lipe	(301) 975-4251	tlipe@nist.gov	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

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)	1821
53351C	First Point for Each Applied Voltage or Current Range	860
53352C	Additional Points for Each Applied Voltage and Current Level (Additional Frequency/Voltage or Frequency/Current Points)	61

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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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)	3971
54121C	Additional Frequency Points	3971
54130C	Inductive Voltage Dividers – (Single Frequency, Voltage to be Specified, Each Setting of Most Significant Dial Only)	2507
54131C	Additional Frequency Points	2507

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	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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	3051
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	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
54510C	Voltage Transformer, Ratio & Phase Angle, at 60 Hz on 1 Range, 1 Secondary Voltage, 1 Burden Primary Vrms ≤ 150 kV	At Cost
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	3842
54521C	Current Transformer, Ratio & Phase Angle, 1 Secondary Current, Additional Combination of Range, Frequency, and Burden, Primary Current Not Over 12 000 A	380
54522C	Current Transformer, Ratio & Phase at Each Additional Secondary Current, Same Combination of Range, Frequency, and Burden as 54520C or 54521C	304
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:**
Mark E. Parker	(301) 975-2413	mparker@nist.gov	NIST
Bryan C. Waltrip	(301) 975-2438	bwaltrip@nist.gov	100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170
Administrative and Logistics:			
Denise D. Prather	(301) 975-4221	dprather@nist.gov	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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	1431
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	467
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)	1859
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)	527

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)	1859
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)	527

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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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	3456
56201C	Each Additional Determination, Same Meter at 50 Hz	213
56202C	Initial Two Determinations of One or Two Meters Run Simultaneously with the First (56200C)	3129
56210M	Measurement Assurance Program for Watthour Meters	4470
56220S	Special Tests of Watthour Meter with Pulse Output; 120 Volts, 5 Amperes, 60 Hz at 0.5 Lag, Unity and 0.5 Lead Power Factors	1460
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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
The following tests are for 50 Ω thermistor and thermoelectric detectors with coaxial connectors.		
61100S	Measurement setup charge (applies to all coaxial power measurements—one setup charge for multiple detectors with the same connectors and frequencies[1])	2373
61110S	Coaxial Detectors in the Frequency Range from 0.1 MHz to 10 MHz	2740
61120S	Coaxial Detectors at user Selected Frequencies in the appropriate Frequency Range for the Connector Type [2]. Up to 20 Frequency Points	2963
61121S	Coaxial Detectors at user Selected Frequencies in the appropriate Frequency Range for the Connector Type [2]. 20 to 40 Frequency Points	3237
61122S	Coaxial Detectors at user Selected Frequencies in the appropriate Frequency Range for the Connector Type [2]. 40 to 120 Frequency Points	3512
61123S	Coaxial Detectors at user Selected Frequencies in the appropriate Frequency Range for the Connector Type [2]. More than 120 Frequency Points	4173
61137C	NIST Model CN Coaxial Detectors at 21 Frequencies within the Frequency Range of 50 MHz to 18 GHz	7361
61138C	NIST Model CN Coaxial Detectors at Single Customer Selected Frequency within the Frequency Range of 50 MHz to 18 GHz	46
The following tests are for thermistor detectors with waveguide flanges.		
61140S	Measurement setup charge (applies to all waveguide power measurements EXCEPT WR15—one charge for multiple detectors with the same connectors and frequencies[1])	4571
61141S	Measurement setup charge (applies to all WR15 waveguide power measurements—one charge for multiple detectors with the same connectors and frequencies[1])	3553
61142S	Rectangular Waveguide Detectors with WR90 Flanges[2]	3056
61143S	Rectangular Waveguide Detectors with WR62 Flanges[2]	3056
61144S	Rectangular Waveguide Detectors with WR42 Flanges[2]	3056
61145S	Rectangular Waveguide Detectors with WR28 Flanges[2]	3201

61146S	Rectangular Waveguide Detectors with WR22 Flanges[2]	3596
61147S	Rectangular Waveguide Detectors with WR15 Flanges[2]	5564
61148S	Rectangular Waveguide Detectors with WR10 Flanges[2]	6453
Miscellaneous Tests		
61190S	Special Microwave and RF Power Measurement Services, by Prearrangement	At Cost

[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

Fees are subject to change without notice.

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

Technical Contacts: Ronald A. Ginley
Telephone: (303) 497-3634
Email: rginley@boulder.nist.gov
Mailing Address: 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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
The following tests are for two-port 50 Ω devices with coaxial connectors		
61200S	Measurement setup charge for all Coaxial Two-port measurements with GR900, GC7 or Type-N connectors, frequencies of 0.05 GHz and 0.1 GHz—one setup charge for multiple devices with the same connectors and frequencies[1]	549
61201S	Measurement setup charge for all Coaxial Two-port measurements with GR900, GC7 or Type-N connectors, frequencies at or above 0.2 GHz—one setup charge for multiple devices with the same connectors and frequencies[1]	2530
61202C	Measurement setup charge for all Coaxial Two-port measurements with 3.5 mm, 2.92 mm, or 2.4 mm connectors and frequencies of 0.05 GHz and 0.1 GHz —one setup charge for multiple devices with the same connectors and frequencies[1]	549
61203S	Measurement setup charge for all Coaxial Two-port measurements with 3.5 mm, 2.92 mm, or 2.4 mm connectors and frequencies at or above 0.2 GHz— one setup charge for multiple devices with the same connectors and frequencies[1]	3342
61211S	Fixed Two-port Devices with GR900, GPC7 or Type-N connectors[2]	3763
61212S	Variable Two-port Devices with GR900, GPC7 or Type-N connectors[2]	3763
61213S	Fixed Two-port Devices with 3.5 mm, 2.92 mm, or 2.4 mm connectors[2]	2865
61214S	Variable Two-port Devices with 3.5 mm, 2.92 mm, or 2.4 mm connectors[2]	2982

The following tests are for two-port devices with waveguide flanges.		
61220S	Measurement setup charge for all Waveguide Two-port measurements EXCEPT WR15—one setup charge for multiple devices with the same connectors and frequencies[1]	3309
61221S	Measurement setup charge for all WR15 Waveguide Two-port measurements—one setup charge for multiple devices with the same connectors and frequencies[1]	3796
61222S	Additional Measurement setup charge for all VARIABLE Waveguide Two-port measurements— one setup charge for multiple devices with the same connectors and frequencies[1]	631
61223S	Fixed and Variable Rectangular Waveguide Two-port Devices with WR90 Flanges[2]	2929
61224S	Fixed and Variable Rectangular Waveguide Two-port Devices with WR62 Flanges[2]	2889
61225S	Fixed and Variable Rectangular Waveguide Two-port Devices with WR42 Flanges[2]	3005
61226S	Fixed and Variable Rectangular Waveguide Two-port Devices with WR28 Flanges[2]	3005
61227S	Fixed and Variable Rectangular Waveguide Two-port Devices with WR22 Flanges[2]	3005
61228S	Fixed and Variable Rectangular Waveguide Two-port Devices with WR15 Flanges[2]	5875
61231S	Fixed and Variable Rectangular Waveguide Two-port Devices with WR10 Flanges[2]	5992
The following tests are for one-port 50 Ω devices with coaxial connectors		
61250S	Measurement setup charge for all Coaxial One-port measurements with GR900, GC7 or Type-N connectors, frequencies of 0.05 GHz and 0.1 GHz—one setup charge for multiple devices with the same connectors and frequencies[1]	741
61251S	Measurement setup charge for all Coaxial One-port measurements with GR900, GC7 or Type-N connectors, frequencies at or above 0.2 GHz—one setup charge for multiple devices with the same connectors and frequencies[1]	2677
61252S	Measurement setup charge for all Coaxial One-port measurements with 3.5 mm, 2.92 mm, or 2.4 mm connectors and frequencies of 0.05 GHz and 0.1 GHz — one setup charge for multiple devices with the same connectors and frequencies[1]	724
61253S	Measurement setup charge for all Coaxial One-port measurements with 3.5 mm, 2.92 mm, or 2.4 mm connectors and frequencies at or above 0.2 GHz—one setup charge for multiple devices with the same connectors and frequencies[1]	3384
61261S	Fixed One-port Devices with GR900, GPC7 or Type-N connectors[2]	3244
61262S	Variable One-port Devices with GR900, GPC7 or Type-N connectors[2]	3244
61263S	Fixed One-port Devices with 3.5 mm, 2.92 mm, or 2.4 mm connectors[2]	2696
61264S	Variable One-port Devices with 3.5 mm, 2.92 mm, or 2.4 mm connectors[2]	2929

The following tests are for one-port devices with waveguide flanges.		
61270S	Measurement setup charge for all Waveguide One-port measurements —one setup charge for multiple devices with the same connectors and frequencies[1]	3409
61271S	Additional Measurement setup charge for all VARIABLE Waveguide One-port measurements —one setup charge for multiple devices with the same connectors and frequencies[1]	587
61272S	Fixed and Variable Rectangular Waveguide One-port Devices with WR90 Flanges[2]	2696
61273S	Fixed and Variable Rectangular Waveguide One-port Devices with WR62 Flanges[2]	2771
61274S	Fixed and Variable Rectangular Waveguide One-port Devices with WR42 Flanges[2]	2771
61275S	Fixed and Variable Rectangular Waveguide One-port Devices with WR28 Flanges[2]	2771
61276S	Fixed and Variable Rectangular Waveguide One-port Devices with WR22 Flanges[2]	2771
61277S	Fixed and Variable Rectangular Waveguide One-port Devices with WR15 Flanges[2]	5717
61278S	Fixed and Variable Rectangular Waveguide One-port Devices with WR10 Flanges[2]	5717
Miscellaneous Tests		
61290S	Special Microwave and RF Power Measurement Services, by Prearrangement	At Cost

[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

Fees are subject to change without notice.

G.3 High-Accuracy Attenuation Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Ronald A. Ginley	(303) 497-3634	rginley@boulder.nist.gov	NIST
Jeff Jargon	(303) 497-3516	jargon@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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
61330S	Attenuation Measurements of Three-Port and Two-Port Devices at 1.25 MHz, 0 dB and 6 dB	At Cost

G.4 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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Freq.	Connector Type	Device Requirements/Service	Fee ($)
61410S	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			3637
	Per Frequency			5924
61420S	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 to 12.4 GHz)	Temperature < 15 000 K (ENR < 17 dB) Reflection Coefficient < 0.2	
	Set Up Charge, per order			5014
	Per Frequency			606
61425S	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			6807
	Per Frequency			3899
61430S	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			6649
	Per Frequency			3767

61435S	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			9452
	Per Frequency			5483
61450S	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			5173
	Per Frequency			606
61455S	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			6649
	Per Frequency			3685
61460S	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			6649
	Per Frequency			3685
61465S	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			8631
	Per Frequency			4215
61470S	33 GHz to 50 GHz Continuous Frequencies	*Waveguide* WR 22	Temperature <15 000 K (ENR < 17 dB) Reflection Coefficient <0.2	
	Set Up Charge, per order			9187
	Per Frequency			5168
61475S	50 GHz to 65 GHz Continuous Frequencies	*Waveguide* WR 15	Temperature < 15 000 K (ENR , 17 dB) Reflection Coefficient < 0.2	
	Set Up Charge, per order			9187
	Per Frequency			6745
61495S	Special Noise Temperature Measurements, by Prearrangement			At Cost

Fees are subject to change without notice.

G.5 Microwave Dielectric and Magnetic Material Measurements

Technical Contact:	**Telephone:**	**Email:**	**Mailing Address:**
James R. Baker-Jarvis	(303) 497-5621	jjarvis@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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
61620S	Special Tests for Dielectric and Magnetic Materials 1 kHz to 60 GHz	At Cost
61640S	Special Consulting and Advisory Services for Dielectric and Magnetic Materials, by Prearrangement	At Cost

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
Katherine MacReynolds (63100S)	(303) 497-3471	mreynold@boulder.nist.gov	Boulder, CO 80305-3328
Michael H. Francis (63200S)	(303) 497-5873	francis@boulder.nist.gov	

Administrative and Logistics:

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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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
63300S	Special Test Service for Calibration of Probes Used with Near-Field Scanning Facilities	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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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
64200S	Special Test Services for Antenna/Field Strength/Measurements, Utilizing the Open Area Test Site and Standard Antenna Method	At Cost
64300S	Special Test Services for Antenna/Field Strength/Reflectivity Measurements, Utilizing the Anechoic Chamber and Standard Field Method	At Cost

I. Pulse Waveform Measurements

Technical Contacts:	**Telephone:**	**Email:**	**Mailing Address:**
Paul Hale (65100S, 65200S and 65400S)	(303) 497-5367	hale@boulder.nist.gov	NIST 325 Broadway, MC 815.01 Boulder, CO 80305-3328
David I. Bergman (65250S, 65500S and 65501S)	(301) 975-4464	dbergman@nist.gov	NIST 100 Bureau Drive, Stop 8170 Gaithersburg, MD 20899-8170

Administrative and Logistics (65100S, 65200S and 65400S):
John Lomax (303) 497-3842
FAX: (303) 497-4286

Administrative and Logistics (65250S , 65500S and 65501S):
Denise D. Prather (301) 975-4221 dprather@nist.gov

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
65100S	Impulse Spectrum Amplitude (50 Ω)	At Cost
65200S	Fast Repetitive Pulse Transition Parameters (50 Ω)	At Cost
65250S	Repetitive Pulse Waveform Measurements, Including Settling Parameters	At Cost
65400S	Pulse Time Delay Interval	At Cost
65500S	Peak-to-Peak Detector Calibration at One Frequency Selected from Those Given in Table 9.23 at 1.2 V	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
Marc A. Weiss (Time)	(303) 497-3261	mweiss@boulder.nist.gov	325 Broadway, MC 847.40
John Lowe	(303) 497-5453	lowe@boulder.nist.gov	Boulder, CO 80305-3328

Administrative and Logistics:

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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
	Broadcast Services (WWW, WWVH, WWVB, GOES, ACTS and NTS)	
76100S	Frequency Measurement Service (Frequency Delivered to User's Site)	Initial One-Time Fee $1,500 Monthly Charge $500
76110S	Global Time Service (Frequency and Time delivered to User's Site)	$15,000 per year
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
James E. Gray	(303) 497-3209	jgray@boulder.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	

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

Service ID Number	Description of Services	Fee ($)
77100C	Oscillator Frequency Calibration	At Cost
77110C	Characterization of Atomic Frequency Standards	At Cost
77120C	Characterization of Oscillators: Time Domain	At Cost

77130C	Characterization of Oscillators and Amplifiers: Phase Noise in the Frequency Domain	At Cost
77131C	Characterization of Oscillators and Amplifiers: Amplitude Noise in the Frequency 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

Do not ship instruments or standards to the mailing address. Contact the staff for the shipping address.

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
SEMINARS

The following announcements concern notification of changes in services and information about future NIST Measurement Seminars. General policy question 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 and 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.ts.nist.gov/ts/htdocs/230/235/calen103.htm for the 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/public_affairs/confpage/conffutr.htm for Upcoming NIST Conferences.

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