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UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
WASHINGTON

Letter
Circular
IC-440

(April 22, 1935)

(Revision of Letter Circular IC195 issued March 12, 1926)

TESTING LABORATORIES EQUIPPED FOR METALLURGICAL TESTS

Compiled by the Division of Metallurgy of the National Bureau of Standards, from replies to a circular letter which was distributed to engineering schools and laboratories.

The National Bureau of Standards, in accordance with law, makes tests and carries out investigations for other agencies of the Federal Government. Owing to the large amount of this official work, it is impracticable for the Bureau to make metallurgical tests for private individuals if other laboratories can do the work.

This list, alphabetically arranged, has been prepared to inform persons interested regarding the location of other laboratories and the type of work which they state they are prepared to do.

It is expected that additions to or revisions of this circular will be made from time to time as information is received as to other laboratories equipped for metallurgical testing.

Letter Circulars are not available in the Government Printing Office, and the supply at the National Bureau of Standards is limited. They are often transitory in character and are used primarily to answer specific inquiries, thus avoiding the preparation of a large number of letters on the same subject.

ALABAMA

Fertig, George J., Comer Building, Birmingham
Physical testing

Pittsburgh Testing Laboratory, Phoenix Building, Birmingham
(Branch, see Pennsylvania)

ARIZONA

University of Arizona, College of Mines and Engineering,
Tucson
(T. G. Chapman)
General metallurgy

CALIFORNIA

California Institute of Technology, Pasadena
(Frederick J. Converse)
Metallographic examinations
Photomicrography

Hunt Company, Robert W., 251 Kearny Street, San Francisco
(Branch, see Illinois)

Los Angeles Testing Laboratory, 1300 South Los Angeles Street,
Los Angeles
(H. E. McCall)
Fully equipped for chemical and physical testing

Maas Laboratories, Arthur R., 308 West 8th Street, Los Angeles
Chemical compositions and analyses on ferrous and non-
ferrous alloys
Melting points of non-ferrous alloys

Smith-Emery Company, 920 Santee Street, Los Angeles
(Otto Wartenweiler, T. O. Slater)
Chemical analyses
Metallography

Twining Laboratories, The, 2527 Fresno Street, Fresno
(F. E. Twining, B. W. Casebolt, Herman Rempel)
Chemical analysis and research
Metallographic analysis and research
Photomicrography
Physical testing
Spectrographic analysis and research

COLORADO

Colorado School of Mines, Department of Civil Engineering,
Golden

(T. A. Kelly, S. A. McCosh)

Electrolytic work

Fatigue

Grinding

Heat treatment

Metallography

Standard compression, tension and flexure tests

CONNECTICUT

Rockwell Co., Stanley P. 396 Homestead Avenue, Hartford

(Stanley P. Rockwell)

Bearing metals

Heat treatment in any commercial size that can be shipped

Melting points

Metallography

Solder

Thermal analysis (by dilatometer)

Wear tests under specific commercial conditions

Welding materials

Souther Engineering Co., The Henry 11 Laurel Street, Hartford

(Jas. A. Newlands, F.P. Gilligan, J.H.G. Williams)

Advice as to preferable compositions and heat treatments
for particular designs or type of construction

Chemical analysis of iron and steels, brases and bronzes,
special alloys, industrial chemical compounds

Control methods for iron foundry, brass foundry, forging,
heat treating and inspection departments; to insure uni-
formity of quality, proper physical characteristics,
machinability, etc.

Development of special properties in steels or alloys
through special treatment

Influence of elevated temperatures on the physical proper-
ties of metals

Macroscopic and microscopic studies of metals and reports
thereon in plain language that reveals the information
sought

Physical characteristics of steels, bronzes and special
alloys, including data as to resistance to impact, re-
peated stresses, etc.

Preparation of specifications for material, treatment,
inspection, etc.

Simple but effective methods for increasing output of plat-
ing rooms, improving quality of plate, and providing oper-
ating force with simple methods of control

CONNECTICUT (continued)

Yale University, Sheffield Scientific School, Hammond Metal-
lurgical Laboratory, 14 Mansfield Street, New Haven

(C. H. Mathewson, A. Phillips)

Laboratory of Engineering Mechanics

(C. J. Tilden)

Bearing metals

Experimental alloys by gas and electric melting

Forging on a small scale

High temperature tensile and flow tests could be arranged for.

Melting points

Rolling and wire drawing

Thermal analysis

X-ray diffraction

DISTRICT OF COLUMBIA

Fuller, Henry C., Columbia Medical Building, 1835 I Street

Miscellaneous analytical work on metals, metallic products
and alloys

IDAHO

University of Idaho, College of Engineering, Moscow

(I. C. Crawford)

Core sand testing

Molding sand testing

ILLINOIS

Armour Institute of Technology, Chemical Engineering and
Mechanical Engineering Laboratories, Chicago

(H. McCormack, A. H. Carpenter, P. C. Huntly)

Corrosion testing

Experimental forging

Gas in metals analyses could probably be arranged for,
but are not now done

Heat treatment of small specimens

Metallography

Preparation of special alloys

Rolling and drawing can probably be arranged for

Sand testing

Solders

Thermal analysis, high temperature tests (-50 to 1800°F)
including stress-strain relations, bearing metals,
melting points

Wear tests

Welding materials

ILLINOIS (continued)

Block Laboratories, 45 East Ohio Street, Chicago

(D. J. Block, R. H. Block, E. I. Dresher)

Core binders
Sand testing
Tensile strength

Gordon Co., Claud S., 707-714 West Madison Street, Chicago

(C. S. Gordon)

Temperature testing (gas and electric furnaces), short or long-time tests
X-ray testing (completely equipped for)

Hunt Company, Robert W., 2200 Insurance Exchange, Chicago

(C. T. Plummer, G. B. Girault, R. K. Akin, C. Bowen)

Assaying
Chemical analysis
Foundry service
Industrial research and special investigation of all engineering materials, ferrous and non-ferrous
Metallography
Microscopic analysis
Physical testing
Welder qualification tests
X-ray

Kawin Company, Charles C., 431 So. Dearborn Street, Chicago

(C. C. Kawin, John Tissing)

Bearing metal analysis
Iron and steel analysis
Molding sands (foundry practice a specialty)

Northwestern University, Dental School, 511 East Chicago Avenue, Chicago

Corrosion resistance)
Crushing strength) dental amalgams
Flow)
Setting changes)

Corrosion resistance)
Hardness) dental golds(wrought and casting)
Heat treatment)
Tensile tests)

Pittsburgh Testing Laboratory, 205 W. Wacker Drive, Chicago

(Branch, see Pennsylvania)

Republic Steel Corporation, Chicago

Robert Archer (Branch, see Ohio)

INDIANA

Purdue University, Department of Chemistry, Lafayette
(A. R. Middleton)
Metallography

Rose Polytechnic Institute, Terre Haute
(D. B. Prentice)

Brinell hardness
Chemical analysis of iron, steel, brass and other alloys
Cross bending
Heat treating specimens as desired
Machining standard test specimens
Macroscopic examination
Microphotography and microscopic examination
Tension or compression
Torsion

IOWA

Iowa State College, Engineering Experiment Station, Ames
(T. R. Agg)

Not prepared to do commercial metallurgical work except
by special arrangement

Patzig Testing Laboratories, 2215 Ingersoll Avenue, Des Moines
(Monroe L. Patzig)

Analytical analyses and tests for tensile, transverse
and compression strengths, elongation, hardness and impact

State University of Iowa, College of Engineering, Iowa City
(C. C. Williams, Edward Bartow, H.O. Croft, A.P. Hoelscher)

Corrosion testing
Heat treatment
Metallography
Physical tests of dental amalgams
Thermal analysis

KENTUCKY

University of Kentucky, Department of Mining and Metal-
lurgical Engineering, Lexington
(C. S. Crouse)

Heat treatment
Metallographic testing
Non-ferrous foundry sands; foundry practice

MAINE

University of Maine, College of Technology, Orono
(W. J. Sweetser, H. D. Watson, C. C. Tyrrell)
Metallography

MARYLAND

Johns Hopkins University, School of Engineering, Baltimore
(A. G. Christie)
Metallography (equipped with Leitz "Metallograph" camera and polishing and etching equipment, supplementing the ordinary universal testing machine equipment)

MASSACHUSETTS

Little, Inc., Arthur D. 30 Charles River Road, Cambridge
(E. P. Stevenson, R. C. Griffin, B. B. Fogler,
C. G. Harford, H. C. Parish)
Apparatus not now assembled for gas in metals work, but would take up this work if occasion warranted
Bearing metals
Chemical and spectroscopic analyses
Core binders
Corrosion testing
Heat treatment (small specimens)
Melting points (metals and sand or refractories)
Soldering
Tensile testing
Thermal analysis
Wear
Welding materials
X-ray

Worcester Polytechnic Institute, Worcester
(Carl G. Johnson)

Casting
Chemical analysis
Critical transformation determination of steel
Forging
Heat treating
Macroscopic and microscopic analyses
Physical testing
Welding

MICHIGAN

Detroit Testing Laboratory, The 554 Bagley Avenue, Detroit
(W. P. Putnam, J. D. Stoddard, Mary E. Black)

Metallography
Physical testing of materials
Salt spray corrosion testing and plating solution control

Michigan College of Mining and Metallurgy, Houghton
(J. T. Eddy)

Chemical analysis
Metallography
Physical testing (tensile, compression impact, hardness
and other conventional tests)
Protective coatings (electroplating, copper and cyanide,
nickel, chromium, zinc; hot dip and vitreous enamel)
X-ray (diffraction, radiography)

Michigan State College, East Lansing

(W. E. Reuling, H. E. Publow, F. G. Seifing)

Chemical analysis: gold and silver; ferrous and non-ferrous
Compressive strength
Determination of thermal transformations, having both
Leeds, Northrup and Brown instruments
Forging on power hammer specimens not over 1-3/4" diameter
Hardness testing
Heat treatment of steels
Melting points
Metallography (Bausch & Lomb and Leitz machines)
Molding sand tests
Physical testing
Special alloys in high frequency furnace up to 12 lbs and
any type of ferrous alloy up to 3100°F

Pittsburgh Testing Laboratory, 429 Wayne Street, Detroit
(Branch, see Pennsylvania)

United States Radiator Corporation, Industrial Research
Laboratory, Detroit

(J. F. McIntire, Franz Valtier, H. W. Dietert)

Core binders
Facings
Partings and other foundry material
Sand testing

MICHIGAN (continued)

University of Michigan, Department of Engineering Research,
Ann Arbor

(A. E. White)

Caustic embrittlement
Chemical analysis
Corrosion resistance - to oxygen and sulphur
Foundry sands and core oils
Gases in metals by vacuum fusion method
Metal cutting and tool life (planing, milling, turning,
boring and drilling)
Metallography
Physical properties (tension, compression, bending, tor-
sion impact, hardness, fatigue and creep; all at room or
elevated temperatures)
Radiography (230,000 volt X-ray equipment)
Spectroscopic analysis (both qualitative and quantitative)
Testing of surfaces for smoothness using the Profilograph
with magnifications up to 5000 times
Thermal and dilatometric analysis

MINNESOTA

University of Minnesota, School of Mines, Minneapolis

(R. L. Dowdell)

Bearing metals
Heat treatment (small specimens)
High and low temperature tensile tests with stress-strain
relations
Impact tests at high and low temperatures
Metallography
Preparation of special alloys (dental alloys a specialty)
Solders
Thermal analysis
Welding materials

MISSOURI

Bruce Williams Laboratories, The 680 Joplin Street, Joplin
(Successors to Waring & Williams)

Industrial and analytical testing of iron, steel, clays,
sands, metals, zinc, copper, bearing metals, alloys, etc.

Hunt Company, Robert W. Syndicate Trust Building, St. Louis
(Branch, see Illinois)

MISSOURI (continued)

University of Missouri, School of Mines and Metallurgy, Rolla
(Chas. Y. Clayton, H. R. Hanley)
Metallography, including microscopic analyses
Non-ferrous metallurgy, specializing in hydrometallurgy
and electrometallurgy
Physical testing
Thermal analyses

MONTANA

Montana School of Mines, Butte
(C. L. Wilson)
Bearing metals
Metallography
Thermal analysis

NEVADA

Lovelock Assay Office, Box 777, Lovelock
(A. H. Scott)
Bearing metals
Solders

University of Nevada, MacKay School of Mines, Reno
(J. A. Fulton)
Heat treatment
Metallography

NEW JERSEY

Ajax Electrothermic Corporation, Trenton
(Dudley Willcox)
Melting and heating in high frequency induction furnaces

Newark College of Engineering, Newark
(H. H. Metzenheim)
Bending tests
Compression testing
Hardness (Brinell)
Heat treatment (gas and electric furnaces)
Metallography
Polishing and grinding
Shore scleroscopes
Tension testing
(definite limits to commercial testing which may be done)

NEW YORK

College of the City of New York, Materials Testing Laboratory,
Convent Avenue and 139th Street, New York City

(J. S. Peck)

Fatigue tests
Impact tests
Micrographic examinations
Physical tests
(R. Stevenson)
Heat transmittance
Physical-chemical measurements

Columbia University, New York City

(W. Campbell, C. G. Fink, B. Davis, A. H. Beyer,
H. A. Fales, L. Work)

Bearing metals
Corrosion testing
Gases in metals (Ledebur oxygen and Allen nitrogen)
Heat treatment
High temperature testing
Metallography
Preparation of special alloys up to 50 lbs
Solders
Thermal analysis
Welding materials
X-ray work, particularly identification of solid phases,
particle size determination, and preferred orientation

Cornell University, Department of Experimental Engineering,
Sibley College of Mechanical Engineering, Ithaca

(H. Biederichs, G. B. Upton, W. M. Sawdon, A. C. Davis)

Heat treating
Materials tests
Metallography

Department of Chemistry, College of Arts and Sciences

(E. M. Chemot, W. D. Bancroft, P. R. Briggs,
F. H. Rhodes, C. W. Mason)

Corrosion
Metallography
Preparation of special alloys (small high frequency fur-
nace available)
Spectroscopic analysis

Department of Geology

(K. Ries)

Core binders
Sand testing

NEW YORK (continued)

Electrical Testing Laboratories, 80th St. and East End Avenue,
New York City

(P. S. Millar, F. W. Farmer)

Chemical analyses

Melting temperature determinations

Photomicroscopy

Tensile tests (limited facilities for tests at high
temperatures)

Hunt Company, Robert W. 53 Park Place, New York City
(Branch, see Illinois)

Ledoux & Co., 155 Sixth Avenue, New York City
(A. M. Smoot)

Corrosion

Gases in metals (Ledebur oxygen and Allen nitrogen only)

Metallography

Special methods of analysis

Kawin Company, Charles C., 110 Pearl Street, Buffalo
(Branch, see Illinois)

New York Testing Laboratories, 80 Washington Street, New York
(G. Brinton Jack, jr., G. J. Horvitz)

Hardness testing

Heat treatments

Impact testing

Metallography

Micromasurements

Photomicrography

Radiography

Tensile strengths

Torsion tests

Wear tests

X-ray

New York University, University Heights, New York City
(H. J. Masson)

Usual physical or chemical tests applied to metals

Pitkin, Inc., Lucius Gerrans Building, Buffalo
(A. L. Hall, J. H. Birdsong)
(Branch, see following page)

NEW YORK (continued)

Pitkin, Inc., Lucius 47 Fulton Street, New York City
(T. A. Wright, Sam Tour, E. P. Polushkin)
A.S.T.M. Salt spray and steam test
Chemical analysis
Controlled atmosphere
Corrosion
High power metallography and microscopy (planimetric and
particle size)
Magnetic analysis
Physical tests
Specialties (jewelry and dental alloys
(alloy steels
(die casting and permanent mold
(secondary metals
(malleable and cast iron
Spectrography
Wear

Pittsburgh Testing Laboratory, 72 Washington Street, New York
(Branch, see Pennsylvania)

Pratt Institute, School of Science and Technology,
215 Myerson Street, Brooklyn
(C. B. Jones, Allen Rogers, F. S. Egilsrud, R.E.Nesbitt)
Core binders
Corrosion testing (salt spray and electrolysis)
Heat treatment (small specimens)
Metallography
Preparation of special alloys
Sand testing
Solders
Thermal analysis
Welding materials

Rensselaer Polytechnic Institute, Troy
(M. A. Hunter, A. Jones, T. R. Lawson, R. A. Patterson,
F. W. Schwartz)
Brine ll tests
Charpy tests
Chemical examination of metallurgical materials
Compression testing to capacity of 1,200,000 lb machine
Extensometer and gauges for determination of deformations,
elastic properties and deflections
Metallographic examination
Physical properties, including linear expansion, electrical
and thermal conductivity and magnetic properties
Preparation of metals and alloys(arc or high frequency
vacuum furnaces)

NEW YORK (continued)

Rensselaer Polytechnic Institute (continued)

Rockwell tests

Spectroscopic analysis: qualitative and quantitative

Tensile and torsion tests at high temperatures

Tensile testing to capacity of 600,000 lb machine

X-ray analysis: crystal structure and orientation; radio-
graphy of thin or light metal castings

Republic Steel Corporation, Buffalo

(H. Burket)

(Branch, see Ohio)

Stillman & Van Sicken, 254 West 31st Street, New York City

(I. Hochstadter, R. C. Brunfield (Cooper Union))

Bearing metals

Metallography

Solders

Welding materials

St. John X-Ray Service, Inc., 20-20 Thomson Avenue, Long
Island City

(Ansel St. John, Herbert R. Isenburger)

Radiography (can penetrate up to 12 inches of steel)

X-ray analysis

Touceda Laboratories, 943 Broadway, Albany

(E. Touceda, E. G. Touceda, David Pales)

Core binders

Heat treatment

Metallography

Metallurgical analysis of all kinds

Sand testing

NORTH DAKOTA

University of North Dakota, University Station, Grand Forks

(L. C. Harrington)

Bearing metals

Corrosion (within limits)

Melting points of metals and refractories

Metallography

Wear tests

OHIO

Cosma Laboratories Co., The 1545 E. 18th Street, Cleveland
(F. K. Bezzenberger)

Analysis of iron and steel, brass and bronze
Microscopy (including microphotography, measurements,
analyses)
Thermal conductivity (by the plate method)

Crowell & Murray, Inc., 2830 Washington Avenue, Cleveland
(C. B. Murray)

Melting points
Sand testing

Herron Co., James H. 1360-4 West 3d Street, Cleveland
(J. H. Herron, L. F. Herron)

Bearing metals
Chemical analysis (all inorganic materials)
(E. T. Holmberg, J. E. Spohn, J. T. Wilson)
Corrosion testing
Gases in metals (Ledebur oxygen and Allen nitrogen only)
Heat treatment (small specimens)
Melting points
Metallography
Physical testing (tension, compression, transverse,
Brinell, scleroscope)
Sand testing and core binders
Solders
Thermal analysis
Welding materials

Kawin Company, Charles C., 222 West 4th Street, Cincinnati
(Branch, see Illinois)

Marshall Co., L. H. 2525 North High Street, Columbus
(L. H. Marshall)

Foundry problems a specialty (clays, corebinders and sands)
Pyrometer service and calibration

Ohio Brass Co., Laboratory Department, Mansfield
(F. L. Wolf, L. B. Thomas)

Bearing metals
Comparative wear tests
Corrosion by salt spray
Heat treatment (small specimens)
High temperature testing (impact -50° to 600°C, tension
and compression -50° to 800°C; stress-strain relation
not determined)

OHIO (continued)

Ohio Brass Co. (continued)

Metallography

Preparation of special alloys (35 K.V.A. high frequency furnace available)

Solders

Thermal analysis

Welding materials

Ohio State University, Metallurgical Department, Columbus

(D. J. Demorest)

Bearing metals

Chemical analysis of metals, alloys, clays

Corrosion testing

Gases in metals (including modified vacuum fusion methods)

Heat treatment (small specimens)

Metallography

Melting points (metals and refractories)

Preparation of special alloys (35 K.V.A. high frequency furnace available)

Sand testing

Thermal analysis

X-ray work

Queen City Steel Treating Co., 432 Oliver Street, Cincinnati

(N. M. Salkover)

Commercial heat treating only

Republic Steel Corporation, Youngstown

(E. C. Smith, L. B. Grindlay)

Spectroscopic equipment Hilger E1

Vacuum fusion gas equipment with inclusion determination train

----- Warren

(J. J. Bowden)

(Branch, see above)

----- Cleveland

(R. Drews)

(Branch, see above)

----- Canton

(M. J. R. Morris)

(Branch, see above)

----- Massillon

(E. C. Smith)

(Branch, see above)

OREGON

Laucks Laboratories, Inc., Portland
(branch, see Washington)

Oregon State Agricultural College, School of Engineering,
Corvallis

(S. H. Graf)
Bearing metals
Corrosion testing
Experimental heat treatment (small specimens)
Forging (power hammer)
Melting points
Metallography
Structural
Thermal analysis
Wear tests (Norris slip abrasion test)
X-ray for radiography of welds and light castings

PENNSYLVANIA

Bishop & Co., J. Platinum Works, Malvern
(G. M. Hickey, J. W. Cox, Raymond Steele)
Analyses of platinum metals, gold and silver and various
precious metals
Make special alloys of precious metals

Carnegie Institute of Technology, College of Engineering,
Schenley Park, Pittsburgh
(Webster N. Jones)

Bearing metals
Corrosion testing
High temperature tensile tests to 1500°F without stress-
strain relations
Metallography
Sand tests

Coleman & Co., W. B. 1920 W. Indiana Avenue, Philadelphia
(W. B. Coleman, C. K. Mitchell)

Advice on the melting of cast iron and steel, foundry prac-
tice, heat treatment of steel and problems concerning the
use of metals
Chemical analysis of metals, alloys
Complete sand testing
Melting points
Metallography

PENNSYLVANIA (continued)

Drexel Institute, 32d & Chestnut Streets, Philadelphia

(L. D. Stratton, J. H. Billings)

Bearing metals
Heat treatment, small specimens
Microscopy
Photo-elastic investigations
Solders
Wear tests
Welding materials

Erie Laboratory, 1519 French Street, Erie

(J. A. Evans)

Bearing metals
Brass and bronze
Physical tests of materials
Sand tests, core binders
Solders
Steel and iron
Welding materials

Hunt Company, Robert W. Professional Building, Pittsburgh

(Branch, see Illinois)

Knerr, Horace C., 1116 W. Montgomery Avenue, Philadelphia

(Consulting Metallurgical Engineer)

Chemical analysis
Heat treatment
Metallography
Physical tests

Metallurgical Advisory Service, 214 Dewey Street, Edgewood-

(Max Hartenheim)

Pittsburgh

Corrosion testing
Forging
Foundry
Furnace investigations
Heat treatment
Metallic protective coatings
Metallography
Physical testing
Thermal analysis
Welding processes

PENNSYLVANIA (continued)

Pittsburgh Testing Laboratory, Stevenson and Locust Streets,
Pittsburgh

(C.E.Betz, H.H.Craver, J.W.Reifsnyder, R.B.Lincoln)
Bearing metals
Certification of welders
Chemical analysis
Coefficient of expansion
Corrosion testing (salt spray, weather-ometer, outdoor)
Gases in metals (Ledebur oxygen and Allen nitrogen only)
Heat treatment (small specimens)
Magnetic inspection (Magnaflux)
Metallography and metallurgical investigations
Molding sand tests
Stress-strain relations (Twing extensometer)
Tensile, compression, shear, torsion and impact tests
Tensile tests at elevated temperatures, to 1600°F
Thermal analysis
Wear tests
Welding construction supervision, investigations and materials

Swarthmore College, Swarthmore

(C. G. Thatcher)
Bearing metals
Heat treatment (small specimens)
Physical tests of metals
Thermal analysis

Tinius Olsen Testing Machine Co., 500 N. 12th St., Phila.

(T. Y. Olsen)
Bearing metals
Endurance tests
Hardness tests
Physical testing
Tensile tests
Wear tests (Norris slip abrasion machine)

RHODE ISLAND

Rhode Island State College, School of Engineering, Kingston

(R. L. Wales)
Compression, shear and tension tests up to a capacity
of 300,000 lbs

Saunders, Walter M., 184 Whittier Avenue, Providence

Chemical and metallurgical analyses
Foundry materials
Metallography
Molding sands

TENNESSEE

University of Tennessee, Materials Testing Laboratory, Knoxville
(Chas. E. Ferris)

Beam testing, up to 10,000 lb capacity
Impact testing, up to 120 ft lb Izod type
Strain measuring instruments for tensile tests of metals
Torsion testing up to 60,000 in lb
Universal testing machine, 5,000 up to 200,000 lb capacity

Vanderbilt University, Department of Chemistry, Nashville
(J. M. Breckenridge, W. P. Fishel)
Metallography

TEXAS

College of Mines & Metallurgy, (branch of University of Texas), El Paso
(John F. Graham)
Hydrometallurgy
Metallographic polishing

Fort Worth Laboratories, The, P. O. Box 1379, Fort Worth
(R. H. Fash)
Analysis of metals and alloys
Solder
Tensile strength tests on steels

Pittsburgh Testing Laboratory, Santa Fe Building, Dallas
(Branch, see Pennsylvania)

Rice Institute, Department of Engineering, Houston
(J. H. Pound)
Heat treatment (small specimens)
Metallography
Thermal analysis

UTAH

University of Utah, School of Mines and Engineering, Salt Lake City
(R. B. Ketchum)
Materials testing
Microscopy
Pyrometallurgical testing, including rotary kilns, Cottrell precipitator and Bag House

VIRGINIA

University of Virginia, Department of Engineering, University
(Arthur F. Macconochie)
Expect to have a well-equipped metallurgical laboratory
in the fall of 1935.

WASHINGTON

Laucks Laboratories, Inc., 911 Western Avenue, Seattle
(I.F.Laucks, H.P.Banks, H.F.Rippey, J.M.Kniseley)
Bearing metals
Corrosion testing
Melting points
Metallography
Sand tests
Tensile compression tests
Wear tests

Laucks Laboratories, Inc., Tacoma
(Branch, see above)

Laucks Laboratories, Inc., Spokane
(Branch, see above)

Northwest Testing Laboratories, Hartford Building, Second
Avenue and James Street, Seattle
(J. G. Priestley)
Bearing metals
Corrosion, including electrolytic
Heat treatment (small specimens)
Melting points
Metallography
Sand tests
Soldering and welding
Thermal analysis
Wear tests

University of Washington, College of Engineering, Seattle
(R. G. Tyler, Milnor Roberts, B. T. McMinn,
G. S. Schaller, C. R. Corey)
Core sands and core binders
Heat treatment (small specimens)
Metallography
Thermal analysis

WEST VIRGINIA

West Virginia College of Engineering, Morgantown
(R. P. Davis, W. W. Hodge)

Drop forging
Experimental cupola
Heat treatment (small specimens)
Metallography
Preparation of special alloys to 50 lbs gas furnace
Sand testing, core binders
Solders and welding materials

CANADA

Canadian Inspection & Testing Co. Ltd., 52 York Street,
Toronto, Ontario

(R. W. Hurlburt, B.A.Sc., J. E. Clark, B. A. Sc.)

Bearing metals
Metallography to 500 diameters
Solder
Welding materials

Hunt, Donald, Limited, 1181 Guy Street, Montreal
(Branch of Robert W. Hunt Company; see Illinois)

Appendix (Material received by April 30, 1935)

CALIFORNIA

University of California, College of Engineering, Berkeley
(C. Derleth, jr.)
Heat treatment
Physical testing

OKLAHOMA

University of Oklahoma, College of Engineering, Department of Mechanics, Norman
(R. V. James)
Brinell hardness machine (Olsen)
Compression and tension tests (Universal Testing Machines 50,000, 100,000 and 200,000 lb capacities, with shear and bending attachments)
Herbert pendulum
Photomicrography (E. Leitz equipment)
Stress-strain data
Tension (details given under compression)
Torsion machine (10,000 in. lb capacity)