

David L. McElroy¹ and John A. Scott²

ASTM C16 Survey for Heat Transfer Test Method Equipment

Reference: McElroy, D. L. and Scott, J. A., “ASTM C16 Survey for Heat Transfer Test Method Equipment,” *Insulation Materials: Testing and Applications, 4th Volume, ASTM STP 1426*, A. O. Désjarlais and R. R. Zarr, Eds., ASTM International, West Conshohocken, PA, 2002.

Abstract: Committee C16 on Thermal Insulation has conducted two surveys to determine the availability of test equipment in North America that meets the requirements for the following five ASTM standards³:

1. Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus (C 177);
2. Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus (C 518);
3. Standard Test Method for Steady-State Heat Transfer Properties of Horizontal Pipe Insulation (C 335);
4. Standard Test Method for Steady-State Heat Transfer Properties of Pipe Insulation Installed Vertically (C 1033); and,
5. Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Thin-Heater Apparatus (C 1114)

The surveys were conducted during 2000 and 2001 and the results will assist in the continued development of the above C16 test methods by identifying potential participants for future interlaboratory round robins.

Keywords: guarded hot plate, heat flow meter, heat flux, pipe insulation, steady state, survey, test equipment, thin heater

Introduction

In the late 1990s Committee C16 on Thermal Insulation formed a new task group to identify laboratories willing to participate in future interlaboratory studies conducted by ASTM Committee C16. This appendix describes the scope, history, and results of the surveys conducted by the task group.

¹ Consultant, 7914 Gleason Drive, Knoxville, TN, 37919

² Technical Services and Standards Manager, Roxul Inc, 551 Harrop Drive, Milton, ON, L9T3H3

³ *Annual Book of ASTM Standards*, Vol. 04.06.

Scope

The scope for task group C16.30.1.6 on Test Equipment Inventory And Training is as follows: *Conduct a survey of C16.30 test methods equipment availability in North America. Initially, this will include equipment that meets five standards: C 177, C 518, C 335, C 1114, and C 1033. This information may benefit existing test method standards and future interlaboratory round robins.*

History

In June 2000, ASTM Headquarters distributed to C16 members the Equipment Survey (ES-2000) given in Addendum A. The survey was also distributed to NVLAP laboratories accredited for thermal insulation testing and purchasers of thermal insulation SRMs. Information was sought about apparatuses in North America that complied with the technical requirements of five standards: C 177, C 518, C 335, C 1033, and C 1114. **Table 1** summarizes the results of responses to ES-2000.

Table 1 – List of Nineteen (19) Responders to Equipment Survey - 2000 (ES-2000)

Organization	Contact	C177	C518	C335	C1114	C1033
Anter Corporation	Peter Gaal	1	1	0	0	0
Armacell LLC	Paul Hough	0	1	0	0	0
Celotex Technical Center	R. Gerry Miller	0	7	0	0	0
Dow Chemical Co.	George Lennox	0	1	0	0	0
Geoscience Ltd	Heinz F. Poppendiek	7	7	5	3	0
Holometrix	Tim Kunz	4	2	1	0	0
Integrex Testing Systems	John R. Mumaw	2	3	1	1	0
Johns Manville	Michel Drouin	0	2	0	0	0
Knauf Fiber Glass GmbH	Timothy R. Jonas	2	2	2	0	0
L. L. Bean, Inc.	Daniel Otis	0	1	0	0	0
Mexmil Company	David Indyke	0	1	0	0	0
NIST	Robert Zarr	2	2	0	0	0
Owens Corning	Barbara Fabian ¹	0	3	0	0	0
Precision Measurement and Instrument Co.	Heng Wang	1	1	0	0	0
R&D Services, Inc.	Ronald S. Graves ¹	0	1	0	0	0
RADCO	Mike Ziemann	0	1	0	0	0
Thermal Visions, Inc.	Dwight Musgrave	0	1	0	0	0
Tutco Scientific	F. B. Hutto	1	1	2	0	0
Underwriters Laboratory	Ken Rhodes	0	1	0	0	0
<i>Total</i>		<i>20</i>	<i>39</i>	<i>11</i>	<i>4</i>	<i>0</i>

¹Also responded to ES-2001 (see Table 2)

To obtain additional responses, in April 2001 ASTM Headquarters distributed to C16 members ES-2001, a one-page Equipment Survey, given in Addendum B. Later, in July 2001, Kevin P. Collins from Lasercomp distributed the same survey to their customers for additional input to be included with the survey results from C16 membership. Table 2 summarizes the results of responses to ES-2001.

Table 2 – *List of Twenty-one (21) Responders to Equipment Survey - 2001 (ES-2001)*

Organization	Contact	C177	C518	C335	C1114	C1033
Architectural Testing, Inc.	Richard Troyer	0	2	0	0	0
BASF Corporation	Roy Pask	0	2	0	0	0
Dow Chemical Co. – GA	Stacy Blake	0	1	0	0	0
Dow Chemical Co. – IL	Robert Braun ¹	0	1	0	0	0
Dow Chemical Co. – IL	Jess Garcip ¹	0	2	0	0	0
Dow Chemical Co. – MI	Linda M. Hess	0	3	0	0	0
DuPont Co.	Joe Creazzo	0	0	0	0	0
Firestone Building Products	Tim Tackett	0	4	0	0	0
Foam Enterprises	Abbas Shekari	0	1	0	0	0
General Plastics Mfg. Co.	Kathy Devlin-LaFontaine	0	1	0	0	0
Huntsman Polyurethanes	John Bowers	0	5	0	0	0
Insultech Inc.	Les Truksa	0	1	0	0	0
Johns Manville, JMTC	Mark Albers	3	16	4	1	0
Lasercomp, Inc.	Kevin P. Collins	1	10	0	0	0
Mesa Insulation	Rick L. Dolin	0	0	1	0	0
NAHB Research Center	Thomas Kenney	0	4	0	0	0
OC Celfortec, Inc.	Micheline Roy	0	1	0	0	0
OSI Specialties	K. M. Stalnaker	0	2	0	0	0
Owens Corning	Barbara Fabian ²	0	3	0	0	0
R & D Services, Inc.	Ronald S. Graves ^{1,2}	0	3	0	0	0
Tennessee Technological University	David W. Yarbrough ¹	0	1	0	0	0
<i>Total</i>		<i>4</i>	<i>63</i> <i>(58)³</i>	<i>5</i>	<i>1</i>	<i>0</i>

¹Responder represents same laboratory facility.

²Also responded to ES-2000 (see Table 1).

³Total excludes duplications.

A total of 40 responses (addresses are given in Addendum C) were obtained from both ES-2000 and ES-2001; however, only 36 responses were considered unique because of some duplication as noted above. Table 3 summarizes the grand total for the 2000 and 2001 surveys (excluding duplications).

Table 3 – *Grand Total of Available Apparatus (By Test Method)*

	C 177	C 518	C 335	C 1114	C 1033
Number of Apparatus	24	97	16	5	0

Discussion

Of the responders, 36 were willing to participate in future round robins sponsored by ASTM C16. Table 4 lists their specific suggestions with regard to ASTM standards and apparatuses.

Table 4 – *Comments Given by Responders Concerning ASTM C16 Standards*

#	Comment
1	Too complicated. Most people do not take the time to read and understand. Not friendly.
2	C 1114 needs a round robin.
3	It would be beneficial to industry that NIST develop a user-friendly standard reference material one day that could be used over and over on C 335 apparatus.
4	Run round robin at more than one temperature.

The responders provided a variety of suggestions for potential materials to be used in future C16 interlaboratory studies and the comments are given in Table 5. The minutes of six meetings of this task group are given in Addendum D.

Table 5 – *Suggested Materials for Use in Future Interlaboratory Round Robins*

#	Comment
1	Fiberglass and Some type of foam.
2	C 1086 needled material for high temperature.
3	Reinforced plastics or resin plates for C 1114 (higher k @ 75 °F).
4	Vacuum insulation or foam.
5	Suggest each task group consult E 691 to plan test program, including materials.
6	Extruded polystyrene foam (XPS).
7	Aircraft grade fiberglass insulation (per ASTM C 800).
8	Extruded polystyrene insulation foam and bead board.
9	For C 335 or C 177 or C 518 Xonotlite PC (Xonotlite BD).
10	We use our apparatus primarily for clothing and bedding tests.
11	Pyroceram 9606, fused Silica, and alumina.
12	Noncellular polymers, evacuated panels.
13	(Polyurethane) Rigid closed cell foams from our company-various product lines and densities.
14	Batts, blown insulations, foam boards.

-
- 15 There is a need for standards in the 1 - 3 Btu-in/hr-ft²-°F range to be used for computer simulation in the fenestration industry.
 - 16 Expanded polystyrene/Xpanded polystyrene, Polyiso.
 - 17 Non-aging foam board.
 - 18 Polyurethanes.
 - 19 Preformed mineral fiber, expanded polymer foams.
 - 20 EPS thermal insulation.
 - 21 Calsil, foam glass, mineral wool.
 - 22 Rigid foam, 8 in. x 8 in. x 1 in. from boardstock mfg.
 - 23 Polystyrene, polyurethane, polypropylene.
 - 24 Rigid polyurethane "foam".
 - 25 Rigid polyurethane foam, EPS board.
 - 26 Polyisocyanurate cellular foam.
-

Conclusion

The results of these surveys indicate that there is considerable interest by C16 members and users in compiling (and maintaining) current data on the availability of equipment for Test Methods C 177, C 518, C 335, C 1114, and C 1033. The statistics of the surveys indicated that the largest number of apparatus in use were for C 518 (total of 97), followed by totals of C 177 (24), C 335 (16), and C 1114 (5). There were apparently no current users of Test Method C 1033. The responders also provided useful information on the test method standards and suggested materials for future interlaboratory round robins. The surveys identified several potential participants for future interlaboratory round robins. These results will assist ASTM C16 in planning future comparisons and for developing better standards.

Addendum A: Equipment Survey – 2000 (June 16, 2000)

Equipment Survey Questions - 2000***

Please complete this form. Thank you.

Name _____ Telephone _____

Company _____ Fax Number _____

Address _____ E-Mail Address _____

1. Are you willing to participate in future Interlaboratory Round Robins sponsored by ASTM C16?

2. Can you suggest materials for consideration for an Interlaboratory Round Robin for your apparatus?

3. Do you have any specific suggestions about the ASTM standard that your apparatus(s) meet?

4. Circle the Standard(s) that your apparatus(s) meet:

1. C177 (Guarded-Hot-Plate) 2. C518 (Heat-Flow-Meter) 3. C335 (Pipe-Insulation Apparatus)

4. C1033 (Vertical-Pipe Apparatus) 5. C1114 (Thin-Heater Apparatus)

Please proceed to the page of questions for your apparatus(s)

*****Please return this form by October 1, 2000 to Ms. Melinda Long, ASTM, 100 Barr Harbor, West Conshohocken, PA 19428-2959. Thank You**

Addendum A1. C177 (Guarded-Hot-Plate Apparatus) Questions (April 16, 2000)

-Please use one page per apparatus-

1. Circle the items that describe your apparatus(s): Horizontal Plates Vertical Plates

Single Sided Double Sided Heat Flow Direction: Up Down Variable

Special (Please Describe) _____

2. Plate Dimensions (Please Do for Each Apparatus):

Total Plate Size (Guards + Meter) _____ in.

Plate Meter Size _____ in.

Guard(s) Size(s) _____ in.

Maximum Sample Thickness _____ in.

Minimum Sample Thickness _____ in.

3. Temperature Limits

Hot Face Maximum _____ Minimum _____

Cold Face Maximum _____ Minimum _____

Temperature Difference Across Specimen _____

Addendum A2. C518 (Heat-Flow-Meter Apparatus) Questions (April 16, 2000)

-Please use one page per apparatus-

1. Circle the items that describe your apparatus(s): Horizontal Plates Vertical Plates
Single Sided Double Sided Heat Flow Direction: Up Down Variable

2. Plate Dimensions (Please Do for Each Apparatus):

Total Plate Size _____ in.

Heat Flux Transducer Size _____ in.

Maximum Sample Thickness _____ in.

Minimum Sample Thickness _____ in.

Is Any Guarding Used? _____

3. Temperature Limits

Hot Face Maximum _____ Minimum _____

Cold Face Maximum _____ Minimum _____

Temperature Difference Across Specimen _____

Addendum A3. C335 (Pipe-Insulation Apparatus) Questions (April 16, 2000)

-Please use one page per apparatus-

1. Circle the items that describe your apparatus (s):

Guarded-End Pipe Insulation Apparatus Calibrated-End Pipe Insulation Apparatus

Horizontal Pipe

Vertical Pipe

Other (Please Describe) _____

2. Pipe and Sample Dimensions (Please Do for Each Apparatus):

Nominal Pipe Size _____ in. Minimum Sample Outer Diameter _____ in.

Exact Pipe Diameter _____ in. Sample Length _____ in.

Length of Each Guard _____ in. Minimum Sample Thickness _____ in.

Metered Length _____ in. Maximum Sample Thickness _____ in.

Total Length (Guards + Meter) _____ in.

3. What is the minimum pipe surface temperature for testing with your apparatus?

4. What is the maximum pipe surface temperature for testing with your apparatus?

Addendum A4. C1033 (Vertical-Pipe Apparatus) Questions (April 16, 2000)

-Please use one page per apparatus-

1. Circle the items that describe your apparatus (s):

Guarded-End Pipe Insulation Apparatus Vertical Pipe

Other (Please Describe) _____

2. Pipe and Sample Dimensions (Please Do for Each Apparatus):

Nominal Pipe Size _____ in. Minimum Sample Outer Diameter _____ in.

Exact Pipe Diameter _____ in. Sample Length _____ in.

Length of Each Guard _____ in. Minimum Sample Thickness _____ in.

Metered Length _____ in. Maximum Sample Thickness _____ in.

Total Length (Guards + Meter) _____ in.

3. What is the minimum pipe surface temperature for testing with your apparatus?

4. What is the maximum pipe surface temperature for testing with your apparatus?

Addendum A5. C1114 (Thin-Heater Apparatus) Questions (April 16, 2000)

-Please use one page per apparatus-

1. Circle the items that describe your apparatus(s): Horizontal Plates Vertical Plates
 Single-Sided Double-Sided Heat Flow Direction: Up Down Variable
 Special (Please Describe) _____
2. Heater Dimensions (Please Do for Each Apparatus):
 Heater Material _____
 Total Heater Size _____ in. Thickness _____ in.
 Meter Size _____ in. Guard(s) Size(s) _____ in.
 Minimum Sample Thickness _____ in. Maximum Sample Thickness _____ in.
3. Temperature Limits
 Hot Face Maximum _____ Minimum _____
 Cold Face Maximum _____ Minimum _____
 Temperature Difference Across Specimen _____

Addendum B: Equipment Survey - 2001* (April 17, 2001)**

Please complete this form. Thank you.

Name _____ Telephone _____

Company _____ Fax Number _____

Address _____ E-Mail Address _____

1. Are you willing to participate in future Interlaboratory Round Robins sponsored by ASTM C16?

2. Can you suggest materials for consideration for an Interlaboratory Round Robin for your apparatus?

3. Do you have any specific suggestions about the ASTM standard that your apparatus(s) meet?

4. Circle the Standard(s) that your apparatus(s) meet and indicate the Number Owned:

Standard	Number Owned
1. C177 (Guarded-Hot-Plate)	_____
2. C518 (Heat-Flow-Meter Apparatus)	_____
3. C335 (Pipe-Insulation Apparatus)	_____
4. C1033 (Vertical-Pipe Apparatus)	_____
5. C1114 (Thin-Heater Apparatus)	_____

*****Please return this form by September 1, 2001 to Mr. Timothy S. Brooke, ASTM, 100 Barr Harbor, West Conshohocken, PA 19428-2959. Thank You Very Much.**

Addendum C1: Addresses Of Nineteen Responders To ES - 2000

<u>Name and Address</u>	<u>Telephone, Fax Number, and E-Mail Address</u>
Peter Gaal Anter Corporation 1700 Universal Road Pittsburgh, PA 15235	(412) 795-6410 (412) 795-8225 (Fax) testing@anter.com
Paul Hough ArmaceLL LLC P. O. Box 1038 Mebane, NC 27302	(717) 396-4195 (717) 396-4079 (Fax) pahough@armstrong.com
R. Gerry Miller Celotex Technical Center 10301 9th St. N St. Petersburg, FL 33716	(727) 563-5151 (727) 563-5180 (Fax) gmiller@celotex.com
George Lennox The Dow Chemical Company 200 Larkin, 1605 Joseph Drive Midland, MI 48674	(517) 638-4318 (517) 636-0194 (Fax) ghlennox@dow.com
Heinz F. Poppendiek Geoscience Ltd 6260-B Marindustry Drive San Diego, CA 92121	(858) 453-5483 (858) 453-4694 (Fax) ---
Tim Kunz Holometrix 25 Wiggins Avenue Bedford, MA 01730	(781) 275-3300 (781) 275-3705 (Fax) tkunz@holometrix.com
John R. Mumaw Integrex Testing Systems 2790 Columbus Rd., Rt 16 Granville, Ohio 43023-1200	(740) 321-7068 (740) 321-4067 (Fax) john.mumaw@owenscorning.com
Michel Drouin Johns Manville P. O. Box 398 Cornwall, Ontario, K6H 5T1, Canada	(613) 932-6352 (613) 932-8060 (Fax) drouinm@jm.com

Timothy R. Jonas
Knauf Fiber Glass Gmbh
240 Elizabeth Street
Shelbyville, IN 46176

(317) 398-4434
(317) 392-8181 (Fax)
trj1@knauffiberglass.com

Dan Otis
L. L. Bean, Inc
Casco Street
Freeport, ME 04033

(207) 552-2461
(207) 552-6851 (Fax)
dotis@llbeam.com

David Indyke
The Mexmil Company
2865 South Pullman Street
Santa Ana, CA 92705

(949) 250-4999
(949) 250-4556 (Fax)
david.indyke@mexmil.com

Robert Zarr
NIST
100 Bureau Drive, MS 8632
Gaithersburg, MD 20899-8632

(301) 975-6436
(301) 975-5433 (Fax)
rzarr@nist.gov

Barbara Fabian
Owens Corning
275 Southwest Ave.
Tallmadge, OH 44278

(330) 633-6735, x211
(330) 633-4939 (Fax)
barbara.fabian@owenscorning.com

Heng Wang
Precision Measurement and
Instrument Co.
3665 SW Deschutes Street
Corvallis, OR 97333

(541) 753-0607
(541) 753-0610 (Fax)
hengwang@pmiclab.com

Ronald S. Graves
R&D Services, Inc.
P. O. Box 2400
Cookeville, TN 38502-2400

(931) 372-8871
(931) 525-3896 (Fax)
rdserv2@charter.net

Mike Zieman
RADCO
3220 E. 59th St.
Long Beach, CA 90805

(562) 272-7241
(562) 529-7513 (Fax)
mzieman@radcoinc.com

Dwight Musgrave
Thermal Visions, Inc.
83 Stonehenge Rd.
Granville, OH 43023

(740) 587-4025
(740) 587-4025 (Fax)
dwight.musgrave@thermalvisions.com

F. B. Hutto, Jr.
Tutco Scientific
676 Peony Drive
Grand Junction, CO 81503

(970) 245-7763
(970) 245-7763 (Fax)
tutco@gj.net

Ken Rhodes
Underwriters Laboratories, Inc.
353 Pfingsten Road
Northbrook, IL 60062-2096

(847) 664-2211

Addendum C2: Addresses Of Twenty-One Responders To ES - 2001

<u>Name and Address</u>	<u>Telephone, Fax Number, and E-Mail Address</u>
Richard Troyer Architectural Testing, Inc. 130 Derry Ct. York, PA 17402-9405	(717) 764-7700 (717) 764-41229 (Fax) rtroyer@testati.com
Roy Pask BASF Corporation 1609 Biddle Avenue Wyandotte, MI 48192	(734) 324-6308 (734) 324-6301 (Fax) paskr@basf.corp.com
Stacy Blake Dow Chemical 1881 West Oak Parkway Marietta, GA 30062	(678) 269-1298 (770) 590-3539 (Fax) sjblake@dow.com
Robert Braun The Dow Chemical Co. 2050 N. Broadway Joliet, IL 60435	(815) 774-6500 (815) 774-3760 (Fax) bgbraun@dow.com
Jess Garcip Dow Chemical Company 2050 N. Broadway Joliet, IL 60435	(815) 727-1472 (815) 774-6542 (Fax) jmgarcip@dow.com
Linda M. Hess Dow Chemical 1605 Joseph Drive Midland, MI 48642	(989) 636-5069 (989) 636-0194 (Fax) lindahess@dow.com
Joe Creazzo DuPont Co. P. O. Box 80711 Wilmington, DE 19880-0711	(302) 999-4167 (302) 999-2093 (Fax) joseph.a.creazzo@usa.dupont.com
Tim Tackett Firestone Building Products 525 Congressional Blvd. Carmel, IN 46032	(317) 575-7109 (317) 575-7227 (Fax) tdtackett@firestonebp.com

Abbas Shekari (731) 796-9743
 Foam Enterprises (731) 796-1530 (Fax)
 1703 Crosspoint abbas_shekari@foamenterprizes.com
 Houston, TX 77054

Kathy Devlin-LaFontaine (253) 473-5000
 General Plastics Mfg. Co. (253) 473-5104 (Fax)
 4910 Burlington Way Kathy_Devlin@generalplastics.com
 Tacoma, WA 98404

John Bowers (856) 423-8524
 Huntsman Polyurethanes (856) 423-8502 (Fax)
 286 Mantua Grove Road john_d_bowers@huntsman.com
 West Deptford, NJ 08066

Les Truksa (416) 746-8989
 Insultech Inc. (416) 746-4829 (Fax)
 100 Milvan Drive triska@ica.net
 Weston, Ontario, M9L 126, Canada

Mark Albers (303) 978-5008
 Johns Manville (303) 978-3123 (Fax)
 JMTC albersm@jm.com
 10100 W. Ute Avenue
 Littleton, CO 80127

Kevin P. Collins (781) 233-1717
 Lasercomp, Inc. (781) 981-2484 (Fax)
 20 Spring Street www.lasercom.com
 Saugus, MA 01906

Rick L. Dobin/Max Lopez (970) 858-6209
 Mesa Insulation (970) 858-1018 (Fax)
 1110 16 Road dolinr@jm.com
 Fruita, CO 81521

Thomas Kenney (301) 430-6246
 NAHB Research Center (301) 430-6246 (Fax)
 400 Prince George's Blvd. tkenney@nahbrc.org
 Upper Marlboro, MD 20774

Micheline Roy (450) 377-1725, x5025
 OC Celfortec, Inc. (450) 377-2973 (Fax)
 542 Gaetan micheline.roy@owenscorning.com
 Grande-Ile, Quebec, J6S 4V3 Canada

412 INSULATION MATERIALS: TESTING AND APPLICATIONS

- | | |
|--|---|
| K. M. Stalnaker
OSI Specialties
3200 Kanawha Turnpike
South Charleston, WVA 25303 | (304) 746-1670
(304) 746-1801 (Fax)
stalnka@cromptoncorp.com |
| Barbara Fabian
Owens Corning
275 Southwest Ave
Tallmadge, OH 44278 | (330) 633-6735, x211
(330) 633-4939 (Fax)
barbara.fabian@owenscorning.com |
| Ronald S. Graves
R & D Services, Inc.
P. O. Box 2400
Cookeville, TN 38502-2400 | (931) 372-8871
(931) 525-3896 (Fax)
rdserv2@charter.net |
| David W. Yarbrough
Tennessee Technological University
TTU Box 5013
Cookeville, TN 38505 | (931) 372-3494
(931) 372-6352 (Fax)
rdserv1@charter.net |

Addendum D. Minutes of Meetings of C16.30.1.6 Test Equipment Survey Task Group

First Meeting: This Task Group met April 19, 1999 in Seattle with seven members: David L. McElroy, Kenneth E. Wilkes, Mark Leuthold, John Scott, Gerry Miller, Robert Zarr, and Cliffe Shirtliffe. The initial survey will focus on test equipment that meets C335 and C1033. The survey form will be similar to that used by Gerry Miller and Bill Goss in 1991 for the Hot Box Survey. We believe the survey will obtain information that will be beneficial to future revisions of Test Method Standards.

Second Meeting: This Task Group met from 4 to 5 PM on Monday, October 4, 1999, in San Antonio. Present were: Randi Gerrish, Francis Hutto, Tim Jonas, Gerry Miller, Dave McElroy, Roger C. Oxford, John Scott, and Bob Zarr. The Task Group reviewed ASTM equipment surveys and pipe insulation interlaboratory tests to obtain a limited questionnaire. This survey will be conducted in 2000 to identify: (1) Who has pipe tester insulation testers? and, (2) Are they willing to participate in interlaboratory tests?

Third Meeting: Task Group C16.30.1.6, Test Equipment Survey, met from 4 to 5 PM on Monday, April 10, 2000 in Toronto. Twelve Members were present: Mark Albers, Bill Brayman, Andre Désjarlais, Francis Hutto, Tim Jonas, Kumar Kumaran, Dave McElroy, Gerry Miller, John Mumaw, John Scott, Ken Wilkes, and Bob Zarr. The Task Group reviewed and modified a set of equipment survey questions for five standards: C177, C1114, C518, C335, and C1033. ASTM will mail this to all C16 members in May 2000. The forms are to be returned to M. Long, ASTM, by August 1, 2000. Others to be surveyed include: NVLAP Labs, SRM-1450 buyers, and Equipment Buyers by Equipment Manufacturers.

Fourth Meeting: Task Group C16.30.1.6, Test Equipment Survey, met from 4 to 5 PM on Monday, October 30, 2000 in Charlotte. Eight Members were present: Randi Gerrish, Tim Jonas, Tim Kunz, Gerry Miller, John Scott, Tom Whitaker, Ken Wilkes, and Bob Zarr. This meeting was chaired by John Scott in Dave McElroy's absence. The Task Group reviewed input from 13 responders on the thermal equipment survey of C518, 177, 1114, 335, and 1033 equipment. The Task Group agreed to ask C16 to again issue the survey to all C16 members to try to generate further input for the database. We will request further input by December 31, 2000. Equipment manufacturers will be asked to circulate the survey to their customers for input. It was suggested by the Task Group that the findings of the survey be documented in one or both of the following ways: 1. ASTM Research Report, 2. Electronic Storage on ASTM Web Site for future reference and up dating. This Task Group will require a table for the next C16.30 meeting.

Fifth Meeting: Task Group C16.30.1.6, Test Equipment Survey, met from 4 to 5 PM. on Monday, April 2, 2001 in Phoenix. Nine members were present: Mark Albers, Bill Brayman, Andre Désjarlais, Francis Hutto, Tim Jonas, Tim Kunz, Dave McElroy, Cliffe Shirtliffe, and Tom Whitaker. The history of the Equipment Survey (ES-2000) was reviewed. Mailouts totaling over 350 (C16: 320; NVLAP labs: 18; SRM purchasers: 24) has yielded 19 responses (about 5%). Causes for the low response are not known. Future plans include

thanking the 19 responders; distributing a much, much simpler Equipment Survey (ES-2001) with a reply date of September 1, 2001; and asking only: "Do you have equipment that meets C177, C518, C335, C1114, or C1033?"

Sixth Meeting: Task Group C16.30.1.6, Test Equipment Survey, met from 4 to 5 PM on Monday, October 15, 2001, in Deerfield Beach, FL. This meeting was chaired by John Scott. The task group met with six members present. A finished report on C177, 518, 335, 1033 and 1114 equipment availability and location was reviewed. One of the labs missing information will be added to the report. A cover page will be written for the report and will be issued to ASTM as a research report. This report can then be referenced within the respective standards for ease of finding equipment for round robin candidates. Valuable suggestions for standard improvement and round robin materials were also suggested. Copies of the report will also be circulated to the task group chairs. This task group has completed its' goal and will now be disbanded. The task group would like to thank Dave McElroy for his work on this report.