

SONOMA COUNTY ENERGY INDEPENDENCE PROGRAM

POLICIES AND PROCEDURES MANUAL

TOOL LENDING LIBRARY



ENERGY
INDEPENDENCE
TOOL LENDING LIBRARY
A SONOMA COUNTY PROGRAM

NOVEMBER 2010

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I. OVERVIEW OF THE PROGRAM

A Memorandum of Understanding was entered into by and between the Sonoma County Human Services Department and the Sonoma County General Services Department in April 2010.

Sonoma County has received a grant for the California Clean Energy Workforce Training Program for development of services to identify and train for employment opportunities in green energy occupations and General Services has the expertise in the delivery of services.

Both Human Services and General Services are departments of the County of Sonoma and have a mutual goal of serving the citizens of Sonoma County.

This Memorandum of Understanding shall be from November 1, 2009 through June 30, 2011.

A tool lending library of Home Energy Rating System (HERS) certified equipment will be established by General Services. To establish this lending library General Services will:

- a. Procure three sets of HERS certified diagnostic tools, including three infrared cameras which will be allocated to another program participant by Human Services, to measure building performance as approved in the grant application.
- b. Procurement of all equipment shall be performed in conformance with 29 CFR 95.44, and include, at minimum, documentation of three (3) price quotations from different vendors. For purposes of this Agreement, procurement shall mean purchase, lease, or rental.
- c. Store diagnostic tools purchased for this grant in a secure location.
- d. Track and report inventory and issuance and return of tools on a monthly basis.

Tool Lending Library: General Services shall receive a maximum of Seventy Seven Thousand Four Hundred Two Dollars (\$57,402 + \$20,000) for purchase of tools for the lending library under this Memorandum of Understanding.

Minneapolis Blower Door® and Minneapolis Duct Blaster® System
Pressure Gauges
Air Flow Metering Devices
Automated Performance Testing (APT) System
Infrared Cameras
Blower Door Accessories

This program has been modeled very similar to the Pacific Gas & Electric (PG&E) Tool Lending Library at their San Francisco Pacific Energy Center. The SCEIP TLL Program began September 15, 2010.

II. TOOL LENDING PROCEDURE

A. POLICY

The Tool Lending Library (TLL) is a grant funded program that loans building measurement equipment free of charge to qualified professionals in Sonoma County working on short term energy efficiency projects.

We also provide advice and application notes for some of the tools in the TLL. There are special considerations or borrower qualifications for most of the equipment in the TLL. This document describes the specific policies around these tools.

RESPONSE TIME GUIDELINES

The Tool Lending Library responds to an online tool request by email within one business day with information regarding tool availability and to request more information about the project if needed. After the Tool Library confirms the loan, it takes one or more days (depending on the number of tools) to prepare the tools and make them available for pick up.

Some tools are limited in quantity and may have waiting lists. Borrowers should confirm availability with us before making any project commitments that require tools from the Tool Lending Library.

SHIPPING

We are not able to ship items to customers due to the size of some tools and since many of the tools are sensitive and require calibration. The tools are picked up from and hand-delivered back to the Energy Independence Program office when borrowed. This eliminates the chance of shipping damage and delays.

RESIDENTIAL & COMMERCIAL PROJECTS

The Tool Lending Library program focuses primarily on residential projects, although some tools are utilized for both residential and commercial. Others are specific to a commercial application. These tools are only made available to home performance professionals, energy analysts and specialty contractors (see our certification and liability insurance policy below).

The tools focus primarily on promoting the performance and efficiency of existing energy systems. There are some tools available for those interested in site analysis and installing renewable energy systems. Use of tools varies in complexity and user expertise required.

BORROWER RESPONSIBILITY AND LIABILITY

PROOF OF LIABILITY INSURANCE

The Tool Lending Library requires borrowers to furnish documentation of sufficient business liability insurance to cover up to \$10,000.00. This requirement is meant to ensure that tools borrowed from the Tool Lending Library are used in a safe and effective way.

If an employer has additional employees that are certified by one of the approved agencies and the employer's liability insurance covers that employee, the employee may also apply to use the Tool Library. They must fill out their own application and provide proof of certification along with a copy of the employer's Certificate of Insurance.

Borrowers must provide documentation of commercial general liability insurance.

INDEMNIFICATION

The Borrower assumes full responsibility for the use of the borrowed equipment and all accessories. Borrower agrees to indemnify and defend the County of Sonoma and its employees and agents from any claims or liabilities arising from Borrower's actions in borrowing or using the equipment from the Tool Lending Library. Borrower agrees to waive any claims against the County, its employees, and agents related to Borrower's actions in borrowing or using the equipment from the Tool Lending Library.

LOST OR DAMAGED TOOLS

Borrowers agree to return tools in the same condition as when they were checked out. Borrowers who lose or damage tools are asked to reimburse SCEIP or replace the tools with equivalent tools of equal value, to be approved by SCEIP staff before purchase. Borrowers who lose or damage tools will have their borrowing privileges revoked until the tools are replaced.

SPECIFIC EQUIPMENT CONSIDERATIONS

DATA LOGGING METERS

Borrowers using data logging equipment with the intent of installing these meters in an electrical control center or any other location with line voltage (any voltage above 12V) must be installed by a licensed, qualified electrician.

REQUIRED CERTIFICATION

Borrowers must provide documentation of certification from the Building Performance Institute (BPI), Residential Energy Services Network (RESNET®)/HERS, or equivalent certification. These requirements are meant to ensure that tools borrowed from the SCEIP Tool Lending Library are used in a safe and effective way. Borrowers need to either have full certification or proof that they are in the process of obtaining certification from one of the agencies listed below. For instance, they may have completed and passed their written test for one of the agencies and they have to complete and pass their field test in order to become fully certified. In this instance, a copy of their test results or a letter from the agency will be acceptable. However, they must have proof of current commercial general liability insurance.

APPROVED AGENCIES

Building Performance Institute (BPI)
Residential Energy Services Network (RESNET®)
California Home Energy Efficiency Rating Services (CHEERS)
California Certified Energy Rating Training Services (CalCERTS)
California Building Performance Contractors Association (CBPCA)
Build It Green (BIG) GreenPoint Rater (for existing home)
US Green Building Council (USGBC) LEED
CA Association of Building Energy Consultants (CABEC) (CEA ONLY)
Association of Energy Engineers (AEE) (CEM ONLY)
California State License Board (CSLB) (C20 ONLY)

LOAN PERIOD DURATION

Loan periods are a maximum of one week.*

** The data logging meters are the only exception to this policy. The loan period for them is up to four (4) weeks.*

SOFTWARE

Data logger and other proprietary software programs associated with tools in the lending library are made available to the borrower for the duration of the loan. Borrowers agree to un-install these programs after the tools are returned.

OTHER LOAN LIMITATIONS

SPECIAL RESEARCH AND EDUCATIONAL LOANS

There are cases where extended loan period may be granted. These projects are those that will result in explicit energy efficiency and/or demand reduction benefits for California utility customers. We will assess these special projects on a case-by-case basis.

LOANS OUTSIDE OF SONOMA COUNTY, CALIFORNIA

As a Sonoma County, California-funded program, we cannot loan tools to borrowers whose primary address is located out of Sonoma County or out-of-state. The only exceptions to this policy occur when a California customer is involved with an investigation, training or demonstration project outside of California where the data gathered ultimately benefits California energy efficiency efforts.

B. FORMS

Borrowers are to be directed to the SCEIP webpage in order to fill out the Application Form and the Tool Request Form. We will accept these fully completed forms by email, fax, mail or walk-in.

Application Form:

If the borrower is a first time borrower they will need to fill out the application form in order to apply for the program and have copies of their certification and general liability insurance page included with the application form in order to be considered “complete”. The application form requires the borrower’s signature on the form.



**Sonoma County Energy Independence Program
Tool Lending Library
BORROWER APPLICATION**

A [Tool Request Form](#) must be submitted each time an item is borrowed. Please note that lead time on loan requests is subject to availability and demand. To avoid disappointment, please await a reply from TLL@sonoma-county.org to assure the equipment you need is available for your project.

DATE	OFFICE USE ONLY – BORROWER NUMBER
------	-----------------------------------

1. Borrower Information

Enter contact information for the person who will be responsible for the tools. A copy of certification is required.

BORROWER FULL NAME		BORROWER COMPANY/ORGANIZATION	
CSLB OR CERTIFICATION NO	EXPIRATION DATE	CERTIFICATION PROVIDER	
CLASSIFICATION(S)			
BORROWER ADDRESS		BORROWER CITY	STATE ZIP CODE
BORROWER PHONE NUMBER ()		BORROWER MOBILE PHONE NUMBER ()	
BORROWER FAX NUMBER ()		BORROWER EMAIL	

1. Insurance Information

Copy of Certificate of Liability Required

PRODUCER / AGENT		POLICY NO	
INSURED		INSURED ADDRESS	
TYPE(S) OF INSURANCE			
GENERAL <input type="checkbox"/>	AUTOMOBILE <input type="checkbox"/>	GARAGE <input type="checkbox"/>	UMBRELLA <input type="checkbox"/>
			WORKERS COMP <input type="checkbox"/>
			PROFESSIONAL <input type="checkbox"/>
INSURER A		INSURER B	
POLICY EFFECTIVE DATE		POLICY EXPIRATION DATE	

Important, please read:

Borrower (hereinafter "Borrower" means anyone borrowing equipment from the Sonoma County Energy Independence Program Tool Lending Library) agrees that in no event shall SCEIP be liable to the Borrower for any damages arising out of or connected with this tool loan. Borrower will review the specifications of this equipment and will be aware of its limitations and uses. Misapplication of the equipment, injury of any type sustained during installation or damage to the Borrower's facility or equipment shall be the Borrower's responsibility. Installation of tools in mechanical equipment rooms or other potentially hazardous areas should be done by qualified personnel experienced with mechanical operating systems. The tools are intended for projects that identify or quantify energy savings opportunities in buildings. Power monitoring equipment in the Tool Lending Library is not revenue grade and is not to be used to verify utility billing data. If borrowed, data logger software will not be copied or used beyond the term of the loan. The tools are made available through funding from California Workforce Investment Board and managed by the Sonoma County Energy Independence Program. Borrowers are required to fill out a survey form after using the TLL Program in order to track the success of creating a clean energy workforce. Borrower shall maintain insurance and comply with all other requirements of the [SCEIP Tool Lending Library Policy](#). The Borrower assumes full responsibility for the use and return of the borrowed equipment and all accessories in full working order and for the repair or replacement costs of damaged or unreturned components. Borrower agrees to indemnify and defend the County of Sonoma and its employees and agents from any claims or liabilities arising from Borrower's actions in borrowing or using the equipment from the Tool Lending Library. Borrower agrees to waive any claims against the County, its employees, and agents related to Borrower's actions in borrowing or using the equipment from the Tool Lending Library.

The Borrower Application must be submitted with the initial Tool Request Form and again when changes in borrower information occur.

Agreement

I have read this form in its entirety and agree to its statements. A copy of my Certification and Certificate of Insurance are attached as required.

_____ NAME (PLEASE PRINT) _____ SIGNATURE

FOR OFFICE USE ONLY	PROVIDER	LICENSE, CERTIFICATION OR POLICY NO	EXPIRATION DATE	STAFF INITIALS
<input type="checkbox"/> Certification Verified				
<input type="checkbox"/> Identification Verified				
<input type="checkbox"/> Insurance Verified				



Sonoma County Energy Independence Program
TOOL LENDING LIBRARY
 404 Aviation Boulevard, Santa Rosa, CA 95403
 Phone: (707) 521-6200 Fax: (707) 524-3769
TLL@sonoma-county.org
www.sonomacountyenergy.org

REVISED 09/13/2010

Certificate of Insurance Example:

GENEENE-01 SICO					
ACORD™ CERTIFICATE OF LIABILITY INSURANCE					
PRODUCER (209) 578-0183 DiBuduo & DeFendis Insurance Agency, Inc. - Modesto License # 0707137 P.O. Box 580531 Modesto, CA 95358-0071	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.				
INSURED	INSURERS AFFORDING COVERAGE NAIC # INSURER A: Hartford Casualty Insurance Company INSURER B: Philadelphia Indemnity Insurance Compar INSURER C: INSURER D: INSURER E:				
COVERAGES					
THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.					
INSR ADD'L LTR INSRNO	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC		5/22/2010	5/22/2011	EACH OCCURRENCE \$ 1,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000 PERSONAL & AUTO INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000
	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS				COMBINED SINGLE LIMIT (EA accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
	GARAGE LIABILITY <input type="checkbox"/> ANY AUTO				AUTO ONLY - EA ACCIDENT \$ OTHER THAN EA ACC \$ AUTO ONLY AGG \$
	EXCESS/UMBRELLA LIABILITY <input type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS MADE DEDUCTIBLE \$ RETENTION \$				EACH OCCURRENCE \$ AGGREGATE \$ \$ \$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below				WC STATUTORY LIMITS \$ OTHER \$ E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$
	OTHER B Professional Liab B Professional Liab		5/22/2010 5/22/2010	5/22/2011 5/22/2011	Per Occurrence/Aggregate \$1,000,000/\$1,000,000 Per Claim Deductible \$2,500
DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS 10 days notice of cancellation for non payment of premium.					
CERTIFICATE HOLDER			CANCELLATION		
On award of the contract, the Certificate Holders name and address will be included in this space			SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES. AUTHORIZED REPRESENTATIVE XX		
ACORD 25 (2001/08)			© ACORD CORPORATION 1988		

Tool Request Form:

Once the borrower fills out the application and is on file, they can fill out a tool request form to borrow tools from the library. When the form is received it will be dated stamped. The tools will be available on a first come, first serve basis. Borrowers can only request one (1) item from each of the different items available. In other words, they cannot borrow two (2) Blower Doors at the same time, even if they are for two different projects in which they are working. They can borrow multiple tools at the same time as long as they are not duplicate tools. *Exception: They can borrow up to four (4) Data Loggers at a time.*



**Sonoma County Energy Independence Program
Tool Lending Library
TOOL REQUEST FORM**

A [Tool Request Form](#) must be submitted each time an item is borrowed. Please note that lead time on loan requests is subject to availability and demand. To avoid disappointment, please await a reply from TLL@sonoma-county.org to assure the equipment you need is available for your project.

DATE	BORROWER NUMBER
------	-----------------

1. Borrower Information

Enter contact information for the person who will be responsible for the tools.

BORROWER FULL NAME	BORROWER COMPANY/ORGANIZATION		
BORROWER ADDRESS	BORROWER CITY	STATE	ZIP CODE
BORROWER PHONE NUMBER ()	BORROWER MOBILE PHONE NUMBER ()		
BORROWER FAX NUMBER ()	BORROWER EMAIL		

2. Project Information (Where will tools be used?)

PROJECT OR BUILDING NAME			
PROJECT OR BUILDING ADDRESS	CITY	STATE CA	ZIP CODE

3. Requested Tools and Project Description

Please list which tools you are wishing to borrow. Describe what you want to learn from your study? List what needs to be measured? Note that a specific tool may not be available and we cannot guarantee availability.

4. Requested Loan Period

Allow at least 2 or 3 days lead time. Duration for Loan - Loans are typically short-term (up to 1 week). Data loggers may be loaned out for longer periods, depending on the project type and the availability of the requested tools.

START DATE	RETURN DATE
------------	-------------

5. Potential Post-measurement Actions

Please describe possible energy conservation measures (ECMs) and/or demand reduction strategies that you may implement as a result of using these tools (i.e. repair and/or retrofit work, equipment replacement, installing new control system, etc).

Important, please read:

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Agreement

I have read this form in its entirety and agree to its statements.

NAME (PLEASE PRINT) _____ SIGNATURE

FOR OFFICE USE ONLY	CERTIFICATION PROVIDER	CSLB, LICENSE, OR CERTIFICATION NO	EXPIRATION DATE	STAFF INITIALS
<input type="checkbox"/> Borrower App on file				
<input type="checkbox"/> Certification Verified				
<input type="checkbox"/> Identification Verified				
<input type="checkbox"/> Insurance Verified				



Sonoma County Energy Independence Program
TOOL LENDING LIBRARY

404 Aviation Boulevard, Santa Rosa, CA 95403
Phone: (707) 521-6200 Fax: (707) 524-3769

TLL@sonoma-county.org
www.sonomacountyenergy.org

REVISED 09/13/2010

C. CHECKING OUT, CHECKING IN TOOLS FROM THE LIBRARY

Any request to borrow tools needs to be answered within one (1) working day from the initial inquiry. Notify the borrower as to the availability of the tools requested. The tools need be inspected to ensure all components are present and in good working order. Make sure to the batteries are fully charged before leaving the SCEIP office.

Each tool contains a protective sleeve with a check-out, check-in sheet. The tools also contain an asset tag (barcode) that will be scanned into the customer's file in the database at the time of check-out and check-in.

CHECK-OUT:

The person checking out the tools will go through the sheet with the borrower and check off all items. There is plenty of room on the sheet to make notes if necessary. You will initial and date the check-out columns and have the borrower sign the form. Then photocopy the check out form(s) and keep the copy in their file in case the original document is lost. Verify the due date with the borrower and write the date on the check out form(s).

Verify the borrower's identification with a photo ID. You do not need to make a photocopy; however, you need to write what type of ID was verified on the forms. There is a space allotted for this purpose.

Bring up the borrower's file in the database and scan the asset tag(s) showing the inventory has been checked out.

CHECK-IN:

Once the borrower returns the tools to the library, the person assisting them will take the sheet from the protective sleeve and go through the list with the borrower present. You will initial and date the check-in columns and make any notes if necessary. Have the borrower sign and date the check-in form(s), showing they returned the tools.

(Note: Do not take the borrower's word that everything is present. Make sure you take the time to personally check. Many of these items are expensive and it's critical we make sure everything is returned.)

Be sure to bring up the borrower's file in the database and scan the item back into inventory.

Place the tool(s) in the tool room area marked "returned" so they can be inspected by the librarian to ensure they are in working order and batteries can be charged.

D. PROCEDURE FOR LOST OR DAMAGED TOOLS

Once it has been identified that a tool is lost or damaged, SCEIP has a choice of either having the borrower reimburse the TLL for the full retail price, plus tax and shipping or allowing the borrower to replace the tool with equivalent tools of equal value provided they have approval from SCEIP prior to replacement. In the case that repair can be done to the item, the borrower will reimburse SCEIP for the price of repairing the item plus tax and shipping.

III. TOOLS

A. BLOWER DOOR

Blower Door testing is used to measure the air tightness level of building envelopes, diagnose and demonstrate air leakage problems, estimate natural infiltration rates, estimate efficiency losses from building air leakage, and certify construction integrity.

B. DUCT TESTER

The Duct Blaster is a calibrated air flow measurement system used to test and document the air tightness of forced air duct systems in both houses and light commercial buildings. The Duct Blaster fan is directly connected to the duct system, typically at a central return, or at the air handler cabinet. With the remaining registers and grills temporarily taped off, duct air tightness is measured by either pressurizing or depressurizing the duct system and precisely measuring the fan flow and duct pressure. Duct air tightness measurements are used to diagnose and demonstrate leakage problems, estimate efficiency losses from duct leakage, and certify the quality of duct system installation.

C. THEATRICAL FOGGER

The Fogger machine can be used in conjunction with the Duct Blaster by sucking the fog smoke into the Duct Blaster fan. The fan sends the fog smoke throughout the entire ducting system and aids in visually pinpointing leakage areas within the ducting system.

D. CALIBRATION PLATE

The Field Calibration Plate allows you to quickly check the calibration of the entire Duct Blaster System with DG-700 gauge.

The calibration plate, which contains a 5 inch diameter hole, is mounted on the square transition piece that is connected to the end of the flex duct.

The Duct Blaster fan is turned on to pull air through the calibration plate and simulate a duct leakage test.

Results from the simulated test are compared to the known leakage rate to determine if the entire system is within a +/- 3% accuracy range.

It can be used to document calibration compliance for testing programs such as California Title 24 and RESNET Home Energy Ratings.

E. TRUE FLOW AIR HANDLER FLOW METER

The Energy Conservatory's TrueFlow® Air Handler Flow Meter is designed to provide a simple and accurate measurement of air flow through residential air handlers. The air flow rate through residential air handlers is an important variable in estimating and optimizing the performance of heat pumps and air conditioners.

The TrueFlow Meter temporarily replaces the filter in a typical air handler system during the air flow measurement procedure. If the filter location is directly adjacent to the air handler, the TrueFlow Meter will measure the total air handler flow. If the filter is located remotely at a single central return, the TrueFlow Meter will measure the air flow through the central return.

F. PRESSURE PAN: LARGE & SMALL

The Pressure Pan is a duct leakage diagnostic tool which is used along with the Blower Door and digital pressure gauge to identify exterior air leakage in duct systems. This technique involves placing a gasketed Pressure Pan over each register or grille with the air handler fan off and the Blower Door depressurizing the house to a standard reference pressure. A measurement of the pressure between a duct run and the room where the duct register or grille is located provides a quick and reliable indication of whether significant exterior duct leaks exist in that section of the duct system.

The pattern of Pressure Pan readings allows for quick identification of major leakage sites, and can be used to tell technicians if they have done a good job of air sealing the duct system. Because the Pressure Pan does not require taping off of registers and grilles, it is an extremely quick diagnostic procedure.

G. EXHAUST FAN FLOW METER

The Exhaust Fan Flow Meter was designed to make quick and accurate measurements of airflow through residential bathroom fans, whole house ventilation fans, and other exhaust devices. Smaller, lighter and easier to use than conventional flow measuring hoods, the Exhaust Fan Flow Meter was specifically engineered to measure flow down to 10 cfm. When the Exhaust Fan Flow Meter is placed over a fan grill, air is drawn through the calibrated opening. The opening is adjusted to minimize back pressure while maximizing accuracy. When used with your DG-700 or DG-3 Digital Pressure and Flow Gauge, you can display air flow values directly in cubic feet per minute.

H. HOSE KIT

Colored hoses are used in several building testing protocols to facilitate equipment setup and provide quick identification of pressure input and reference sources. The hose colors provided in the kit are consistent with the Duct Diagnostic Checklist forms and procedures developed by the Advanced Energy Corporation (AEC).

I. PRESSURE & FLOW GAUGE (DG-700) MANOMETER

The DG-700 Pressure and Flow Gauge is a multi-functional differential pressure gauge with 2 independent measurement channels. In addition to providing high-resolution pressure measurements, the DG-700 is programmed to operate with other Energy Conservatory test devices to provide airflow measurements during building performance test procedures. The DG-700's dual pressure channels and air flow measurement features make it ideally suited for a wide range of building performance testing applications including:

- Blower Door air tightness testing
- Duct system air tightness testing
- Exhaust fan flow measurements
- Air handler flow measurements
- Building depressurization and combustion safety testing
- Static pressure and velocity measurements using a Pitot tube

J. AIR CAPTURE FLOW HOOD

Air Capture Flow Hoods measure air volume flowing through registers, diffusers and grilles. Weighing just seven and a half pounds, these air capture hoods are easy to carry, lift and use. Simply hold the ACCUBALANCE up to a diffuser or grille and read direct supply or exhaust airflow on the large digital display.

K. GAS LEAK DETECTOR

The Leakator 10 is a low maintenance combustible gas leak detection unit, small enough to be operated with just one hand, yet loaded with advanced features and technology professionals demand. The Leakator 10 includes a flexible 20-inch long probe for hard-to-reach areas and a patented solid state sensor that will last for up to five years. It pinpoints large and small leaks quickly, while quickly checking a large area no calibration required. The Leakator 10 can detect gas leaks for 15 different combustible gases.

L. THERMAL IMAGING CAMERA

Thermal Imaging or Infrared Cameras assist in detecting missing or low quality insulation, inadequate Heating, Ventilation, and Air Conditioning (HVAC) systems, poor air flow — all are typical problems that cause homes to waste energy. Infrared thermography is the art of transforming an infrared image into a radiometric one, which allows temperature values to be read from the image. In order to do this, complex algorithms are incorporated into the infrared camera.

Infrared radiation lies between the visible and microwave portions of the electromagnetic spectrum. The primary source of infrared radiation is heat or thermal radiation. Any object that has a temperature above absolute zero (-273.15 degrees Celsius or 0 Kelvin) emits radiation in the infrared region. Even objects that we think of as being very cold, such as ice cubes, emit infrared radiation. We experience infrared radiation every day. The heat that we feel from sunlight, a fire or a radiator is all infrared. Although our eyes cannot see it, the nerves in our skin can feel it as heat. The warmer the object, the more infrared radiation it emits.

M. COMBUSTION GAS ANALYZER

The Testo 327 is a hand-held measuring instrument for the professional flue gas analysis of domestic and light commercial gas and oil boilers and appliances. This includes condensing boilers and gas heaters.

N. INFRARED THERMOMETER

The infrared thermometer is a non-contact diagnostic tool for quick basic temperature checks in applications where a technician is close to the target object. Simple to use, it enables technicians to discover temperature discrepancies before they become problems. Professionals can troubleshoot maintenance problems by measuring surface temperatures of motors, electrical equipment, insulated walls and pipes, heating, ventilation and refrigeration systems all from a safe distance.

O. TEMPERATURE/ HUMIDITY METER

The Fluke 971 measures relative humidity and temperature. Through a few easy to use controls, the Meter displays three different temperature points of the air surrounding the meter's sensor: ambient, wet bulb, and dew point.

P. CARBON MONOXIDE (CO) TESTER

The CO monitor detects the presence of carbon monoxide (CO) in ambient air and warns the user both visually and audibly about dangerous CO concentrations during furnace and boiler service and maintenance, weatherization audits or home inspections.

Q. LOW E COATING DETECTOR

The ETEKT + Low-E Coating detector is the industry standard for instruments detecting the presence and location of thermal resistant coatings (Low E) used on energy efficient single and dual lite glass and window assemblies. The ETEKT+ is a rugged handheld device that is accurate, easy to use, and rarely requires calibration. Place the unit flat on the glass surface, press the button and read the results.

R. DATA LOGGER

The HOBO Data Logger is designed for interior usage. It tracks over a period of time the temperature, relative humidity, and light in its surrounding. The software allows you to download the information into an excel spreadsheet and calculate the readings. They are good to use inside homes, crawlspaces, and attics and allow you to see what happens over a period of time.

S. KILL-A-WATT EZ METER

You can cut your energy costs and find out what appliances are actually worth keeping plugged in. Simply connect your appliances to the Kill A Watt™EZ, and it will assess how efficient they really are. Large LCD display will count consumption by the Kilowatt-hour, same as your local utility. Calculate your cumulative electrical expenses and forecast by the day, week, month, even an entire year. Also check the quality of your power by monitoring Voltage, Line Frequency, and Power Factor.

IV. APPENDIX

A. RESERVED FOR LATER