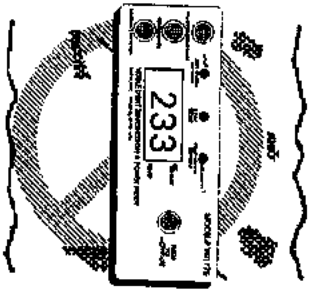
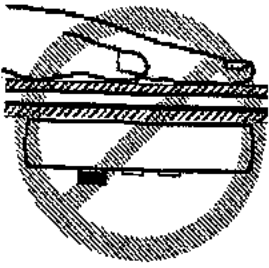


IMPROPER OPERATING CONDITIONS

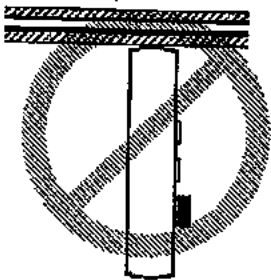


If the glass or film area under test is excessively dirty or contaminated, the **VISIBLE LIGHT TRANSMISSION (%) AND POWER METER** may give improper results. The area under test must be **RELATIVELY CLEAN**. Clean the test area or move the meter to a clean location on the window.

The **VISIBLE LIGHT TRANSMISSION (%) AND POWER METER** must be used with the surface opposite the "Activate" button against the window. Using the small end surface of the unit or tilting the unit away from the surface will give improper results.



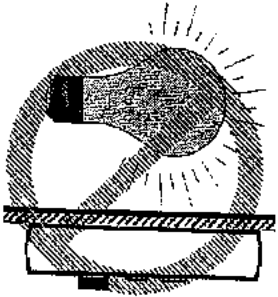
Placing the hand or any object that blocks the light from the white sensing area on the back will give improper results. Remove hand or object.



IMPORTANT:
The **VISIBLE LIGHT TRANSMISSION (%) AND POWER METER** has been optimized for **VISIBLE LIGHT**, as it occurs in the solar spectrum. The unit may be used with other light sources, however it must be realized the absolute value readings may vary from actual sun (solar) conditions.

NOTE: AT A MINIMUM, ANNUALLY REPLACE THE BATTERY.

To replace the battery, remove the four (4) Phillips screws from the enclosure. Replace the battery with a 9-volt alkaline battery only. While the enclosure is open **DO NOT TOUCH** any of the optics or filters. The oils of your skin and dirt can alter the calibration of your meter.



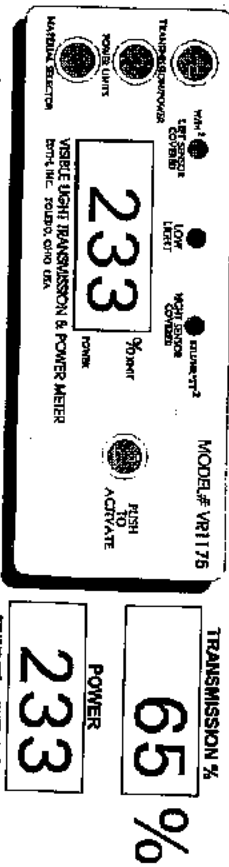
THE DIGITAL VISIBLE LIGHT TRANSMISSION (%) AND POWER METER

MODEL #VR1175

OPERATING MANUAL

GENERAL DESCRIPTION:

The "VISIBLE LIGHT TRANSMISSION AND POWER METER" measures the visible light transmission characteristics (as experienced in the solar spectrum) of transparent materials along with the power value of the incident visible light reaching the meter's sensing area. The meter uses state of the art light sensors coupled with microprocessor control to achieve an **EASY TO READ** and **USE** hand held meter. The device may be used with various transparent mediums to measure the visible characteristics of the material.



The user may select between the following options:

1. Mode of operation: transmission (%) or power,
2. Units of measurement for power readings: BTU/HR-FT² or W/M², and
3. The type of material under test.

If "POWER MODE" is selected, then the instrument will measure the direct and diffuse solar irradiance from the sun. If "TRANSMISSION MODE" is selected, the meter will measure the transmission percentage of the material you have placed behind one of the sensors located on the back of the meter.

The largest incident value of visible light power is obtained when the back of the meter is placed directly behind the material under test and faces the sun directly. When the meter does not face the sun, the incident visible light power is reduced by the cosine curve of the angle to the sun. Make sure the material being tested is reasonably clean.

This instrument is traceable to a NIST (NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY) traceable broad band silicon detector. The calibration data is based upon ASTM G159-98 for Solar Spectral Irradiance at Air Mass 1.5.

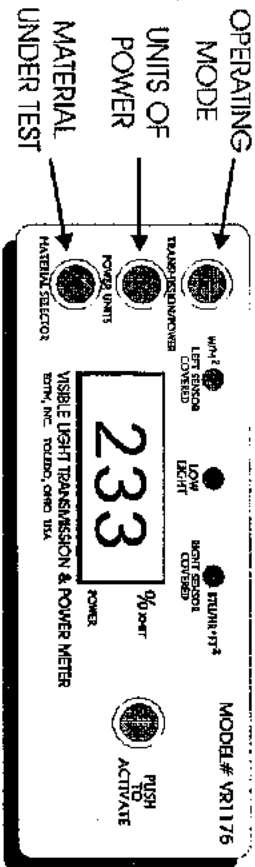
ELECTRONIC DESIGN TO MARKET, INC. (EDTM, INC.)

5333 Secor Road, Suite #6
Toledo, Ohio 43623 USA
PHONE: (419) 480-1098 FAX: (419) 480-1099

KEEP THE COMPETITIVE EDGE

CALL US FOR INFORMATION ON OUR OTHER TEST EQUIPMENT FOR GLASS,
LOW-E DETECTORS, 4 POINT RESISTIVITY METER,
GLASS AND AIR SPACE MEASUREMENT METERS

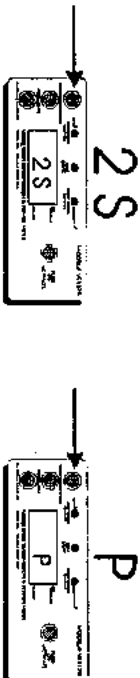
USER SELECTIONS AND START-UP



Each time power is applied to the VR1175, it will cycle through the default settings that are loaded in memory before taking a measurement. This is to remind the user of how the meter is configured. To learn how to change these default settings, read the section entitled "Changing Default Settings". The settings will cycle on the LCD screen in the order they appear on the label from top to bottom: operating mode, power units, and material type. For an explanation of the symbols, please view each section of the manual that explains the three user selections.

OPERATING MODE: TRANSMISSION OR POWER

The VR1175 has two light sensors located on the back side of the meter. These two sensors work independently and allow the user to measure transmission percentages, or the absolute power of incident visible light. The user may select between the two operating modes at any time during the operation of the meter. The selector switch is located in the upper left-hand corner of the meter.



2 SENSOR TRANSMISSION (%) MODE

TRANSMISSION (%) MODE: The symbol "2 S" will appear on the screen as power is applied if TRANSMISSION mode is set as the default setting. ("2 S" stands for 2 Sensor mode of operation). The meter will display readings in percent of visible light transmitted through the material under test. The user may place the material being tested behind either of the light sensors located on the back of the meter, while the other sensor is left uncovered to monitor the ambient condition. One of the two material indicator LEDs (green) on the front panel will light to indicate which light sensor is covered by the material being tested. The display will blink and the center RED LED will light if a "LOW LIGHT" condition is encountered. If a LOW LIGHT condition occurs, move to an environment with more light.

POWER MODE

POWER MODE: The symbol "P" will appear on the screen when the meter turns on if "POWER" was set as the default mode of operation. The meter will display the absolute power of incident visible light. The left sensor will be the active sensor during power measurements. If you would like to place a material behind the sensor to watch the amount the power is reduced by, be sure the material is positioned behind the left sensor. One of the two GREEN LEDs will indicate the unit of power that is selected (BTU/hr² or W/m²).

APPLICATIONS: IDENTIFY COATINGS/GLASS

IN THE FIELD OR FACTORY:

IDENTIFY TYPES OF GLASS OR

INVISIBLE COATINGS (i.e. VARIOUS TYPES OF LOW-E ...)

STEP 1: Identify Glass thickness and/or Low E coating location by use of EDTM's GC2000 Glass & Air Space Thickness Meter and/or the AE1600 Low E Coating Detectors.

STEP 2: Use the VR1175 to take readings on your sample of glass/film. Compare your measured visible light transmission values to the percentages quoted by the manufacturer. You may also create small samples of various glass combinations and compare your readings on these small standards, to readings you obtain in the field.

EXAMPLE OF I.G. TRANSMISSION CHARACTERISTICS OF VISIBLE LIGHT:

CLEAR GLASS IG UNIT: ~81% VISIBLE LIGHT TRANSMISSION

SINGLE COATING OF LOW-E: ~77% VISIBLE LIGHT TRANSMISSION

MULTIPLE COATINGS: ~71% VISIBLE LIGHT TRANSMISSION

The prior analysis may be useful when working with sunrooms, curfainwalls and large architectural buildings.

Glaziers who are attempting to perform replacements, can implement the VR1175 to get a better understanding of the glass being replaced. Gaining a perspective on the visible light performance will help the glazier to install a comparable product, whether it be film, tinted glass, reflective glass, etc. . . The VR1175 can help the glazier to match the replacement glass to the existing glass.

WARRANTY

The manufacturer warrants all models of the VR1175 to be free from defects in material and workmanship under normal use and service as specified within the operator's manual. The manufacturer shall repair or replace the unit within ninety (90) days from the original date of shipment after the unit is returned to the manufacturer's factory, prepaid by the user, and the unit is disclosed to the manufacturer's satisfaction, to be thus defective. This warranty shall not apply to any unit that has been repaired or altered other than by the manufacturer. The aforementioned provisions do not extend the original warranty period of the unit which has been repaired or replaced by the manufacturer. Batteries are not covered by warranty.

EDTM, Inc. assumes no liability for the consequential damages of any kind through the use or misuse of the VR1175 product by the purchaser or others. No other obligations or liabilities are expressed or implied. Any damage or liability claim will be limited to an amount equal to the sale price of the VR1175.

DEFAULT SETTINGS

The VR1175 stores default settings into memory. These settings can be changed in the field by the user. The default settings are shown on the display each time the meter is powered up, prior to taking a reading. The settings are displayed in the following sequence: Operating Mode, Power Units, and Material Selected. The symbols for each setting are described under the appropriate category elsewhere in this manual. After powering up the meter, if the user continues on to take a reading, the meter will operate in the configuration designated by the default settings.

For example, if the display comes up with the following sequence:

"2 S" "BTU" "GL O"

the meter will take a Transmission reading (2 S) on Other Types of Glass (GL O). If the user switched to power readings, the power readings would be taken in units of BTU/HR*FT² (BTU).

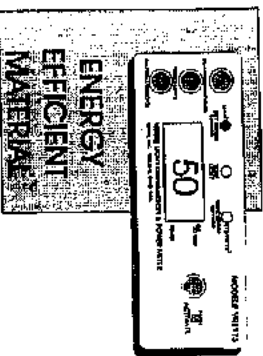
The user may change settings at any time during the operation of the meter. However, to change the default settings, only the selections that are made in the first few seconds after powering up the meter, will be stored as the default settings.

To conduct a change of default settings, power up the meter and wait for the display to cycle through the current default settings. Immediately after viewing the last setting (Material), make the changes that you want for the default settings. To test your changes, shut off the meter and power it back up. Your default settings should now be shown on the display. If your settings are not shown, redo the steps described above.

Any changes made after the first few seconds of operation, will not affect your default settings. The changes made after the few seconds will only apply to the readings you are currently taking.

APPLICATIONS: ENERGY SAVINGS

Use the VR1175 to illustrate the outstanding performance of your product in the visible light spectrum. The Transmission mode can be used to illustrate the transmission of visible light that results from the use of your products.



In this example, the material being tested has a visible light transmission of 50%. This value can be compared to other competing values that can also be tested by the VR1175. The difference between transmission percentages can be used to compare various products.

OPERATING INSTRUCTIONS: TRANSMISSION MODE (FIELD CALIBRATION)

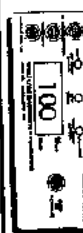
To operate the meter in transmission mode, use the mode of operation switch in the upper left-hand corner to select transmission (2 S). Before taking a reading, you may choose to perform a field calibration of the two sensors. To determine if you need to perform a calibration, switch the meter to read in "Transmission" mode (2 S) with "Glass Other" (GL O) selected as the material. While holding the meter in a position where both sensors will receive an equal amount of light, the display should read 100, meaning that both sensors are seeing the same amount of solar irradiance. Be careful not to block or shadow one of the sensors during this test, as this would obviously affect the results of your test.

If the display does not show 100, you may wish to perform a field calibration. To do this, switch the default settings of the meter to "Transmission" mode (2 S) and "Glass Other" (GL O). Again, position your meter so that both sensors will receive an equal amount of light. Release the power button. Now push down the top and bottom switches simultaneously (Operating Mode switch and Material Selector switch), and then push the power button. Hold all three buttons down simultaneously for approximately 20 seconds, at which time the word "CAL" will appear on the display. After the "CAL" letters disappear, you can release all of the buttons. To confirm your calibration, power up the meter in the same position, and confirm that 100 appears in the display. After you have verified your calibration, you can then change the material selection to something other than "Glass Other" (GL O), if desired.

PERFORMING A FIELD CALIBRATION



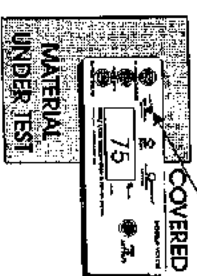
VERIFYING CALIBRATION



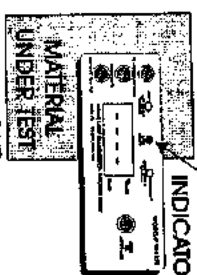
TRANSMISSION MODE: TAKING MEASUREMENTS

To take a transmission reading, select transmission (2 S) mode. Review the need for a field calibration as described above. Power up the meter and select the material you will be testing. The descriptions of the materials are located in the "MATERIAL SELECTION" portion of this manual. Place the material to be tested behind one of the two sensors on the backside of the meter. The other sensor should not be covered as it must be able to sample the ambient condition. One of the two green indicators will light on the front panel to indicate which sensor has been covered by the material being tested. The resulting visible light transmission percentage for the material being tested will be shown on the display.

If there is not sufficient light available to take a reading, the "Low Light" Indicator will turn on. Move your test to an environment that has more light available.



LEFT SENSOR COVERED INDICATOR

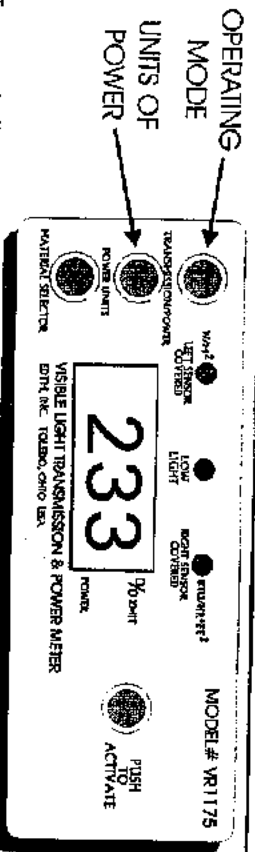


LOW LIGHT INDICATOR

THIS MATERIAL TRANSMITS 75% OF THE VISIBLE LIGHT SPECTRUM

LOW LIGHT CONDITION

OPERATING INSTRUCTIONS: POWER MODE



To operate the meter in power mode, use the operating mode switch in the upper left-hand corner to select power. A "P" will appear in the display when you have selected Power mode. The meter will now display the total incident (direct and diffuse) visible light power. The left sensor will perform the power measurement. Please note, the largest incident value of visible light power is obtained when the back of the meter faces the sun (or alternative light source) directly.

UNITS IN POWER MODE: At any time during the operation of the meter, the user may toggle between two different units of measure. Either W/M^2 or $BTU/HR*FT^2$ can be selected. A "W" for W/M^2 or "BTU" for $BTU/HR*FT^2$ will appear in the display. While operating in Power mode, one of the two GREEN LEDs near the top will illuminate to show the unit of measure that is selected. Please note that the two green LEDs save dual purposes. In Transmission mode, these two LEDs illustrate which sensor has been covered by the material under test. Do not confuse the operation of these two indicators.

While taking readings in Power Mode, the Material Selection setting is not used. Regardless of the material you may be measuring, it is not necessary to select the correct material setting. This feature is only applicable to the Transmission Mode (2 S). For a more detailed description of the Material Selection process, refer to "Transmission Mode: Taking Measurements" or the section discussing "Default Settings".

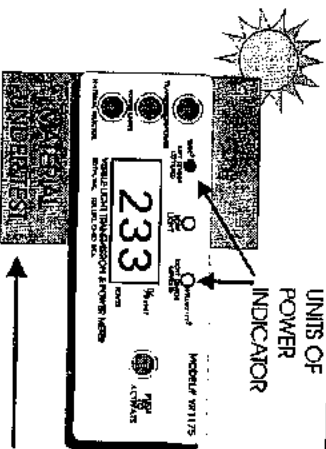
$Ld = W/M^2$



$BTU = BTU/HR*FT^2$



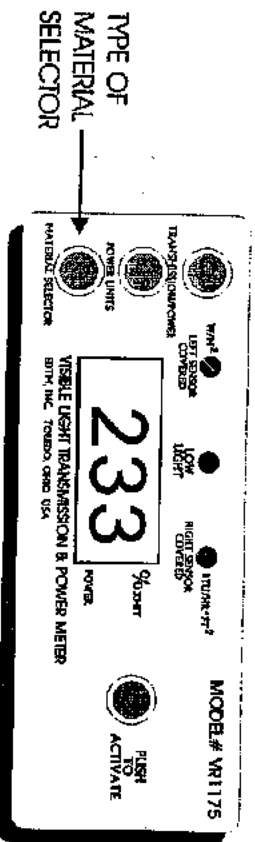
The user may select the unit of measure for power readings by pushing the "POWER UNITS" button. The GREEN LEDs indicate the unit of power selected by the user.



In this example, $233 W/M^2$ is shown.

IF POWER READINGS ARE BEING TAKEN THROUGH A MATERIAL, THAT MATERIAL MUST BE POSITIONED BEHIND THE LEFT SENSOR

"MATERIAL SELECTION" INSTRUCTIONS

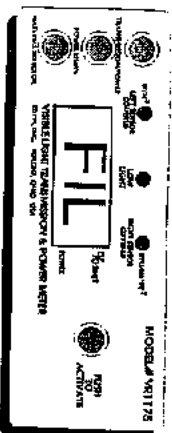


MATERIAL SELECTION: Various types of films, glass, low e coatings, tinted glass, and reflective glass absorb, reflect and transmit various parts of the visible light spectrum. Therefore, to provide the user with the most accurate reading possible, the user needs to select the type of material under test from a number of selections offered. If the user works within a defined market segment with a common product, many of the user options may be set a single time as the default setting, and not require any alterations thereafter. For an explanation of the default settings, please reference that section in the manual.

THE MATERIAL SELECTION OPTION IS ONLY VALID FOR THE TRANSMISSION MODE OF THE METER. WHEN TAKING READINGS IN POWER MODE, IT IS NOT NECESSARY TO SELECT THE MATERIAL BEING TESTED.

To change the material selection, simply press the button in the bottom left-hand corner. The display will toggle to a new material each time the button is pushed. Below is the description of each material offered and the associated abbreviation that will appear on the display.

If you cannot determine the best match to the material you are testing, it is recommended that you select "All Other Types of Glass" (GL O).



Material Description	Symbol
Film applied to glass.....	FIL
Blue or Green glass.....	BGG
Light Gray glass.....	LGG
All Other Types of Glass.....	GL O