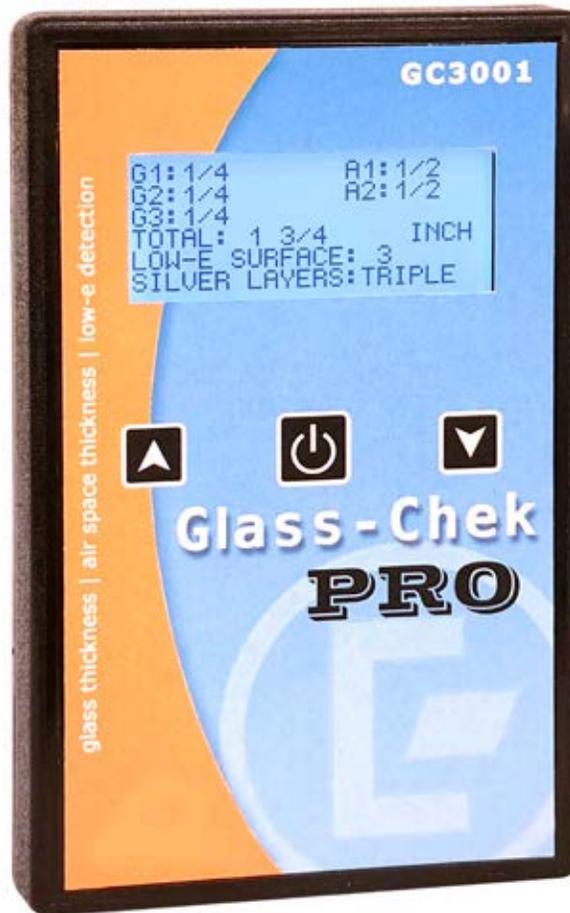SEPTEMBER 2020

Glass Thickness Meter and Low-E Detector with Laminates

Cat. No. GC 3001

SEPTEMBER 2020

The Glass-Chek PRO enables you to measure glass and air space thickness of single, double and triple pane windows from a single side. The GC3001 allows you to determine the presence, location and type of invisible Low-E coatings. There are numerous other applications described within this operating manual.

This manual will outline how to use the meter, including choosing language and measurement settings, explanations of "results" screens, proper use, and maintenance of the meter. Additionally, it will outline appropriate applications, technical details and warranty information.

TABLE OF CONTENTS

SEPTEMBER 2020

METER LAYOUT

Results display: DATA
– Digital measurement results of the glass, air space, and overall IG thickness
– Also displays the type of Low E coating In the window, and the surface location

The ARROW keys are used to:
– Scroll between measurement result screens (forward and backwards)
– Press & Hold to enter the MENU system
– Move the cursor up and down in the MENU
– Toggle between options in the MENU
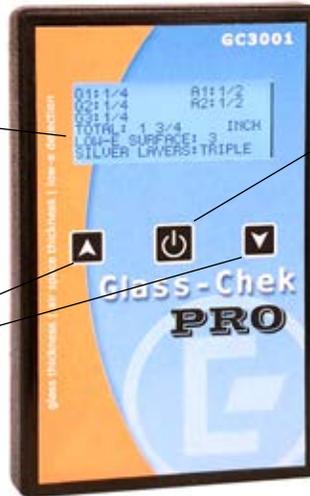
The POWER button is used to:
– Turn the power ON (Momentary press)
– Turn the power OFF (Press & Hold)
– Take a measurement (Momentary press)
– Make a selection in the MENU

EXPLANATION OF THE RESULTS SCREEN

Glass thickness typically shown in the left column

Air Space thickness typically shown in the right column
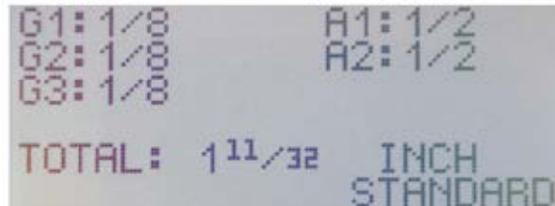
MENU OPTIONS

There are various OPERATING MODES and user–selectable options that will make your experience with the Glass–Chek PRO more convenient All of these options are available in the MENU system. To access the MENU system, turn the meter on by pressing and releasing the POWER BUTTON and wait for the WELCOME screen to complete its display. The WELCOME screen will show you the version of software that is in your meter, as well as confirm the current OPERATING MODE that the meter is operating in. Be sure you have selected the proper operating mode for your application. Choosing the wrong mode can result In Incorrect measurement results, or no results at all. Remember If you change the operating mode, It will stay In that mode for all future measurements, until you change It again by entering the MENU system. Powering the meter OFF will NOT reset the operating mode.

SEPTEMBER 2020

MENU OPTIONS (CONT.)

WELCOME SCREEN

software version #

current operating mode
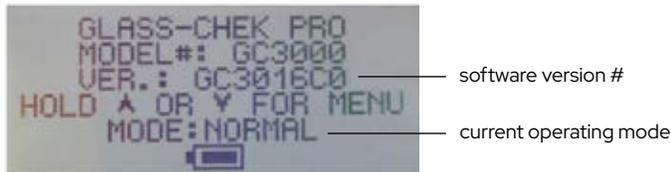
MEASUREMENT REMINDER SCREEN

After the WELCOME SCREEN, the meter will go to its measurement reminder screen, reminding you to place the GC3001 meter at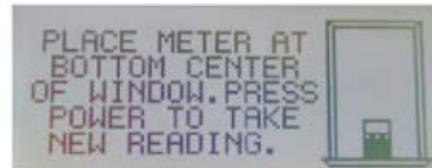 the bottom center of the window for ALL MEASUREMENTS, approximately 1 to 2 inches up from the frame/sash!! This is the preferred measurement location that should be used for ALL MEASUREMENTS. Testing in this location will eliminate effects from glass that is flexing inward, resulting in a concave glass surface. The most accurate measurements of a window will be obtained in this location when using the GC3001 meter.

After the measurement reminder screen appears, PRESS and HOLD one of the ARROW buttons for several seconds until the ENTERING MENU screen appears. Release the ARROW button once that screen appears. You can enter the MENU system any time the meter is powered on by pressing and holding one of the ARROW buttons. Please note that you may need to hold the ARROW button down for several seconds before entering the MENU system.

NAVIGATING THROUGH THE MENU

A small arrow will appear next to the top option. In the illustration below, the arrow is next to the "MODE" option.

To move the cursor from line to line, press the UP or DOWN arrow buttons to navigate through the MENU. To select an option, press the POWER button one time. Once a category is selected, your options will be displayed. Use the ARROW buttons to scroll through the available options for that selection. Once you have the desired option on the display, press the POWER button one time to select that option. You will then move back one level in the MENU system. If you make a selection by mistake, press the POWER button again to select that option a second time and make your correct selection. Once you are finished making changes, use the ARROW buttons to move to the EXIT options: "EXIT - SAVE CHANGES" OR "EXIT - DO NOT SAVE".

SEPTEMBER 2020

SELECTING UNIT OF MEASURE:

The GC3001 can display thickness measurements in various units. You also have the option of rounding measurements to the nearest "Glass Thickness Standard" (Refer to GC3001 Glass Standards chart on page 19). To choose the display units appropriate for your application, follow these steps:

In the MENU, select the "DISPLAY UNITS" option. The sub-menu to the right will be displayed:
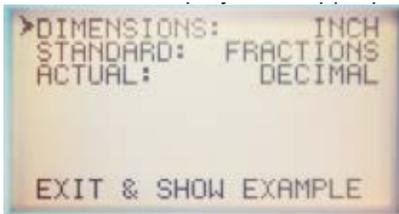
First, select the "DIMENSIONS" option by pressing the POWER button. Choose if you want your unit of measure to be millimeters or inches. Use the ARROW keys to toggle between units and press the POWER button to make your selection.

Next, determine whether you want the meter to: 1.) round measurements to the nearest Glass STANDARD, 2.) display the ACTUAL glass thickness dimensions or 3.) display both STANDARD and ACTUAL. To turn STANDARD rounding on or off, select the "STANDARD" option. If your dimensions are set to inches, you will have the options: FRACTION, DECIMAL or OFF. If your dimensions are set to millimeters, you will have the options: ON or OFF. Use the ARROW button to find your desired setting and press the POWER button to select it. PLEASE NOTE, if the STANDARD option is selected in inches, the glass thickness designations will always be shown in fractions. If decimal inches are chosen, only the air space thickness and overall IG unit thickness will be shown in decimal inches. The glass thickness will always be shown in fractions of an inch when STANDARD is turned on.

Next, choose your ACTUAL setting. If this setting is activated, your meter will display actual glass thickness dimensions without rounding. If your dimensions are set to inches, you will have the options: FRACTION, DECIMAL or OFF. If your dimensions are set to millimeters, you will have the options: ON or OFF. Use the ARROW buttons to find your desired setting and press the POWER button to select it.

NOTE: STANDARD and ACTUAL cannot both be set to OFF. If they are both activated, the measurements will alternate on the screen after a measurement has been taken. For an illustration of this feature, see the "Measurement Examples" section.

When you exit the Display Units menu, the meter will show an example of what the measurement results screen will look like according to your selections. This will help you determine whether you chose the correct options. Press the POWER button to exit the example display.

RESULTS SCREEN DISPLAY SPEED:

Measurement results are displayed across multiple screens. These screens can be controlled two different ways. If you take no action, the screens will automatically advance from one to the next. If you do not want to wait for the screen to advance, you can use the ARROW keys to advance or go back to a previous screen. If you let the meter advance the screens for you, the speed at which these screens advance can be set in the MENU system. Select DISPLAY SPEED in the MENU. You can independently select the number of seconds you want the THICKNESS measurement screens to display as well as the LOW-E results screen. Use the ARROW keys to change the time, and then press the POWER button to confirm the selection. Exit when complete to go back to the main MENU.

SEPTEMBER 2020

RESULTS SCREEN DISPLAY SPEED (CONT.):

PLEASE NOTE: If you would prefer that the meter only advances to the next result screen when you push the ARROW key, then change the Result Screen times to the maximum value of 60 seconds for both the THICKNESS and LOW E screens. This will maximize the time each screen is displayed, allowing you to advance the screens via the ARROW buttons when ready (as long as you do so before 60 seconds).

OPERATING MODES

Depending on your application, you may need to choose a different operating MODE. In the MENU, select MODE by pressing the POWER button. Then use the ARROW buttons to scroll through all of the available MODE options. Here is a list of the MODES you can choose from, as well as an explanation of the applications you would select for each MODE.

| MODE	APPLICATIONS
1. NORMAL GLASS	This is the default operating mode. NORMAL GLASS MODE will be used for the majority of all measurements. This mode will test single, double and triple pane (IG) windows. If you use this mode to test laminated glass, the meter will display the overall thickness of the laminated glass, but not identify It as laminated glass nor provide details about the Inner-layer thickness. You will need to upgrade to the GC3200 Glass-Chek ELITE if you want to test laminated glass.
2. LAMI + LOW E	Select this MODE if you are tasting a laminated piece of glass that has a Low E coating placed against the laminate inner layer (Surface 2 or3). This MODE will estimate the thickness of both pieces of glass in the assembly, and also identify if the Low E coating is on Surface 2 versus Surface 3. PLEASE NOTE: ONLY USE THIS MODE WHEN THE LOW E COATING IS PLACED AGAINST THE LAMINATE INNER LAYER. USING THIS MODE ON ANY OTHER GLASS COULD CAUSE ERRORS IN YOUR MEASUREMENT RESULTS.
3. SUSPENDED FILM	If you encounter a window that has film (polyester) suspended between the panes of glass, use this MODE to measure the glass and multiple air spaces that occur in the window. In this MODE, the meter will only test the nearest pane of glass for low e coatings. This MODE will only test for 1 piece of suspended film in the air space of the window. Testing regular windows in this MODE will cause an error.

SEPTEMBER 2020

CHOOSE YOUR LANGUAGE

In the MENU, select the "LANGUAGE" option. Use the ARROW buttons to select LANGUAGE, then press the POWER button. Use the ARROW buttons to scroll through the available languages. Press the POWER button when your desired language appears. Save your changes and exit.

WARNING: Once the meter's language is changed, the menu will immediately change to the language selected. If you choose the wrong language and can't get back to your desired language, stop navigating the menu and allow the meter to automatically power down. The meter will automatically shut off after 1 to 2 minutes of inactivity. When the meter powers back up, it will display the previously selected language.

The following languages are available in the GC3001: English, German, French, Spanish, Dutch, Italian, Swedish and Danish.
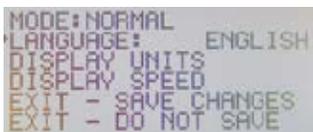
ENGLISH	GERMAN	SPANISH	FRENCH
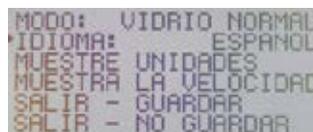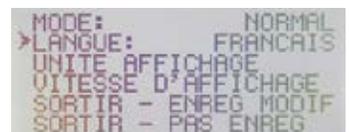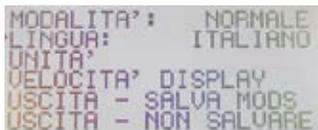
ITALIAN	DUTCH	DANISH	SWEDISH
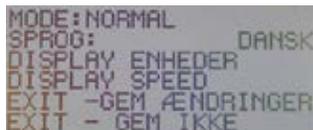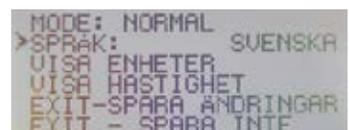
PROPER OPERATION OF THE GLASS-CHEK PRO

Place the meter at the bottom center of the window to be tested. Press and release the POWER button to take a measurement. Do not hold the POWER button down, as this will cause the meter to shut off. The "TAKING READING" message will be displayed while your measurement is being completed. The "TAKING READING" screen also indicates the remaining battery life, as well as confirms the operating MODE the meter is in.
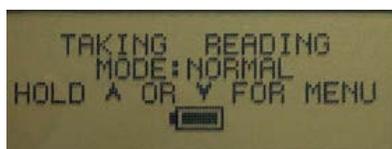
SEPTEMBER 2020

PROPER OPERATION OF THE GLASS-CHEK PRO (CONT.)

TURNINg Th E METER Off

Hold the button down for several seconds to turn off the meter. A message will display on the screen notifying you that the meter is about to power down. Continue holding the button down until the screen goes blank. If the meter is left unused for a period of time, the unit will automatically shut off. To conserve battery life, it is recommended to turn the meter off manually when you are finished using it.

g uidelines f or Most Accurate Results:

- Hold the meter steady and flat against the test surface during measurement
- Do not touch the glass with your hand while taking the reading
- Take readings at the BOTTOM CENTER of the window for best thickness accuracy (see explanation below)
- Take multiple measurements to verify results
- Make sure the window being measured is clean
- Make sure the two lenses on the back of the GC3001 are clean. See Image to the right. -------->
  Use only clean compressed air to clean the lenses. Only use a lint free cloth if absolutely necessary to clean smudges, fingerprints, etc.
- Make sure nothing is touching the far side surface of the window during the measurement
- It is best to test windows in free air, not resting on a tabletop surface, or stacked on other pieces of glass.

Above: Back of GC3001 meter with the two lenses circled. Use clean compressed air to clean the lenses.

4 OPTIMAL TEST LOCATIONS

f OR MOST ACCURATE RESULT

At Left: Recommended placement of meter:

- Hold the meter steady AND FLAT against the glass during measurement.
- The meter should be centered on one of the four edges of the window with the bottom edge of the meter placed parallel to the edge of the window (see image to the left). BOTTOM CENTER IS THE PREFERRED LOCATION. This will minimize the effect of a concave (or collapsed) window. As you move away from the edge of a window, many windows will bow inward (concave). Because the sensor runs parallel to the bottom edge of the meter, it is important to place the bottom edge of the meter along the edge of the window as shown. You can place the meter approximately 1 to 2 inches from the edge of the window.
- DO NOT touch the glass with your hand or thumb while taking measurements. Note the hand placement used in the picture at left. The user's thumb is resting on the GC3001 without touching the glass being measured. Also, be sure there are no other metallic objects touching the glass.
- DO NOT continue to hold down the button while taking a measurement.
- Place your index finger next to the button as shown at left.

At Right: Incorrect hand placement.

- DO NOT hold the POWER button while taking a measurement. This will cause the meter to turn off. Rest your index finger next to the button as shown above.
- DO NOT touch the glass with your hand while taking readings. The picture at right shows the user's thumb resting on the window while taking a measurement. This could cause incorrect results for the low-E measurement.

SEPTEMBER 2020

APPLICATION EXAMPLES

The Glass-Chek PRO offers various display formats. The following illustrations are examples of measurement displays with explanations of the application being tested and how the display format was configured.

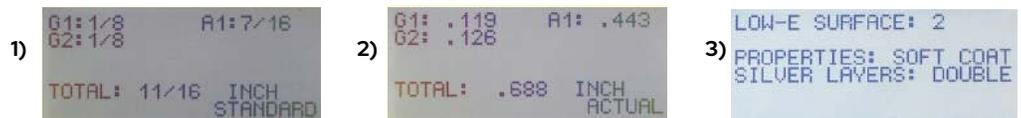### – Measurement Example One – Double Pane Ig with Low E on Surface 2

Display format

- Dimensions: Inch
- Standard: Fraction
- Actual: Decimal
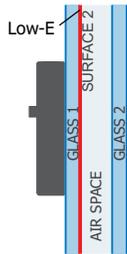
Double Pane Window

Resulting Measurement Displays: Due to the application and display format, the measurement will alternate the following three messages:

1)
```
G1:1/8        A1:7/16
G2:1/8
TOTAL:  11/16  INCH
                 STANDARD
```

2)
```
G1:  .119    A1:  .443
G2:  .126
TOTAL:   .688   INCH
                  ACTUAL
```

3)
```
LOW-E SURFACE: 2
PROPERTIES: SOFT COAT
SILVER LAYERS: DOUBLE
```

Display 1 shows fractional inches rounded to the nearest standard. Display 2 shows the actual measurements in decimal inches. Notice how the actual measurements in 2 are slightly different than the measurements in 1 because Display 1 shows the readings rounded to the nearest standard. Display 3 shows that the low-E coating is on surface 2, and it indicates that the coating properties are soft coat and have the performance of double-silver Low-E.

– Measurement Example Two – Double Pane Ig with Low E on Surface 3

Display format

- Dimensions: MM
- Standard: ON
- Actual: OFF
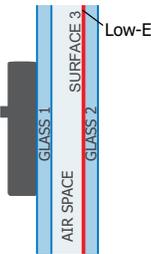
Double Pane Window

Resulting Measurement Displays: Due to the application and display format, the measurement will alternate the following two messages:

1)
```
G1:  6        A1:  12.7
G2:  6
TOTAL:   24.5   MM
                  STANDARD
```

2)
```
LOW-E SURFACE: 3
PROPERTIES: HARD COAT
```
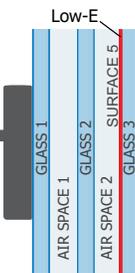
Display 1 shows millimeters rounded to the nearest standard. Since the •Actual" setting Is set to OFF, there Is no display showing the actual dimensions of the glass - only the dimensions rounded to the nearest standard. Display 2 shows that the low-E coating Is on surface 3. Please note there are times where the meter will not specifically designate surface 3, and may show the result as Surface 3 or 4. This means that the meter Is only Indicating the coating Is on the second pane of glass. In that Instance, the user must test the window from the opposite side to confirm the exact. low e surface.

– Measurement Example Three – Triple Pane Ig with Low E on Surface 5

Display format

- Dimensions: Inch
- Standard: Fraction
- Actual: Decimal

Triple Pane Window

Resulting Measurement Displays: Due to the application and display format. the measurement will alternate the following three messages:

1)
```
G1:1/8        A1:1/2
G2:1/8        A2:1/2
G3:1/8
TOTAL:  1 11/32  INCH
                 STANDARD
```

2)
```
G1:  .115    A1:  .497
G2:  .115    A2:  .499
G3:  .116
TOTAL:  1.342   INCH
                  ACTUAL
```

3)
```
CLEAR GLASS
```

Display 1 shows fractional inches rounded to the nearest standard. Display 2 shows the actual measurements In decimal inches. Display 3 shows that the meter did not detect a low-E coaling on G1 or G2. Since the GC3001 only detects coatings on the first 2 panes, you may be required to test both sides of a triple pane window to verify the presence of a low-E coating on the glass on the opposite side of the window.
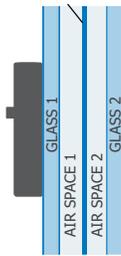
SEPTEMBER 2020

APPLICATION EXAMPLES (CONT.)

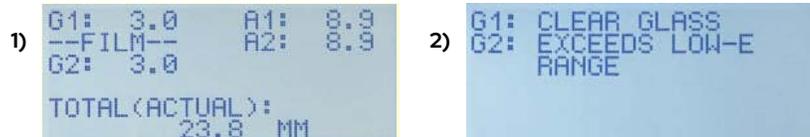### – Measurement Example four – Double Pane Ig with Suspended film

Display format

• Dimensions: MM
• Standard: OFF
• Actual: ON

GLASS 1
AIR SPACE 1
AIR SPACE 2
GLASS 2

Double Pane with
Suspended Film

Resulting Measurement Displays: Due to the application and display format, the measurement will alternate the following 2 messages:

1)
```
G1:   3.0      A1:    8.9
--FILM--       A2:    8.9
G2:   3.0

TOTAL(ACTUAL):
          23.8   MM
```

2)
```
G1: CLEAR GLASS
G2: EXCEEDS LOW-E
    RANGE
```
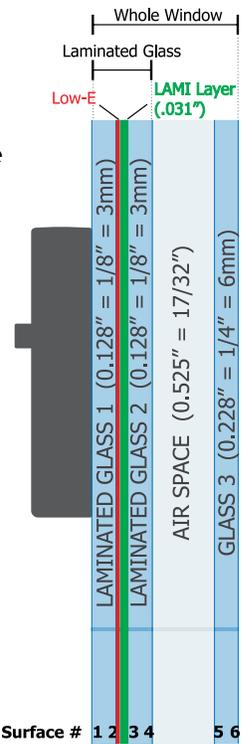
Display 1 shows the actual thickness of the window in MM. Since the •standard" setting is set to OFF, STANDARD dimensions are not displayed. The word "FILM" indicates suspended film between the two panes of glass. Display 2 indicates that G1 does not have any low E coatings ("CLEAR" of any low-E coating). In Suspended Film Mode, the GC3001 will NOT test G2 for Low E Coatings.

– Measurement Example five – LAMI + LOW E (Low E Coating against LAMI inner layer)

When working with laminated glass that has a low e coating placed against the laminate Inner-layer, the Glass-Chek PRO helps identify which surface has the low-E coaling (2 vs 3). To perform this function, the meter must be switched into LAMI + LOW E mode (see page 4 & 6). Please note for the example below, that STANDARD Mode has been set to FRACTIONS of an Inch, and the ACTUAL Mode has been set to DECIMAL Inches.

The LAMI + LOWE Mode of the GC3001 meter will allow you to test laminated Low E places of glass monolithically, and also with the laminated Low E glass assembled into a double pane (IG) window. For IG's, the GC3001 meter must be placed on the side of the window that contains the laminated low-E glass. The first screen that appears will show the thickness of the overall laminated piece of glass, the air space, the second pane of glass thickness, and also the overall thickness of the IG. The laminated piece of glass will be denoted as G1/L1/G2 on the display screens. Screen 1 and 3 below show this example. Screen 1 is displaying the information infractions of an inch (STANDARD), while screen 3 shows the data in decimal inches (ACTUAL).

Whole Window
Laminated Glass
Low-E
LAMI Layer (.031")

LAMINATED GLASS 1 (0.128" = 1/8" = 3mm)
LAMINATED GLASS 2 (0.128" = 1/8" = 3mm)
AIR SPACE (0.525" = 17/32")
GLASS 3 (0.228" = 1/4" = 6mm)

Glass Surface #   1 2 3 4   5 6

G1: G1 (0.128" OR 1/8") nearest piece of glass (Screen 2 & 4-Line 1)

L1 + G2: LAMI L1 (0.031") + G2 (0.128"or 1/8") = 0.159" or 5/32" (Screen 2 & 4-Line 2)

G1 + L1 + G2: G1 (0.128" or 1/8") + LAMI Layer (0.031") + G2 (0.128" or 1/8") = 0.287" or 9/32" total laminated glass thickness (Screen 1 & 3-Line 1, Screen 2&4-Line 3, & Screen 5-Line 4)

A1: Air Space Thickness (.525" or 17/32") (Screen 1 & 3, Line 1)

G3: G3 (.228" or 1/4") (Screen 1 & 3, Line 2)

TOTAL: Total Window Thickness (1.040" or 1-1/32") (Screen 1 & 3, Line 3)

SEPTEMBER 2020

APPLICATION EXAMPLES (CONT.)

The next screens will show the make-up of the laminated Low E piece of glass by Itself. The meter has been designed to add the thickness of the LAM I layer to the thickness of the glass that contains NO low-E coating. For the Low E piece of glass, the meter will display the actual thickness of the glass itself. Therefore the piece of glass that is displayed as a "normal" standard thickness (0.128" or 1/8" for example) Is the pane that has the low-E coating on it. This means that the piece of glass that has an abnormal (larger) glass thickness (caused by adding the LAM I thickness to the glass thickness) will be the glass pane that is clear of any Low E coating. In the example the clear glass + lami = . 159'' or 5/32".

On screens 2 and 4, you will see that these two thickness values are denoted by the letter "D" (D1 & D2). Because the meter does not know which thickness value is the glass, and which one contains the glass+ lami, an arbitrary value of D assigned to the thickness values.

Screen 5 takes the evaluation one step further and makes the assumption that both pieces of glass comprising the laminated piece are the same thickness (G1 + G2). This Is called the ASSUMPTION SCREEN. If G1 = G2 for your application, then Screen 5 will show the glass thickness, the laminate inner-layer thickness, and it will also confirm that the low e coating is on Surface 2 versus Surface 3. You will also notice on Screen 5, the meter actually identifies SURFACE 2 as the Low E surface in this example.

The final Screen 6 in the sequence confirms the presence of the Low E Coating against the laminate inner–layer, and also indicates the type of low E coating.

STANDARD IN FRACTIONS
(inches)

1)
```
G1■G2=9/32    A1:17/32
G3:1/4

TOTAL(STANDARD):
       1¹/₃₂   INCH
```

STANDARD IN FRACTIONS
(inches)

2)
```
D1:1/8
D2:5/32

TOTAL(STANDARD):
         9/32   INCH
```

ACTUAL IN DECIMAL
(inches)

3)
```
G1■G2= .287  A1: .525
G3: .228

TOTAL(ACTUAL):
         1.040  INCH
```

ACTUAL IN DECIMAL
(inches)

4)
```
D1: .128
D2: .159

TOTAL(ACTUAL):
        .287   INCH
```

ASSUMPTION SCREEN
(inches)

5)
```
IF  G1 = G2, THEN
G1= 1/8      L1=  .030
G2= 1/8
TOTAL:   9/32
LOW-E SURFACE: 2
```

LOW E
RESULTS SCREEN

6)
```
LOW-E SURFACE: 2 OR 3
PROPERTIES: HARD COAT
```

SEPTEMBER 2020

LOW-E DETECTION CAPABILITIES

The electronics that detect the presence of the Low-E coatings are impacted by the surroundings of the meter. This has been explained elsewhere in the manual by showing proper hand placement on the meter and positioning of the glass when testing. The Low-E detection circuitry is affected by conductive materials that are detected by the meter. Conductive materials could include the metal spacer in the window or muntin bars (grid) inside the window itself, just to name a few. Keeping the meter at least 2 inches away from any metal/conductive material when taking measurements will result in the most accurate Low-E measurements.

One additional note regarding Low E detection. If your application contains more than one low e coating in the window, the Glass-Chek PRO will only identify the first (nearest) Low E coating that it encounters. Testing from the opposite side of the window would allow you to identify the other Low E coating in the window. The GC3001 detects the presence and location of low-E coatings on the following applications:
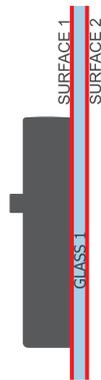
Single Pane Window
Monolithic

SINg LE PANE WINDOWS
The GC3001 will specify if the coating is located on Surface 1 or Surface 2 of a single piece of glass.
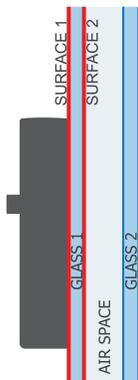
Double Pane Window   Double Pane Window
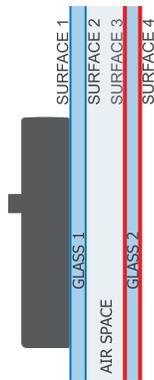
DOUbLE PANE WINDOWS
The GC3001 will specify if the coating is located on Surface 1, Surface 2, Surface 3, OR Surface 3 or 4. If the meter does not specifically identify Surface 3, you can move to the other side of the window to confirm the low e surface.

SEPTEMBER 2020

LOW-E DETECTION CAPABILITIES (CONT.)

Triple Pane Window   Triple Pane Window
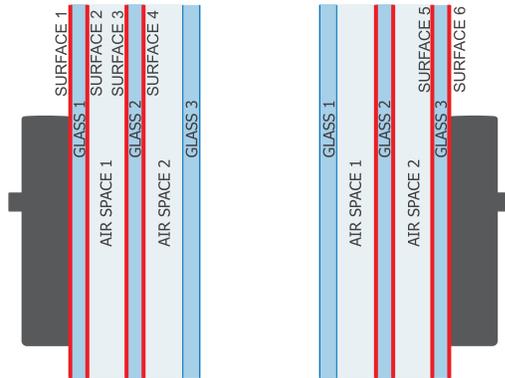
TRIPLE PANE WINDOWS

The GC3001 will specify if the coating is located on Surface 1, Surface 2, Surface 3, or Surface 3or4. By moving to the other side of the window, the meter can specify Surface 5 and Surface 6. The GC3001 detects the presence of low-E coatings on the middle pane of a triple pane unit. It will either show results of Surface 3, or Surface 3or4. If there are multiple low E coatings, the GC3001 will only identify the nearest coating.

IDENTIFYING THE TYPE OF LOW-E

In addition to identifying the location of low-E coatings, the GC3001 determines the type of low-E on your window. The meter will specify it as "hard coat''(aka pyrolytic or on-line coating) or "soft coat" (aka sputtered or off-line coating). If the Low E is soft coat, the meter will also specify the number of silver-layers as single, double, or triple, based on the coating's energy performance. If you happen to know the manufacturer of the glass, in many cases you can identify the exact type of low-E coating used to make the window. A convenient reference chart is included with the GC3001 meter that lists many of the common Low E coatings used in the USA. Here are some examples.

SOf T COAT (sputtered)			h ARD COAT (pyrolytic)
Triple Silver	Double Silver	Single Silver	
- Cardinal 366 - PPG SolarBan 70 - Guardian CG 62/27	- Cardinal 270 & 272 - PPG SolarBan 60 - AFG TIPS, TIR, & TIAC - Guardian ClimaGuard 71/38	- Cardinal 180 - PPG Sungate 100 & 400 - Guardian ClimaGuard 75/68	- Pilkington Energy Advantage - PPG Sungate 500 - AFG Comfort E2

SEPTEMBER 2020

HELPFUL OPERATING TIPS AND EXPLANATIONS

1. The darker the glass, the longer it will take to complete a measurement

2. If testing dark glass in a window, try to test from the side of the window that contains the clear piece of glass.

3. Always conduct your measurements in the BOTTOM CENTER of the window.

4. Take multiple measurements to confirm your test results, but always test near the bottom center of the window (either side).

5. If the window has more than one low e coating, the GC3001 will only identify the first (nearest) coating it encounters.

SEPTEMBER 2020

EXPLANATION OF ERROR MESSAGES

ERROR MESSAg ES:

Ex PLANATIONS:

ERROR: 1 CLEAN & PLACE
METER BOTTOM CENTER
PRESS POWER BUTTON
TO TAKE NEW READING.

This error indicates a problem with the measurement. Be sure you are following the guidelines for the most accurate results outlined on Page 5, and attempt to take the reading again. Make sure the meter is flat against the glass during the measurement, and do not move the meter during the course of a measurement.

If the window area under test is excessively dirty or contaminated, the Glass-Chek PRO may give improper thickness or low-E results or issue an error message. The window area under test must be CLEAN as well as the lenses on the back of the meter. Clean the lenses on the back of the GC3001 with compressed air. Use a lint-free cloth if absolutely necessary to clean smudges, fingerprints, etc., as shown on Page 5.

EXCESS LIGHT: MOVE
TO OPPOSITE SIDE

The Glass-Chek PRO uses a laser to measure the thickness of the glass and air space. The unit may be affected by *extremely* bright lights or facing the sun directly. The screen will display this error message if this condition occurs. Simply move to a different location, go to the other side of the window, or shade the laser aperture. If the window is operable you may be able open the window and reach through the opening to block the incident light from the back side of the meter.

GLASS EXCEEDS LOW-E
RANGE: GLASS IS
TOO THICK

This error message indicates that your application is most likely out of the maximum thickness range for low-E measurement. See the "Specifications" section on Page 11 of this manual for more details on the GC3001's maximum thickness ranges.

LOW BATTERY
REPLACE SOON

battery and replacement:
The GC3001 meter is powered by a 9-volt alkaline battery. When the battery is starting to get low, an error message will appear that recommends replacing the battery soon. This gives the user plenty of warning that a battery replacement is needed soon, but the meter will still function for a period after this initial warning. Once the battery voltage gets below a dangerous level that could impact the performance of the instrument, an error message appears that tells you to replace the battery immediately. The instrument will NOT take measurements once it reaches this level.

REPLACE BATTERY NOW
GC3001 WILL POWER
DOWN IN:

Please remember to ALWAYS replace the battery with a 9-volt ALKALINE battery.

SEPTEMBER 2020

TROUBLESHOOTING GUIDE

If you are having difficulty obtaining an accurate measurement, please follow these steps:

1. Be sure you are following the guidelines for most accurate results outlined on Page 5 of this manual. Make sure you are testing the BOTTOM CENTER of the window.

2. Ensure that the Glass-Chek PRO is placed flat against the glass surface and that you are testing at one of the four optimal locations detailed on Page 5. The meter must be used with the surface opposite the Power button against the window. Using the small end surface of the unit or tilting the unit away from the surface will give improper results.

3. Clean the glass surface or move to a cleaner area of the glass.

4. Remove dust particles from the two lenses on the back of the Glass-Chek PRO. To clean the lenses: WE STRONGLY RECOMMEND USING CLEAN COMPRESSED AIR ONLY TO CLEAN THE LENSES. However, if there are fingerprints or other smudge marks on the lenses that can not be removed in any other way, a lint free cloth can be used to wipe off the smudges.

5. If only a partial reading occurs, move to another location on the glass or take a reading from the other side of the window. Page 10

6. Be sure nothing is touching the glass while taking measurements. Placing your hand or any metallic object against the lite of glass you are testing may cause the Glass-Chek PRO to yield improper Low E results. Remove your hand or object. Do not touch any part of the glass with your hand while taking readings.

7. Verify the operating temperature range

8. If measurements seem to take a long time:
The amount of time it takes the GC3001 to complete a measurement will vary by application. This does not mean your meter is defective, it simply takes varying amounts of time depending on the application. Be sure to hold the meter steady against the window until the results are displayed. Measurements that will take longer include: Thick Glass, Dark Glass

9. For operating in cold temperatures:

    a) Keep the unit in a warmer environment until you are ready to take the readings. The meter will record accurate readings until the point the electronics reach the temperature below the operating range. Depending on the degree of coldness, this will allow for several readings to be taken.

    b) Carry the meter close to your body or in some other manner that will keep the unit near a warmer temperature.

    c) When temperature is only slightly below the temperature range, operate the unit several times repeatedly in attempt to warm up the laser.
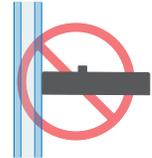
SEPTEMBER 2020

## TROUBLESHOOTING GUIDE (CONT.)

10. <u>For operating in hot temperatures:</u>
    Keep the unit in a cooler environment until you are ready to take the readings. The meter will record accurate readings until the point the electronics reach the temperature above the operating range. Depending on the degree of heat, this will allow for several readings to be taken.

11. DO NOT STORE THE METER IN YOUR VEHICLE. TEMPERATURES INSIDE VEHICLES COMMONLY EXCEED THE MAXIMUM ALLOWED TEMPERATURE IN SUMMER MONTHS, AND ALSO DROP BELOW MINIMUM ALLOWED TEMPERATURES IN WINTER MONTHS. CARRY YOUR METER INDOORS EVERY DAY.

Important Safety Consideration:
The GLASS-CHEK family of glass thickness and air space meters use a Class 2M laser to take its measurements. Do NOT push the power button and point the instrument laser at a persons' eyes. Always check the other side of the window being tested to ensure that no one will be looking directly into the laser.
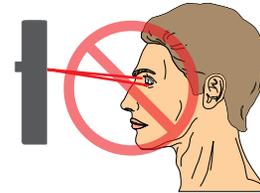
SPECIFICATIONS

|	
Power Source:	9 volt alkaline battery (NEDA 1604A) only
Physical Dimensions:	3.5" x 5.5" x 1.7 inch (89 x 140 x 43 mm)
Weight:	0.75 pounds
Maximum Laser Output:	<1mW (2M laser product)
Laser Wavelength:	650 - 680 nm
Storage Temperature:	+14 to 140 degrees F (-10 to +60 degrees Celsius)
Operating Temperature:	+32 to 104 degrees F (0 to +40 degrees Celsius)
Display:	Graphic
Accuracy:	Glass: 0.008 inch (0.2 mm)
	Air Space: 0.012 inch (0.3 mm)

This product complies with IEC 60825-1 and FDA regulation 21 CFR 1040.10. The thickness tolerance is calibrated to NIST traceable standard No. 821/268634-03.

GLASS THICKNESS RANGE

Minimum Glass Thickness Allowed:	0.080 inch or 2.0 mm
Minimum Air Space Allowed:	0.187 inch or 4.7 mm
Glass Thickness Allowed for Low-E readings:	up to 0.5 inch or 12.7 mm

SEPTEMBER 2020

TRIPLE PANE WINDOWS
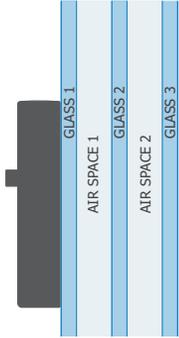
The GC3001 will display the thickness of each pane of glass, the thickness of each air space, and the total IG thickness. Depending on the thickness of the glass, the maximum allowable range for the total IG thickness changes according to the data below:

g lass Thickness	Maximum Overall Thickness Range
3/32" or 2.5mm	1.9" or 48mm
5/32" or 4mm	2.0" or 50mm
1/4" or 6mm	2.1" or 53mm
1/2" or 12mm	2.5" or 63mm

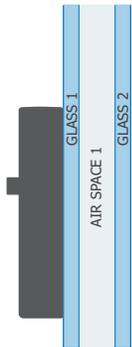## DOUBLE PANE WINDOWS

The GC3001 will display the thickness of each pane of glass, the thickness of each air space, and the total IG thickness. Depending on the thickness of the glass, the maximum thickness range for the total IG thickness changes according to the data below. **Note** these same dimensions apply when measuring a double pane window with suspended film.

g lass Thickness	Maximum Overall Thickness Range
3/32" or 2.5mm	1.9" or 48mm
1/4" or 6mm	2.0" or 50mm
1/2" or 12mm	2.2" or 55mm

SINGLE PANE MONOLITHIC GLASS

The GC3001 will display the thickness of single pane monolithic glass up to 2.75 inches or 70 mm thick.

SEPTEMBER 2020

GLASS STANDARDS TABLE

When operating the GC3001 in "STANDARD" mode, the glass measurements will be rounded to the nearest standard thickness according to the table below:

g C3001 Standards – Tolerance Specifications for f lat g lass
Based on the American Society for Testing and Materials (ASTM) Standards

g lass Tolerance

Traditional Designation	Designation		mm		inches	
	mm	inches	min	max	min	max
3/32 in. (single)	2.5	0.09	2.16	2.57	0.085	0.101
1/8 in. (double)	3	0.12	2.92	3.4	0.115	0.134
5/32 in.	4	0.16	3.78	4.19	0.149	0.165
3/16 in.	5	0.19	4.57	5.05	0.18	0.199
1/4 in.	6	0.23	5.56	6.2	0.219	0.244
5/16 in.	8	0.32	7.42	8.43	0.292	0.332
3/8 in.	10	0.39	9.02	10.31	0.355	0.406
1/2 in.	12	0.5	11.91	13.49	0.469	0.531

GC3001 WARRANTY

The manufacturer warrants all models of the GC3001 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 twelve (12) months from the original date of shipment after the unit is returned to the manufacturers factory, prepaid by the user, and the unit is disclosed to the manufacturers 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 war-ranty period of the unit which has been repaired or replaced by the manufacturer. Batteries are not covered by warranty.

The manufacturer assumes no liability for the consequential damages of any kind through the use or misuse of the GC3001 product by the purchaser or others. No other obligations or liabilities are expressed or implied. All damage or liability claims will be limited to an amount equal to the sale price of the GC3001, as established by the manufacturer.

SEPTEMBER 2020

GLASS STANDARDS TABLE (CONT.)

f RACTION TAbLE
1/32
1/16
3/32
1/8
5/32
3/16
7/32
1/4
9/32
5/16
11/32
3/8
13/32
7/16
15/32
1/2
17/32
9/16
19/32
5/8
21/32
11/16
23/32
3/4
25/32
13/16
27/32
7/8
29/32
15/16
31/32
1

Low-E Coating Table
Triple Silver Soft Coat
Guardian ClimaGuard 62/67
Cardinal LoE – 336
PPG SolarBan 70XL
Double Silver Soft Coat
Cardinal LoE – 240
Guardian ClimaGuard 55/27
PPG SolarBan 67
Guardian ClimaGuard 63/31
Guardian ClimaGuard 70/36
Cardinal LoE – 270
Guardian ClimaGuard 71/38
AGC Comfort TIAC
PPG SolarBan 60
Cardinal LoE – 272
AGC Comfort TIR
Single Silver Soft Coat
AGC Comfort TIPS
PPG Sungate 100
Cardinal ClimaGuard 75/68
PPG SolarBan 400
Cardinal LoE -180
Guardian ClimaGuard 80/70
h ard Coat Pyrolytic
Pilkington Solar E
AGC Comfort E2
PPG Sungate 500
Pilkington Energy Advantage