TotalCheck

Owner's Manual

Version 3.02, for TotalCheck Meters starting with Serial #12468

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TABLE OF CONTENTS

GENERAL DESCRIPTION/FEATURES:

Thank you for your purchase of Delmhorst Instrument Co.'s newly designed **TotalCheck** handheld combination moisture meter/thermo-hygrometer. **TotalCheck** provides the user with a host of data acquisition capabilities, and offers the latest in features and functionality. Even with its wide range of functions, **TotalCheck** is intuitive and easy to operate. We recommend that you read the following pages in detail to take full advantage of all that **TotalCheck** has to offer.

Outstanding Features:

- **Pin mode**

  - Wood scale (Douglas Fir) – 5%-60% MC
  - Wood species corrections for 69 species
  - Temperature corrections over the range of 0°-255°-F (-18° - 124°C)
  - Drywall scale - 0.1% - 6% MC
  - Reference scale (0-100) for non-wood building materials

- **Scan Mode**

  - 0-300 numerical reference scale

- **Thermo-hygrometer**

  - RH Sensor -- includes RH/T-S3for ASTM F-2170 in-situ testing of concrete slabs. RH/T-S1 available for general industrial ambient applications.
  - Measures RH over the range of 0-100% (with accuracy of +/- 2% over 10%-90%)
  - Measures temperature over the range of -40°F-255°F with accuracy of +/- 1.8°F over -4°F to 158F (range of -40°C - 124°C with accuracy of +/- 1°C over -20° to 70°C)
  - Calculates Dew Point over the range of -40°F - 176°F (-40°C - 80°C)
  - Calculates GPP (Grains Per Pound) when in Fahrenheit mode over the range of 0.1-3820 GPP
  - Calculates GPK (Grains Per Kilogram) when in Celcius mode over the range of 0.01-545 GPK

- **General Features:**

  - Connector for external Electrodes
  - On-screen reading recall of up to 1400 readings
  - Date and time stamp for each stored reading
  - Job groupings
  - Optional infrared linking capability w/ application software
  - 9V battery included
  - 1-year warranty
  - Carrying Case

OPERATING INSTRUCTIONS

-User Guide-

This guide provides step-by-step instructions on powering up, using and powering down the meter.

NAVIGATION:

The meter uses an on-screen, menu-driven approach to navigate through the meter features, allowing for an intuitive understanding of keypad functions. Each screen presents the user with a number of selectable options. One of the options is always selected and the user can move (navigate) the selection to any other available option. The keypad is aimed at providing navigational control, and not at accessing specific features. There are four directional keys aligned intuitively around a middle (fifth) key (see Figure 1): Above (UP), below (DOWN), to the right (RIGHT) and to the left (LEFT). The middle key is used to SELECT the option highlighted on the screen. For purposes of this owner's manual, the five keys will be referred to as ⇦ ⇨ ⇧ ⇩   and SELECT.
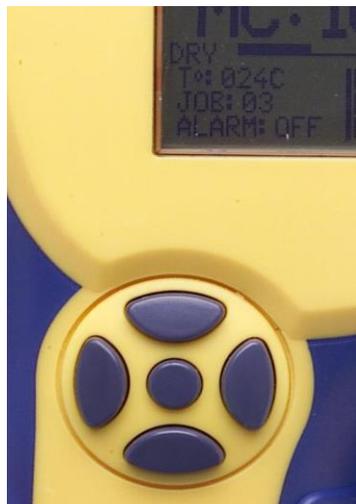

Fig. 1 Keypad Layout

INSTALLING THE BATTERY:

The battery compartment is located on the underside of the case, at the bottom of the handle.

1. Open the battery compartment by sliding the lid back while pressing on the release indent.
2. Ensure correct polarity, and push the battery in flush with the bottom board until the connectors snap together on both sides. Use only Duracell or Energizer alkaline 9V.
3. Replace the battery compartment lid.

IMPORTANT NOTE:

DO NOT REMOVE THE BATTERY WITHOUT TURNING THE METER OFF FIRST.
BATTERY REMOVAL WHILE THE METER IS ON MAY CAUSE LOSS OF STORED READINGS AND MAY CORRUPT THE STORAGE MEMORY. IF THIS OCCURS, CERTAIN FUNCTIONS (SUCH AS STATISTICS, READING RECALL, ETC) WILL FAIL AND LOCK UP THE METER. If the battery is removed by accident while the meter is ON, and if the readings already stored are important, DO NOT store additional readings. Turn the meter back on and perform a PC download. Beware that any readings stored during the power cycle that included the battery removal WILL NOT be available and CANNOT be recovered. Once the download is complete, perform a meter reset by choosing "RESTORE DEFAULTS" in the Storage Menu. If a download is not necessary, go directly to "RESTORE DEFAULTS".

LOW BATTERY:

The meter features a battery status monitor, designed to warn the user as well as protect measurement accuracy from impending battery failure conditions. The battery warning is triggered by either continuous or temporary low voltage conditions. Visible (a battery icon on the top right side of the display) and audible (buzzer warble) indicators accompany a battery warning.

Once a permanent low battery condition is detected, all measurement functions are disabled. Enough power remains for other menu functions, including a PC download, although almost any user action at this time causes a low-battery warning to be generated. The battery should be replaced immediately. If the battery reaches critical levels, the meter will refuse to stay on at power-up.

This gradual warning system is intended to provide the user advanced battery status notice and give ample time for replacement before operational limitations occur.

NOTE: *Stored readings are not lost during battery replacement or low battery conditions. Current meter settings are maintained as well.*

TO POWER THE METER ON:

To turn the meter on, press and hold the SELECT button for approx. 2 seconds. The first screen will temporarily display the meter name and the software revision level. Refer to this revision level whenever you call Customer Service.

The next screen is the MAIN MENU. Use ⇦ ⇨   ⇧   ⇩ keys to select the desired function/mode and then press **SELECT** to activate the function.

METER USE

BASIC AND ENHANCED MODES:

TotalCheck may be used as a BASIC meter, which allows the user to begin taking readings in either the scan mode or pin mode, without having to set up a job definition. **BASIC** mode does not allow for data collection and is the default mode of the meter upon power up.

Or, TotalCheck may be used in ENHANCED mode, which requires the user to set job definitions and materials for each location within a job. The meter also stores each reading in **ENHANCED** mode to allow for on screen reading recall or download to a PC.

USING THE METER IN BASIC MODE:

TotalCheck is shipped from the factory set to BASIC mode. Use this option if you wish to use the meter for scan or pin readings without having to set up a job.

Although Basic Mode does not allow for data acquisition, it does allow the user to set the type of material being tested, and set the alarm to sound if a pre-established %MC is exceeded.

```
BASIC MENU

1.PIN MODE    4.DEFAULTS
2.SCAN        5.ENHANCED
3.RH-T MODE   6.OFF
```

TO TAKE PIN READINGS IN BASIC MODE:

1. **From the BASIC Main Menu**, use the ⇩ key to highlight **PIN MODE**. Then, use the **SELECT** key to enter the pin mode.

2. **The meter will display** the main %MC **READ** screen, as shown below:

```
MC: 19.2%

DRY --------------------------------- WET

DOUG FIR        T : 70 F
4P NONINS       EXIT
ALARM: OFF
```

3. **Use the ⇩key to highlight the default material** (Douglas Fir) if you wish to change it to a different material. Press the **SELECT** key to get into the **SELECT MATERIAL** sub menu.

```
DOUG FIR       ASPEN
SHEETROCK      APITONG
REL 0-100      BAMBOO
SPF            BASWOOD
ALDER          BEECH_EURO
ASH_WHITE      BIRCH
BACK           NEXT
CANCEL
```
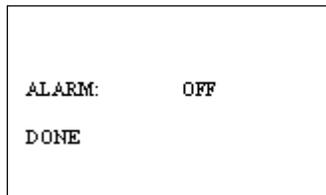
4. **Use the ⇧   ⇩ keys to highlight** the material you are testing. Press the **SELECT** key to choose that material. This will bring you back to the main %MC **READ** screen.

5. **Use the ⇧ ⇩ keys to highlight** the pin type selection. Press the **SELECT** key to toggle between 4-pin (non-insulated) pins and 2-pin (insulated) pins.

   You may begin taking readings by inserting the pins into the material and pressing the **SELECT** key. This will display a %MC reading. If you wish to hold a reading on screen, press the **SELECT** key again; otherwise remove the pins from the material being tested and take another reading.

TO SET THE ALARM IN BASIC PIN MODE:

1. **If you wish to set the alarm** to beep after a pre-selected %MC value is reached, use the ⇧ ⇩ keys from the %MC screen to highlight the **ALARM**. Press the **SELECT** key to enter the alarm sub menu.

2. **The default status of the alarm is "OFF**." Press the **SELECT** key to turn it on.

```
┌─────────────────────────────┐
│                             │
│                             │
│   ALARM:      OFF           │
│                             │
│   DONE                      │
│                             │
│                             │
└─────────────────────────────┘
```

3. **After the alarm is turned on, use the ⇦ ⇨ keys** to scroll up or down to a higher or lower alarm value.

4. **After you have selected the alarm value**, use the ⇩key to highlight **DONE.** Press **SELECT** to get back to the %MC **READ** screen.

**Default alarm settings in pin mode are as follows for different materials:**

   All wood materials: 15%
   Drywall: 1.0%
   Concrete: 85 (on the 0-100 relative scale)

   Note: The default alarm setting in scan mode is 300.

TO CHANGE THE TEMPERATURE CORRECTION:

TotalCheck defaults to a temperature of 70ºF. As wood temperature increases, its electrical resistance decreases and indicated moisture content rises. Lower wood temperatures result in lower indicated moisture content. A correction is necessary if the wood temperature is outside the range of 50ºF (10ºC) to 90ºF (32ºC). Set the temperature accordingly and the meter will make the correction.

1. **To change temperature** use the ⇐ ⇒ keys from the %MC **READ** screen to highlight the **TEMPERATURE**, T: 70ºF. Press the **SELECT** button to get into the **TEMPERATURE** sub menu.
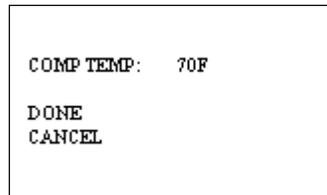
```
COMP TEMP:    70F

DONE
CANCEL
```

2. **To scroll through the temperature settings**, use the ⇐ ⇒ keys to scroll up or down to a higher or lower temperature value. Temperature values will change in 5°F increments.

3. **To change between ºC and ºF** press **SELECT** key when the **COMP TEMP** is highlighted.

4. **After you have selected the appropriate** temperature setting, use the ⇩ key to highlight **DONE**. This will bring you back to the %MC **READ** screen and you may begin taking readings.

TO TAKE SCAN READINGS IN BASIC MODE:

1. **From the BASIC Main Menu**, use the ⇧ ⇩ key to highlight **SCAN MODE**. Then, use the **SELECT** key to get into the **SCAN** mode main menu.

   The meter will display the main **SCAN** mode main menu, as shown below:

```
SCAN MODE
   142
DRY ------------------------------WET
ALARM: OFF        EXIT
```
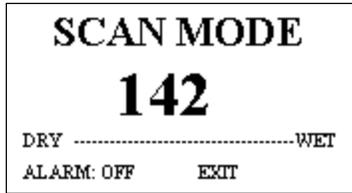
2. **You may begin taking readings** by firmly pressing the back of the meter onto the material. This will display a relative reading that ranges between 0 and 300.

TO SET THE ALARM IN BASIC SCAN MODE:

1. **If you wish to set the alarm** to beep after a pre-selected relative value is reached, use the ⇧   ⇩ keys from the **SCAN** screen to highlight the **ALARM**. Press the **SELECT** key to enter the alarm sub menu.

```
ALARM:        OFF

DONE
```
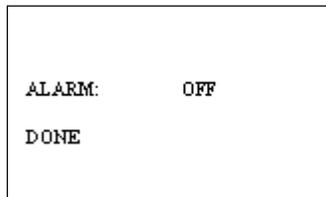
2. **The default status of the alarm is "OFF."** Press the **SELECT** key to turn it on.

3. **After the alarm is turned on, use the** ⇦   ⇨   keys to scroll up or down to a higher or lower alarm value.

4. **After you have selected the alarm value**, use the ⇩key to highlight **DONE.** Press **SELECT** to get back to the %MC **SCAN** screen.

Note: Default alarm settings for SCAN mode is 300.

TO TAKE TEMP/RH READINGS IN BASIC MODE:

Before entering the RH-T mode, firmly insert the RH/T-S1 sensor into the top of the meter, making sure to align the pin-out on the DIN connector.

1. **From the BASIC Main Menu**, use the ⇧ ⇩ key to highlight **RH-T MODE**. Then, press the **SELECT** key to get into the **RH-T** mode main menu.
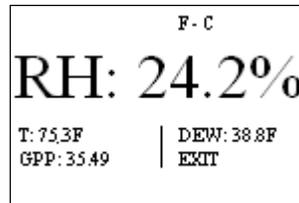
   The meter will display the main **RH-T** mode main menu, as shown below:

```
                    F-C

RH: 24.2%

T: 75.3F        |  DEW: 38.8F
GPP: 35.49      |  EXIT
```

2. **The meter will begin taking readings.** As a default setting the RH reading will be the most prominent on the screen. If you would like to make another variable (temperature, GPP or dew point), the prominent reading, use the ⇧ ⇩ and ⇦ ⇨ keys to highlight your selection. Press the **SELECT** key to choose that variable.

TO RESET THE METER TO DEFAULT SETTINGS IN BASIC MODE:

1. **Use the ⇦ ⇨ keys from the BASIC** main menu to highlight #4: **DEFAULTS**. Press the **SELECT** key. The meter will display the following question:

```
   SETTINGS WILL BE
       DELETED

      CONTINUE?

YES              NO
```
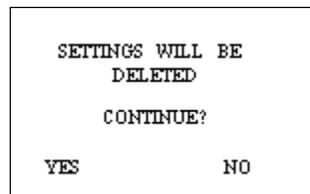
2. **Use the ⇦ ⇨ keys to answer "YES" or "NO."** If you answer "yes," the meter will return to factory default settings in basic

mode; i.e. Species = Douglas Fir, Temperature correction = 70 F, Alarm = OFF in pin mode. In Scan mode, Alarm = "off."

USING THE METER IN ENHANCED MODE:

To use TotalCheck in enhanced mode, use the ⇧   ⇩ keys to highlight #5: **ENHANCED**. Setting the meter to enhanced mode requires you to create job definitions and store readings as described below.

NOTE: Although TotalCheck's default mode is BASIC, it will remember the mode last saved at power off, and will remain in the saved mode at next power up.

Settings stored in each particular mode will not be affected by restoring defaults in a different mode.

JOB DEFINITION:

Using TotalCheck in **ENHANCED** mode allows you to define jobs. In this mode, TotalCheck also stores each reading and allows you to download the data to a PC or laptop via Infrared connection. Jobs may be defined only when using the meter in pin mode or RH-T mode. Scanned readings cannot be part of a job.

TO CREATE OR MODIFY A JOB IN PIN MODE:

1. **From the Enhanced Main Menu,** highlight **PIN MODE.**

2. **Use the ⇧   ⇩ keys to highlight** JOB. Press **SELECT** to enter the job sub menu.
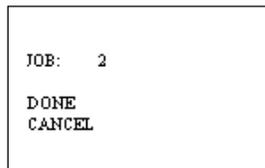
```
JOB:   2

DONE
CANCEL
```

3. **Use the ⇨key to change the job number**.   Press the ⇩ key and highlight **DONE**. Press **SELECT** to save that job number.

If it is a new job, the "Create Job" screen will appear as follows:

```
CREATE JOB 3

DOUG FIR
T: 70F
ALARM OFF

DONE
CANCEL
```

At the "Create Job" screen, you may select the material being tested, specify the temperature at which measurements will be taken, and select an alarm value, if desired. All parameters are alterable while taking readings in the new job, except for the species.

If the job was previously defined and used, you will be asked if you want to "Update" the job.

```
JOB 1 IN USE

UPDATE DATA?

YES        NO
```

Use the ⇦ ⇨ keys to answer "YES" or "NO." If YES is selected, the meter will retrieve the selected job's settings (during this time a "PROCESSING…" message appears) and then switch back to the Pin Mode screen with the restored settings.

If NO is selected, the meter returns to the Job sub menu.

TO SET TEMPERATURE CORRECTION:

TotalCheck defaults to a temperature of 70ºF. As wood temperature increases, its electrical resistance decreases and indicated moisture content rises. Lower wood temperatures result in lower indicated moisture content. A correction is necessary if the wood temperature is outside the range of 50ºF (10ºC) to 90ºF (32ºC). Set the temperature accordingly and the meter will make the correction.

1. **To change the temperature**, use the ⇧ ⇩ keys from the **CREATE JOB** sub menu to highlight the temperature, T: 70ºF.

2. **Press the SELECT key** to enter the **COMP TEMP** sub menu.

3. **Using the** ⇦ ⇨ **keys**, scroll up or down to a higher or lower temperature value. Temperature values will change in 5º F increments.

4. **To change between C and F**, press the **SELECT** key when the **COMP TEMP** is highlighted.

```
COMP TEMP:    70F

DONE
CANCEL
```

TO SET THE ALARM IN ENHANCED PIN MODE:

1. **If you wish to set the alarm** to beep after a pre-selected value is reached, use the ⇩ key from the **MC READ** screen, highlight **ALARM**, and press the **SELECT** key to enter the **ALARM** sub menu.

```
ALARM:        OFF

DONE
```

2. **The default status of the alarm is "OFF."** Press the **SELECT** key to turn it on.

4. **After the alarm is turned on, use the** ⇦ ⇨ keys to scroll up or down to a higher or lower alarm value.

5. **After you have selected the alarm value**, use the ⇩key to highlight **DONE**. Press **SELECT** to get back to the **MC READ** screen

Default alarm settings in PIN mode are as follows for different materials:

All wood materials: 15%
Drywall: 1.0%
Concrete: 68 (on the 0-100 relative scale)

TO TAKE PIN READINGS IN ENHANCED MODE:

1. **From the Enhanced Main Menu**, use the ⇧ ⇩ keys to highlight #1, **PIN MODE**.

2. **Press the SELECT key to get into the ENHANCED READ** screen. The current location will stay the same while toggling between scan and pin modes.
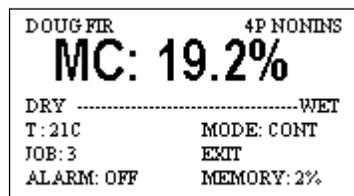
This screen contains the following information: material, pin setting, temperature correction, Job #, alarm setting, mode, and memory used.

3. **Using the external probe, insert the pins into the material. The meter will** start taking measurements in one of the two following ways, depending on whether it is set for **CONTINUOUS** or **TRIGGERED** mode. To choose between **TRIGGERED** or **CONTINUOUS**, use the ⇧ ⇩ and ⇦ ⇨ keys to highlight **MODE**, and then press the **SELECT** key to toggle between **TRIG** and **CONT.**

   - **When the meter is set to Triggered mode**, a single reading is taken every time the **SELECT** button is pressed. Each reading is stored in memory. The last measurement remains displayed on the screen.

   - **When the meter is set to Continuous mode**, press **SELECT** key to initiate the reading cycle. The meter keeps taking MC readings in this mode. These readings are NOT stored until the **SELECT** key is pressed again. To exit continuous mode WITHOUT STORING the current reading, press any directional key (⇧ ⇩ and ⇦ ⇨**)**. To exit continuous mode and STORE the current reading, press

the **SELECT** key. Exiting continuous mode leaves the last reading on the screen. To resume continuous mode, press the **SELECT** key again. Use the ⇧ ⇩ and ⇦ ⇨ keys to choose a different option.

4. At any time, you may modify Temperature (T)

The **EXIT** option in both **SCAN** and **PIN MODE** menus will cancel the measurement process and will put the meter in the **MAIN MENU**.

TO TAKE SCAN READINGS IN ENHANCED MODE:

1. **In the MAIN Menu**, highlight option #2: **SCAN**

The screen will look as follows:

```
SCAN MODE
     142
DRY --------------------------------WET
ALARM: OFF       EXIT
```
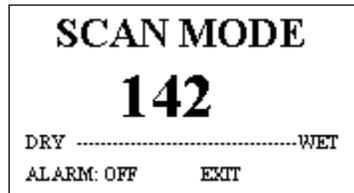
2. **You may begin taking readings** by firmly pressing the back of the meter onto the material.

3. This will display a relative reading that ranges between 0 and 300.

TO SET THE ALARM IN ENHANCED SCAN MODE:

1. **If you wish to set the alarm to beep after a pre-selected relative value is reached, highlight option #1: SCAN MODE from the ENHANCED main menu.** This will bring you to the **SCAN** screen.

2. **Use the ⇩ and ⇨ keys and highlight** ALARM: OFF. Press the **SELECT** key to enter the alarm sub menu.

3. **The default status of the alarm is "OFF."** Press the **SELECT** key to turn it on.
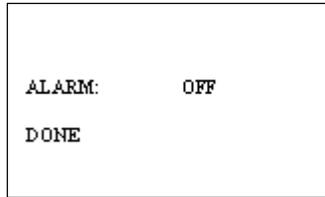
```
ALARM:        OFF

DONE
```

4. **After the alarm is turned on, use the** ⇦ ⇨ keys to scroll up or down to a higher or lower alarm value.

5. **After you have selected the alarm value**, use the ⇩key to highlight **DONE**. Press **SELECT** to get back to the **SCAN** screen.

   Default alarm settings for SCAN mode is 300.

TO TAKE TEMP/RH READINGS IN ENHANCED MODE:

Before entering the RH-T mode, firmly insert the RH/T-S1 sensor into the top of the meter, making sure to align the pin-out on the DIN connector.

1. **From the ENHANCED Main Menu**, use the ⇧ ⇩ key to highlight **RH-T MODE**. Then, press the **SELECT** key to get into the **RH-T** mode main menu.

   The meter will display the main **RH-T** mode main menu, as shown below:

```
NEW JOB        F - C

RH: 24.2%

T: 75.3F        DEW: 38.8F
GPP: 35.49      EXIT
JOB: 01         MEMORY: 1%
```
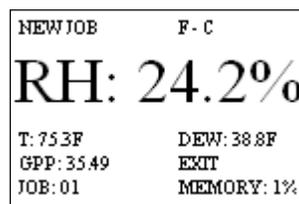
2. **The meter will begin taking readings.** As a default setting the RH reading will be the most prominent on the screen. If you would like to make another variable (temperature, GPP or dew point), the prominent reading, use the ⇧ ⇩ and ⇦ ⇨ keys to highlight your selection. Press the **SELECT** key to choose that variable.

MAIN MENU OPTIONS:

STORAGE:

The Storage Menu groups all meter features related to measurement storage, retrieval and manipulation. All operations on stored readings may only be performed on a single job.

1. While in the **ENHANCED** main menu, use the ⇧   ⇩ keys to highlight option #4 **STORAGE**.

2. Press the **SELECT** key to enter the storage sub menu. There are four available selections in this menu as shown below:

```
           MEMORY USAGE
   E ||_____ F

   VIEW MC STATISTICS
   STORED READINGS
   CLEAR MEMORY
   RESTORE DEFAULTS
   EXIT
```

- **View Statistics**:

  This menu option selects the meter's statistical analysis option. Selecting this option gives the user access to two sets of statistical data. A screen shot example of the first set is shown below:

```
   JOB:         3
   READINGS:    2
   MC AVG:      21.7%
   STD DEV:     2.0%
   COEF VAR:    0.092

   MORE
   DONE
```

- The first line indicates the Moisture Content (MC) job being analyzed.

- The second line shows the number of readings stored in the specific job

- The third line shows the Average MC value for all stored readings in the specific job.

- The fourth line shows the Standard Deviation for the specific job.
- The fifth line shows the Coefficient of Variation for the specific job.
- Selecting "MORE" gives the user access to the second set of statistical data.
- Selecting "DONE" returns the user to the storage menu screen.

NOTE:

The second set of calculations may require significant processing time, depending on the number of readings stored in the specific job. The meter will display a screen with the word "PROCESSING…" while calculations take place. User input is ignored during this time. Control is returned to the user once the algorithm is complete and the second statistics screen is shown, as in the example below:

```
JOB:          1
READINGS:     2
95% CI:       3.7

MIN:          9.0
MAX:          16.4
```

- The first line indicates the specific MC job.
- The second line indicates the number of readings present in the specific job.
- The third line shows the 95% Confidence Interval for the specific job. This is the value (+/-) away from the calculated average value within which 95% of the stored readings are guaranteed to exist.
- The fourth line shows the value of the lowest MC reading stored in the specific job.
- The fifth line shows the value of the highest MC reading stored in the specific job.

There are no control entries present in this screen, such as "MORE", "CANCEL" or "DONE". The only available option is to return to the storage menu screen, by pressing any key.

- **STORED READINGS**:

    1. **From the storage sub menu,** use the ⇧ ⇩ keys to highlight "STORED READINGS." Press the SELECT key to enter the stored readings sub menu.

        There are two available selections from this menu, as follows:

        ```
        SHOW MC READINGS
        SHOW RH-T READINGS

        CANCEL
        ```

    2. **Use the ⇧ ⇩ keys to highlight** MC readings or RH-T readings. Press the SELECT key to choose your selection.

    3. **By using the ⇦ ⇨ keys** you may select which job you wish to view. If there are no readings in a job, the following screen will display:

        ```
        JOB:     3

        NO READINGS

        CANCEL
        ```

        If there are readings saved to a job, the following screen will display:

        ```
        JOB:          3
        READINGS:     2

        VIEW SET:     1 - 2

        DONE
        CANCEL
        ```

        After you have made your job selection, scroll to **DONE** and press the **SELECT** key.

        A complete record of information per reading will be displayed. You will be able to scroll through each reading, using

the **NEXT** key. Scroll to "DONE" if you do not wish to see any more readings.

```
JOB:2
RECORD:1 OF 3

MC:21.4%
DOUG FIR AT 21C
10.12.04          |8:33AM
NEXT
DONE
```

A selected job containing readings offers two other selectable options: "VIEW SET" and "DONE".

- o **VIEW SET:** This option allows the user to view a specific range of readings in a particular job, as opposed to the entire set, by providing a configurable start point. It becomes useful when large numbers of readings are present in the meter. View Set always begins by displaying "1 TO XXX", where XXX is the maximum number of readings in the selected job. If left unchanged, the first reading to be reviewed will be number 1. Readings may only be reviewed in ascending sequential order.

  Using the ⇦ ⇨ keys, the left-side value can be changed in increments of 10. For example, assume the selected job contains 23 readings. The View Set entry will begin by displaying "1 TO 23". Successive Right button presses will yield the following: "11 TO 23" and "21 TO 23". At this point, the value on the left side is within 10 readings of the value on the right side. Alternately, pressing the Left button causes the meter to subtract 10 from the current left-side value.

- o **DONE:** Selecting this option signals to the meter that the user has completed the reading recall setup process and is ready to begin reviewing readings.

NOTE: There may be a significant delay while the meter processes the required set of readings for review, depending on the number of jobs present in the meter, percentage of memory space occupied by readings, current job size and fragmentation. The meter will display a screen with the word "PROCESSING…". User input is ignored during this time. Control is returned to the user once the algorithm is complete and the Retrieved Readings screen is displayed, as shown in the example above:

- o **Cancel**: This feature returns the meter to the Storage Menu
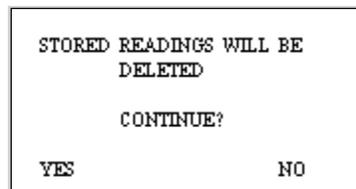
- **CLEAR MEMORY:**

  This option will delete all the readings stored in the meter, but will keep the defined job structures and associated locations and areas in tact.

  ➢ **RESTORE DEFAULTS:**

  This will delete all defined parameters and readings stored in the meter. The meter will be now set to the factory parameters: T = 70F, Non-insulated probe, Backlight = OFF, Power-off time = 2 min.

Note:

Memory deletion and restoring defaults are both irreversible.

```
┌─────────────────────────────────┐
│   STORED READINGS WILL BE       │
│          DELETED                │
│                                 │
│        CONTINUE?                │
│                                 │
│  YES                    NO      │
└─────────────────────────────────┘
```

- **EXIT**: This menu option returns the meter to Main Menu

IR LINK:

This menu option initiates a wireless communication session during which the currently stored readings will be downloaded to a PC. Before using this feature, the target PC must be loaded with Delmhorst Instrument Co.'s Universal Application Program and a Delmhorst base unit must be connected to an available USB port.

- **REQUIREMENTS:**

  The wireless communication technology employed in the meter requires line-of-sight access between the red side window of the meter and the receiving window of the base unit. Simply place the meter and base unit on a flat surface, with the red side window of the meter facing the receiving window of the base unit. Separation requirements between the meter and base unit are anywhere from 0 to 12 inches.

- **OPERATION:**

  1. **Begin by starting the Delmhorst Instrument Co.** Universal Application Program (double click the application icon or choose the program from the Start Menu).

  2. **Once the TotalCheck and base unit** are lined up and the base unit is connected to a USB port (a green LED should be lit), select the IR LINK option in the Main Menu. The meter will display the message "Linking…" for a few seconds, followed by "Link OK" when successful communication is established with the base unit. The base unit will also indicate communication established by turning off the green LED and turning on a red LED.

  3. **Press the "MANAGE DATA" button in the Delmhorst Instrument Co.** Universal Application Program. The meter will display "**Data**" on the screen and the base unit will alternately turn on a yellow and red LED while data transfer takes place (red indicates communication between the meter and Base Unit, while yellow indicates communication between the base unit and the PC). When finished, the meter will return to the Main Menu and the base unit will, once again, turn on its green LED. For further details on managing the meter data in the PC please refer to the HELP feature in the program.

     NOTE: The above sequence of events in initiating communication between the PC and the meter is not mandatory. The Application Program may be started first, or the IR Link may be selected first. The **MANAGE DATA** button may also be pressed before communication is started between the Base Unit and the meter. The meter, base unit and Application Program all have ample delays built in to allow the other link components to come online in any sequence.

- **TROUBLESHOOTING THE IR LINK:**

Most problems tend to occur due to the positioning of the meter relative to the base unit. There are a few error messages that may appear on the meter's screen:

a. **Timeout**: This error message occurs when too much time has passed between data sent by the meter and the response that should have been received from the base unit. Possible causes:

   - Meter misalignment with the Base Unit (make sure the communication windows are facing each other, within the distance indicated).

   - Base Unit is not powered. If power is present, one Base Unit LED should be lit. If this is not the case, check power connections.

   - No connection to the PC. The Base Unit must be connected to the PC through a serial cable. Check connection.

b. **KBD:** This message occurs when the user presses a key during communications. Do not push any key on the meter during data transfer. The meter interprets this as a request to escape this activity and returns to the Main Menu. The base unit should return to a green LED status in a few seconds. A message should appear on the PC screen as well, indicating lost communications.

c. **Sync:** This message occurs when data framing is lost during data transmission. This would only happen if the wireless link becomes unreliable. Ensure the meter and base unit are aligned and restart the session.

d. **Data E**: This message occurs when the content of a correctly framed data packet is invalid. Again, this is an unreliable wireless link problem.

   NOTE: Individual records cannot be downloaded to the PC. The entire storage content is delivered to the PC during a link session.

SETUP MENU:

The Setup group of features allows access to the configurable parameters of the meter. They are: Date and Time, Power-off time, Backlight, and Conversions (temperature mode and electrode type). All can only be accessed in the Setup Menu. **To get to the Setup Menu, use the** ⇧ ⇩ **keys** to highlight option #6: **SETUP**.

SETUP MENU ENTRY DESCRIPTIONS:

```
TUE-10.12.04      10:53 AM
SETUP MENU
1.RETURN TO MAIN MENU
2.SET DATE AND TIME
3.SET POWER-OFF TIME
4.SET BACKLIGHT
5.SET CONVERSIONS
```

- **Return to Main Menu:** This menu option returns the meter to Main Menu. The meter also returns to Main Menu if no user input is detected for 20 seconds.

- **Set Date and Time:** This menu option allows user access to the date and time set screen:

```
YEAR:          04
MONTH:         10
DATE:          12
DAY:           TUE
HOURS:         10 AM
MINUTES:       58
DONE
CANCEL
```

The Date and Time set screen is populated with the time and date values present in the meter at access time. ⇧ ⇩ key action switches the row selection among available parameters. ⇦ ⇨ key action changes the selected parameter's value (for "**DONE**" and "**CANCEL**" – parameters without assigned values, the ⇦ ⇨ keys perform no function). All parameter values are incremented using the ⇨ key and decremented using the □ key. The DAY parameter moves forward through weekdays using the ⇨ key and backward using the ⇦ key. The **SELECT** (center) key is only active when menu selection is applied to "**HOURS**" (switch between standard or military time), "**DONE**" or "**CANCEL**". Selecting "**DONE**" exits this screen back to the **SETUP MENU** and updates the clock with the newly chosen

values. Selecting "**CANCEL**" exits this screen back to the **SETUP MENU** without updating the clock.

- **Set Power Off time:** This menu option allows the user to change the amount of time allowed to lapse between the last key press and meter shut-down. Allowable range is 1min – 9min, with a default value of 2min.

```
TIMEOUT:        02 MIN

DONE
CANCEL
```
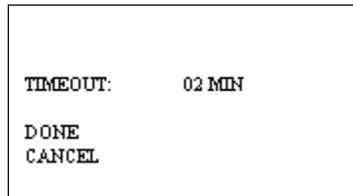
- **Set Backlight:** This menu option allows the user to change the amount of time allowed to lapse between the last key press and backlight shutdown. The default setting for this feature is "**NO**", where the backlight is completely disabled. Backlight shutdown delays are 10, 20, 30sec. It is recommended that the backlight delay be set to the minimum amount of time necessary in order to maximize battery life.

```
BACKLIGHT:      10 SEC

DONE
CANCEL
```
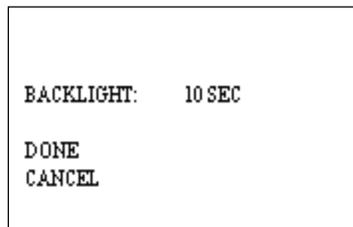
- **Conversions:** This menu option allows the user to change the temperature scale from Fahrenheit (default) to Celsius. You can also change the electrode type from 4-pin (or non-insulated) to 2-pin (insulated.)

   NOTE: Except for clock settings, all other parameters will return to their default values, as indicated above, when the "RESTORE DEFAULTS" option is selected in the Storage Menu. The values chosen for the Setup Menu parameters will remain in effect even if the meter is turned off, and even if the battery is removed.

TAKING A READING – PRACTICAL APPLICATIONS

The following application notes are intended for use with the meter in PIN MODE.

TESTING WOOD:

Use the 26-ES electrode on hard materials, wood over 50mm (2 inches) thick, or for any application where using the insulated pins are needed for best accuracy. The 2-E electrode, with pins that penetrate 8mm (5/16") maximum are best for drywall and wood up to 50mm (2 inches). The 22-E with 13mm (1/2in) non-insulated pins is also an excellent option for wood or drywall. Mount the electrode directly to the external connector at the top of the meter.

⇒ **Set the meter's parameters** as described previously in the owners' manual. If the species (construction-grade only) is unknown, set the meter to the reference calibration, Douglas Fir and take the readings at face value.

⇒ **To take a reading**, align the contact pins parallel to the grain and push them to their full penetration into the wood, if possible. Insulated pins read only at the tip and can be driven to the desired depth.

⇒ **Press the SELECT button** and read the moisture content on the meter scale. The meter displays the %MC for two seconds.

⇒ **To add a reading to the** previously stored readings, release the SELECT button if you are in triggered mode. If you are in continuous mode, the meter will not store a new reading until the SELECT button is pressed and released again during the reading cycle.

NOTE: MC RANGE AND VALID READINGS

Readings below 5% or above 60% are displayed as LOW or HIGH, respectively. However, since the resistance of the wood also depends on the species and temperature of the wood, the meter may not always be able to read down to 5%. For different species and different wood temperatures, there is a minimum %MC limit below that the meter can not read. All readings below this "lowest limit" are displayed as LOW, and are not stored. These readings are not considered valid readings and are not used by the meter in any statistical calculations.

PAINT FAILURE AND MOISTURE

Moisture is by far the most frequent cause of paint failure. The key to preventing paint failure is to insure that moisture is not absorbed through the wood to the back of the paint film. So, in order to insure quality paint jobs, wood must remain dry after the application of paint.

Outdoor wood can be safely painted without danger of peeling if the %MC is 15% or less. In drier climates, the maximum reading should be 10% to 11%. Indoor wood should be between 7% to 8% prior to painting.

The following conditions may cause high moisture content in wood:

⇒ Leaky gutters and down spouts
⇒ Leaky pipes or condensation on cold water lines in attic or hollow walls
⇒ Faulty flashing around windows, doors and where porch and dormer roofs meet sidings
⇒ End-grain wood that is not sealed with paint at all joints around windows, corners, and butt joints
⇒ Porch columns that do not have good drainage and ventilation where they rest on porch floors
⇒ Siding or any other wood that is in contact with the ground may absorb moisture
⇒ Siding and shingles without sufficient lap so that water is forced up through cracks by wind pressure
⇒ Ice dams
⇒ Condensation of vapor within hollow walls

EIFS (Exterior Insulation & Finish Systems) *

Moisture intrusion problems in EIFS (also known as synthetic stucco) stem from leaking window frames, improper use of or lack of sealant, and faulty installation of flashing.

If you suspect a problem take a visual inspection. Look for gaps around windows, doors, air conditioning units, light fixtures, hose bibs, dryer vents and other areas of potential penetration. Also look for visible signs of water damage. If you feel a problem exists, use the **TotalCheck** with a **# 21-E electrode**. This electrode includes the **#608 - (10mm / 4") insulated pins or #608/001 (15mm / 6") Insulated pins in EIFS Package.**

   Procedure:

⇒ **Drill two 6mm (1/4") holes** about 19mm (¾") apart at an upward 45° angle.

⇒ **Push the # 21-E Electrode into the holes** through the polystyrene and into the substrate.

⇒ **Press the SELECT button** and read the moisture content on the meter scale. The meter displays the %MC for two seconds.

⇒ **To add a reading to the** previously stored readings, release the SELECT button if you are in triggered mode. If you are in continuous mode, the meter will not store a new reading until the SELECT button is pressed and released again during the reading cycle.

   *If the sheathing is plywood, set the meter to the proper species if known. If the species is unknown, use Douglas Fir. If the sheathing is gypsum material, set the species to Drywall.

USING 0-100 NUMERICAL REFERENCE SCALE (REL 0-100)

When taking a reading on hard materials such as concrete or masonry, set the meter to REL 0-100 for a **qualitative** indication of the moisture level.
Make the best use of reference scale by first establishing a benchmark for the material you are testing. Take readings in areas that you know are dry, or acceptable. Then take readings on areas that are wet. These "dry to wet" readings can be used as reference points against

which subsequent readings are compared. Understanding the meter's behavior on a particular material, along with these comparative readings, your experience, and visual clues will all help determine the overall condition. All readings should be evaluated in the light of factors such as type of paint, type of construction, and climatic conditions.

The user-selectable alarm will sound if the displayed reading is above the alarm value.

TESTING CONCRETE SLABS FOR FLOORING APPLICATIONS

Moisture meters are an effective tool to check comparative moisture conditions in concrete slabs. They can tell you where there may be excess moisture and help determine if you need to conduct further testing, and identify specific areas on which that testing should be performed. Meters do not provide quantitative results as a basis for acceptance of a slab for installation of moisture-sensitive flooring systems. ASTM Test Method F2170 (RH using in-situ probes), F1869 (calcium chloride), and F2420 (RH on surface using insulated hood) provide quantitative information for determining if moisture levels are within specific limits.

It is important to test both the surface and mid-section of the slab, especially if the slab is on or below grade. This will help determine if there is continuous moisture migration toward the surface. If this condition exists, the moisture movement may be so slow that once it reaches the surface, moisture evaporates and causes a "dry" reading when a surface test is made.

However, if a sub-surface test is made, the meter may read "wet" indicating the presence of moisture. When the slab is covered and the upward movement of moisture continues, moisture will move into a hygroscopic (wood) floor, or build-up pressure under a non-breathing synthetic floor, causing delamination.

Taking surface readings:

> **Set the meter to PIN mode and the 0-100 Rel scale**

> **Drive two hardened-steel masonry nails** about 19mm (3/4") apart into the finish coat of concrete floor. Drive them about 3mm (1/8") deep so they make firm contact with the concrete and do not move when touched

> **Touch the nails** with the contact pins.

> **Press the select key** and read the meter. If the meter reads less than "68", the surface is dry. However, sub-surface tests should be made to verify if the slab is dry throughout.

Taking subsurface readings:

> **Drill two 6mm (1/4") holes,** 19mm (3/4") apart and 13mm to 50mm (1/2" to 2") deep.

> **Drive the masonry nails** into the bottom of the holes and make the tests as described above. Nails must not touch sides of drilled holes.

If the meter still indicates a "dry" condition, the floor is ready for covering. Tests should be made at several points, especially when the slab is thick (10mm /4" or more) and air circulation is poor. Make tests only in newly drilled holes.

Even readings in the "wet" range can indicate relatively low moisture content in Concrete. For example, readings in the "68 to 77" range indicate approximately 2% to 4% moisture content.

When evaluating a slab for readiness, always consider its age, thickness, whether the slab is on grade or suspended, whether a vapor barrier is present and the drainage condition of the ground.

MEASURING RH IN CONCRETE SLABS:

TotalCheck can be used to measure the RH in a concrete slab in accordance with the ASTM F-2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs.

Basic Test Procedure:

⇒ Drill 16 mm (5/8") hole to a depth of 40% of the slab thckness using a rotary hammer drill. Use a drill bit specially designed for rotary drills and with 3 or 4 cutting edges to insure a smooth, round hole. Surface preparation is not required.

⇒ Vacuum the hole thoroughly, then use a wire brush to clean and loosen any concrete remaining in the hole. Vacuum again and repeat the process a second time.

⇒ Insert the yellow sleeve into the hole. Use silicone (or other water-resistant sealant) to seal the interface between the collar of the sleeve and the concrete surface. Use a hammer to insure the sleeve is fully inserted into the hole and sealed to the concrete.

⇒ Insert the protective yellow cap into the sleeve and let the hole acclimate for 72h. Optional plugs (p/n CS-Plug) are available in three sizes that will isolate a 0.062 space at the hole bottom during acclimation time.

⇒ Remove the cap and immediately insert the RH probe sensor to full hole depth. Wait minimum 1h. Connect one end of the RH/T-C1 cable to the top of meter and the other end to the exposed end of the probe sensor. Take reading using the RH/TEMP mode of TotalCheck as described on pages 13 and 19.

⇒ Alternately, insert the RH probe sensor into the sleeve immediately after setting the sleeve. Readings can then be taken as soon as the hole has acclimated. Note that continued and long term exposure to high humidity may damage the sensor irreversibly.

For a complete explanation of the ASTM F2170-02 standard, please visit www.ASTM.org. or contact Delmhorst Europe.

Refer to the White Paper, "Relative Humidity Sensor Behavior and Care" on our website for additional information regarding the sensor itself.

TESTING INSULATION:

⇒ **Set the meter scale** for the "REL 0-100" as described in the Create/Edit a Job section on page 14.

⇒ **To take a reading,** attach a 21-E electrode with 10mm (4") insulated contact pins to the meter. Push the contact pins through the drywall into the insulation behind it.

⇒ **Press the SELECT button** and read the moisture content on the meter scale. The meter displays the "relative" moisture level for two seconds.

⇒ **To add a reading to the** previously stored readings, release the SELECT button if you are in triggered mode. If you are in continuous mode, the meter will not store a new reading until the

SELECT button is pressed and released again during the reading cycle.

TESTING DRYWALL

⇒ **Set the meter scale** for Sheetrock® as described in the Create/Edit a Job section on page 14.

⇒ **To take a reading,** push the contact pins into the Sheetrock® to their full penetration, if possible.

⇒ **Press the SELECT button** and read the moisture content on the meter scale. The meter displays the %MC for two seconds.

⇒ **To add a reading to the** previously stored readings, release the SELECT button if you are in triggered mode. If you are in continuous mode, the meter will not store a new reading until the SELECT button is pressed and released again during the reading cycle.

Note:

Readings between 0.1% and 0.5% indicate a sufficiently dry moisture level. Readings between 0.5% and 1% indicate a borderline situation. Readings greater than 1% indicate material that is too wet for painting or wallpaper. A reading above 1% also indicates enough moisture present to allow mold growth to occur but only if other factors are also present such as a high RH level and food source.

CARE OF YOUR METER

➢ Store your meter in a clean, dry place. The protective carrying case provided is an ideal storage place when the meter is not in use. If the meter has been left in a hot or cold environment overnight or for an extended period, the calibration of the pinless mode may be adversely affected. Under these conditions, allow the meter to acclimate to the temperature conditions in which it will be used for minimum 1-2 hours, or as long as possible.

➢ Clean the meter with any biodegradable cleaner. Use the cleaner sparingly and on external parts only. Keep cleaner out of the external connector.

➢ Remove the battery if the meter will not to be used for one month or longer.

SERVICE FOR YOUR METER

your meter is not working properly, replace the battery with a new one and check the calibration. If this does not resolve the problem please send your meter back to Delmhorst for repair:

Before sending in your meter we recommend you give one of our trained technicians a call. Many times troubleshooting can be taken care of over the phone. Call us at +31 73 6395080

Returning instructions:

- Pack your meter securely. Enclose a purchase order or letter with a brief description of the problem.
- There is no need to call us for a return authorization number if you are within the EU. Customers outside the EU must contact us for more specific instructions prior to returning a meter.
- Include your name, address, daytime phone and fax numbers or e-mail address. If you believe the meter is under warranty, please provide the original sales slip or invoice.
- Ship via UPS, Express Mail, Priority Mail or any overnight courier who provides prompt service. Do not use standard parcel post.
- Insure your instrument for its full value and ship prepaid. We are not responsible for damage in transit.
- We do not accept COD shipments or cover any incoming freight or duty charges on returned merchandise
- Turnaround time on repairs is approximately two weeks.
- We will call you with an estimate if you specifically request one, or if we determine that the meter may be too costly to repair.
- Non-warranty repairs will be returned via UPS/COD unless you have already established other payment terms. There is no COD service outside the EU.
- Payments have to be made by Bank transfer prior to the return shipment. A Proforma invoice will be raised in advance.
- Warranty repairs will be returned at no charge if shipped within the EU via GLS Ground Service. Freight charges for expedited services (i.e., Federal Express, UPS/2 Day, UPS/1 Day, etc.) are the customer's responsibility and will be charged as per the above terms.

WARRANTY

DELMHORST EUROPE, referred to hereafter as DELMHORST, guarantees your moisture meter for one year from date of purchase and any optional electrodes against defects in material or workmanship for 90 days. If, within the warranty period of the meter, you find any defect in material or workmanship return the meter following the instructions in the "Service for Your Meter" section. This limited warranty does not cover abuse, alteration, misuse, damage during shipment, improper service, unauthorized or unreasonable use of the meter or electrodes. This warranty does not cover batteries, pin assemblies, or pins. If the meter or any optional electrodes have been tampered with, the warranty shall be void. At our option we may replace or repair the meter. DELMHORST shall not be liable for incidental or consequential damages for the breach of any express or implied warranty with respect to this product or its calibration. With proper care and maintenance the meter should stay in calibration; follow the instructions in the "Care of Your Meter" section.

Under no circumstances shall DELMHORST be liable for any incidental, indirect, special, or consequential damages of any type whatsoever, including, but not limited to, lost profits or downtime arising out of or related in any respect to the meters or electrodes and no other warranty, written, oral or implied applies. DELMHORST shall in no event be liable for any breach of warranty or defect in this product that exceeds the amount of purchase of this product. The express warranty set forth above constitutes the entire warranty with respect to Delmhorst meters and electrodes and no other warranty, written, oral, or implied applies. This warranty is personal to the customer purchasing the product and is not transferable.

<div align="center">

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For 65 years Delmhorst has been the leading manufacturer of high quality moisture meters and thermo-hygrometers. We also offer a wide range of meters for a variety of applications including woodworking/lumber, agriculture, construction, paper, restoration, IAQ and flooring.

SPECIES LIST:

The following 71 species are programmed in the meter. The default species is Douglas Fir.

1	DOUGLAS FIR	37	MAGNOLIA
2	DRYWALL	38	MAHOGANY, AFRICAN
3	REL 0-100	39	MAHOGANY, HONDURAN
4	SPF	40	MAHOGANY, PHILLIPINE
5	ALDER	41	MAPLE
6	ASH, WHITE	42	MASSARANDUBA
7	ASPEN	43	MERANTI
8	APITONG	44	MONKEY POT
9	BAMBOO	45	MYRTLE
10	BASSWOOD	46	OAK, RED
11	BEECH, EUROPEAN	47	OAK, WHITE
12	BIRCH	48	OSB
13	BUBINGA	49	PECAN
14	CEDAR, RED	50	PINE, LONGLEAF
15	CEDAR, INCENSE	51	PINE, PONDEROSA
16	CEDRELLA	52	PINE, RADIATA
17	CHERRY	53	PINE, SHORTLEAF
18	CHERRY, BRAZILIAN	54	PINE, SOUTHERN YELLOW
19	COCOBOLO	55	PINE, SUGAR
20	COTTONWOOD	56	PINE, WHITE
21	CUMARU	57	POPLAR, YELLOW
22	CYPRESS	58	PURPLEHEART
23	EBONY, AFRICAN	59	RAMIN
24	ELM, AMERICAN	60	REDWOOD
25	FIR, RED	61	ROSEWOOD, BRAZILIAN
26	FIR, WHITE	62	RUBBERWOOD
27	GUM, BLACK	63	SPF - COFI
28	GUM, RED	64	SPRUCE, ENGLEMA
29	HACKBERRY	65	SPRUCE, SITKA
30	HEMLOCK	66	TAURAI
31	HICKORY	67	TEAK
32	IPE	68	VIROLA
33	JATOBA	69	WALNUT, BLACK
34	KERUING	70	WALNUT, BRAZILIAN
35	KOA	71	WESTERN HEMLOCK - COFI
36	LARCH		