Seedburo 1200D® Digital Moisture Tester Manual

MMAN0235-02

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1 UNPACKING

Before shipment, your new **Seedburo Model 1200®D Digital Moisture Tester** has been thoroughly tested and found free of defects. Upon unpacking the unit, please inspect for any visual damage before continuing. If any damage or missing part is noticed, please retain the packing material and contact the office from which the unit was purchased.

The **Model 1200D ®** is shipped, along with a universal power supply with the DUMP CELL and the GRAIN CELL disconnected. Unpack both cells and verify that the serial numbers are identical. The utilization of components with different serial numbers may result in inaccurate results, since all units are carefully calibrated in the factory to obtain the most accurate results.

The **Model 1200D ®** should be installed and maintained in a level position in a location where the ambient temperature will be between 50°F and 95°F.

2 GENERAL INFORMATION

The **Seedburo Model 1200D® Digital Moisture Tester** is an automatic, electronic instrument designed for the determination of moisture in cereal crops and in a wide variety of other products. An outside scale is required with accuracy of plus or minus .5 grams for weighing the sample.

The official Grain Standards of the United States specifies that the percentage of moisture shall be ascertained by:

(a) the use of the air-oven method, or
(b) any device and method which gives equivalent results.

The **Seedburo Model 1200D® Digital Moisture Tester** is outstanding in providing this equivalency quickly and accurately. The instrument determines the quantity of moisture in the grain sample by evaluating changes in its electrical characteristics due to the presence of moisture. Using internally stored calibration data, this change is automatically displayed as percent moisture.

Corn
Durum Wheat
Hard Red Spring Wheat
Hard White Wheat
Hard Red Winter Wheat
Soft Red Winter Wheat
Soft White Wheat
Grain Sorghum (Milo)
Six Row Barley
Two Row Barley
Oats
Soybeans
Sunflower Seed
Long Grain Rough Rice
Medium Grain Rough Rice

Seedburo Equipment Company participates in the NTEP with the **Model 1200A Automatic Moisture Tester** in the on-going calibration program that represents the NTEP Phase II.

The grains and commodities not listed above can still be measured for moisture content using the calibration data developed by Motomco Ins., and are at the discretion of the regulatory body having authority over the device.

2.1 FEATURES

The **Seedburo Model 1200D® Digital Moisture Tester** is equipped with the following features:

1. Full featured backlit graphic LCD display
2. Measure key for multiple measurement of the same grain type.
1. Three multifunction keys for easy operation and setup.
4. Correct sample size and sample temperature determination.
5. RS-232 serial port for external printer or computer connection.
6. Power Supply universal and an optional car battery cord.
7. Calibration available for over 250 different types of grains.
8. Single or average measurements for improved accuracy.

3 TECHNICAL REFERENCE

3.1 MAIN COMPONENTS

The Seedburo Model 1200D® consists of the following components:

(1) *DUMP CELL*

Completely redesigned from the previous version of the 1200D, it contains temperature sensing probe in the Grain cell. The design of the DUMP CELL insures that the sample is always deposited into the GRAIN CELL in the same uniform pattern.

(2) *GRAIN CELL*

It is located directly under the DUMP CELL and it accommodates a uniform sample for maximum accuracy of results. Patented center post construction compensates for differences in bushel weight and random dumping. The temperature sensor inside is accurate by 0.5 degrees Celsius.

The GRAIN CELL is uniquely identified by the serial number of the unit, and is calibrated in the factory to work properly only with that unit. The utilization of a different GRAIN CELL will cause inaccurate results.

(3) *MAIN HOUSING*

The electronic circuitry of the **Seedburo Model 1200D Digital Moisture Meter** is totally encased in a rigid die-cast aluminum housing with components mountings carefully designed to withstand the rigors of normal field usage. The power-on switch can be found in the back of the **Model 1200D**, while in the front panel the liquid display can be found.

3.2 POWER CONNECTION

The **Seedburo Model 1200D Digital Moisture Meter** is supplied with the universal 110/230 VAC power supply (an optional car battery cord is also available on request).

The power cord is connected in the AC power inlet also located in the back panel, where the fuse holder is also present.

3.3 DISPLAY & KEY PAD

All information, from moisture percent to error messages, is clearly displayed on the 128x64 pixels graphic LCD screen (Part a in figure).

Three MULTI-FUNCTION KEYS are located below the display (Part b in figure). Their function changes in the operation of the **Model 1200D,** and is continuously displayed on the last line of the graphical display.

The MEASURE key (part c in figure) button is located beneath the three multi-function keys.

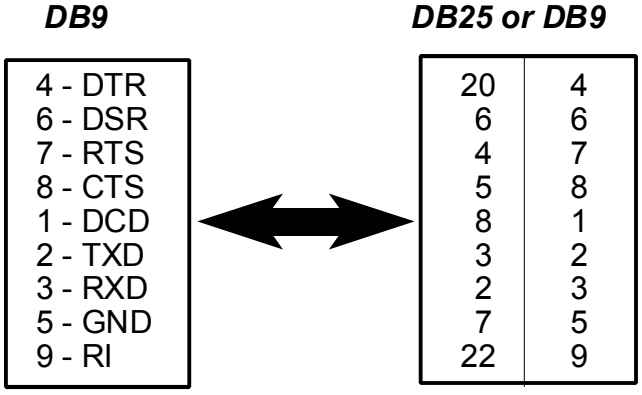
3.4 SERIAL COMMUNICATION

An input/output Serial Port (Standard 9DB Pin RS 232) is located on the back panel of the unit. It can be used to connect the **Seedburo Model 1200D** to a RS232 compatible printer or to the serial port of a computer.

The electrical signal assignment for the RS-232 9 pin connector is here given.

Pin	Label	Signal
1	DCD	+ RLSD
2	TXD	Transmit Data
3	RXD	Receive Data
4	DTR	Data Terminal Ready
5	GND	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicate

The electrical wiring diagram for the 9 pin to a 25 or 9 pin connector is here given.



The **1200D** can be configured for 300, 600, 1200, 2400 or 9600 baud serial communications with 1 stop bit, 8 data bits and no parity.

If the print option on the unit is activated, the unit will send through the communication interface the following information: unit serial number, program and calibration version, user identification, date and time of the measurement, sample number and product name and percent moisture. The sample number is automatically incremented for each measurement, and is reset to zero at power-on.

A typical printed ticket is shown in figure.

SEEDBURO 1200D S/N: SP-0733
Cal. USA
Ver. VC1.5 User: SEC
Time: 03/15/2003 18:22
Sample Number: 5
Sample:CORN TO 21%
(8 TO 21 % MOIST)
MOISTURE: 11.08%

4 OPERATION

4.1 SAMPLE COLLECTION

The moisture content in various portions of a lot or parcel of grain to be tested may vary considerably.

In order for the sample to be representative, grain should be removed from different sections of the lot and thoroughly mixed. For the most accurate results, a grain probe should be used and the sub-samples mixed and divided in a Boerner divider.

If such equipment is not available, an equivalent procedure should be devised and followed. The importance of accurate sampling cannot be over stressed. This is true no matter what method of moisture determination is used. In addition, the size of the sample upon which the test is made should be as large as possible in order to average out small variations. This is accomplished in the Seedburo Model 1200®D Digital Moisture Meter by the use of 3½" test cell which, for most types of commodities, can contain sizes up to 300 grams.

The proper sample size is shown on the display. An outside scale with the accuracy of .5 grams should be used.

4.2 POWER-UP

At Power-Up the Seedburo logo is shown on the screen, as well as the program version and calibration version.

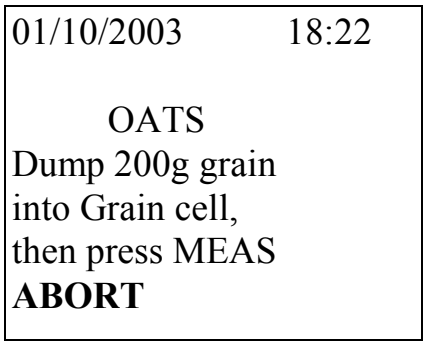
The Empty Grain cell and the empty DUMP cell must be connected to the unit so that the instrument can perform the initial SELFTEST and verify that all components are properly working.

Once the self test is performed (no error messages) the instrument will change to the menu screen.

4.3 MENU SCREEN MODE

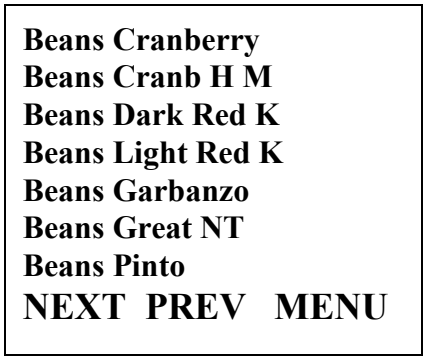
In the first line of the *Menu Screen* the current date and time are displayed. The sample type is displayed in the next line, followed by sample size to be measured.

Note: When turned on, the moisture meter Shows the last grain type used.



If you press ABORT, a sample List screen will appear:

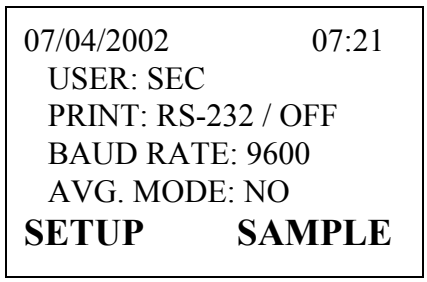
Press NEXT to scroll down the grain list, or press INDIV. to choose grain type. (explained under sample screen mode on page 15)

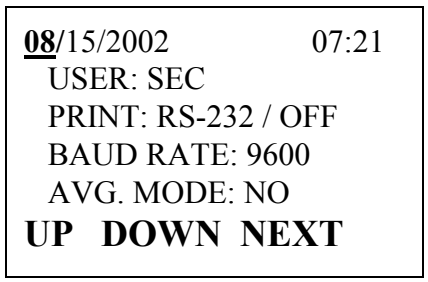


SETUP SCREEN MODE (MENU)

In this screen you can change the following:
- DATE; TIME; USER; PRINT OPTION; BAUD RATE;
- AVERAGE MODE (see page 15)

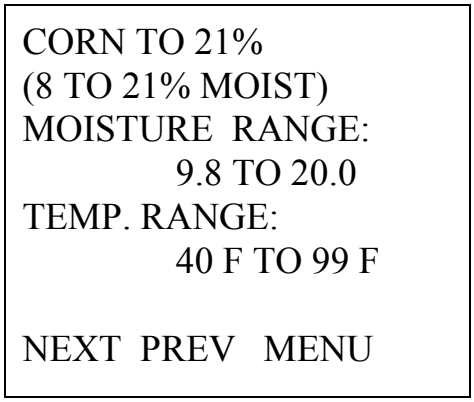
Pressing SAMPLE takes you back to the grain list, and pressing SETUP allows you to change the values (date, time etc.)
Once in Setup, press the UP or DOWN key to change the values, or NEXT to move from one variable to another. Press MEASURE when done. Pressing MEASURE will save the changes and allow you to get out of the setup mode.





4.4 SAMPLE SCREEN MODE

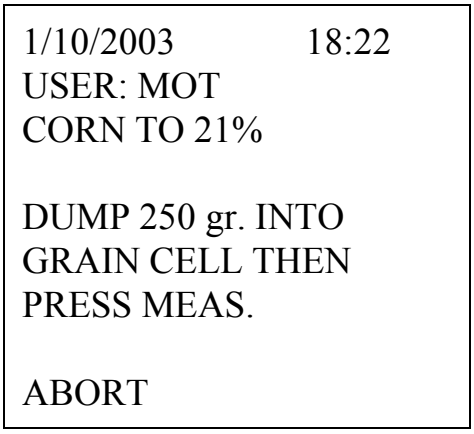
In this Mode the user can choose the sample type of the grain being tested. Besides the sample name, the moisture and temperature ranges are displayed. The NEXT and PREV keys are used to scroll forward or backward in the list of possible sample types. The list of the sample types is given in the Appendix. This mode is exited by either pressing the MENU key which brings the unit back to the Menu mode, or by pressing the MEASURE Key which will start the measurement routine.



Sample Mode Screen

4.5 MEASURE MODE

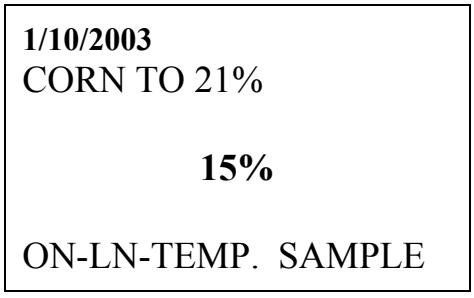
1. Attach empty Grain cell and DUMP cell to the unit. Make sure that the wings on the DUMP cell are closed so that when the sample is poured in it does not fall into the Grain cell. If the wings are not closed, just flip the DUMP cell upside down over the Grain cell. Follow screen by manually pressing DUMP CELL knob.



Measure Screen 1

The unit will take temperature and then will display % moisture.

2. At this point the unit will change to the size control screen and display % Moisture.



If the average mode is enabled (AVG

Mode: YES) then the instrument will display as follows:

01/10/2003 18:22

CORN TO 21%

Averaged meas.
1 out of 3
SAMPLE

To speed up the operation of the **Model 1200D** between two successive readings on the same sample, the sample removed from the GRAIN cell can be directly placed into the DUMP cell and the measuring process activated by pressing the MEASURE button, and dumping grain in Grain cell. In this case, the correct size is already present in the cell. This procedure can also be used to perform statistical measurements on the sample.

To insure great accuracy of results, the instrument performs calibration, after pressing the MEASURE KEY, if any of the following conditions are satisfied:

1. Before the first measurement after power-on (initial cal.).
2. If the equipment temperature has changed more than 2 C since last calibration (Temp. diff.).
3. After an interrupted or erroneous (not complete) calibration (prev. aborted).

4. If the newly selected grain has a different internal calibration value than the previous grain (diff. cal. value).
5. If the user quits from the measurement mode and enters into the SETUP mode. This is the only way to force a recalibration at any time (forced by SETUP).

In addition, the instrument performs a self-calibration on every measurement.

5 MAINTENANCE

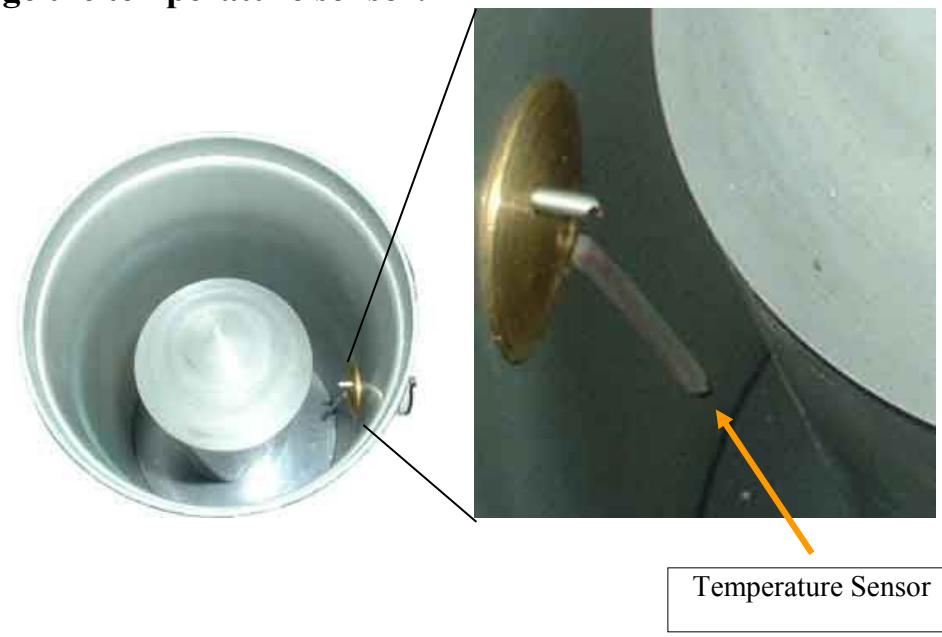
The **Seedburo Model 1200®D Digital Moisture Meter** is a high precision moisture meter, and care should be taken in maintaining the instrument.

5.1 ROUTINE CARE AND MAINTENANCE

The presence of any foreign material in or on the inside of the DUMP and GRAIN cells will affect the accuracy of moisture determinations. To clean the inside of the cells, swab out with a soft cloth dampened with water. Do not use alcohol or other solvent, which can affect the plastic housing present in the cells.

Verify that the butterfly mechanism in the DUMP cell is working correctly, and that both wings are opening in the same manner. Check if the contacts in the DUMP and GRAIN cell are good, verify that the spring mechanism of the contact brackets is strained enough to assure good electrical connection.

When cleaning the grain cell, please be extra careful not to damage the temperature sensor.



5.2 FACTORY SERVICE

Before shipment, all Seedburo Model 1200D Digital Moisture Meters are calibrated against the factory Primary Standard. This Standard is maintained in continuing agreement with the Master Standard held by the Grain Division of the United States Department of Agriculture.

To assure continuing accuracy, meters in commercial usage should be returned to the factory or to any authorized dealer periodically for replacement of any worn parts, since any replacement requires recalibration against the primary Standard. This service should be scheduled during your "off season", when the meter can be most conveniently spared from your operation.

Frequency of service will depend necessarily on the amount and type of usage and it is recommended that any meter be returned for factory service not later than the end of its first three years of field usage.

To return a product for repair, first contact the AgPoint Precision Scales Service Department at 1-866-668-4855 for a return authorization number.

An RMA (Return Material Authorization) is required for any returned product. A delay in the repair can be expected if a product is returned without proper documentation, including the RMA number.

All returns MUST be packaged in good sturdy protective packaging
Please save your original packaging

After receiving an RMA number, package the equipment in its original shipping carton. If the original shipping carton is not available, contact the service department to get a set of the correct packaging sent to you. You will be charged a nominal fee. If you choose to use other packaging material and boxes, the unit will be sent back in the proper packaging for which you will be charged and you will also be charged for any shipping damage.

Clearly mark the package with the RMA number and ship to:

AgPoint Precision
24121 West Theodore Street
Plainfield, IL 60586
866-668-4855
FAX/Phone 312-878-6400

6 TROUBLESHOOTING

6.1 ERROR MESSAGES

The **Seedburo Model 1200D Digital Moisture Meter** has error codes incorporated into its program. These error messages are used to warn the operator of malfunctions of the equipment and/or procedural errors committed by the operator. In the case of an error, please note the error number and check the following table of error messages, which also lists the possible cause and a suggested corrective action, for each error.

If no corrective action can be taken or fails to alleviate the problem, please call Seedburo Equipment Company with the error number, and the sequence of operations performed to obtain such error.

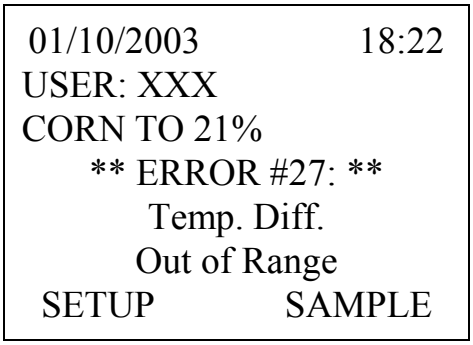
The errors can be divided into two types:

1. Equipment errors and
2. Procedural errors.

In general the equipment errors result in the in operational status of the unit, while procedural errors can be easily fixed.

After an error has occurred, please verify your steps, and correct them accordingly to the instructions set in this manual.

A typical *Error Message Screen* is here shown.



6.2 ERROR LIST

Error #	Message	Possible Cause	Corrective Action
1	RCT data corrupt SET time + date	Real time clock values are corrupted.	The date and time are reset to original values. Reset values in the SETUP MODE. Check Lithium coin battery on printed circuit board voltage should be between 2.9VDC and 3.0 VDC.
2	Corrupt data for chart #xxx	Calibration data for moisture measurement are corrupted.	Download a known good set of charts. If error persists it can be a hardware error (flash memory). Otherwise chart could have an error in its parameters. Last try initializing the flash.
3-4	Instr. Temp. out of range: xx.xC/F	Instrument temperature is out of operating range.	Wait for instrument to reach temperature range. Check the equipment temperature A/D counts in the special combination mode. A/D counts should change if you touch RT1 on the printed circuit board.
5-8	Hardware error	Not applicable for 1200D	
9-10	Grain Temperature out of range: xx.xC/F	Grain cell temperature is out of operating range because test sample is too hot or cold. Hardware failure.	Wait for sample to reach temperature range. Check the grain temperature in the special combination mode. The A/D counts should change when the grain cell temperature sensor is touched. Re-calibrate sensor if needed. If needed replace Boss and pin assembly TSUB0032. Lastly check hanger bracket assembly for shorts. Replace hanger bracket assembly TSUB0036.
11-14	Hardware error	Not applicable on 1200D	
15	Hardware error	Improper measuring procedure, wrong grain or grain cell, Internal hardware problem.	Verify that correct Grain cell is being used (same serial number) and that the correct sample type is selected. Repeat measurement. Error will occur if operator selects measure to early or dumps grain in the wrong sequence. This error can occur if the female or male conical is loose, dirty or not making proper contact. Check empty cell counts in special combination mode must be within 9,000-15,000 counts.
16-26	N/A		
27	Temp. diff. out of range	Temperature difference between instrument and grain is greater than required.	Wait for grain to stabilize at room temperature. Repeat measurement. Check grain temperature is accurate in special combination mode. Re-calibrate if necessary.
28	Instrument temp. out of range	Instrument temperature is out of operating range.	Wait for instrument to reach temperature range of 40-99F. Check equipment calibration is accurate in special combination mode. Re-calibrate if necessary.
29	Moisture out of range!	Grain moisture exceeds measurable values. Dial Division reading is out of absolute limits.	Dial division reading is beyond –40 to +215. Check dial division readings in special combination mode. Loose conical connectors, bad E-F PCB, calibration is off, cold solder joint on female conical.
30	Moisture out of limits	Dial division reading is out of chart limits.	The grain moisture exceeds the chart limits. Check dial division readings in special combination mode. Loose conical connectors, bad E-F PCB, calibration is off, cold solder joint on female conical.
31,32 and 36	Sample temp. out of range	Sample temperature is outside chart temperature limits.	Wait for sample to stabilize in temperature range defined by chosen sample in SAMPLE MODE. Verify accuracy of grain temperature sensor. Re-calibrate if necessary.
39	Configuration Error	Incompatible parameter , flash not compatible with EPROM, corrupted flash or EPROM.	Power up in special combination mode verify all parameters are set correctly for the unit you are working on. Verify flash is compatible with Eprom. Download new flash. Verify EPROM is compatible with the unit under test. replace EPROM.

40,42,43	Eqpt. T. Sensor cal. data error!	Problem with equipment temperature sensor.	Test equipment temperature in the special combination mode. Verify accuracy re-calibrate if needed. Touch RT1 equipment temperature should change.
41,44,45,46	Grain T. Sensor cal. data error!	Problem with grain temperature sensor.	Test Grain temperature in the special combination mode. Verify accuracy re-calibrate if needed. Touch grain temperature sensor the A/D counts and temp. should change.
47-53	N/A for 1200D		

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Please save your original packaging. Replacement packaging can be ordered.

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Clearly mark the package with the RMA number and ship to:

AgPoint Precision
24121 West Theodore Street
Plainfield, IL 60586
866-668-4855
FAX/Phone 312-878-6400

A. WARRANTY

Included with the factory shipment of each Seedburo 1200®D Digital Moisture Meter is a warranty and registration card. For your convenient reference, the full language of the warranty is reproduced below.

SEEDBURO EQUIPMENT COMPANY warrants each new instrument sold by it to be free from defects in material and workmanship in normal use and service, its obligation under this warranty being limited to repairing or, at its option, replacing at its factory any part or parts thereof which shall, within sixty days after delivery of such instrument to the original user, be returned to SEEDBURO EQUIPMENT COMPANY with transportation charges prepaid and which examination shall disclose to SEEDBURO EQUIPMENT COMPANY satisfaction to have been thus defective.

This warranty shall not apply to any instrument which has been repaired or altered outside of the manufacturer's factory in any way so as, in the judgment of the manufacturer, to affect the instrument's stability or reliability, or which has been subject to misuse, neglect or accident, or which has had the serial number altered, effaced or removed. Nor shall this warranty apply to any instrument which has been connected otherwise than in accordance with the instructions furnished by the manufacturer.

This warranty is in lieu of any other warranty, express or implied, including any warranty of merchantability or of fitness for a particular purpose. SEEDBURO EQUIPMENT COMPANY neither assumes nor authorizes any representative or other person to assume for it any other liability in connection with the sale of this instrument.

IN NO EVENT SHALL SEEDBURO EQUIPMENT COMPANY BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES AND ITS LIABILITY UNDER THE WARRANTY SHALL BE LIMITED SOLELY TO THE REPAIR OR REPLACEMENT OF PARTS AS STATED.

B. REGISTRATION

On your receipt of a new meter, please fill in and mail the registration card promptly. The factory maintains a file record, by serial number, of all Seedburo 1200®D Digital Moisture Meter produced. With your cooperation in mailing the registration card, the serial number of your Seedburo 1200®D Digital Moisture Meter will be fully identified as to owner and location.

Instrument Serial No. _____ **Date registration Card Mailed** _____

Please remove this page and mail to:

Seedburo Equipment Company
2293 S. Mt. Prospect Rd.
Des Plaines, IL 60018

REGISTRATION CARD

Seedburo® Model 1200D Digital Moisture Meter

SERIAL No. _____

Name of Purchaser _____

Street Address _____

City or Town _____

Date of Purchase _____

Seller's Name and Location _____

Your Phone No. _____

(Please fill in and mail this registration card within five days after your receipt of the Instrument. Thank you.)

Seedburo Equipment Company