

INSTRUCTION MANUAL

For

Downloading D-Meter[®]

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I. BATTERY CHARGING, RE-CALIBRATION, & MAINTENANCE

A. Charging the Ni-Cad/ Li-Ion Power Pack (International Customers see Page I-4)

To charge / recharge the D-Meter's internal power pack, plug the charger into a 115 volt grounded outlet and plug the charger lead into the socket on the left hand side of the unit. Please see the notice on prolonging battery performance on page I-3.

B. Re-Calibration Requirements

The D-Meter's calibration is set at the factory and cannot be changed by the operator. Unless the unit is dropped or otherwise obviously damaged, the factory calibration should remain constant well beyond the re-calibration period.

Every D-Meter must be returned to the factory annually (for domestic customers) or tri-annually (for international customers) for re-calibration and refurbishment to maintain the warranty. (There is a nominal charge for this service.) The re-calibration date is displayed on the D-Meter's screen every time the unit is turned on. Normal turn around time for all factory services is one week (excluding transit time). Replacement units may be borrowed free of charge, if a request is made at least two weeks in advance (freight both ways to be paid by the borrower).

D-Meters in current calibration are fully warranted indefinitely for both parts and labor (absent obvious abuse).

C. Routine Maintenance

1. Use a commercial glass cleaner (e.g. Windex®) and a soft cloth to clean all exterior surfaces. NEVER use any type of organic solvent to clean the unit.
2. For the D-Meter software to work properly, the bottoms of the black rubber "shoes" mounted on the swivel feet must remain clean and properly positioned.
3. If the unit "hangs-up" and the display cannot be returned to the <OFF> screen by pressing the <STOP/ESC> key, reset the entire system by pressing the **POWER <OFF>** and **POWER<ON>** keys. Only the readings in the run being recorded when the unit is reset will be lost.

Warning! The D-meter is a sealed unit. **NEVER** attempt to remove either of the end plates.

!!! IRREPARABLE ELECTRONIC DAMAGE WILL OCCUR !!!

Warning! NEVER immerse the unit.
NEVER run the unit through standing water.
NEVER expose the unit to steady rain.

!!! IRREPARABLE ELECTRONIC DAMAGE WILL OCCUR !!!

Warning! All liabilities attendant to the use of any D-Meter shall reside entirely with the user. AF&Co does not warrant the accuracy or adequacy of any of the information provided by the D-Meter and will not be liable for any damages suffered as a consequence of any use thereof or reliance thereupon by any party.

- 4. Questionable or troublesome units should be returned immediately to the factory for inspection and repair along with a note describing the problems in detail.
- 5. When returning a unit for service or recalibration, please remove the manual and accessories from the case.

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Note: Please include your business card (or other identifying note) inside the case along with specific instructions regarding billing and return shipment. Unless arranged otherwise, return shipment will be ground via a carrier of our choice

!! READ THIS PAGE CAREFULLY !!

PROLONGING NI-CAD BATTERY PERFORMANCE

NOTE: IF YOUR METER IS EQUIPPED WITH A LI-ION BATTERY PACK THE FOLLOWING TEXT DOES NOT APPLY AND YOU CAN SKIP THIS PAGE. LI-ION BATTERIES CAN BE CHARGED AT ANY TIME AND DO NOT RETAIN A MEMORY.

IF YOUR METER IS EQUIPPED WITH A NI-CAD BATTERY PACK, PLEASE READ THE FOLLOWING:

REPEATED RE-CHARGING OF NI-CAD BATTERIES THAT HAVE NOT BEEN FULLY DISCHARGED AND/OR LEAVING THE BATTERY PACK CONNECTED TO THE CHARGER LONGER THAN 8 HOURS CAN CAUSE THE NI-CAD BATTERIES TO DEVELOP A “MEMORY”. THIS WILL REDUCE THE LENGTH OF TIME THAT THE BATTERY PACK WILL SUPPLY POWER TO THE METER. IF THIS HAPPENS, THE BATTERY PACK IS NOT “BAD”; IT JUST NEEDS RECONDITIONING.

THE CHARGER SUPPLIED WITH THE UNIT AUTOMATICALLY SHUTS DOWN AFTER THE BATTERY PACK IS COMPLETELY CHARGED. WHEN YOU PLUG THE CHARGER INTO THE METER, THE RED LIGHT ON THE CHARGER INDICATES THAT THE UNIT IS CHARGING. WHEN THE RED LIGHT GOES OUT, THE BATTERY PACK IS FULLY CHARGED.

FOLLOW THE STEPS BELOW TO RECONDITION THE BATTERY PACK & MAXIMIZE THE METER’S RUN TIME:

1. AT LEAST ONCE A MONTH, TURN THE METER ON AND LET THE BATTERY DRAIN TILL THE METER SHUTS DOWN. (THIS WILL COMPLETELY DISCHARGE THE BATTERY PACK.)
2. AFTER FULL DISCHARGING, RECHARGE THE BATTERY PACK USING THE CHARGER SUPPLIED WITH THE METER. LEAVE THE CHARGER CONNECTED UNTIL ITS RED LIGHT GOES OFF (THUS INDICATING THAT THE BATTERY PACK IS FULLY CHARGED).
3. IF YOU NOTICE THAT THE UNIT IS “RUNNING DOWN” SOONER THAN YOU THINK IT SHOULD, REPEAT STEPS 1 AND 2 ABOVE.
4. IF YOU STILL HAVE PROBLEMS, PLEASE CALL 910-763-4501

NOTICE TO INTERNATIONAL CUSTOMERS

D-METER BATTERY CHARGER REQUIREMENTS

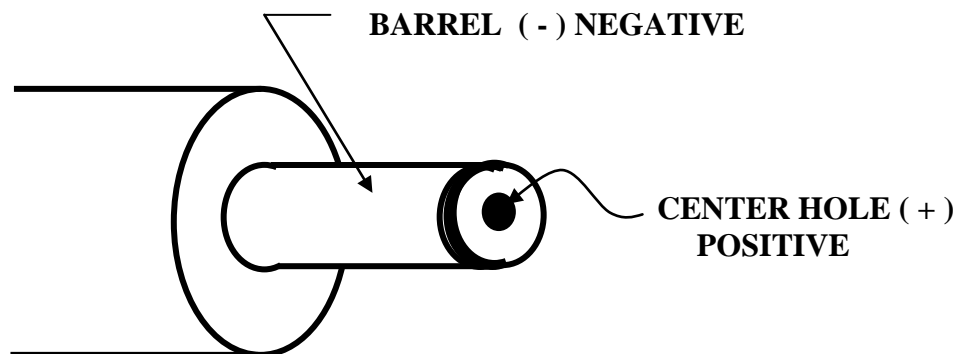
The battery charger supplied with your D-Meter is designed to operate on 60 cycle, 115 volt, AC electricity. If your electricity is different, you will have to acquire an appropriate battery charger from your local electronics supplier.

The replacement battery charger should have the following operating characteristics:

Output Voltage	:	11 - 13 volts DC
Output Current	:	500 - 800 milliamps
Polarity	:	Center pole positive (+)

WARNING ! DO NOT USE A CHARGER OF OPPOSITE POLARITY ! USING A CENTER POLE NEGATIVE (-) CHARGER WILL DESTROY THE UNIT'S CIRCUIT BOARD !

If you want to splice the plug off the charger we supplied onto your charger, please note that the WHITE STRIPED wire is the POSITIVE (+) lead.



II. SETTING-UP & OPERATING the DOWNLOAD SOFTWARE

A. Loading the F/D-Meter® Download Software onto Your PC's Hard Drive

The Download Manager is available at our web site www.AllenFace.com under the meter downloads tab.

The following instructions should be followed to correctly install the Allen Face Download Manager software.

1. Uninstall any existing version of the Allen Face download programs. To remove go to Control Panel>Add Remove Programs (Programs and Features in Vista and Windows 7). Locate the Allen Face Download Manager and click uninstall.
2. At our web site www.AllenFace.com click on the meter downloads tab and scroll to the bottom of the page and open the zipfile “3mb” at the bottom of the page. Extract the file.
3. Double click on the [AllenFace.Meter.Install.msi](#) and follow the setup instructions. Accepting the defaults will work for most installations.
4. Once the program is installed, a shortcut will appear on your desktop. Double click to launch the manager.
5. Install the driver for the USB to Serial adapter that was supplied with the meter (if this is a meter that was recently purchased).

B. System Requirements

1. Intel x86 or x64 processor, 512 MB RAM, Intel Duo Core Processor or above.
2. Operating Systems
 - A. Windows XP sp3
 - B. Windows Vista
 - C. Windows 7
3. Net Framework 3.5 sp1 – Typically downloaded via Windows Update

C. Running the F/D-Meter® Download Software

Please download the PDF under the zip file at our web site. This file will explain how to use the new download and its features.

III. GENERAL OPERATION

A. Recommended Run Pattern

Select the run pattern to be measured. ASTM E-1155 (see Appendix) requires that measurement lines conform to one of the following two schemes:

1. Runs parallel and perpendicular to the longest slab boundary, where the aggregate run length in each direction is approximately equal, or
2. Runs of any length all oriented at 45° to the longest slab boundary.

It is strongly recommended that all tests always be performed using an “X” the bays approach – even if the N/S and E/W column spacing are not exactly equal. Standardizing the run pattern on the bay diagonals offers a number of practical advantages:

1. The minimum q and z sampling requirement will always be well satisfied.
2. Uniform coverage is automatically obtained.
3. No run location decisions are required of the operator.
4. No measurement line diagrams ever have to be produced or archived.
5. Straight line runs without the aid of a taught string reference is facilitated.
6. Tests can always be easily duplicated in the future.
7. Results from different projects can always be reasonably compared.

B. Unit power-up & Memory Clearance

Press the <ON> button to turn the unit ON. Observe the various system status screens during power up. Respond to all memory status inquiries as prompted:

Pressing the <VOID PREV RUN> button at the **VOID Clears Memory** prompt initiates the memory clearance routine. Pressing the <GO/OK> button at the **Are You Sure?** query will then permanently delete all resident run records from memory by writing zeros over their memory locations. Be careful! **Cleared (and voided) runs are unrecoverable.**

Pressing <STOP/ESC> exits the memory clearance routine at any prompt.

C. Start New Session? Query

If the operation mode remains unchanged from the previous power up, the **Start New Session?** query will appear. Pressing the <STOP/ESC> key (to answer "NO") to this query will cause the runs collected during this power up to be added to those of the previous active session. Pressing the <GO/OK> key (to answer "YES") to this query will close the previous active session and put the runs collected during this power up into their own new session number.

D. The “<OFF>” Screen

After the session number has been selected, the <OFF> (i.e. “not recording”) screen will be displayed. This is the unit's "home screen".

Each new run begins with a <GO/OK> key press at the <OFF> screen (see F, G, and H). If the unit has just been turned on, however, pressing the <GO/OK> key at the <OFF> screen will automatically initiate the re-zeroing routine. In order to ensure the accuracy of the measured FF numbers (which will be compromised, if the unit's zeroing has shifted), no runs may be recorded on a unit that has just been turned on until that unit has been re-zeroed (see E).

All session and run result displays are also initiated from the <OFF> screen (see I).



FIG 1

E. Zeroing The D-Meter

Perform the following operations to zero the D-Meter properly. **The meter must be zeroed before any runs can be recorded.**

Pressing the <GO/OK> key during initial power up will initiate a **Re-Zero Meter** flashing prompt. This prompt will also be initiated after the D-Meter has been on for 45 minutes, and after each subsequent 45-minute interval.

Step E1: Turn the meter on and place it on the floor with the start arrow pointed to your right (i.e. so you can read the screen). Let the meter go through all screens until it stops at the <OFF> screen. Press the <GO/OK> key to bring up the flashing **Re-Zero Meter** screen. This screen will be flashing, so press the <GO/OK> key (It's the only key you can push to escape a flashing screen).



FIG 2

Step E2: This flashing screen is telling you that the D-Meter has to be zeroed before you can proceed. Press the <GO/OK> key.



FIG 3

Step E3: The next screen will say **Want To Continue?** (Fig 3). If you want to proceed with the zeroing procedure, press the <GO/OK> key. If not, press the <STOP/ESC> key to go back to the <OFF> screen.

Step E4: The flashing **PUSH <GO> When Ready** screen (Fig 4) will come up next. When you've gotten the meter into position to take the first zero reading, and have marked the positions of the feet on the floor with a pencil, push the <GO/OK> key. The meter will then display the **Do Not Move** screen (Fig 5) and take the required reading. Be sure to hold the unit as still and perpendicular as possible while this measurement is being taken.



FIG 4



FIG 5



FIG 6

(III-4)

Step E5: After the initial zeroing reading is taken, the **Reverse Meter** screen will appear (Fig 6). This screen directs you to pick the meter up and reverse it end-for-end. Using your pencil marks, put the left foot on the floor where the right foot was, and put the right foot on the floor where the left foot was.

The start arrow should now be pointing to your left (Fig 7). The **Reverse Meter** screen will disappear after a few seconds, and the flashing **PUSH <GO> When Ready** screen will appear again



FIG 7

Step E6: When you're ready to take the second zeroing reading, push the **<GO/OK>** key. The meter will then display the **Do Not Move** screen (Fig 8) and take the required reading. Be sure to hold the unit as still as possible while this measurement is being taken.



FIG 8

Step E7: There are now 2 possibilities. Either:

- 1) The zeroing was successful, in which case the **Meter Is Zeroed** screen (Fig 10 - rev) will appear briefly, and the unit will then return to the <OFF> screen - leaving you ready to make your first run.
- or
- 2) The zeroing was unsuccessful, in which case the **Zeroing Failed** and **Do Zeroing Again** screens will appear briefly, and the unit will then start flashing the **PUSH <GO> When Ready** screen - sending you back to **Step E4**.



FIG 9



FIG 10 (reversed)

F. Starting the Run

Step F1: After the unit has been zeroed, the meter automatically goes back to the <OFF> screen (Fig 11). You are now ready to make a run.

To start a run, place the meter on the floor at the first reading position with the **START** arrow pointing down the run.



FIG 11

Step F2: Holding the handle straight up and down, press the <GO/OK> key. The maximum allowable run length message will appear briefly, the RED and GREEN lights will go off; and the screen will then go blank while the first reading is being taken. Once the first reading has been recorded, the RED and GREEN lights will come back on, and a screen like that shown in Fig 12 will appear - showing you the distance measured, the value recorded, and the direction down the run.



FIG 12

G. Continuing the Run

Step G1: Push the handle away from you to tilt the unit forward on its front foot, slightly raising the rear foot off the floor. As soon as you start to move the unit, the RED and GREEN lights will go off, and the screen will go blank. Without letting the front foot slide on the floor, simultaneously twist and pull back on the handle to rotate the unit 180°. Set the old rear foot down on the run line in front of the front pivot foot - in effect, making a step down the run line. The unit is now in the next reading position.

Warning! When making a run, never move the unit while the screen and lights are off. If you don't wait for the screen and lights to come back on before initiating the next step, no reading will be taken, the reading sequence will be compromised, and the FF and FL results will be invalid.

The direction arrows shown in Fig 12 can be used at any time to check whether a reading has been skipped. They must always point in the direction that the readings are being taken. Otherwise, the run has been corrupted.

Step G2: Hold the handle upright and keep still until the next reading is taken - whereupon the RED and GREEN lights and screen will come back on - thereby indicating that the unit is ready to take another step down the run line. Now, either go back to **Step G1** (if you want to take another reading), or go ahead to **Step H1** (if you want to end the run).

H. Ending the Run

Step H1: Every D-Meter run must be between 11 feet and 240 feet long. Within this range of run lengths, a run may be ended at any location simply by pushing the <STOP/ESC> key. The unit will then immediately display the **Computing Run ##,##** screen, and once the data have been processed, will automatically return to the <OFF> screen (Fig 1).

Step H2: You may now return to **Step F1** to start the next run.

I. Displaying Results

Individual run results and profile elevations are displayed using the <PREV RUN> and <GO/OK> keys. Session results (showing the combined results for all runs in the session) are displayed using the <ALL RUNS> key. Individual runs are deleted using the <VOID PREV RUN> and <GO/OK> keys. The <OFF> screen can be reached at any time by pressing the <STOP/ESC> key. See Section IV for a detailed explanation of the required key press sequences.

J. Check Codes

Included in each <ALL RUNS> display of session results is a twelve (12) character “Check Code” which encrypts the session's FF/FL results and all pertinent data collection information. This Check Code feature provides absolute, independent confirmation of all displayed session values, and (as explained in the following example) allows any Owner to gain complete confidence in the accuracy of any overall results submitted by any Contractor.

A Contractor self-tests his FF/FL numbers and submits his session results to the Owner along with the associated Check Code. The Owner then goes on-line to www.allenface.com and types the Check Code given to him by the Contractor into the Check Code De-Crypter, which then instantly displays the corresponding FF/FL results and associated sampling information. A match between the Contractor's reported results and those displayed by the De-Crypter provides the Owner instant and absolute confirmation of the Contractor's veracity.

K. Automatic Retention of All Run Records

The unit may be turned off at any time simply by pressing the <OFF> key. The unit may also turn itself off, if the power pack's voltage drops too low. However, no matter how the unit is shut down, all resident run data will be preserved. In fact, pressing the <GO/OK> key after power up at the **Are You Sure?** is the only way that run records can be cleared from memory. When the operator clears the memory in this way, the total run capacity is reset to 99 runs, and the next run and session numbers (see below) are reset to 1.

All individual run records are organized under “session numbers”, and the run numbers shown on the <OFF> and <ON> screens now consist of two parts: the associated session number and the sequential run number. Run number “3, 14”, for example, was recorded during the third session and was the fourteenth run in memory.

Every time the unit is turned **ON**, a new session begins. Turning the unit **OFF** terminates the current session. This protocol allows runs taken on different projects (or slabs) to be collected under different session numbers and thus be kept separate from one another. The <ALL RUNS> routine reports the aggregate FF/FL results for all the runs collected during each individual session as well as the aggregate FF/FL results for all the sessions combined (i.e. all the

L. Downloading of All Run Records to PC

Section II describes how to install and use the Allen Face Download Manager on your PC or laptop.

All D-Meters have been fitted with serial communication ports and are fully capable (with the requisite cabling and PC software) of downloading all retained data directly into Microsoft Excel. After connecting the unit to an unused COM port on any PC or laptop running both Excel and the Allen Face Download Manager, from the <OFF> screen all resident run data can be downloaded to the host computer in a matter of seconds.

IV. FACEPLATE KEY & LED DESCRIPTIONS

A. POWER Section

1. <ON> key : Turns power "On"
2. <OFF> key : Turns power "Off"
3. **GREEN LED** :
 - a. When not recording a run:
 - Steady **ON** indicates unit is turned ON
 - Flashing **ON/OFF** indicates low battery
 - b. When recording a run:
 - Steady **ON** indicates unit is ready to be moved to next reading position
 - Steady **OFF** indicates unit is being moved or taking a reading

B. RECORD Section

1. <GO/OK> key:

Deletes all runs in memory and resets unit from the **Are You Sure?** screen
Displays selected run results from the **OK Shows Run s,r** screen
Displays individual point elevations from the **Run r: Show H's?** screen
Deletes selected run from memory from the **OK Voids Run s,r** screen
Displays **Re-Zero Unit?** query from the flashing **Re-Zero Meter** screen
Displays raw readings from **Show Raw Output?** screen

2. <STOP/ESC> key:

Exits memory clearance routine from the <VOID> **Clears Runs** screen
Exits memory clearance routine from the **Are You Sure?** screen
Stops run recording and starts run calculation from the <ON> screen
Displays <ESC> = **Utilities** screen from the <OFF> screen
Displays run date & time, battery status, session number, **Re Zero Unit ?** query, and
Show Raw Output ? query from the <ESC> = **Utilities** screen
Returns to the <OFF> screen after any error message

3. **RED LED** :

- a. Normally **OFF** when not recording a run:
- b. When recording a run:
 - Steady **ON** indicates unit is ready to be moved to next reading position
 - Steady **OFF** indicates unit is being moved or taking a reading

C. RESULTS Section

1. **<PREV RUN>** key: Displays **<OK> Shows Run s,r** screen from the **<OFF>** screen

Repeated key pushes scroll through all recorded run numbers, starting with last run made
When desired run appears in **<OK> Shows Run s,r** screen, pressing the **<GO/OK>** key
will display the results for that run

2. **<ALL RUNS>** key: Sequentially displays composite run results for all sessions.

3. **<VOID PREV RUN>** key: Displays **<OK> Voids Run s,r** screen from **<OFF>** screen

Repeated key pushes scroll through all recorded run numbers, starting with last run made
When desired run appears in **<OK> Voids Run s,r** screen, pressing the **<GO/OK>** key will
display the **Are You Sure?** screen
Pressing the **<GO/OK>** key will then delete the selected run from memory, while pressing
the **<STOP/ESC>** key will return to the next **<OK> Voids Run s,r** screen

Warning! Voided runs are un-recoverable.

V. DETAILED SCREEN DESCRIPTIONS

A. STATUS / INFORMATION SCREENS

D-Meter [d #.##]	Software version identification
(c) 2009: Allen Face	Software copyright notice
FF/FL per ASTM E1155	ASTM conformity verification
S/N: ####	The unit's serial number
Re-calibrate by: M, D, Y	Required re-calibration date

Note! Warranty terms require each unit to be returned annually (every 3 years for international units) to the factory for re-calibration. Fees and terms are posted on www.allenface.com. Turn around time for routine re-calibrations averages less than 3 days. Free loaner units are available upon request (customer pays all freight charges).

Battery: xxxx	Current charge status of the battery
No Runs Stored	Run memory is empty
rr Runs Stored	<i>rr</i> run records are currently stored in memory
Deleting All Records / Re-starting Unit	Memory clearance has been ordered
rr Runs Left	<i>rr</i> runs can still be recorded before the memory is full
<OFF> ss, rr ff'	The "OFF" screen is the unit's "home" screen from which all routines are initiated. <i>ss</i> is the current session number. <i>rr</i> is the last run number recorded. <i>ff</i> are the total feet traveled in recording all the runs in session <i>ss</i> .
<ON> rr: ff' +/- i.iii <	The "ON" screen shows that a run is being recorded. <i>rr</i> is the run number being recorded. <i>ff</i> are the current total feet traveled in making run <i>rr</i> . +/- <i>i.iii</i> is the instantaneous elevation difference from the rear foot to the front foot (in inches). The sign (+ or -) indicates whether the elevation difference is uphill (+) or downhill (-).

Max Run Length = 240'	Reminder that the run length can not exceed 240 feet
Computing Run rr	Run <i>rr</i> just recorded is now being calculated.
Serial I/O Active	The unit is communicating with another computer through the serial download cable.

B. QUERY SCREENS

<Void> Clears Runs	Pressing the <VOID PREV RUN> key at this start-up prompt will initiate memory clearance & unit reset. Pressing the <STOP/ESC> key at this prompt will skip the memory clearance routine and retain all current run records.
Are You Sure ?	At the <Void> Clears Runs query, memory clearance has been initiated by pressing the <VOID PREV RUN> key. Pressing the <GO/OK> key now will permanently delete all run records and force a full reset. Pressing the <STOP/ESC> key instead will exit the memory clearance routine and retain all current run records.
<OK> Shows Run rr	Pressing the <GO/OK> key at this prompt causes the results for run <i>rr</i> to be displayed. Pressing the <PREV RUN> key at this prompt scrolls <i>rr</i> to the next lower run number. Pressing the <STOP/ESC> key at this prompt exits the run results selection routine and returns to the <OFF> screen.
Run: rr Show H's ?	Pressing the <GO/OK> key at this query initiates the sequential display of the point elevations (on 1 foot centers) down run number <i>rr</i> .
<OK> Voids Run rr	Pressing the <GO/OK> key at this prompt causes the record for run <i>rr</i> to be deleted permanently from memory. Pressing the <VOID PREV RUN> key at this prompt scrolls <i>rr</i> to the next lower run number. Pressing the <STOP/ESC> key at this prompt exits the void run results selection routine and returns to the <OFF> screen.
Start New Session ?	Pressing the <GO/OK> key at this query opens a new session for collecting the next sequence of runs. Pressing the <STOP/ESC> key at this query exits the start new session routine and returns to the <OFF> screen.

C. INSTRUCTION SCREENS

Don't Move	Unit is automatically recording a static reading. Do not move the unit until both the screen and RED and GREEN lights come back ON.
.Go	Unit is ready to be moved to the next reading position.

D. RESULTS SCREENS

Run Date: mm/dd/yy	In <i>month / day / year</i> format, either the GMT date the subject run was recorded, or the GMT date of the last run in the subject session
Run Time: hh:mm GMT	In <i>hour : minute</i> format, either the GMT time the subject run was recorded, or the GMT time of the last run in the subject session
NO Runs Saved	Memory is empty. There are no run records to display.
Run rr Voided	Run number <i>rr</i> has been deleted from memory and can no longer be displayed.
ss,rr: L= ###.0 ft	Length in feet of run <i>rr</i> in session <i>ss</i> .
ss,rr: FF= ###.#	FF number result for run <i>rr</i> in session <i>ss</i>
ss,rr: FL= ###.#	FL number result for run <i>rr</i> in session <i>ss</i>
ss,rr: FE= ###.#	FE number result for run <i>rr</i> in session <i>ss</i>
90% CI = <aaa.a,- zzz.z>	90% confidence interval (see ASTM E1155) for the FF, FL, or FE value being reported. The lower limit of the confidence interval is <i>aaa.a</i> , and the upper limit is <i>zzz.z</i> .
\$\$\$\$ \$\$\$\$ \$\$\$\$ \$\$\$\$	Session Check Code
ff: H = iii +	The profile elevation <i>ff</i> feet from the start point of the subject run. Value shown is actual point elevation in inches multiplied by 1000. The + or - sign indicates whether the elevation is above (+) or below (-) the mean profile elevation.

Note! For consistency of reporting and graphing, every run profile is arbitrarily referenced to its mean elevation. Thus, elevation “000.0” (i.e. the x-axis) simply corresponds to the average profile elevation (i.e. the area under the run profile above the x-axis will always equal the area above the run profile under the x-axis.)

- All ss Sessions** The results which follow are the aggregation of all the runs contained in all *ss* sessions in memory.
- Session ss** The results which follow are the aggregation of all the runs contained in session number *ss*.
- rr Runs ffff.0 ft** Aggregate length of all *rr* runs in current session *ss*.
- rr Runs FF=###.#** Aggregate FF number for all *rr* runs in current session *ss*
- rr Runs FL=###.#** Aggregate FL number for all *rr* runs in current session *ss*
- rr Runs FE=###.#** Aggregate FE number for all *rr* runs in current session *ss*

E. BATTERY STATUS SCREENS

- Battery : bb%** Power pack voltage is at *bb* % of its nominal max value.
- Battery : Full** Power pack voltage is at > 99% of its nominal max value.
- <Recharge Battery>** Power pack voltage is approaching its nominal minimum operating value. There are less than 15 minutes of operating power remaining.
- <ReCharge Unit ASAP>** Power pack voltage is at its nominal minimum.
- <Turn Unit Off ASAP>** Turn unit OFF and re-charge for at least 3 hours.

F. ERROR MESSAGE SCREENS

- Run Structure Error** Subject run record has been corrupted. Clearing the memory of all runs at unit start-up will usually correct this problem. If problem persists, however, then unit must be returned to factory for service.

Memory Error	Current run pointer has been corrupted. Clearing the memory of all runs at unit start-up will usually correct this problem. If problem persists, however, unit must be returned to factory for service.
Operator Error	Operator has somehow violated the operational protocol.
Run rr Too Short	Run <i>rr</i> has been terminated before 11' – 0" have been measured.
Softfail @ fff' ii"	A reading outside the permitted range has been taken in <ON> mode. Press the <STOP/ESC> key to cancel the run and return to the <OFF> screen.
Run Length > 240' Max	The length of the run being recorded has exceeded the maximum 240' – 0" allowable.
.Run ss, rr Cancelled	The run being recorded has suffered a fatal recording error and has been cancelled. Press the <STOP/ESC> key to return to the <OFF> screen.
<OK>=Yes <ESC>=NO	A key other than the <GO/OK> or <STOP/ESC> key has been pressed in response to a query screen requiring a "Yes" or "No" answer. Press the <GO/OK> key for "Yes", or the <STOP/ESC> key for "No".

VI. D-METER PROJECT MANAGEMENT

Proper reporting of daily FF and FL results (which used to require manual generation of the green Daily Placement Report, the light blue In-Place Area Report, the dark blue Remaining Area Report, and the yellow FF/FL Quality Control Charts) has now been fully automated. With AF&Co's new Excel report generator, daily report preparation should now take less than 10 minutes.

Go to www.allenface.com, click the Project Management button on the left side of the home page, and download the **Daily Report & Charts** Excel program to your PC. Open the program and customize the blue font fields as desired to create your own standard report template.

Each line of the **Daily Report & Chart** corresponds to a separate slab placement. After testing the first floor slab placement on any new project, be sure to record the following:

Specified OAFF
Specified OAFL
Specified MLFF
Specified MLFL
Test Date
Slab Designation
Slab Area
Measured FF
Measured FL

Now to report the results for that first floor slab, open your Daily Report & Chart template, customize the project identification fields, and type the various specified FF and FL values into the header. Save this modified template in a new folder for the project.

Re-open the template you just created and type the test date, slab name, slab area, and measured FF/FL numbers into the top line. Print both pages, save the file using today's date as the file name, and distribute the 2-page report. That's it.

After collecting the test results for each new slab, simply open the previous report file, add the new data to the next line, print both pages, save this latest amended report as a new file using today's date as the file name, and distribute the 2 new modified pages.

The 2-page Daily Report & Chart contains all of the information necessary to manage the flatness and levelness of any new floor installation. In doing so, it avoids all of the unnecessary complications that are created by the extraneous and voluminous distribution of the individual run results.

VII. STANDARD FF/FL FLOOR TOLERANCE SPECIFICATION

A. **Designation:** The floor area bounded by column lines (___), (___), (___), and (___) is designated the Random Traffic Floor. Any floor slab which comprises a portion of the Random Traffic Floor is designated a Random Traffic Slab.

B. **Local Flatness/Levelness:** Except as set forth in Paragraph D below, the Random Traffic Floor shall conform to the following minimum F-number requirements:

Specified Overall Values : OAFF- (X) / O AFL- (3X / 5)
Minimum Local Values : MLFF- (3X / 5) / MLFL- (9X / 25)

C. **General Conformity to Design Grade:** Except as set forth in Paragraph D below, the entire Random Traffic Floor shall fall within $\pm 3/4"$ of its specified elevation.

D. **Exceptions:** Both the O AFL and MLFL levelness tolerances set forth in Paragraph B above shall not apply to any Random Traffic Slab that is to be inclined or cambered. Likewise, no FL levelness tolerances will be applied to any un-shored elevated construction. The general conformity to design grade tolerance set forth in Paragraph C above will apply to un-shored elevated slab constructions, but in all such cases, the tolerance will be increased to $\pm 1-1/4"$.

E. **Testing:** All floor flatness, levelness, and grade conformity tests shall be made (at the Owner's expense) on each newly installed Random Traffic Slab within 8 hours after completion of the final troweling operation. FF and FL tests shall be made by a factory certified technician in accordance with ASTM E1155 (latest revision) using a "D-Meter" as manufactured by Allen Face & Company of Wilmington, NC. Grade conformity tests shall be made using an optical or laser level. Results of all floor tolerance tests - including a formal notice of acceptance or rejection of the work - shall be provided to the contractor within 12 hours after testing. Failure to adhere to the testing and reporting requirements set forth in this paragraph shall constitute *de facto* acceptance of the work.

NOTE: Weekends and holidays shall be ignored when computing specified testing and reporting deadlines.

F. **Remedy for Out-of-Tolerance Work:** The entire Random Traffic Floor shall be subdivided into Minimum Local Floor Sections bounded either by the column and half-column lines, or the construction and control joints, whichever subdivision yields the smaller areas.

All Minimum Local Floor Sections measuring at or above both the specified MLFF and MLFL numbers shall be accepted for F-number compliance as constructed. All Minimum Local Floor Sections which fail to meet or exceed both the specified MLFF and the specified MLFL shall be corrected in their entirety. Such corrective work on elevated slabs may take the form of grinding or depression-and-re-topping. Such corrective work on slabs-on-grade may take the form of grinding, depression-and-re-topping, or removal-and-replacement. In all cases, the particular method of correction to be employed shall be determined solely by the Owner.

If the entire Random Traffic Floor, when completed, fails to meet or exceed both the specified OAFF-number and the specified O AFL-number , then liquidated damages shall be paid by the Contractor to the Owner in an amount equal to:

$$\text{\$1.00} \times [\text{Total balance of ft}^2 \text{ measuring below Specified OAFF}] \times [\text{Specified OAFF} / \text{Actual OAFF}]$$

or

$$\text{\$1.00} \times [\text{Total balance of ft}^2 \text{ measuring below Specified O AFL}] \times [\text{Specified O AFL} / \text{Actual O AFL}]$$

whichever is the greater amount. The defective square footages to be used in the above formulae shall be calculated using the "VI. D-Meter Project Management" procedure published in the D-Meter Manual by:

Allen Face & Company, LLC
2725 Old Wrightsboro Road (12-5)
Wilmington, NC 28405
Tel: (910) 763-4501
Fax: (910) 763-4502

- G. Additional Information:** A complete description of the F-Number System may be found in either the Apr '87 issue of CSI's Construction Specifier or the Jan '89 issue of ACI's Concrete International.

ACI/ASTM “Acceptance” of F-Number Test Instruments

The question occasionally arises as to ACI’s and/or ASTM’s “acceptance” of the D-Meter for floor tolerance testing. Unfortunately, such questions fundamentally misunderstand the roles that both these organizations play in promulgating the F-Number System. In fact, **neither ACI or ASTM are involved in any way in the approval of any particular proprietary instrument for the testing of F-Numbers.** The status of the D-Meter relative to ACI’s or ASTM’s “acceptance” is, therefore, no different from that of the Profileograph, or the Dipstick, or the FloorPro, or the F-Meter, or any other instrument intended for the measurement of floor profiles.

In its committee 117 (Tolerances) and 302 (Floor Construction) documents, ACI only provides information regarding specification format, the particular F-Number values to be specified for various floor categories, the testing time limits, and the exact testing procedure (i.e. ASTM E-1155) to be used. However, **nowhere in ACI will be found any list of “approved” floor profile testing devices.**

Likewise, Paragraph 6 (“Apparatus”) of ASTM E-1155 establishes only minimal requirements for the test device to be used. Indeed, it was the specific intention of the task group that developed E-1155 (strongly encouraged by key members of ACI-117) that the user be given wide latitude in selecting his test apparatus, so that neither ACI nor ASTM could ever be accused of collusion in promoting sales of the Dipstick, which was, at that time, by far the most practical device available for measuring F-Numbers. This ambition to allow a wide variety of test devices was (and still remains) entirely consistent with ASTM’s long-standing policy mandating the use of any particular proprietary product. *Note 3* still clearly reflects that ambition:

Since the basis of the results to be obtained with this test method will vary directly with the accuracy of the particular measurement device employed, all project participants should agree on the exact test apparatus to be used prior to the application of this test method for contract specification enforcement.

Though often misunderstood to be otherwise, ASTM’s mission has never involved the direct acceptance and/or rejection of proprietary test equipment, and consequently, **nowhere in ASTM will be found any list of “approved” floor profile testing devices.**

The D-Meter fully conforms to the Type II Apparatus requirements set forth in Paragraph 6.1.2 of ASTM E-1155. As far as ASTM is concerned, **this fact alone is sufficient to categorize the D-Meter as an “acceptable device” for the measurement of FF and FL numbers in accordance with that test procedure.**

I hope this information helps to dispel any concerns regarding the D-Meter’s utility vis-a-vis ASTM E-1155. Of course, if any questions persist regarding this or any other issue, please do not hesitate to call us at 910-763-4501. Thank you for your interest in the D-meter

Philip J. Keiser
Customer Relations Manager