

Accu-Cast

TITLE PAGE.....	1
HOW IT WORKS	2
CALIBRATION VALUES	4
SYSTEM PARAMETERS.....	4
HYDRAULIC PARAMETERS.....	6
TRUCK PARAMETERS.....	8
SPEEDOMETER CALIBRATION.....	10
OPERATOR SET UP.....	11
TROUBLESHOOTING AND ADJUSTMENT	12
CALIBRATION AND VERIFICATION	16
CALIBRATION STATEMENT.....	19



Section #6 computer



**3000V Operation Manual
For Models
AC3200, 3300, 5200, 5300.**

How It Works

The **ACCU-CAST™** 3000V Sanding control unit has been completely reworked to incorporate a new SMT 4 layer board, flash memory, closed loop gate control, more download options and space for future expansion. It consists of the following components:

- A remote display - with a two line by 16-character liquid crystal display, two 10 position rotary switches, a 3 position momentary toggle switch to increase and decrease values in the programming mode, as well as overriding the gate position and a three-position maintain toggle switch to select between suspend – on – and program mode.
- A control unit - which monitors the vehicle speed, the conveyor speed, the gate position and controls the spinner speed, and the conveyor output via speed and gate position.



The **ACCU-CAST™** 3000 can be run in three modes

- **Computer** - The operator selects a material and a desired application rate. The computer then monitors the vehicle speed, and runs the conveyor and the gate at the speed and the position required to achieve the desired application rate. **Complete Calibration of the ACCU-CAST™ 3000 is necessary before the computer can accurately control the application rate.**
- **Ground Speed Sense** - The operator selects a relative rate of application. The computer increases or decreases the conveyor speed to maintain this rate relative to the speed of the truck. The maximum vehicle sanding speed and the conveyor maximum and minimum must be set before this can work accurately.

- **Manual** - The operator selects a conveyor speed. The conveyor runs at this speed.

NOTE: In both of the above modes the gate must be controlled manually with the up / down switch.

The four control switches on the front panel and key switch on the **ACCU-CAST™** 3000V are used as follows:

- \wedge - This toggle position also called *up/down* switch up is used to increase values when in the programming modes and to raise the gate in operation mode
- \vee - This toggle position also called *up/down* switch down is used to decrease values in the programming mode and to lower the gate in operation mode
- **CONVEYOR** - This 10 position rotary switch is used to select the material application rate when running, or to select various parameters when in the programming mode. When running, full anti clockwise rotation will result in no material or 0 application rate. Turning the knob clockwise will increase material application.
- **SPINNER** - This 10 position rotary switch is used to select the spinner rate (or spread width) when running, or to select various parameters when in the programming mode. When running, full anti clockwise rotation (position 0) will result in no spinner rotation. Turning the knob clockwise will increase the spinner rate.
- **DOWNLOAD** - Moving this toggle switch to the DOWNLOAD position will suspend material application and spinner motion when running, and enters the “Download” mode. “System Suspend” will be displayed.
- **RUN** - Moving the toggle switch from the DOWNLOAD position to the RUN position initiates material application as selected by the programming mode and the Spinner and Conveyor switch positions. The operation mode will be displayed.
- **PGM** – To enter “Route Setup” mode hold the toggle switch in the PGM position while powering the unit up when Route Setup is displayed, release the switch to the run position, this will enter the “operator programming mode.” This mode permits selection of operator parameters.
- **Key Switch** - With the key in place, rotate one quarter turn clockwise then power the unit up, this will enter the “System Calibration” Program mode. This mode permits detailed calibration. To exit this mode after programming, turn the key back one quarter turn and switch the *master switch* off and back on again.

Temperature Calibration

To calibrate the temperature, you must gain access to the temp. adjustment pot (THIS IS THE ONLY ADJUSTABLE POT ON THE COMPUTER BOARD) Power up the unit and turn the screw on the pot (ccw to increase) until the display reads the proper temperature. (you will need to know the actual temperature and give the unit sufficient time to normalize).

Calibration Values

With power, speedometer, conveyor sensor, gate cylinder and position sensor, temperature sensor, conveyor valve, and spinner valve connected to the **ACCU-CAST™** 3000V proceed with the calibration as follows.

- In all cases you must start with the unit powered off
- Rotate the *CONVEYOR* and *SPINNER* knobs to the 0, or fully anti clockwise positions
- Insert the program key into the *program switch* and rotate it clockwise to the program position and then power the unit on.....
- Leaving the *CONVEYOR* knob at the fully anti clockwise (0) position, rotate the *SPINNER* knob to the following positions. The *CONVEYOR* knob position is indicated at the upper left of the display, the *SPINNER* at the upper right. Use the ^ and v switch to increase or decrease the values as required.

Set System Parameters; (Program key on) Power unit up

Conveyor switch	- 0	<u>Clock setup</u>
Spinner switch	- 0	Minutes
	- 1	Hours
	- 2	Day of Week
	- 3	Date of Month
	- 4	Month
	- 5	Year

Move spinner switch back to position "0" then move the switches as follows:

Conveyor switch	- 1	<u>Sand setup</u>
------------------------	------------	--------------------------

- Spinner switch - 0 The number here may be altered up or down to “tweak” the overall accuracy after road testing.
(see Hydraulic parameters conveyor switch –8)
- Spinner switch - 1..9 Enter application rates for switch positions 1..9
- Conveyor switch - 2 Salt setup**
- Spinner switch - 0 The number here may be altered up or down to “tweak” the overall accuracy after road testing.
(see Hydraulic parameters conveyor switch –8)
- Spinner switch - 1..9 Enter application rates for switch positions 1..9
- Conveyor switch - 3 Material 1 setup**
- Spinner switch - 0 The number here may be altered up or down to “tweak” the overall accuracy after road testing.
(see Hydraulic parameters conveyor switch –8)
- Spinner switch - 1..9 Enter application rates for switch positions 1..9
- Conveyor switch - 4 Material 2 setup**
- Spinner switch - 0 The number here may be altered up or down to “tweak” the overall accuracy after road testing.
(see Hydraulic parameters conveyor switch –8)
- Spinner switch - 1..9 Enter application rates for switch positions 1..9
- Conveyor switch - 5 Intersection Blast Mode**
Enter the amount of time you would like the intersection blast mode to remain in effect after speed is sensed (0 to 30 seconds) 0 seconds will disable this function.
- Conveyor switch - 6 Blast rate as a percentage of maximum output**

Enter the percentage of maximum output you wish to use for blast.

Conveyor switch - 7

Spinner auto off selection (yes / no)

Choose Yes and the spinner will stop when the truck stops, choose No and the spinner will continue to run when the truck stops.

Conveyor switch - 8

Operation mode (Manual / Ground speed / Computer)

Manual mode or ground speed mode may be selected should the conveyor signal or speedometer signal be faulty. (See "How it Works" Pg. – 2)

Conveyor switch - 9

Save system parameters (press blast to save)

All above parameters will be saved.

NOTE: NONE OF THE ABOVE VALUES WILL BE SAVED UNLESS THIS SAVE STEP IS PERFORMED

Set Hydraulic PWM Parameters; Program key switch on, (while holding the ^ and v switch Up) Power unit on, hold ^ and v switch up until proper mode (PWM) is indicated on display.

NOTE: IT IS IMPORTANT THAT YOU DO THESE STEPS IN THE PROPER ORDER AS FOLLOWS

Conveyor switch - 0 SKIP

Conveyor switch - 1 Set spinner Minimum; (Program switch on while holding the ^ and v switch Up) Power unit on, hold ^ and v switch up until proper mode is indicated on display

Use ^ and v toggle to adjust. (Note: you must depress the blast switch in order for the spinner to run so you can see the results of your adjustments).

Conveyor switch - 2 Set spinner Maximum

Use **^** and **v** toggle to adjust. To see the results of your adjustments press blast. The spinner will not run unless *blast* is pressed, but the PWM signal **is** being adjusted with the toggle.

Conveyor switch - 3 **SKIP**

Conveyor switch - 4 **SKIP**

Conveyor switch - 5 **Set Gate min. PWM**

Gate movement for this adjustment is controlled by the “*program / run / download*” switch (download is down, run is off, program is up).

Use the **^** and **v** switch to adjust the speed until the gate moves slowly (1” per second or more) in both directions (I.e. 80)

Conveyor switch - 6 **Set Gate max. PWM**

Gate movement is controlled by the “*program / run / download*” switch (run is off, download is down, program is up).

Use the up **^** and **v** switch to adjust the speed until the gate moves quicker but under control in both directions. (I.e. 10 points higher than what was set in above step)

Note: in the above adjustments the “min.” is prevented from exceeding the “max.” and the “max.” is prevented from being adjusted lower than the “min.”

Conveyor switch - 7 **Set Valve Frequency as Required (120 for VOAC)**

Conveyor switch - 8 **Press Blast to Save PWM Settings**

Press the blast once if you are happy with the changes you have made and wish to save them.

Conveyor switch - 9 **Disabled**

POWER CONSOLE OFF THEN BACK ON AGAIN WITH THE PROGRAM KEY ON AND HOLDING THE ^ and v SWITCH UP UNTIL THE DISPLAY READS PWM SETUP

Conveyor switch - 0 Now run the conveyor auto setup

Set the engine RPM to 1200. Then as prompted press *blast* to start setup. The conveyor will begin to run at full speed and the max. pulses will be indicated on the display. The computer will gradually decrease the PWM until a decrease of 4 pulses is sensed. It will then mark the maximum speed, the display will change to "Min." and the PWM will continue to decrease until only 4 pulses per sec. are sensed. This is the Min. setting. The computer will mark it and save the settings. This whole procedure will take approximately 6 minutes so have some patience. As long as there is a pulse number indicated you can walk away and do something else. If no pulses are indicated and the conveyor is running you will have to correct the problem with the sensor before proceeding.

Conveyor switch - 3 Conveyor Min.

Use ^ and v toggle to fine tune conveyor min. if required.

Conveyor switch - 4 Conveyor Max.

Use ^ and v toggle to fine tune conveyor max. if required.

NOTE:

If the parameters in -3 and -4 above have been changed you must go to "conveyor switch pos. -8 and press *blast* to save them.

Set Truck Parameters; (program key on - hold ^ and v switch Down) Power unit up, continue to hold ^ and v switch down until proper Mode is indicated on display

Conveyor switch - 0 Maximum ground speed

In groundspeed operating mode this is the vehicle speed at which the conveyor will reach maximum speed.

Conveyor switch - 1 Maximum gate opening (unused) (default 8) (For non controlled gate only) - (8" for Viking LW box – 6" for Viking HW box)

Conveyor switch - 2

Gate low position

Move the gate down using the Download/Run/Program switch (moving the switch up will move the gate down and holding the switch down will move the gate up) until the hydraulic cylinder is fully extended and the gate is closed. Press Blast (the LCD display will indicate “marking gate”)

Conveyor switch - 3

Gate high position

Move the gate up using the Download/Run/Program switch (moving the switch up will move the gate down and holding the switch down will move the gate up) until the cylinder is fully collapsed or the gate is fully open. Toggle the blast switch to mark this position.

Conveyor switch - 4

Truck serial number

This is only required if you plan to use the download feature of your system. It is used to identify this truck from others in the fleet in the downloaded data. i.e. the last 3 digits of the unit number

Conveyor switch - 5

Save

Press blast to save all of the above information.

Turn master off

NOW RETURN TO TRUCK SETUP PARAMETERS (Program switch on, while holding the ^ and v switch down – turn console on – continue to hold ^ and v switch down until the “truck parameters” are shown on the display.

Conveyor switch - 6

Not used

Conveyor switch - 7

Create profile

Press blast – The computer will use the above conveyor and gate parameters to create a profile for the material output curve. When this process is complete the display will read “profile finished”

- **Note:** When ever the gate positions or the conveyor min and max are changed and saved the profile must be re-created as in “programming mode / truck setup parameters / conveyor switch 7 / create profile”

Turn master off

NOW RETURN TO TRUCK SETUP PARAMETERS (Program switch on, while holding the ^ and v switch down – turn console on – continue to hold ^ and v switch down until the truck parameters are shown on the display.

Conveyor switch - 8

Calibrate profile

For this test the truck should be filled with the material to be tested and then weighed on a scale of known accuracy. After each test (below) the unit must be re weighed to determine the amount of material that was passed for that test

Pressing the blast switch will start the five point weight calibration during which the operator will be asked to enter the weights of the material passed during each test as measured by a scale. After entering the first weight you can begin the next test by once again pressing the blast switch. (The first test will run the conveyor for 500 seconds, the second test will run for 400 seconds, the third test is 300 seconds the fourth test is 200 seconds and the fifth test is 100 seconds. Each successive test will run the conveyor a little faster and the gate will be a bit higher. After all 5 tests for material sand are complete, pressing blast again will enter the weight sequence for the next material

NOTE:

You can bypass the material dispensing and enter or change the weights by having the “download / run / program” switch in the “download” position. This is handy for putting the weights that were acquired as above into successive units with the same configurations I.E. Hopper, Gate, Conveyor motor and sensor. It can also be used to skip over those portions of the calibration that do not need to be changed.

Conveyor switch - 9 **Calibrate speedometer; (program key on and ^ and v switch Down) Power unit up, hold ^ and v switch down until proper Mode is indicated on display**

Set *pause* switch to off, Power unit off, be sure *program key* is on, hold ^ and v switch down, power unit on, hold ^ and v switch until display indicates mode.

Press *blast* switch to enter speed setup mode, Drive truck at exactly 50 KPH then switch to *pause* mode to calibrate, after about 2 seconds the unit will automatically save and exit.

Caution: if you have a maintain type switch for the *blast* you must ensure that you return it to the normal position after entering the setup mode (above).

NOTE:

Check calibration as follows:-

After all of the above parameters are set you should re fill the hopper, weigh it and then take the truck out on a road course and operate it at a specific rate for a measured distance (for example 200 KG of sand per KM for 5 KM) and then re weigh it. In the above example the difference in the two weights should be 1000 KG or 1 tonne. If it is not you can use the numbers in “System Parameters” on page – 5 for the material you are working with to “tweak” the setting. For instance in the above scenario if when you weigh the truck you find that you have only put out 900 KG instead of the required 1000 KG your output is 10% low, you can enter system parameters for sand rate – 0 which has a default number of 1000 and lower it by 10% to 900 this should correct your output. (Remember lowering the number will increase the output and visa versa.)

An alternate method of checking the calibration is as follows:-

Fill hopper with enough sand or salt to ensure you will not run low (2 or 3 tonne). Weigh truck. Park truck close to pile. Enter simulated 40 km/hr speed mode (hold ^ and v switch up while turning master on. Put Pause on and set rate to 500 kg/km. While watching the second hand on your watch take the system out of pause for 3 minutes. At the end of the 3 minute period put the pause switch back on and then re-weigh the truck. If your calibration is correct the truck should now weigh 1000 kg. less than at the first weigh.

Operator Setup; No program key, Must be in computer mode, hold off/run/program switch in program while unit is powered up, continue to hold switch until mode is displayed

- | | | |
|-----------------|----|--|
| Conveyor switch | -0 | Material to be used on current route
Select from salt, sand, material 1 or material2 |
| Conveyor switch | -1 | Gate opening (not used with controlled gate)
Select in 1 inch increments from 1 to maximum |
| Conveyor switch | -2 | Route number
Select route number with up/dn. Switch |
| Conveyor switch | -3 | Driver number
Select driver number with <i>up/dn.</i> Switch |
| Conveyor switch | -4 | Press <i>blast</i> to save route information |

Unload Feature:

Start with system powered off, *pause switch* in pause position, hold down *blast* switch while powering system on, continue to hold *blast* switch, turn pause off, once conveyor starts then release *blast*.

Simulated 40 KPH Speed Mode

Start with the system powered off, hold the *up/down* switch up while turning on the *master* switch, continue to hold the *up/down* switch until the display shows a 40 KPH speed.

TROUBLESHOOTING AND ADJUSTMENT

Spinner Control

Typical spinner problems are:

- Too slow
- Too fast

- Poor speed range control

Good spinner control depends on reasonably accurate setting of the spinner minimum and maximum calibration values. The PHE 2000V takes the minimum and maximum settings and divides the range into 10 equal increments. If the minimum and/or maximum setting is too high or too low the spinner may have few or no useful speed settings. In the spinner calibration mode set the minimum so that the spinner is just turning. The maximum is harder to do, as it is difficult to determine when the spinner speed has topped out, sometimes listening to it rather than watching it will give you a better idea. Verify this point by decreasing the maximum until the spinner noticeably decreases in speed, or is at a maximum desirable speed. The maximum may have to be adjusted several times to achieve the optimal setting.

The **ACCU-CAST™** 3000V will always try to provide accurate spinner control, however deterioration of the hydraulic system from wear or contamination may make this difficult or impossible. Indications of hydraulic problems are:

- Pulsing in the spinner
- Maximum speed of the spinner not being as fast as it should be
- A narrow range between calibration minimum and maximum settings (10% or less)

On many occasions a worn or improperly sized motor has been mistaken for a calibration problem. The best way to diagnose this is to put a flow meter into the spinner circuit and observe the flows at different settings. If the flows ramp up and down consistently between 0 and about 6 GPM the system is doing its job and the problem is most likely in the motor.

Conveyor and Gate Control

Typical conveyor problems are:

- Increased frequency of “overspeed” messages
- “No pulse” message
- Decreased or no material output
- System reverts to “Manual Mode”

Successful “computer controlled gate” operation depends upon accurate calibration and correct profile settings. The *ACCU-CAST*[™] 3000V uses the material calibration values to calculate the rate at which granular material is ejected from the gate to achieve the desired application rate for the vehicle speed. Granular application in “computer” mode is “closed loop”. The *ACCU-CAST*[™] 3000V monitors the truck speed, conveyor speed, gate opening and material type (as set and recorded by the operator). It then adjusts the conveyor speed and gate opening to achieve the selected application rate. The conveyor and gate maximum and minimum settings are important to the computer so that it can do the best possible job of applying material accurately. These maximum and minimum settings are sensed automatically by the computer during calibration and saved at the end of the sequence. The above calibration sequences may take some time, however they need only be done once for each type of hopper and then the numbers can be applied to the rest of the fleet.

- An incorrect conveyor maximum pulse count will cause error messages to be displayed. (Normal wear in the system may require occasional re-calibration to maintain accuracy).

Increased frequency of “OVERSPEED” messages

- Check the calibration number, it may have been improperly set
- Re calibrate the conveyor to compensate for system wear
- Check the gate Min. and Max. settings
- Check what application rate is being used (the system may not be capable of the desired rate at the speed the truck is being driven)

Gate hunting for position

- This condition is normally caused by the gate min. speed being set too fast causing the gate to overshoot its position.

“No Pulse” Message

The *ACCU-CAST*[™] 3000V thinks that the conveyor should be running but there is no signal to confirm that it is running. The computer will increase flow to the conveyor in an attempt to make it start, if this is not successful after 30 seconds the computer will revert to manual operation. The display will indicate manual operation and the positions of the spinner and conveyor switches. Each time the system is powered down and back up again the *ACCU-CAST*[™] 3000V will attempt to start in “computer” mode and in the absence of a conveyor signal will revert to **“manual”** after 30 seconds.

- Put the computer into conveyor calibration mode. The conveyor should run at full speed and the display should indicate the maximum number of pulses.
- If the conveyor is running at full speed and the max. pulses are displayed let the calibration process continue, this may be all that is required.
- If the conveyor is turning at full speed but there is no indication of Max. pulses after a few seconds, you will have to check the sensor and related wiring.
- If the conveyor is not running you will need to check the conveyor PWM output light on the computer board..
- If the PWM output light is on but the conveyor is not running you either have a wiring problem between the computer and the valve or you have a hydraulic problem.

Increased or Decreased Material Output

- Re-run the conveyor calibration sequence to compensate for normal system wear or component replacement.
- Check the material calibration numbers
- Do a material calibration for the material that you are currently spreading (material weights and flow rates may change significantly from pile to pile and with weather conditions)
- When ever the gate positions or the conveyor min and max are changed and saved the profile must be re-created as in “programming mode / truck setup parameters / conveyor switch 7 / create profile”

CALIBRATION VERIFICATION PROCEDURES

GENERAL

The purpose of this document is to explain calibration verification procedures for the AC 3000V snow and ice spreader control system, to ensure it distributes the proper amount of material in accordance with the rate that the unit has been set.

Like any other computer the AC 3000V can only be as accurate as the information that is fed in. The contractor shall be responsible for providing properly calibrated snow and ice control spreader units for winter maintenance, and shall submit certification to the ministry that its spreader units are in compliance with levels of variance as specified in the contract documents.

The ministry has the right at any time to test a contractor's spreader unit(s), to verify performance.

CALIBRATION OF THE AC 3000V SPREADER SYSTEM

(Some of the context of the following section is taken from the Ontario Ministry of Transportation calibration requirements.)

The Accu-Cast™ 3000V spreader control will accurately maintain the desired application rate for snow and ice control regardless of road speed up to a maximum of at least 60 km/hr.

The calibration of the AC 3000V spreader shall be done in accordance with the instructions beginning on page 4 of this section of the manual.

The gate on an AC 3000V equipped spreader unit is completely controlled by the system. This eliminates the possibility of an operator in-advertently setting the gate in the wrong position. This also allows for the gate to close when in “pause” or when the truck is stopped, eliminating unwanted leakage of sand or salt. Another side benefit of this type of control is that at low speed the gate is very nearly closed so the conveyor can run at a more efficient speed, increasing accuracy. At high speed the gate is all the way open, eliminating many of the over-speed conditions.

A sample sheet is included in this document for the purpose of recording the calibration numbers for the different types of materials that are to be spread.

CALIBRATION VERIFICATION PROCEDURES FOR SPREADERS

EQUIPMENT REQUIRED FOR CALIBRATION VERIFICATION

1. TEST BOX with inside measurements – bottom not required:
70 x 70 x 20.4 cm. or 27.5” x 27.5” x 8”.
This is equivalent to 0.1 m³
2. Stop watch.

Material density:

Salt and sand density may fluctuate. As such, for the purpose of spreader calibration verification the following densities are assumed:

<u>Salt density:</u>	<u>1.30 t/m³</u>
<u>Sand density:</u>	<u>1.70 t/m³</u>

Salt – $1.30 \text{ t/m}^3 \times 0.1 \text{ m}^3 = 130 \text{ kg}$

Sand – $1.70 \text{ t/m}^3 \times 0.1 \text{ m}^3 = 170 \text{ kg}$

Formula: Since spreading operations should be conducted at speeds between 32 and 48 km/h, the calibration is calculated at 40 km/h.

Salt:

At 40 km/h a vehicle travels 1 km in 1.5 minutes (90 seconds)

at 130 kg per 2 lane km this means $130/1.5 = 86.6 \text{ kg per minute}$

The box holds 130 kg, thus $130/87 = 1.5 \text{ minutes or (90 sec.) to fill the box.}$

Sand:

At 40 km/h a vehicle travels 1 km in 1.5 minutes (90 seconds)

at 570 kg per 2-lane km this means $570/1.5 = 380 \text{ kg per minute}$

the box holds 170 kg, thus $170/380 = 0.45 \text{ minutes or (27 sec.) to fill the box.}$



The correct calibration will be achieved when the test box is filled level in the time shown below.

Single spinners for two-lane highway -	<u>SAND</u> <u>27 sec.</u> (570 kg rate)	<u>SALT</u> <u>90 sec.</u> (130 kg rate)
Dual spinners for 3 lane highway -	<u>26 sec.</u> (855 kg rate)	<u>120 sec.</u> (195 kg rate)

In order to fully test the ability of the controlled gate feature you can cut the above rates in half and then double the times i.e. 285 kg for 54 seconds (two lane sand rate.)

A simulated speed of 40 Km/Hr is available for test purposes by holding the up/down switch in the up position while turning the master switch on.

Of course the most accurate test is to spread selected materials over a measured course, weighing the load both before and after the test to determine the actual amount of material spread. For example load several buckets of material into the hopper and weigh the truck. Set the spread rate to 400 kg/km then put the system into pause. Drive to the beginning of a 3 km measured course at 40 km/hr and take the system out of pause. Immediately upon crossing the 3 km mark put the pause back on and return to the scale to re-weigh the truck. The difference between the two weights should be 1200 kg.

The Accu-Cast™ AC 5200 Sand and Salt spreader system has been proven to meet the above requirements with amazing accuracy however it must be understood that these machines can only be as accurate as the numbers that are entered into them. Varying factors such as material densities, frozen materials, blockages in the conveyor and gate, inaccurate calibration can seriously affect the output at any given time.



Accu-Cast™ 3000V

SANDING TRUCK CALIBRATION STATEMENT

Unit number _____ Company _____ Date _____

Body make and model _____

The *Accu-Cast*™ Sanding system installed on the above truck was calibrated on this date using the following manufacturers accepted method.

The truck was loaded approximately 2/3 full with the material to be calibrated. It was then weighed with a scale of known accuracy.

The sander controls were put into profile calibration mode and material was dispensed for 500 seconds on test 1, 400 seconds on test 2, 300 seconds on test 3, 200 seconds on test 4 and 100 seconds on test 5. The truck was re-weighed after each test and the amount of material dispensed in KG. was entered into the program in order to establish the position of 5 points on the output profile of the conveyor and gate as per the *Accu-Cast*™ operation manual.

The following materials have been calibrated for this unit and the results are recorded as follows:

MATERIAL	DESCRIPTION	TEST 1	2	3	4	5	Fudge #
SAND	_____	_____	_____	_____	_____	_____	_____
SALT	_____	_____	_____	_____	_____	_____	_____
MATERIAL 1	_____	_____	_____	_____	_____	_____	_____
MATERIAL 2	_____	_____	_____	_____	_____	_____	_____

This calibration was conducted by NAME _____

SIGNATURE _____

COMMENTS: