TD100 Depth Chart and Strapping Table Construction

A depth chart for any compartment may be built using a metered amount of liquid and a dipstick or measuring tape. The procedure is to start with an empty tank, load slowly through a flow meter and record the total volume loaded at each inch from the bottom to the top of the tank.

The TD100 Transmitter will be programmed to operate as the dipstick and calibrated in inches.

The recorded chart is then entered into SensorLink and used to program the TD100 transmitter. Volume at fractional inches is not required. SensorLink will calculate the increments between whole inches.

The TD100 needs to be programmed to report inches if it is already installed and in service. This is also the method used for measuring the depth of hazardous products such as jet fuel. There's no need to be on top of the tank with an open hatch.

Read and save the existing TD100 programming before reprogramming it. You may need the original settings later.

Program the TD100 as a Dipstick

SensorLink is used to create a strapping table to display inches with a resolution of 1/16". The TD100 programmed with this strapping table becomes a dipstick for creating the depth chart.

1. Measure or determine the height of the compartment. This is the total height inside, from the bottom of the tank to the top inside the shell.
2. Measure the tank shell thickness or use the value on the vehicle's ID plate.
3. Measure the Probe Offset. This is the distance from the top of the tank to the bottom of the probe nut. It is a critical measurement to maintain measurement accuracy.
4. Select the Probe Type and set the Detection Mode to Performance. This setting minimizes the distance of the 2 Lo and Spill alarm levels.
5. Select Depth and Volume units of Inches.

6. Fill the table with the information below. This creates a linear strapping table.
   a. Depth Start Value = 0
   b. Depth Increment = 1
   c. Depth End Value = height of the compartment to the nearest even inch. Fractional parts of an inch can't be entered using the Fill Table operation.

In this example, the tank height is 84.25". The table is filled to the even-inch value of 84"
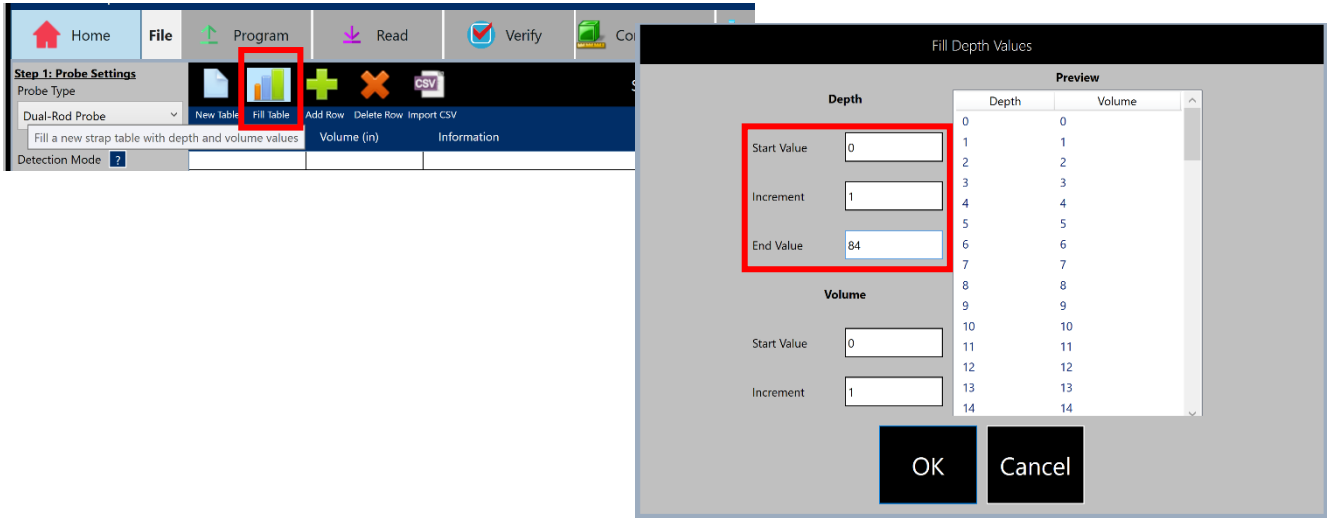
7. If the tank height includes a fractional inch:
   a. Delete the last row of the table. This is the Offset Measurement value and will be entered later.
   b. Manually edit the even-inch tank height value with the actual height in the depth and volume columns.

In this example, the table is filled with the values 0" to 84". The default Offset Measurement (85.81") was automatically inserted by Fill Table. It is deleted and the actual tank height is corrected to 84.25".

8. Click the **Done** button.
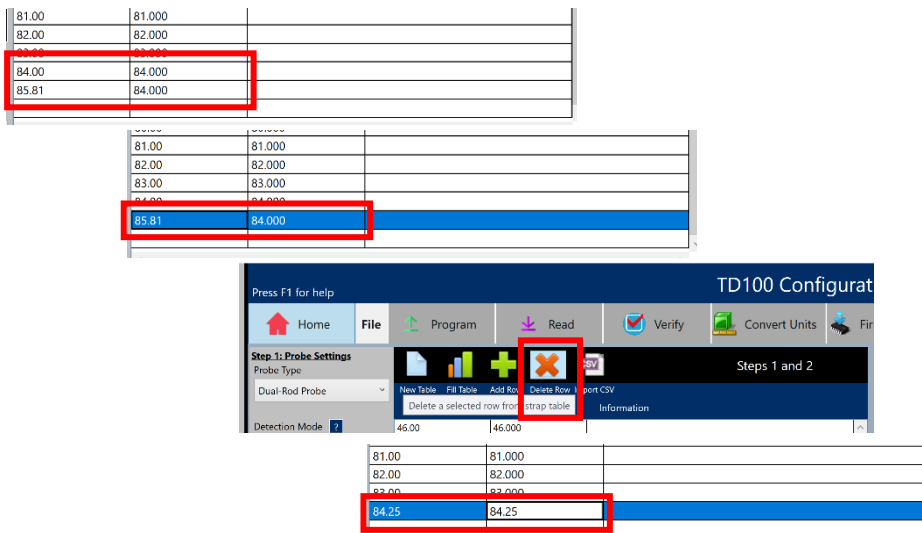
Step 2: Strapping Table	9.00	9.000
Fill in table on right	10.00	10.000
	11.00	11.000
Done	12.00	12.000
	13.00	13.000

9. Enter the tank shell thickness and probe offset for the Offset Measurement. If you already know the Total Offset value, enter it in the Probe Offset box and the Tank Thickness box remains blank.
10. A linear strapping table has now been built to act as a dipstick calibrated in inches with a resolution of 1/16".
11. Select the smallest Spill level for the selected probe.
    a. 7.1" for dual rod probe and Band-Clear are the only settings.
    b. 4" for coaxial probe and reset to Auto-Clear.
12. Enter a HH alarm level of 2" below the Spill alarm level. This is the highest possible HH alarm level for the TD100.
13. Select 2 digits for Display Resolution
14. Save this linear strapping table.
15. Program the TD100.
16. The TD100 is now a dipstick with measurements calibrated for inches and a resolution of 0.0625" (1/16").

Construct the Depth Chart

Before you start the calibration:

- Ensure that the tank to be calibrated is level.
- Ensure that the tank to be calibrated remains level during the calibration.
- Ensure that the flowmeter being used for the calibration is accurate.

1. Set the display's Fill alarm to the highest level. This is the HH alarm setting.
2. Begin with an empty compartment. The display shows 2 Lo.
3. Slowly begin filling the compartment and monitor the flowmeter.
4. The display begins to show a level of 4.5". Record the total volume from the flowmeter.
5. Continue recording total volume at whole-inch values 5, 6, 7, … until the HH alarm.
6. Acknowledge the HH alarm and continue recording the level and total volume at whole-inch values until the Spill alarm activates.
7. Stop loading.
8. Record the final level and total volume at the Spill alarm level.
9. Manually fill in the volume values between 0" and 4.5" (where 2 Lo ended) with small increments of volume. Begin with 0" and 0 volume and blend the values to the volume at 4.5".
10. Manually fill in the volume values from where loading stopped to the top of the compartment with small increments of volume. Begin with the volume at 4" from the top for the coaxial probe, 7.1" for the dual rod probe and blend the volume up to the maximum depth and volume of the compartment.

Program the TD100

1. Build a new strapping table in SensorLink using the newly created depth chart.
    a. Set the Probe Type, Detection Mode, Depth and Volume Units.
    b. Enter the inch values and the volume recorded up to the top of the tank.
    c. Convert the depth or volume units according to customer requirements.
    d. Enter the Offset Measurement value.
    e. Set the Spill alarm level and reset option according to customer requirements.
    f. Enter the HH alarm level or volume according to customer requirements.
    g. Enter the 4-20mA adjustments according to customer requirements, if installed.
2. Save the strapping table
3. Program the TD100

After Calibration

- Expect that the displayed volume will be different when the tank is not level. The TD100 measures the depth of liquid in the compartment at the position where the probe is mounted. Any change in how the tank tilts up or down changes the depth of liquid at the probe.
- The TD100 calculates volume using the measured depth at the probe and the strapping table. The tank must be level to accurately measure the depth of liquid at the probe and to calculate the volume.
- Expect that the TD100 is affected by all the same conditions as when manually dipping the tank to determine the loaded volume.

Blank Depth Chart Form

The following form can be used when creating a depth chart for a tank or compartment. Enter the liquid volume (m3, litres, barrels, or gallons) at each inch. Note the volume at the 2Lo depth of 4.5". At the end of the chart, enter any remaining fractional part of an inch and volume. This can then be entered into SensorLink to build a TD100 Transmitter Strapping table.

DEPTH	VOLUME	DEPTH	VOLUME	DEPTH	VOLUME
0		33		66	
1		34		67	
2		35		68	
3		36		69	
4.5		37		70	
5		38		71	
6		39		72	
7		40		73	
8		41		74	
9		42		75	
10		43		76	
11		44		77	
12		45		78	
13		46		79	
14		47		80	
15		48		81	
16		49		82	
17		50		83	
18		51		84	
19		52		85	
20		53		86	
21		54		87	
22		55		88	
23		56		89	
24		57		90	
25		58		91	
26		59		92	
27		60			
28		61			
29		62			
30		63			
31		64			
32		65			