

Patent Pending



SDIcube™

For automating & normalizing Silt Density Index (SDI) measurements

“Normalized SDI” with improved ease, accuracy, and repeatability

Automates flow rate measurements and calculations

Normalizes for variation in temperature and permeability

Mobile - includes both battery and standard power capability for operating an optional booster pump for remote sample testing

SDIcube™ shown with:
SDI test assembly
SDItripod™
SDIpump™

The SDIcube™, SDI test assembly, SDItripod™, and SDIpump™ are all included within the SDIcube™KIT or may be purchased separately.



Instructions for Use (*Instructions specific to the SDIcube™ are shown in bold type*)

Water Connections: Tube the manual SDI device to a sample valve in the water piping system. The outlet from its filter holder should be tubed to the left-side inlet of the SDIcube™ with its bottom outlet tubed to drain. For inlet pressure less than 30 psig or for batch water samples, the optional SDIpump™ should be tubed from the source (include the inlet screen with batch/dirty samples to protect the pump) to the manual SDI device’s inlet.



Power: The SDIcube™ is powered by either opening the enclosure and turning on the battery (“I”)¹ or by plugging in the pump transformer that is provided with the optional SDIpump™ into its lower-right external power connection. The SDIpump™ is directly powered by the SDIcube™ by aligning their red and black wire connectors and initiating its operation with the black on/off button.

¹ The battery should be fully charged prior to use (See “Charging the Battery”).

When the SDIcube™ is first powered or after resetting the unit, the prior two sets of SDI results will be displayed before showing the SDI initiation screen, unless the device is set for its Iron Test. (If the wrong test is displayed, disengage the power. Hold down the black pump button and reengage the power. After 1 second, release the black button and the SDI screens should now be displayed. If they are not, disengage the power and repeat this process.)

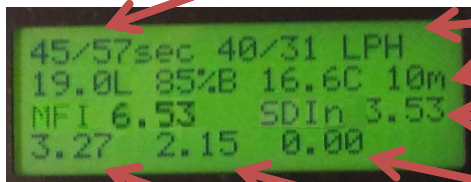
Before installing a filter into the filter holder, condition the sample port, SDI device and tubing by opening any throttle valves feeding the SDI unit and tubing to allow a strong/fast stream of water to flow through the system. Work the inlet sample valves ten times. **Connect the optional SDI pump™ as shown on the preceding page if the upstream line pressure is less than 30 psig (2 bar) or when testing a non-pressurized water source, and engage it by pressing the black “Pump” button.** Allow a high flow rate minute to pass through the SDI test equipment for at least five minutes to flush out biological materials.

Disengage the SDI pump by again pressing the black button and valve off the inlet water to install a new 47 mm, 0.45 micron Millipore nitrocellulose filter disc into its holder by unscrewing the bottom of the filter housing. Remove the orange O-ring and place it on a clean surface. Use tweezers to lightly grab the edge of the white 0.45 micron filter located between its two blue-paper separators and center it into the bottom chamber of the filter housing. Replace the housing O-ring on top of the filter and work it into the interal edge of the chamber. Screw the holder bottom back into the upper filter holder making sure that the O-ring stays centered on top of the filter.

Partially open the inlet valves to wet the filter. **Engage the SDI pump with its black button as required.** Open the vent valve located on top of the filter holder to displace most of the air from the filter holder. Fully open all manual valves and adjust the pressure regulator as required to maintain 30.0 psig (2 bar) at the filter inlet.

Immediately press the green button to start the SDIcube™ test. Adjust the regulator as necessary to maintain a constant pressure of 30 psig (2 bar) feeding the SDI filter. The test will proceed automatically while keeping you informed of the current test status:

Line 1: The initial/current time for 500 mL to flow through the filter and the initial/current water flow rate (liters/hr)



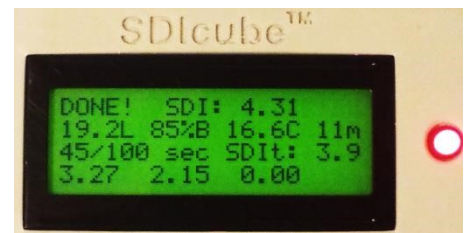
Line 2: The total volume in liters, the remaining battery life, the water temperature, and the current test time (min)

3: The final Modified Fouling Index and the fully normalized SDI values

Line 4: The traditional 5-minute SDI, 10-minute SDI, and 15-minute SDI values as they are available

The test will continue until the filter is 50% plugged or until 15 minutes has elapsed, whichever occurs first. **At that point, line 1 will display “DONE!” with the final fully normalized SDI value** and the pump will automatically turn off (if previously turned on).

The red LED will illuminate when the test is complete or if the flow sensor is not registering its minimum flow rate although flow may continue until the inlet valve is manually closed.



To reset the display in preparation for the next test, hold down the green button for at least 1 second.

Traditional Silt Density Index (SDI) calculation: $100 \times (1 - t_o/t_f) / T$

Where: t_o is the initial time in seconds to fill a 500 mL graduated cylinder

t_f is the final time in seconds to fill a 500 mL graduated cylinder

T is the minutes timed from the beginning of the test to the beginning of the final measurement



Millipore®

Suspended Iron Test

Using the **SDIcube™**

For filter color comparison using a Babcock & Wilcox chart

**offline testing requires the optional SDIpump™*

Instructions for Use

Water Connections: Tube the manual SDI device to a sample valve in the water piping system. The outlet from its filter holder should be tubed to the top inlet of the SDIcube™ with its side outlet tubed to drain. **For testing offline water samples, the optional SDIpump™ will be required and controlled by the SDIcube™.**

Power: The SDIcube™ is provided power by either plugging in its power adaptor or its battery wire connection into the lower right-side power input connection. The optional SDIpump™ is powered by the SDIcube™ using its battery or with the power adaptor provided with the pump. The battery must be turned on ("I") to initiate its operation or when charging the battery.

To switch the SDIcube™ to its Iron Test mode, hold down the black pump button before engaging its power. After 1/2 second, release the black button and the Iron Test screen should now be displayed. Repeat if they are not.

Before installing a filter into the filter holder, condition the sample port, SDI device and tubing by opening any throttle valves feeding the SDI unit and tubing to allow a strong/fast stream of water to flow through the system. After rinsing the system, reset the SDIcube™ by holding down the green button if it was already under power.

When using the SDI pump for offline water samples, engage the pump by pressing the black "Pump" button. The SDIcube™ will monitor the fractions of a liter that are passing through the filter. When 1.0 liter has passed, the red LED light will illuminate and the inlet source should be valved off. The SDIpump™ automatically stops if in use.

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NO FLOW SIGNAL!  
0.0L 80%B 18.9C  
0 sec NAN LPM  
Pos flow starts test
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Unscrew the filter holder to gain access to the spent filter. Evaluate its iron concentration by comparing its surface color with standard iron color charts.

For operation at water temperatures up to 158°F (70°C), purchase the SDIcube™ HT (High Temperature) option.

Charging the Battery

The battery must be charged before the SDIcube™ will correctly function unless using the power transformer provided with the SDIpump™. A battery charger is provided with the SDIcube™ that should only be used to charge the battery. The battery must be turned on ("I") for charging. When completely charged, the charger LED light will illuminate green (if the battery is turned on). A fully charged battery will perform two 15-minute SDI tests while powering the optional SDIpump™.

Replacement Part List

SDIcube™ SDI test accessory for automating & normalizing measurements



- Includes: Rechargeable battery and power adaptor
3/8" tubing with connector
Capable of performing both measurement:
Automated Silt Density Index (SDI)
Millipore® Suspended Iron Measurement*
*Requires **SDIpump™** & color chart
HT-High Temperature option: (158°F / 70°C maximum)

Manual Silt Density Index KIT



- Includes: Manual SDI test assembly with pressure gauge and regulator, filter holder with vent, and inlet valve
SDI3-in-1Tool™
Pack of 100 Millipore 0.45 micron 47 mm SDI filters
Carrying case with 3/8" tubing and fittings
500 mL graduated cylinder
Stopwatch and Calculator

SDItripod™ supports the SDI test assembly roughly 25 inches above ground level, ideal for use with the **SDIcube™**



- Includes: Hub, fits around the SDI assembly's 1/4" pipe connector
6 leg segments with 3 threaded couplings

SDIcube™ KIT the preceding three devices provided in one carrying case



- Includes: **SDIcube™**
SDI Test Assembly includes all SDI kit components except for the graduated cylinder, stopwatch, calculator
Pack of 100 Millipore 0.45 micron 47 mm SDI filters
SDI Tripod

Photo includes optional SDI pump

SDIpump™ powered by the **SDIcube™** for portable analysis of contained water or to boost low line pressure for SDI/iron test purposes



- Includes: 12 VDC pump operated by the **SDIcube™**
Inlet strainer (50 micron) to protect the pump
Electrical adaptor to directly power **SDIcube™** with **SDIpump™**

Replacement Parts

Millipore® 0.45 micron filters

Extra package of 100 each - 47mm filters for use with the **SDIcube™** for performing SDI/Iron tests



0.45 micron nitrocellulose filters approved for use in:

SDI measurement

Millipore® suspended iron measurement

(both performed with the SDIcube™)

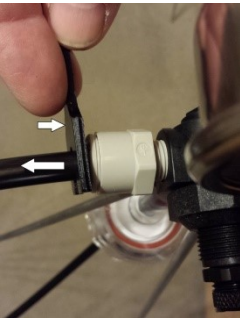
Battery Pack Adder/Replacement

Purchase an additional battery for extended, remote use of the **SDIpump™** option



includes: 12 volt rechargeable battery
charger power adapter
connection cord

SDI3-in-1Tool™ (included with the *Manual Silt Density Index Kit*)



Press SDI3-in-1Tool™ against quick-connect fitting to release and pull out the 3/8" tubing

Regulator adjustment (under pressure)



Vent plug adjustment (when under pressure)

Fittings Kit

Quick-connect Acetal tube fittings and replacement parts that includes:



3/8" Tubing x 1/2" MNPT, x 3/8" FNPT, x 3/8" MNPT, x 1/4" MNPT Fittings

3/8" x 3/8" Tubing Coupling

2 each Vent Plugs

1 each Filter Holder O-ring