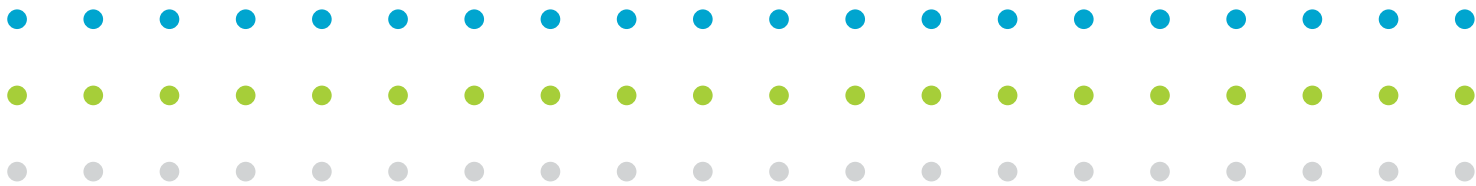




ECHO
INSTRUMENTS

RESPIROMETERS 2022



INSTRUMENTS FOR BIODEGRADATION MEASUREMENTS

SOLID / LIQUID / SEDIMENT

Respirometer is a device that measures respiration of living organisms. Respirometer determines aerobic or anaerobic biodegradability of solid, liquid and algae samples in various applications. The system measures O₂ and CO₂ concentration in flow through the sample under controlled conditions. Flow, Temperature, Pressure, Humidity are also measured continuously. Additional gases can also be measured.

Applications:

- **ISO 14855-1, ASTM D 5338** - Biodegradability of plastics in solid medium;
- **ISO 14852** - Biodegradability of plastics in aqueous medium;
- **ISO 17556** - Biodegradability of plastic materials in soil;
- **ASTM D6691** (marine tests), **OECD 301 B**, etc;
- Sea and lake sediment biodegradability tests;
- Sludge measurements;
- Organic waste biodegradation measurements;
- Insects and small animals respirometry;
- Food respiration, R&D in plastics, biotechnology, ecology, pharmacy, packaging, etc.



ECHO 12 channel Respirometer

Advantages

- Modular design (upgradable);
- On-line biodegradation measurements;
- Plug & Play system;
- Aerobic or anaerobic measurements;
- 12 / 24 / 36 / 48 / 60 channel systems;
- Laboratory or industrial use;
- MFC (mass flow controller) for each channel;
- Various flow configuration;
- Flow leakage alarm;
- Automatic humidification;
- Multitube cable connections;
- O₂ and CO₂ sensors installed;
- Optional sensors: CH₄, H₂S, H₂, NH₃;
- Temperature range +3°C - +70°C;
- Air source (compressor) included;
- Internal air supply connection;
- Various sizes of vessels;
- Vessels with illumination;
- No special connections required;
- Remote control software;
- Data export in MS Excel;
- Customizable.

Technical specifications

• Dimensions - Control units:

- 12 channel respirometer: 60 x 60 x 60 cm;
- 24 channel respirometer: 60 x 60 x 120 cm;
- 36, 48 & 60 channel respirometer: 60 x 60 x 200 cm.

• Dimensions - Thermostatic chambers:

- 12 channel respirometer: 60 x 60 x 150 cm;
- 24 channel respirometer: 80 x 80 x 200 cm;
- 36 channel respirometer: 150 x 86 x 200 cm;
- 48 & 60 channel respirometer: 150 x 86 x 200 cm (2x).

- O2 and CO2 sensors (additional sensors on request);
- MFC +/- 1,5% FS: 0-200ml/min, 0-500ml/min or 0-100ml/min;
- 2 connecting multicore cables;
- Vessels for solid samples - 2,8l;
- Vessels for liquid samples - 125ml - 1000ml;
- Vessels for algae samples (controlled LED lighting) - 1000ml.



16929 Respirometer – Disintegration measurements



Vessel for
solid
samples



Vessel for
liquid
samples

Vessels

ECHO Instruments ER respirometer software



PLASTIC DISINTEGRATION RESPIROMETER

DISINTEGRATION PILOT SCALE TESTS

DETERMINATION OF THE DEGREE OF DISINTEGRATION OF PLASTIC MATERIALS UNDER DEFINED COMPOSTING CONDITIONS IN A PILOT-SCALE TEST

Principles

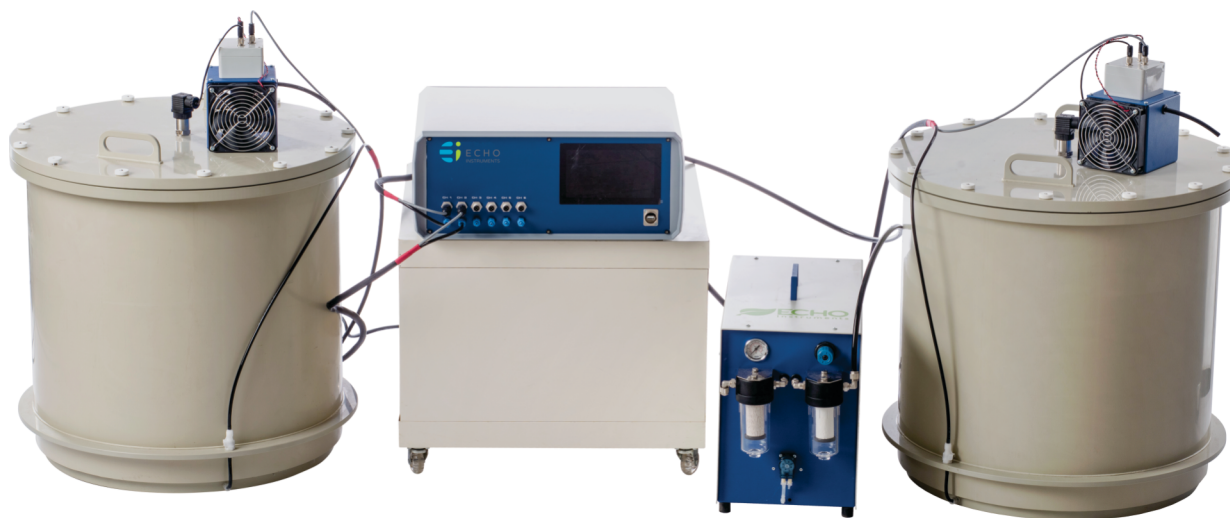
The biological treatment of biodegradable plastic materials includes aerobic composting in well- operated, municipal or industrial biological waste treatment facilities. Determining the degree of disintegration of plastic materials in a pilot-scale plant is an important step within a test scheme to evaluate the industrial compostability of such materials.

The disintegration test is performed under defined and standardized composting conditions on a pilot-scale level.

The test material is mixed with fresh bio waste in a precise concentration and introduced into a defined composting environment. A natural ubiquitous microbial population starts the composting process spontaneously and the temperature increases. The composting mass is regularly turned over and mixed. Temperature and O₂ concentration are regularly monitored.

Applications

- **ISO 16929** - Plastics — Determination of the degree of disintegration of plastic materials under defined composting conditions in a pilot-scale test.



16929 Respiriometer

Advantages

- Single or Multi - channel system: 1 / 3 / 6 / 12;
- Plug & Play design (easy to install, use and maintain);
- Integrated PC in the control unit;
- Cooling system for each reactor;
- Temperature, flow, measurements;
- Sensor O₂: Range 0-25%, Accuracy: 2%;
- Various sizes of vessels;
- Remote desktop control;
- Air pump;
- User friendly software with excel export files.

Technical specifications

- Dimensions - Control unit: 39 x 49 x 20 cm;
- Volume of vessels: 35 l, 64l, 140l, etc.



Bio reactor 64l

ECHO Instruments 16929 respirometer software



DYNAMIC RESPIRATION INDEX

WASTE DEGRADATION TESTS

Principles

DRI Respirometer measures O_2 to determine the activity of microorganisms in degradable organic matter under defined continuous airflow and adiabatic conditions. The samples are measured in hermetically sealed vessels (adiabatic), which create controlled conditions determined by EU and other norms.



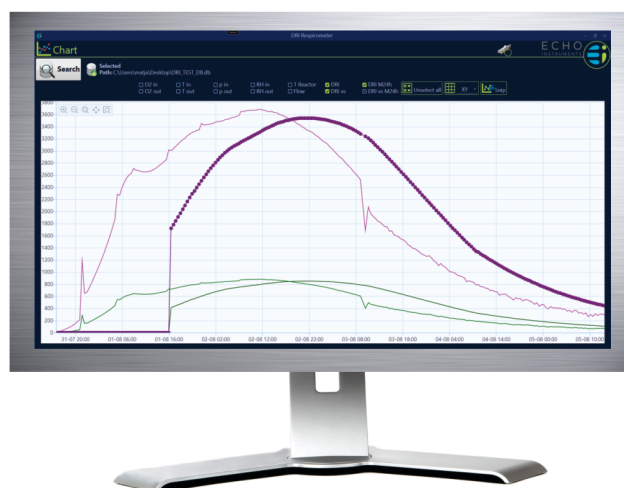
DRI Respirometer

Applications

- **UNI 11184** - Determination of biological stability by DRI;
- **EN 15590** - Determination of the current rate of aerobic microbial activity using DRI;
- Other applications for waste degradation.

Advantages

- Multi - channel system: 3 / 6 / 12;
- Various sizes of vessels: 2L, 10L, 20L, 30L;
- Temperature sensor in each vessel;
- Automatic condensate removal system;
- Temperature, flow, pressure, humidity measurements;
- Sensor O_2 : Range 0-25%, Accuracy: 2%;
- Remote desktop control;
- Air source (compressor) included.



DRI Software

CO₂ FLUX MEASUREMENTS

PORTABLE AND AUTOMATIC SOIL FLUX ANALYZERS

Various gas sensors measure the gas concentration inside the measuring head. Software calculates the flux directly on site. Accurate GPS module determines the exact location of the measurements.

Portable and automatic Soil flux devices are ideal for simultaneous measurements of gas flux CO₂, O₂, CH₄, Rn, H₂, H₂S, SO₂, Hydrocarbons, VOC, etc over a wide dynamic range on various surfaces. Devices are suitable for measurements in the fields, forests, landfills and other areas.



Portable Soil Flux

Applications

- Flux CO₂ from soil;
- Flux CO₂ from compost;
- Flux CO₂ from landfills;
- Gas presence on playground areas;
- Agronomy;
- Post fire ground activity;
- Uranium mines mapping;
- Carbon fingerprint & greenhouse gases.

Technical specifications

- Operating conditions; Portable version:
5°C – 40 °C < 90% RH, non - condensing;
- Operating conditions automatic:
-10° C – 40 °C < 90% RH, non - condensing;
- Map location (inbuilt GPS module);
- Up of 5 different gas sensors with different ranges;
- Power supply: Li-ion battery;
- Gas sensors: O₂, CO₂, CH₄, VOC, H₂, H₂S, NH₃, Rn, etc;
- Automatic system: 4 / 8 channels.

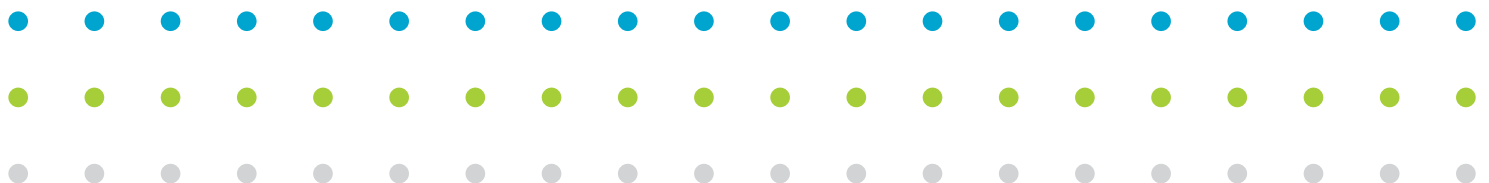


Automatic Soil Flux



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