Portable battery-operated hand-measuring-system



for monitoring oxygen content in composting materials

Composting

The prerequisite for the production of high-quality finished compost is optimal conditions for decomposition. Here particular attention must be paid to the rotting factors of oxygen content and temperature.

In the aerobic process of decomposition, organic waste is converted by bacteria and fungi and the addition of oxygen into carbon dioxide and water according to the formula

 $C_6H_{12}O_6 + 6 O_2 ---> 6 CO_2 + H_2O + energy.$

The role played by the amount of oxygen in this process is particularly clear. The activity of microorganisms is reduced in direct proportion to the extent that the low oxygen content is available for other composting factors. The degree of oxygen saturation can therefore also be understood as the degree of efficiency of the composting process.

Since the process described above is exothermic, energy is additionally set free in the form of heat. Temperatures of well over 70°C can occur. If these temperatures can be maintained over a certain period of time, pathogens and seeds capable of germinating can be effectively killed. On the other hand, excessively high temperatures can cause overheating of the compost material and consequently a disadvantage for the process of degradation.

So to high temperatures and / or a oxygen under-supply will decrease the degradation of organic substance and will cause increasing the odour. Both factors are controlled and monitored with the hand held measuring system what is shown above. With this gadget it is possible to detect e.g. weaknesses in the oxygen supply and the temperature control and to optimise the composting installations by directed use of measuring and controlling devices.



Oxygen-measurement

A special oxygen sensor (amperometric membrane-covered Clark cell) allows the O_2 content so vital for the effect of the micro-organisms on the compost material to be measured and monitored **directly** inside the pile.

Temperature-measurement

A temperature measuring head integrated in the oxygen sensor records the temperature at the measuring point in the range of 0...99°C.

Equipment configuration

Direct measurement of the parameters oxygen and temperature is carried out with a special insertion probe of corrosion-proof special steel. Connection of the probe to the measuring device is by means of a high-quality special cable as well as a splash proof plug connector permitting a high degree of functional reliability when operating the system outdoors under extreme conditions.

Measuring values can be stored periodic in the hand-held device and read out to a PC.

The measuring device has a splash proof, robust plastic housing with high chemical stability and the IP 65 system of protection. The particular configuration of the operating elements prevent unintentional maladjustment of the calibration. A necessary battery change is signalled in due time by the LC display.





Technical data: Device	
 oxygen temperature Measuring accuracy: 	0200% air saturation 0100°C
oxygentemperature	< 1% ± 1 Digit under reference conditions. < 0,5 K ± Digit
Display: Power supply: Controls: Protection: Interface: Allowed ambient temperature.: Dimensions: EMV:	graphic LCD, 128 x 64 pixels, with backlight 3 x AA, IEC R6, LR6, 1,5 V 5 buttons in front foil IP 65 (with closed connector) USB, galvanic separated -1050°C 210 mm x 95 mm x 40 mm equal to EN 61326; class B
Insertion probe	material high-grade-steel WS 1.4571 (German standard) Ø approx. 18 mm (shaft), Ø approx. 26 mm (tip), length 1 m, weight approx. 2,5 kg; length of the cable 1,5 m
<u>Sensor-element</u> Measuring principle: Measuring range: Allowed surrounding temp.: Allowed surrounding pressure: Lateral sensibility against:	amperometric Clark-cell 025 Vol% oxygen max. 80°C max. 0,1 MPa CO_2 : to 50 Vol.% = 0, KW (propane): to 20 Vol.% within measuring accuracy, CO, H ₂ = 0

Ausgabe 09 / 2016. Alterations are subject to the technical state of the art.