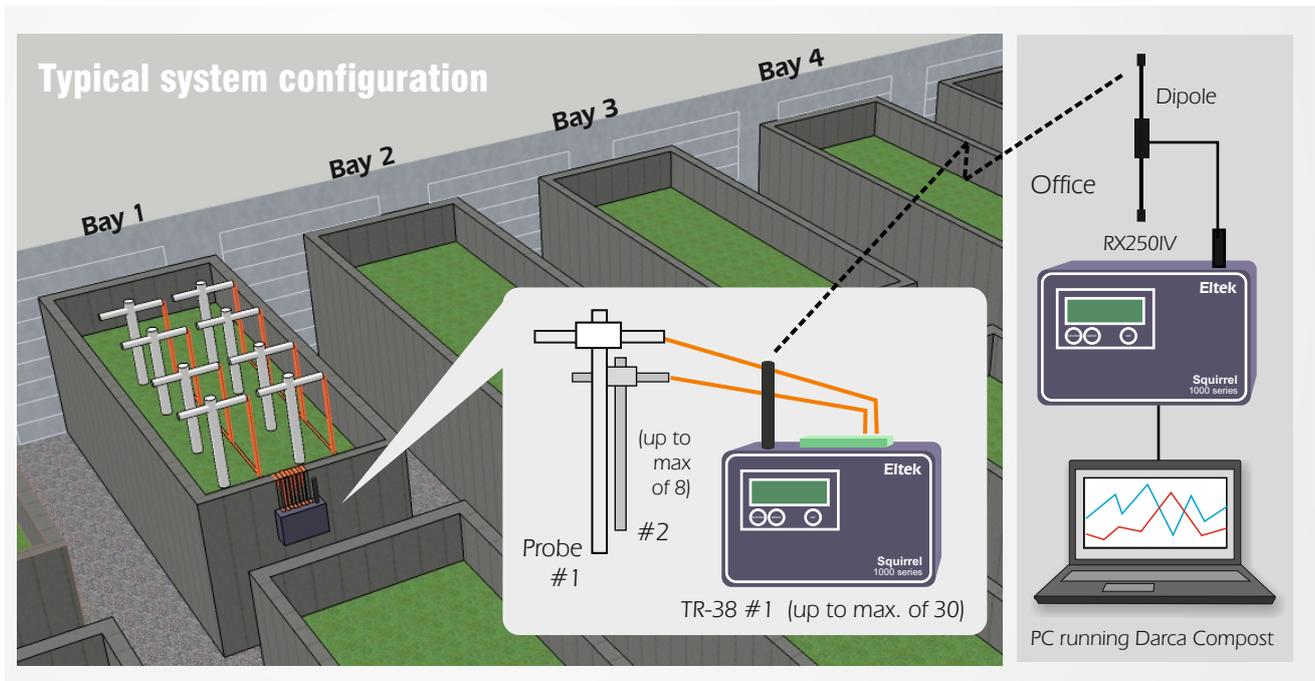


The Eltek in-vessel compost monitoring system

is designed for batch tunnel in-vessel composting systems which can process various materials such as kitchen waste, green waste and organic fines. It is field proven within demanding, corrosive and moist environments.



The Eltek in-vessel compost system is designed for batch tunnel-in-vessel composting systems and is equally suitable for Windrow composting. The system is approved for use in both PAS100 and Non PAS100 facilities.

Typically the vessel is 3m x 3m x 10m long with a retractable roof. Such a vessel can take 100 to 200 tons of feed stock. The batch tunnel-in-vessel composting process can comprise of a two stage pasteurisation process of at least 60°C for a minimum of 48 hours as required under ABPR 2005 / National Standards, or 70°C for 1 hour under the European Standard. Our system works for both standards. The temperature is monitored using specialist designed stainless steel temperature ('lance') probes inserted into the material at predetermined positions and depths. The probes are connected by long runs of robust cable to the transmitter located outside the vessel. The feed stock is referred to as the batch.

The process is policed by AHVLA veterinarians who will require evidence that the two heat cycles detailed above have been correctly implemented. A total of 8 probes is considered ideal to provide a mean batch temperature of greater than 60°C for 48 hours, However, a mean temperature calculated from 6 probes worth of data is considered sufficient by the vets, providing redundancy in the system should a probe fail.

The Eltek system comprises:

- Darca Compost (batch monitoring software)
- RX250IV receiver logger and power supply
- Per bay: 8 x heavy duty T handle stainless steel temperature ('lance') probes
1 x TR-38 robust wireless transmitter

Application example

Our most recent facility processes food waste, green waste and organic fines, which consist of residue from black bin waste that can pass through a 12mm screen. Aerobic sanitisation is used to produce a compost for brown field site restoration.

System Features



Lance Probe

- Heavy duty stainless steel
- Detachable probe tip to facilitate easy on-site sensor renewal
- Low cost sensor
- Standard low cost connecting cable allows easy on-site maintenance
- High accuracy ($\pm 0.1^{\circ}\text{C}$ at 0 to 70°C)

RX250IV Receiver / Logger

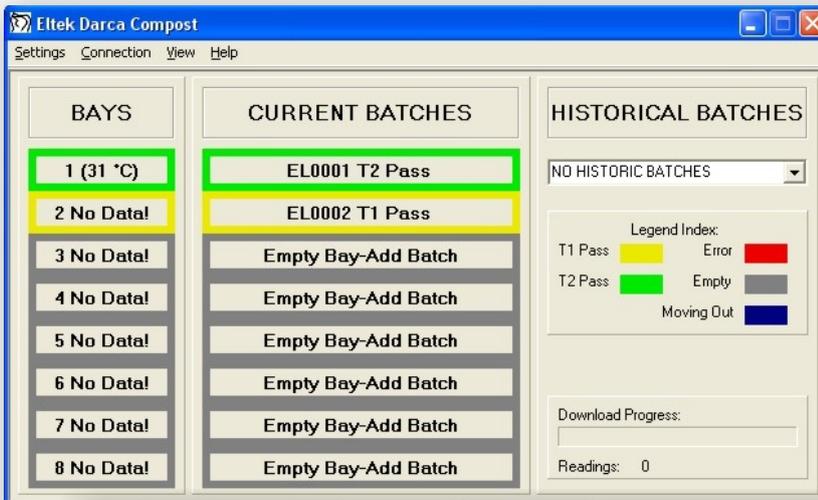


- Compact size - 180 x 120 x 60mm
- Includes full battery backup in the event of AC mains or PC failure
- Memory for 245,000 readings ensures continuous system reliability if power to site fails
- Quick setup using front panel buttons

TR38 Transmitter

- Heavy duty robust weatherproof enclosure (type WBCMP)
- Up to 8 probe inputs
- Screw down terminals for easy probe connection
- Front panel controls can set temporary fast transmission interval - ideal for detailed analysis
- LCD display shows current measured temperature(s) and battery condition
- Licence exempt UHF radio transmitter with outstanding range and reliability
- Field-exchangeable, off the shelf batteries provide greater than 1 year of operation
- Range of transmission can be significantly extended using Eltek Repeater unit(s)

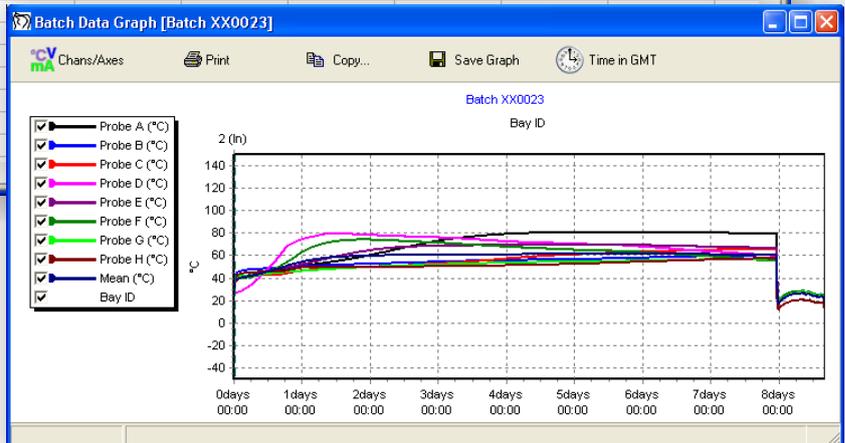
Darca Compost Software



Darca Compost has been designed specifically for compost recycling applications. It allows the user to keep track of each batch of compost as it moves between physical storage containers ("Bays"). Batches are grouped either as "Current" (typically less than 6 months old) or as "Historical" for ease of access in the software.

The software calculates the results from the two tests each batch must undergo, informing the user whether a batch has passed or failed.

Date and Time	Bay ID	Probe A °C	Probe B °C	Probe C °C	Probe D °C	Probe E °C	Probe F °C	Probe G °C	Probe H °C	Mean °C
11/10/2004 15:00	Bay 2	31.6	31.2	27.7	25.1	31.9	34.2	29.6	30.0	29.9
11/10/2004 15:15	Bay 2	36.3	39.5	34.0	26.1	35.7	37.3	37.4	37.8	35.4
11/10/2004 15:30	Bay 2	37.7	42.0							
11/10/2004 15:45	Bay 2	38.7	43.8							
11/10/2004 16:00	Bay 2	39.2	44.6							
11/10/2004 16:15	Bay 2	39.5	45.1							
11/10/2004 16:30	Bay 2	39.7	45.5							
11/10/2004 16:45	Bay 2	39.9	45.8							
11/10/2004 17:00	Bay 2	40.1	46.0							



Key Features

Data table - Displays the data in a table consisting of all data plus the average of the used probes.

Graph - Displays a graph of the batch data and mean values. Batch movements are indicated with vertical lines.

Batch Movements - Displays a batch movements table that traces all the movements of the batch between different bays.

Diary - Displays a list of events for the batch. New events can be entered for active batches.

Summary - Displays batch details, movements, probe table, test results, and events diary.

Export - Exports batch data, movements table and summary to CSV format. This can be opened by Microsoft Excel.

Print Record - Prints a record consisting of the batch summary and graph.

Batch Summary (Batch No: XX0023)

Batch Details:
 Start: 11/10/2004 15:00 GMT
 End: 26/10/2004 14:15 GMT
 Duration: 14 days 23 hours 15 minutes
 Status: Active Batch

Movements:
 All times are in GMT
 11/10/2004 15:00 In to bay 2
 20/10/2004 07:15 Out of bay 2

	Probe A	Probe B	Probe C	Probe D	Probe E	Probe F	Probe G	Probe H
Bay 1	No							
Bay 2	No	Yes						
Bay 3	Yes							
Bay 4	Yes							
Bay 5	Yes							
Bay 6	Yes	Yes	Yes	Yes	No	No	No	No
Bay 7	Yes	Yes	Yes	Yes	No	No	No	No
Bay 8	Yes	Yes	Yes	Yes	No	No	No	No
Bay 9	Yes	Yes	Yes	Yes	No	No	No	No
Bay 10	Yes	Yes	Yes	Yes	No	No	No	No

Test Results:

Batch process example

The batch in this example will be referred to as Batch 1.

1. Batch 1 is subjected to the first phase of the composting process in the first vessel ('Bay 1' or 'Clamp 1'). The temperature profile for Batch 1 is logged.
2. The material is moved (and in doing so turned) and put in a second bay, Bay 2.
3. The probes in Bay 2 are now inserted into Batch 1 and the batch movement event is entered into the Darca software. Temperature data is logged in order to provide evidence that a temperature of $>60^{\circ}\text{C}$ is held for 48 hours.
4. If all tests are passed, the material at the end of Bay 2's composting process is deemed ready for use.



Row of closed bays



Opening a bay



Covering the batch after installing probes



Lance probe in situ

System administration

The Technically Competent Person ('TCP') at the site is responsible for

- Correct placement of probes
- Connection to the batch transmitter
- Setting the transmitter as required
- Data logging and archival of data

The T handle stainless steel lance probes are designed so that the thermistor temperature sensor can be replaced in situ. Eltek suggests that the thermistor element is replaced every 6 months to assure reliable performance of the probe.

Eltek can provide systems for other composting methods included vertical vessel, conventional windrow and rotating vessel systems.

Eltek

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CE **Guarantee:** Equipment manufactured by Eltek is guaranteed against faulty materials or workmanship for three years. For repairs carried out under guarantee, no charge is made for labour, materials or return carriage.