TES POST-HARVEST COOLING & STORAGE SYSTEMS

TES WET AIR COOLING SYSTEMS - HOW THE GROWER BENEFITS

- Maintains crop quality and appearance
- Reduces weight loss and maximises profits
- High humidity is achieved without the need for additional equipment or water supply
- Suitable for a wide variety of fresh fruits and vegetables
- Enhanced crop quality ensures premium prices for the Grower
- Crop quality enhances reputation and helps win new customers
- Meets modern supermarket quality assurance requirements
- Modular design ensures complete flexibility for all cold room applications
- Glycol secondary cooling provides flexibility, future expansion options and cost effective installation and running costs
- Each system is installed by TES personnel
- Low maintenance requirements and long working life
- Backed by national service and support network

TECHNICAL DESIGN SERVICE

With more than 2 decades of experience in the horticultural industry, TES are able to provide growers with comprehensive advice and support in relation to all aspects of the preservation and storage of high quality produce. The service includes site visits, local advice and problem solving, no-commitment proposals, equipment installation and commissioning and on-going back-up, nationwide and overseas.

An individual HUMIDICOIL project recently designed for cooling strawberries in two adjacent cold stores. Electric louvers allow cold air into the rapid cooling chamber as well as maintaining the correct temperature and humidity of stored produce in the second chamber.

OTHER TES PRODUCTS: TES Jetfan, Packaged Ice-Bank and Rolling Vellums, see separate leaflets.

FOR FURTHER INFORMATION on specifications and performance, and details of other TES products and services for agriculture and horticulture, please contact our Sales Department.

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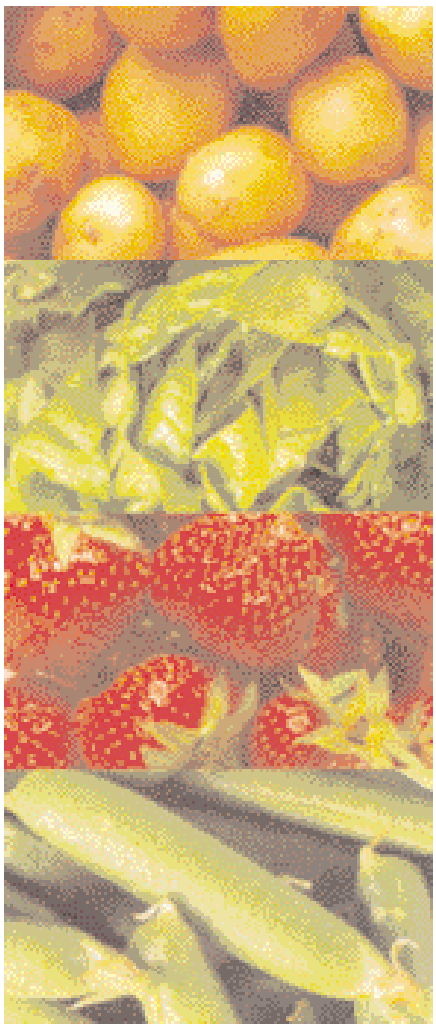
TES POST-HARVEST COOLING & STORAGE SYSTEMS

Specifically designed to preserve the freshness and quality of fruit, vegetables and cut flowers.



TES is a leading UK manufacturer and supplier of post-harvest cooling systems, making an important contribution to crop preservation and quality through high humidity cooling. The products and services offered include:

POST HARVEST RAPID COOLING

The TES patented HUMIDICOIL range of rapid wet air coolers provide cooling options to cover a wide range of produce and conditions for both mobile and fixed installations.

Rolling Vellums, manufactured by the company are available to achieve forced air ventilation for rapid pull-down.

LONG TERM CROP STORAGE SYSTEMS

The same patented technology is utilised for high humidity long term crop storage. Suitable for a wide range of fruits and vegetables, with options for direct refrigeration and glycol chillers for larger cold stores.

TEMPERATURE MANAGEMENT

A range of in-store management and control systems are available with options for remote links in order to closely monitor and control in store conditions for optimum results.

TECHNICAL DESIGN SERVICE

A comprehensive service to growers includes advice and problem-solving, individually designed equipment and technical back-up and support provided throughout the UK and overseas.

Thermal Engineering Systems

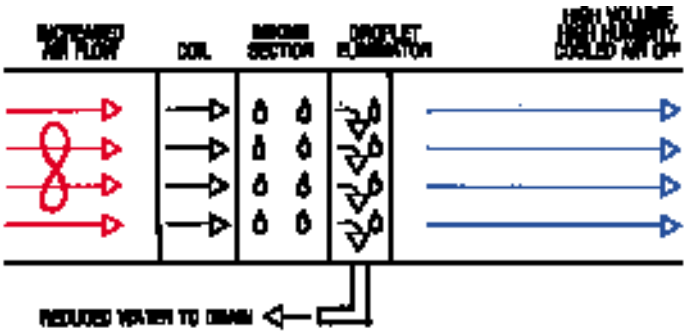
growing technology from TES

TES Cooling Method

The same patented principle of cooling is used in all TES HUMIDICOIL coolers. There are six coolers available in the cooling range from 10 to 30 kW cooling duty. These are of a standard size generally arranged for floor mounting and are available for direct refrigeration or glycol cooling.

PATENTED COIL DESIGN

The limitations of traditional high humidity produce coolers have been overcome by TES through their unique coil design. This traps condensate in a mixing section, increased airflows improving the mixing effect between cooled air and moisture. The cool re-humidified air passes through a droplet eliminator to prevent carry-over. (See diagram below)



Special Features

- All coolers incorporate a patented water-wetted large surface area within a watertight rot free GRP housing.
- Single coolers are available for direct refrigeration or glycol operation.
- High airflow rates for rapid cooling and good store ventilation.
- In multi-store operations glycol chiller systems offer both technical and cost advantages:
  - Easily controlled glycol temperature
  - Very small refrigeration gas charge
  - Very simple refrigeration system outside the store
  - Centralised electrical power supply
  - Cooling switchable from single source to multi outlets.
  - Little if any defrosting required
  - Time clock for night and day running

TECHNICAL AND PERFORMANCE CHARACTERISTICS

Humidicoil Storage Systems General Specification

Cooler Type	Cooling Capacity kW	Air Flow m^3/h	Fans 230-1-50 / 400-3-50 kW	DIMENSIONS (mm)		
				Width	Depth	Height
HCF 10	10	16,560	1 off 1.5	1270	1600	1300
HCF 15	15	22,500	1 off 2.2	1270	1600	1675
HCF 20	20	21,600	1 off 2.2	1270	1600	2055
HCF 30	30	43,200	2 off 2.2	1750	1600	2055
HCF-R 10	10	1,2000	2 off 0.5	1750	750	1950
HCF-R 15	15	1,8000	3 off 0.5	1750	900	1950

RANGE OF PRODUCE & APPLICATIONS

Outdoor Vegetables	Hydro Cooling	Vacuum Cooling	Air Cooling: Conventional	Wet Air Cooling
Asparagus	+++	+	++	++
Brussel Sprouts	+	++	+	+++
Beetroot	++	*	+	+++
Calabrese	+	++	+	+++
Carrots	+++	*	+	++
Cauliflower	+	+	+	+++
Celery	++	+++	+	++
Courgettes & Marrows	*	*	+	+++
Leeks	+++	+	++	+++
Lettuce Butterhead & Crisp	*	+++	+	++
Onions - salad	+++	++	+	++
Potatoes - new	*	*	++	+++
Radish	+++	*	+	+
Sweet Corn	+	++	+	+++
Watercress	+++	+	*	+

Fruit	Hydro Cooling	Vacuum Cooling	Air Cooling: Conventional	Wet Air Cooling
Blackberries	*	*	++	+++
Blackcurrants	*	*	++	+++
Cherries	+	*	+++	++
Gooseberries	*	*	++	+++
Raspberries	*	*	++	+++
Strawberries	*	*	++	+++

Protected Crops	Hydro Cooling	Vacuum Cooling	Air Cooling: Conventional	Wet Air Cooling
Bulb Flowers	*	++(i)	++	++
Flowers	*	++(i)	++	++
Celery	*	+++	+	++
Chinese Cabbage	*	++	+	+++
Cress	*	+++	++	+++
Cucumbers	+	*	++	+++
Mushrooms	*	+++	+	++
Sweet Peppers	*	*	++	+++
Tomatoes	+++	*	++	++

(i) A manufacturer's reccomendation

Key +++ Most suitable
++ Suitable
+ Less suitable
* Generally unsuitable

Preserving flavour and appearance

Fresh produce is composed of living cell tissue which maintains a precise water balance. Once this water balance has been interrupted through loss of water, the living tissue dies and starts to decompose.

By cooling crops with high humid air at temperatures near freezing, it is possible to maintain the correct water structure within the produce and keep it in a living form without deterioration. Because the temperature is low and the produce still in its natural form, contamination by harmful micro-organisms is reduced to a minimum. The final result is the prolonging of the storage period during which the produce has a fresh appearance and maintains it's flavour.

The four methods of achieving rapid post-harvest cooling can be seen in the table listed to the left. These comparisons have been made on the basis of considerable research and are generally accepted throughout the horticultural industry as being accurate.

Rapid Cooling

HUMIDICOIL high humidity wet air coolers are available in 10 and 15 kW cooling duty, specifically designed and comprising the following elements for effective cooling.

Cooling means

Direct expansion (DX) cooler (glycol for multiple units), offering high cooling duty in a compact package, and achieving outlet air temperatures as low as 2.5˚C without ice formation on the cooler coils.

HCF-R

The HCF-R (pictured) is designed to fit into a 20ft mobile container.

Air to water heat exchanger

The large refrigerated/wetted working surface within the HUMIDICOIL provides prolonged contact between air and water, resulting in the effective production of cool humid air.

Air distribution over the produce being cooled

The cold moist air must reach, as near as is practicable, all the produce being cooled, as quickly as possible i.e. forced air ventilation. Used in conjunction with the TES Rolling Vellum, the distance travelled by the air is never more than 1 box width, providing equal cooling for every box.

Rolling Vellum

Crop Storage

A typical HUMIDICOIL potato store installation: 2 x 30kW and 1 x 20 kW HCF units linked to a Glycol chiller. Each unit is made from rust free durable green GRP and incorporates automatic humidifying technology.

HUMIDICOIL high humidity crop storage systems are available in 10, 15, 20 and 30 kW modules offering complete flexibility for all cold room applications. Systems have been supplied for over 10 years in hundreds of different cold rooms across the UK and E.U.

The HUMIDICOIL system can cool down to 2.5˚C using highly humid air without the use of a defrost cycle on the refrigeration system. This is due to the unique design of the cooling coils and the high air volumes at low pressure that are used on each cooler.

The flexibility of the modular system means that any size of cold store can be accommodated. Single modules are usually cooled by direct expansion refrigeration units. For larger projects, the use of Glycol secondary cooling systems is preferred for reasons of cost, flexibility and power consumption.

A typical Glycol Chiller system supplying cooling to two 1,500 T potato stores. Connected to 6 x 30 kW HUMIDICOIL units and supplying Glycol at minus 2 degrees C. In-store temperature is approximately 3 degrees C.

CONTROLLED ATMOSPHERE STORES

In such stores the gas mixture may be artificially controlled, but generally speaking the temperature will be near 0˚C and the humidity as high as possible.

The HUMIDICOIL system has been modified for C.A. storage, but the overall design and size has not been changed. The total cooler can be serviced from the outside of the store with no need to enter the store through the main doors