# ENDO ENTERPRISES™

ADVANCED WATER TREATMENT SOLUTIONS

H&V NEWS AWARDS 2019
SMALL COMPANY ACHIEVEMENT
OF THE YEAR

CIBSE BUILDING PERFORMANCE
AWARDS 2016 - ENERGY SAVING
PRODUCT OF THE YEAR

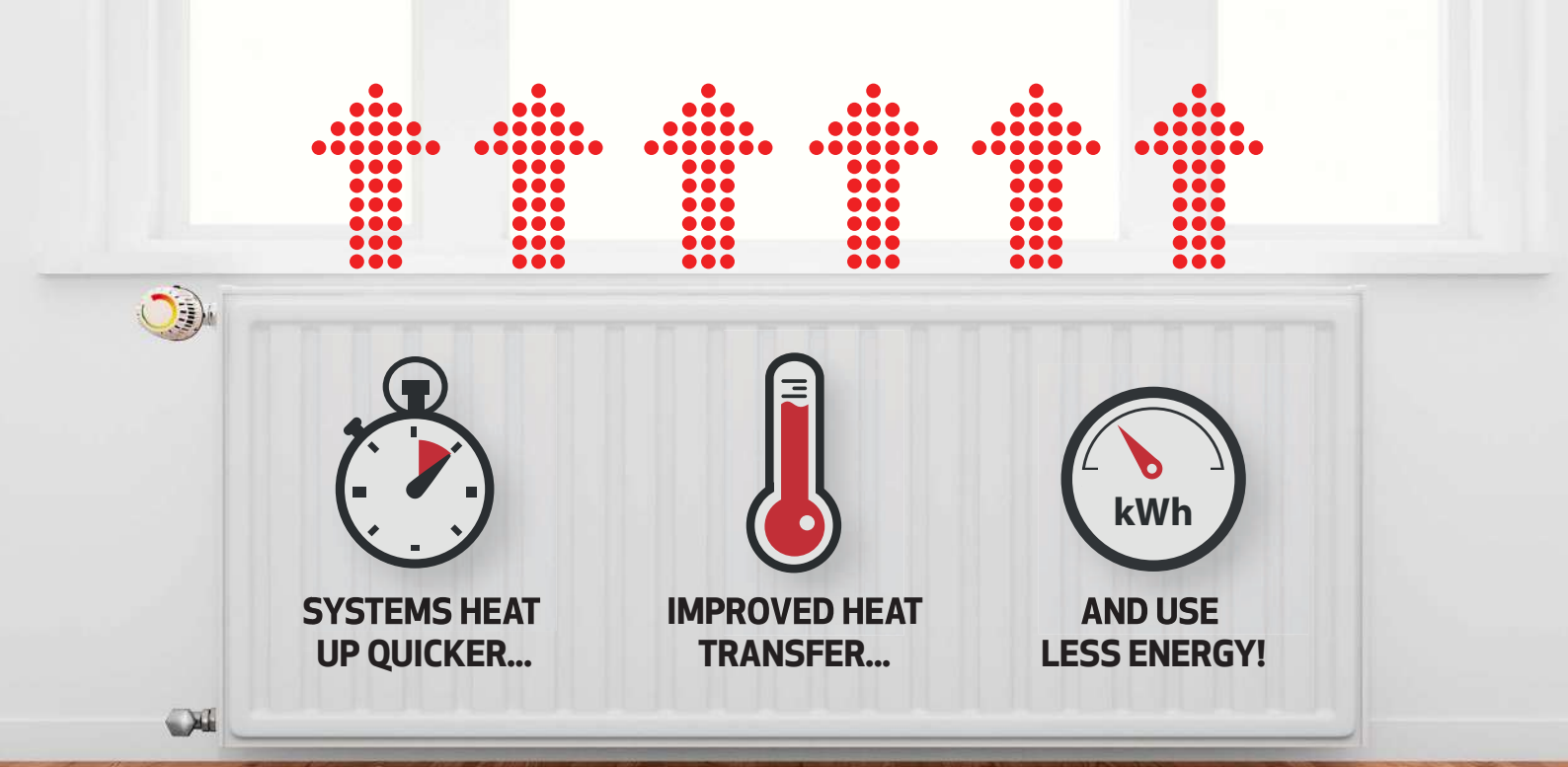
H&V NEWS AWARDS 2015
DOMESTIC H&V
PRODUCT OF THE YEAR

THE BIG INNOVATION PITCH
ECOBUILD 2015
M&S BIG INNOVATION PITCH
WINNER


# EndoTherm®

ENERGY SAVING ADDITIVE FOR HEATING SYSTEMS

SAVE UP TO 15% ON HEATING COSTS




# EndoTherm®

## ENERGY SAVING HEATING ADDITIVE

SAVE UP TO 15%

- PROVEN TO REDUCE HEATING BILLS BY UP TO 15%
- 100% ORGANIC WITH ONE DAY $CO_2$ PAYBACK
- TYPICAL RETURN ON INVESTMENT IN LESS THAN ONE YEAR
- NON CORROSIVE & COMPATIBLE WITH LEADING INHIBITORS
- FOR USE WITH ANY WET HEATING SYSTEM
- INVENTED & MANUFACTURED IN GREAT BRITAIN

H&V news AWARDS 2019 WINNER
Small Company Achievement of the Year

Shell Springboard
2018 REGIONAL WINNER

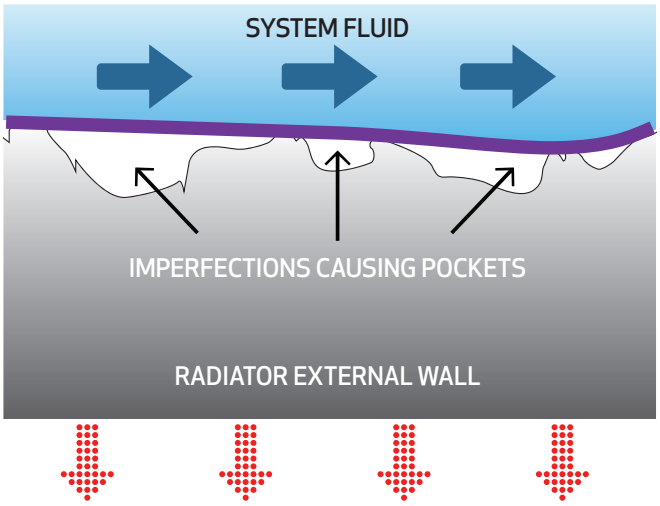
CIBSE BUILDING PERFORMANCE AWARDS 2016
ENERGY SAVING PRODUCT OF THE YEAR

H&V news AWARDS 2015 WINNER

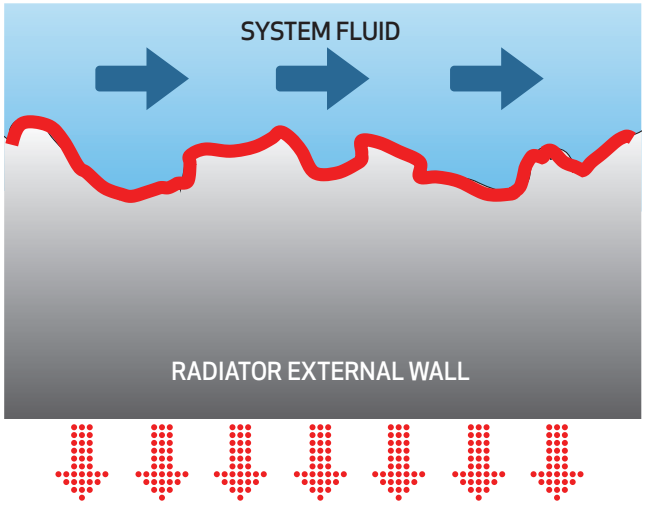
# How EndoTherm Works

When dosed into a wet heating system at a 1% concentration, EndoTherm's unique formula changes the surface tension of water by over 60%. A reduction in surface tension is known to make water 'wetter' and EndoTherm improves the wetted perimeter or thermal contact area on the inside of the heating system.

**Without EndoTherm**




**With EndoTherm**




**Wetted perimeter without EndoTherm**

**Wetted perimeter with EndoTherm**

An increase in the thermal contact area on the inside of a wet heating system can be seen to improve the efficiency of a wet heating system in a number of ways:

**System water heats up quicker due to improvement in nucleate boiling.**

**Improved thermal contact area increases heat loss. Buildings dosed with EndoTherm reach set temperature quicker.**

**Increased heat loss reduces water return temperatures. This allows boilers to condensate more and recover more latent heat. This also reduces flue gas losses.**

**Continual improvement in heat transfer maintains set temperature longer. This increases cycle length therefore reducing the number of boiler cycles.**

Through an improvement in thermal contact area and thus heat transfer efficiency, EndoTherm creates improved conditions to allow boilers to operate more efficiently whilst being more reactive to changes in heat demand.

EndoTherm has been installed into thousands of wet heating systems. Independent field and laboratory data confirm savings of up to 15% on those systems dosed with EndoTherm.

# Independent Performance Testing

All product claims have been tested and proven by respected, independent authorities.

**Laboratory testing, and studies carried out in samples of domestic and non-domestic properties, shows that EndoTherm has been effective in reducing energy and fuel consumption with condensing boilers ***

*These results are specific to the cases studied. Similar performance improvements may not be realised in other heating systems. Potential performance improvements depend on the current performance, condition and settings of the heating system. Based on performance data and instances reviewed comprising results from Enertek test report E3363 (dated 14th January 2014); RCT Homes field trial report from Artega and non-domestic case studies.

energy saving trust verified by

Enertek International

Direct comparison tests with and without EndoTherm in the system water indicate that the gas consumption of the boiler in the heating system can be reduced by up to 15%.

This empirical evidence indicates that the addition of EndoTherm can significantly reduce gas consumption and therefore $CO_2$ emissions.

UNIVERSITY OF THE WEST of SCOTLAND UWS

Surface Tension measurements using K11 Kruss Force tensiometers confirmed a reduction in surface tension of over 60%.

EndoTherm achieved a 19.2% improvement in heating during experiments. Testing also showed EndoTherm liberated this thermal energy much quicker through an improvement in heat transfer.

uclan

The recorded gas consumption from two tests was compared and results showed that systems dosed with EndoTherm consumed 10.4% less gas than systems containing only water.

MCS Midland Corrosion Services Ltd.

MEADOWHEAD CONSULTANCY

EndoTherm is proven to be non-corrosive in use, compatible with leading brand inhibitors and causes no degradation of heating system components.

SureScreen Scientifics

EndoTherm is proven to be compatible with EPDM rubber seals. EPDM is a common material found within heating systems.

Institute for European Environmental Policy

EndoTherm is not regarded as hazardous waste as defined by EU Directive 91/689/EEC (No Discharge Requirements)

# Award Winning

H&V news AWARDS 2019
WINNER
Small Company Achievement of the Year

Shell Springboard
2018 REGIONAL WINNER

CIBSE BUILDING PERFORMANCE AWARDS 2016
ENERGY SAVING PRODUCT OF THE YEAR

H&V news AWARDS 2015 WINNER

ecobuild 2015 THE INNOVATION BIG PITCH in association with M&S
WINNER

# Approved Compatibility

WORCESTER
Bosch Group

ideal

BAXI

De Dietrich

Lochinvar®

FERNOX
MAKES WATER WORK

SENTINEL®

VIESMANN

SPIROTECH
FOR BETTER PERFORMANCE

# Example Case Studies

## Commercial Case Study
### United Utilities Headquarters
Lingley Mere, Warrington. United Kingdom

**15.53 %**
**AVERAGE SAVINGS**

**PROJECTED ANNUAL SAVING**
**£23,797**

**PROJECTED ANNUAL $CO_2$ SAVING**
**194,938 kg**

- 100 acre site managed by EMCOR UK.
- EndoTherm installed in six buildings on-site.
- Pre and Post-EndoTherm Actual Meter Reading (AMR) data compared.
- Comparison data normalised using Heating Degree Day (HDD) data.
- HDD data sourced from nearby Liverpool Airport at a baseload of 15.5°C.
- Financial savings based on a unit cost of 2p per kWh.

| SITE | Qty EndoTherm | Duration | Saving (%) | Saving (£) | Saving ($kgCO_2$) |
|---|---|---|---|---|---|
| 1 | 50 Litres | 6 Months | 9.52% | £1,618.15 | 14,887 kg |
| 2 | 3 Litres | 3 Months | 18.51% | £184.49 | 1,697 kg |
| 3 | 2 Litres | 7 Months | 15.3% | £159.82 | 1,470.3 kg |
| 4 | 3 Litres | 10 Months | 18.3% | £242.08 | 2,227.17 kg |
| 5 | 38 Litres | 7 Months | 12.1% | £2,565.46 | 23,601.73 kg |
| 6 | 60 Litres | 6 Months | 19.52% | £6,126.50 | 56,363 kg |
| **TOTAL** | **156 Litres** | | | **£10,896** | **98,922 kg** |

## Commercial Case Study
### Young & Co.'s Brewery
Full roll-out across all sites. United Kingdom

**17.16 %**
**AVERAGE SAVINGS**

**PROJECTED ANNUAL SAVING**
**£154,378**

**PROJECTED ANNUAL $CO_2$ SAVING**
**1,020,060 kg**

- Young & Co.'s Brewery is a British pub chain operating circa 270 pub sites across the UK.
- Each Young's site has a wet heating system powered by gas boilers.
- Young's spend circa £899,640 on heating costs per annum.
- Following site surveys and analysis, EndoTherm was installed into a number of Young's sites in the Greater London area.
- Two years' historical gas consumption data was analysed to calculate a baseline for each pilot site.
- Post-EndoTherm gas consumption data was analysed and compared to the pre-EndoTherm data with temperature differences compensated for by using Heating Degree Days from a local weather station.
- Results showed significant average energy savings of 17.16% and substantial carbon reduction.
- After presenting a strong business case, Young's rolled out EndoTherm across their portfolio.

## ROYAL BANK OF SCOTLAND BRISTOL BRANCHES


**29.25 %**

**AVERAGE SAVINGS**

**$CO_2$ SAVING**

10,689 kg

Installed April 2016
1 boiler per site
Radiators and AHU
ROI 3 months

## NATS PRESTWICK AYRSHIRE AIR TRAFFIC CONTROL CENTRE

**16.36 %**

**TOTAL SAVINGS**

**$CO_2$ SAVING**

46,370 kg

Installed April 2015
5 x Ferroli 247.5kW
AHU and Fan Coil Units
ROI 12 months

## MIDDLESBROUGH COUNCIL CIVIC CENTRE


**20.56 %**

**TOTAL SAVINGS**

**$CO_2$ SAVING**

26,362 kg

Installed Dec 2014
2 x Allen Ydnis 2M BTU
Air Handling Units
ROI 5 months

## ROTHERHAM NHS PARK REHABILITATION CENTRE

**13.54 %**

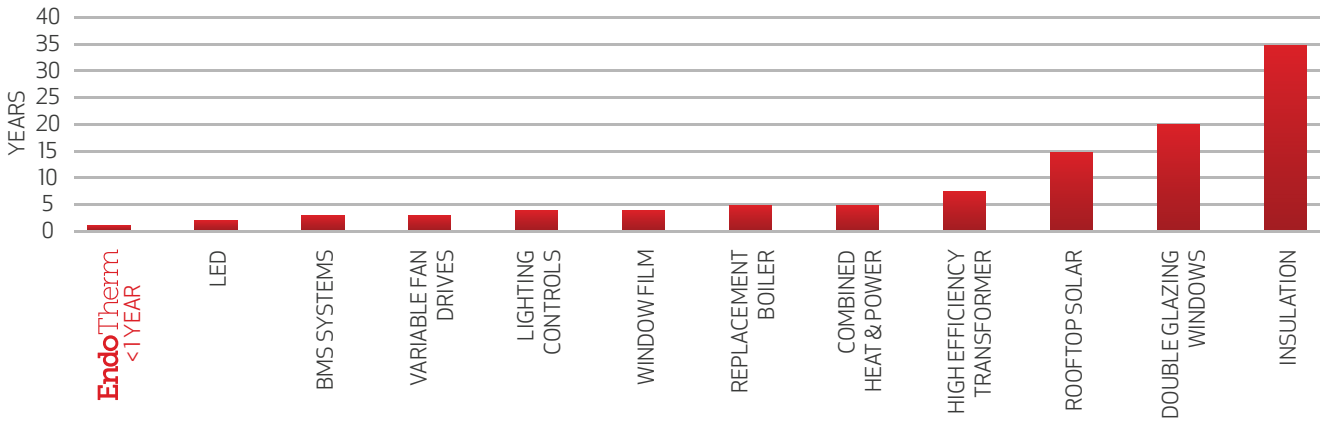
**TOTAL SAVINGS**

**$CO_2$ SAVING**

16,000 kg

Installed July 2014
2 x Remeha 205kW
Radiators and AHU
ROI 5 months

# Typical ROI time for Energy Saving Technologies



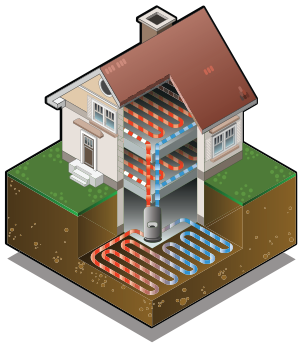

Many energy saving technologies have a low ROI and rely on government rebates/incentives to make commercial sense. Other technologies are far too expensive to be considered in an energy budget. Most of the attractive technologies affect electrical savings but not gas/heating efficiencies. However, with a typical return on investment in less than a year and considerable reductions in carbon emissions, EndoTherm stands out in a crowd of energy saving products.

# Additional Applications

The improvement in heat transfer that EndoTherm provides can be utilised in a multitude of different applications outside of traditional closed loop boiler systems for comfort heating. Below are some examples of EndoTherm delivering energy savings in alternative applications.

## GROUND SOURCED HEAT PUMPS (GSHP)

EndoTherm can be used in the LTHW heating systems provided by both Ground and Air Sourced Heat Pumps. It can also be applied to the glycol filled brine loop (collector loop) to enhance the surface area of the pipework to effectively increase the size of the collector loop and therefore the ability to absorb heat from the ground.



### LARGE STATELY HOME — 6 MONTH TRIAL

- Large Stately Home in Yorkshire attracting 250,000 visitors each year.
- 2 x 110kW GSHP with collector loop under 3 acre lake next to property.
- 65 Litres of EndoTherm was installed in July 2014.
- Savings determined by comparing sub-metered electricity usage.
- Return on investment (ROI) achieved within 12 months.

**16.1**
**% TOTAL SAVINGS**

| FINANCIAL SAVING | £2,069 | $CO_2$ SAVING | 12,880 Kg |
|---|---|---|---|

## AGRICULTURAL/LIVESTOCK

For many agricultural applications the climate influences the well-being, health and thus profitability of the stock. For most temperature control is essential as many crops thrive at specific temperatures. This makes heating an expensive overhead for farms especially for those in isolated areas where there is no natural gas connection.

EndoTherm has been installed into commercial greenhouses, farmhouses and poultry sheds to reduce the gas consumption without impacting on the closely controlled temperatures needed to ensure a healthy and profitable crop.

### POULTRY FARM — 6 MONTH TRIAL

- 3 Shed Poultry farm located in Derbyshire, UK.
- Heat provided by both Biomass (195kW) and LPG (400kW)
- 52 Litres of EndoTherm was installed in June 2016.
- Heat meter readings were compared with previous years usage.
- Observed to include several crop cycles.
- Return on investment (ROI) achieved within 9 months.

**20.6**
**% TOTAL SAVINGS**

| FINANCIAL SAVING | £2,611 | $CO_2$ SAVING | 16,014 Kg |
|---|---|---|---|

# Embodied Carbon

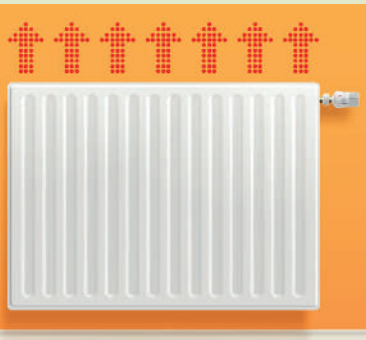

## Each bottle of EndoTherm is responsible for 0.58Kg of embodied carbon

http://www.eugeos.co.uk/

**EMBODIED CARBON**

The term embodied carbon is used to describe the amount of carbon dioxide emitted during the manufacture and transport of EndoTherm per bottle.

**EndoTherm becomes carbon neutral in under 1 day of use and is proven to last for at least 6 years!**



The average UK household uses

**15,000 kWh**

to heat their home in a year

DECC domestic energy bill estimates


**EndoTherm**

is proven to save up to 15%, which results in

**2,250 kWh**

saved in a year

Enertek International

=

**£90**

saved in a year per home

Based on 4p/kWh gas cost

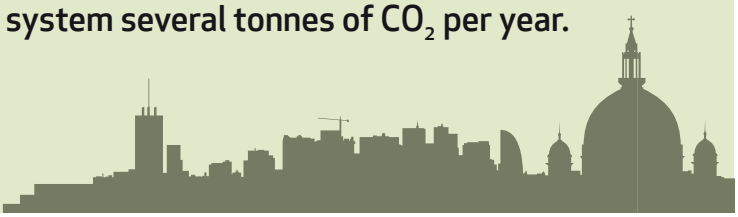

Every kWh saved equates to 0.184Kg of $CO_2$ also saved!

Over the course of a year thats a reduction of 414Kg of $CO_2$

## Equivalent to the workload of 207 trees!


http://www.forestry.gov.uk


Each 5 litre EndoTherm container is responsible for 5.3Kg of embodied carbon. Each container has the potential to save a commercial heating system several tonnes of $CO_2$ per year.



# FAQ's

## DOES ENDOTHERM WORK IN ANY WATER BASED HEATING SYSTEM?

EndoTherm is suitable for any wet system with a water to air heat transfer. This may include systems with radiators, air handling units, fan coil units and underfloor heating systems using mains gas, biomass, heating oils like kerosene and LPG and even electric heated systems.

We have also seen EndoTherm work with ground sourced heat pumps, air sourced heat pumps and chilled water systems.

## HOW MUCH ENDOTHERM DO I NEED?

For optimal performance, we recommend a dosage a 1%. This is 1L for every 100L of system water. For more advice on calculating system volume please contact a member of the EndoTherm team.

## SHOULD ENDOTHERM BE INSTALLED INTO A CLEAN OR DIRTY SYSTEM?

EndoTherm will work in both 'clean' and 'dirty' systems. EndoTherm works by increasing thermal contact area on the inside of systems but this can only happen on part of the system that the water can access. So dirty systems filled with scale restrict the surface area than EndoTherm can improve.

It is recommended that systems are flushed / cleaned before the installation of EndoTherm to maximise energy savings but this is NOT require for savings to occur.

## HOW LONG DOES ENDOTHERM LAST?

The chemicals in EndoTherm are thermally stable and we expect them to stay active in a closed wet system (with no water loss) under the temperatures typically experienced in a heating system. There is evidence to support a longevity of a minimum 6 years .

## IS ENDOTHERM NON-CORROSIVE?

Extensive testing has been carried out on EndoTherm using BuildCert approved test houses. EndoTherm is proven to have no corrosive or damaging effects on the material found within heating systems.

## SHOULD AN INHIBITOR STILL BE INSTALLED INTO MY SYSTEM?

Yes, Whilst EndoTherm does have some inhibitor properties it is NOT designed to be a replacement to BuildCert approved corrosion inhibitors. We have conducted independent tests with leading brand inhibitors and can confirm a compatibility with these chemicals.

## IS ENDOTHERM SAFE TO HANDLE?

EndoTherm carries a standard warning against contact to the eyes but this can be easily alleviated with best practice guidelines. A safety data sheet and risk assessment for dosing EndoTherm is available upon request.

## ARE THERE ANY DRAINAGE RESTRICTIONS WITH ENDOTHERM?

No, EndoTherm is not regarded as hazardous waste as defined by the EU Directive 91/689/EEC and has not special discharge requirements.

## WHAT ARE THE TYPICAL RETURN ON INVESTMENTS (ROIS) OF AN ENDOTHERM INSTALL?

The typical ROI of an EndoTherm install is 9-12 months based on a conservative 10% saving.

# EndoCool™

## Energy Saving Additive for Chilled Water Systems

## STAY COOL FOR LESS

EndoCool is an environmentally friendly and energy-efficient additive for cooling systems that improves the heat transfer of the system – lowering the energy requirements and the costs of running the system.

After adding EndoCool, you will immediately start to save energy, or for the same energy achieve greater cooling.

EndoCool is an advanced proprietary formula born out of the multi award winning EndoTherm family of technologies.


## BENEFITS

- Save money on cooling costs.
- Large carbon reduction potential.
- Non-corrosive.
- Quick and easy install.
- Independently tested technology.
- Compatible with inhibitors and glycols.
- Fast return on investment.
- Developed and manufactured in UK.

**www.endocool.co.uk**
**www.twitter.com/endo_cool**

# EndoTherm®

**UK Patent Approved** GB2494073
**US, Canada and Europe Patent Pending**
PCT/GB2016/050291

| Product | SKU | Volume | Weight | Pallet Qty |
|---|---|---|---|---|
| **EndoTherm 500ml** | 10-10-000 | 0.5 Litres | 0.5 KG | 960 |
| **EndoTherm 1L** | 10-10-001 | 1 Litre | 1 KG | 660 |
| **EndoTherm 5L** | 10-10-005 | 5 Litres | 5 KG | 160 |
| **EndoTherm 10L** | 10-10-010 | 10 Litres | 10 KG | 75 |
| **EndoTherm IBC** | 10-10-IBC | 1000 Litres | 1000 KG | 1 |

ENDO ENTERPRISES™
ADVANCED WATER TREATMENT SOLUTIONS

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v6

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UKAS MANAGEMENT SYSTEMS 0026

Certificate Number 12560
ISO 9001