

Test report:

TT-KS „Electric Heat System” from TECHNOTHERM



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1. EXECUTIVE SUMMARY

The TECHNOTHERM TT-KS Eco-Electric Combination Radiator central heating system is manufactured in Germany and has been developed and used to provide high performance, low cost central heating solutions primarily for the social housing market in the United Kingdom and Northern Ireland.

The TECHNOTHERM system is used and endorsed by over 70 Social Housing Bodies in the U.K. with over 15.000 systems installed to date (List and contact details available on request).

TECHNOTHERM Electric-Heating systems use the latest state of the art German electric heating technology to deliver running costs which are cheaper than traditional oil or gas “wet” heating systems. On average TECHNOTHERM Heating System is 50% cheaper to run than oil (see cost comparisons section 3).

United Kingdom has one of the highest Fuel Poverty levels in Western Europe. 42% of homes in the region are deemed to be in fuel poverty.

The main cause of this is the high cost of oil fired heating on which almost 70% of United Kingdom homes are reliant as their primary source of heating.

TECHNOTHERM Electric heating has emerged as the most viable central heating system currently available with real potential to seriously address fuel poverty in United Kingdom.

TECHNOTHERM ELECTRIC HEATING SYSTEMS ARE PARTICULARLY SUITED TO THE SOCIAL HOUSING MARKET:

- TECHNOTHERM is MAINTENANCE FREE
- TECHNOTHERM does not require any annual servicing or safety checks
- TECHNOTHERM carries a 15 year warranty which is longer than the life expectancy of a modern gas or oil boiler
- TECHNOTHERM installation costs are competitive with, or cheaper than oil or gas
- TECHNOTHERM is a “dry” heating system and has no associated plumbing maintenance costs
- TECHNOTHERM carries no carbon monoxide risk

2. TECHNOTHERM IN SOCIAL HOUSING IN UK

PROFILE OF 524 TECHNOTHERM INSTALLATIONS

- The TECHNOTHERM system was first trialed successfully in a flat in multi store in January 2010
- This was followed by a pilot scheme in multi-storey tower block in November 2012 (54 properties)
- After monitoring the multi store pilot scheme for one year the system was provided for tenants in an additional eleven multi-storey blocks totaling 524 flats:
- A further scheme was undertaken in April 2012: 13x 3 bedroom maisonettes / 14x 2 bedroom low rise flats
- The vast amount of properties throughout these schemes suffered from very poor insulation resulting in unusually high levels of heat loss

TOTAL TENANT CARE PROGRAMME (TTCP)

The Total Tenant Care Program (TTCP) was provided as part of the installation cost of the TECHNOTHERM Electric Heating system.

The program was offered to provide advice, guidance and support to tenants on the best, most efficient and most economical use of the TECHNOTHERM TT-KS system throughout the first year following installation.

Energy monitors which recorded cost, energy use in kw/hrs and temperature were fitted in each property to monitor results for heating only so as these could not be confused with electric consumption in rest of house.

The TTCP guaranteed five statutory visits to each property throughout the year including a pre-install survey to determine tenant lifestyle and heating requirements and end of year visits to record final annual monitoring results.

A telephone "Helpline" service was set up and tenants could avail of extra home visits as and when required. Some elderly and vulnerable tenants received up to eighteen visits, the average number of visits received across all tenants was nine.

The TTCP represents the largest and most comprehensive heating survey and tenant support program ever carried out in social housing in the UK.

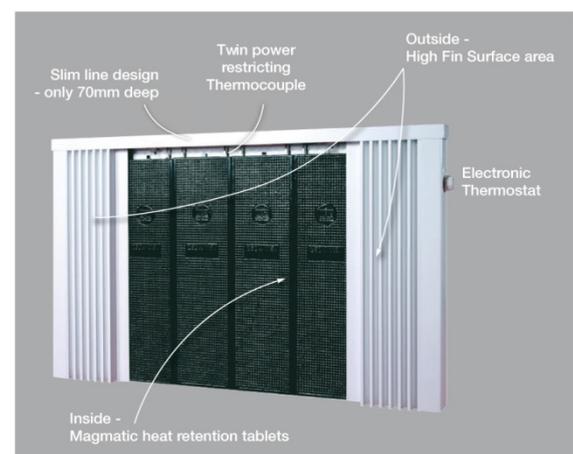
TECHNOTHERM TECHNOLOGY – HOW IT WORKS

- TECHNOTHERM TT-KS is a “dry” electrical central heating system. It is known as an Electric Combination Radiator System
- TECHNOTHERM TT-KS is NOT an electric storage heater system however it can be operated during Economy 7 hours at the lower tariff rate
- TECHNOTHERM TT-KS is fully programmable and can be centrally controlled to meet “Decent Homes Standard”
- TECHNOTHERM TT-KS is a modulating system and only draws power as and when needed to maintain a constant room temperature
- TECHNOTHERM technology ensures the combination radiator will draw power (modulate) between 10 minutes minimum and 30 minutes maximum in any given hour to maintain required temperature in the room

10 minutes per hour = Modern, well insulated building with low heat loss

30 minutes per hour = Older, badly insulated building with high heat loss

- TECHNOTHERM TT-KS is 100% efficient. It does not require a boiler and therefore there is ZERO heat loss through flues, water or pipe runs
- TECHNOTHERM TT-KS provides 150% more radiant heat than a traditional gas or oil wet system. This has the tangible effect of distributing heat evenly from floor to ceiling and is more effective at heating physical mass. TECHNOTHERM does not create the “hot spot” at ceiling level associated with wet systems which is wasted heat
- TECHNOTHERM uses on average 65% less energy in terms of kw/hrs than a wet heating system



- TECHNOTHERM Combi-rads deliver heat in the ratio of 50% radiant and 50% convected allowing even distribution of heat from floor to ceiling.
- Oil or gas wet heating systems deliver 20% radiant to 80% convected heat. The result is that the hottest part of the room is above head height at ceiling level this “hot spot” is essentially wasted heat and contributes to the lower efficiency of traditional wet heating systems when compared to the TECHNOTHERM dry system.

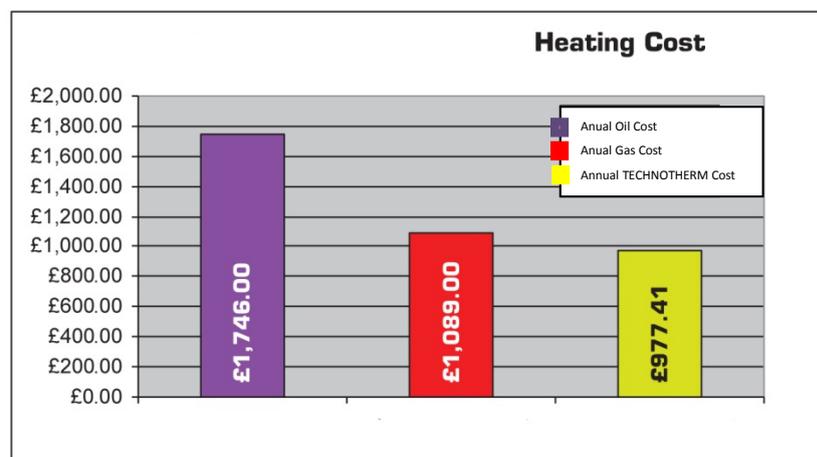
TECHNOTHERM RUNNING COSTS

DIRECT COMPARISON OF TECHNOTHERM AGAINST OIL & GAS

Running costs for TECHNOTHERM were calculated using same criteria as the recent consumer council report comparing gas against oil, "Comparative Domestic cost of Gas vs Oil – May 2013"

ANNUAL GAS COST: £1089
 ANNUAL OIL COST: £1746.00
 ANNUAL TECHNOTHERM COST: £977.41

TECHNOTHERM (£977.41) v's Gas (£1089.00) : TECHNOTHERM 10% CHEAPER THAN GAS
 TECHNOTHERM (£977.41) v's OIL (£1746.00) : TECHNOTHERM 44% CHEAPER THAN OIL



METHODOLOGY:

Consumer Council have recently published the first definitive report comparing running costs of gas against oil. Subsequently a report was submitted to the consumer council outlining all data collected through the TTCP on the TECHNOTHERM Electric Heating system and full methodology used in calculating running costs.

- The methodology and criteria behind the Consumer Council report which used Sutherland tables as a common guide was applied to TECHNOTHERM data.
- Sutherland tables advised that the TECHNOTHERM pricing model which was in line with their 2 bedroom property estimates was the 6 hour model.
- The TECHNOTHERM 6 hour model was then updated to take out zoning of bedrooms, in other words 6 hours whole system/whole house was calculated. Price per KWH was increased to current average daytime tariff across providers in UK as directed by the Consumer Council (16.8p per KWH) calculations did not take in to account of any night time tariff used.
- An estimated cost for domestic hot water based on 120 litre cylinder was then added to apply a like for like calculation in line with Sutherland tables.
- Total figure calculated was based on 2 bedroom property so in order to bring this into line with the consumer council figures for an "average home in UK", this figure was increased by a ratio of 40%

TECHNOTHERM RUNNING COSTS

TECHNOTHERM RUNNING COST PRICING MODELS

All forecasted running cost pricing models were based on 30 minutes modulation per hour.

Pricing models were split into three categories to best capture a range of tenant lifestyles and heat requirements.

Each category was split into two scenarios:

- a) All hours at full daytime tariff
- b) First two hours of programmable heat between 6am & 8amin the morning at night-time (Economy 7) tariff. The majority of tenants took advantage of this facility.

Cat. 1 6Hrs whole house / Beds zoned for 3hr	Cat. 2 8Hrs whole house / Beds zoned for 4hr	Cat. 3 10Hrs whole house / Beds zoned for 4hr
a) £403.63p b) £319.88p	a) £537.97p b) £454.54p	a) £631.80p b) £588.85

TECHNOTHERM ACTUAL ANNUAL RUNNING COSTS IN HOUSING EXECUTIVE SCHEMES

Block Name	Block average days installed	Block average Total Cost for install Period	Block Daily average	Block Weekly average	Weekly ave excluding less than £3	Weekly ave excluding less than £5
Co... House	366	£303.16	£0.83	£5.81	£8.91	£10.33
Ra... House	369	£586.88	£1.59	£11.15	£15.84	£17.73
Pa... House	363	£303.72	£0.83	£5.84	£8.71	£9.63
Fe... House	366	£457.87	£1.25	£8.75	£9.94	£11.95
Ri... House	371	£323.69	£0.87	£6.08	£8.16	£9.17
Mo... House	372	£352.49	£0.94	£6.58	£8.24	£9.27
Mo2... House	373	£358.23	£0.97	£6.76	£8.20	£9.79
Wh... House	387	£362.68	£0.94	£6.59	£8.92	£11.08
Wil... House	373	£392.67	£1.06	£7.40	£10.91	£10.91
Wo... House	370	£383.78	£1.03	£7.24	£10.58	£11.17
Ki... House	360	£311.97	£0.87	£6.08	£7.69	£10.78
Ca... House	364	£409.37	£1.12	£7.84	£8.53	£9.98
Total 11 block ave	369	£378.88	£1.03	£7.18	£9.55	£10.98
True average of actual annual running costs (pa) =						£373.22
Average of actual running costs excluding very low users (pa) =						£496.72
Average of actual running costs excluding low users (pa) =						£571.05

TECHNOTHERM FINAL TENANT SATISFACTION QUESTIONNAIRE RESULTS

Total Surveys Complete: 306	Very Satisfied	Satisfied	Reasonably satisfied	Dissatisfied	Very Dissatisfied
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1) Ease of use of the system:

This question refers to how easy the tenants found it to use and set our systems as well as make changes to the programmer.	68.52%	14.10%	13.44%	1.97%	0.98%
	96.07% Satisfaction Rate				2.95%

2) The amount of heat you can get:

Tenants were asked how satisfied they were with the quality and level of heat the TECHNOTHERM system delivered. A high percentage of tenants reported poor insulation at this question.	43.28%	21.97%	20.00%	6.56%	7.21%
	85.25% Satisfaction Rate				13.77%

3) The control over the level of heat:

This question assessed the way tenants viewed the several different control features of the TECHNOTHERM system.	68.85%	15.41%	11.48%	1.31%	1.97%
	95.74% Satisfaction Rate				3.28%

4) Health factors i.e. cleaner heat:

The rationale behind this question was at pilot stage some tenants reported health improvements inc better sleeping comfort & alleviation of respiratory conditions, we monitored to identify any trends	42.62%	12.13%	40.98%	0.98%	2.30%
	95.74% Satisfaction Rate				3.28%

5) Cost of running the system:

Tenants were asked if they had seen a reduction in their heating bills and how satisfied they were with their heating bills.	40.66%	18.03%	22.95%	6.23%	10.49%
	81.64% Satisfaction Rate				16.72%

6) Understanding your heating system:

We asked tenants how comfortable they were with the overall TECHNOTHERM system and how to make it work for them.	61.64%	18.03%	16.72%	1.64%	0.98%
	96.39% Satisfaction Rate				2.62%

7) The level of tenant care that you received:

Tenants were asked to state how they felt about the customer experience received from TECHNOTHERM Total Tenant Care Program (TTCP). This could have been in excess of. 8 visits per client.	75.08%	12.13%	9.18%	1.31%	1.31%
	96.39% Satisfaction Rate				2.62%

Finally would you recommend this system to a friend or family member?

Yes 81.64%	No 18.36%
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CONCLUSION: ASSESSMENT OF THE TECHNOTHERM SYSTEM BY HOUSING EXECUTIVE

CRITERIA

The Council clearly lays out its agenda for the comparison of heating systems in social housing past and present in its Heating Policy Review Document – September 2012. Natural gas condensing (inc. zone and e-controls) scores highest at 9.1. Oil Condensing boiler is ranked 5th with a score of 6.5 TECHNOTHERM SCORES HIGHER THAN GAS & OIL IN EVERY CATEGORY we've added in scores for the TECHNOTHERM system to the original document, the rationale for which is explained overleaf please find below:

Page 26 - 7.1 choosing the optimal heating system (Theme 1)

7.1.1 Assessing heating systems

A range of issues are considered and weighted to assess the heating systems most suitable for installation in properties:

		TECHNOTHERM Score
Financial		
Running costs to the tenant and PAYGO availability	30	29
Installation costs & maintenance costs for NIHE	30	29
Practical		
Resistance to obsolescence and potential for future development	10	9
Usability of by all tenants including ability to control	5	4
Resilience to a variety of situations such as severe cold weather and improper use	7	6
Environmental		
Impact upon local air quality (health and environment)	10	10
Global impact of carbon emissions from fuel use	8	7
Total	100	94

7.1.2 Assessment scores

Heating systems were scored (out of 10) against the criteria prior to application of a weighting factor.

The table below includes systems currently available (New-5) and compares these to previously specified systems (6-9)

Rank	Heating system	Score
New	TECHNOTHERM TT-KS Eco-Electric Combination Radiator Systems	9.4
1	Gas Condensing Boiler (inc. zone and e-controls)	9.1
2	Gas Condensing Boiler	8.9
3	Oil Condensing Boiler (inc. zone and e-controls)	6.7
4	Wood pellet boiler (based on bags inc. zone control)	6.6
5	Oil condensing boiler	6.5
6	Oil standard boiler	6.2
7	Electric dry storage heaters	5.8
8	solid fuel room heater and radiators	5.6
9	Coal fire and radiators	4.9

CONCLUSION: ASSESSMENT OF THE TECHNOTHERM SYSTEM TT-KS

Below is TECHNOTHERM TT-KS rationale on why the Electric heating system scored 9.4 marking it as a more advanced and suitable heating solution ahead of gas and oil.

Given that TECHNOTHERM outscores the highest ranking system (gas) it makes the TECHNOTHERM system the only viable solution outside the gas network to replace oil heating and when approached in volume would have a direct positive effect on fuel poverty.

FINANCIAL:

Running Costs – The outcome of the 3 year intense monitoring was that the TECHNOTHERM Electric Heating system is proven to be at least 10% cheaper than gas and 50% cheaper than oil on average.

PAYGO – All installations can avail of one solo PAYGO meter which gives customer much more flexibility while benefiting from continuous supply outside of working hours regardless of being in credit.

Installation costs – Installation is cheaper than gas on a like for like system and in certain installs much less intrusive with minimal upheaval to the tenant.

Maintenance – TECHNOTHERM is virtually maintenance free and is considered 'fit and forget', TECHNOTHERM system does not require annual safety checks or servicing.

PRACTICAL:

Resistance to obsolescence – As TECHNOTHERM TT-KS is fuelled by electricity either from grid or produced on site by renewable measures it is resistant to world economies and dependencies on exhausted materials like crude oil prices etc.

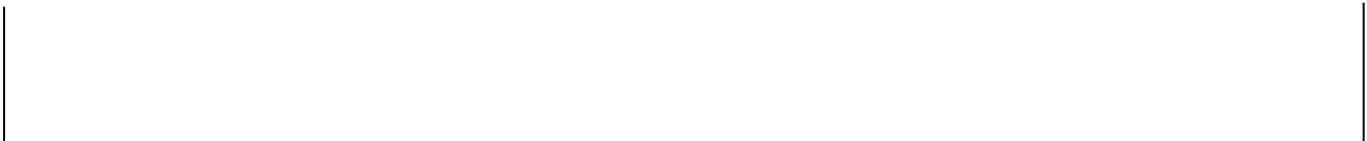
Potential for future development – The TECHNOTHERM TT-KS system has been designed with all future developments in mind and would be especially suited for renewable energy innovations. TECHNOTHERM have looked at utilizing any electricity generated by any form of renewable systems and solves the issue of trying to store power. It is also easily adaptable to any breakthroughs in control/programming.

Usability of by all tenants – TECHNOTHERM have developed a wide range of control options which can be as simple or as sophisticated as necessary depending on the tenant. With intuitive controls becoming more popular making it easier again for tenants to manage their heating requirements we have ensured that the TECHNOTHERM system can avail of these new technologies.

Resilience – TECHNOTHERM TT-KS is a tough design with no moving parts and no fluids whatsoever making it the strongest most durable system on the market. It will not suffer from burst or frozen pipes, split seams or faulty pumps and is 100% reliable in all conditions. TECHNOTHERM carries a 15 year warranty.

ENVIRONMENTAL:

The TECHNOTHERM TT-KS Eco-Electric system uses a fraction of the KWH that gas uses and as carbon emissions are dealt with at source (power stations) it gives the control back to local governments and authorities to realistically hit emission targets while providing a clean green heating system. TECHNOTHERM does not impact adversely on local air quality as no boiler is required.





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