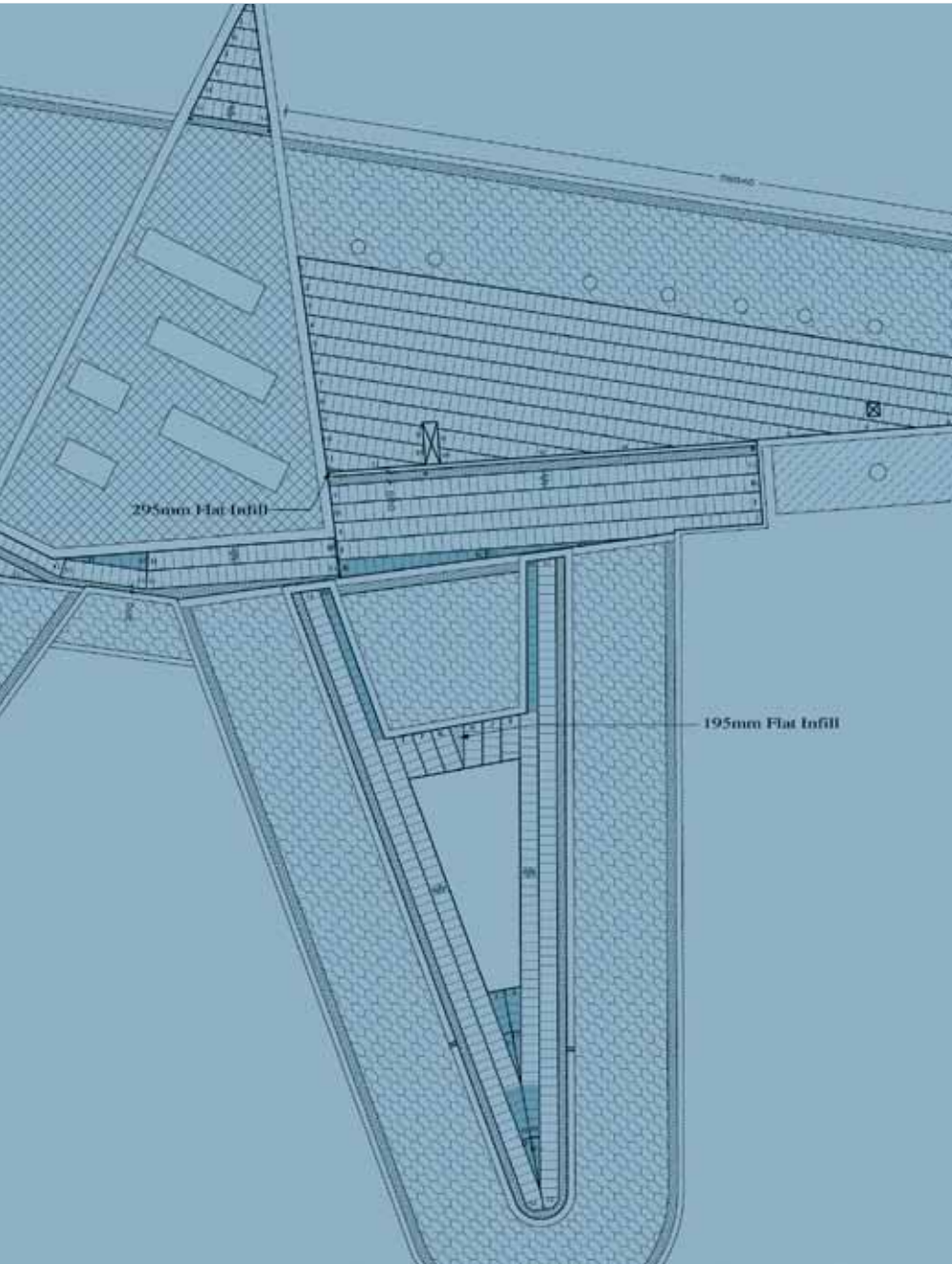


# Cost comparison of single layer versus multi-layer tapered insulation

QS Report

TECHNICAL PAPER **001**



## An independent research project

This document provides a synopsis of the findings of an independent research project commissioned by Gradient Flat Roofing and carried out by leading construction consultancy, Davis Langdon.

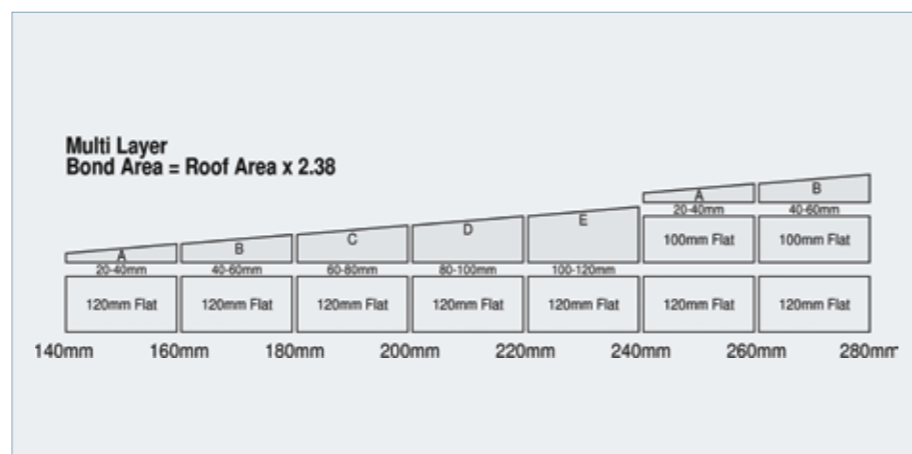


## WHAT IS CONVENTIONAL MULTI-LAYER TAPERED INSULATION?

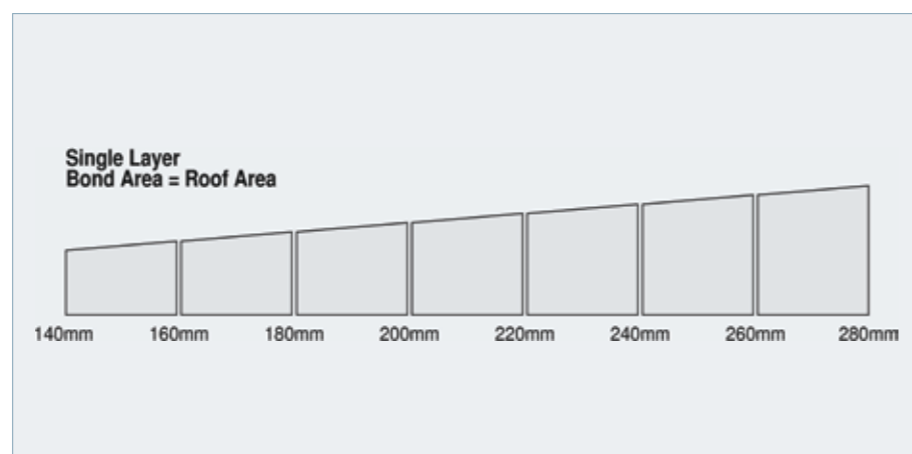
Having pioneered the use of single-layer tapered insulation systems for over 25 years, Gradient Flat Roofing leads the UK market in this field.

The aim of the research, which was completed in March 2010, was to assess the advantages and disadvantages of using single-layer tapered insulation when compared to multi-layer tapered insulation. The research was based on three actual projects. It highlighted the following comparative costs and the potential savings that can be achieved.

Multi-layer tapered insulation is created from a series of tapered insulation components which are laid over flat 'packer' boards and bonded together on-site. This can result in a total surface area which needs to be bonded that is up to three times greater than the actual roof area. This dramatically increases the cost and time involved in installing the insulation and also creates a considerably greater margin for error. For bonded membrane applications each board must be securely bonded to the roof deck or underlying board to provide a reliable base for the membrane and prevent wind uplift.



Single-layer tapered insulation systems feature carefully manufactured components which are bonded together in factory conditions to form complete bespoke insulation panels which are ready for delivery to site. They are then simply installed and bonded to the roof deck, in single units.



## WHAT IS SINGLE LAYER TAPERED INSULATION?

## WHY CHOOSE SINGLE LAYER?

Single-layer tapered insulation systems offer a number of advantages

- They simplify and speed up the setting-out process as there are fewer individual boards to be handled.
- They promote more effective and reliable adhesive bonding as most of this work is done under carefully controlled factory conditions.
- They can significantly reduce installation times, labour costs and adhesive costs.
- They provide greater control over board tolerances and can generate far less on-site waste.
- Any thickness of tapered single layer system can be produced, and a bespoke solution can be created for each individual roof.
- Off-site manufacturing process adheres to modern methods of construction guidelines.
- Potential for error in laying system is reduced.
- Any required falls can be created.
- Ponding and roof loading are minimised.
- Working life and reliability are maximised.

## RESEARCH PROCESS

Three case studies were researched

- A single, 166m<sup>2</sup> footprint roof with a central ridge and falls to gutters at two ends.
- A project comprising four separate roofs, with a total footprint area of 198m<sup>2</sup>.
- A large 1080m<sup>2</sup> footprint roof arranged around a central core and including complex hips and valleys.

The insulation systems for each case study were designed to achieve the required U-values with the minimum thickness of insulation.

## RESEARCH FINDINGS

The Davis Langdon research revealed that

- An average saving of 16% of the insulation cost could be achieved by using a single-layer tapered insulation system rather than a multi-layer tapered equivalent.
- Time savings valued at between £600 - £2,500 per week are possible, depending on the construction programme and the roof installation's position in the schedule.
- A maximum saving of 22% was possible on the projects studied.
- As the thickness of insulation used increases so does the average savings that can be made.

	SINGLE LAYER INSULATION MATERIAL COST	TOTAL POSSIBLE SAVINGS SINGLE LAYER v MULTI-LAYER	SAVINGS %
CASE STUDY A	£26.73	£2.27	8.5%
CASE STUDY B	£32.65	£7.17	22%
CASE STUDY C	£19.15	£3.41	17.8%

If you would like to discuss the findings of the Davis Langdon report in more detail, please contact:

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