Corus Building Systems

A breath of fresh air

Kalzip® Nature Roof

Imagine...

...a quieter urban environment with a more comfortable atmosphere and fresher air quality. Less heat, less dust, less traffic pollution and little need for energy hungry air conditioning systems.

The way we live will be transformed - our children will be healthier, we will be happier and live longer.
And, we will be saved from climatic crisis - the future of everything that lives and breathes on this planet will be assured.

An impossible dream? Not necessarily...

The earth in turmoil

During the last decade of the second millennium we have been slowly coming to terms with the fact that mankind has damaged the world's climate and put the future of our civilisation in jeopardy. Global warming is happening and its effects are being felt around the world. From the melting of the polar icecaps to drought in Africa and unprecedented high rainfall and flooding in the UK - we need no further proof - our climate is changing and the consequences could be disastrous for us all.

The commitment at Kyoto

In 1997 the international summit at Kyoto committed the developed nations to achieving reduced emissions of a 'basket' of 6 gases known to be associated with global warming. Ratification of the summit within the European Union gave the UK a reduction target of 12.5%, by comparison with 1990 levels, within the period 2008 - 2012. Over and above this, the government has committed the UK to achieving a reduction in CO_2 emissions to 20% below 1990 levels by 2010.

Revised building regulations

In the UK, buildings and building engineering services consume 52% of the total energy output. This amounts to 46% of the total carbon dioxide emissions - some 235 million tonnes per year. To help achieve the Kyoto target, the government has initiated a review of Part L of the Building Regulations which conveys the legal technical requirements for the conservation of fuel and power.

The carbon dioxide budget

Effective from early 2002, the revised regulations will not only improve the energy efficiency of buildings but will also include calculations for the net carbon dioxide performance - in terms of the construction materials deployed, the cost in use - heating, lighting, ventilation, maintenance, etc. The result: an environmental costing of the structure and a positive movement towards true sustainability in the built environment.

Predicted Climate Change			Recorded	Predicted	
			1961-1990	**2050**	**2080**
Temperature	Summer maximum	**London**	21.18	23.68	24.3
mean daily		**Glasgow**	17.56	19.18	19.49
°C	Winter maximum	**London**	1.94	4.05	5.18
		Glasgow	0.43	2.34	3.28
Precipitation	Summer maximum	**London**	1.73	1.97	2.15
mm/day		**Glasgow**	4.14	4.46	4.72
	Winter maximum	**London**	1.77	1.45	1.41
		Glasgow	3.1	3.07	3.29
Wind Speed	Summer maximum	**London**	4.99	4.93	5.05
mean		**Glasgow**	5.18	5.09	5.2
m/s	Winter maximum	**London**	4.03	4.07	4.16
		Glasgow	4.23	4.31	4.41

We can help...

Nature Roof. The perfectly balanced solution

The Kalzip Nature Roof is an advanced green roofing system that has been carefully developed to provide measurable performance and environmental benefits.

Our specialist horticultural team has tested and proven the system during the past two years at trial sites around the UK. We can now provide clients and specifiers with validated performance data to demonstrate how the Nature Roof can contribute to the balancing of critical carbon dioxide budgets.

House for the Future, Museum of Welsh Life, St Fagans.
Sedum mat installation

Small selection of sedum species

The Nature Roof is underpinned by a fully engineered system with an unbeatable pedigree - Kalzip aluminium standing seam roofing. With more than 60 million square metres installed worldwide, the Kalzip offer by Corus has no equal. Kalzip's non-penetrative 'zip' technology and outstanding durability allows it to provide complete weather protection throughout the lifetime of the building. No holes means, quite simply, no leaks.

Every single component has been carefully selected for compatibility; the system as a whole has been subject to the most rigorous testing both in the UK, where it carries BBA approval and in Germany where it holds the coveted Zulassung accreditation. And, when new building regulations prompt the development of enhanced system configurations for compliance over and above the statutory requirements - each variation is subject to the same exhaustive procedures to prove long term capability.

High performance, lightweight and uniquely corrosion resistant due to its special clad alloy material, Kalzip could have been designed with green roofing systems in mind. Not only does Kalzip provide the perfect substrate, it also neatly completes the unique 'sustainability' of the Nature Roof proposition - every single element of the underlying system is fully recyclable or re-usable - no landfill costs, no toxic waste at the end of the day.

When gauged across the lifetime of a building the embedded energy costs of aluminium (taken into account when calculating the carbon dioxide budget) are less than those of other roof cladding materials.

Naturally Kalzip

Kalzip system benefits

- Outstanding durability
- High performance
- Fully recyclable
- High residual value
- Maintenance free
- Exceptional spanning characteristics
- Ease of installation

Naturally beneficial
Quite literally ‘over and above’ all the performance features of Kalzip standing seam, the Nature Roof provides:

- Improved thermal performance
- Reduced carbon dioxide levels
- Improved oxygen levels
- Improved air quality - fusion of dust and airborne particulates
- Reduced rainwater run-off
- Contributes to lowering urban temperatures
- 30% of stored rainwater returned to the natural cycle
- Improved acoustic performance
- Fully recyclable
- Reduced influence of night sky radiation on the roof structure
- High aesthetic appeal
- High ‘feel good’ factor for owners and occupants
- Encourages insect and bird life
- Minimal maintenance
- Low growing and totally self-sustaining
- Ease of installation
- Can be ‘retro-fitted’ on existing Kalzip roofs

Nature Roof... in detail

Improved thermal performance

The Nature Roof will improve the thermal performance of a building by providing protection against heat loss in the winter and heat gain during the summer. The internal environment is enhanced by more constant temperatures and has a better air quality than buildings that are heavily dependent on mechanical heating and cooling systems. The combined effect of the insulation within the underlying Kalzip system together with the insulating effect of the planting substrate and the foliage layer enhances the thermal performance. However, as the Nature Roof is a 'living' structure, actual U values will vary according to the current status of the roof, i.e. density/maturity of foliage and whether the roof is 'wet' or 'dry'.

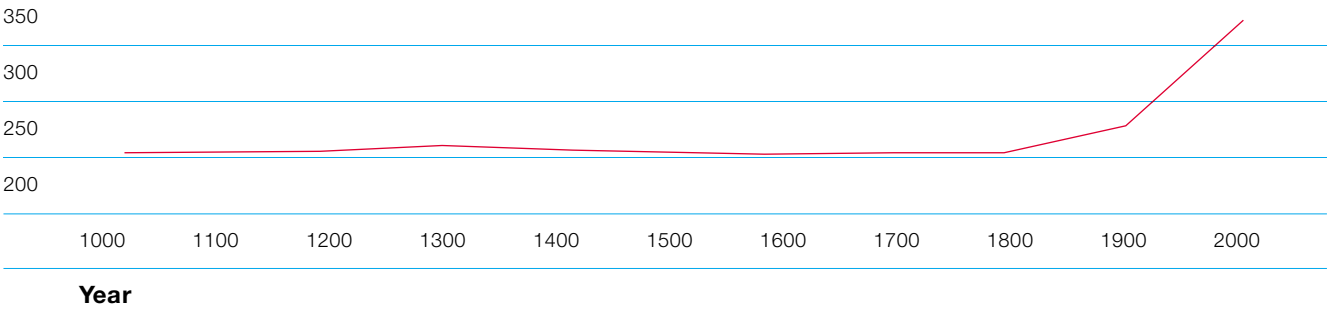
Recorded building temperatures beneath planted roof systems are consistently cooler than the surrounding air temperature during periods of warm weather. This 'cooling' effect could be important as the UK climate warms during the next 10-20 years. Less reliance on energy hungry air conditioning systems will lead to significant cost savings with the consequent positive effect on the carbon dioxide budget.

Improved air quality

Plants absorb carbon dioxide and release oxygen to the atmosphere via the process of photosynthesis. At the same time, plant leaves take in and 'lock-up' air borne pollutants such as particulates from traffic fumes and dust. In this way, the Nature Roof can lead to dramatic improvements in air quality around the building and, where large scale roof greening occurs, to the air quality of entire conurbations.

By taking the net balance of the natural processes of respiration and photosynthesis, and assuming maximum conditions of twelve hours daylight, it has been calculated that each square metre of single leaf surface on an established Nature Roof will take up 14.15g of carbon dioxide and release 9.68g of oxygen per day. It must be emphasised that this calculation is very conservative as mature plantings will have multiple leaf surface cover.

Atmospheric CO_2 concentrations over the past 1000 years



Testing in extreme conditions

Examining sedum mat root structure

Examining sedum mat

Reduced rainwater run-off

In urban areas the management of rainwater can be a major problem. The impervious nature of the majority of surfaces (both roof and ground) means that the drainage systems have to cope with sudden and large changes in flow rate. Severe autumn and winter storms with high rainfall have made destructive flash floods a common occurrence.

Initial studies in the UK show that planted roof surfaces will retain up to 100% of rainfall where up to 3mm falls, up to 80% between 3mm and 23mm and for one period where 41mm of rain fell over 47 hours, 73% of the water was retained. Similar dramatic reductions in rain water run-off have been experienced during the Nature Roof trials and the team is now in the process of carrying out dynamic analysis of the retention characteristics specific to the system.

These studies are also looking at how retention is affected by roof pitch. (Kalzip can be installed to a minimum pitch of one degree, in such a situation retention rates will be optimised). Other factors affecting retention rates include; temperature, maturity of the planted system and plant species.

Minimising temperature variation

Roof planting helps to reduce this temperature differential by covering up the heat sink surfaces and dissipating solar energy by the evaporation of water from the plant and substrate layers. In Europe, it has been shown that the roof surface can often have a temperature range of 100°C. By planting the roof surface, this temperature range can be reduced to 20-25°C.

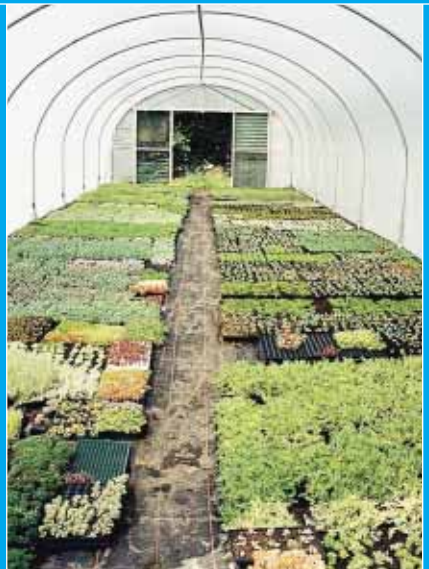
Greening by decree

The Nature Roof provides life-long environmental and performance advantages to the structure on which it is installed - with measurable improvements to the surrounding 'micro-climate'. However, for roof greening to have a significant and long term effect on climatic conditions across broader geographic regions, a fully integrated and collective approach at both national and international level is required. In several European countries this has already been recognised and there are legal and fiscal incentives in position to drive roof greening programmes forward.

In Switzerland, for instance, city laws require that 25% of all new commercial construction areas be greened following completion of the development. In Germany, the government estimates that 43% of German cities now offer financial incentives for roof greening. These consist of subsidies towards general greening and a reduction in taxes as part of water management programmes.

Similar measures are urgently required to encourage roof greening in the UK where the loss of our natural 'green' environment is taking place at an ever accelerating rate. The Council for the Protection of Rural England has calculated that, every day since 1992, an area of space equivalent to 100 football pitches has been lost to development in England. At the same time, it has been estimated that 20,000 hectares of existing urban roofed structures could be 'greened' with little or no structural modification.

Monitoring sedum performance



Sedum trials

Trials close up

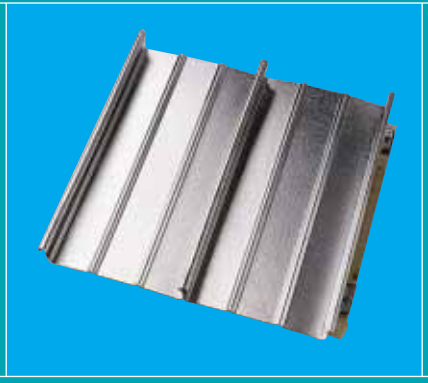
A co-ordinated system

The Kalzip Nature Roof has been developed as an integrated system with no fewer than 18 separate elements in addition to the plants - these include drainage matting, filter web, rainwater reservoirs, planting substrates and fertilisers. All of these have been carefully tested, both individually and in combination, to produce a system that has all the traditional Kalzip hallmarks of high performance, longevity and low cost in use.

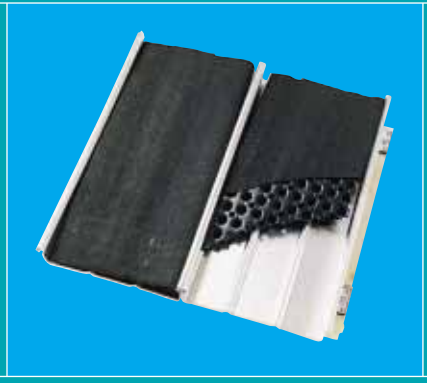
The assembled system not only nourishes and supports the selected planting programme but also actively helps to inhibit the invasive effects of weeds which can so easily lead to mass plant failure in some green roofing systems.

All year round performance

Based on the extremely hardy sedum species, the Nature Roof is capable of withstanding all kinds of weather. Found naturally in rocky, gravel soil conditions, sedums can endure prolonged dry spells with no detrimental effects and at the other extreme, high rainfall and severe temperatures present no threat to plant survival. The principal UK trial site was based at an altitude of 300 metres on Saddleworth Moor in the Pennines - totally exposed to wind, high rainfall and snow. The plants have thrived and provide not only glorious summer colour when in full bloom but also attractive autumnal and winter tones.



Kalzip sheets



Drainage modular mat installed

Performance comes naturally

Alternative planting formats - plug and mat

There are two alternatives at installation stage: the Nature Roof can be supplied in either ‘mat’ or ‘plug plant’ format. The mats comprise sedums which have been grown to early maturity on a special fibre matting at our field nursery in Somerset. Already closely knitted together, the installed effect of the ‘roll-out’ matting is of instant greening - total roof cover at the outset.

The plug plant option involves the random planting of a selection of young plants across the roof where they come to maturity in-situ. The immediate post-installation effect is rather like a newly planted rock garden but within several months the fast-growing plants will reach maturity to achieve striking combinations of colour and texture across the roof.

Flexible planting programmes

With either format, the selection of sedums can be varied to suit the precise geographic location. Whether the requirement is to ensure performance against specific local climatic conditions - a marine environment, for instance - or to provide compatibility with the tones and shades of local building materials and landscape - project specific planting programmes can be devised from the extensive range of sedums available to our horticultural team.

Fire blown clay substrate added

Plug planted sedums (advanced)

Alternatively, instant sedum mat laid

Stucco embossed Kalzip roof

The drainage/reservoir mat is clamped into position

The substrate is laid

The Nature Roof is supplied, delivered to site, installed and supervised only by our trained specialist team of contractors. It is a complete package developed exclusively as an extension of the Kalzip aluminium standing seam proposition. We provide everything from the structural purlins through to the plants themselves and an aftercare service.

The complete package

Assorted sedum plugs ready for planting

Planting out - a simple, rapid process. It takes a team of 3 just 2 hours to plant 3,000 plugs

A ‘one-off’ application of liquid mulch/fertilizer completes the process

100sqm Nature Roof fully installed in a day (11 months old)

Full support

Fully trained installers

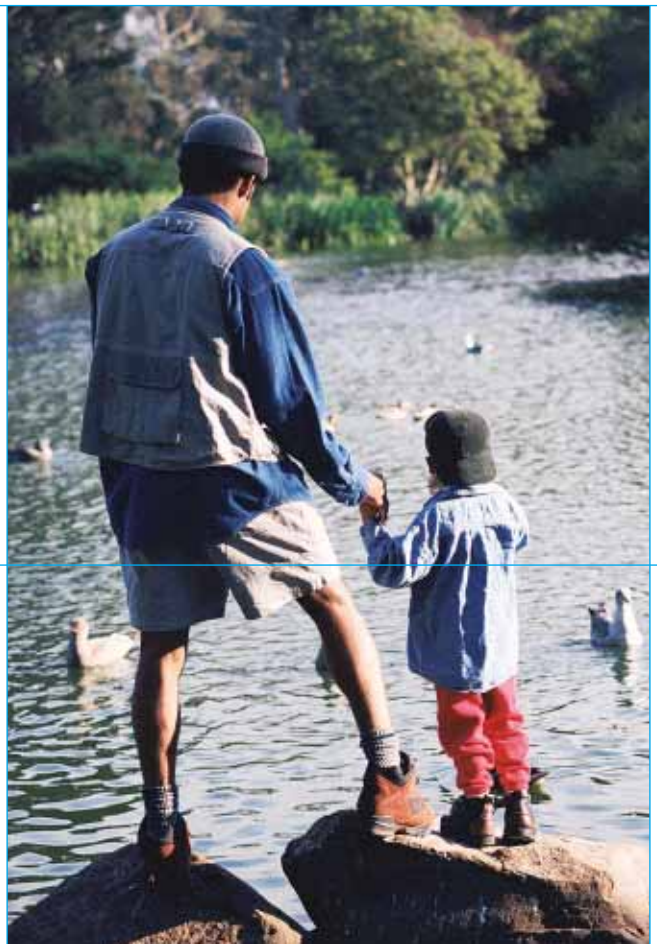
Only fully trained horticulturalists and approved installers from our Teamkal network install the Kalzip Nature Roof. To ensure that quality is guaranteed at every stage from first design concept through to final installation, personnel of contracting companies within the network are trained at the purpose-built centres at our Haydock and Koblenz headquarters. The specialist horticultural team has also been trained to advanced level in the installation of Kalzip aluminium standing seam allowing us to provide a totally integrated and informed approach at every stage of the process.

This commitment to training and supporting on-site services is an integral part of the Kalzip offer and is one of the key differentiators between the system and its many imitators.

After sales care

Whilst maintenance requirements with the Nature Roof are minimal, for complete peace of mind, we do offer an ongoing inspection and maintenance service. For the first year this is free and then a three year maintenance contract is available. Under normal circumstances, a twice yearly inspection is all that is required to check drainage and to allow for the identification of any pests or diseases - in the event of which the horticultural team employs biological methods to eradicate the problem.

Kalzip®
Teamkal Network



Further information

This brochure represents just a brief introduction to the Nature Roof. Additional and extensive detail about performance and environmental benefits is available on our website www.natureroof.com.

Kalzip. Where to find us.

For further information about Kalzip, please contact initially the primary centre for your region. (Full address details are shown on the back cover). And visit our web sites:
www.corusgroup.com
www.kalzip.com
www.kalzip.co.uk
www.natureroof.com

or contact: 01925 825100 for literature.

You can also use this number to arrange a visit to one of our trial sites, or an inspection of your existing Kalzip roof to determine suitability for a Nature Roof ‘retro-fit’.

Technical Literature

A range of indepth technical documents covering every aspect of our products and systems is available, (on line, hard copy and CD rom in various languages).

The future is in our hands.

Sedum plant photography supplied by
Blackdown Horticultural Consultants Limited.

www.natureroof.com

The information and product descriptions contained in this publication are provided to the best of our knowledge and based on our experience and studies. They do not refer to any specific application and cannot give rise to any claims for compensation. We reserve the right to make any changes to the construction or product range which seem technically sensible in view of our high demands for quality and progress. We have endeavoured to reproduce colours accurately. However, colour deviations due to printing constraints whilst regrettable cannot be excluded.

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