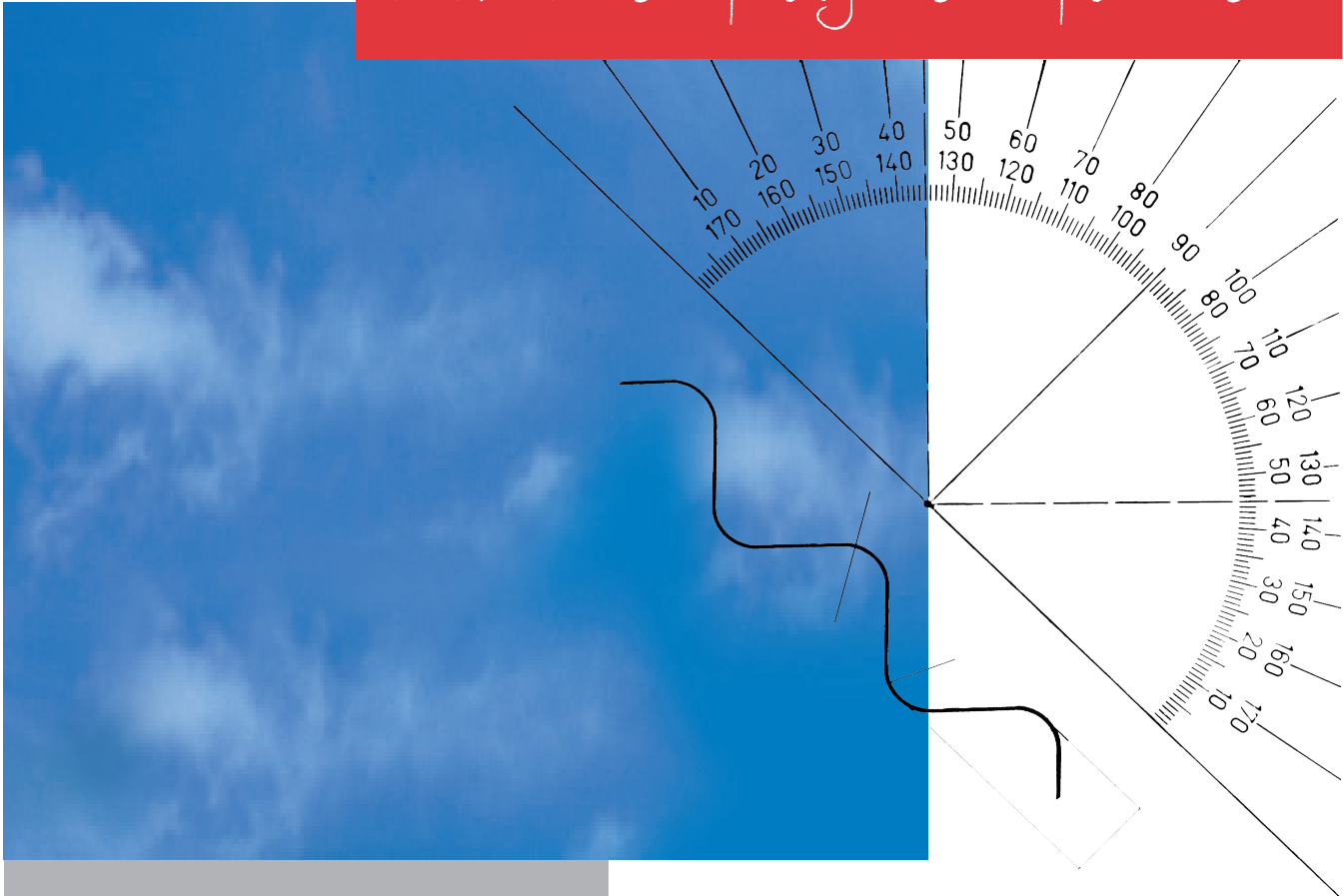


ONDULINE



*TECHNICAL
TEST DATA AND CERTIFICATES*

*Highest quality standards.
Environmental production
Ethical employment policies*



www.onduline.co.uk

Bituminous Corrugated Roofing Sheet

Test Data and Certification

Onduline has always paid particular attention to specific country regulations and harmonized standards, that is why our products are subjected to the most rigorous performance tests in laboratories and research institutes all over the world.

The following table illustrates the nature of just some of the tests taken in several countries world wide and their abbreviated results.

General Tests & Technical agreements :

- CSTB (France): AT 5/04/1779, AT 5/10/2094.
AT 5/06/1877.
- BBA (UK): A.C. 87/1823 C
- ITB (Poland): 500/02 AT 1 21145/2002
- Conformity to EN534:1998 - Corrugated bitumen sheets general performance and attitude tests.
EN 14964:2006 Rigid underlays for discontinuous roofing.
- ISO 9001: 2008 Quality Management Standard
- ISO 14001: 2004 Environmental Management Standard



Ecological

Onduline is manufactured from 48% recycled material, it is produced in environmentally efficient manufacturing plants which utilise industry leading technology to both recycle production energy and eliminate both airbourne and water pollution. Onduline contains no asbestos and presents no known health risk in handling, fixing or in service. It can be disposed of in landfill and will decompose naturally to its constituent elements without presenting a hazardous contamination risk.



Insulation and Condensation

Onduline has excellent thermal insulation properties; however any single thickness roofing material is at risk of condensation forming during the winter months. Water vapour can also freeze on the underside of the sheets at night, melting the following day which is often mistaken for condensation. Generally high and low ventilation will avoid these problems. If high levels of humidity are present in a building Ondutiss underlay or a roof deck should be first laid below the sheets.



Maintenance

Onduline Roofing Sheets are extremely durable for long service. The following maintenance procedures should be undertaken: Leaf debris should be removed as any build up will form a leaf mould which can soften the Onduline sheets and reduce its effective life. Tree and shrub branches in contact with the sheets can, through wind generated movement, cause damage and should be trimmed accordingly.





Strength and Impact Loading

Warrington Research Laboratory Test (UK) BS1 811

United States Testing Co. ASTM D1502-60
CEBTP (France): Report No 2342.7.098

Bureau Veritas (France): BTE JPD/NC 1016/1995

CSTB: No GM/92-20

Tests showed adequate bearing strength, impact resistance and resistance to wind lift.



Wind Lift

Yarsley Research Centre (UK). Proved Onduline suitable in hurricane and earthquake conditions. Tested up to 120mph (192kph).

Building Research Establishment (UK): no BRE/83/11/1 – good behaviour in wind lift conditions
Wood Technology Division (New Zealand): No WTC 1468/2 – good resistance in cyclonic conditions.
Minister of Economy (Argentina): No 83-1 INPRES 95 & PV No 030 DPDU-95.



Water And Weather Proofing

Tests (UK) BS1811 and ASTM D1499(USA)
UIDIEM (Chile): Certification No 150 385

Results showed excellent weather-proofing characteristics.



Water Absorption

Warrington Research Laboratory Test (UK) BS1 811

Showed minimal absorption.

ASTM E96 (USA). Performed excellently in

moisture vapour transmission and showed only minimal absorption.

DIN 52103 (Germany) Showed no effect after 16 days when emerged.

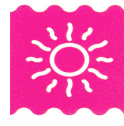


Hail/Frost Resistance

ASTM E196 (USA) and DIN 52103 and 52104 (Germany). Meets snow and frost resistance for all regions.

No mechanical damage in frost.

For roofs on exposed sites or at high altitude with high annual snow fall, Onduline Roofing Sheets should be laid on fully supporting decking. In areas prone to significant hail proprietary protective netting should be laid over the Onduline corrugations



Thermal Resistance

ASTM C177-76 (USA) and BS874 (UK).

Provided excellent thermal resistance.

K value 0.46 to 0.51 British Thermal Units.

LNE (France): Certification No 7070916D MAT/1

Thermal conductivity: 0.099 W/mK



Heat Deformation

Warrington Research Laboratory Test (UK).

Tropical investigations tests showed no visible effects.

Yarsley Research Centre (UK).

Middle East suitability tests up to 70°C proved complete suitability in severe humidity and under all foreseeable conditions.



Fire Resistance

Warrington Research Laboratory Tests (UK). Show resistance to fire of up to Extl. S.AA

classification BS476.3 for Onduline AA Sheets,

Note: This grade of sheet is temporarily

unavailable in the UK in order to facilitate changes at our production facilities.



Toxicity and resistance to chemicals tests

Yarsley Research Centre Test (UK). Tests carried out on water collected after catchments with Onduline sheets gives water suitable for drinking

complying with World Health Organisation and EEC regulations.

CSTB (France): No SM/98-0062 - stable under exposure to acids, alkalis and salts.

Note: Although safe to use Onduline do not recommend rainwater collection from roofs for human or animal consumption. This is due to the high incidence of airborne pollutants and possible algae formation in water storage systems. If the rainwater is used for this purpose the roof, gutters and collection system must be cleaned and purified regularly. It is recommended that only proprietary water collection storage systems are used which incorporate water filters at the point of delivery.



Acoustical Insulation

CEBTP No 2312.6.244/1 Reverberation coefficient (max): 0.4 to 315 Hz

CSTB C/95/CL/1896/1. Sound attenuation coefficient: $R_w = 28\text{db}$

Wolfson unit Southampton University (UK).

No 2089 1592/BI: antinoise wall with Onduline reduces the airborne noises of 7db



Mechanical Strength

Warrington Research Laboratory Test (UK) BS4 154.

Provided resistance to 33kg [73lbs] sheered force on fixing bolt.

Health and Safety Data

The covering of new and existing roofs is a specialised occupation and should be carried out with due regard to Health and Safety regulations, Site access and working provision must be in strict accordance with the regulations for site safety and roof work detailed in HSE33.

Toxicity and Odour

Onduline sheets in the construction of a catchment system for rainwater collection give water suitable for drinking in compliance with the World Health Organisation and EEC regulations (Report Yarsley Technical Centre).

During storage or when first fixed an odour may emit from the sheet as a result of the production process within the sheet at the time of production process. It is not harmful and will dissipate with normal ventilation provision.

Condensation can form on newly fixed sheets as a result of the drying out of building materials, This moisture can absorb dust from the atmosphere and mix with bitumen production residue on the sheet surface. The resulting discoloured water droplets can fall on underlying surfaces, It can be easily removed using proprietary cleaning agents.

Handling Materials

Onduline sheets contain no asbestos and present no known health hazard in handling or in use. It is not fragile and is without sharp edges requiring specialist protective clothing. Finally its light weight and modular size make it safe and easy to handle using established methods.

Working on Onduline Roofs:

Onduline sheets should be regarded as providing a 'fragile' roof covering, work should be conducted using roof access platforms and ladders or crawling boards as detailed Health and Safety regulations as set out in HSG33 (Roof work). These should be positioned with reasonable care to avoid damaging the sheets surface. If access to the roof is required for some purpose other than occasional maintenance of sheets, a permanent access platform should be provided.

Bitumen

The bitumens used in the production of Onduline are of low order toxicity and there is no evidence from tests or through experience that bitumens present a health risk to humans, as a result of regular exposure over an extended period.

The International Agency for research on cancer has concluded that there is no evidence that Class 2 bitumens are carcinogenic to man.

Storage of Onduline Products

Onduline sheets should be protected from the elements and stored internally, if stored externally cover with a tarpaulin. It is advisable to store the sheets on the delivery pallets to avoid any possibility of sheet deformation due to flattening of the corrugations. Care should be exercised with Onduline PVC sheets which must be protected from UV radiation at all times to avoid distortion and discolouration damage to the sheets.

Consideration of Fire Risk

Onduline sheets do not emit significant amounts of combustible gases during storage or use, and therefore require no special storage provision, although we recommend the material is stored in a normally ventilated area to ensure any moisture present can dissipate.

The composition of the sheet will burn only if ignited by an intense independent heat source. A fire can be tackled using normal fire fighting procedures with due precautions taken in respect of radiated heat and fumes. Normal water based fire extinguishers are suitable for this use.

Table of Constituent Materials
The following materials are present in Onduline and related products

	Bitumen	Organic Fibre	Pre Pigmented Colour	Emulsion paint finish	Polypropylene	Polyethylene/foam	ABS Copolymer	PVC
Onduline pre pigmented corrugated roofing sheets	●	●	●					
Onduline painted corrugated roofing sheets	●	●		●				
Ridge and Verge units	●	●	●	●				
PE & Safe-top Nails caps (steel shanks)						●		●
Batten Cloaking Piece					●			
Corrugated Fillers						●		
Multi-purpose Eaves Tray								●
Multi-purpose Ventilator Strips					●			
Roof Ventilators							●	
Roof Light Window						●		
Roof Light Sheets								●
Apron Flashings					●			

MAINTENANCE NOTES:

Leaf debris:

Do not allow leaf debris to build up on the surface of the corrugated roofing sheets. Left unattended the debris will form leaf mould which by holding moisture in the corrugation bases will soften the Onduline sheet and ultimately reduce the effective life of the product.

Tree and shrub branches:

Check that overhanging branches are not in contact with the surface of the sheets, as wind generated movement can result in mechanical damage to the surface of the Onduline sheets.

Gutters:

Clean all gutters, down-pipes and gullies regularly. If water collection systems are used, filter and circulate water in accordance with the instructions of the system manufacturer. Note: Whilst rainwater run off from Onduline roofs is non-hazardous, we do not recommend its use for human consumption due to the inherent risk of air bourn pollutants being introduced into the water collection system.

Condensation:

Always ensure high and low level ventilation channels are unrestricted. If a new concrete floor is laid condensation can result due to the high levels of moisture produced from the concrete curing process.

Health and Safety:

Working on roofs can be a hazardous operation. All work must be carried out with due regard to health and safety regulations as set out in HSG33 (Roof work).

Product Support:

If you require further information on our products or services we will be pleased to assist, just call our sales office or access our web site at: www.onduline.co.uk

Onduline

Guarantee

Terms & Conditions

Onduline roofing sheets are guaranteed to remain weatherproof for fifteen years under normal usage and conditions, when fixed and maintained in strict accordance with the fixing instructions. The guarantee is non transferable and does not cover the aesthetic quality of the material. The guarantee after five years service is limited to the pro-rata replacement value of the Onduline materials set against the service life measured in annual increments and does not extend to labour, related construction or third party costs.



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Note: The information in this brochure is correct at the time publishing, Onduline reserve the right to change specifications at any time without prior notice. TKM Design P03 – 08- 2012

For further details of our products and services; contact the Sales Office who will be pleased to assist. Alternatively visit www.onduline.co.uk for the latest product information.



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