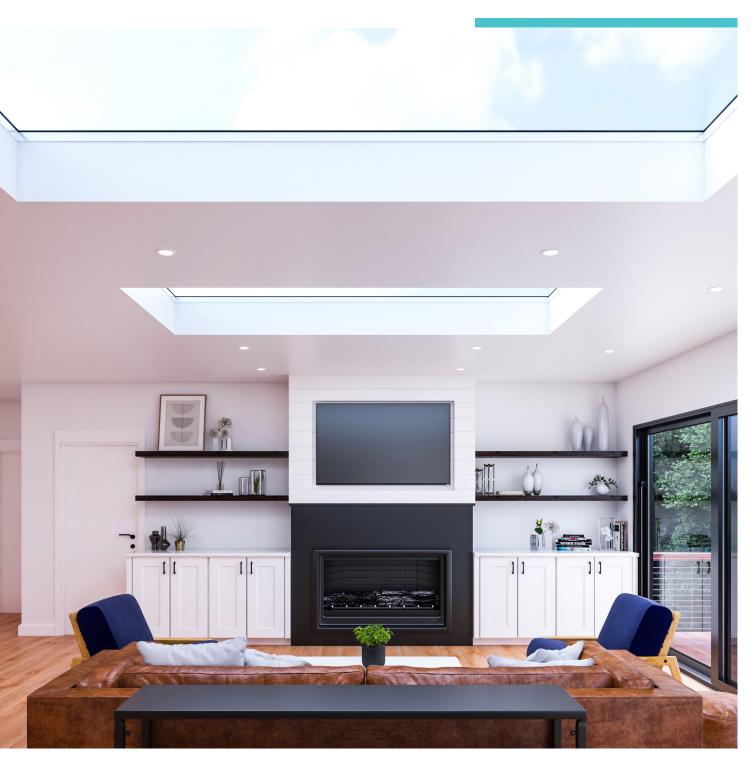


# **Product Directory & Price List**

Flat Roof Window Range

2022









Have you met RUFUS?

# experience. brighter

It's no secret why we're the number one choice for professionals. For over 30 years, Whitesales has led the way in the design, manufacture and supply of high-performance flat roof windows and rooflights.

As humans, we spend an estimated 90% of our time indoors and the benefits of optimum levels of daylight and fresh air are well known. Incorporating modern, quality rooflights into a building can be transformational.

#### Why choose Whitesales for your project...

Reliability, strength, longevity and all-round environmental performance are our watchwords.

Long term satisfaction comes from selecting a product that is tried and trusted, offering assured peace of mind – all backed up with unsurpassed service and support.

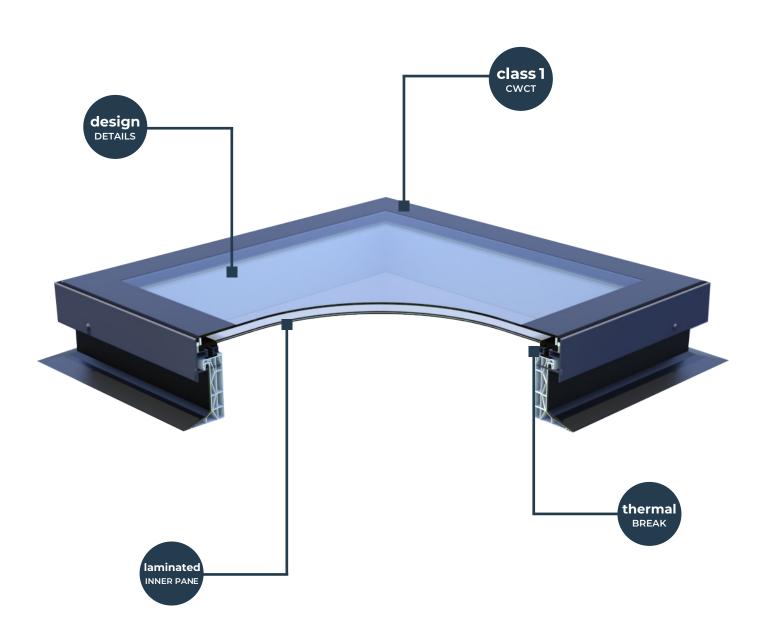
Explore the design possibilities and our full range of sizes, options and finishes – delivering a **brighter experience**.

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# What to look for in a quality glass rooflight

Superb aesthetics and high performance – the basic checklist when selecting a rooflight product. However, it's important to look closely at the details and specification of a product. Testing for impact-resistance, durability, environmental and thermal performance, and security and safety performance are essential criteria.





#### **Glass Specification & Safety**

The first, and **safest**, **choice** for the **inner pane** of a rooflight should be **laminated glass**.

Laminated glass is constructed of two sheets of glass which are bonded together with interlayers to form a permanent bond. If the glass is damaged, these interlayers act like a 'glue' to hold the fragments in place ensuring the glass does not break up into large jagged shards or hundreds of little pieces, **protecting occupants below**.



#### **Non-Fragility & Testing**

Non-fragile rooflights are designed to be strong enough to prevent a person from falling through the glass should they slip or trip whilst carrying out maintenance, cleaning or other activities on the rooftop(subject to risk assessment).

Several testing procedures are undertaken by The Advisory Committee For Roof Safety and the Centre for Window & Cladding Technology. **CWCT TN66 & 67 deals specifically in glass rooflights** and sloped glazing.

Class 1 refers to rooflights that can be trafficked infrequently for maintenance but are not designed for everyday foot traffic. Class 2 is the minimum non-fragility classification, designed to prevent a person from falling through the glazing if they were to fall onto the rooflight. See page 6 for further information on testing and certification.



#### Thermal Performance – and 'true' thermal break design

The thermal performance of a rooflight **must be considered for the whole assembly**, because while glazing may be compliant, poor frame design can affect thermal performance. It's important to look for the **'whole product' U-values** to ensure thermal performance in compliance with Part L Building Regulations. 'Centre pane' U-values do not take into account edge spacers and frame construction. Whole unit values are represented as Ud-value.

A 'true' thermal break is achieved when a frame design incorporates specific features to achieve the thermal break. The use of foam strips cannot be considered as a true thermal break as these strips may deteriorate over time and therefore their efficacy will be affected.



#### **Design Details**

Where a rooflight frame has been poorly designed, or the unit has been installed without sufficient pitch to allow water run-off, the result can be water building up on the glazing and eventually penetrating edge seals. Look for a glass unit that has been factory bonded into the frame, and specific design details that ensure the unit is fully watertight. Poorly designed frames can lead to water tracking back on the underside of the glass. Flat glass rooflights should always be installed at a slight pitch to avoid ponding – typically a minimum 5 degree pitch.

## **Guaranteed Quality**

#### **Technical Data Sheets**

Full technical details and specification information can be found on each product datasheet. Datasheets and other performance documents are available on our website.



## **Quality Assured**

Our products are easy to install, rigorously tested by independent experts, compliant with all current building regulations and legislation, and tried and trusted by professionals.

A stringent approach to quality assurance ensures that every product we manufacture is of the highest standard. Our design ethos is to strive for an elegant product whilst maintaining maximum thermal efficiency and high-performance glass technologies.

#### **Product Warranty**

Our rooflights and flat roof windows have an expected life of at least 25 years. All of our products are guaranteed for 10 years.

Glazing: 10 years

Mechanical components: 1 year

Powder coating: 10 years Silicone Sealants: 2 years

**Note:** Warranty validity is dependent on correct installation and ongoing care as detailed in product Operation & Maintenance (O&M) Manual (documents can be found on our website).

#### **Testing & Certification**

Our products are rigorously tested during design and development and are compliant with all current building regulations and legislation. A typical testing regime for a rooflight or flat roof window is similar to that for a vertical window or door and includes air permeability, water tightness and wind resistance. Additional testing covers safety and impact resistance, which should be in accordance with the Centre for Window and Cladding Technology (CWCT) test TN67. This includes impact tests to assess the effect of both hard and soft bodies on the glazing.

CWCT TN92 provides a set of 'deemed to satisfy' criteria, which is an alternative measurement, and can be applied to glass units specifically. Solar gain and sound insulation properties are also important measures to consider when selecting an appropriate product.

Detailed technical datasheets and declarations of performance can be found on our website.

# Flat roof window range



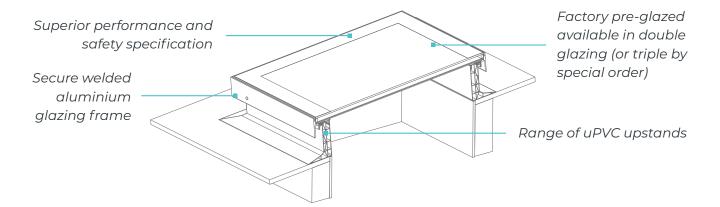
<sup>\*</sup> Refers to standard spec/size – refer to technical datasheet for full details



## em.glaze flat glass

Highly energy efficient, its glass-toedge design offers undisrupted views and stunning, modern good looks. Exceptional performance perfectly blended with contemporary styling ensures em.glaze will add the finishing touch to your project.

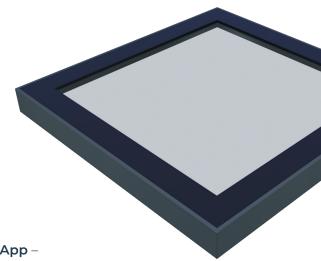




## **Key Features & Benefits**

- 18 sizes available from stock
- Flush glazed glass-to-edge design
- Thermally broken aluminium frame
- Combined unit U-Value 1.23W/m²K
- Non-fragility CWCT Class 1 tested, as standard
- Toughened outer and laminated inner
   the safest choice
- Stocked in RAL 7016 (Anthracite Grey)
- Bespoke sizing and colours available (5-8 weeks lead-time)

- For use with a range of ventilation options – manual, electric and fixed
- To suit either site-formed, builder's upstand, or proprietary uPVC upstand
- Should be installed at minimum 5° pitch





**Did you know?** You can contact us through **WhatsApp** – see inside back cover for more details.

# **Price List**

## With uPVC 150mm Splayed Upstand:

			Glazing		Ventilation options	
	Size ref	To suit roof opening size (mm)	Double glazed (£)	Controllable trickle vents (£)	Manual hinged opening (£)	Electric concealed motors hinged opening (£)
	S2 700 x 700		598	643	826	1338
	S4	800 x 800	690	735	936	1401
	S5	900 x 900	880	925	1164	1522
Square	S7	1000 x 1000	916	961	1173	1614
Squ	S8	1100 x 1100	1035	1080	1312	1752
	S9 1200 x 1200		1154	1199	1429	2270
	S11	1400 x 1400	1482	1526	N/A	2431
	S13 <u>(</u>	1600 x 1600	1937	1981	N/A	2601
	R5	800 x 1100	855	900	1128	1555
	R6	800 x 1400	1140	1184	1422	1856
Inlai	R6m <u></u>	800 x 2600	1736	1781	N/A	2741
ang	R7	900 x 1200	1061	1105	1346	1781
Rectangular	R16	1100 x 1400	1189	1233	1492	2206
	R17a	1200 x 1700	1534	1578	N/A	2493
	R19 <u></u>	1200 x 2200	1783	1828	N/A	2994

## With uPVC 150mm Vertical Upstand:

			Glazing		Ventilation options	
	Size ref	To suit roof opening size (mm)	Double glazed (£)	Controllable trickle vents (£)	Manual hinged opening (£)	Electric concealed motors hinged opening (£)
	S2	500 x 500	566	611	809	1316
	S4	600 x 600	662	707	908	1378
	S5	700 x 700	852	897	1133	1497
Square	S7	800 x 800	871	916	1137	1582
Squ	S8	900 x 900	1000	1045	1276	1722
	S9 1000 x 1000		1105	1150	1380	2242
	S11	1200 x 1200	1443	1488	N/A	2428
	S13 <u>^</u>	1400 x 1400	1896	1941	N/A	2560
	R5	600 x 900	825	870	1097	1530
,	R6	600 x 1200	1099	1144	1382	1824
Rectangular	R6m <u></u>	600 x 2400	1668	1713	N/A	2701
ang	R7	700 x 1000	1024	1069	1308	1753
Rect	R16	900 x 1200	1188	1233	1491	2203
	R17a	1000 x 1500	1487	1532	N/A	2455
	R19 <u></u>	1000 x 2000	1740	1785	N/A	2952



## To Suit Builder's Upstand:

			Glazing		Ventilation options
		To suit external curb size (mm)	Double glazed (£)	To suit external curb size (mm)	Electric concealed motors hinged opening (£)
	S2	600 x 600	497	620 x 620	1180
	S4	700 x 700	521	720 x 720	1231
	S5	800 x 800	590	820 x 820	1324
Φ	S7	900 x 900	614	920 x 920	1394
Square	S8	1000 x 1000	715	1020 x 1020	1521
Sc	S9	1100 x 1100	766	1120 x 1120	2030
	S11	1300 x 1300	1032	1320 x 1320	2181
	S13 <u>(</u>	1500 x 1500	1609	1520 x 1520	2273
	S17 * <u></u>	2100 x 2100	3071	2120 x 2120	N/A
	R5	700 x 1000	584	720 x 1020	1353
	R6	700 x 1300	779	720 x 1320	1625
	R6m 🛕	700 x 2500	1210	720 x 2520	2371
ular	R7	800 x 1100	766	820 x 1120	1562
ang	R16	1000 x 1300	861	1020 x 1320	1974
Rectangular	R17a	1100 x 1600	1029	1120 x 1620	2191
	R19 <u></u>	1100 x 2100	1415	1120 x 2120	2641
	R22z * <u></u>	1100 x 3100	2567	1120 x 3120	N/A
	R30a * 🔨	1600 x 3100	3282	1620 x 3120	N/A

<sup>\*</sup> delivery 5-10 working days

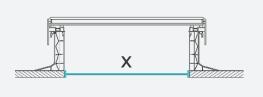


Due to their size and/or weight, any products marked \( \bar{\Delta} \) will require offloading by a mechanical means, i.e. a forklift. Please note the driver cannot offload these goods by hand. Vehicle mounted offloading facilities (HIAB) is available by prior arrangement at extra cost. Please call us should this be required. For special order items, this applies to any product above 1.5 square metres.



#### If there is an existing upstand, please provide:

- Length and width dimensions of the desired size that include the width/thickness of the upstand (A)
- The width/thickness of the upstand (B)
- That you will require a rooflight only



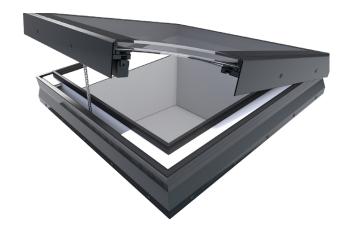
#### If a new upstand is required, please provide:

- Length and width dimensions of the desired size that are the same as the roof opening size (X)
- Choice of upstand (see pages 31 and 33 for options)

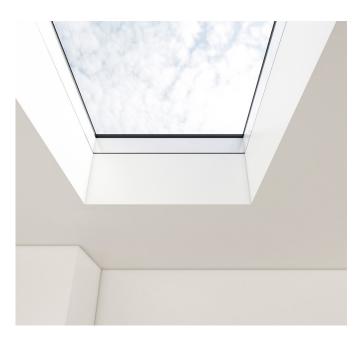


# em.glaze electric opening









# em.glaze electric opening with concealed motors

em.glaze electric opening units now feature concealed motors, offering a sleek and modern look.

- Thermally broken profile
- Motor fully concealed within subframe when closed
- All units have motor leads protruding minimum 2m
- Special motor bracket to em.glaze flat glass unit allows unit to be detached from inside in event of power failure
- Water management channel within profile
- Single or tandem motors depending on unit size
- Tandem units require no additional control panels, intelligent motors used that communicate with each other
- Motor mounted chain down as standard, minimising water/moisture entry into motors
- Unit fit to builders curb or uPVC em.curb
- Concealed hinge with no visible fixings internally or externally
- Wiring concealed inside em.glaze frame
- Standard RAL 7016 externally and White RAL 9016 internally

# em.glaze bespoke range

Our comprehensive em.glaze range offers a wide choice of glazing options, finishes and glass specifications. Call us to discuss your requirements.



We understand the technical complexities of daylighting in the built environment. Our em.glaze bespoke glass range offers the ability to customise numerous features:

- Glass specification
- Glazing options (see page 13 for further details)
- Bespoke sizing
- Frame colour

## **Glass Options**

#### **Solar Control Coating:**

Helps to reduce the build up of heat. The coating, applied to the outer pane of glass, reflects the heat from the sun keeping the interior cooler, and significantly reduces the amount of heat that is able to pass in, providing occupants with a more comfortable and usable living space.

#### EasyClean Coating:

Uses the forces of nature to maintain a cleaner and clearer appearance. In a dualaction process, organic dirt is broken down by daylight and is then washed away by rain, thus making it environmentally friendly and very easy to maintain.

#### **Triple Glazing:**

If you require triple glazing for increased efficiency and noise reduction, almost our entire em.glaze range can be manufactured with triple glazing as a tailor made option.

#### **Heat Strengthened Laminate (HSL):**

Whilst visually breath-taking, flat-roof glazing can often involve large expanses of glass. When considering the size, location and functionality of a glass unit, the requirement for heat-strengthened laminated glass should be considered. Heat-strengthened laminated glass is typically specified when additional strength is needed to resist wind pressure, thermal stress, or both.

What is thermal stress and why can it cause thermal fracture? Detailed information can be found on our website and a brief overview can be seen in the FAQs on page 37.

Whitesales have a specific policy relating to Thermal Stress Fracture (TSF) & Toughened Glass. The policy outlines how we will support TSF related claims. It can be found at: https://www.whitesales.co.uk/terms-and-conditions/



Minimalist, contemporary design. Factory glazed modules form continuous rooflights of unlimited length with large glazed areas and minimal framework.

#### **Key Features & Benefits**

- Modular system allows multiple glazed sections to be linked together with no external capping
- Non-fragility CWCT Class 2\*
- Secure, welded thermally broken glazing frame with self-supporting ioints
- Can be wall abutted
- Aluminium frame powder coated to any RAL colour
- Available in bespoke sizes and glass specifications
- Bespoke units available in 4–6 weeks
- Available as a supply only product



us for further details and pricing.

Standard up to 3m span and infinite length; for sizes above 3m please contact us



<sup>\*</sup> Refers to standard spec/size – dependent on glass specification required.

# Want to build your product at the click of a button?

Our online portal and configurator **RUFUS** is your 'one site' to configure products, save quotes, place orders and more...



Saves time



Available on the go



Detailed product information

## Visit whitesales.co.uk/RUFUS

What's the difference between splayed and vertical upstands?





What's the most cost-effective product for my situation?



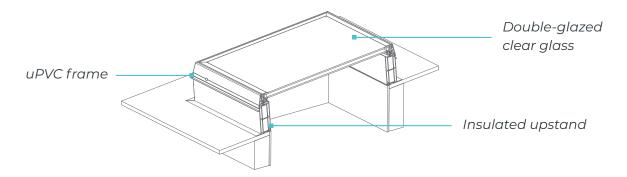
What product is going to fit my hole in the roof?



# ray.lux glass

The blend of optimal functionality with easy installation makes it suitable for both new and refurb projects. Featuring high performance materials with exceptional functionality - create light and welcoming spaces with this adaptable and affordable roof window.





#### **Key Features & Benefits**

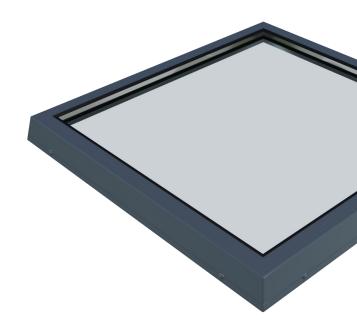
- 14 sizes available from stock
- Thermally broken uPVC frame
- Combined unit U-Value 1.26W/m²K
- Non-fragility CWCT Class 1 tested, as standard
- Toughened outer and laminated inner panes - the safest choice
- For use with a range of ventilation options - manual, electric and fixed
- Available in two colour choices:





Anthracite Grey - RAL 7016

- To suit either site-formed builder's upstand, or proprietary insulated upstand with vertical sides
- Should be installed at an angle between 5 and 15°





# **Price List**

## To Suit Builder's Upstand:

				Grey			White	
			Glazing	Ventilatio	n options	Glazing	Ventilatio	n options
	Size ref	To suit external curb size (mm)	Double glazed (£)	Manual hinged opening (£)	Electric hinged opening (£)	Double glazed (£)	Manual hinged opening (£)	Electric hinged opening (£)
	RX S2	600 x 600	464	701	811	402	611	743
	RX S4	700 x 700	487	811	907	425	704	826
Ō	RX S5	800 x 800	527	840	925	462	729	837
Square	RX S7	900 x 900	549	848	952	482	737	862
Ñ	RX S8	1000 x 1000	638	950	1035	561	824	950
	RX S9	1100 x 1100	685	998	1126	607	866	1025
	RX S11	1300 x 1300	884	N/A	1571	786	N/A	1460
	RX R5	700 x 1000	523	855	938	459	743	849
	RX R6	700 x 1300	628	927	1044	552	803	942
Rectangular	RX R7	800 x 1100	597	888	1014	525	770	914
ang	RX R16	1000 x 1300	739	1024	1159	654	888	1056
Rect	RX R17a	1100 x 1600	918	N/A	1663	819	N/A	1545
	RX R19 <u></u>	1100 x 2100	1347	N/A	2307	1205	N/A	2120
	RX R23c <u></u>	1300 x 2300	1521	N/A	2494	1361	N/A	2278

## With uPVC 150mm Vertical Upstand:

				Grey			White	
			Glazing	Ventilatio	n options	Glazing	Ventilatio	n options
	Size ref	To suit roof opening size (mm)	Double glazed (£)	Manual hinged opening (£)	Electric hinged opening (£)	Double glazed (£)	Manual hinged opening (£)	Electric hinged opening (£)
	RX S2	500 x 500	507	747	840	472	681	791
	RX S4	600 x 600	544	874	951	507	794	893
Ō	RX S5	700 x 700	590	912	976	551	827	911
Square	RX S7	800 x 800	614	920	1010	570	833	938
Š	RX S8	900 x 900	714	1036	1129	663	935	1059
	RX S9	1000 x 1000	794	1120	1228	738	1006	1144
	RX S11	1200 x 1200	986	N/A	1647	912	N/A	1551
	RX R5	600 x 900	585	931	990	545	842	920
	RX R6	600 x 1200	706	1014	1113	656	915	1033
Rectangular	RX R7	700 x 1000	672	970	1078	624	876	1000
ang	RX R16	900 x 1200	855	1148	1272	791	1029	1183
<b>Sect</b>	RX R17a	1000 x 1500	1026	N/A	1713	949	N/A	1612
	RX R19 <u></u>	1000 x 2000	1508	N/A	2448	1390	N/A	2282
	RX R23c <u></u>	1200 x 2200	1564	N/A	2531	1440	N/A	2344





Due to their size and/or weight, any products marked \(\bar{\Delta}\) will require offloading by a mechanical means, i.e. a forklift. Please note the driver cannot offload these goods by hand. Vehicle mounted offloading facilities (HIAB) is available by prior arrangement at extra cost. Please call us should this be required. For special order items, this applies to any product above 1.5 square metres.



#### If there is an existing upstand, please provide:

- Length and width dimensions of the desired size that include the width/thickness of the upstand (A)
- The width/thickness of the upstand (B)
- That you will require a rooflight only



#### If a new upstand is required, please provide:

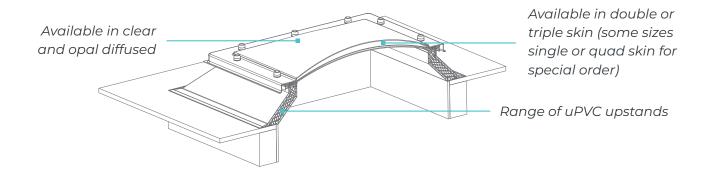
- Length and width dimensions of the desired size that are the same as the roof opening size (X)
- Choice of upstand (see pages 31 and 33 for options)



# em.dome polycarbonate

Tested to the highest standards, available in a wide range of shapes and profiles in over 140 sizes, the em.dome is simply unmatched – choose this outstanding dome for your next project.

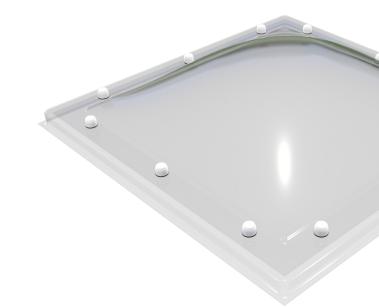




### **Key Features & Benefits**

- Over 40 sizes available from stock
- Next-day nationwide delivery on stock sizes
- Range of uPVC upstands
- Clear or opal diffused glazing stocked
- Polycarbonate em.domes are certified 'Non-Fragile'
- Wide range of ventilation options
- Available in single, double, triple or quad skin
- Square, rectangular and circular units in stock

- CE certified to EN 1873 (UKCA from 2022)
- Comprehensive range of proprietary accessories available





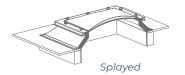
# **Price List**



## To Suit Builder's Upstand:

**KEY:** ECS = External Curb Size CRTV = Controllable Rotating Trickle Vents

				Doub	le Skin			Triple	Skin	
			Fixed	Vented		Opening	Fixed	Vented	Hinged (	Opening
	Size ref	To suit ECS (min 50mm thickness) (mm)	Dome only (£)	CRTV (£)	Manual (£)	Electric (£)	Dome only (£)	CRTV (£)	Manual (£)	Electric (£)
	S1	500 x 500	177	458	536	914	231	511	589	967
	S2	600 x 600	227	522	603	979	296	590	671	1047
	S3	650 x 650	250	550	642	1019	329	629	721	1097
	S4	700 x 700	269	577	670	1047	349	657	750	1128
	S5	800 x 800	319	639	741	1119	412	733	834	1214
	S6	850 x 850	348	677	784	1162	452	779	887	1266
Φ	S7	900 x 900	356	690	805	1180	462	794	911	1287
Square	S8	1000 x 1000	440	788	913	1289	570	918	1043	1419
Sq	S9	1100 x 1100	499	857	986	1364	643	1003	1132	1509
	S10	1150 x 1150	541	910	1042	1420	701	1070	1202	1580
	S10a	1200 x 1200	577	952	1094	1472	746	1119	1262	1641
	S11	1300 x 1300	720	1107	1262	1637	934	1320	1475	1851
	S12	1400 x 1400	810	1208	1376	1789	1055	1456	1622	2035
	S13	1500 x 1500	951	1362	1766	2902	1225	1635	2038	3174
	S15a	1800 x 1800	1162	1616	2045	3179	1498	1951	2380	3514
	R3	500 x 800	231	532	618	994	300	602	687	1065
	R3a	500 x 1100	299	612	714	1091	385	697	800	1176
	R4	600 x 900	267	583	681	1058	347	661	761	1139
	R4a	600 x 1200	350	686	802	1178	458	793	910	1286
	R4b	600 x 1800	550	921	1067	1442	737	1109	1253	1630
	R5	700 x 1000	386	713	818	1195	500	828	934	1309
	R6	700 x 1300	523	872	981	1357	682	1030	1140	1516
	R7	800 x 1100	394	736	845	1223	516	856	965	1344
_	R7a	800 x 1400	522	881	1012	1389	673	1032	1163	1540
Rectangular	R7b	800 x 1700	641	1021	1170	1547	835	1216	1364	1741
anc	R10a	900 x 1200	483	837	964	1342	629	982	1110	1488
ect	R11	900 x 1400	633	1000	1132	1509	825	1191	1323	1700
~	R11a	900 x 1800	727	1118	1249	1660	947	1337	1469	1880
	R16	1000 x 1300	705	1071	1205	1581	915	1282	1416	1792
	R16a	1000 x 1600	714	1100	1257	1632	927	1314	1470	1847
	R17	1100 x 1400	691	1069	1218	1596	899	1279	1427	1806
	R17a	1100 x 1600	734	1123	1275	1655	952	1341	1493	1872
	R18	1100 x 1700	712	1111	1265	1643	924	1325	1477	1856
	R20	1100 x 2300	1144	1582	2035	3171	1518	1957	2376	3511
	R22b	1200 x 1800	805	1216	1574	2744	1078	1489	1848	2984
	R22c	1200 x 2400	1134	1588	2048	3184	1504	1958	2385	3520
	C1	500	209	N/A	N/A	N/A	270	N/A	N/A	N/A
	C2	600	282	N/A	N/A	N/A	366	N/A	N/A	N/A
_	C3	700	335	N/A	N/A	N/A	438	N/A	N/A	N/A
Circular	C4	800	365	N/A	N/A	N/A	473	N/A	N/A	N/A
Circ	C5	900	424	N/A	N/A	N/A	550	N/A	N/A	N/A
	C6	1000	483	N/A	N/A	N/A	629	N/A	N/A	N/A
	C7	1100	593	N/A	N/A	N/A	767	N/A	N/A	N/A
	C8	1200	685	N/A	N/A	N/A	888	N/A	N/A	N/A





# $em.dome^{m}$

## With 150mm Upstand:

**KEY:** ROS = Roof Opening Size CRTV = Controllable Rotating Trickle Vents

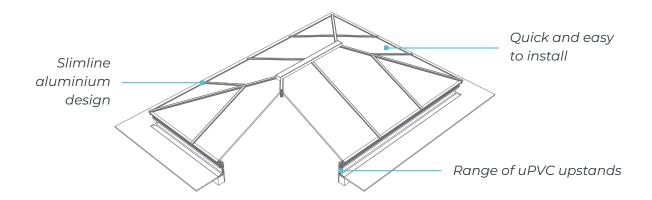
Splayed   Vertical   Fixed   Vented   Hinged Opening   Fixed   Vented   Hinged Opening   Fixed   To suit ROS   To suit ROS   CRTV   (f.)   (					Double Skin			Triple Skin				
Test   Comm   Comm   Comb			Splayed	Vertical	Fixed			Opening	Fixed			Opening
S2												
S3		S1	600 x 600	400 x 400	303	349	477	853	371	417	545	921
S4   800 x 800   600 x 600   411   457   601   979   514   561   704   1083   1058   55   900 x 900   700 x 700   484   531   683   1058   604   651   803   1179   656   950 x 950   750 x 750   520   566   723   1099   650   696   853   1229   577   1000 x 1000   800 x 800   531   577   743   1120   667   713   878   1257   1000 x 1000   900 x 900   629   675   849   1228   787   833   1008   1388   593   1200 x 1200   1000 x 1000   697   744   920   1298   873   920   1096   1475   1300   1300 x 1300   1100 x 1100   749   796   977   1355   941   988   1169   1548   1518   1510   1250 x 1250   1050 x 1050   749   796   977   1355   941   988   1169   1548   1511   1400 x 1400   1200 x 1200   946   992   1198   1575   1193   1240   1443   1821   1513   1600 x 1600   1400 x 1400   1213   1259   1713   2850   1525   1571   2026   3162   1513   1600 x 1600   1400 x 1400   1213   1259   1713   2850   1525   1571   2026   3162   1579   1336   1300 x 1300   1700 x 1700   1466   1512   1991   3127   1848   1895   2373   3509   353   1600 x 1600   1400 x 1400   1400 x 1400   1213   1259   1713   2850   1525   1571   2026   3162   1579   1733   1570   1466   1512   1991   3127   1848   1895   2373   3509   1838   1600 x 1600   1700 x 1700   1466   1512   1991   3127   1848   1895   2373   3509   1838   1600 x 1600   500 x 1000   464   510   663   1040   575   621   774   1151   1		S2	700 x 700	500 x 500	362	409	539	915	452	498	630	1006
S5   900 x 900   700 x 700   484   531   683   1058   604   651   803   1179		S3	750 x 750	550 x 550	388	434	575	952	486	533	673	1049
S6		S4	800 x 800	600 x 600	411	457	601	979	514	561	704	1083
S7   1000 x 1000   800 x 800   531   577   743   1120   667   713   878   1257   588   1100 x 1100   900 x 900   629   675   849   1228   767   833   1008   1388   899   1200 x 1200   1000 x 1000   697   744   920   1298   873   920   1096   1475   1475   1501   1250 x 1250   1050 x 1050   749   796   977   1355   941   988   1169   1548   1698   1510   1300 x 1300   1100 x 1100   789   835   1030   1406   990   1038   1231   1608   1511   1400 x 1400   1200 x 1200   946   992   1198   1575   1193   1240   1443   1821   1512   1513   1600 x 1500   1300 x 1300   1054   1100   1322   1697   1336   1382   1602   1979   1513   1600 x 1500   1300 x 1400   1213   1259   1713   2850   1525   1571   2026   3162   1513   1900 x 1900   1700 x 1400   1213   1259   1713   2850   1525   1571   2026   3162   1513   1900 x 1900   1700 x 1400   1213   1259   1713   2850   1525   1571   2026   3162   1513   1900 x 1900   1700 x 1400   1213   1259   1713   2850   1525   1571   2026   3162   1513   1900 x 1900   1700 x 1400   1213   1259   1713   2850   1525   1571   2026   3162   1513   1900 x 1900   1000 x 1000   464   510   663   1040   575   621   774   1151   1100   1324   1000   1000   1000   1464   1510   663   1040   575   621   774   1151   1000   1300   10		S5	900 x 900	700 x 700	484	531	683	1058	604	651	803	1179
SS   1100 x 1100   900 x 900   629   675   849   1228   787   833   1008   1388   1595   1200 x 1200   1000 x 1000   697   744   920   1298   873   920   1096   1475   1608   1548   1510   1520 x 1250   1050 x 1050   749   796   977   1355   941   988   1169   1548   1608   1511   1400 x 1400   1200 x 1200   946   992   1198   1575   1193   1240   1443   1821   1500 x 1500   1300 x 1300   1054   1100   1322   1697   1336   1382   1602   1979   1513   1600 x 1600   1400 x 1400   1213   1259   1713   2850   1525   1571   2026   3162   1515   1515   1000 x 1900   1700 x 1700   1466   1512   1991   3127   1848   1895   2373   3559   1515   1600 x 1600   400 x 700   365   412   545   923   454   500   634   1013   1383   600 x 1200   400 x 1000   464   510   663   1040   575   621   774   1151   115		S6	950 x 950	750 x 750	520	566	723	1099	650	696	853	1229
SIO   1250 x 1250   1050 x 1050   749   796   977   1355   941   988   1169   1548	മ	S7	1000 x 1000	800 x 800	531	577	743	1120	667	713	878	1257
SIO   1250 x 1250   1050 x 1050   749   796   977   1355   941   988   1169   1548	nai	S8	1100 x 1100	900 x 900	629	675	849	1228	787	833	1008	1388
Si0a   1300 x 1300   1100 x 1100   789   835   1030   1406   990   1038   1231   1608   1400 x 1400   1200 x 1200   946   992   1198   1575   1193   1240   1443   1821   1502 x 1500 x 1500   1300 x 1300   1054   1100   1322   1697   1336   1382   1602   1979   1313   1600 x 1600   1400 x 1400   1213   1259   1713   2850   1525   1571   2026   3162   1515a   1900 x 1900   1700 x 1700   1466   1512   1991   3127   1848   1895   2373   3509   1838   600 x 1200   400 x 1700   365   412   545   923   454   500   634   1013   103   103   104   103   104   104   105   104   105   105   103   104   105   104   105	Sq	S9	1200 x 1200	1000 x 1000	697	744	920	1298	873	920	1096	1475
SII		S10	1250 x 1250	1050 x 1050	749	796	977	1355	941	988	1169	1548
\$\frac{\text{S12}}{\text{S12}}\$ \frac{\text{1500} \times \text{1500}}{\text{1500}}\$ \frac{\text{1300}}{\text{1500}}\$ \frac{\text{1300}}{\text{1200}}\$ \frac{\text{1300}}{\text{1200}}\$ \frac{\text{1300}}{\text{1200}}\$ \frac{\text{1300}}{\text{1200}}\$ \frac{\text{1300}}{\text{1200}}\$ \frac{\text{1300}}{\text{1200}}\$ \frac{\text{1320}}{\text{1200}}\$ \frac{\text{1525}}{\text{1571}}\$ \frac{\text{2026}}{\text{3162}}\$ \frac{\text{3162}}{\text{3162}}\$ \frac{\text{1525}}{\text{1571}}\$ \frac{\text{2026}}{\text{3162}}\$ \frac{\text{3162}}{\text{3162}}\$ \frac{\text{3162}}{\text{3162}}\$ \frac{\text{1571}}{\text{2026}}\$ \frac{\text{3162}}{\text{3162}}\$ \text{316		S10a	1300 x 1300	1100 x 1100	789	835	1030	1406	990	1038	1231	1608
\$\frac{\text{S13}}{\text{S15}}\$  \text{1600 \times 1600}  \text{1400 \times 1400}   \text{1213}  \text{1259}  \text{1713}  \text{2850}   \text{1525}   \text{1571}  \text{2026}   \text{3162}  \text{3166}  \text{3162}   \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  \text{3162}  3162		S11	1400 x 1400	1200 x 1200	946	992	1198	1575	1193	1240	1443	1821
Si5a   1900 x 1900   1700 x 1700   1466   1512   1991   3127   1848   1895   2373   3509		S12	1500 x 1500	1300 x 1300	1054	1100	1322	1697	1336	1382	1602	1979
R3   600 x 900   400 x 700   365   412   545   923   454   500   634   1013   R3a   600 x 1200   400 x 1000   464   510   663   1040   575   621   774   1151   R4   700 x 1000   500 x 800   427   473   624   1000   527   574   724   1100   R4a   700 x 1300   500 x 1100   522   569   733   1109   656   703   867   1243   R4b   700 x 1900   500 x 1700   751   799   990   1369   967   1014   1207   1587   R5   800 x 1100   600 x 900   551   598   752   1132   691   737   892   1270   R6   800 x 1400   600 x 1200   712   759   918   1296   899   946   1106   1484   484   7900 x 1500   700 x 1500   571   617   779   1155   720   766   927   1304   767   947   1326   904   951   1130   1508   775   900 x 1500   700 x 1500   857   904   1102   1482   1084   1130   1329   1708   7708   7709   77		S13	1600 x 1600	1400 x 1400	1213	1259	1713	2850	1525	1571	2026	3162
R3a 600 x 1200 400 x 1000 464 510 663 1040 575 621 774 1151 R4 700 x 1000 500 x 800 427 473 624 1000 527 574 724 1100 R4a 700 x 1300 500 x 1100 522 569 733 1109 656 703 867 1243 R4b 700 x 1900 500 x 1700 751 799 990 1369 967 1014 1207 1587 R5 800 x 1100 600 x 900 551 598 752 1132 691 737 892 1270 R6 800 x 1400 600 x 1200 712 759 918 1296 899 946 1106 1484 R7 900 x 1200 700 x 1000 571 617 779 1155 720 766 927 1304 R7a 900 x 1200 700 x 1300 721 767 947 1326 904 951 1130 1508 R7b 900 x 1800 700 x 1600 857 904 1102 1482 1084 1130 1329 1708 R10a 1000 x 1300 800 x 1100 681 727 905 1282 857 904 1083 1459 R11 1000 x 1500 800 x 1300 840 887 1071 1447 1065 1111 1294 1671 R11a 1000 x 1500 800 x 1300 966 1013 1192 1569 1221 1268 1445 1824 R16 1100 x 1400 900 x 1200 912 959 1142 1522 1155 1202 1387 1764 R16 1100 x 1700 900 x 1500 949 996 1201 1579 1200 1246 1450 1829 R17 1200 x 1500 1000 x 1500 975 1021 1221 1597 1220 1246 1450 1829 R18 1200 x 1800 1000 x 1500 975 1021 1221 1597 1228 1274 1475 1851 R18 1200 x 1800 1000 x 1500 955 1002 1205 1581 1205 1252 1456 1831 R20 1200 x 2400 1000 x 2200 1437 1484 1989 3125 1858 1904 2376 3511 R22b 1300 x 1900 1100 x 1700 1070 1116 1559 2692 1382 1429 1837 2972 R22c 1300 x 2500 1100 x 2300 1468 1514 1993 3129 1854 1900 2379 3515		S15a	1900 x 1900	1700 x 1700	1466	1512	1991	3127	1848	1895	2373	3509
R4 700 x 1000 500 x 800 427 473 624 1000 527 574 724 1100 R4a 700 x 1300 500 x 1100 522 569 733 1109 656 703 867 1243 1243 1243 1244 1245 1245 1245 1245 1245 1245 1245		R3	600 x 900	400 x 700	365	412	545	923	454	500	634	1013
R4a 700 x 1300 500 x 1100 522 569 733 1109 656 703 867 1243  R4b 700 x 1900 500 x 1700 751 799 990 1369 967 1014 1207 1587  R5 800 x 1100 600 x 900 551 598 752 1132 691 737 892 1270  R6 800 x 1400 600 x 1200 712 759 918 1296 899 946 1106 1484  R7 900 x 1200 700 x 1000 571 617 779 1155 720 766 927 1304  R7a 900 x 1500 700 x 1300 721 767 947 1326 904 951 1130 1508  R7b 900 x 1800 700 x 1600 857 904 1102 1482 1084 1130 1329 1708  R10a 1000 x 1300 800 x 1100 681 727 905 1282 857 904 1083 1459  R11 1000 x 1500 800 x 1300 840 887 1071 1447 1065 1111 1294 1671  R11a 1000 x 1900 800 x 1700 966 1013 1192 1569 1221 1268 1445 1824  R16 1100 x 1400 900 x 1200 912 959 1142 1522 1155 1202 1387 1764  R16a 1100 x 1700 900 x 1500 949 996 1201 1579 1200 1246 1450 1829  R17 1200 x 1500 1000 x 1500 975 1021 1221 1597 1228 1274 1475 1851  R18 1200 x 1800 1000 x 1500 955 1002 1205 1581 1205 1252 1456 1831  R20 1200 x 2400 1000 x 2200 1437 1484 1989 3125 1858 1904 2376 3511  R22b 1300 x 1900 1100 x 2300 1468 1514 1993 3129 1854 1900 2379 3515  C1 650 - 379 N/A 665 1042 440 N/A 725 1101		R3a	600 x 1200	400 x 1000	464	510	663	1040	575	621	774	1151
R4b 700 x 1900 500 x 1700 751 799 990 1369 967 1014 1207 1587  R5 800 x 1100 600 x 900 551 598 752 1132 691 737 892 1270  R6 800 x 1400 600 x 1200 712 759 918 1296 899 946 1106 1484  R7 900 x 1200 700 x 1000 571 617 779 1155 720 766 927 1304  R7a 900 x 1500 700 x 1300 721 767 947 1326 904 951 1130 1508  R7b 900 x 1800 700 x 1600 857 904 1102 1482 1084 1130 1329 1708  R10a 1000 x 1300 800 x 1100 681 727 905 1282 857 904 1083 1459  R11 1000 x 1500 800 x 1300 840 887 1071 1447 1065 1111 1294 1671  R11a 1000 x 1900 800 x 1700 966 1013 1192 1569 1221 1268 1445 1824  R16 1100 x 1400 900 x 1200 912 959 1142 1522 1155 1202 1387 1764  R16a 1100 x 1700 900 x 1500 949 996 1201 1579 1200 1246 1450 1829  R17 1200 x 1500 1000 x 1500 975 1021 1221 1597 1228 1274 1475 1851  R18 1200 x 1800 1000 x 1500 955 1002 1205 1581 1205 1252 1456 1831  R20 1200 x 2400 1000 x 2200 1437 1484 1989 3125 1858 1904 2376 3511  R22b 1300 x 1900 1100 x 1700 1070 1116 1559 2692 1382 1429 1837 2972  R22c 1300 x 2500 1100 x 2300 1468 1514 1993 3129 1854 1900 2379 3515		R4	700 x 1000	500 x 800	427	473	624	1000	527	574	724	1100
R5 800 x 1100 600 x 900 551 598 752 1132 691 737 892 1270  R6 800 x 1400 600 x 1200 712 759 918 1296 899 946 1106 1484  R7 900 x 1200 700 x 1000 571 617 779 1155 720 766 927 1304  R7a 900 x 1500 700 x 1300 721 767 947 1326 904 951 1130 1508  R7b 900 x 1800 700 x 1600 857 904 1102 1482 1084 1130 1329 1708  R10a 1000 x 1300 800 x 1100 681 727 905 1282 857 904 1083 1459  R111 1000 x 1500 800 x 1300 840 887 1071 1447 1065 1111 1294 1671  R11a 1000 x 1900 800 x 1700 966 1013 1192 1569 1221 1268 1445 1824  R16 1100 x 1400 900 x 1200 912 959 1142 1522 1155 1202 1387 1764  R16a 1100 x 1700 900 x 1500 949 996 1201 1579 1200 1246 1450 1829  R17 1200 x 1500 1000 x 1500 975 1021 1221 1597 1228 1274 1475 1851  R18 1200 x 1800 1000 x 1600 955 1002 1205 1581 1205 1252 1456 1831  R20 1200 x 2400 1000 x 2200 1437 1484 1989 3125 1858 1904 2376 3511  R22b 1300 x 1900 1100 x 1700 1070 1116 1559 2692 1382 1429 1837 2972  R22c 1300 x 2500 1100 x 2300 1468 1514 1993 3129 1854 1900 2379 3515		R4a	700 x 1300	500 x 1100	522	569	733	1109	656	703	867	1243
R6 800 x 1400 600 x 1200 712 759 918 1296 899 946 1106 1484 R7 900 x 1200 700 x 1000 571 617 779 1155 720 766 927 1304 R7a 900 x 1500 700 x 1300 721 767 947 1326 904 951 1130 1508 R7b 900 x 1800 700 x 1600 857 904 1102 1482 1084 1130 1329 1708 R10a 1000 x 1300 800 x 1100 681 727 905 1282 857 904 1083 1459 R11 1000 x 1500 800 x 1300 840 887 1071 1447 1065 1111 1294 1671 R11a 1000 x 1900 800 x 1700 966 1013 1192 1569 1221 1268 1445 1824 R16 1100 x 1400 900 x 1200 912 959 1142 1522 1155 1202 1387 1764 R16a 1100 x 1700 900 x 1500 949 996 1201 1579 1200 1246 1450 1829 R17 1200 x 1500 1000 x 1500 975 1021 1221 1597 1228 1274 1475 1851 R18 1200 x 1800 1000 x 1500 955 1002 1205 1581 1205 1252 1456 1831 R20 1200 x 2400 1000 x 2200 1437 1484 1989 3125 1858 1904 2376 3511 R225 1300 x 1900 1100 x 1700 1070 1116 1559 2692 1382 1429 1837 2972 R22c 1300 x 2500 1100 x 2300 1468 1514 1993 3129 1854 1900 2379 3515 C1 650 - 379 N/A 665 1042 440 N/A 725 1101		R4b	700 x 1900	500 x 1700	751	799	990	1369	967	1014	1207	1587
R7 900 x 1200 700 x 1000 571 617 779 1155 720 766 927 1304  R7a 900 x 1500 700 x 1300 721 767 947 1326 904 951 1130 1508  R7b 900 x 1800 700 x 1600 857 904 1102 1482 1084 1130 1329 1708  R10a 1000 x 1300 800 x 1100 681 727 905 1282 857 904 1083 1459  R11 1000 x 1500 800 x 1300 840 887 1071 1447 1065 1111 1294 1671  R11a 1000 x 1900 800 x 1700 966 1013 1192 1569 1221 1268 1445 1824  R16 1100 x 1400 900 x 1200 912 959 1142 1522 1155 1202 1387 1764  R16a 1100 x 1700 900 x 1500 949 996 1201 1579 1200 1246 1450 1829  R17 1200 x 1500 1000 x 1500 975 1021 1221 1597 1228 1274 1475 1851  R18 1200 x 1800 1000 x 1500 955 1002 1205 1581 1205 1252 1456 1831  R20 1200 x 2400 1000 x 2200 1437 1484 1989 3125 1858 1904 2376 3511  R22b 1300 x 1900 1100 x 1700 1070 1116 1559 2692 1382 1429 1837 2972  R22c 1300 x 2500 1100 x 2300 1468 1514 1993 3129 1854 1900 2379 3515		R5	800 x 1100	600 x 900	551	598	752	1132	691	737	892	1270
R7a   900 x 1500   700 x 1300   721   767   947   1326   904   951   1130   1508     R7b   900 x 1800   700 x 1600   857   904   1102   1482   1084   1130   1329   1708     R10a   1000 x 1300   800 x 1100   681   727   905   1282   857   904   1083   1459     R11   1000 x 1500   800 x 1300   840   887   1071   1447   1065   1111   1294   1671     R11a   1000 x 1900   800 x 1700   966   1013   1192   1569   1221   1268   1445   1824     R16   1100 x 1400   900 x 1200   912   959   1142   1522   1155   1202   1387   1764     R16a   1100 x 1700   900 x 1500   949   996   1201   1579   1200   1246   1450   1829     R17   1200 x 1500   1000 x 1300   907   953   1152   1530   1148   1194   1393   1771     R17a   1200 x 1500   1000 x 1500   975   1021   1221   1597   1228   1274   1475   1851     R18   1200 x 1800   1000 x 2200   1437   1484   1989   3125   1858   1904   2376   3511     R22b   1300 x 1900   1100 x 1700   1070   1116   1559   2692   1382   1429   1837   2972     R22c   1300 x 2500   1100 x 2300   1468   1514   1993   3129   1854   1900   2379   3515     C1   650   - 379   N/A   665   1042   440   N/A   725   1101		R6	800 x 1400	600 x 1200	712	759	918	1296	899	946	1106	1484
R7b         900 x 1800         700 x 1600         857         904         1102         1482         1084         1130         1329         1708           R10a         1000 x 1300         800 x 1100         681         727         905         1282         857         904         1083         1459           R11         1000 x 1500         800 x 1300         840         887         1071         1447         1065         1111         1294         1671           R11a         1000 x 1500         800 x 1700         966         1013         1192         1569         1221         1268         1445         1824           R16         1100 x 1400         900 x 1200         912         959         1142         1522         1155         1202         1387         1764           R16a         1100 x 1700         900 x 1500         949         996         1201         1579         1200         1246         1450         1829           R17         1200 x 1500         1000 x 1300         907         953         1152         1530         1148         1194         1393         1771           R17a         1200 x 1700         1000 x 1500         975         1021         12		R7	900 x 1200	700 x 1000	571	617	779	1155	720	766	927	1304
R11a 1000 x 1900 800 x 1700 966 1013 1192 1569 1221 1268 1445 1824  R16 1100 x 1400 900 x 1200 912 959 1142 1522 1155 1202 1387 1764  R16a 1100 x 1700 900 x 1500 949 996 1201 1579 1200 1246 1450 1829  R17 1200 x 1500 1000 x 1300 907 953 1152 1530 1148 1194 1393 1771  R17a 1200 x 1700 1000 x 1500 975 1021 1221 1597 1228 1274 1475 1851  R18 1200 x 1800 1000 x 1600 955 1002 1205 1581 1205 1252 1456 1831  R20 1200 x 2400 1000 x 2200 1437 1484 1989 3125 1858 1904 2376 3511  R22b 1300 x 1900 1100 x 1700 1070 1116 1559 2692 1382 1429 1837 2972  R22c 1300 x 2500 1100 x 2300 1468 1514 1993 3129 1854 1900 2379 3515  C1 650 - 379 N/A 665 1042 440 N/A 725 1101	_	R7a	900 x 1500	700 x 1300	721	767	947	1326	904	951	1130	1508
R11a 1000 x 1900 800 x 1700 966 1013 1192 1569 1221 1268 1445 1824  R16 1100 x 1400 900 x 1200 912 959 1142 1522 1155 1202 1387 1764  R16a 1100 x 1700 900 x 1500 949 996 1201 1579 1200 1246 1450 1829  R17 1200 x 1500 1000 x 1300 907 953 1152 1530 1148 1194 1393 1771  R17a 1200 x 1700 1000 x 1500 975 1021 1221 1597 1228 1274 1475 1851  R18 1200 x 1800 1000 x 1600 955 1002 1205 1581 1205 1252 1456 1831  R20 1200 x 2400 1000 x 2200 1437 1484 1989 3125 1858 1904 2376 3511  R22b 1300 x 1900 1100 x 1700 1070 1116 1559 2692 1382 1429 1837 2972  R22c 1300 x 2500 1100 x 2300 1468 1514 1993 3129 1854 1900 2379 3515  C1 650 - 379 N/A 665 1042 440 N/A 725 1101	gula	R7b	900 x 1800	700 x 1600	857	904	1102	1482	1084	1130	1329	1708
R11a 1000 x 1900 800 x 1700 966 1013 1192 1569 1221 1268 1445 1824  R16 1100 x 1400 900 x 1200 912 959 1142 1522 1155 1202 1387 1764  R16a 1100 x 1700 900 x 1500 949 996 1201 1579 1200 1246 1450 1829  R17 1200 x 1500 1000 x 1300 907 953 1152 1530 1148 1194 1393 1771  R17a 1200 x 1700 1000 x 1500 975 1021 1221 1597 1228 1274 1475 1851  R18 1200 x 1800 1000 x 1600 955 1002 1205 1581 1205 1252 1456 1831  R20 1200 x 2400 1000 x 2200 1437 1484 1989 3125 1858 1904 2376 3511  R22b 1300 x 1900 1100 x 1700 1070 1116 1559 2692 1382 1429 1837 2972  R22c 1300 x 2500 1100 x 2300 1468 1514 1993 3129 1854 1900 2379 3515  C1 650 - 379 N/A 665 1042 440 N/A 725 1101	ano	R10a	1000 x 1300	800 x 1100	681	727	905	1282	857	904	1083	1459
R11a 1000 x 1900 800 x 1700 966 1013 1192 1569 1221 1268 1445 1824  R16 1100 x 1400 900 x 1200 912 959 1142 1522 1155 1202 1387 1764  R16a 1100 x 1700 900 x 1500 949 996 1201 1579 1200 1246 1450 1829  R17 1200 x 1500 1000 x 1300 907 953 1152 1530 1148 1194 1393 1771  R17a 1200 x 1700 1000 x 1500 975 1021 1221 1597 1228 1274 1475 1851  R18 1200 x 1800 1000 x 1600 955 1002 1205 1581 1205 1252 1456 1831  R20 1200 x 2400 1000 x 2200 1437 1484 1989 3125 1858 1904 2376 3511  R22b 1300 x 1900 1100 x 1700 1070 1116 1559 2692 1382 1429 1837 2972  R22c 1300 x 2500 1100 x 2300 1468 1514 1993 3129 1854 1900 2379 3515  C1 650 - 379 N/A 665 1042 440 N/A 725 1101	ect	R11	1000 x 1500	800 x 1300	840	887	1071	1447	1065	1111	1294	1671
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R22b     1300 x 1900     1100 x 1700     1070     1116     1559     2692     1382     1429     1837     2972       R22c     1300 x 2500     1100 x 2300     1468     1514     1993     3129     1854     1900     2379     3515       C1     650     -     379     N/A     665     1042     440     N/A     725     1101		R18	1200 x 1800	1000 x 1600	955	1002	1205	1581	1205	1252	1456	1831
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C1 650 - 379 N/A 665 1042 440 N/A 725 1101		R22b	1300 x 1900	1100 x 1700	1070	1116	1559	2692	1382	1429	1837	2972
		R22c	1300 x 2500	1100 x 2300	1468	1514	1993	3129	1854	1900	2379	3515
C2 750 (71 N/A 70/ 11C2 FF/ N/A 0CF 12/F		C1	650	_	379	N/A	665	1042	440	N/A	725	1101
- 4/1 IN/A /84 IIOZ 554 IN/A 86/ 1245		C2	750	-	471	N/A	784	1162	554	N/A	867	1245
C3 850 - 541 N/A 870 1247 641 N/A 968 1348	_	C3	850	-	541	N/A	870	1247	641	N/A	968	1348
C4 950 - 603 N/A 959 1335 712 N/A 1068 1443 C5 1050 - 674 N/A 1043 1420 801 N/A 1169 1547	ula u	C4	950	-	603	N/A	959	1335	712	N/A	1068	1443
<u>C</u> C5 1050 – 674 N/A 1043 1420 801 N/A 1169 1547	<u>:</u>	C5	1050	-	674		1043	1420	801	N/A	1169	1547
C6 1150 – 763 N/A 1138 1516 909 N/A 1284 1662		C6	1150	-	763		1138	1516	909	N/A	1284	1662
C7 1250 - 888 N/A 1303 1682 1065 N/A 1480 1858		C7	1250	-	888				1065			
C8 1350 – 1014 N/A N/A N/A 1217 N/A N/A N/A		C8	1350	-	1014	N/A	N/A	N/A	1217	N/A	N/A	N/A



# em.glaze ridgelight

Perfectly designed to maximise natural light in internal spaces, it delivers both outstanding visual appeal and thermal performance. Traditional features mixed with contemporary design mean this ridgelight makes a stunning solution for any project.





## **Key Features & Benefits**

- 6 sizes available from stock
- Stocked in white (RAL 9010)
- Units stocked and delivered in component form
- Toughened outer and inner panes
- Quick and easy install (online step-bystep video on our YouTube channel)
- Thermally insulated
- Fixed or electric ventilation available (special order)
- Fully bespoke design options also available



example shown is bespoke ridgelight with custom specification



**Need more in-depth information?** Visit whitesales.co.uk/RUFUS to generate a unique product part code to order the exact product you need.

## **Price List**



#### To Suit Builder's Upstand:

			Glazing
	Size ref	To suit external curb size (mm)	Double glazed (£)
Square	S9	1100 x 1100	1685
	R16	1000 x 1300	1746
ıular	R17a	1100 x 1600	1927
Rectangular	R19 <u></u>	1100 x 2100	2271
Rect	R22 <u></u>	1100 x 2600	2690
	R30a <u></u>	1600 x 3100	3697

#### With 150mm uPVC Splayed Upstand:

			Glazing	Ventilation options
	Size ref	To suit roof opening size (mm)	Double glazed (£)	Controllable trickle vents (£)
Square	S9	1200 x 1200	1891	1936
	R16	1100 x 1400	1959	2004
ıular	R17a	1200 x 1700	2175	2220
ang	R19 <u></u>	1200 x 2200	2555	2600
Rectangular	R22 <u></u>	1200 x 2700	3015	3060
	R30a <u></u>	1700 x 3200	4321	4366

## With 150mm uPVC Vertical Upstand:

			Glazing	Ventilation options
	Size ref	To suit roof opening size (mm)	Double glazed (£)	Controllable trickle vents (£)
Square	S9	1000 x 1000	1863	1908
	R16	900 x 1200	1929	1974
ıular	R17a	1000 x 1500	2142	2187
ang	R19 <u></u>	1000 x 2000	2517	2562
Rectangular	R22 <u>^</u>	1000 x 2500	2973	3018
_	R30a <u></u>	1500 x 3000	4016	4061



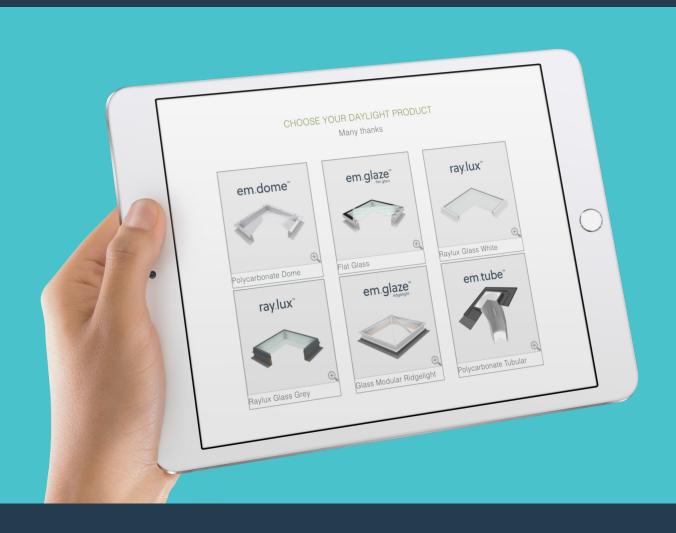
Due to their size and/or weight, any products marked \(\bar{\text{

# Discover RUFUS.

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Saves time



Available on the go



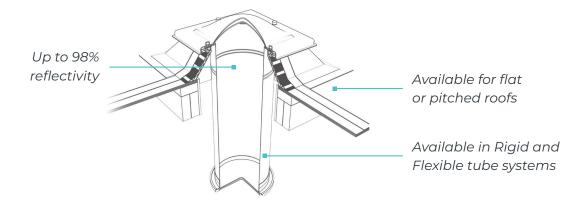
Detailed product information



# em.tube flat & pitched

Its innovative features allow light captured at roof level to be directed downwards to illuminate windowless internal spaces – lighter, brighter and exceptionally functional.





## **Key Features & Benefits**

#### Rigid tube

- Provides 98% reflectivity, transmitting more light than flexible tube
- Recommended where longer tube is needed

#### Flexible tube

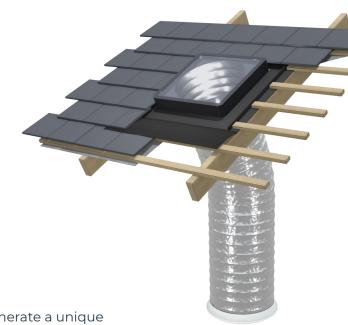
- Simple and easy to install
- For use where rigid tube is not suitable
- Most cost-effective option

#### Flat roof option

- To suit builder's or proprietary uPVC upstand
- Incorporates polycarbonate dome

#### Pitched roof option

- Aesthetically-pleasing square flat glass unit
- Compatible with both slate and tiled roofs



**Save time.** Visit **whitesales.co.uk/RUFUS** to generate a unique product part code to order the exact product you need.

# **Price List**

## For Flat Roof:

Ref No	Nominal size	Rigid Tube System – includes 0.6m tube length (£)	2m Flexible Tube System (£)
ETF35	350mm	589*	342
ETF45	450mm	788*	456*
ETF55	550mm	948*	519*

## For Flat Roof With Upstand:

Ref No	Nominal size	Rigid Tube System – includes 0.6m tube length (£)	2m Flexible Tube System (£)
ETF35	350mm	712*	474
ETF45	450mm	922*	591*
ETF55	550mm	1084*	656*

## For Pitched Roof (Tiled or Slate):

Ref No	Nominal size	Rigid Tube System – includes 0.6m tube length (£)	3m Flexible Tube System (£)
ETF35	350mm	674*	348
ETF45	450mm	931*	456*
ETF55	550mm	1141*	519*

#### **Accessories:**

Ref No	Nominal size	Description	(£)
ET35R-EXT625	350mm	625mm long Rigid pipe extension*	106
ET35R-EXT1250	350mm	1250mm long Rigid pipe extension*	209
ET35R-AA	350mm	Angle adaptor*	86
ET45R-EXT625	450mm	625mm long Rigid pipe extension*	131
ET45R-EXT1250	450mm	1250mm long Rigid pipe extension*	227
ET45R-AA	450mm	Angle adaptor*	147
ET55R-EXT625	550mm	625mm long Rigid pipe extension*	159
ET55R-EXT1250	550mm	1250mm long Rigid pipe extension*	270
ET55R-AA	550mm	Angle adaptor*	196
ETEL	-	Electric light unit*	103

 $<sup>^{\</sup>star}$  non stocked items 5-10 days delivery

# **Product Options: Curbs**



There are a number of curb options to choose from depending on your project requirements.

#### **Builder's Curb:**



If there is a site-formed upstand (builder's curb), both domes and flat glass units can be provided without a proprietary curb. In this case, you must provide the external dimensions of the upstand and the thickness of the upstand.

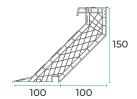
Our proprietary upstands are suitable for use with almost our entire range. Prefabricated upstands ensure rapid, airtight and watertight rooflight installation for shorter construction timescales. em.curbs are suitable for use with various roofing membranes, including single ply (bonded, welded or mechanically fixed), torch-on felt, hot melt, asphalt, GRP and liquid systems. Some designs feature smooth white internal finish to eradicate the need for further interior decoration – as well as a U-formed groove at the bottom of the curb to allow for a seamless fit with 12.5mm plasterboard, eliminating risk of unsightly cracks at the rooflight and lining interface.

#### 150 Splayed GRP:



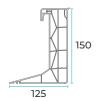
For circular units only. Integral 10mm polyurethane foam insulation and robust dome fixing and mounting flanges.

#### 150 Splayed uPVC:



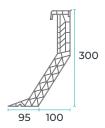
Extruded white uPVC. Multi-chambered construction. Thermally efficient performance.

#### 150 Vertical uPVC:



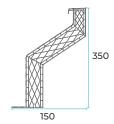
Vertical kerbs are useful when the dimensions of the roof aperture need to be maintained.

#### 300 Splayed uPVC:



Allows for smaller unit whilst still providing excellent spread of light through the room. Ideal for when additional insulation is required.

## **Oversleeve Splayed:**



To oversleeve an existing site upstand. Useful if existing linings must not be disturbed e.g. asbestos.

#### Cowl:



Enables domes to be fitted where existing dimensions are irregular or a direct size match is not available.



**Useful tip.** By selecting a vertical curb, you can increase the amount of daylight transmission by up to 40%. Curb selection will affect the overall thermal transmission and u-value of the rooflight.

# **Product Options: Overview**

**Stocked**: ✓- Most popular, standard option ✓\*- Optional X - Not available S - Special order

Glazing	em.glaze flat glass	ray.lux	em.dome	em.glaze ridgelight	em.tube
Glazing Types					
Single glazed	X	X	S	X	<b>✓</b>
Double glazed	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b>	√* Flat roof only
Triple glazed	S	Χ	<b>√</b>	S	√* Flat roof only
Quad glazed	X	X	S	X	X
Glazing Finish					
Clear	✓	✓	✓	✓	<b>✓</b>
Diffused	S	X	<b>✓</b>	X	X
Heat Reflect	X	X	S	✓	X
Easy Clean Coating	S	S	X	<b>✓</b>	X
Glazing Shape					
Square	✓	✓	✓	<b>✓</b>	✓
Rectangle	<b>✓</b>	<b>√</b>	<b>✓</b>	<b>✓</b>	X
Circle	S	X	<b>√</b>	X	Х
Glazing Profile					
Flat	<b>√</b>	<b>✓</b>	X	Χ	√ Pitched roof only
Dome	Х	Х	<b>√</b>	Х	√ Flat roof only
Pyramid/Trapezoidal	Х	Х	S Limited sizes	<b>√</b>	X



 $\textbf{Stocked}: \hspace{0.2cm} \checkmark \text{-} \hspace{0.1cm} \text{Most popular, standard option} \hspace{0.2cm} \checkmark ^* \text{-} \hspace{0.1cm} \text{Optional} \hspace{0.2cm} X \text{-} \hspace{0.1cm} \text{Not available} \hspace{0.2cm} S \text{-} \hspace{0.1cm} \text{Special order}$ 

Upstands	em.glaze flat glass	ray.lux	em.dome	em.glaze ridgelight	em.tube
Upstands					
Builder's Curb	<b>√</b>	<b>✓</b>	<b>√</b>	<b>√</b>	√ Flat roof option
Proprietary PVC Options					
150mm splayed	<b>√</b> *	X	<b>√</b>	X	√ Flat roof option
150mm vertical	<b>✓</b>	<b>✓</b>	<b>√</b> *	√ Limited sizes	X
300mm splayed	<b>√</b> *	X	<b>√</b> *	×	X
350mm splayed oversleeve	<b>√</b> *	X	<b>√</b> *	X	X

Ventilation	em.glaze flat glass	ray.lux	em.dome	em.glaze ridgelight	em.tube
Ventilation					
Permanent ventilation	X	X	<b>√</b> *	X	X
Trickle ventilation (only with PVC upstand)	<b>✓</b>	X	<b>✓</b>	<b>✓</b>	X
Manual hinged opening	√ Limited sizes	√ Limited sizes	<b>✓</b>	X	X
Electric hinged opening	<b>√</b>	✓	<b>✓</b>	X	Х

Accessories See p34 for further details and prices	em.glaze flat glass	ray.lux	em.dome	em.glaze ridgelight	em.tube
Ventilation					
Winding rods (for manual hinged opening)	<b>√</b>	<b>√</b>	<b>√</b>	<b>√</b> *	X
Security grid	S	X	S	Х	X
Powered extract fan (only with uPVC curb	<b>√</b> *	Х	<b>√</b> *	X	Х
Premium comfort kit (for electric hinged opening)	<b>✓</b>	<b>√</b>	<b>✓</b>	Х	X
Standard comfort kit (for electric hinged opening)	<b>√</b>	<b>√</b>	<b>√</b>	Х	X

# **Product Options: Controls & Accessories**

## **Operating Rods**

Manual spindle for hinged manual opening ventilation.

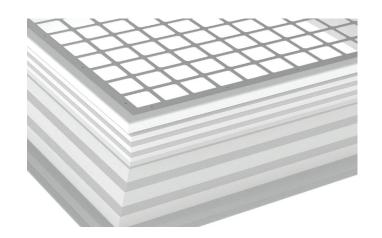
1.5m	2m	3m
£27	£34	£47



## **Security Grid**

- Increased security
- Visual deterrent to potential intruders

Security grid	
POA	



#### Fans

- Used where natural ventilation is insufficient
- Designed for ventilating internal bathrooms, WCs and other small rooms
- Mounted in side wall of em.curb 150mm or 300mm upstand

Vent Axia solo	Centrif duo
£347	£515





#### **Standard Comfort Controls**

- Electric opening units supplied with retractive switch as standard
- Option of standard comfort kit including a control panel, remote control and rain sensor

Standard comfort kit

Control Panel | Remote
Control | Rain Sensor



#### **Premium Comfort Controls**

- For electric opening
- Wireless controls which include open/ close manual switch and internal and external temperature
- Wireless weather station which includes wind and rain sensor
- Option of handheld remote

Premium Comfort Kit	Optional
Wireless Controls   Weather Station	Remote Control
£601	£271



# **Frequently Asked Questions**

#### What are your lead times?

Our delivery depot holds large volumes of stock, allowing us to supply your order at short notice – including next-day delivery if ordered by 2pm, in most cases (exceptions apply). Special order units may take 1–3 weeks for delivery. Bespoke units can be manufactured in as little as 3–5 weeks. See page 7 for further details.

# How do I place an order (homeowners)?

Homeowners: your installer is likely to purchase your product on your behalf. Direct purchases can be made through our national network of building and roofing merchants. Use our 'find a merchant' resource on our website to find Whitesales' merchants in your area.

## Do you get the unit to my roof?

Unless specifically advised otherwise (product is marked with! in price list table), products will be delivered and offloaded by the delivery driver and placed in a practical location within reasonable proximity to the vehicle. Please note the driver cannot move the product to point of installation or inside your building so please ensure you take note of the product weight and make appropriate arrangements to move it as required. Due to vehicle sizes used we may not be able to deliver to locations with restricted or narrow access.

#### Do you have an installation service?

Our full range of products are designed for easy installation. Full installation instructions are available for download from our website, and we have installation videos on our YouTube channel. For bespoke products and projects, we are able to offer installation services. Please call us to discuss your requirements. Our design team can offer guidance and advice.

#### Do you have a site survey service?

We are very happy to visit a site to check measurements and review product suitability for larger scale orders/projects. Our survey team cover the entire UK and can provide condition surveys, quotes and roof plans if needed. However, in most cases we work to customers' measurements provided. We can offer telephone assistance or video call over WhatsApp to ensure correct measurements are being taken.

## How will my rooflight be packaged?

We want to ensure that our rooflights arrive exactly in the same condition as when they left our production facility. We take every precaution to ensure that units are not damaged during transportation. Most larger glass units will be shipped on a pallet. If goods are damaged in transit, the carrier's note must be signed accordingly and Whitesales notified in writing within 3 days of receipt of goods. We cannot accept claims for damaged goods if they are signed for in good condition.

#### How do I store the rooflight?

If the unit/s are to be stored before installation the following points should be noted:

- care should be taken to ensure protective packaging is not ripped, as glazing could then be scratched
- units should be stored under cover

#### For glass only:

- units should be laid flat and not placed upright on their edge. Units should not be stacked
- units should not be stored in light/shade environments which could allow heating of one area of the unit (see thermal fracture FAQ)

#### What is thermal fracture?

In simple terms, thermal stress fracture occurs (very rarely) because one area of glass is heated faster than another area of the glass – this 'heated' area will expand, while the 'cooler' area will not – causing expansion/compression forces and resulting in the glass 'fracturing'. In reality it is quite a complex scientific process and there are many factors that increase/decrease the risk of thermal fracture. It is important to understand the implications of thermal stress and more information can be found on our website

#### Is planning permission required?

In England and Wales, planning permission is not usually required for the installation of new rooflights, subject to the current limits and conditions stipulated by the government's Planning Portal under Schedule 2, Article 3, part 1 class C permitted development. However, we advise that you thoroughly research planning permission rules and building regulations prior to purchase.

# How high does an upstand need to be?

A rooflight upstand must be 150mm above the roof surface at it's lowest point. em.curb proprietary curbs are compatible with almost our entire range and ensure rapid, airtight and watertight rooflight installation.

# What about cleaning and maintenance?

Please refer to the O&M Manual for your specific product. This can be found on our website.

#### What warranty do you provide?

Our rooflights have an expected life of at least 25 years and are guaranteed for 10 years. For full details of our comprehensive product warranties, please contact customer services.

#### More info on terms and conditions?

Please refer to our website where our Terms & Conditions can be viewed. Should you require any further details, please feel free to contact us.

## **Terms & Conditions**

#### Delivery:

Free delivery on all orders over £650 for products shipped to Mainland UK only, £26 delivery surcharge for orders under this amount. For deliveries outside of Mainland UK we offer delivery to a port on the mainland for onward shipping arranged by the customer, or we can agree a carriage charge relevant to the order. Next-day for most stock products for orders placed by 2pm (exceptions apply). See page 7 for further details.

Unless specifically advised otherwise (product is marked with! in price list table), products will be delivered and offloaded by the delivery driver and placed in a practical location within reasonable proximity to the vehicle. Please note the driver cannot move the product to point of installation or inside your building so please ensure you take note of the product weight and make appropriate arrangements to move it as required. Due to vehicle sizes used we may not be able to deliver to locations with restricted or narrow access.

#### Prices and conditions of sale:

All prices quoted are subject to VAT. Goods will be charged at prices ruling at date of despatch. The supply of any goods to which this price list applies will be subject to Whitesales standard conditions of sale available on request, on our website and shown on the reverse of each delivery note.

#### Damage or loss in transit:

If goods are damaged in transit, the carrier's note must be signed accordingly and Whitesales notified in writing within 3 days of receipt of goods. We cannot accept claims for damaged goods if they are signed for in good condition. Whitesales must also be notified in writing if goods are not received within 10 days of date of invoice.

#### Return of goods:

By prior arrangement only, and subject to the goods being received in reasonable condition upon inspection by Whitesales. Subject to a 25% handling charge (minimum £50) for all products. Special order items cannot be returned for credit.

#### Fixings:

All units are supplied complete with security fixings at no extra cost.

#### Application and limitation on use:

All units are designed for use in normal circumstances on flat roofs up to 15° pitch. For applications in excess of 15° or in unusual circumstances (e.g. extreme temperature or climatic conditions) please refer to Whitesales. Please note that all information supplied is based on our best knowledge and general experience. Because of factors outside our control which can affect installation and use of products, no warranty is given or implied in respect of information provided. A policy of continuous improvement applies and Whitesales therefore reserve the right to alter specifications without prior notice.

#### Condensation:

Condensation occurs where warm moist air meets cold surfaces. As warm air rises, the risk of condensation forming at rooflight level is relatively greater than at lower level. The risk can be minimized by specifying thicker glazing/more glazing skins and em.curb insulated upstands. The provision of ventilation may also assist. However, because temperature and humidity levels are clearly beyond our control, no guarantee can be given against the formation of condensation.

# Need help?

# Did you know you can now contact us on WhatsApp!

Create a contact in your phone with the phone number: **07553 730663**You could call it 'Whitesales Support'

Open WhatsApp

Search for the Whitesales Support contact and send us a message. You can attach pictures, videos, files, whatever you want to help us solve your query

## or

Visit whitesales.co.uk/RUFUS to 'build' your product and create your custom order in just a few clicks.



Saves time



Available on the go



Detailed product information

# experience.brighter

#### Delivering on our promises, that is our focus

- and it is what has made us the no.1 choice for professionals for over 30 years. We take our role as market leaders very seriously. Our aim is to develop superior solutions that allow our customers to buy in complete confidence.



Europa House, Alfold Road, Cranleigh, GU6 8NQ Tel: 01483 917580 | Fax: 01483 271771 sales@whitesales.co.uk | whitesales.co.uk

Opening Times: 07:30-16:30







