





Number BAR 11-346/2	 <p style="text-align: center;">BDA Agrément® Nr. BAR 11-346/2</p> <p style="text-align: center;">Data Sheet Roof - Design</p> <p style="text-align: center;">To check the validity of this document please consult www.bda.nl</p>	Category Specific																																												
Date 1st version: 2009.12.15 2nd version: 2011.03.21		Phase Design																																												
Code 41MF99		Subject Multi-foil reflective thermal insulation for roofs																																												
Product Supplier Description Scope (objective) Frame of reference Product characteristics Ancillary items Points of attention	<p>SuperQuilt 19</p> <p>Yorkshire Building Services (Whitwell) Ltd. The Craggs Industrial Park Morven Street UK-S80 4AJ Creswell Derbyshire T.: +44 (0) 1909 721662, F.: +44 (0) 1909 721442 E.: technical@ybsinsulation.com, I.: www.ybsinsulation.com</p> <p>Multi-layered roof insulation material made up of nineteen layers of metallic foil, flexible wadding and closed cell foam. The layers are spot wise connected by 40 mm long double T plastic clips in a regular pattern, avoiding thermal bridging and creating flat surfaces. The first and nineteenth layer consist of aluminium foil with polyethylene backing and reinforcing scrim. The core of the product consists of three layers of polyester fibre wadding and four double layers of closed cell foam separated by six metallized film layers.</p> <p>Thermal insulation for use above and/or below rafters in tiled or slated pitched roofs of dwellings and buildings with similar temperature and humidity conditions, designed and constructed in accordance with the relevant clauses of BS 5534⁴.</p> <ol style="list-style-type: none"> Directive for the issue of a BDA Agrément, May 2009 BDA Agrément® Nr. BAR 11-347/2 SuperQuilt 19 (phase: installation) BDA Agrément® Nr. BAR 11-348/2 SuperQuilt 19 (phase: regulations) BS 5534: 2003 <i>Code of practice for slating and tiling (including shingles) – Installation</i> BS 5250: 2002 <i>Code of practice for control of condensation in buildings</i> BDA-Report 0036-L-09/3 SuperQuilt 19: <i>Determination of thermal resistance</i>, 2009.07.17 BDA-Report 0036-L-09/4 SuperQuilt 19: <i>Determination of thermal resistance</i>, 2009.07.17 BDA-Report 0036-L-09/6 SuperQuilt 19: <i>Determination of thermal resistance</i>, 2009.08.03 Deutsches Institut für Bautechnik, Allgemeine bauaufsichtliche Zulassung, Nr. Z-23.11-1723: <i>Mehrlagige Verbund-Wärmedämm-Matte "SuperQuilt" als Wärmedämmstoff</i>, 10. September 2008 Fraunhofer Test Report P17-084e/2008: <i>Approval Testing of Thermal Insulation Composite Mat „SuperQuilt 19 layers“</i>, 27. 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Roof insulation <ul style="list-style-type: none"> special attention should be given to the air tightness of the ceiling, being the most important measure to avoid excessive condensation in the space above the insulation; if ventilation has been provided above the SuperQuilt layer, there is no requirement for a vapour control layer above the (plasterboard) ceiling, provided that the SuperQuilt layer is thoroughly sealed at all joints, resulting in an airtight layer; if ventilation openings are used they should be positioned along two opposite sides of the roof at eaves level in accordance with BS 5250: 2002⁵; ventilation openings should be arranged in such a way that blockage is prevented and also the ingress of rain, snow, birds and small mammals. Thermal performance aspects <ul style="list-style-type: none"> for the purpose of U-value calculations to determine if the requirements of the Building (or other statutory) Regulations are met, the thermal resistance of the product in combination with a non-ventilated air cavity on both sides of the SuperQuilt layer of 25 mm (nominal value) may be taken as given in table 1; this performance can be different if the product is combined with certain products facing the air cavity at the opposite side, as given in table 1; the effect of thermal bridging is not included in table 1, this effect has to be assessed according BBA Information Bulletin No. 3: <i>Reflective foil insulation – Conventions for U-value calculations</i>, March 2010¹¹; to minimize the effect of thermal bridging cross-battening is advised; 	• nominal length	: 10.00, 6.667	(m)	• nominal width	: 1500	(mm)	• nominal thickness	: 40	(mm)	• nominal mass	: 0.80	(kg.m ⁻²)	• thermal performance core			- measured value BS EN 12667:2001 ^{6,10}	: 1.48	(m ² .K.W ⁻¹)	- calculation value ⁹	: 1.38	(m ² .K.W ⁻¹)	• thermal performance in combination with cavities	: see table 1		• dimensional stability (length)	: 1.5	(%)	• dimensional stability (width)	: 2.3	(%)	• tensile strength parallel to faces	: 142	(kPa)	• water vapour diffusion factor μ (with seam)	: 1700	(-)	• water vapour diffusion factor μ (without seam)	: 75000	(-)	• emission coefficients of outer surfaces	: 0.03	(-)	• reaction to fire classification	: E	
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Date 1st version: 2009.12.15 2nd version: 2011.03.21		Phase Design
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Points of attention (continued)	<ul style="list-style-type: none"> - the requirement for limiting the heat loss through the building fabric, including the effect of thermal bridging can be satisfied if the U-values of the building elements do not exceed the maximum values in the relevant Elemental Methods given in the National Building Regulations of England and Wales (Approved Documents L), Scotland (Technical Standards Regulations 9) and Northern Ireland (Technical Booklet F); further information on regulations is given in BDA Agrément® Nr. BAR 11-348/2 SuperQuilt 19 (phase: regulations³). <p>4. Condensation risk</p> <ul style="list-style-type: none"> - roofs incorporating the product will adequately limit the risk of interstitial condensation when designed in accordance with BS 5250: 2002²; - when installed in accordance with BDA Agrément® Nr. BAR 11-347/2 SuperQuilt 19 (phase: installation²) the product will provide a convection-free envelope of high vapour resistance; - when installed against the external side of the studs or battens a vapour control layer could be considered in certain cases, this is to be judged by a specialist; - when installed against the internal side of the studs or battens the product will perform as a vapour barrier and should be used in conjunction with a suitable breather membrane against the sheathing on the external side of the studs or battens, see also ref.2. <p>5. Behaviour in relation to fire</p> <ul style="list-style-type: none"> - when installed with an internal lining board, e.g. 12.5 mm thick plasterboard, the insulation will be contained between the external part of the roof and internal lining board, until one is destroyed. Therefore, the insulation will not contribute to the development stages of a fire or present a smoke or toxic hazard; - the insulation must not be carried over junctions between roofs and roofs required to provide a minimum period of fire resistance; - the continuity of fire resistance must be maintained, for example as described in: England and Wales- Approved Document B, Volume 1, Sections 5.11 to 5.12; Scotland-Mandatory Standard 2.2, clause 2.2.10; Northern Ireland-Technical Booklet E, paragraph 3.21; - the use of the product will not affect the fire rating obtained by brick or block roofs when evaluated by assessment or test to BS 476-3: 1958. <p>6. Durability</p> <p>The product is stable, rot-proof and durable and will remain effective as an insulant for the life of the building in which it is installed. There is no risk for moth or beetle infestation.</p> <p><i>Table 1 – Possible thermal resistances (R_{eq} in $m^2.K.W^{-1}$) of a combination of SuperQuilt 19 with cavities, as measured under an angle of 45° under different heat flow conditions BS EN 12667:2001^{6,7,8}; the effect of thermal bridging is not included (see point of attention 3, which means that by applying cross-battening the given thermal resistances can be used for calculations without further correction for thermal bridging)</i></p> <table border="1" data-bbox="367 1137 1353 2018"> <thead> <tr> <th>Combination</th> <th>Winter conditions (heat flow from inside to outside)</th> <th>Summer conditions (heat flow from outside to inside)</th> </tr> </thead> <tbody> <tr> <td>1. • High emissivity surface • 25 mm air cavity • SuperQuilt 19 • 25 mm air cavity • High emissivity surface</td> <td style="text-align: center;">2,71</td> <td style="text-align: center;">2,83</td> </tr> <tr> <td>2. • Low emissivity surface • 25 mm Air cavity • SuperQuilt 19 • 25 mm Air cavity • High emissivity surface</td> <td style="text-align: center;">2,76</td> <td style="text-align: center;">2,99</td> </tr> <tr> <td>3. • Low emissivity surface • 25 mm Air cavity • SuperQuilt 19 • 25 mm Air cavity • Low emissivity surface</td> <td style="text-align: center;">2,98</td> <td style="text-align: center;">3,24</td> </tr> <tr> <td>4. • High emissivity surface • 100 mm Glasswool • 25 mm Air cavity • SuperQuilt 19 • 25 mm Air cavity • High emissivity surface</td> <td style="text-align: center;">5,37</td> <td style="text-align: center;">Not measured</td> </tr> <tr> <td>5. • Low emissivity surface • 25 mm Air cavity • SuperQuilt 19 • 50 mm Air cavity¹⁾ • SuperQuilt 19 • 25 mm Air cavity • Low emissivity surface</td> <td style="text-align: center;">5,07</td> <td style="text-align: center;">5,48</td> </tr> </tbody> </table> <p>¹⁾As tested. In actual practice an air cavity of nominal 38 mm will be sufficient to achieve a minimal clear cavity of 13 mm. See also installation procedure point 3 in BAR 11-347/2 ³⁾.</p>	Combination	Winter conditions (heat flow from inside to outside)	Summer conditions (heat flow from outside to inside)	1. • High emissivity surface • 25 mm air cavity • SuperQuilt 19 • 25 mm air cavity • High emissivity surface	2,71	2,83	2. • Low emissivity surface • 25 mm Air cavity • SuperQuilt 19 • 25 mm Air cavity • High emissivity surface	2,76	2,99	3. • Low emissivity surface • 25 mm Air cavity • SuperQuilt 19 • 25 mm Air cavity • Low emissivity surface	2,98	3,24	4. • High emissivity surface • 100 mm Glasswool • 25 mm Air cavity • SuperQuilt 19 • 25 mm Air cavity • High emissivity surface	5,37	Not measured	5. • Low emissivity surface • 25 mm Air cavity • SuperQuilt 19 • 50 mm Air cavity ¹⁾ • SuperQuilt 19 • 25 mm Air cavity • Low emissivity surface	5,07	5,48
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Roof insulation <ul style="list-style-type: none"> special attention should be given to the air tightness of the ceiling, being the most important measure to avoid excessive condensation in the space above the insulation; if ventilation has been provided above the SuperQuilt layer, there is no requirement for a vapour control layer above the (plasterboard) ceiling, provided that the SuperQuilt layer is thoroughly sealed at all joints, resulting in an airtight layer; if ventilation openings are used they should be positioned along two opposite sides of the roof at eaves level in accordance with BS 5250: 2002²; ventilation openings should be arranged in such a way that blockage is prevented and also the ingress of rain, snow, birds and small mammals. <ol style="list-style-type: none"> General <ul style="list-style-type: none"> installation of SuperQuilt 19 and additional products should be in accordance with the Agrément holder's instructions and current good building practice; during installation care must be taken to avoid damaging of the product. Should damage occur, holes in the product should be repaired with suitable tape, as provided by the Agrément holder; the product should be attached to the rafters by using staples or nails of at least 14 mm length; the width of overlap joints must be at least 50 mm; the joints must be taped over the full length with suitable tape, as provided by the Agrément holder; when the product is cut to fit around openings or connections, gaps must be minimized; any exposed cut edges should be sealed with suitable tape, as provided by the Agrément holder. 	• nominal length	: 10.00, 6.667	(m)	• nominal width	: 1500	(mm)	• nominal thickness	: 40	(mm)	• nominal mass	: 0.80	(kg.m ⁻²)	• thermal performance core			- measured value ^{6,10}	: 1.48	(m ² .K.W ⁻¹)	- calculation value ⁹	: 1.38	(m ² .K.W ⁻¹)	• thermal performance in combination with cavities	: see table 1		• dimensional stability (length)	: 1.5	(%)	• dimensional stability (width)	: 2.3	(%)	• tensile strength parallel to faces	: 142	(kPa)	• water vapour diffusion factor μ (with seam)	: 1700	(-)	• water vapour diffusion factor μ (without seam)	: 75000	(-)	• emission coefficients of outer surfaces	: 0.03	(-)	• reaction to fire classification	: E	
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Installation procedure (continued)


2. **Delivery and site handling**
 - the product is delivered to site in rolls packed in a protective bag sealed with a plastic tie. Fitting instructions are placed in the bag;
 - the rolls should be stored in clean, dry conditions, not exposed to sunlight;
 - the product must be protected from being dropped or crushed by objects. Care must be exercised when storing large quantities on site;
 - the product must not be exposed to open flame or other ignition sources and must be stored away from flammable material such as paint and solvents;
 - to ensure maximum performance of the product when installed, on site precautions must be taken to protect it from mud and dirt.
3. **Roof insulation**
 - the product shall be cut equal to the length of the sloping section plus 100 mm;
 - installation should start from the ridge with the product being unrolled parallel to the eaves across the rafters, after which it is fixed using staples or nails;
 - the product should be held in place using wooden battens in such a way that there is a nominal 25 mm air cavity above the product and a nominal 25 mm air cavity below the product, resulting in effectively minimal cavity thicknesses of 13 mm;
 - to minimize the effect of thermal bridging cross-battening is advised;
 - when installed above rafters a vapour barrier should be installed in conjunction with a suitable breather membrane under the tiles, without a ventilated air space;
 - when installed below rafters the product will perform as a vapour barrier and should be used in conjunction with a suitable breather membrane under the tiles, without a ventilated air space;
 - the breather membrane should be installed on the counter battens and tiling battens attached perpendicular to the rafters;
 - roof tiles or slates shall be installed in accordance with BS 5534: 2003⁴;
 - recommendations of the tile/slate manufacturer should be followed.
4. **Ceiling**
 - a foil-backed layer of plasterboard should be fixed to the battens in case of the roof insulation installed below the rafters. The batten size should be sufficient to ensure a nominal 25 mm gap between the product and the plasterboard;
 - in case of the roof insulation installed above the rafters the foil-backed layer of plasterboard can be fixed directly to the rafters;
 - further details are given in BDA Agrément® Nr. BAR 11-348/2 SuperQuilt 19 (phase: regulations³).
5. **Maintenance and repair**
 - once installed, the product does not require any maintenance. Small holes, rips or punctures in the outer layers should be repaired with YBS Insulation tape.
6. **Regulations**

Table 1 – Possible thermal resistances (R_{eq} in $m^2.K.W^{-1}$) of a combination of SuperQuilt 19 with cavities, as measured under an angle of 45° under different heat flow conditions BS EN 12667:2001^{6,7,8}; the effect of thermal bridging is not included (see point of attention 3, which means that by applying cross-battening the given thermal resistances can be used for calculations without further correction for thermal bridging)

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Product Supplier Description Scope (objective) Frame of reference Product characteristics Ancillary items Regulations	<p>SuperQuilt 19</p> <p>Yorkshire Building Services (Whitwell) Ltd. The Craggs Industrial Park Morven Street UK-S80 4AJ Creswell Derbyshire T.: +44 (0) 1909 721662, F.: +44 (0) 1909 721442 E: technical@ybsinsulation.com, I: www.ybsinsulation.com</p> <p>Multi-layered roof insulation material made up of nineteen layers of metallic foil, flexible wadding and closed cell foam. The layers are spot wise connected by 40 mm long double T plastic clips in a regular pattern, avoiding thermal bridging and creating flat surfaces. The first and nineteenth layer consist of aluminium foil with polyethylene backing and reinforcing scrim. The core of the product consists of three layers of polyester fibre wadding and four double layers of closed cell foam separated by six metallized film layers.</p> <p>Thermal insulation for use above and/or below rafters in tiled or slated pitched roofs of dwellings and buildings with similar temperature and humidity conditions, designed and constructed in accordance with the relevant clauses of BS 5534⁶.</p> <ol style="list-style-type: none"> Directive for the issue of a BDA Agrément, May 2009 BDA Agrément® Nr. BAR 11-346/2 SuperQuilt 19 (phase: design) BDA Agrément® Nr. BAR 11-347/2 SuperQuilt 19 (phase: installation) BS 5250: 2002 <i>Code of practice for control of condensation in buildings</i> BS 5268 <i>Code of practice for timber</i> BS 5534: 2003 <i>Code of practice for slating and tiling (including shingles) – Regulations</i> BS 4016:1997 <i>Specification for flexible building membranes (breather type)</i> <table border="0"> <tr><td>• nominal length</td><td>: 10.00, 6,667</td><td>(m)</td></tr> <tr><td>• nominal width</td><td>: 1500</td><td>(mm)</td></tr> <tr><td>• nominal thickness</td><td>: 40</td><td>(mm)</td></tr> <tr><td>• nominal mass</td><td>: 0.80</td><td>(kg.m⁻²)</td></tr> <tr><td>• thermal performance core</td><td></td><td></td></tr> <tr><td> - measured value²</td><td>: 1.48</td><td>(m².K.W⁻¹)</td></tr> <tr><td> - calculation value²</td><td>: 1.38</td><td>(m².K.W⁻¹)</td></tr> <tr><td>• thermal performance in combination with cavities</td><td>: see table 1 in ref. 2</td><td></td></tr> <tr><td>• dimensional stability (length)</td><td>: 1.5</td><td>(%)</td></tr> <tr><td>• dimensional stability (width)</td><td>: 2.3</td><td>(%)</td></tr> <tr><td>• tensile strength parallel to faces</td><td>: 142</td><td>(kPa)</td></tr> <tr><td>• water vapour diffusion factor μ (with seam)</td><td>: 1700</td><td>(-)</td></tr> <tr><td>• water vapour diffusion factor μ (without seam)</td><td>: 75000</td><td>(-)</td></tr> <tr><td>• emission coefficients of outer surfaces</td><td>: 0.03</td><td>(-)</td></tr> <tr><td>• reaction to fire classification</td><td>: E</td><td></td></tr> </table> <ul style="list-style-type: none"> YBS Insulation foil-backed tape with acrylic adhesive, width 75 mm 14 mm staples or nails vapour control layer breather membrane pre-treated counter battens, softwood battens and tiling laths roofing slates or tiles additional insulation where required <ol style="list-style-type: none"> Requirements: The Building Regulations (England and Wales) (as amended) <ul style="list-style-type: none"> B3(4) Internal fire spread (structure) – Junctions between roofs and compartment walls must be fire stopped. SuperQuilt 19 has a Class 1 surface spread of flame rating. The insulation must not be carried over junctions between roofs and walls required to provide a minimum period of fire resistance. C4 Resistance to weather and moisture – SuperQuilt 19 can adequately resist the passage of moisture to the underlying structure, provided the roof is constructed in accordance with BS 5534: 2003⁶ and the requirements of BDA Agrément® nr. 11-347/2 SuperQuilt 19 (phase: installation³). J3 Protection of the building from heat-producing appliances – in order to comply with this Regulation SuperQuilt 19 must be adequately separated or shielded from a chimney, flue, fireplace recess, heat-producing appliance or hearth. The separations recommended, where appropriate, are detailed in Approved Document J supporting these Regulations, to which reference must be made. L1 Conservation of fuel and power – roofs constructed using SuperQuilt 19 can be designed and constructed to provide a U-value of no greater than 0.30 W.m⁻²K⁻¹. Regulation 7 Materials and workmanship – SuperQuilt 19 is manufactured from suitably safe and durable materials for their application and can be installed to give a satisfactory performance. 	• nominal length	: 10.00, 6,667	(m)	• nominal width	: 1500	(mm)	• nominal thickness	: 40	(mm)	• nominal mass	: 0.80	(kg.m ⁻²)	• thermal performance core			- measured value ²	: 1.48	(m ² .K.W ⁻¹)	- calculation value ²	: 1.38	(m ² .K.W ⁻¹)	• thermal performance in combination with cavities	: see table 1 in ref. 2		• dimensional stability (length)	: 1.5	(%)	• dimensional stability (width)	: 2.3	(%)	• tensile strength parallel to faces	: 142	(kPa)	• water vapour diffusion factor μ (with seam)	: 1700	(-)	• water vapour diffusion factor μ (without seam)	: 75000	(-)	• emission coefficients of outer surfaces	: 0.03	(-)	• reaction to fire classification	: E	
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Number BAR 11-348/2	 <p style="text-align: center;">BDA Agrément® Nr. BAR 11-348/2</p> <p style="text-align: center;">Data Sheet Roof - Regulations</p> <p style="text-align: center;">To check the validity of this document please consult www.bda.nl</p>	Category Specific
Date 1st version: 2009.12.15 2nd version: 2011.03.21		Phase Regulations
Code 41MF99		Subject Multi-foil reflective thermal insulation for roofs
Regulations (continued)	<p>2. 2. Requirements: The Building (Scotland) Regulations (as amended)</p> <p>2.1 Regulations 8 (1) Durability of materials and workmanship</p> <ul style="list-style-type: none"> - SuperQuilt 19 is manufactured from acceptable materials and are considered to be adequately resistant to deterioration and wear under normal service conditions, provided they are installed in accordance with the requirements of BDA Agrément® nr. 11-347/2 SuperQuilt 19 (phase: installation³). <p>2.2 Regulation 9 Building Standards Construction</p> <p>Section 2 Fire</p> <ul style="list-style-type: none"> - cavity barriers - combustible materials are permitted in the roof cavity but require any opening to be sealed. The insulation must not be carried over junctions between roofs and walls required to provide a minimum period of fire resistance. - 2.5 Heat-producing, solid fuel burning or oil- or gas-fired installations - a roof, incorporating SuperQuilt 19 can be designed and constructed to comply with these Standards, provided that they are isolated from the flue of a gas-fired, or solid fuel, or oil-fired heat-producing appliance by a separation. The insulation must be adequately separated from a fire place opening, recess, hearth or flue pipe, or from any heat-producing appliance. <p>Section 3 Environment</p> <ul style="list-style-type: none"> - 3.10 Precipitation - SuperQuilt 19 can adequately resist the passage of moisture to the underlying structure provided the roof is constructed in accordance with BS 5534: 2003⁶ and the requirements of this Agrément. - 3.15 Condensation - a roof formed using SuperQuilt 19 in accordance with the requirements of BDA Agrément® nr. 11-347/2 SuperQuilt 19 (phase: installation³) and of BS 5250⁴, can be designed and constructed to comply with these Standards. <p>Section 6 Energy</p> <ul style="list-style-type: none"> - 6.1(b) Where a proposed roof U-value is not better than (or is greater than in Scotland) the relevant 'notional' value, additional energy saving measures will be required in the building envelope and/or services to achieve the required overall carbon dioxide emission rate reduction of about 20% in dwellings (18% to 25% in Scotland) and 23% to 28% in buildings other than dwellings. - 6.2.1. Conservation of fuel and power: the building fabric - external cavity roofs can be designed and constructed with SuperQuilt 19 to provide a U-value of less than 0.27 W.m⁻²K⁻¹. <p>3. 3. Requirements: The Building Regulations (Northern Ireland) (as amended)</p> <ul style="list-style-type: none"> - B2 Fitness of materials and workmanship - SuperQuilt 19 is manufactured from materials which are considered to be suitably safe and acceptable for use as vapour open roof cavity rain barrier. - C5 Resistance to moisture and weather - where SuperQuilt 19 is installed within a timber frame roof, that roof can be designed and constructed so as to prevent the passage of moisture or water vapour through it. Advice is given in ref. 3. - C7 Condensation - a roof incorporating SuperQuilt 19 can be designed and constructed to prevent any harmful effect from moisture in the form of interstitial condensation. - E5(b) The product will not affect the external fire rating of a tiled or slated roof in which it is installed. - F2 Conservation of fuel and power - Timber frame roofs, incorporating SuperQuilt 19 between the roof insulation and tiles, can be designed and constructed to provide a U-value no greater than 0.30 W.m⁻².K⁻¹. - F3(2) The product can contribute to a building satisfying its Target Emission Rate. - L2 Heat-producing appliances and associated constructions - a roof, incorporating SuperQuilt 19 can be designed and constructed to comply with these Regulations, provided that the insulation is isolated from the flue of a gas-fired, or solid fuel or oil-fired heat-producing appliance or an incinerator. They must be adequately separated from a chimney or fireplace recess, from a flue pipe, from a hearth or from the appliance. 	
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