

Declaration of Performance



No. 91323 033 DoP 2015-08-24 · Declaration of Performance (DoP)

1. Unique identification code of the product-type:

Multi-wall chimney system type TEC-LS-A according to EN 1856-1:2009

2. Type, batch or serial number or any other element allowing identification of the construction product as required under Article 11(4):

Metal chimney system with specified outer wall type TEC-LS-A¹⁾

Model 1	TEC-EW-HIGH	DN (80- 450)	T120 – P1 – W – V2 – L50050 – O00 ^{2) 5) 7)}
Model 2	TEC-EW-COMPLETE oder TEC-EW-CLASSIC	DN (80- 450)	T160 – N1 – W – V2 – L50050 – O00 ^{2) 7)}
Model 3	TEC-EW-COMPLETE oder TEC-EW-HIGH	DN (80- 450)	T160 – P1 – W – V2 – L50050 – O00 ^{2) 6) 7)}
Model 4	TEC-EW-COMPLETE	DN (80- 450)	T160 – H1 – W – V2 – L50050 – O00 ^{2) 7)}
Model 5	TEC-EW-COMPLETE oder TEC-EW-CLASSIC	DN (80- 450)	T200 – N1 – W – V2 – L50050 – O00 ^{3) 7)}
Model 6	TEC-EW-COMPLETE oder TEC-EW-HIGH	DN (80- 450)	T200 – P1 – W – V2 – L50050 – O00 ^{3) 6) 7)}
Model 7	TEC-EW-COMPLETE	DN (80- 450)	T200 – H1 – W – V2 – L50050 – O00 ^{3) 7)}
Model 8	TEC-EW-COMPLETE oder TEC-EW-CLASSIC	DN (80- 300) DN (350- 450)	T400 – N1 – W – V2 – L50050 – O50 ^{3) 7)} T400 – N1 – W – V2 – L50050 – O75 ^{3) 7)}
Model 9	TEC-EW-COMPLETE	DN (80- 300) DN (350- 450)	T400 – H1 – W – V2 – L50050 – O50 ^{3) 7)} T400 – H1 – W – V2 – L50050 – O75 ^{3) 7)}
Model 10	TEC-EW-COMPLETE oder TEC-EW-CLASSIC	DN (80- 300) DN (350- 450)	T600 – N1 – W – V2 – L50050 – O50 ^{4) 7)} T600 – N1 – W – V2 – L50050 – O75 ^{4) 7)}
Model 11	TEC-EW-COMPLETE	DN (80- 300) DN (350- 450)	T600 – H1 – W – V2 – L50050 – O50 ^{4) 7)} T600 – H1 – W – V2 – L50050 – O75 ^{4) 7)}

¹⁾ Manufacturer product identification TEC-LS-A

²⁾ Wall thickness shaft 60 mm for L_A90 resp. 50 mm for L_A30/ without insulation/ annular gap min. 20 mm ⁷⁾

³⁾ Wall thickness shaft 50 mm for L_A90/ with 25 mm insulation/ annular gap min. 20 mm ⁷⁾

⁴⁾ Wall thickness shaft 60 mm for L_A90/ with 25 mm insulation/ annular gap min. 20 mm ⁷⁾

⁵⁾ TEC-EW-HIGH with **EPDM-gasket**

⁶⁾ TEC-EW-HIGH with **silicone-gasket**

⁷⁾ Free cross sectional area between inner flue pipe resp. insulation and inside duct, ventilated annular gap of min. 20 mm necessary

3. Intended use or uses of the construction product, in accordance with the applicable harmonized technical specification, as foreseen by the manufacturer:

Convey the products of combustion from heating appliances to the outside atmosphere

4. Name, registered trade name or registered trade mark and contact address of the manufacturer as required under Article 11(5):

TECNOVIS GmbH
Lessingstr. 20
DE-63110 Rodgau

5. Where applicable, name and contact address of the authorized representative whose mandate covers the tasks specified in Article 12(2):

not applicable

6. System or systems of assessment and verification of constancy of performance of the construction product as set out in CPR, Annex V:

System 2+ and System 4

7. In case of the declaration of performance concerning a construction product for which a European Technical Assessment has been issued:

Notified factory production control certification body no. 0036 performed the initial inspection of the manufacturing plant and of factory production control and the continuous surveillance, assessment and evaluation of factory production control and issued the certificate of conformity 0036 CPR 91323 033 of the factory production control.

8. Declared performance:



	ESSENTIAL CHARACTERISTICS	PERFORMANCE	HARMONIZED TECHNICAL SPECIFICATION																						
8.1	<p>Compressive strength</p> <p>Chimney sections, fittings and supports</p>	<p><u>Sections and fittings:</u></p> <p>Model 1 to 11 DN (80- 300): up to 27 m (metal chimney system)</p> <p>Model 1 to 11 DN (350- 450): up to 21 m (metal chimney system)</p> <p>Model 1 to 11 for all cross sections: up to 25 m (shaft)</p> <p>For further information see the installation instruction TEC-LS-A</p>	EN 1856-1:2009																						
8.2	Resistance to fire	<p><u>Resistance to fire from inside to outside:</u></p> <table border="0"> <tr> <td>Model 1 TEC-EW-HIGH</td> <td>DN (80- 450): T120 – 000 ¹⁾</td> </tr> <tr> <td>Model 2 TEC-EW-COMPLETE/ TEC-EW-CLASSIC</td> <td>DN (80- 450): T160 – 000 ¹⁾</td> </tr> <tr> <td>Model 3 TEC-EW-COMPLETE/ TEC-EW-HIGH</td> <td>DN (80- 450): T160 – 000 ¹⁾</td> </tr> <tr> <td>Model 4 TEC-EW-COMPLETE</td> <td>DN (80- 450): T160 – 000 ¹⁾</td> </tr> <tr> <td>Model 5 TEC-EW-COMPLETE/ TEC-EW-CLASSIC</td> <td>DN (80- 450): T200 – 000 ²⁾</td> </tr> <tr> <td>Model 6 TEC-EW-COMPLETE/ TEC-EW-HIGH</td> <td>DN (80- 450): T200 – 000 ²⁾</td> </tr> <tr> <td>Model 7 TEC-EW-COMPLETE</td> <td>DN (80- 450): T200 – 000 ²⁾</td> </tr> <tr> <td>Model 8 TEC-EW-COMPLETE/ TEC-EW-CLASSIC</td> <td>DN (80- 300): T400 – 050 ²⁾ DN (350- 450): T400 – 075 ²⁾</td> </tr> <tr> <td>Model 9 TEC-EW-COMPLETE</td> <td>DN (80- 300): T400 – 050 ²⁾ DN (350- 450): T400 – 075 ²⁾</td> </tr> <tr> <td>Model 10 TEC-EW-COMPLETE/ TEC-EW-CLASSIC</td> <td>DN (80- 300): T600 – 050 ³⁾ DN (350- 450): T600 – 075 ³⁾</td> </tr> <tr> <td>Model 11 TEC-EW-COMPLETE</td> <td>DN (80- 300): T600 – 050 ³⁾ DN (350- 450): T600 – 075 ³⁾</td> </tr> </table> <p>¹⁾ wall thickness shaft: 60mm for L_A90 resp. 50mm for L_A30/ no insulation</p> <p>²⁾ wall thickness shaft 50mm for L_A90/ insulation: min. 25mm</p> <p>³⁾ wall thickness shaft 60mm for L_A90/ insulation: min. 25mm</p> <p><u>Resistance to fire from outside to outside:</u></p> <p>Model 1 to 11: 90 minutes (L_A90) according to DIN V 18160-60:2014-02</p> <p><u>Distance to combustible material:</u></p> <p>Model 1 to 7: Between outside duct and combustible material is no distance necessary.</p> <p>Model 8 to 11: Between outside duct and combustible material is a distance from min. 50mm (from DN 350: min. 75mm) necessary. It can be realized ventilated or with mineral insulation 90-117kg/m³ all-over insulated. Stripes of the duct material can be used on the edges to create a clean finish that can be plastered afterwards.</p> <p><u>Ceiling duct:</u></p> <p>Model 1 to 7: Closed, no minimum distance at vertical installation</p> <p>Model 8 to 11: Closed and insulated or ventilated, minimum distance 50mm (from DN 350: min. 75mm) at vertical installation</p> <p>Tested without additional cladding around the mineral duct between ceilings.</p> <p><u>Annular gap:</u></p> <p>Model 1 to 11: Min. 20 mm ventilated annular gap in co-current flow to the exhaust gas is necessary between insulation shell and inner surface of the duct.</p>	Model 1 TEC-EW-HIGH	DN (80- 450): T120 – 000 ¹⁾	Model 2 TEC-EW-COMPLETE/ TEC-EW-CLASSIC	DN (80- 450): T160 – 000 ¹⁾	Model 3 TEC-EW-COMPLETE/ TEC-EW-HIGH	DN (80- 450): T160 – 000 ¹⁾	Model 4 TEC-EW-COMPLETE	DN (80- 450): T160 – 000 ¹⁾	Model 5 TEC-EW-COMPLETE/ TEC-EW-CLASSIC	DN (80- 450): T200 – 000 ²⁾	Model 6 TEC-EW-COMPLETE/ TEC-EW-HIGH	DN (80- 450): T200 – 000 ²⁾	Model 7 TEC-EW-COMPLETE	DN (80- 450): T200 – 000 ²⁾	Model 8 TEC-EW-COMPLETE/ TEC-EW-CLASSIC	DN (80- 300): T400 – 050 ²⁾ DN (350- 450): T400 – 075 ²⁾	Model 9 TEC-EW-COMPLETE	DN (80- 300): T400 – 050 ²⁾ DN (350- 450): T400 – 075 ²⁾	Model 10 TEC-EW-COMPLETE/ TEC-EW-CLASSIC	DN (80- 300): T600 – 050 ³⁾ DN (350- 450): T600 – 075 ³⁾	Model 11 TEC-EW-COMPLETE	DN (80- 300): T600 – 050 ³⁾ DN (350- 450): T600 – 075 ³⁾	EN 1856-1:2009
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8. Declared performance:



	ESSENTIAL CHARACTERISTICS	PERFORMANCE	HARMONIZED TECHNICAL SPECIFICATION																								
8.3	Gas tightness/ leakage	Model 1 TEC-EW-HIGH DN (80- 450): P1 Model 2 TEC-EW-COMPLETE/ TEC-EW-CLASSIC DN (80- 450): N1 Model 3 TEC-EW-COMPLETE/ TEC-EW-HIGH DN (80- 450): P1 Model 4 TEC-EW-COMPLETE DN (80- 450): H1 Model 5 TEC-EW-COMPLETE/ TEC-EW-CLASSIC DN (80- 450): N1 Model 6 TEC-EW-COMPLETE/ TEC-EW-HIGH DN (80- 450): P1 Model 7 TEC-EW-COMPLETE DN (80- 450): H1 Model 8 TEC-EW-COMPLETE/ TEC-EW-CLASSIC DN (80- 450): N1 Model 9 TEC-EW-COMPLETE DN (80- 450): H1 Model 10 TEC-EW-COMPLETE/ TEC-EW-CLASSIC DN (80- 450): N1 Model 11 TEC-EW-COMPLETE DN (80- 450): H1	EN 1856-1:2009																								
8.4	Flow resistance of chimney sections, fittings and terminals	According to EN 13384-1 <table border="1"> <thead> <tr> <th>component:</th> <th>ζ (Zeta-value) single resistance</th> </tr> </thead> <tbody> <tr> <td>pipe tee 87°:</td> <td>1.14</td> </tr> <tr> <td>pipe tee 45°:</td> <td>0.35</td> </tr> <tr> <td>pipe bend 87°:</td> <td>0.40</td> </tr> <tr> <td>pipe bend 45°:</td> <td>0.28</td> </tr> <tr> <td>pipe bend 30°:</td> <td>0.20</td> </tr> <tr> <td>pipe bend 15°:</td> <td>0.10</td> </tr> <tr> <td colspan="2">Terminals: (only for operation in negative pressure)</td> </tr> <tr> <td>rain cap:</td> <td>1.0</td> </tr> <tr> <td>fin cap type „Hubo“:</td> <td>≤ Ø 140 mm 0.1/ ≥ Ø 150 mm 0.2</td> </tr> <tr> <td>wind deflector:</td> <td>≤ Ø 140 mm 0.1/ ≥ Ø 150 mm 0.2</td> </tr> <tr> <td>hurrican:</td> <td>0.1</td> </tr> </tbody> </table>	component:	ζ (Zeta-value) single resistance	pipe tee 87°:	1.14	pipe tee 45°:	0.35	pipe bend 87°:	0.40	pipe bend 45°:	0.28	pipe bend 30°:	0.20	pipe bend 15°:	0.10	Terminals: (only for operation in negative pressure)		rain cap:	1.0	fin cap type „Hubo“:	≤ Ø 140 mm 0.1/ ≥ Ø 150 mm 0.2	wind deflector:	≤ Ø 140 mm 0.1/ ≥ Ø 150 mm 0.2	hurrican:	0.1	EN 1856-1:2009
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8.5	Thermal resistance	Model 1 to 4 DN (80- 450): 0.5 m²K/W calculated for 200°C * Model 5 to 9 DN (80- 450): 0.5 m²K/W calculated for 200°C * Model 10 to 11 DN (80- 450): 0.5 m²K/W calculated for 200°C * * Thermal resistance of the whole system (inner pipe, if applicable 25mm insulation and mineral outer pipe)	EN 1856-1:2009																								
8.6	Thermal shock resistance	Model 1 to 11 DN (80- 450): No ²⁾																									
8.7	Sootfire resistance	²⁾ Because designated O																									
8.7	Thermal performance under normal operating conditions	Model 1 TEC-EW-HIGH DN (80- 450): T120 Model 2 TEC-EW-COMPLETE/ TEC-EW-CLASSIC DN (80- 450): T160 Model 3 TEC-EW-COMPLETE/ TEC-EW-HIGH DN (80- 450): T160 Model 4 TEC-EW-COMPLETE DN (80- 450): T160 Model 5 TEC-EW-COMPLETE/ TEC-EW-CLASSIC DN (80- 450): T200 Model 6 TEC-EW-COMPLETE/ TEC-EW-HIGH DN (80- 450): T200 Model 7 TEC-EW-COMPLETE DN (80- 450): T200 Model 8 TEC-EW-COMPLETE/ TEC-EW-CLASSIC DN (80- 450): T400 Model 9 TEC-EW-COMPLETE DN (80- 450): T400 Model 10 TEC-EW-COMPLETE/ TEC-EW-CLASSIC DN (80- 450): T600 Model 11 TEC-EW-COMPLETE DN (80- 450): T600	EN 1856-1:2009																								
8.8	Flexural tensile strength (only for means of connection for chimney sections and fittings)	Model 1 to 11 DN (80- 450): n.p.d.	EN 1856-1:2009																								

8. Declared performance:

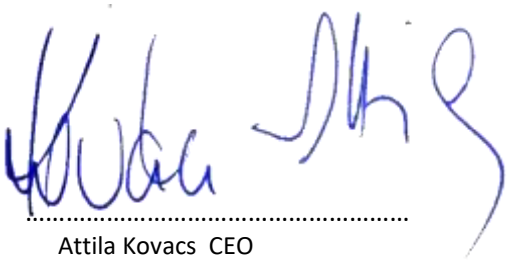


	ESSENTIAL CHARACTERISTICS	PERFORMANCE	HARMONIZED TECHNICAL SPECIFICATION
8.9	Non vertical installation	Model 1 to 11 DN (80- 450): Maximum offset between supports/ suspensions $\leq 1 \text{ m}$ at 90° The fixations have to be affixed to the joints of the outer shell. (All vertical and horizontal forces of the flue gas system have to be transfered into the building in a safe way)	EN 1856-1:2009
8.10	Components subject to wind load	Model 1 to 11 DN (80- 450): Free standing height 1.5 m above roof. Maximum spacing between lateral supports: 5 m (For the run inside the building with suspended ceiling) 3 m (For the installation in/ affixed to buildings with fixation to the wall)	EN 1856-1:2009
8.11	Durability: Water and vapour diffusion resistance	Model 1 to 11 DN (80- 450): Yes	EN 1856-1:2009
8.12	Condensate penetration resistance	Model 1 to 11 DN (80- 450): Yes	
8.13	Against corrosion	Model 1 to 11 DN (80- 450): V2	
8.14	Freeze thaw resistance	Model 1 to 11 DN (80- 450): Yes	

9. The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 8. This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.

Signed for and on behalf of the manufacturer by:

Rodgau, 24th August 2015



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Attila Kovacs CEO

“Chimneys – Requirements for metal chimneys - Part 1 System chimney products“ EN 1856-1:2009

Manufacturer’s identification:

TECNOVIS GmbH
Lessingstr. 20
DE-63110 Rodgau

Product trade name:

TEC-LS-A (metal chimney system with specified outer wall)

Certification office:

TÜV SÜD Industrie Service GmbH

Name and position of the responsible person:

Attila Kovacs CEO

Identification of accompanying documentation

0.1 TEC-EW-HIGH	Metal chimney	EN 1856-1	T120	P1	W	V2-L50050	000	80 - 450	Chimney system with metallic inner flue liner, system TEC-EW-HIGH (with EPDM gasket) and 60mm light construction duct (L ₉₀) resp. 50mm light construction duct (L ₃₀) as outer lining, composed of Calciumsilicat fire protection material. Annular gap between inner pipe and inside duct of minimum 20mm is necessary. Moisture resistant operation. Closed ceiling duct, no distance to combustible material necessary. Operation mode in positive pressure up to 200Pa.
0.2 TEC-EW-COMLETE/ TEC-EW-CLASSIC	Metal chimney	EN 1856-1	T160	N1	W	V2-L50050	000	80 - 450	Chimney system with metallic inner flue liner, system TEC-EW-COMLETE or TEC-EW-CLASSIC and 60mm light construction duct (L ₉₀) resp. 50mm light construction duct (L ₃₀) as outer lining, composed of Calciumsilicat fire protection material. Annular gap between inner pipe and inside duct of minimum 20mm is necessary. Moisture resistant operation. Closed ceiling duct, no distance to combustible material necessary. Operation mode in negative pressure.
0.3 TEC-EW-COMLETE/ TEC-EW-HIGH	Metal chimney	EN 1856-1	T160	P1	W	V2-L50050	000	80 - 450	Chimney system with metallic inner flue liner, system TEC-EW-COMLETE or TEC-EW-HIGH (with silicone gasket) and 60mm light construction duct (L ₉₀) resp. 50mm light construction duct (L ₃₀) as outer lining, composed of Calciumsilicat fire protection material. Annular gap between inner pipe and inside duct of minimum 20mm is necessary. Moisture resistant operation. Closed ceiling duct, no distance to combustible material necessary. Operation mode in positive pressure up to 200Pa.
0.4 TEC-EW-COMLETE	Metal chimney	EN 1856-1	T160	H1	W	V2-L50050	000	80 - 450	Chimney system with metallic inner flue liner, system TEC-EW-COMLETE and 60mm light construction duct (L ₉₀) resp. 50mm light construction duct (L ₃₀) as outer lining, composed of Calciumsilicat fire protection material. Annular gap between inner pipe and inside duct of minimum 20mm is necessary. Moisture resistant operation. Closed ceiling duct, no distance to combustible material necessary. Operation mode in positive pressure/ high pressure up to 5000Pa.
0.5 TEC-EW-COMLETE/ TEC-EW-CLASSIC	Metal chimney	EN 1856-1	T200	N1	W	V2-L50050	000	80 - 450	Chimney system with metallic inner flue liner, system TEC-EW-COMLETE or TEC-EW-CLASSIC with 25mm insulation and 50mm light construction duct (L ₉₀) as outer lining, composed of Calciumsilicat fire protection material. Annular gap between insulation and inside duct of minimum 20mm is necessary. Moisture resistant operation. Closed ceiling duct, no distance to combustible material necessary. Operation mode in negative pressure.
0.6 TEC-EW-COMLETE/ TEC-EW-HIGH	Metal chimney	EN 1856-1	T200	P1	W	V2-L50050	000	80 - 450	Chimney system with metallic inner flue liner, system TEC-EW-COMLETE or TEC-EW-HIGH (with silicone gasket) with 25mm insulation and 50mm light construction duct (L ₉₀) as outer lining, composed of Calciumsilicat fire protection material. Annular gap between insulation and inside duct of minimum 20mm is necessary. Moisture resistant operation. Closed ceiling duct, no distance to combustible material necessary. Operation mode in positive pressure up to 200Pa.
0.7 TEC-EW-COMLETE	Metal chimney	EN 1856-1	T200	H1	W	V2-L50050	000	80 - 450	Chimney system with metallic inner flue liner, system TEC-EW-COMLETE with 25mm insulation and 50mm light construction duct (L ₉₀) as outer lining, composed of Calciumsilicat fire protection material. Annular gap between insulation and inside duct of minimum 20mm is necessary. Moisture resistant operation. Closed ceiling duct, no distance to combustible material necessary. Operation mode in positive pressure/ high pressure up to 5000Pa.
0.8 TEC-EW-COMLETE/ TEC-EW-CLASSIC	Metal chimney	EN 1856-1	T400	N1	W	V2-L50050	050 075	80 - 300 350 - 450	Chimney system with metallic inner flue liner, system TEC-EW-COMLETE or TEC-EW-CLASSIC with 25mm insulation and 50mm light construction duct (L ₉₀) as outer lining, composed of Calciumsilicat fire protection material. Annular gap between insulation and inside duct of minimum 20mm is necessary. Moisture resistant operation. Distance between duct and combustible material of minimum 50mm, can be realized ventilated or with mineral insulation 90-117kg/m ³ all-over insulated. Closed and insulated or ventilated at the ceiling duct, minimum distance 50mm at vertical installation. Operation mode in negative pressure.
0.9 TEC-EW-COMLETE	Metal chimney	EN 1856-1	T400	H1	W	V2-L50050	050 075	80 - 300 350 - 450	Chimney system with metallic inner flue liner, system TEC-EW-COMLETE with 25mm insulation and 50mm light construction duct (L ₉₀) as outer lining, composed of Calciumsilicat fire protection material. Annular gap between insulation and inside duct of minimum 20mm is necessary. Moisture resistant operation. Distance between duct and combustible material of minimum 50mm, can be realized ventilated or with mineral insulation 90-117kg/m ³ all-over insulated. Closed and insulated or ventilated at ceiling duct, minimum distance 50mm at vertical installation. Operation mode in positive pressure/ high pressure up to 5000Pa.
0.10 TEC-EW-COMLETE/ TEC-EW-CLASSIC	Metal chimney	EN 1856-1	T600	N1	W	V2-L50050	050 075	80 - 300 350 - 450	Chimney system with metallic inner flue liner, system TEC-EW-COMLETE or TEC-EW-CLASSIC with 25mm insulation and 60mm light construction duct (L ₉₀) as outer lining, composed of Calciumsilicat fire protection material. Annular gap between insulation and inside duct of minimum 20mm is necessary. Moisture resistant operation. Distance between duct and combustible material of minimum 50mm, can be realized ventilated or with mineral insulation 90-117kg/m ³ all-over insulated. Closed and insulated or ventilated at ceiling duct, minimum distance 50mm at vertical installation. Operation mode in negative operation.
0.11 TEC-EW-COMLETE	Metal chimney	EN 1856-1	T600	H1	W	V2-L50050	050 075	80 - 300 350 - 450	Chimney system with metallic inner flue liner, system TEC-EW-COMLETE with 25mm insulation and 60mm light construction duct (L ₉₀) as outer lining, composed of Calciumsilicat fire protection material. Annular gap between insulation and inside duct of minimum 20mm is necessary. Moisture resistant operation. Distance between duct and combustible material of minimum 50mm, can be realized ventilated or with mineral insulation 90-117kg/m ³ all-over insulated. Closed and insulated or ventilated at ceiling duct, minimum distance 50mm at vertical installation. Operation mode in positive pressure/ high pressure up to 5000Pa.

Properties of a multi-wall metal chimney system

Product description	
Standard number	EN 1856-1
Temperature level	T120
Pressure level	P1
Condensate resistance (W: wet / D: dry)	N1
Corrosion resistance	H1
Flue liner material specification	V2-L50050
Sootfire resistance (G: yes / O: no) and distance to combustible material (in mm)	050 075
Nominal diameter (Ø) (inner tube) in mm	80 - 300 350 - 450

Compressive strength:

Inner pipe to DN 300: 27m / to DN 450: 21m
Shaft: to maximum 25m

Flow resistance:

Average roughness: 1.0 mm, Zeta-values according to EN 13384-1

Thermal resistance (WDW) in shaft:

Model 1 to 4: 0.5 m²K/W without insulation
Model 5 to 9: 0.5 m²K/W with 25mm insulation
Model 10 to 11: 0.5 m²K/W with 25mm insulation

Flexural strength:

Angular assembly: Maximum length between two supports:

1 m at 90° from the perpendicular. All vertical and horizontal forces of the flue gas system have to be transferred into the building in a safe way.

Maximum distance between vertical supports:

1 m (Fixations to the joints of duct elements) all vertical and horizontal forces of the flue gas system have to be transferred into the building in a safe way

Wind load: free standing end above last fixation: ≤ 1.5 m over the last support

Freeze-thaw resistance: Yes

Cleaning:

The chimney system is only allowed to be cleaned with cleaning devices made of plastic or rust-resistant stainless steel.