DÉCLARATION DE PERFORMANCE

N° VKING-01

1. Code d'identification unique du produit type
VIS CHARPENTE VKING
2. Usage(s) prévu(s)
Liaisons dans les structures en bois porteuses entre des supports à base de bois ou entre éléments bois et éléments en acier.
3. Fabricant
VISWOOD – France (42450) **Rue de la roseliere** **42450 – Sury Le Comtal** **France**
4. Système d'évaluation
Système 3
5.Document d'évaluation européen
Organisme d'évaluation : **Deutsches Institut für Bautechnik (DIBt)** **Kolonnenstraße 30b Berlin** **Allemagne** **Evaluation technique européenne : ETA-17/0609 du 28/08/2017 selon EAD 130118-00-0603**

** Les performances du produit identifié ci-dessus sont conformes aux performances déclarées. Conformément au règlement (UE) no 305/2011, la présente déclaration des performances est établie sous la seule responsabilité du fabricant mentionné ci-dessus.*

Signé pour le fabricant et en son nom par : SIRETAS Louis

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42450 Sury Le Comtal
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Le : 17/01/2023

DÉCLARATION DE PERFORMANCE

N° VKING-01

6. Performance déclaré		
Caractéristiques essentielles	**Performances**	**Spécification technique harmonisée**
Résistance mécanique de stabilité BWR 1 **Sécurité pendant l'utilisation BWR 4**		**ETA-17/0609** du 28/08/2017 selon EAD 130118-00-0603
Dimensions	Voir annexe 5 (Page 8 à 11)	
Moment caractéristique	Voir annexe 2 (Page 7)	
Force d'arrachement	Voir annexe 2 (Page 7)	
Force de traversée de la tête	Voir annexe 2 (Page 5/6)	
Résistance à la traction	Voir annexe 2 (Page 7)	
Limite d'élasticité	Voir annexe 2 (Page 4)	
Résistance à la torsion	Voir annexe 2 (Page 7)	
Espacement mini et distance mini au bord	Voir annexe 2 (Page 3)	
Module de glissement axial	Voir annexe 2 (Page 7)	
Protection incendie BWR 2		
Réaction au feu	Classe A1	

A.2.4 Spacing, end and edge distances of the screws and minimum thickness of the wood based material

Minimum thickness for structural members made from solid timber, glued laminated timber, glued solid timber, laminated veneer lumber and cross laminated timber is t = 30 mm for screws with d ≤ 8 mm, t = 40 mm for screws with d = 10 mm and t = 100 mm for screws with d = 12 mm.

A.2.4.1 Laterally and/or axially loaded screws

Screws in non pre-drilled holes

For VKING screws minimum spacing and distances are given in EN 1995-1-1: 2004+AC:2006+A1:2008+A2:2014, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes. Here, the outer thread diameter d shall be considered.

For Douglas fir members minimum spacing and distances parallel to the grain shall be increased by 50%.

Minimum distances from loaded or unloaded ends shall be at least 15·d for screws with outer thread diameter d ≥ 8 mm and timber thickness t < 5·d.

Minimum distances from the unloaded edge perpendicular to the grain may be reduced to 3·d also for timber thickness t < 5·d, if the spacing parallel to the grain and the end distance is at least 25·d.

A.2.4.2 Only axially loaded screws

For VKING screws the minimum spacings, end and edge distances are given in EN 1995-1-1:2004+AC:2006+A1:2008+A2:2014, clause 8.3.1.2 and Table 8.2 as for nails in non-predrilled holes and clause 8.7.2, Table 8.6.

A.2.5 Insertion moment

The ratio between the characteristic torsional strength $f_{tor,k}$ and the mean value of insertion moment $R_{tor,mean}$ fulfills the requirement for all screws.

A.2.6 Durability against corrosion

The screws and washers made from carbon steel may have the coatings according to Table A.2.3

Table A.2.3 Coatings of the VKING screws

Coating	**Mean thickness of the coating [µm]**
electrogalvanised	8

A.2.3.3 Compressive capacity of VKING-F screws

The design axial capacity $F_{ax,Rd}$ of VKING-F screws embedded in solid timber, glued solid timber or glued laminated timber made from softwood with an angle between screw axis and grain direction of 30° ≤ α ≤ 90° is the minimum of the axial resistance against pushing-in and the buckling resistance of the screw.

$$F_{ax,Rd} = \min \left\{ f_{ax,d} \cdot d \cdot \ell_{ef} ; \kappa_c \cdot N_{pl,d} \right\} \quad (2.5)$$

$f_{ax,d}$ design value of the axial withdrawal capacity of the threaded part of the screw [N/mm²]
d outer thread diameter of the screw [mm]
l_{ef} penetration length of the threaded part of the screw in the timber member [mm]

$$\kappa_c = 1 \quad \text{für } \bar{\lambda}_k \le 0{,}2 \quad (2.6)$$

$$\kappa_c = \frac{1}{k + \sqrt{k^2 - \bar{\lambda}_k^2}} \quad \text{für } \bar{\lambda}_k > 0{,}2 \quad (2.7)$$

$$k = 0{,}5 \cdot \left[1 + 0{,}49 \cdot \left(\bar{\lambda}_k - 0{,}2 \right) + \bar{\lambda}_k^2 \right] \quad (2.8)$$

and a relative slenderness ratio $\bar{\lambda}_k = \sqrt{\frac{N_{pl,k}}{N_{ki,k}}}$ (2.9)

where:

$N_{pl,k}$ characteristic plastic normal force related to the net cross-section of the inner thread diameter: $N_{pl,k} = \pi \cdot \frac{d_1^2}{4} \cdot f_{y,k}$ (2.10)

$f_{y,k}$ characteristic yield strength,
$f_{y,k}$ = 900 N/mm² for VKING-F screws with d = 12 mm and
$f_{y,k}$ = 1000 N/mm² for VKING-F screws with 6 mm ≤ d ≤ 10 mm

d_1 inner thread diameter of the screw [mm]

$$N_{pl,d} = \frac{N_{pl,k}}{\gamma_{M1}} \quad (2.11)$$

γ_{M1} partial factor according to EN 1993-1-1 in conjunction with the particular national annex

Characteristic ideal elastic buckling load:

$$N_{ki,k} = \sqrt{c_h \cdot E_S \cdot I_S} \quad [N] \quad (2.12)$$

Elastic foundation of the screw:

$$c_h = \left(0{,}19 + 0{,}012 \cdot d\right) \cdot \rho_k \cdot \left(\frac{90° + \alpha}{180°} \right) \quad [N/mm^2] \quad (2.13)$$

ρ_k characteristic density of the wood-based member [kg/m³],
α angle between screw axis and grain direction, 30° ≤ α ≤ 90°

Modulus of elasticity:

E_s = 210000 N/mm²

Second moment of area:

$$I_s = \frac{\pi \cdot d_1^4}{64} \quad [mm^4] \quad (2.14)$$

VKING screws	Annex 2
Compressive capacity	

A.2.3.2 Head pull-through capacity

The characteristic value of the head pull-through parameter for VKING screws for a characteristic density of 350 kg/m³ of the timber and for wood-based panels like

- Plywood according to EN 636 and EN 13986
- Oriented Strand Board, OSB according to EN 300 and EN 13986
- Particleboard according to EN 312 and EN 13986
- Fibreboards according to EN 622-2, EN 622-3 and EN 13986
- Cement-bonded particle boards according to EN 634-2 and EN 13986,
- Solid-wood panels according to EN 13353 and EN 13986

with a thickness of more than 20 mm is

$f_{head,k}$ = 9.4 N/mm² for screws with countersunk or wafer head.

For wood-based panels a maximum characteristic density of 380 kg/m³ and for LVL a maximum characteristic density of 500 kg/m³ shall be used in equation (8.40b) of EN 1995-1-1.

The head diameter shall be equal to or greater than 1.8 · d_s, where d_s is the smooth shank or the inner thread diameter. Otherwise the characteristic head pull-through capacity in equation (8.40b) of EN 1995-1-1 is for all wood-based materials: $F_{ax,\alpha,RK}$ = 0.

For wood based panels with a thickness 12 mm ≤ t ≤ 20 mm the characteristic value of the head pull-through parameter for the screws is:

$f_{head,k}$ = 8 N/mm²

For wood based panels with a thickness of less than 12 mm the characteristic head pull-through capacity for screws shall be based on a characteristic value of the head pull-through parameter of 8 N/mm², and limited to 400 N complying with the minimum thickness of the wood based panels of 1.2·d, with d as outer thread diameter and the values in Table A.2.2.

Table A.2.2 Minimum thickness of wood based panels

Wood based panel	**Minimum thickness [mm]**
Plywood	6
Fibreboards (hardboards and medium boards)	6
Oriented Strand Boards, OSB	8
Particleboards	8
Cement-bonded particle board	8
Solid wood Panels	12

For VKING-F and VKING-D screws with countersunk or wafer head the withdrawal capacity of the thread in the wood-based member with the screw head may be taken into account instead of the head pull-through capacity:

$$F_{ax,\alpha,Rk} = \max \begin{cases} f_{head,k} \cdot d_h^2 \cdot \left(\frac{\rho_k}{350}\right)^{0,8} \\ \frac{f_{ax,k} \cdot d \cdot l_{ef,k}}{1.2 \cdot \cos^2 \alpha + \sin^2 \alpha} \cdot \left(\frac{\rho_k}{350}\right)^{0,8} \end{cases} \quad (2.3)$$

For VKING-F and VKING-D screws with cylinder head the withdrawal capacity of the thread in the wood-based member with the screw head may be taken into account:

$$F_{ax,\alpha,Rk} = \frac{f_{ax,k} \cdot d \cdot l_{ef,k}}{1.2 \cdot \cos^2 \alpha + \sin^2 \alpha} \cdot \left(\frac{\rho_k}{350}\right)^{0,8} \quad (2.4)$$

where

$f_{head,k}$ characteristic value of the head pull-through capacity of the screw [N/mm²]

$f_{ax,k}$ characteristic value of the axial withdrawal capacity of the threaded part of the screw, $f_{ax,k}$ does not apply for wood-based panels [N/mm²],

d_h diameter of the screw head [mm],

ρ_k characteristic density of the wood-based member with the screw head [kg/m³],

$l_{ef,k}$ penetration length of the threaded part of the screw in the wood-based member with the screw head [mm], $l_{ef,k} \geq 4 \cdot d$

α angle α between screw axis and grain direction, $30° \leq \alpha \leq 90°$.

Outer diameter of washer $d_k > 32$ mm shall not be considered.

In steel-to-timber connections the head pull-through capacity is not governing.

VKING screws	Annex 2
Characteristic values of the load-carrying capacities	

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ANNEX 2 – Characteristic values of the load-carrying capacities

Table A.2.1 Characteristic load-carrying capacities of VKING screws

Outer thread diameter [mm]	**6.0**	**8.0**	**10.0**	**12.0**
Characteristic yield moment $M_{y,k}$ [Nm]	10.0	20.0	30.0	42.0
Characteristic tensile strength $f_{tens,k}$ [kN]	12.0	21.0	27.0	36.0
Characteristic torsional strength $f_{tor,k}$ [Nm]	10.0	24.0	39.0	58.0

A.2.1 General

The minimum penetration length of the threaded part of the screw in the wood-based members l_{ef} shall be

$$l_{ef} = \frac{4 \cdot d}{\sin \alpha} \qquad (2.1)$$

where

α angle between screw axis and grain direction

d outer thread diameter of the screw.

The outer thread diameter of screws inserted in cross-laminated timber shall be at least 6 mm. The inner thread diameter d_1 of the screws shall be greater than the maximal width of the gaps in the layer of cross laminated timber.

A.2.2 Laterally loaded screws

The outer thread diameter d shall be used as effective diameter of the screw according to EN 1995-1-1.
The embedding strength for the screws in wood-based members or in wood-based panels shall be taken from EN 1995-1-1 or from national provisions that apply at the installation site unless otherwise specified in the following.

A.2.3 Axially loaded screws

The axial slip modulus K_{ser} of the threaded part of a screw for the serviceability limit state shall be taken independent of angle α to the grain as:

$$K_{ser} = 780 \cdot d^{0,2} \cdot l_{ef}^{0,4} \quad [N/mm] \qquad (2.2)$$

Where

d outer thread diameter of the screw [mm]
l_{ef} penetration length of the of the threaded part of the screw in the wood-based member [mm].

A.2.3.1 Axial withdrawal capacity

The characteristic withdrawal parameter at an angle α = 90° to the grain based on a characteristic density of the wood-based member of 350 kg/m³ is

$f_{ax,k}$ = 11 N/mm² for screws with 6 mm ≤ d ≤ 8 mm and

$f_{ax,k}$ = 10 N/mm² for screws with d ≥ 10 mm.

For LVL a maximum characteristic density of 500 kg/m³ shall be used in equation (8.40a) of EN 1995-1-1.

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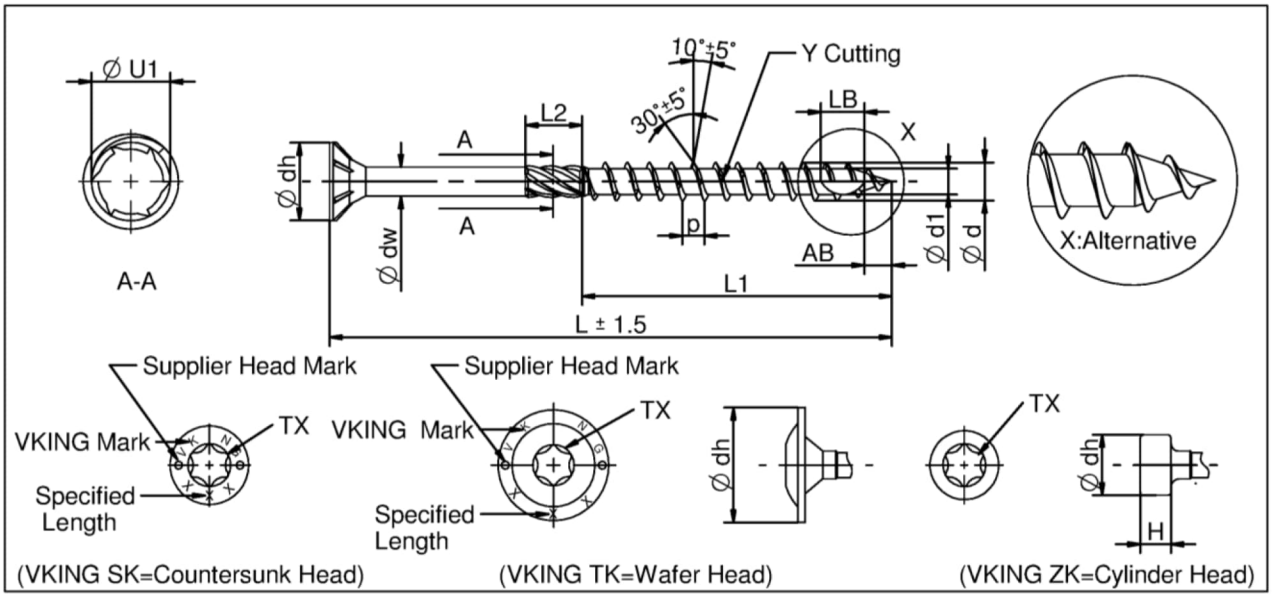


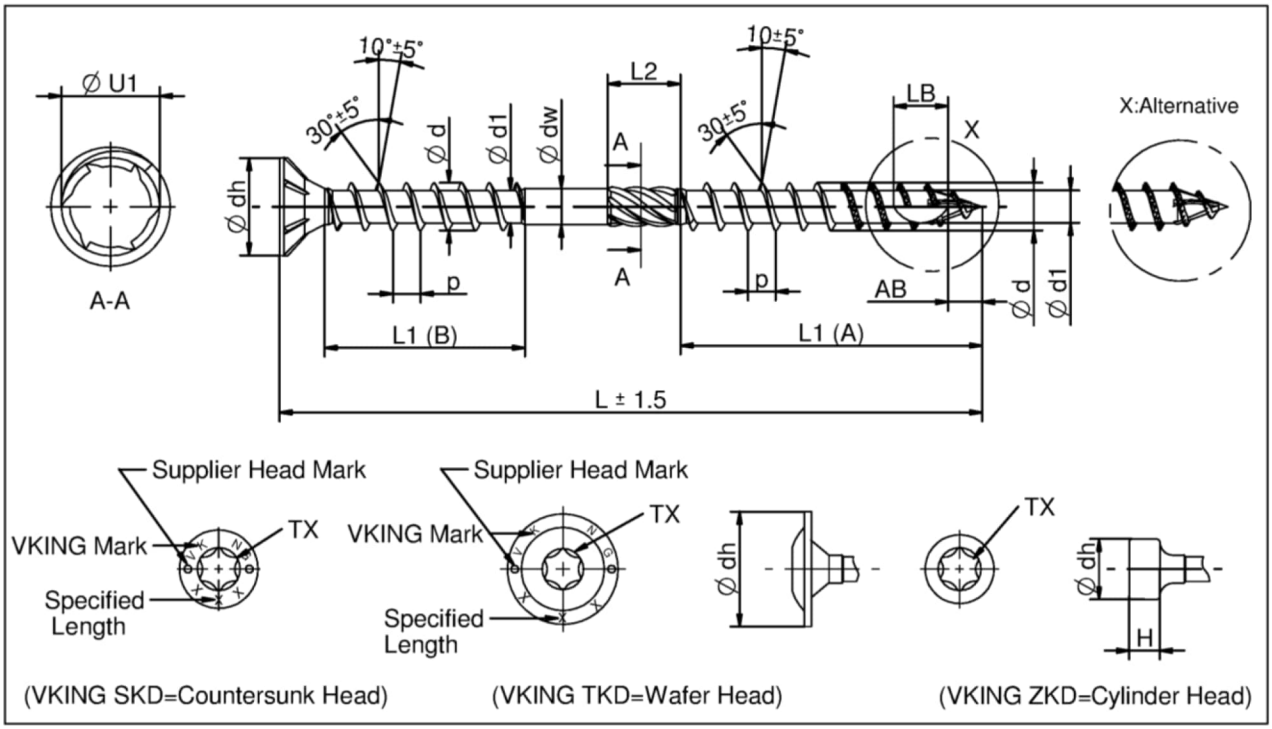
Nominal Diameter		∅ 6.0	∅ 8.0	∅ 10.0	∅ 12.0
∅dh (Countersunk Head)	Upper Tol. / Lower Tol.	12.0 +0 / - 1.0	15.0 +0 / - 1.0	18.5 +0 / - 1.0	21.5 +0 / - 1.0
∅dh (Wafer Head)	Upper Tol. / Lower Tol.	15.0 +1.0 / - 1.0	22.0 +1.0 / - 1.0	25.0 +1.0 / - 1.0	29.0 +1.0 / - 1.0
∅dh (Cylinder Head)	Upper Tol. / Lower Tol.	8.0 +0 / - 1.0	11.0 +0 / - 1.0	13.0 +0 / - 1.0	15.0 +0 / - 1.0
H (Cylinder Head)	Upper Tol. / Lower Tol.	5.0 +0.5 / - 0.5	6.0 +0.5 / - 0.5	7.0 +0.5 / - 0.5	8.0 +0.5 / - 0.5
∅dw	Upper Tol. / Lower Tol.	4.25 +0.05 / - 0.05	5.8 +0.05 / - 0.05	7.0 +0.05 / - 0.05	8.0 +0.05 / - 0.05
∅d	Upper Tol. / Lower Tol.	6.0 +0.2 / - 0.2	8.0 +0.2 / - 0.2	10.0 +0.3 / - 0.3	12.0 +0.3 / - 0.3
∅d1	Upper Tol. / Lower Tol.	4.0 +0.2 / - 0.2	5.2 +0.25 / - 0.25	6.2 +0.3 / - 0.3	7.0 +0.3 / - 0.3
∅U1	Upper Tol. / Lower Tol.	5.1 +0.3 / - 0.3	7.0 +0.3 / - 0.3	8.5 +0.3 / - 0.3	8.8 +0.3 / - 0.3
LB	Upper Tol. / Lower Tol.	17.0 +3.0 / - 3.0	18.0 +3.0 / - 3.0	19.0 +3.0 / - 3.0	20.0 +3.0 / - 3.0
AB	Upper Tol. / Lower Tol.	4.0 +2.0 / - 2.0	6.0 +2.0 / - 2.0	7.0 +2.0 / - 2.0	8.0 +2.0 / - 2.0
p ±10%		4.5	5.2	5.6	6.0
TX		T30	T40	T50	T50

L	∅ 6.0 L1	∅ 6.0 L2	∅ 8.0 L1	∅ 8.0 L2	∅ 10.0 L1	∅ 10.0 L2	∅ 12.0 L1	∅ 12.0 L2
40 mm	32±1.5		32±1.5					
50 mm	42±1.5		42±1.5					
60 ~ 70 mm	52±1.5		52±1.5					
80 ~ 120 mm	52±1.5	12±1.5	52±1.5	12±1.5	52±1.5	12±1.5		
130 ~ 200 mm	75±1.5	12±1.5	80±1.5	12±1.5	80±1.5	12±1.5	80±1.5	12±1.5
220 ~ 300 mm	75±1.5	12±1.5	100±1.5	12±1.5	100±1.5	12±1.5	100±1.5	12±1.5
320 ~ 400 mm			100±1.5	12±1.5	100±1.5	12±1.5	100±1.5	12±1.5
420 ~ 500 mm			100±1.5	12±1.5	100±1.5	12±1.5	120±1.5	12±1.5
520 ~ 600 mm			100±1.5	12±1.5	100±1.5	12±1.5	120±1.5	12±1.5

VKING screws

VKING screw

Annex 5



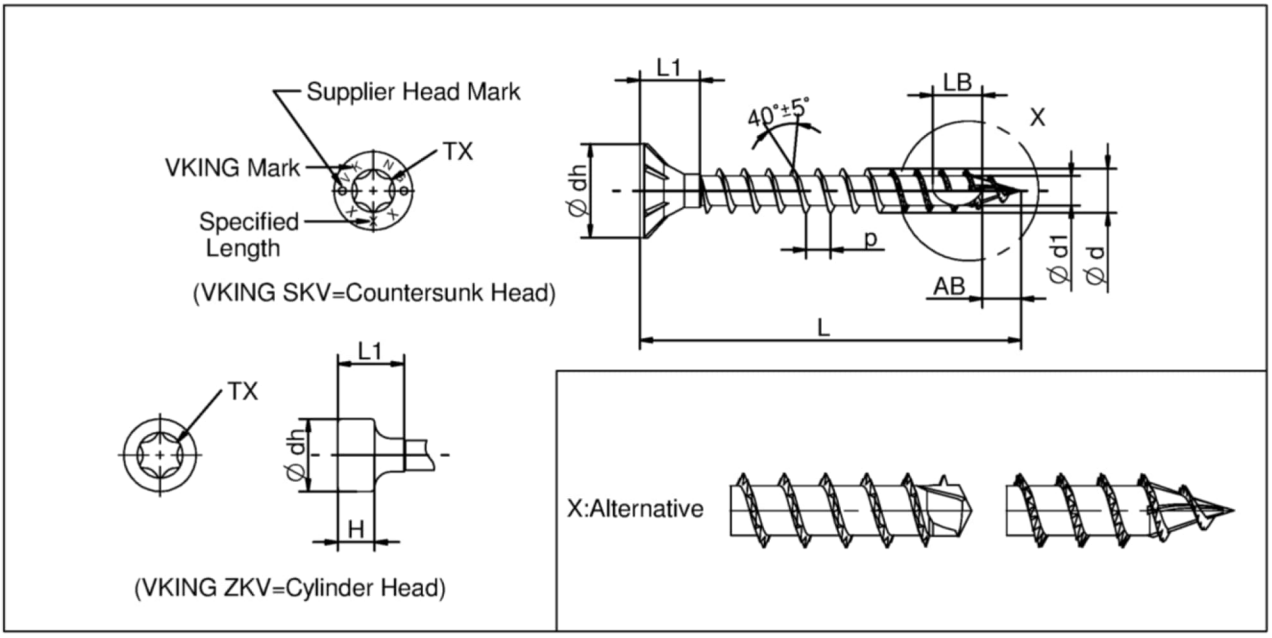
Nominal Diameter		∅ 6.0		∅ 8.0		∅ 10.0	
∅dh (Countersunk Head)	Upper Tol. / Lower Tol.	12.0	+0 / - 1.0	15.0	+0 / - 1.0	18.5	+0 / - 1.0
∅dh (Wafer Head)	Upper Tol. / Lower Tol.	15.0	+1.0 / - 1.0	22.0	+1.0 / - 1.0	25.0	+1.0 / - 1.0
∅dh (Cylinder Head)	Upper Tol. / Lower Tol.	8.0	+0 / - 1.0	11.0	+0 / - 1.0	13.0	+0 / - 1.0
H (Cylinder Head)	Upper Tol. / Lower Tol.	5.0	+0.5 / - 0.5	6.0	+0.5 / - 0.5	7.0	+0.5 / - 0.5
∅dw	Upper Tol. / Lower Tol.	4.25	+0.05 / - 0.05	5.8	+0.05 / - 0.05	7.0	+0.05 / - 0.05
∅d	Upper Tol. / Lower Tol.	6.0	+0.2 / - 0.2	8.0	+0.2 / - 0.2	10.0	+0.3 / - 0.3
∅d1	Upper Tol. / Lower Tol.	4.0	+0.2 / - 0.2	5.2	+0.25 / - 0.25	6.2	+0.3 / - 0.3
∅U1	Upper Tol. / Lower Tol.	5.1	+0.3 / - 0.3	7.0	+0.3 / - 0.3	8.5	+0.3 / - 0.3
LB	Upper Tol. / Lower Tol.	17.0	+3.0 / - 3.0	18.0	+3.0 / - 3.0	19.0	+3.0 / - 3.0
AB	Upper Tol. / Lower Tol.	4.0	+0.2 / - 0.2	6.0	+0.2 / - 0.2	7.0	+0.2 / - 0.2
p ± 10%		4.5		5.2		5.6	
TX		T30		T40		T50	

L	L1 (A)	L1 (B)	L2	L1 (A)	L1 (B)	L2	L1 (A)	L1 (B)	L2
165 ~ 200 mm	75 ± 1.5	60 ± 1.5	12 ± 1.5	80 ± 1.5	60 ± 1.5	12 ± 1.5	80 ± 1.5	60 ± 1.5	12 ± 1.5
201 ~ 300 mm	75 ± 1.5	60 ± 1.5	12 ± 1.5	100 ± 1.5	60 ± 1.5	12 ± 1.5	100 ± 1.5	60 ± 1.5	12 ± 1.5
301 ~ 400 mm				100 ± 1.5	60 ± 1.5	12 ± 1.5	100 ± 1.5	60 ± 1.5	12 ± 1.5
401 ~ 500 mm				100 ± 1.5	60 ± 1.5	12 ± 1.5	100 ± 1.5	60 ± 1.5	12 ± 1.5
501 ~ 600 mm							100 ± 1.5	60 ± 1.5	12 ± 1.5

VKING screws

VKING-D screw

Annex 5

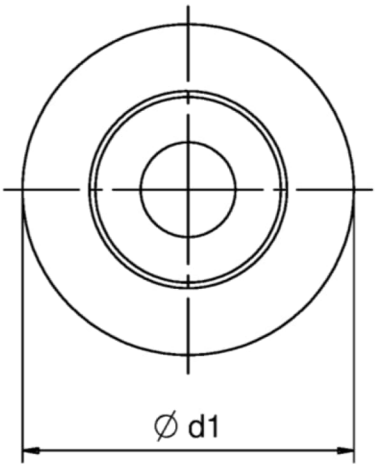


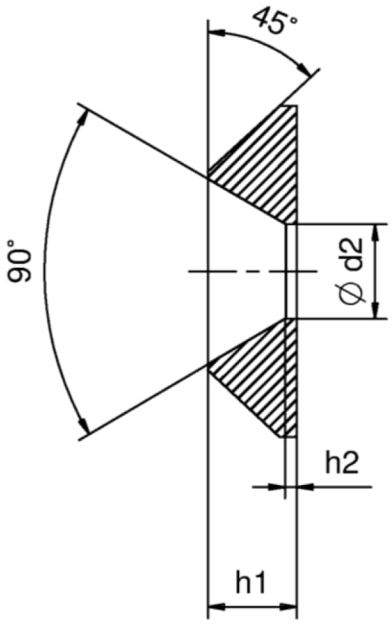
Nominal Diameter		∅ 6.0	∅ 8.0	∅ 10.0	∅ 12.0
∅dh (Countersunk Head)	Upper Tol. / Lower Tol.	**12.0** +0 / - 1.0	**15.0** +0 / - 1.0	**18.5** +0 / - 1.0	**21.5** +0 / - 1.0
∅dh (Cylinder Head)	Upper Tol. / Lower Tol.	**8.0** +0 / - 1.0	**11.0** +0 / - 1.0	**13.0** +0 / - 1.0	**15.0** +0 / - 1.0
H (Cylinder Head)	Upper Tol. / Lower Tol.	**5.0** +0.5 / - 0.5	**6.0** +0.5 / - 0.5	**7.0** +0.5 / - 0.5	**8.0** +0.5 / - 0.5
∅d	Upper Tol. / Lower Tol.	**6.0** +0.2 / - 0.2	**8.0** +0.2 / - 0.2	**10.0** +0.3 / - 0.3	**12.0** +0.3 / - 0.3
∅d1	Upper Tol. / Lower Tol.	**4.0** +0.2 / - 0.2	**5.2** +0.25 / - 0.25	**6.2** +0.3 / - 0.3	**7.0** +0.3 / - 0.3
LB	Upper Tol. / Lower Tol.	**17.0** +3.0 / - 3.0	**18.0** +3.0 / - 3.0	**19.0** +3.0 / - 3.0	**20.0** +3.0 / - 3.0
AB	Upper Tol. / Lower Tol.	**4.0** +2.0 / - 2.0	**6.0** +2.0 / - 2.0	**7.0** +2.0 / - 2.0	**8.0** +2.0 / - 2.0
p ±10%		3.8	4.8	5.6	6.0
TX		T30	T40	T50	T50
L		L1	L1	L1	L1
100 ~ 200 mm		max. 12mm	max. 19mm	max. 20mm	max. 20.5mm
210 ~ 300 mm		max. 12mm	max. 19mm	max. 20mm	max. 20.5mm
310 ~ 400 mm			max. 19mm	max. 20mm	max. 20.5mm
410 ~ 500 mm			max. 19mm	max. 20mm	max. 20.5mm
510 ~ 600 mm				max. 20mm	max. 20.5mm
610 ~ 800 mm					max. 20.5mm
810 ~ 1000 mm					max. 20.5mm

VKING screws

VIKING-F screws

Annex 5





SIZE	M 6	M 8	M 10	M 12
∅ d1	19.50 ± 0.30	24.50 ± 0.30	30.00 ± 0.30	37.50 ± 0.30
∅ d2	7.50 ± 0.30	8.50 ± 0.30	10.80 ± 0.30	14.00 ± 0.30
h1	4.60 ± 0.30	5.40 ± 0.30	6.40 ± 0.30	8.50 ± 0.30
h2	1.50 ± 0.10	2.50 ± 0.10	2.70 ± 0.10	3.50 ± 0.10

VKING screws

VIKING Washer

Annex 5