FAQ - The new fastener mask in SandStat.

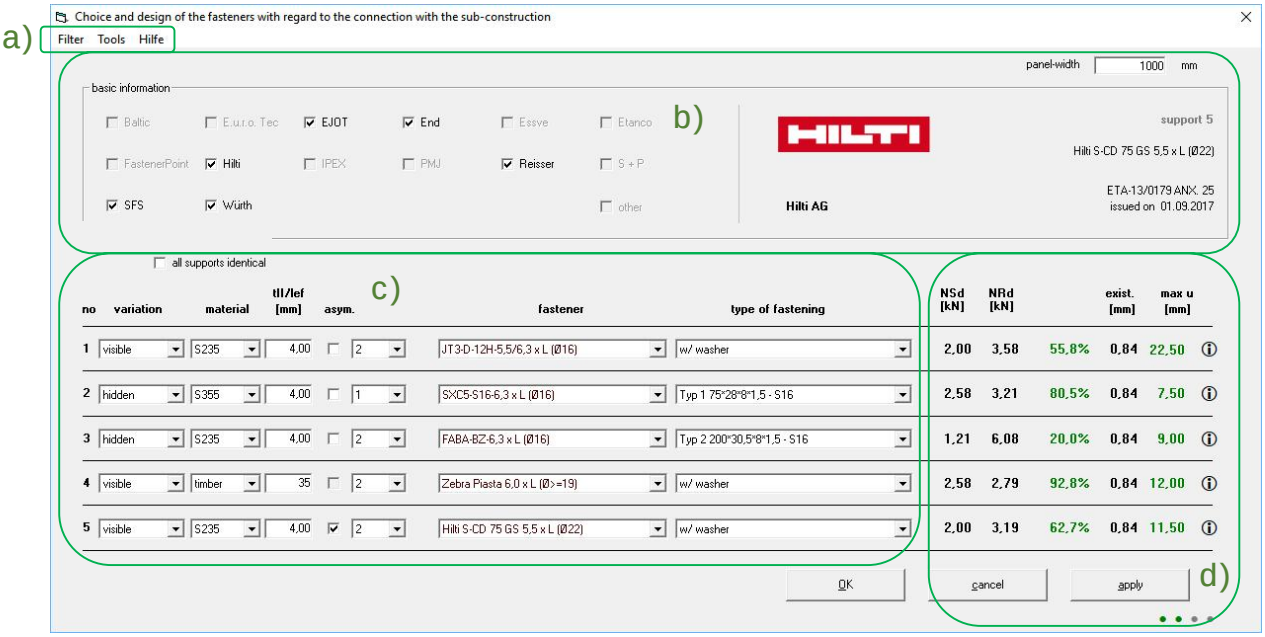
As of May 2018, SandStat delivered the new fastener mask, which was optically modified again in June 2019 and supplemented by the view of shear force. Below is a brief overview of the new mask and important topics.

The shear force analysis is not included in the basic version and must be purchased as an additional feature.

Furthermore, this mask is only available for elements according to the calculation method "General Technical Approval with DIN EN 14509, Appendix E" or according to "EN 14509".

The calculation principle according to the old approval "General Technical Approval, Annex A", which is not valid since at least the end of 2015, will no longer be developed in this area.

Overview of the new mask



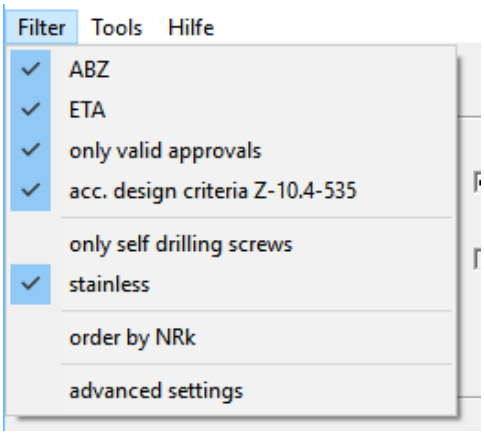
(arbitrary example without rating of the individual fasteners)

The screen is divided into the following sections:

a) Menu bar: Specification of filters in relation to the calculation basis of the fastener
b) Selection of the desired fastener manufacturer/s
c) Information on the specific support formation and the connection
d) Results for the resistance of the selected fastener

a) Calculation basis of the fastener

In the menu item "Filter" the calculation bases of the fastener can be defined:



ABZ	All fasteners with a Technical Approval of DIBt are displayed
ETA	All fasteners according to an European Technical Approval or according to an European Technical Assesment) are displayed
only valid approvals	only fasteners with a valid approval are displayed. Please deactivate this option for the recalculation of old static calculations with expired screw approvals
acc. Design crieteria	…with indication of the corresponding sandwich approval. Some sandwich approvals and evaluations (usually in Appendix 2.x) define restrictions with regard to the use of fasteners. This restriction is taken into account when the check mark is activated.
only self drilling screws	only self drilling screws are displayed
stainless	only fasteners made of stainless material are displayed
order by NRk	The selection list of fasteners is sorted by the resistance value N_{Rk} of the fastener
panel-width	Specification of the element width in mm
advanced settings	Further settings can be defined for the selection of fasteners for concealed fastening. Please refer to page 10 of this document.

b) Selection of the desired manufacturer

In this section you can preselect the manufacturer(s) of fastener(s).

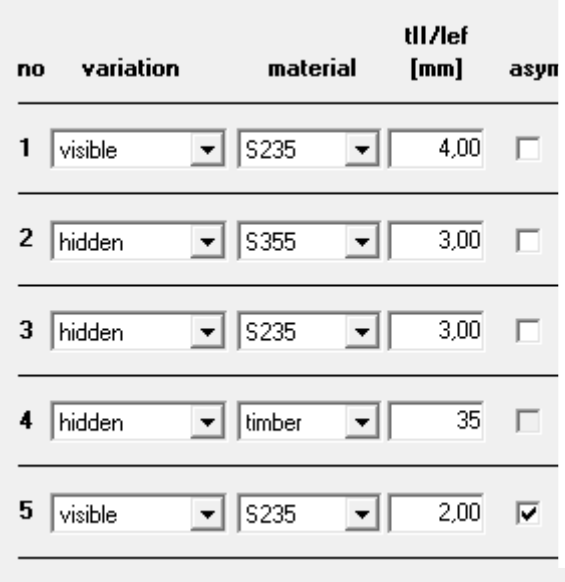
The designation corresponds to the designation in the approval/ETA.

The corresponding manufacturer information is displayed to the right of the selection.

If there are no suitable fasteners in the database from the manufacturer (e.g. due to the top layer quality of the sandwich element or the sandwich thickness), the manufacturer is highlighted in grey and cannot be selected.

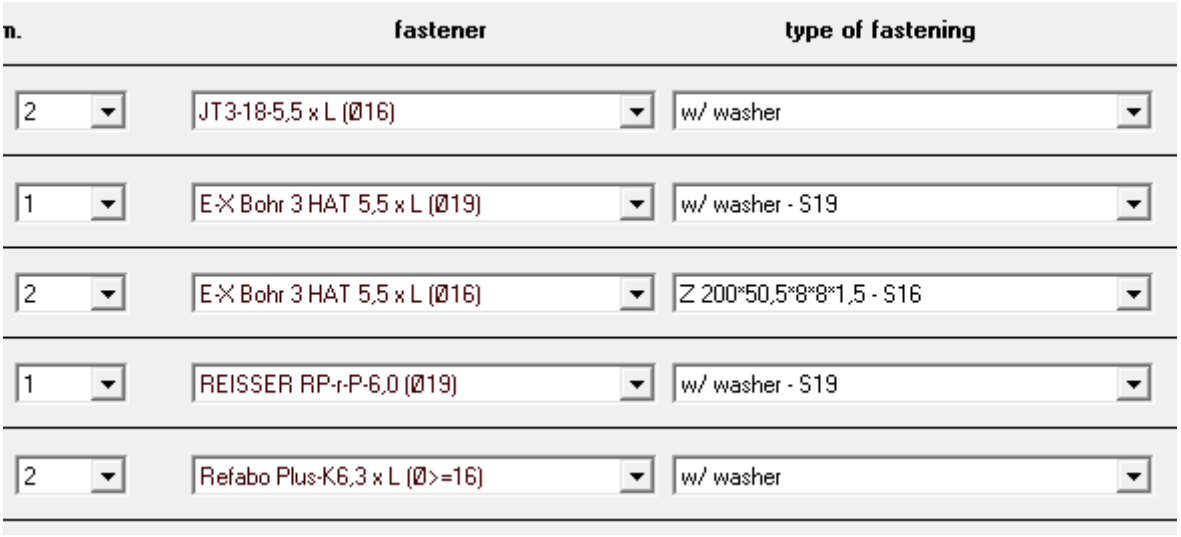
To the right of the selection, the corresponding manufacturer information including its logo is displayed. When a fastener is selected, the corresponding manufacturer logo is displayed.

c) Information on support formation



For each support of the system, starting with support no.1 at the left or bottom of the panel.

variation	Selection of the "visible" variant for visible fastening or "hidden" for hidden/invisible fixings. The option "hidden" is only available if this usage is regulated in the approval for the selected sandwich element.
material	Material of the substructure
tII/leff	Thickness of the substructure (for steel substructure) or screw-in depth (for timber substructure)
asym.	the substructure (component II) is asymmetrical (Z- or C-profiles). For a component thickness t_{II} < 5 mm the characteristic value $N_{R,k}$ is reduced to 70 % if this option is activated.



(Arbitrary example without rating of the individual fasteners)

column without heading	number of fasteners
fastener	the selected fastener with the designation of the approval
type of fastening	depending on the selected fastener or the selected type of hidden fixings, further options are available here e.g. with regard to the washer, the load distribution plate etc.

d) Results

NSd [kN]	NRd [kN]		exist. [mm]	max u [mm]	
2,24	3,61	62,0%	0,84	22,50	ⓘ
2,82	3,01	93,9%	0,84	12,00	ⓘ
1,37	6,02	22,9%	0,84	12,00	ⓘ
2,82	3,32	85,0%	0,84	12,00	ⓘ
2,24	2,21	101,2%	0,84	23,00	ⓘ

N_{Sd}	Design value of the tensile force for the decisive load combination in kN
N_{Rd}	Design value of the tensile strength of the selected fastener in kN
coloumn without heading	utilization factor for tensile strength
exist u	Existing screw head deflection in mm
max u	maximum allowable screw head deflection in mm

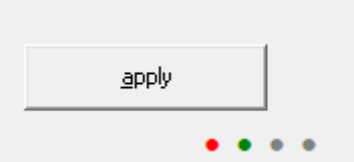
If no proof has been provided, this is marked in red by a colour coding of the utilization.

In the case of hidden fixings, the place of failure is indicated by an index:

Example:

3,52 3,01 II 117,1%	II	failure of fastener (pull out of the substructure, buttoning over or failure of the fastener)
3,52 2,60 V 135,4%	V	failure of hidden fixing (pull over)

Furthermore, the ratios are summarized in the lower right corner of the mask with 4 coloured spots:



Spot 1 – proof of tensile force
Spot 2 – screw head deflection
Spot 3 – Shear force analysis (in process)
Spot 4 – tensile force-transverse force interaction (in process)

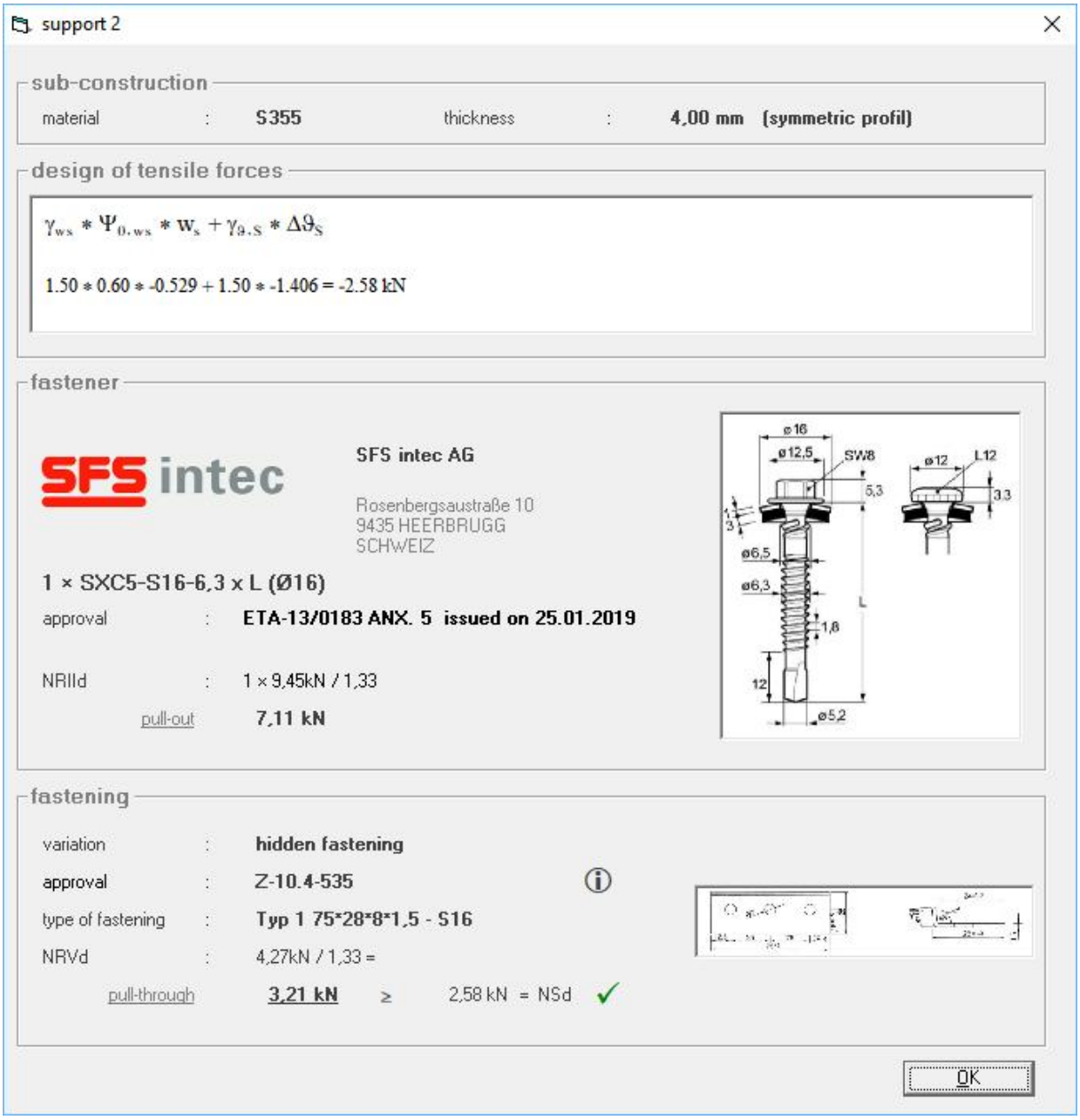
Colour	utilization	
green	< 100 %	fulfilled
orange	< 103 %	still okay (in the responsibility of the user)
red	> 103 %	not fulfilled
grey	not yet implemented	

This allows you to see at a glance - especially with a large number of supports - whether the selection is sufficiently load-bearing.

Informations

By clicking the info ⓘ button, the basics of the design for this support are displayed.

Example on the support with hidden fixing:



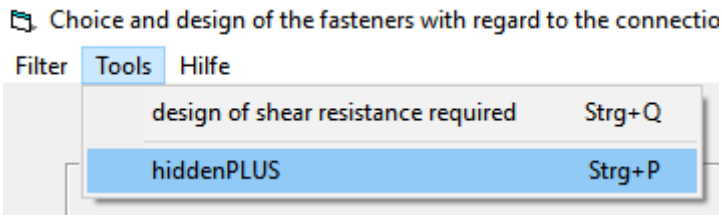
The sketches of the selected fasteners and load distribution plate are displayed partly. If the sketches are poorly displayed due to the resolution, you can click on the corresponding sketch with the mouse and the sketch will be enlarged.

By selecting the additional info ⓘ button - if available - the corresponding installation page of the approval is displayed as a pdf file. An appropriate pdf program is required to display this file.

Hints for hidden fixing

verdecktPLUS

The option "verdecktPLUS" can be selected for hidden fixing.



Please activate this option if you have an exceeding at the hidden fixing. Then the system determines how many additional fasteners are required directly (i.e. visibly). Both the output mask and the printout will then contain, for example, "1+2" - i.e. a fastener at hidden fixing and two additional visible fasteners.

The same fasteners are used both for the hidden fixing and for the visible fixing. Please note that, depending on the design conditions (e.g. required length), these can still have different order details.

Example without activation of „verdecktPLUS“:

Example with activation of „verdecktPLUS“:

Hidden fixings limitations

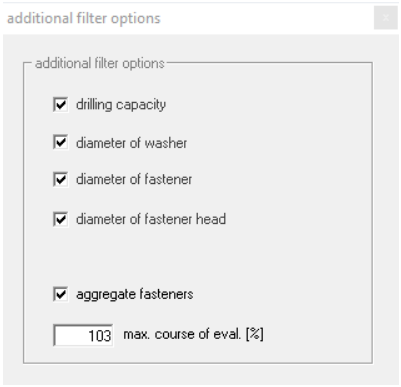
The specifications for hidden fixing are defined in the corresponding sandwich approval. For each approval, the specifications for the fasteners are also mentioned.

These can include the following specifications:

	Example:	german word at mask "Schraubenfilter"
washer	- without washer - with washer Ø 16 - with washer >= 19 mm	Scheibendurchmesser
fastener diameter	- without specification - fastener diameter = 6,3 mm - fastener diameter >= 5,5 mm	Schraubendurchmesser
screw head diameter		Schraubenkopfdurchmesser

These controls were not included in the old version of the fastener mask. Therefore, the new version may no longer display certain fasteners that were previously displayed to you.

If you want a specific fastener that is not displayed in the selection mask not anymore, please choose the option "advanced settings" at menue"Filter". Now you can deactivate the corresponding restriction in the mask that is then displayed:



Please pay attention to the correct hidden fixing and check whether this deviation is feasible and also formally correct.

A corresponding note is then printed in the printout:

Without considering the diameter of the washer.

Without considering the diameter of the fastener.

Without considering the diameter of the fastener head.

Shear force resistance and combined loading by tension and shear force

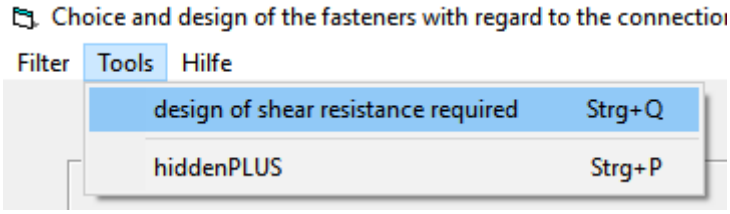
Depending on the static system, the shear load carrying capacity of the screw as well as the combined loading by tension and shear must also be taken into account.

This additional shear force for the fastener is determined from:

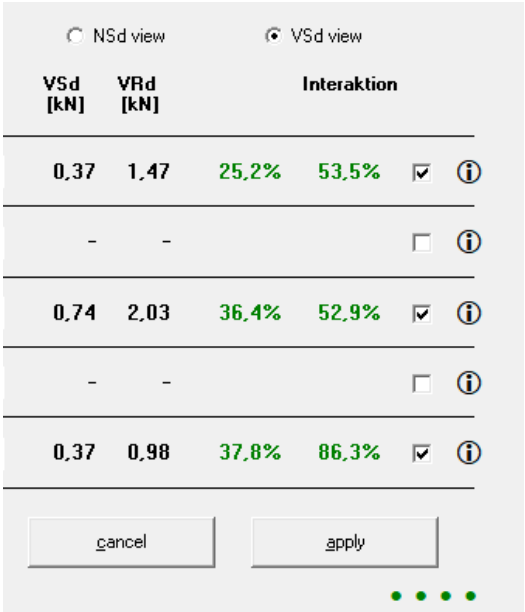
- Wall component: dead weight of the wall component; perpendicular to the wall surface
- Roof component: dead weight of the wall component and snow loads; converted as a function of the roof pitch parallel to the roof surface.

The shear forces are distributed according to load absorption surfaces for vertically clamped components and according to the static shear force system for horizontally clamped components.

To do this, select the option "Shear force check required" under "Extras":



The results for the shear forces and the interaction of tension and shear force are also displayed in the results area of the mask:



The check marks on the right side can be used to define which supports are used to derive the shear forces.

The checks are carried out according to the specifications of the corresponding approval / ETA.

The three checks tensile force, shear force and combined tension force and shear force interaction are carried out separately. In each case, the decisive load combination is determined.

By selecting the Info button, the overview screen for this support is displayed, in which the authoritative checks are listed.