

# Passiv brannbeskyttelse for bygningsskonstruksjoner





# Vi utgjør forskjellen

Skamol Group utvikler, produserer og distribuerer isolasjonsmaterialer til bygninger for et bredt spekter av varmeintensive industriktorer, samt for passiv brannbeskyttelse, peiskabinetter og for forebygging av mugg.

Med produktene og løsningene våre ønsker vi å hjelpe samarbeidspartnere og kunder med å skape merverdi og samtidig gjøre vårt for miljøet. Med bruk av våre unike materialer kan vi dra nytte av mange fordeler, inkludert energibesparelser, bedre ytelse, bedre arbeids- og boforhold og enda lavere CO2-utslipp.

Skamol ble grunnlagt i Danmark i 1912 med det formål å bruke de lokale forekomstene av den unike diatoméjorden, også kjent som kiselgur.

Siden den gang har selskapet vokst til å bli en ledende global leverandør av tekniske isolasjonssystemer for både industriell og privat bruk. Foruten bruk av kiselgur (diatomitt), har vi utvidet vårt produktsortiment til å omfatte vermikulitt og kalsiumsilikat.

## **Ledende i utviklingen av tekniske isolasjonssystemer**

Vi er et moderne selskap og blant de ledende i verden innenfor forskning og systemutvikling samt nye teknikker og teknologier. Fabrikkene våre i Danmark, Polen og Russland holdes toppmoderne for å sikre kontinuerlig høy systemkvalitet; en egenskap som ofte viser seg å være avgjørende for kundene våre.

Vi tror på verdiene tett samarbeid og dialog. Akkurat som vi utvikler nye produkter med nye egenskaper, forbedrer og modifiserer vi eksisterende systemer. Ved å gjøre det legger vi spesielt vekt på kundenes forespørsler og markedskravene generelt.



## Innhold

Brannbeskyttelse for stålkonstruksjoner. . . . .	4	30minutters brannmotstand: Lukkede profiler . . . . .	17
Bruksområder. . . . .	5	60minutters brannmotstand: Lukkede profiler . . . . .	18
Bygningsstål . . . . .	6	90minutters brannmotstand: Lukkede profiler . . . . .	19
Tykkelsen til SkamoStructure Board 250 . . . . .	6	120minutters brannmotstand: Lukkede profiler . . . . .	20
SkamoStructure Board 250 størrelser . . . . .	7	180minutters brannmotstand: Lukkede profiler . . . . .	21
Montering . . . . .	7	30minutters brannmotstand: Åpne profiler . . . . .	22
3-sidede firkantede paneler . . . . .	8	60minutters brannmotstand: Åpne profiler . . . . .	23
4-sidede firkantede paneler . . . . .	9	90minutters brannmotstand: Åpne profiler . . . . .	24
3-sidede firkantede paneler . . . . .	10	120minutters brannmotstand: Åpne profiler . . . . .	25
4-sidede firkantede paneler . . . . .	11	180minutters brannmotstand: Åpne profiler . . . . .	26
4-sidede firkantede paneler . . . . .	12	SkamoStructure Board 250 beskyttede stålbjelker montert under trapestak. . . . .	27
Datablad: SkamoStructure Board 250 . . . . .	13	30minutters brannmotstand: Stålbjelker montert under trapestak . . . . .	28
Søk etter riktig SkamoStructure Board 250-tykkelse . . . . .	14	60minutters brannmotstand: Stålbjelker montert under trapestak . . . . .	29
Eksempler på beregning av paneler. . . . .	15	90minutters brannmotstand: Stålbjelker montert under trapestak . . . . .	30
Am/V-forhold. . . . .	16	120minutters brannmotstand: Stålbjelker montert under trapestak . . . . .	31
		180minutters brannmotstand: Stålbjelker montert under trapestak . . . . .	32
		Våre fabrikker . . . . .	33



# Brannbeskyttelse for stålkonstruksjoner

## Det seriøse alternativet til konvensjonelle løsninger for passiv brannbeskyttelse av stålkonstruksjoner

Skamol gir nå markedet et seriøst alternativ til konvensjonelle løsninger for passiv brannbeskyttelse av stålkonstruksjoner.

I årevis var de unike løsningene på markedet «sementerte brannvernplater» eller brannbestandige gipsplater for disse bruksområdene, og SkamoStructure er et reelt alternativ.

SkamoStructure Board 250 består av kalsiumsilikat og gir vesentlige fordeler sammenlignet med konvensjonelle løsninger.

## Vår fordel: Den enkleste håndteringen

Spesielt én faktor gjør at SkamoStructure skiller seg ut: Platene våre er ekstremt lette. Dette betyr at materialet er veldig enkelt å håndtere. Å feste det er heller ikke noe problem – se side 7 for alle metodene som kan brukes for å feste SkamoStructure akkurat der du ønsker.



DANMARK  
11/0469

Beskyttelsen av bærende konstruksjonselementer mot brann er en avgjørende faktor for å oppfylle byggeforskriftene for brannvern, og dermed sikre bygningens strukturstabilitet ved brann. Vårt lette konstruksjonssystem

SkamoStructure er den perfekte løsningen for å beskytte stålkonstruksjoner. Uansett om det gjelder åpne profiler, lukkede profiler eller søyler: SkamoStructure er ETA-sertifisert og beskytter byggstrukturen på en pålitelig måte.

Sementerte  
brannvernplater.



## SkamoStructure Board 250

Vektreduksjon på rundt 45 % sammenlignet med andre produkter på markedet.



### Lett

SkamoStructure Board 250 veier bare 250kg/m<sup>3</sup>.



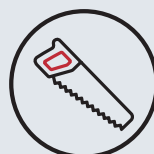
### Rask montering

SkamoStructure er raskt og enkelt å montere.



### Brannvern

SkamoStructure er et klasse A1 byggemateriale.



### Lett å håndtere

SkamoStructure kan håndteres uten spesialverktøy.

# Bruksområder



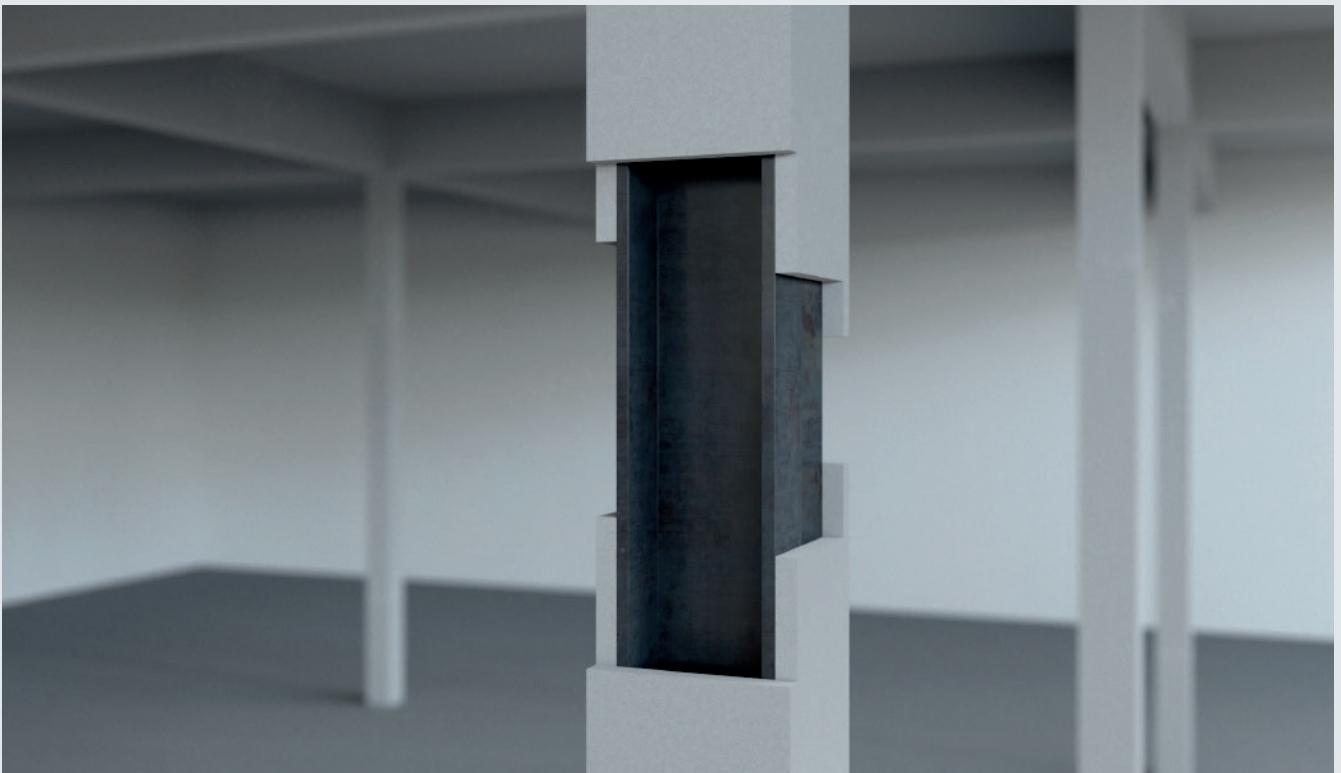
Bjelke med åpen profil.



Bjelke med lukket profil.

## **Allsidig og helt trygt – viktige argumenter som taler for SkamoStructure**

SkamoStructure kan brukes til å beskytte alle relevante deler av byggstrukturen: Både søyler, bjelker og støtter kan kles inn, enten som åpne eller lukkede profiler.



Søyle med åpen profil.

# Bygningsstål

Byggeforskriftene bestemmer hvor lenge konstruksjonselementer må kunne tåle brann. Nødvendig strukturell brannvern avhenger av de følgende faktorene:

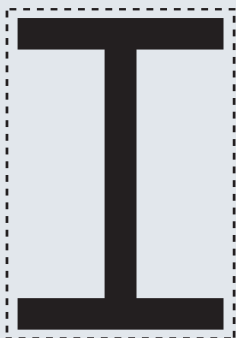
- Fastsatt brannmotstandstid
- Stålelementets fasong og størrelse
- Andel av stålprofil eksponert til brann
- Type brannvern som brukes

SkamoStructure-systemet er testet i godkjente laboratorier etter prosedyren for å bestemme brannmotstand for bærende konstruksjoner (EN 13381-4).

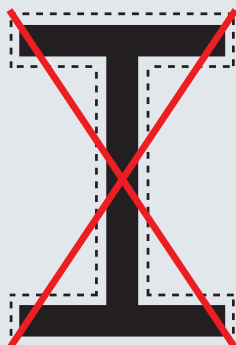
Systemet er godkjent for bærende stålbjelker og -søyler i henhold til ETA-11/00469. SkamoStructure Board brukes som firkantet kledning for åpne og hule profiler for å beskytte stålet.

## Tykkelse, **Skamo**Structure Board 250

Seksjonsfaktor, kritisk ståltemperatur og krav til brannmotstand må tas hensyn til ved valg av tykkelse.



Boksbeskyttelse.



Profilbeskyttelse.

### Seksjonsfaktor

Seksjonsfaktoren er en parameter som brukes til å bestemme den termiske reaksjonen til strukturelle stålkomponenter. De grunnleggende faktorene er hvor raskt stålstøttene og søylene varmes opp proporsjonalt med området utsatt for brann ( $A_p$ ) og motsatt i forhold til volumet til stålprofilen ( $V$ ). Seksjonsfaktoren beregnes ved hjelp av formelen  $A_p/V$  og måles  $\text{m}^{-1}$ , og verdien avhenger av om området på stålbjelken som er utsatt for brann har 3 eller 4 sider og av tykkelsen til strukturkomponenten. Stålprofilenes seksjonsfaktor kan oppgis av stålleverandøren.

### Kritisk ståltemperatur

Den kritiske ståltemperaturen spesifiserer ved hvilke temperatur strukturelle svakheter kan oppstå på grunn av brann. Den kritiske ståltemperaturen kan oppgis av stålleverandøren.

### Krav til brannmotstand

Byggeforskriftene bestemmer hvor lenge konstruksjonselementer må kunne tåle brann.

# SkamoStructure Board 250, størrelser

Produktnummer	Størrelse	Emballasje	m <sup>2</sup> / emballasje	Stykk per pall
24160001	2 440 × 1 220 × 22mm	Stykk	2,98m <sup>2</sup>	47
24160002	2 440 × 1 220 × 25mm	Stykk	2,98m <sup>2</sup>	42
24160003	2 440 × 1 220 × 30mm	Stykk	2,98m <sup>2</sup>	35
24160004	2 440 × 1 220 × 35mm	Stykk	2,98m <sup>2</sup>	30
24160005	2 440 × 1 220 × 40mm	Stykk	2,98m <sup>2</sup>	26
24160007	2 440 × 1 220 × 45mm	Stykk	2,98m <sup>2</sup>	23
24160008	2 440 × 1 220 × 50mm	Stykk	2,98m <sup>2</sup>	21
24160009	2 440 × 1 220 × 55mm	Stykk	2,98m <sup>2</sup>	19
24160010	2 440 × 1 220 × 60mm	Stykk	2,98m <sup>2</sup>	17

## Montering

SkamoStructure Board festes med skruer eller nagler med en 30mm skive, som oppført i tabellen.

SkamoStructure Board 250	Skruer for åpne og lukkede profiler		Nagler med 30mm skiver for lukkede profiler	
Tykkelse	Maksimal skruavstand	Skrue dimensjoner	Maksimal nagleavstand	Naglelengde
22	340mm	3,8 × 45mm	-	-
25	340mm	3,8 × 45mm	460mm	37mm
30	340mm	4,0 × 60mm	460mm	42mm
35	340mm	4,0 × 70mm	460mm	47mm
40	340mm	5,0 × 80mm	460mm	52mm
45	340mm	5,0 × 90mm	460mm	57mm
50	340mm	5,0 × 90mm	460mm	62mm
55	340mm	5,0 × 100mm	-	-
60	340mm	5,0 × 110mm	-	-

Skamol anbefaler bruk av galvaniserte tre-/universalskruer og nagler med dimensjonene oppgitt i tabellen ovenfor.

For montering under trapestak anbefaler Skamol bruk av gips-/sponplateskruer i henhold til dimensjonene i tabellen ovenfor.



# Firkantede paneler med 3 sider



Alle mål imm.

## Plassering av skruer i åpent profilert stål – tresidig beskyttelse

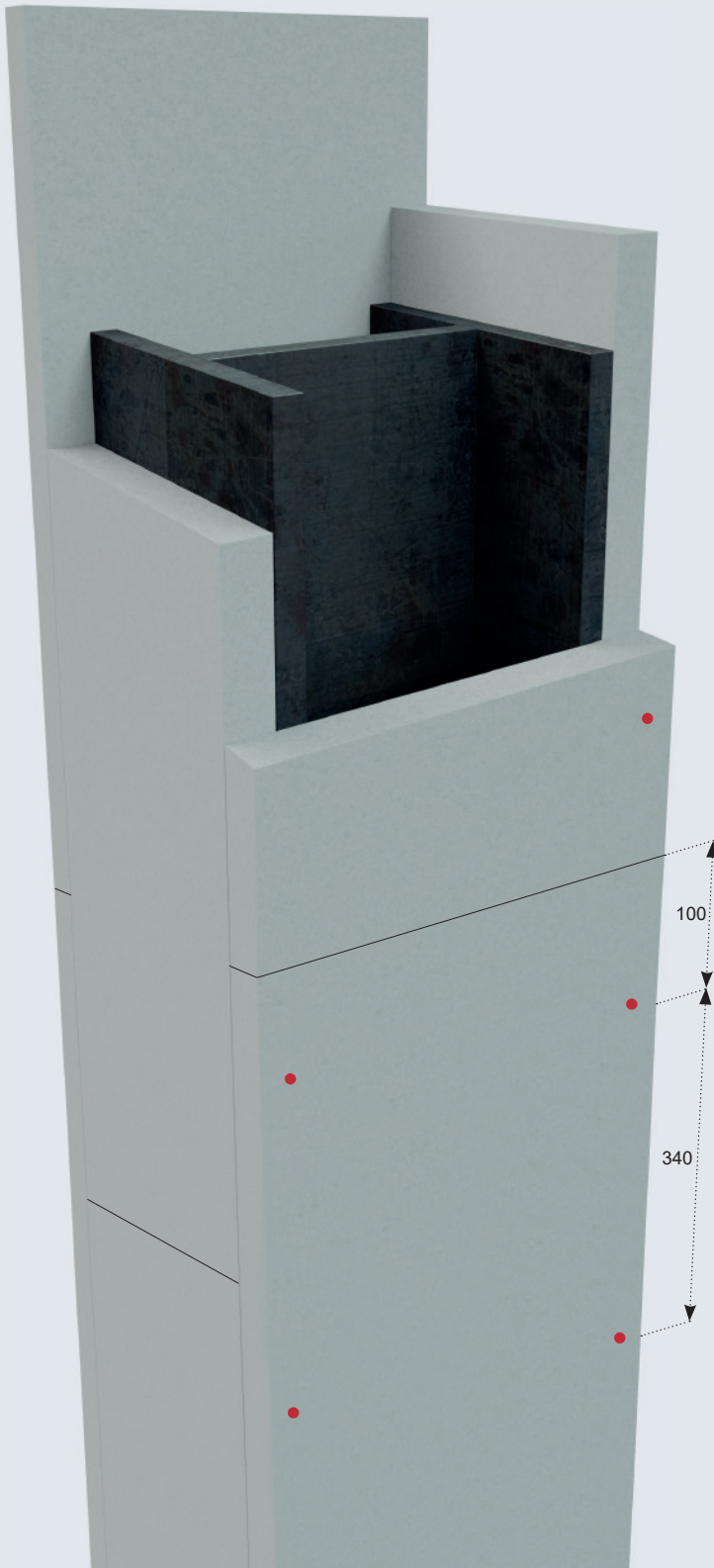
For en stivere struktur må sammenføyningene overlappe med  $\geq 300\text{mm}$

Strukturstøttene sages av med en bredde på minimum 200mm og 1-2mm overskytende høyde, slik at de kan trykkes inn mellom flensene. Strukturstøttene kappes med samme tykkelse som forskalingen. Søylene festes i hver sammenføyning med en avstand på maksimum 1200mm.

Se skruinformasjon på side 7.



# Firkantede paneler med 4 sider



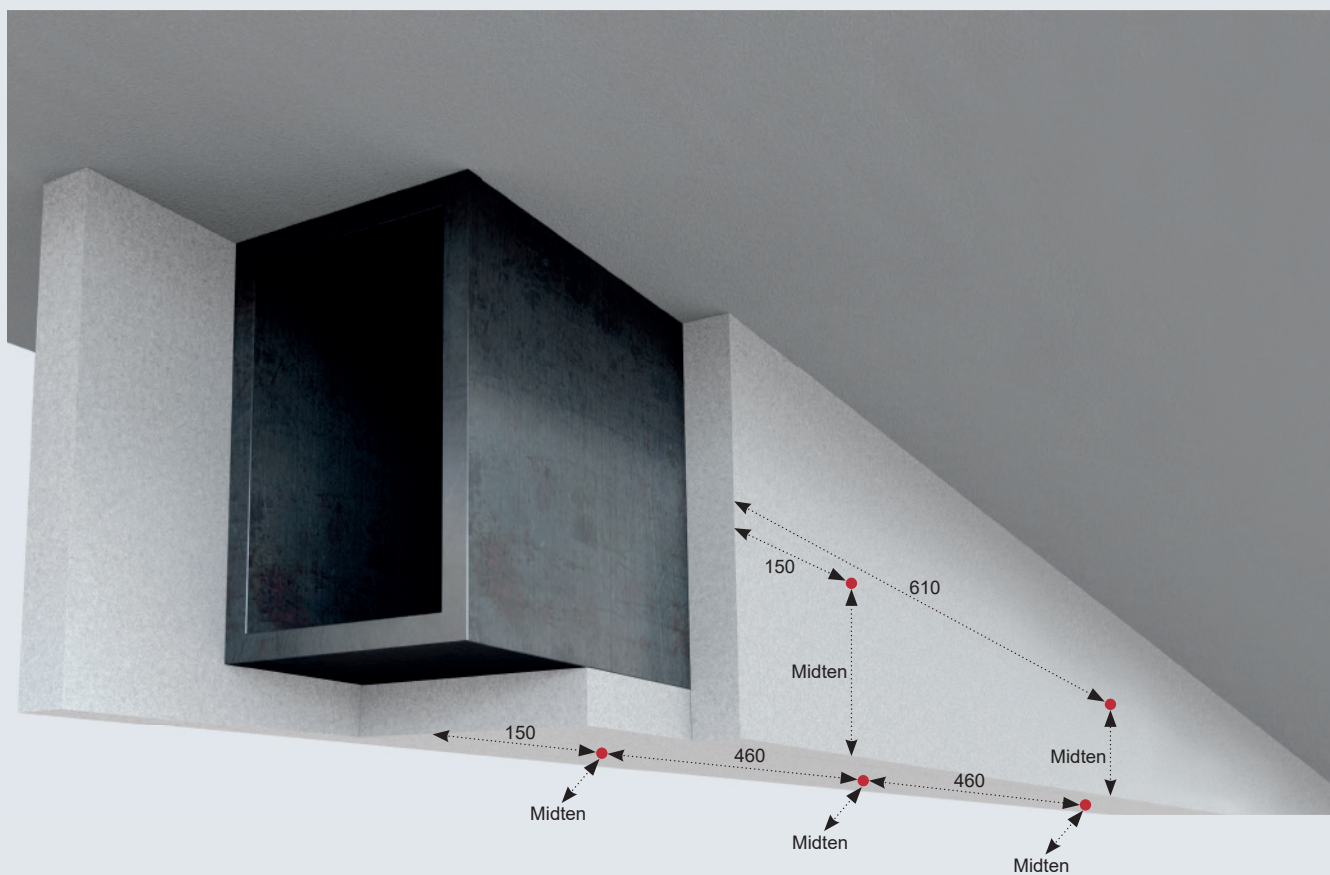
Alle mål imm.

**Plassering av skruer i åpent profilert stål –  
firesidig beskyttelse**

For en stivere struktur må sammenføyningene  
overlappe med  $\geq 300\text{mm}$

Se skruerinformasjon på side 7.

# Firkantede paneler med 3 sider



Alle mål imm.

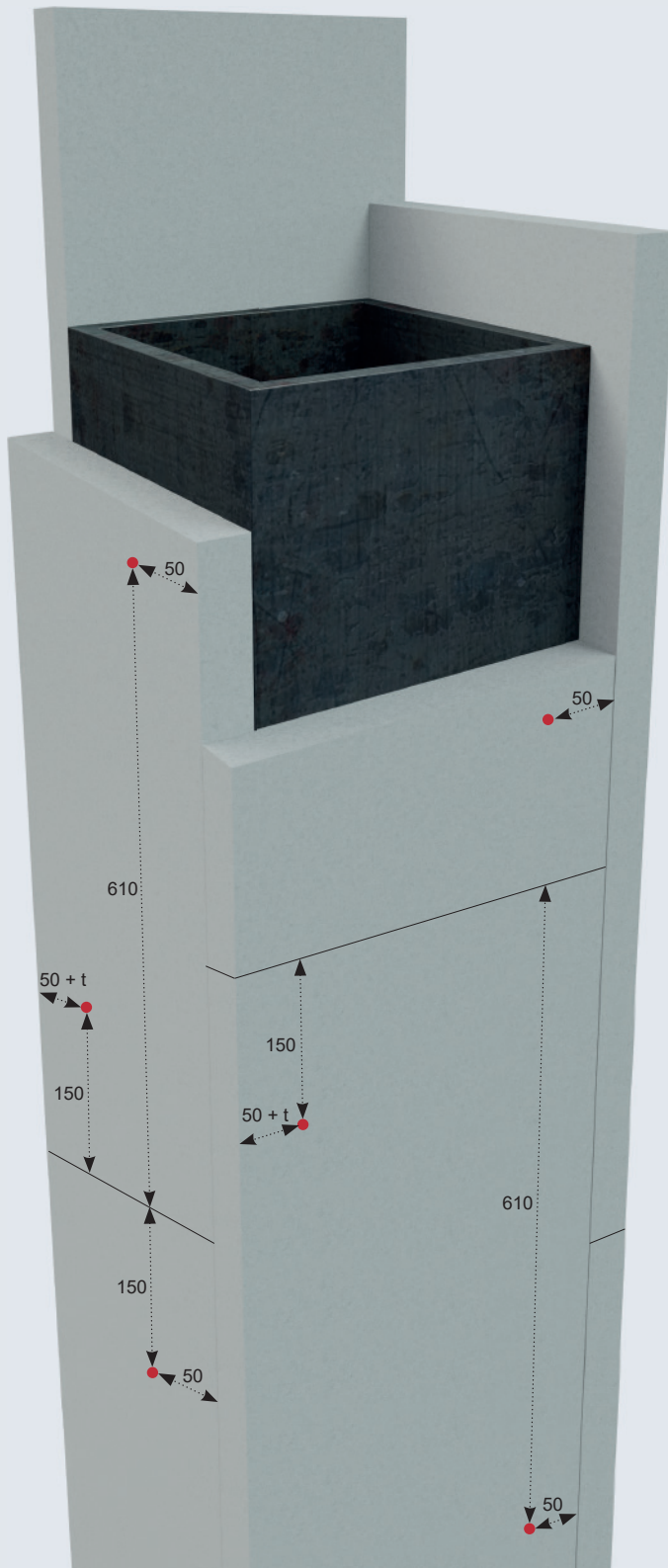
## Plassering av nagler i stål med lukket profil – beskyttelse på tre sider

For en stivere struktur må sammenføyningene overlappe med  $\geq 300\text{mm}$ .

Se skruinformasjon på side 7.



# Firkantede paneler med 4 sider



Alle mål imm.

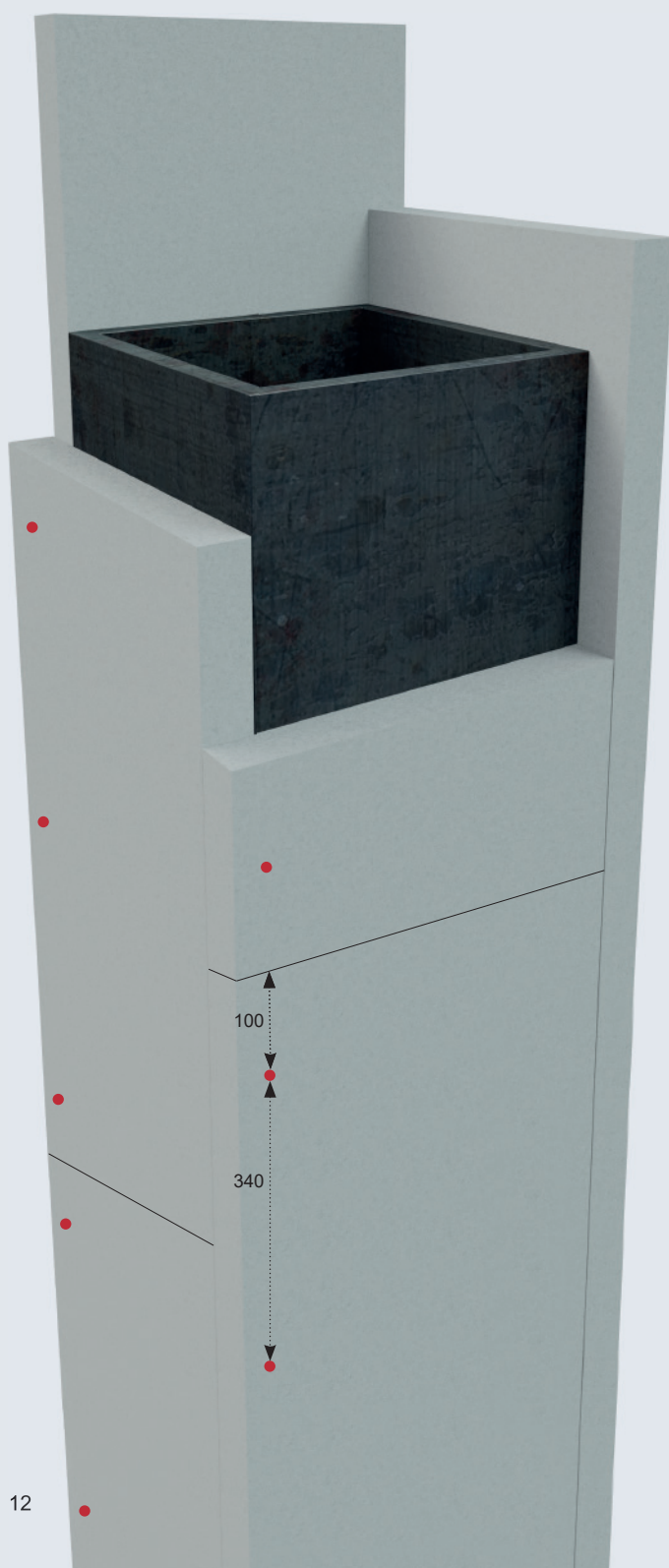
t = SkamoStructure Board 250, tykkelse.

## Plassering av nagler i stål med lukket profil – beskyttelse på fire sider

For en stivere struktur må sammenføyningene overlappe med  $\geq 300\text{mm}$ .

Se skrueinformasjon på side 7.

# Firkantede paneler med 4 sider



Alle mål imm.

## **Plassering av skruer i lukket profilert stål – firesidig beskyttelse**

For en stivere struktur må sammenføyningene overlappe med  $\geq 300\text{mm}$ .

Se skruinformasjon på side 7.



# Datablad: **SkamoStructure Board 250**

	Value	Unit
Non-combustibility tests (EN 13501-1 + A1)	Class A1	
Loadbearing steel beam and column protection (EN 13381-4)	Up to 180	minutes
Weather exposure category	Y (semi-exposure)	
Bulk density	250 16	kg/m <sup>3</sup> lb/ft <sup>3</sup>
Board weight (25mm thickness)	6.3 1.2	kg/m <sup>2</sup> lb/ft <sup>2</sup>
Compressive strength (EN ISO 29469)	2.8 406	MPa lb/in <sup>2</sup>
Modulus of rupture (EN 993-6)	1.3 189	MPa lb/in <sup>2</sup>
Total porosity (EN 1094-4)	90	%
Dimension stability under specified temp. and humidity conditions (EN 1604) at 23°C, 90% RH, 4 hours	0.0	%
Thermal conductivity (EN 12667), $\lambda_{10(\text{average})}$	0.073 0.042	W/(m×K) BTU/(h×ft×°F)
<b>Sound reduction index (<math>R_w(C;C_w)</math>)</b>	Thickness	
	60mm	28 (-1;-3) dB
HS Tariff number (Harmonized Commodity Description and Coding System)	6806.90.00	
Colour	Grey	



Data are average results of tests conducted under standard procedures and are subject to variation. Data contained in this data sheet are supplied in good faith as a technical service and are subject to change without notice. Misprint and errors excepted. Revision number: 26.6.2025

# Finn gjeldende SkamoStructure Board 250-tykkelse

For dimensjonering av brannbeskyttelse av stålkonstruksjoner er det viktig å identifisere den kritiske ståltemperaturen for stålprofilen. Den kritiske ståltemperaturen vises på prosjektmaterialet eller kan spesifiseres av prosjektkonsulenten.

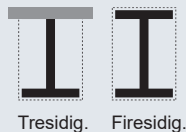
Bortsett fra den kritiske ståltemperaturen må man også ta hensyn til Ap/V-forholdet (seksjonsfaktoren) til stålprofilen som beskyttes. Tabellene på side 16 viser seksjonsfaktor for den vanligste stålprofilen.

Når du kjenner Ap/V-forholdet til stålprofilen, kan du bestemme hvilken SkamoStructure Board 250-tykkelse som skal brukes ved en kritisk temperatur på 500°C i tabellen til høyre.

## Formel for beregning av Ap/V-forholdet for boksbeskyttelse:

Ap = skjermingens indre omkrets.

Ap er summen av den indre omkretsen til det minste mulige rektangelet eller kvadratet.



V = profilens tverrsnitt.

Seksjonsfaktoren til boksbeskyttelsen må alltid rundes oppover etter beregning av Ap/V-verdien.

## Kritisk temperatur på 500°C (åpen profil)

Tid (min)	Ap/V	Tykkelse (mm)
30	40-400	22
60	40-185	22
60	186-210	25
60	211-250	30
60	251-295	35
60	296-330	40
60	331-400	50
90	40-105	22
90	106-115	25
90	116-140	30
90	140-165	35
90	166-185	40
90	186-210	45
90	211-235	50
90	236-260	55
90	261-280	60
120	40-70	22
120	71-80	25
120	81-95	30
120	96-110	35
120	111-125	40
120	126-140	45
120	141-155	50
120	156-170	55
120	171-185	60
180	40	22
180	41-45	25
180	46-50	30
180	51-60	35
180	61-70	40
180	71-80	45
180	81-90	50
180	91-95	55
180	96-105	60



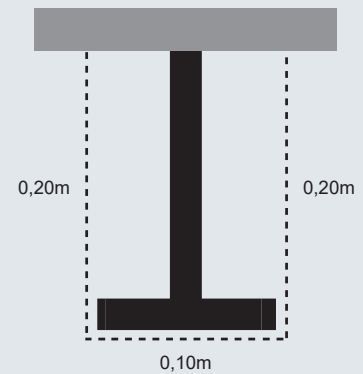
# Eksempler på beregning av paneler

## Eksempler på beregning av kledning med tre sider

En stålprofil, IPE 200, må være brannbeskyttet fra tre sider, og brannmotstanden må være R60.

$$\begin{aligned} A_p &= 2 \times 0,20\text{m} + 0,10\text{m} = 0,50\text{m} \\ V &= 2\,850\text{mm}^2 \approx 0,00285\text{m}^2 \\ A_p/V &= 0,50\text{m} / 0,00285\text{m}^2 \approx 176\text{m}^{-1} \end{aligned}$$

Tykkelsen til SkamoStructure Board 250 i henhold til tabellen på side 14 = 22mm

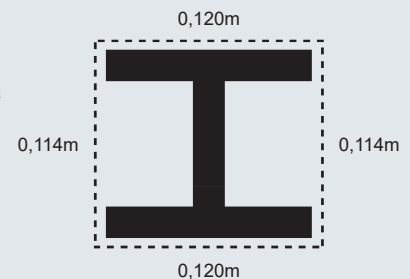


## Eksempler på beregning av kledning med fire sider

En stålprofil, HE 120 A, må være brannbeskyttet fra tre sider, og brannmotstanden må være R90.

$$\begin{aligned} A_p &= 2 \times 0,114\text{m} + 2 \times 0,120\text{m} = 0,468\text{m} \\ V &= 2534\text{mm}^2 \approx 0,002534\text{m}^2 \\ A_p/V &= 0,468\text{m} / 0,002534\text{m}^2 \approx 184\text{m}^{-1} \end{aligned}$$

Tykkelsen til SkamoStructure Board 250 i henhold til tabellen på side 14 = 40mm



# Ap/V-forhold

Ap/V ratio for the most commonly used steel profile is shown in the table below.

Firkant (mm)	Tresidig	Firesidig
100 × 100 × 4	198	264
100 × 100 × 5	161	214
100 × 100 × 6	136	181
100 × 100 × 8	105	139
100 × 100 × 10	86	115
120 × 120 × 5	159	212
120 × 120 × 6	134	178
120 × 120 × 8	103	137
120 × 120 × 10	84	112
140 × 140 × 5	158	210
140 × 140 × 6	133	177
140 × 140 × 8	101	135
140 × 140 × 10	83	111
150 × 150 × 5	157	210
150 × 150 × 6	132	176
150 × 150 × 8	101	134
150 × 150 × 10	82	110

Firkant (mm)	Tresidig	Firesidig
150 × 150 × 12.5	68	90
150 × 150 × 16	55	73
160 × 160 × 5	157	209
160 × 160 × 6	132	175
160 × 160 × 8	83	111
160 × 160 × 10	82	109
180 × 180 × 5	156	208
180 × 180 × 6.3	125	167
180 × 180 × 8	100	133
180 × 180 × 10	81	108
200 × 200 × 5	156	207
200 × 200 × 6.3	124	166
200 × 200 × 8	99	132
200 × 200 × 10	81	107
200 × 200 × 12.5	66	87
200 × 200 × 16	53	70

HEA	Tresidig	Firesidig	HEB	Tresidig	Firesidig	IPE	Tresidig	Firesidig	HEM	Tresidig	Firesidig
HE 100A	138	185	HE 100B	115	154	IPE 80	270	330	HE 100M	65	85
HE 120A	137	185	HE 120B	106	141	IPE 100	247	300	HE 120M	61	80
HE 140A	129	174	HE 140B	98	130	IPE 120	230	279	HE 140M	58	76
HE 160A	120	161	HE 160B	89	118	IPE 140	215	259	HE 160M	54	71
HE 180A	115	155	HE 180B	83	110	IPE 160	200	241	HE 180M	52	68
HE 200A	108	145	HE 200B	77	103	IPE 180	188	226	HE 200M	49	65
HE 220A	100	134	HE 220B	73	97	IPE 200	176	211	HE 220M	47	62
HE 240A	91	122	HE 240B	68	91	IPE 220	165	198	HE 240M	40	52
HE 260A	88	118	HE 260B	66	88	IPE 240	153	184	HE 260M	39	51
HE 280A	84	113	HE 280B	64	85	IPE 270	147	176	HE 280M	38	50
HE 300A	78	105	HE 300B	60	81	IPE 300	139	167	HE 300M	33	43
HE 320A	74	98	HE 320B	58	77	IPE 330	131	156	HE 320M	33	43
HE 340A	72	94	HE 340B	57	75	IPE 360	122	146	HE 340M	33	43
HE 360A	70	91	HE 360B	57	73	IPE 400	116	137			
HE 400A	68	87	HE 400B	56	71	IPE 450	110	130			
HE 450A	66	83	HE 450B	55	69	IPE 500	104	121			
HE 500A	65	80	HE 500B	55	67	IPE 550	98	113			
HE 550A	65	79	HE 550B	55	67	IPE 600	91	105			
HE 600A	65	79	HE 600B	55	67						
			HE 650B	55	66						

Source: Teknisk Ståbi

# 30minutters brannmotstand: Lukkede profiler

Design temp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C
60	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
65	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
70	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
75	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
80	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
85	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
90	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
95	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
100	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
105	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
110	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
115	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
120	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
125	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
130	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
135	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
140	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
145	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
150	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
155	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
160	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
165	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
170	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
175	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
180	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
185	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
190	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
195	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
200	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
205	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
210	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
215	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
220	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
225	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
230	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
235	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
240	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
245	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
250	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
255	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
260	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
265	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
270	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
275	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
280	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
285	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
290	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0



# 60minutters brannmotstand: Lukkede profiler

Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C
60	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
65	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
70	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
75	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
80	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
85	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
90	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
95	30,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
100	30,0	30,0	25,0	25,0	25,0	25,0	25,0	25,0
105	30,0	30,0	25,0	25,0	25,0	25,0	25,0	25,0
110	30,0	30,0	25,0	25,0	25,0	25,0	25,0	25,0
115	35,0	30,0	25,0	25,0	25,0	25,0	25,0	25,0
120	35,0	30,0	25,0	25,0	25,0	25,0	25,0	25,0
125	35,0	30,0	25,0	25,0	25,0	25,0	25,0	25,0
130	35,0	30,0	25,0	25,0	25,0	25,0	25,0	25,0
135	35,0	30,0	30,0	25,0	25,0	25,0	25,0	25,0
140	35,0	30,0	30,0	25,0	25,0	25,0	25,0	25,0
145	35,0	30,0	30,0	25,0	25,0	25,0	25,0	25,0
150	35,0	35,0	30,0	25,0	25,0	25,0	25,0	25,0
155	35,0	35,0	30,0	25,0	25,0	25,0	25,0	25,0
160	40,0	35,0	30,0	25,0	25,0	25,0	25,0	25,0
165	40,0	35,0	30,0	25,0	25,0	25,0	25,0	25,0
170	40,0	35,0	30,0	25,0	25,0	25,0	25,0	25,0
175	40,0	35,0	30,0	25,0	25,0	25,0	25,0	25,0
180	40,0	35,0	30,0	25,0	25,0	25,0	25,0	25,0
185	40,0	35,0	30,0	25,0	25,0	25,0	25,0	25,0
190	40,0	35,0	30,0	30,0	25,0	25,0	25,0	25,0
195	40,0	35,0	30,0	30,0	25,0	25,0	25,0	25,0
200	40,0	35,0	30,0	30,0	25,0	25,0	25,0	25,0
205	45,0	35,0	35,0	30,0	25,0	25,0	25,0	25,0
210	45,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
215	45,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
220	45,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
225	45,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
230	45,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
235	45,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
240	45,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
245	45,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
250	45,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
255	45,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
260	50,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
265	50,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
270	50,0	40,0	35,0	30,0	25,0	25,0	25,0	25,0
275	50,0	40,0	35,0	30,0	30,0	25,0	25,0	25,0
280	50,0	40,0	35,0	30,0	30,0	25,0	25,0	25,0
285	50,0	45,0	35,0	30,0	30,0	25,0	25,0	25,0
290	50,0	45,0	35,0	30,0	30,0	25,0	25,0	25,0

# 90minutters brannmotstand: Lukkede profiler

Design temp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C
60	30,0	30,0	25,0	25,0	25,0	25,0	25,0	25,0
65	35,0	30,0	25,0	25,0	25,0	25,0	25,0	25,0
70	35,0	30,0	30,0	25,0	25,0	25,0	25,0	25,0
75	35,0	30,0	30,0	25,0	25,0	25,0	25,0	25,0
80	35,0	35,0	30,0	25,0	25,0	25,0	25,0	25,0
85	35,0	35,0	30,0	30,0	25,0	25,0	25,0	25,0
90	40,0	35,0	30,0	30,0	25,0	25,0	25,0	25,0
95	40,0	35,0	30,0	30,0	25,0	25,0	25,0	25,0
100	40,0	35,0	35,0	30,0	25,0	25,0	25,0	25,0
105	40,0	35,0	35,0	30,0	25,0	25,0	25,0	25,0
110	40,0	40,0	35,0	30,0	30,0	25,0	25,0	25,0
115	45,0	40,0	35,0	30,0	30,0	25,0	25,0	25,0
120	45,0	40,0	35,0	30,0	30,0	25,0	25,0	25,0
125	45,0	40,0	35,0	35,0	30,0	25,0	25,0	25,0
130	45,0	40,0	35,0	35,0	30,0	25,0	25,0	25,0
135	45,0	40,0	40,0	35,0	30,0	30,0	25,0	25,0
140	45,0	45,0	40,0	35,0	30,0	30,0	25,0	25,0
145	50,0	45,0	40,0	35,0	30,0	30,0	25,0	25,0
150	50,0	45,0	40,0	35,0	30,0	30,0	25,0	25,0
155	50,0	45,0	40,0	35,0	35,0	30,0	25,0	25,0
160	50,0	45,0	40,0	35,0	35,0	30,0	25,0	25,0
165	50,0	45,0	40,0	40,0	35,0	30,0	25,0	25,0
170	55,0	45,0	40,0	40,0	35,0	30,0	30,0	25,0
175	55,0	50,0	45,0	40,0	35,0	30,0	30,0	25,0
180	55,0	50,0	45,0	40,0	35,0	30,0	30,0	25,0
185		50,0	45,0	40,0	35,0	30,0	30,0	25,0
190		50,0	45,0	40,0	35,0	30,0	30,0	25,0
195		50,0	45,0	40,0	35,0	35,0	30,0	25,0
200		50,0	45,0	40,0	35,0	35,0	30,0	25,0
205		50,0	45,0	40,0	35,0	35,0	30,0	25,0
210		55,0	45,0	40,0	40,0	35,0	30,0	25,0
215		55,0	45,0	40,0	40,0	35,0	30,0	25,0
220		55,0	50,0	45,0	40,0	35,0	30,0	30,0
225		55,0	50,0	45,0	40,0	35,0	30,0	30,0
230			50,0	45,0	40,0	35,0	30,0	30,0
235			50,0	45,0	40,0	35,0	30,0	30,0
240			50,0	45,0	40,0	35,0	30,0	30,0
245			50,0	45,0	40,0	35,0	30,0	30,0
250			50,0	45,0	40,0	35,0	30,0	30,0
255			50,0	45,0	40,0	35,0	30,0	30,0
260			50,0	45,0	40,0	35,0	35,0	30,0
265			50,0	45,0	40,0	35,0	35,0	30,0
270			55,0	45,0	40,0	35,0	35,0	30,0
275			55,0	45,0	40,0	35,0	35,0	30,0
280			55,0	45,0	40,0	40,0	35,0	30,0
285			55,0	50,0	40,0	40,0	35,0	30,0
290			55,0	50,0	45,0	40,0	35,0	30,0

# 120minutters brannmotstand: Lukkede profiler

Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C
60	35,0	35,0	30,0	30,0	25,0	25,0	25,0	25,0
65	40,0	35,0	35,0	30,0	25,0	25,0	25,0	25,0
70	40,0	35,0	35,0	30,0	30,0	25,0	25,0	25,0
75	40,0	40,0	35,0	30,0	30,0	25,0	25,0	25,0
80	45,0	40,0	35,0	35,0	30,0	30,0	25,0	25,0
85	45,0	40,0	40,0	35,0	30,0	30,0	25,0	25,0
90	45,0	40,0	40,0	35,0	35,0	30,0	25,0	25,0
95	45,0	45,0	40,0	35,0	35,0	30,0	30,0	25,0
100	50,0	45,0	40,0	40,0	35,0	30,0	30,0	25,0
105	50,0	45,0	40,0	40,0	35,0	30,0	30,0	25,0
110	50,0	45,0	45,0	40,0	35,0	35,0	30,0	25,0
115	50,0	50,0	45,0	40,0	35,0	35,0	30,0	30,0
120	55,0	50,0	45,0	40,0	40,0	35,0	30,0	30,0
125		50,0	45,0	40,0	40,0	35,0	30,0	30,0
130		50,0	45,0	45,0	40,0	35,0	35,0	30,0
135		55,0	50,0	45,0	40,0	35,0	35,0	30,0
140		55,0	50,0	45,0	40,0	35,0	35,0	30,0
145		55,0	50,0	45,0	40,0	40,0	35,0	30,0
150			50,0	45,0	45,0	40,0	35,0	30,0
155			50,0	45,0	45,0	40,0	35,0	35,0
160			55,0	50,0	45,0	40,0	35,0	35,0
165			55,0	50,0	45,0	40,0	35,0	35,0
170			55,0	50,0	45,0	40,0	40,0	35,0
175				50,0	45,0	40,0	40,0	35,0
180				50,0	45,0	40,0	40,0	35,0
185				50,0	45,0	45,0	40,0	35,0
190				50,0	50,0	45,0	40,0	35,0
195				55,0	50,0	45,0	40,0	35,0
200				55,0	50,0	45,0	40,0	35,0
205				55,0	50,0	45,0	40,0	35,0
210					50,0	45,0	40,0	35,0
215					50,0	45,0	40,0	40,0
220					50,0	45,0	40,0	40,0
225					50,0	45,0	40,0	40,0
230					50,0	45,0	45,0	40,0
235					50,0	45,0	45,0	40,0
240					55,0	50,0	45,0	40,0
245					55,0	50,0	45,0	40,0
250					55,0	50,0	45,0	40,0
255					55,0	50,0	45,0	40,0
260					55,0	50,0	45,0	40,0
265						50,0	45,0	40,0
270						50,0	45,0	40,0
275						50,0	45,0	40,0
280						50,0	45,0	40,0
285						50,0	45,0	40,0
290						50,0	45,0	40,0



# 180minutters brannmotstand: Lukkede profiler

Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C	700°C
60	50,0	45,0	40,0	40,0	35,0	35,0	30,0	30,0
65	50,0	45,0	45,0	40,0	40,0	35,0	35,0	30,0
70	50,0	50,0	45,0	45,0	40,0	35,0	35,0	30,0
75	55,0	50,0	50,0	45,0	40,0	40,0	35,0	35,0
80		55,0	50,0	45,0	45,0	40,0	40,0	35,0
85			50,0	50,0	45,0	40,0	40,0	35,0
90			55,0	50,0	45,0	45,0	40,0	40,0
95				50,0	50,0	45,0	40,0	40,0
100				55,0	50,0	45,0	45,0	40,0
105					50,0	50,0	45,0	40,0
110					55,0	50,0	45,0	40,0
115					55,0	50,0	45,0	45,0
120						50,0	50,0	45,0
125						55,0	50,0	45,0
130						55,0	50,0	45,0
135							50,0	45,0
140							50,0	50,0
145							55,0	50,0
150							55,0	50,0
155							55,0	50,0
160								50,0
165								50,0
170								55,0
175								55,0
180								55,0
185								
190								
195								
200								
205								
210								
215								
220								
225								
230								
235								
240								
245								
250								
255								
260								
265								
270								
275								
280								
285								
290								

# 30minutters brannmotstand: Åpne profiler

Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C
40	22.0	22.0	22.0	22.0	22.0	22.0	22.0
45	22.0	22.0	22.0	22.0	22.0	22.0	22.0
50	22.0	22.0	22.0	22.0	22.0	22.0	22.0
55	22.0	22.0	22.0	22.0	22.0	22.0	22.0
60	22.0	22.0	22.0	22.0	22.0	22.0	22.0
65	22.0	22.0	22.0	22.0	22.0	22.0	22.0
70	22.0	22.0	22.0	22.0	22.0	22.0	22.0
75	22.0	22.0	22.0	22.0	22.0	22.0	22.0
80	22.0	22.0	22.0	22.0	22.0	22.0	22.0
85	22.0	22.0	22.0	22.0	22.0	22.0	22.0
90	22.0	22.0	22.0	22.0	22.0	22.0	22.0
95	22.0	22.0	22.0	22.0	22.0	22.0	22.0
100	22.0	22.0	22.0	22.0	22.0	22.0	22.0
105	22.0	22.0	22.0	22.0	22.0	22.0	22.0
110	22.0	22.0	22.0	22.0	22.0	22.0	22.0
115	22.0	22.0	22.0	22.0	22.0	22.0	22.0
120	22.0	22.0	22.0	22.0	22.0	22.0	22.0
125	22.0	22.0	22.0	22.0	22.0	22.0	22.0
130	22.0	22.0	22.0	22.0	22.0	22.0	22.0
135	22.0	22.0	22.0	22.0	22.0	22.0	22.0
140	22.0	22.0	22.0	22.0	22.0	22.0	22.0
145	22.0	22.0	22.0	22.0	22.0	22.0	22.0
150	22.0	22.0	22.0	22.0	22.0	22.0	22.0
155	22.0	22.0	22.0	22.0	22.0	22.0	22.0
160	22.0	22.0	22.0	22.0	22.0	22.0	22.0
165	22.0	22.0	22.0	22.0	22.0	22.0	22.0
170	22.0	22.0	22.0	22.0	22.0	22.0	22.0
175	22.0	22.0	22.0	22.0	22.0	22.0	22.0
180	22.0	22.0	22.0	22.0	22.0	22.0	22.0
185	22.0	22.0	22.0	22.0	22.0	22.0	22.0
190	22.0	22.0	22.0	22.0	22.0	22.0	22.0
195	22.0	22.0	22.0	22.0	22.0	22.0	22.0
200	22.0	22.0	22.0	22.0	22.0	22.0	22.0
205	22.0	22.0	22.0	22.0	22.0	22.0	22.0
210	22.0	22.0	22.0	22.0	22.0	22.0	22.0
215	22.0	22.0	22.0	22.0	22.0	22.0	22.0
220	22.0	22.0	22.0	22.0	22.0	22.0	22.0
225	22.0	22.0	22.0	22.0	22.0	22.0	22.0
230	22.0	22.0	22.0	22.0	22.0	22.0	22.0
235	22.0	22.0	22.0	22.0	22.0	22.0	22.0
240	22.0	22.0	22.0	22.0	22.0	22.0	22.0
245	22.0	22.0	22.0	22.0	22.0	22.0	22.0
250	22.0	22.0	22.0	22.0	22.0	22.0	22.0
255	22.0	22.0	22.0	22.0	22.0	22.0	22.0
260	22.0	22.0	22.0	22.0	22.0	22.0	22.0
265	22.0	22.0	22.0	22.0	22.0	22.0	22.0
270	22.0	22.0	22.0	22.0	22.0	22.0	22.0
275	22.0	22.0	22.0	22.0	22.0	22.0	22.0
280	22.0	22.0	22.0	22.0	22.0	22.0	22.0
285	22.0	22.0	22.0	22.0	22.0	22.0	22.0
290	22.0	22.0	22.0	22.0	22.0	22.0	22.0
295	22.0	22.0	22.0	22.0	22.0	22.0	22.0
300	22.0	22.0	22.0	22.0	22.0	22.0	22.0
330	22.0	22.0	22.0	22.0	22.0	22.0	22.0
400	30,0	25,0	22.0	22.0	22.0	22.0	22.0

# 60minutters brannmotstand: Åpne profiler

Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C
40	22,0	22,0	22,0	22,0	22,0	22,0	22,0
45	22,0	22,0	22,0	22,0	22,0	22,0	22,0
50	22,0	22,0	22,0	22,0	22,0	22,0	22,0
55	22,0	22,0	22,0	22,0	22,0	22,0	22,0
60	22,0	22,0	22,0	22,0	22,0	22,0	22,0
65	22,0	22,0	22,0	22,0	22,0	22,0	22,0
70	22,0	22,0	22,0	22,0	22,0	22,0	22,0
75	22,0	22,0	22,0	22,0	22,0	22,0	22,0
80	22,0	22,0	22,0	22,0	22,0	22,0	22,0
85	22,0	22,0	22,0	22,0	22,0	22,0	22,0
90	22,0	22,0	22,0	22,0	22,0	22,0	22,0
95	22,0	22,0	22,0	22,0	22,0	22,0	22,0
100	22,0	22,0	22,0	22,0	22,0	22,0	22,0
105	22,0	22,0	22,0	22,0	22,0	22,0	22,0
110	22,0	22,0	22,0	22,0	22,0	22,0	22,0
115	22,0	22,0	22,0	22,0	22,0	22,0	22,0
120	22,0	22,0	22,0	22,0	22,0	22,0	22,0
125	25,0	22,0	22,0	22,0	22,0	22,0	22,0
130	25,0	22,0	22,0	22,0	22,0	22,0	22,0
135	25,0	22,0	22,0	22,0	22,0	22,0	22,0
140	25,0	22,0	22,0	22,0	22,0	22,0	22,0
145	30,0	25,0	22,0	22,0	22,0	22,0	22,0
150	30,0	25,0	22,0	22,0	22,0	22,0	22,0
155	30,0	25,0	22,0	22,0	22,0	22,0	22,0
160	30,0	25,0	22,0	22,0	22,0	22,0	22,0
165	30,0	30,0	25,0	22,0	22,0	22,0	22,0
170	35,0	30,0	25,0	22,0	22,0	22,0	22,0
175	35,0	30,0	25,0	22,0	22,0	22,0	22,0
180	35,0	30,0	25,0	22,0	22,0	22,0	22,0
185	35,0	30,0	25,0	22,0	22,0	22,0	22,0
190	35,0	30,0	30,0	25,0	22,0	22,0	22,0
195	35,0	30,0	30,0	25,0	22,0	22,0	22,0
200	40,0	35,0	30,0	25,0	22,0	22,0	22,0
205	40,0	35,0	30,0	25,0	22,0	22,0	22,0
210	40,0	35,0	30,0	25,0	22,0	22,0	22,0
215	40,0	35,0	30,0	30,0	25,0	22,0	22,0
220	40,0	35,0	30,0	30,0	25,0	22,0	22,0
225	45,0	35,0	35,0	30,0	25,0	22,0	22,0
230	45,0	40,0	35,0	30,0	25,0	22,0	22,0
235	45,0	40,0	35,0	30,0	25,0	22,0	22,0
240	45,0	40,0	35,0	30,0	30,0	25,0	22,0
245	45,0	40,0	35,0	30,0	30,0	25,0	22,0
250	45,0	40,0	35,0	30,0	30,0	25,0	22,0
255	50,0	40,0	35,0	35,0	30,0	25,0	22,0
260	50,0	40,0	35,0	35,0	30,0	25,0	22,0
265	50,0	45,0	40,0	35,0	30,0	25,0	25,0
270	50,0	45,0	40,0	35,0	30,0	30,0	25,0
275	50,0	45,0	40,0	35,0	30,0	30,0	25,0
280	55,0	45,0	40,0	35,0	30,0	30,0	25,0
285	55,0	45,0	40,0	35,0	30,0	30,0	25,0
290	55,0	45,0	40,0	35,0	35,0	30,0	25,0
295	55,0	50,0	40,0	35,0	35,0	30,0	25,0
300	55,0	50,0	45,0	40,0	35,0	30,0	25,0
330	60,0	55,0	45,0	40,0	35,0	35,0	30,0
400			55,0	50,0	45,0	40,0	35,0



# 90minutters brannmotstand: Åpne profiler

Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C
40	22,0	22,0	22,0	22,0	22,0	22,0	22,0
45	22,0	22,0	22,0	22,0	22,0	22,0	22,0
50	22,0	22,0	22,0	22,0	22,0	22,0	22,0
55	22,0	22,0	22,0	22,0	22,0	22,0	22,0
60	22,0	22,0	22,0	22,0	22,0	22,0	22,0
65	22,0	22,0	22,0	22,0	22,0	22,0	22,0
70	22,0	22,0	22,0	22,0	22,0	22,0	22,0
75	25,0	22,0	22,0	22,0	22,0	22,0	22,0
80	25,0	22,0	22,0	22,0	22,0	22,0	22,0
85	30,0	25,0	22,0	22,0	22,0	22,0	22,0
90	30,0	25,0	22,0	22,0	22,0	22,0	22,0
95	30,0	30,0	25,0	22,0	22,0	22,0	22,0
100	35,0	30,0	25,0	22,0	22,0	22,0	22,0
105	35,0	30,0	25,0	22,0	22,0	22,0	22,0
110	35,0	30,0	30,0	25,0	22,0	22,0	22,0
115	40,0	35,0	30,0	25,0	22,0	22,0	22,0
120	40,0	35,0	30,0	30,0	25,0	22,0	22,0
125	40,0	35,0	30,0	30,0	25,0	22,0	22,0
130	45,0	40,0	35,0	30,0	25,0	22,0	22,0
135	45,0	40,0	35,0	30,0	30,0	25,0	22,0
140	45,0	40,0	35,0	30,0	30,0	25,0	22,0
145	50,0	40,0	35,0	35,0	30,0	25,0	22,0
150	50,0	45,0	40,0	35,0	30,0	30,0	25,0
155	50,0	45,0	40,0	35,0	30,0	30,0	25,0
160	55,0	45,0	40,0	35,0	30,0	30,0	25,0
165	55,0	45,0	40,0	35,0	35,0	30,0	25,0
170	55,0	50,0	45,0	40,0	35,0	30,0	30,0
175	60,0	50,0	45,0	40,0	35,0	30,0	30,0
180	60,0	50,0	45,0	40,0	35,0	35,0	30,0
185	60,0	55,0	45,0	40,0	35,0	35,0	30,0
190		55,0	50,0	45,0	40,0	35,0	30,0
195		55,0	50,0	45,0	40,0	35,0	30,0
200		55,0	50,0	45,0	40,0	35,0	35,0
205		60,0	50,0	45,0	40,0	35,0	35,0
210		60,0	55,0	45,0	40,0	40,0	35,0
215		60,0	55,0	50,0	45,0	40,0	35,0
220			55,0	50,0	45,0	40,0	35,0
225			55,0	50,0	45,0	40,0	35,0
230			55,0	50,0	45,0	40,0	35,0
235			60,0	50,0	45,0	40,0	40,0
240			60,0	55,0	50,0	45,0	40,0
245			60,0	55,0	50,0	45,0	40,0
250			60,0	55,0	50,0	45,0	40,0
255				55,0	50,0	45,0	40,0
260				55,0	50,0	45,0	40,0
265				60,0	50,0	45,0	45,0
270				60,0	55,0	50,0	45,0
275				60,0	55,0	50,0	45,0
280				60,0	55,0	50,0	45,0
285					55,0	50,0	45,0
290					55,0	50,0	45,0
295					60,0	50,0	45,0
300					60,0	55,0	50,0
330						60,0	50,0
400							

# 120minutters brannmotstand: Åpne profiler

Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C
40	22,0	22,0	22,0	22,0	22,0	22,0	22,0
45	22,0	22,0	22,0	22,0	22,0	22,0	22,0
50	25,0	22,0	22,0	22,0	22,0	22,0	22,0
55	30,0	22,0	22,0	22,0	22,0	22,0	22,0
60	30,0	25,0	22,0	22,0	22,0	22,0	22,0
65	35,0	30,0	25,0	22,0	22,0	22,0	22,0
70	35,0	30,0	25,0	22,0	22,0	22,0	22,0
75	40,0	35,0	30,0	25,0	22,0	22,0	22,0
80	40,0	35,0	30,0	25,0	25,0	22,0	22,0
85	40,0	35,0	35,0	30,0	25,0	22,0	22,0
90	45,0	40,0	35,0	30,0	30,0	25,0	22,0
95	45,0	40,0	35,0	30,0	30,0	25,0	22,0
100	50,0	45,0	40,0	35,0	30,0	30,0	25,0
105	50,0	45,0	40,0	35,0	30,0	30,0	25,0
110	55,0	45,0	40,0	35,0	35,0	30,0	25,0
115	55,0	50,0	45,0	40,0	35,0	30,0	30,0
120	60,0	50,0	45,0	40,0	35,0	35,0	30,0
125	60,0	55,0	45,0	40,0	40,0	35,0	30,0
130		55,0	50,0	45,0	40,0	35,0	30,0
135		55,0	50,0	45,0	40,0	35,0	35,0
140		60,0	50,0	45,0	40,0	40,0	35,0
145		60,0	55,0	50,0	45,0	40,0	35,0
150			55,0	50,0	45,0	40,0	35,0
155			60,0	50,0	45,0	40,0	40,0
160			60,0	55,0	50,0	45,0	40,0
165			60,0	55,0	50,0	45,0	40,0
170				55,0	50,0	45,0	40,0
175				60,0	50,0	45,0	40,0
180				60,0	55,0	50,0	45,0
185				60,0	55,0	50,0	45,0
190					55,0	50,0	45,0
195					60,0	50,0	45,0
200					60,0	55,0	50,0
205					60,0	55,0	50,0
210					60,0	55,0	50,0
215						55,0	50,0
220						60,0	55,0
225						60,0	55,0
230						60,0	55,0
235						60,0	55,0
240							55,0
245							60,0
250							60,0
255							60,0
260							60,0
265							
270							
275							
280							
285							
290							
295							
300							
330							
400							

# 180minutters brannmotstand: Åpne profiler

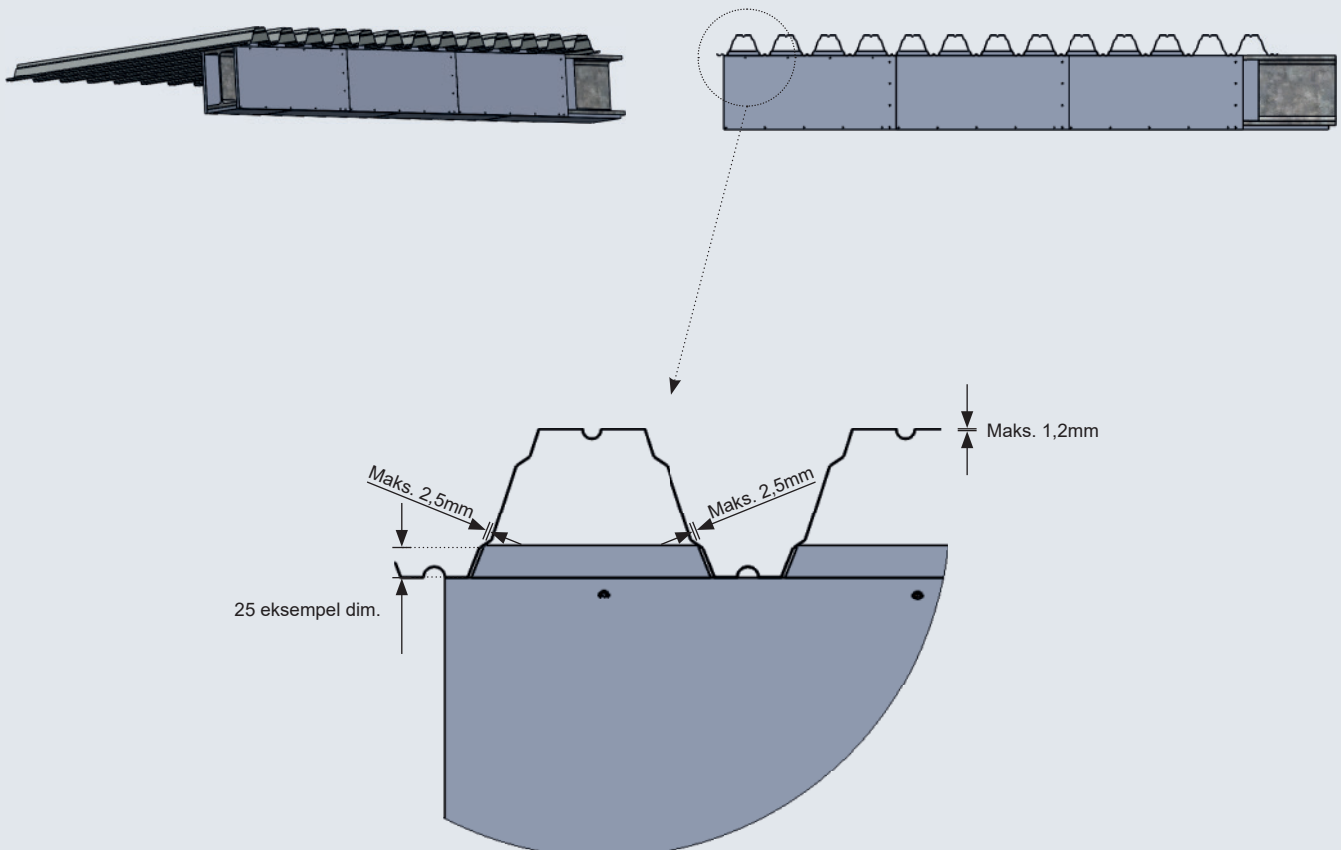
Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C
40	35,0	30,0	25,0	22,0	22,0	22,0	22,0
45	40,0	35,0	30,0	25,0	22,0	22,0	22,0
50	45,0	35,0	35,0	30,0	25,0	22,0	22,0
55	45,0	40,0	35,0	35,0	30,0	25,0	22,0
60	50,0	45,0	40,0	35,0	30,0	30,0	25,0
65	55,0	50,0	45,0	40,0	35,0	30,0	30,0
70	60,0	50,0	45,0	40,0	35,0	35,0	30,0
75		55,0	50,0	45,0	40,0	35,0	30,0
80		60,0	50,0	45,0	40,0	40,0	35,0
85			55,0	50,0	45,0	40,0	35,0
90			60,0	50,0	45,0	40,0	40,0
95			60,0	55,0	50,0	45,0	40,0
100				60,0	50,0	45,0	45,0
105				60,0	55,0	50,0	45,0
110					55,0	50,0	45,0
115					60,0	55,0	50,0
120					60,0	55,0	50,0
125						60,0	55,0
130						60,0	55,0
135							55,0
140							60,0
145							60,0
150							
155							
160							
165							
170							
175							
180							
185							
190							
195							
200							
205							
210							
215							
220							
225							
230							
235							
240							
245							
250							
255							
260							
265							
270							
275							
280							
285							
290							
295							
300							
330							
400							



# SkamoStructure Board 250 beskyttede stålbjelker montert under trapestak

## Vurdert DK R30 til R180

- Bjelkens seksjonsfaktor må beregnes som en firesidig branneksponeering.
- Kontaktflaten mellom bjelkens øvre flens og trapestaket må være 40 % eller mindre av bjelkens totale overflate på oversiden.
- Tykkelsen til SkamoStructure Board 250 er oppgitt i de vedlagte designtabellene og må være den samme for alle sider og klossen mellom trapesprofilen.
- Trapestaket må fylles med et ikke brennbart materiale, for eksempel mineralull, og må ikke inneholde lufthull.
- Tykkelsen til stålplaten på trapestaket må være 1,2mm eller lavere.
- Alle hull mellom SkamoStructure Board 250 og trapestaket må fylles med brannsikker tetningsmasse.
- Tegninger av konstruksjonen med endringene som er vurdert er vedlagt denne vurderingen.
- Vurderingen gjelder kun for kravene i teststandard ENV 13381-4: 2002.
- Alle andre detaljer må konstrueres som beskrevet i vurderingsrapport PH13583\_rev1.



# 30minutters brannmotstand: Stålbjelker montert under trapestak

Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C
40	20	20	20	20	20	20	20
45	20	20	20	20	20	20	20
50	20	20	20	20	20	20	20
55	20	20	20	20	20	20	20
60	20	20	20	20	20	20	20
65	20	20	20	20	20	20	20
70	20	20	20	20	20	20	20
75	20	20	20	20	20	20	20
80	20	20	20	20	20	20	20
85	20	20	20	20	20	20	20
90	20	20	20	20	20	20	20
95	20	20	20	20	20	20	20
100	20	20	20	20	20	20	20
105	20	20	20	20	20	20	20
110	20	20	20	20	20	20	20
115	20	20	20	20	20	20	20
120	20	20	20	20	20	20	20
125	20	20	20	20	20	20	20
130	20	20	20	20	20	20	20
135	20	20	20	20	20	20	20
140	20	20	20	20	20	20	20
145	20	20	20	20	20	20	20
150	20	20	20	20	20	20	20
155	20	20	20	20	20	20	20
160	20	20	20	20	20	20	20
165	20	20	20	20	20	20	20
170	20	20	20	20	20	20	20
175	20	20	20	20	20	20	20
180	20	20	20	20	20	20	20
185	20	20	20	20	20	20	20
190	20	20	20	20	20	20	20
195	20	20	20	20	20	20	20
200	20	20	20	20	20	20	20
205	20	20	20	20	20	20	20
210	20	20	20	20	20	20	20
215	20	20	20	20	20	20	20
220	20	20	20	20	20	20	20
225	20	20	20	20	20	20	20
230	20	20	20	20	20	20	20
235	20	20	20	20	20	20	20
240	20	20	20	20	20	20	20
245	20	20	20	20	20	20	20
250	20	20	20	20	20	20	20
255	20	20	20	20	20	20	20
260	20	20	20	20	20	20	20
265	20	20	20	20	20	20	20
270	20	20	20	20	20	20	20
275	20	20	20	20	20	20	20
280	20	20	20	20	20	20	20
285	20	20	20	20	20	20	20
290	20	20	20	20	20	20	20
295	25	20	20	20	20	20	20
300	25	25	20	20	20	20	20
330	30	25	25	20	20	20	20
400	35	30	25	25	20	20	20

# 60minutters brannmotstand: Stålbjelker montert under trapestak

Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C
40	20	20	20	20	20	20	20
45	20	20	20	20	20	20	20
50	20	20	20	20	20	20	20
55	20	20	20	20	20	20	20
60	20	20	20	20	20	20	20
65	25	20	20	20	20	20	20
70	25	20	20	20	20	20	20
75	25	20	20	20	20	20	20
80	25	25	20	20	20	20	20
85	25	25	20	20	20	20	20
90	25	25	20	20	20	20	20
95	30	25	25	20	20	20	20
100	30	25	25	20	20	20	20
105	30	25	25	20	20	20	20
110	30	30	25	20	20	20	20
115	30	30	25	20	20	20	20
120	30	30	25	25	20	20	20
125	35	30	25	25	20	20	20
130	35	30	30	25	20	20	20
135	35	30	30	25	20	20	20
140	35	30	30	25	25	20	20
145	35	35	30	25	25	20	20
150	40	35	30	30	25	20	20
155	40	35	30	30	25	20	20
160	40	35	30	30	25	20	20
165	40	35	35	30	25	25	20
170	40	35	35	30	30	25	20
175	40	40	35	30	30	25	20
180	45	40	35	30	30	25	20
185	45	40	35	35	30	25	20
190	45	40	35	35	30	25	25
195	45	40	35	35	30	30	25
200	45	40	40	35	30	30	25
205	45	40	40	35	30	30	25
210	50	45	40	35	35	30	25
215	50	45	40	35	35	30	25
220	50	45	40	35	35	30	30
225	50	45	40	35	35	30	30
230	50	45	40	40	35	30	30
235	55	45	40	40	35	35	30
240	55	50	45	40	35	35	30
245	55	50	45	40	35	35	30
250	55	50	45	40	35	35	30
255	55	50	45	40	40	35	30
260	55	50	45	40	40	35	30
265	60	50	45	40	40	35	35
270	60	50	45	45	40	35	35
275	60	55	50	45	40	35	35
280	60	55	50	45	40	35	35
285	60	55	50	45	40	35	35
290	-	55	50	45	40	40	35
295	-	55	50	45	40	40	35
300	-	55	50	45	40	40	35
330	-	60	55	50	45	40	40
400	-	-	-	60	55	50	45

# 90minutters brannmotstand: Stålbjelker montert under trapestak

Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C
40	25	25	20	20	20	20	20
45	25	25	20	20	20	20	20
50	30	25	25	20	20	20	20
55	30	25	25	20	20	20	20
60	30	30	25	20	20	20	20
65	30	30	25	25	20	20	20
70	30	30	30	25	20	20	20
75	35	30	30	25	25	20	20
80	35	30	30	25	25	20	20
85	35	35	30	30	25	25	20
90	40	35	30	30	25	25	20
95	40	35	35	30	30	25	20
100	40	40	35	30	30	25	25
105	45	40	35	35	30	30	25
110	45	40	35	35	30	30	25
115	45	40	40	35	30	30	25
120	50	45	40	35	35	30	30
125	50	45	40	35	35	30	30
130	50	45	40	40	35	30	30
135	55	45	45	40	35	35	30
140	55	50	45	40	35	35	30
145	55	50	45	40	40	35	30
150	60	50	45	40	40	35	35
155	60	55	45	45	40	35	35
160	60	55	50	45	40	35	35
165	-	55	50	45	40	40	35
170	-	55	50	45	40	40	35
175	-	60	50	45	45	40	35
180	-	60	55	50	45	40	40
185	-	60	55	50	45	40	40
190	-	60	55	50	45	45	40
195	-	-	55	50	45	45	40
200	-	-	60	55	50	45	40
205	-	-	60	55	50	45	40
210	-	-	60	55	50	45	40
215	-	-	60	55	50	45	45
220	-	-	-	55	50	50	45
225	-	-	-	60	55	50	45
230	-	-	-	60	55	50	45
235	-	-	-	60	55	50	45
240	-	-	-	60	55	50	45
245	-	-	-	60	55	50	50
250	-	-	-	-	60	55	50
255	-	-	-	-	60	55	50
260	-	-	-	-	60	55	50
265	-	-	-	-	60	55	50
270	-	-	-	-	60	55	50
275	-	-	-	-	60	55	50
280	-	-	-	-	-	60	55
285	-	-	-	-	-	60	55
290	-	-	-	-	-	60	55
295	-	-	-	-	-	60	55
300	-	-	-	-	-	60	55
330	-	-	-	-	-	-	60
400	-	-	-	-	-	-	-



# 120minutters brannmotstand: Stålbjelker montert under trapestak

Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C
40	30	25	25	20	20	20	20
45	30	30	25	25	20	20	20
50	35	30	30	25	20	20	20
55	35	35	30	25	25	20	20
60	40	35	30	30	25	25	20
65	40	35	35	30	30	25	20
70	45	40	35	30	30	25	25
75	45	40	35	35	30	30	25
80	50	45	40	35	35	30	30
85	50	45	40	35	35	30	30
90	55	45	40	40	35	35	30
95	55	50	45	40	35	35	30
100	60	50	45	40	40	35	35
105	60	55	50	45	40	35	35
110	60	55	50	45	40	40	35
115	-	55	50	45	45	40	35
120	-	60	55	50	45	40	40
125	-	60	55	50	45	40	40
130	-	-	55	50	45	45	40
135	-	-	60	55	50	45	40
140	-	-	60	55	50	45	40
145	-	-	60	55	50	45	45
150	-	-	-	60	55	50	45
155	-	-	-	60	55	50	45
160	-	-	-	60	55	50	45
165	-	-	-	-	55	50	50
170	-	-	-	-	60	55	50
175	-	-	-	-	60	55	50
180	-	-	-	-	60	55	50
185	-	-	-	-	-	55	55
190	-	-	-	-	-	60	55
195	-	-	-	-	-	60	55
200	-	-	-	-	-	60	55
205	-	-	-	-	-	-	55
210	-	-	-	-	-	-	60
215	-	-	-	-	-	-	60
220	-	-	-	-	-	-	60
225	-	-	-	-	-	-	60
230	-	-	-	-	-	-	-
235	-	-	-	-	-	-	-
240	-	-	-	-	-	-	-
245	-	-	-	-	-	-	-
250	-	-	-	-	-	-	-
255	-	-	-	-	-	-	-
260	-	-	-	-	-	-	-
265	-	-	-	-	-	-	-
270	-	-	-	-	-	-	-
275	-	-	-	-	-	-	-
280	-	-	-	-	-	-	-
285	-	-	-	-	-	-	-
290	-	-	-	-	-	-	-
295	-	-	-	-	-	-	-
300	-	-	-	-	-	-	-
330	-	-	-	-	-	-	-
400	-	-	-	-	-	-	-

# 180minutters brannmotstand: Stålbjelker montert under trapestak

Designtemp. Ap/V	350°C	400°C	450°C	500°C	550°C	600°C	650°C
40	40	40	35	30	30	25	25
45	45	40	40	35	30	30	25
50	50	45	40	40	35	30	30
55	55	50	45	40	35	35	30
60	60	55	45	45	40	35	35
65	-	55	50	45	40	40	35
70	-	60	55	50	45	40	40
75	-	-	55	50	45	45	40
80	-	-	60	55	50	45	40
85	-	-	-	55	50	50	45
90	-	-	-	60	55	50	45
95	-	-	-	-	55	55	50
100	-	-	-	-	60	55	50
105	-	-	-	-	60	55	55
110	-	-	-	-	-	60	55
115	-	-	-	-	-	60	55
120	-	-	-	-	-	-	60
125	-	-	-	-	-	-	60
130	-	-	-	-	-	-	-
135	-	-	-	-	-	-	-
140	-	-	-	-	-	-	-
145	-	-	-	-	-	-	-
150	-	-	-	-	-	-	-
155	-	-	-	-	-	-	-
160	-	-	-	-	-	-	-
165	-	-	-	-	-	-	-
170	-	-	-	-	-	-	-
175	-	-	-	-	-	-	-
180	-	-	-	-	-	-	-
185	-	-	-	-	-	-	-
190	-	-	-	-	-	-	-
195	-	-	-	-	-	-	-
200	-	-	-	-	-	-	-
205	-	-	-	-	-	-	-
210	-	-	-	-	-	-	-
215	-	-	-	-	-	-	-
220	-	-	-	-	-	-	-
225	-	-	-	-	-	-	-
230	-	-	-	-	-	-	-
235	-	-	-	-	-	-	-
240	-	-	-	-	-	-	-
245	-	-	-	-	-	-	-
250	-	-	-	-	-	-	-
255	-	-	-	-	-	-	-
260	-	-	-	-	-	-	-
265	-	-	-	-	-	-	-
270	-	-	-	-	-	-	-
275	-	-	-	-	-	-	-
280	-	-	-	-	-	-	-
285	-	-	-	-	-	-	-
290	-	-	-	-	-	-	-
295	-	-	-	-	-	-	-
300	-	-	-	-	-	-	-
330	-	-	-	-	-	-	-
400	-	-	-	-	-	-	-

# Våre produksjonsanlegg

Våre moderniserte og automatiserte produksjonsanlegg i Skamol Branden og Skamol Opole sørger for at de tekniske isolasjonssystemene våre har en unik kvalitet med tanke på stabilitet og karakteristikker. Ikke bare har dette gitt konsekvent og høy kvalitet, men også effektiv behandling av standardiserte løsninger og raske leveringstider.

En av de viktigste fordelene med våre kalsiumsilikatplater, er at de er ekstremt lette og ikke knekker under ekstreme temperaturer eller store temperatursvingninger.

## **Plater til mange bruksområder**

Hovedproduktet fra kalsiumsilikafabrikkene våre er plater som kan brukes i mange ulike isolasjonsoppgaver. Dette inkluderer blant annet isolasjon for høye temperaturer, passiv brannbeskyttelse, muggforebygging og peisbekledning.

I tillegg til plater fra masseproduksjon, kan kundene også bestille skreddersydde størrelser i større volum. Vi kan også gjennomføre produksjonstester og inspeksjoner på liten skala for å sikre en effektiv produksjonsprosess for kundene, før vi setter i gang med storskalaproduksjon.

Kalsiumsilikatplatene leveres enten til Skamol Roedding for videreforedling eller sendes direkte til kundene som bulk, slik at kundene kan stå for videreforedlingen selv.



# Notater



Lined area for notes, consisting of multiple horizontal lines on a light gray background.



# Notater

\_\_\_\_\_

[illegible]

**All in one**



Se mer på [www.skamol.com](http://www.skamol.com)

**Skamol by Etex**

Hasselager Centervej 1, 8260 Viby, Danmark

Tel.: +45 97 72 15 33

[www.skamol.com](http://www.skamol.com)