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Konstruktionsnachweis

ST71-74 A1

Stahlstützen- und Stahlträgerbekleidung (Flamtex A1) R15 – R300

ETA-18/0209

Stand 26.02.2021

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Siniat Flamtex A1 Stahlbekleidung R15 - R300

Der Brandschutzbausatz für Siniat Stahlbekleidungen besteht aus Konstruktionen mit Knaggentechnik, mit Metall-Unterkonstruktion oder ohne Metall-Unterkonstruktion.

- Knaggentechnik in Stahlträgern: Der Bausatz besteht aus 3 Komponenten (Siniat Flamtex A1, Siniat Pallas Fill und Siniat Flamtex A1 Brandschutzkleber)
- Knaggentechnik in Stahlstützen: Der Bausatz besteht aus 3 Komponenten (Siniat Flamtex A1, Siniat Pallas Fill und Siniat Flamtex A1 Brandschutzkleber) oder aus 2 Komponenten (Siniat Flamtex A1 und Siniat Pallas Fill)
- Mit Metallunterkonstruktion: Der Bausatz besteht aus 2 Komponenten (Siniat Flamtex A1 und Siniat Pallas Fill)
- Ohne Metallunterkonstruktion: Der Bausatz besteht aus 2 Komponenten (Siniat Flamtex A1 und Siniat Pallas Fill)

Nachweis mit der ETA:

Die Brandschutzbauplatte Siniat Flamtex A1, der Siniat-Brandschutzkleber und Pallas Fill als Fugenfüller bilden einen Bausatz, der als Ganzes bauaufsichtlich durch die Europäische Technische Bewertung ETA-18/0209 zur Bekleidung von Stahlträgern und -stützen nachgewiesen ist, ausgestellt vom Institut Fires s.r.o. aus der Slowakei.

Ein solcher Bausatz gilt baurechtlich als ein Bauprodukt (siehe §2(10) Musterbauordnung bzw. jeweilige Landesbauordnung):

"(10) Bauprodukte sind:

1. Produkte, Baustoffe, Bauteile und Anlagen sowie Bausätze gemäß Art. 2 Nr. 2 der Verordnung (EU) Nr. 305/2011, die hergestellt werden, um dauerhaft in bauliche Anlagen eingebaut zu werden,
2. … "

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Bankverbindung: Commerzbank AG | IBAN: DE90 3004 0000 0491 0063 00 | BIC: COBADEFFXXX |
Umsatzsteuer-ID: DE 121 640 337
Geschäftsführer: Tanguy Vanderborght | Sitz der Gesellschaft: Ratingen | Amtsgericht: Düsseldorf HRB 43209

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CE-Kennzeichnung:

Im Fall der Bekleidung von Stahlträgern und -stützen und des Bausatzes aus Siniat Flamtex A1 sowie Kleber und Fugenfüller ist der Nachweis eine Europäische Technische Bewertung, die zur CE-Kennzeichnung des Bausatzes führt.

Die CE-Kennzeichnung macht das Bauprodukt (hier: den gesamten Bausatz) in Deutschland verwendbar (siehe §16c Musterbauordnung bzw. entsprechender Paragraph der jeweiligen Landesbauordnung):

> "§ 16c Anforderungen für die Verwendung von CE-gekennzeichneten Bauprodukten
>
> [1]Ein Bauprodukt, das die CE-Kennzeichnung trägt, darf verwendet werden, wenn die erklärten Leistungen den in diesem Gesetz oder aufgrund dieses Gesetzes festgelegten Anforderungen für diese Verwendung entsprechen. [2]… "

Mit der CE-Kennzeichnung versehen werden die Begleitunterlagen (Lieferschein o. Ä.), nicht die Verpackungen der einzelnen Produkte.

Bausatz:

Bauprodukte (hier: ein Bausatz) nach harmonisierten technischen Spezifikationen können für tragende Bauteile (hier: Stahltragwerk) eingesetzt werden; die Zuordnung der Klassen, die mit der Europäischen Technischen Bewertung nachgewiesen werden, zu bauaufsichtlichen Anforderungen ergibt sich dabei aus Tabelle 4.3.1 der Muster-Verwaltungsvorschrift Technische Baubestimmungen (bzw. der entsprechenden Tabelle der Verwaltungsvorschrift Technische Baubestimmungen des jeweiligen Bundeslandes), siehe Auszug am Ende dieses Textes.

Stahlbekleidungen nach diesem Bausatz können damit zur Erfüllung der Forderung der bauaufsichtlichen Anforderungen feuerhemmend, feuerbeständig etc. verwendet werden.

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DIN- oder EN-klassifiziert:

Soweit eine Ausschreibung nicht auf diese bauaufsichtlichen Anforderungen lautet, sondern „F 30“, „F 90“ o. Ä., ist darauf hinzuweisen, dass diese Klassen nach DIN ebenfalls bauaufsichtlichen Anforderungen zugeordnet sind. Eine Vorgabe, ob die bauaufsichtliche Anforderung durch DIN- oder EN-klassifizierte Lösungen zu erfüllen ist, gibt es nicht, sprich: DIN- und EN-klassifizierte Lösungen erfüllen gleichermaßen die bauaufsichtlichen Anforderungen.

Die Leistungserklärung des Bausatzes enthält die Tabellen mit einer Zuordnung der U/A-Werte, Bekleidungsdicken und Feuerwiderstandsklassen. Letztere werden in den europäischen Klassen wie R30, R60, R90 etc. ausgedrückt.

Zugleich enthalten die Tabellen die kritischen Stahltemperaturen. Für Deutschland gilt grundsätzlich 500 °C als relevant. Das heißt beispielsweise, zur Erfüllung der Eigenschaft feuerbeständig sind die U/A-Werte und Bekleidungsdicken der Tabelle R90 und der kritischen Stahltemperatur 500 °C zu verwenden.
Zugleich geben die Tabellen dem Planer Grundlagen, eine Bemessung nach Eurocode durchzuführen. Dies gilt bei Bedarf auch für andere kritische Stahltemperaturen als 500 °C, die sich bei der Bemessung konkreter Gebäude aus der örtlichen Situation ergeben können und der Einordnung in ein Brandschutzkonzept bedürfen.

Regeln für das Bauprodukt:

Das Zusammenfügen des Bausatzes gilt nicht als Bauart.

Das bedeutet: Einerseits ist vom Verwender des Bausatzes keine Übereinstimmungserklärung abzugeben. Diese ist ausschließlich für Bauarten vorgesehen, und als solche gilt das Zusammenfügen eines Bausatzes nicht. Natürlich kann der Verarbeiter freiwillig eine Erklärung abgeben.

Andererseits kann es keine nicht-wesentliche Abweichung geben. Diese ist in der Bauordnung nur für Bauarten und Bauprodukte vorgesehen, die nicht CE-gekennzeichnet sind.

Allerdings werden in der Praxis immer wieder bestimmte Anwendungsfälle vorkommen, die nur durch strikte Anwendung des direkten Anwendungsbereichs der Prüfnorm nicht abzudecken sind – und nur diese Anwendungen dürfen in eine ETB aufgenommen werden.

Daher hat die notifizierte Stelle, die die ETB erteilt hat (Fires) ein zusätzliches Gutachten (Expert Judgement) erstellt. Dieses Gutachten klassifiziert auch einige der abweichenden Anwendungsfälle. Es ist bei Bedarf gemeinsam mit der ETB bei der abnehmenden Stelle vorzulegen.

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4.3 Verwendung von Bauprodukten nach harmonisierten technischen Spezifikationen für tragende und/oder raumabschließende Bauteile

Zur Erfüllung der Bauwerksanforderungen in A 2.1.3 bei Verwendung von Bauprodukten nach harmonisierten technischen Spezifikationen für tragende und/oder raumabschließende Teile baulicher Anlagen sind die mindestens erforderlichen Leistungen dem Abschnitt 4.3 zu entnehmen.

Die Anforderungen in den Tabellen sind nur erfüllt, wenn die erforderlichen Leistungen auf Grundlage von Bemessung oder soweit erforderlich einer Prüflastermittlung bei Brandprüfungen nach den Technischen Baubestimmungen des Teiles A, Kapitel A 1, lfd. Nrn. A 1.2, erfolgt sind.

Entsprechend A 2.1.3.3.1 ist bei Anforderungen zum Raumabschluss der Nachweis der Feuerwiderstandsfähigkeit für jede der möglichen Richtungen der Brandeinwirkung zu führen (z. B. sowohl von innen nach außen als auch von außen nach innen sowie sowohl von oben nach unten als auch von unten nach oben).

In Ermangelung einer allgemein anerkannten Regel der Technik für die Planung, Bemessung und Ausführung unter Verwendung von o.g. Bauprodukten ist ein Nachweis gemäß § 16a MBO[1] erforderlich.

4.3.1 Anforderungen zur Feuerwiderstandsfähigkeit einschließlich Brandverhalten bei Verwendung von Bauprodukten nach harmonisierten technischen Spezifikationen[24] für tragende Bauteile und mindestens erforderliche Leistungen

Tabelle 4.3.1: Bauaufsichtliche Anforderungen und mindestens erforderliche Leistungen

Bauaufsichtliche Anforderung	Mindestens erforderliche Leistungen		
	Feuerwiderstandsfähigkeit		Brandverhalten
	ohne Raumabschluss[1]	mit Raumabschluss	
feuerhemmend	R 30	REI 30	E – d2
feuerhemmend und aus nichtbrennbaren* Baustoffen	R 30	REI 30	A2 – s1,d0**
hochfeuerhemmend (tragende Teile brennbar, Dämmstoffe nichtbrennbar* mit brandschutztechnisch wirksamer Bekleidung)	R 60 $K_2$60	REI 60 $K_2$60	Dämmstoff und brandschutztechnisch wirksame Bekleidung: A2 – s1,d0**; im Übrigen: E – d2
hochfeuerhemmend und in den wesentlichen Teilen aus nichtbrennbaren* Baustoffen	R 60	REI 60[2]	A2 – s1,d0**
Wand anstelle einer Brandwand (hochfeuerhemmend und aus nichtbrennbaren* Baustoffen auch unter zusätzlicher mechanischer Beanspruchung standsicher)	-	REI 60-M	A2 – s1,d0**
Wand anstelle einer Brandwand (hochfeuerhemmend (tragende Teile brennbar, Dämmstoffe nichtbrennbar* mit brandschutztechnisch wirksamer Bekleidung) auch unter zusätzlicher mechanische Beanspruchung standsicher)		REI 60-M $K_2$60	tragende und aussteifende Teile E, im Übrigen A2 – s1,d0**
feuerbeständig (tragende und aussteifende Teile nicht brennbar*)	R 90	REI 90[2]	A2 – s1,d0**; im Übrigen E – d2
feuerbeständig und aus nichtbrennbaren* Baustoffen	R 90	REI 90	A2 – s1,d0**
Feuerwiderstandsfähigkeit 120 Min. und aus nichtbrennbaren* Baustoffen	R 120	REI 120	A2 – s1,d0**
Brandwand***	-	REI 90-M	A2 – s1,d0**

1 Für die mit reaktiven Brandschutzsystemen beschichteten Stahlbauteile ist die Angabe IncSlow gemäß

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Leistungserklärung

gem. Bauproduktenverordnung (EU) Nr. 305/2011

Nr. SI-A1-1607200

1. Eindeutiger Kenncode des Produkttyps:

Siniat Flamtex A1 Stahlbekleidung R15-R300
Brandschutzbausatz, bestehend aus den Brandschutzplatten Flamtex A1, Fugenspachtel Pallas Fill und Flamtex A1 Brandschutzkleber

2. Verwendungszweck(e):

Brandschutzbekleidung für Stahlbauteile (Typ 4)
gemäß ETA-18/0209 - 12.01.2021

3. Hersteller:

Etex Building Performance GmbH
Scheifenkamp 16
D-40878 Ratingen
Tel.: +49 (0) 2102 493 0
E-Mail: fragen@siniat.com

4. System(e) zur Bewertung und Überprüfung der Leistungsbeständigkeit:

System 1

5. a) Europäisches Bewertungsdokument: **EAD 350142-00-1106**
   b) Europäische Technische Bewertung: **ETA-18/0209 - 12.01.2021**
   b) Notifizierte Stelle(n): **NB 1396**

6. Erklärte Leistung

Wesentliche Merkmale	Leistung	Harmonisierte technische Bewertung
Brandverhalten	A1	ETA-18/0209 - 12.01.2021
Feuerwiderstand	R15-R300	
Dauerhaftigkeit und Wartung	Typ Z_2	
Gehalt, Emission und/oder Freisetzung von Gefahrstoffen	IA1, S/W2	
Durchzugswiderstand mech. Befestigungsmittel	NPD	
Scherbeanspruchungswiderstand mech.	NPD	
Widerstand gegen weichen Stoß	NPD	
Widerstand gegen harten Stoß	NPD	
Widerstand gegen exzentrische Belastung	NPD	
Adhäsion	NPD	
Luftschalldämmmung	NPD	
Schallabsorption	NPD	
Tritt- und Körperschalldämmung	NPD	
Wärmeleitfähigkeit	0,30 W/m·k	
Wasserdampf-Diffusionswiderstand	10	

Die Leistung des vorstehenden Produkts entspricht der erklärten Leistung/den erklärten Leistungen. Für Die Erstellung der Leistungserklärung im Einklang mit der Verordnung (EU) Nr. 305/2011 ist allein der genannte Hersteller verantwortlich.

Unterzeichnet für den Hersteller und im Namen des Herstellers von:
Ratingen, 12.01.2021

Tanguy Vanderborght, Geschäftsführer

i.V. Dr. Burkhard Bermes, Leiter Entwicklung

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Leistungserklärung

gem. Bauproduktenverordnung (EU) Nr. 305/2011

Nr. SI-A1-1607200

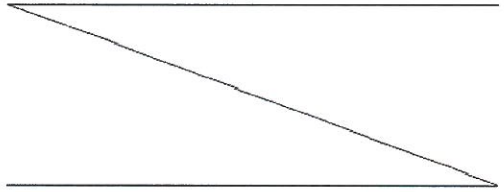
Anlage 1 - einlagige Stahlbekleidung

Annex C

Thickness of fire protection (fire protective kit based on boards Flamtex A1 applied on structural steel members as single layer protection) material to maintain temperature below design temperature Valid for columns and beams (beams from A_m/V = 65 [m^{-1}])

R15									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
55	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
60	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
65	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
70	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
75	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
80	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
85	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
90	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
95	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
100	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
105	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
110	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
115	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
120	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
125	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
130	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
135	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
140	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
145	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
150	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
155	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
160	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
165	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
170	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
175	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
180	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
185	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
190	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
195	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
200	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
205	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
210	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
215	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
220	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5

R15									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
225	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
230	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
235	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
240	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
245	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
250	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
255	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
260	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
265	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
270	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
275	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
280	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
285	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
290	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
295	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
300	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
305	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
310	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
315	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
320	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
325	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
330	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
335	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
340	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
345	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
350	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
355	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5



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Leistungserklärung

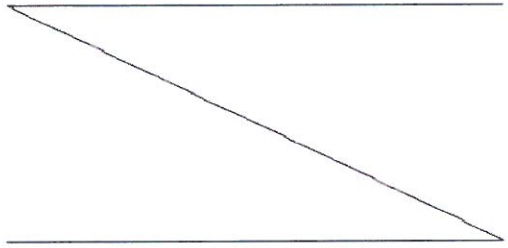
gem. Bauproduktenverordnung (EU) Nr. 305/2011

Nr. SI-A1-1607200

Anlage 1 - einlagige Stahlbekleidung

Design temperature [°C]	R20								
	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
55	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
60	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
65	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
70	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
75	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
80	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
85	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
90	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
95	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
100	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
105	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
110	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
115	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
120	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
125	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
130	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
135	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
140	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
145	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
150	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
155	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
160	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
165	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
170	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
175	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
180	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
185	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
190	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
195	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
200	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
205	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
210	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
215	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
220	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
225	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
230	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
235	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
240	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5

Design temperature [°C]	R20								
	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
250	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
255	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
260	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
265	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
270	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
275	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
280	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
285	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
290	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
295	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
300	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
305	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
310	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
315	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
320	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
325	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
330	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
335	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
340	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
345	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
350	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
355	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5



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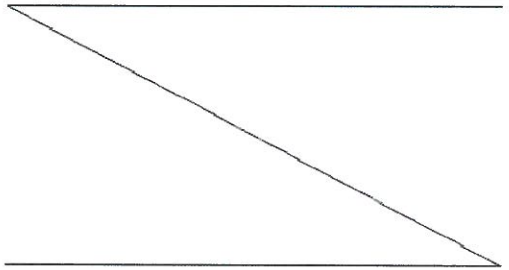
Anlage 1 - einlagige Stahlbekleidung

R30									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
55	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
60	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
65	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
70	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
75	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
80	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
85	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
90	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
95	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
100	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
105	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
110	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
115	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
120	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
125	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
130	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
135	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
140	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
145	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
150	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
155	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
160	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
165	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
170	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
175	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
180	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
185	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
190	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
195	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
200	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
205	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
210	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
215	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
220	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
225	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
230	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
235	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
240	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5

R30									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
250	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
255	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
260	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
265	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
270	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
275	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
280	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
285	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
290	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
295	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
300	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
305	15,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
310	15,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
315	15,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
320	15,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
325	15,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
330	15,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
335	15,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
340	15,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
345	15,0	15,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5
350	15,0	15,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5
355	15,0	15,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5



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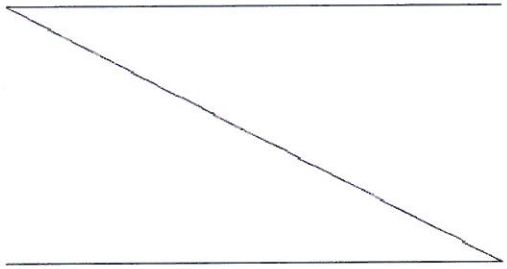
Anlage 1 - einlagige Stahlbekleidung

R45									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
55	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
60	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
65	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
70	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
75	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
80	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
85	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
90	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
95	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
100	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
105	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
110	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
115	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
120	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
125	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
130	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
135	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
140	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
145	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
150	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
155	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
160	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
165	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
170	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
175	20,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
180	20,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
185	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
190	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
195	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
200	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
205	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
210	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
215	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
220	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
225	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5
230	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5
235	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5
240	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5

R45									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	20,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5
250	20,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5
255	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5
260	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5
265	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5
270	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5
275	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5
280	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5
285	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5
290	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5
295	20,0	20,0	20,0	15,0	15,0	15,0	12,5	12,5	12,5
300	20,0	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5
305	20,0	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5
310	20,0	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5
315	20,0	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5
320	20,0	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5
325	20,0	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5
330	20,0	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5
335	20,0	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5
340	20,0	20,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5
345	25,0	20,0	20,0	20,0	20,0	15,0	15,0	12,5	12,5
350	25,0	20,0	20,0	20,0	20,0	15,0	15,0	12,5	12,5
355	25,0	20,0	20,0	20,0	20,0	15,0	15,0	12,5	12,5



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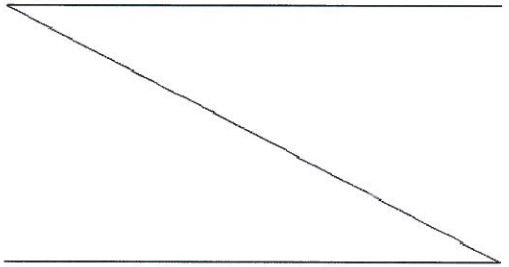
Anlage 1 - einlagige Stahlbekleidung

R60									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
55	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
60	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
65	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
70	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
75	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
80	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
85	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
90	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
95	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
100	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
105	20,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
110	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
115	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
120	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
125	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
130	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
135	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5
140	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5
145	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5
150	20,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5
155	20,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5
160	25,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5
165	25,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5
170	25,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5
175	25,0	20,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5
180	25,0	20,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5
185	25,0	20,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5
190	25,0	20,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5
195	25,0	20,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5
200	25,0	20,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5
205	25,0	20,0	20,0	20,0	20,0	12,5	12,5	12,5	12,5
210	25,0	25,0	20,0	20,0	20,0	12,5	12,5	12,5	12,5
215	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5	12,5
220	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5	12,5
225	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5	12,5
230	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5	12,5
235	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5	12,5
240	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5	12,5

R60									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	25,0	25,0	20,0	20,0	20,0	20,0	15,0	12,5	12,5
250	25,0	25,0	20,0	20,0	20,0	20,0	15,0	12,5	12,5
255	25,0	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5
260	25,0	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5
265	25,0	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5
270	25,0	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5
275	25,0	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5
280	25,0	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5
285	25,0	25,0	25,0	20,0	20,0	20,0	15,0	15,0	12,5
290	25,0	25,0	25,0	20,0	20,0	20,0	15,0	15,0	12,5
295	25,0	25,0	25,0	20,0	20,0	20,0	15,0	15,0	12,5
300	25,0	25,0	25,0	20,0	20,0	20,0	20,0	15,0	12,5
305	25,0	25,0	25,0	20,0	20,0	20,0	20,0	15,0	12,5
310	25,0	25,0	25,0	20,0	20,0	20,0	20,0	15,0	12,5
315	25,0	25,0	25,0	20,0	20,0	20,0	20,0	15,0	12,5
320	25,0	25,0	25,0	20,0	20,0	20,0	20,0	15,0	12,5
325	25,0	25,0	25,0	25,0	20,0	20,0	20,0	15,0	12,5
330	25,0	25,0	25,0	25,0	20,0	20,0	20,0	15,0	12,5
335	25,0	25,0	25,0	25,0	20,0	20,0	20,0	15,0	12,5
340	25,0	25,0	25,0	25,0	20,0	20,0	20,0	15,0	12,5
345	25,0	25,0	25,0	25,0	20,0	20,0	20,0	15,0	12,5
350	25,0	25,0	25,0	25,0	20,0	20,0	20,0	20,0	12,5
355	25,0	25,0	25,0	25,0	20,0	20,0	20,0	20,0	12,5



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siniat

Leistungserklärung

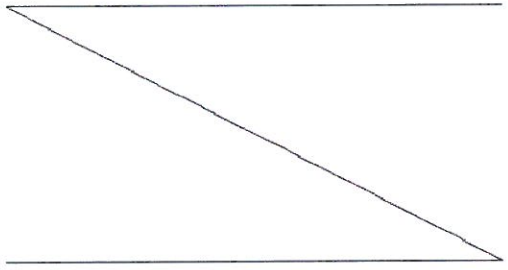
gem. Bauproduktenverordnung (EU) Nr. 305/2011

Nr. SI-A1-1607200

Anlage 1 - einlagige Stahlbekleidung

R90									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
55	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
60	20,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5	12,5
65	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
70	20,0	20,0	15,0	12,5	12,5	12,5	12,5	12,5	12,5
75	25,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5
80	25,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5
85	-	20,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5
90	-	25,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5
95	-	25,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5
100	-	25,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5
105	-	25,0	20,0	20,0	15,0	15,0	12,5	12,5	12,5
110	-	25,0	25,0	20,0	20,0	15,0	12,5	12,5	12,5
115	-	25,0	25,0	20,0	20,0	15,0	12,5	12,5	12,5
120	-	25,0	25,0	20,0	20,0	15,0	12,5	12,5	12,5
125	-	25,0	25,0	20,0	20,0	20,0	15,0	12,5	12,5
130	-	25,0	25,0	25,0	20,0	20,0	15,0	12,5	12,5
135	-	25,0	25,0	25,0	20,0	20,0	15,0	12,5	12,5
140	-	25,0	25,0	25,0	20,0	20,0	15,0	12,5	12,5
145	-	-	25,0	25,0	20,0	20,0	15,0	12,5	12,5
150	-	-	25,0	25,0	20,0	20,0	20,0	12,5	12,5
155	-	-	25,0	25,0	20,0	20,0	20,0	15,0	12,5
160	-	-	25,0	25,0	25,0	20,0	20,0	15,0	12,5
165	-	-	25,0	25,0	25,0	20,0	20,0	15,0	12,5
170	-	-	25,0	25,0	25,0	20,0	20,0	15,0	12,5
175	-	-	25,0	25,0	25,0	20,0	20,0	20,0	12,5
180	-	-	25,0	25,0	25,0	20,0	20,0	20,0	12,5
185	-	-	25,0	25,0	25,0	20,0	20,0	20,0	12,5
190	-	-	-	25,0	25,0	25,0	20,0	20,0	12,5
195	-	-	-	25,0	25,0	25,0	20,0	20,0	12,5
200	-	-	-	25,0	25,0	25,0	20,0	20,0	12,5
205	-	-	-	25,0	25,0	25,0	20,0	20,0	12,5
210	-	-	-	25,0	25,0	25,0	20,0	20,0	12,5
215	-	-	-	25,0	25,0	25,0	20,0	20,0	15,0
220	-	-	-	25,0	25,0	25,0	20,0	20,0	20,0
225	-	-	-	25,0	25,0	25,0	25,0	20,0	20,0
230	-	-	-	25,0	25,0	25,0	25,0	20,0	20,0
235	-	-	-	25,0	25,0	25,0	25,0	20,0	20,0
240	-	-	-	25,0	25,0	25,0	25,0	20,0	20,0

R90									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	-	-	-	-	25,0	25,0	25,0	20,0	20,0
250	-	-	-	-	25,0	25,0	25,0	20,0	20,0
255	-	-	-	-	25,0	25,0	25,0	20,0	20,0
260	-	-	-	-	25,0	25,0	25,0	20,0	20,0
265	-	-	-	-	25,0	25,0	25,0	20,0	20,0
270	-	-	-	-	25,0	25,0	25,0	20,0	20,0
275	-	-	-	-	25,0	25,0	25,0	20,0	20,0
280	-	-	-	-	25,0	25,0	25,0	20,0	20,0
285	-	-	-	-	25,0	25,0	25,0	25,0	20,0
290	-	-	-	-	25,0	25,0	25,0	25,0	20,0
295	-	-	-	-	25,0	25,0	25,0	25,0	20,0
300	-	-	-	-	25,0	25,0	25,0	25,0	20,0
305	-	-	-	-	25,0	25,0	25,0	25,0	20,0
310	-	-	-	-	25,0	25,0	25,0	25,0	20,0
315	-	-	-	-	25,0	25,0	25,0	25,0	20,0
320	-	-	-	-	-	25,0	25,0	25,0	20,0
325	-	-	-	-	-	25,0	25,0	25,0	20,0
330	-	-	-	-	-	25,0	25,0	25,0	20,0
335	-	-	-	-	-	25,0	25,0	25,0	20,0
340	-	-	-	-	-	25,0	25,0	25,0	20,0
345	-	-	-	-	-	-	25,0	25,0	20,0
350	-	-	-	-	-	-	25,0	25,0	20,0
355	-	-	-	-	-	-	25,0	25,0	25,0



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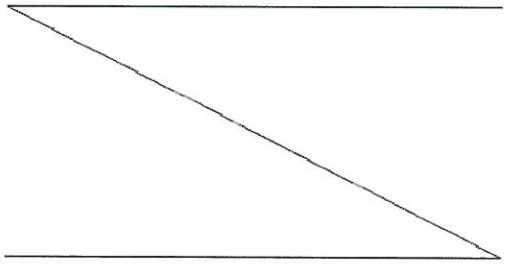
Anlage 1 - einlagige Stahlbekleidung

R120									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	-	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5
55	-	20,0	15,0	15,0	12,5	12,5	12,5	12,5	12,5
60	-	25,0	20,0	15,0	15,0	12,5	12,5	12,5	12,5
65	-	25,0	20,0	20,0	15,0	12,5	12,5	12,5	12,5
70	-	-	25,0	20,0	15,0	15,0	12,5	12,5	12,5
75	-	-	25,0	20,0	20,0	15,0	12,5	12,5	12,5
80	-	-	-	20,0	20,0	15,0	15,0	12,5	12,5
85	-	-	-	25,0	20,0	20,0	15,0	12,5	12,5
90	-	-	-	25,0	20,0	20,0	15,0	12,5	12,5
95	-	-	-	25,0	20,0	20,0	15,0	15,0	12,5
100	-	-	-	-	25,0	20,0	20,0	15,0	12,5
105	-	-	-	-	25,0	20,0	20,0	15,0	12,5
110	-	-	-	-	25,0	20,0	20,0	15,0	15,0
115	-	-	-	-	25,0	25,0	20,0	20,0	15,0
120	-	-	-	-	25,0	25,0	20,0	20,0	15,0
125	-	-	-	-	25,0	25,0	20,0	20,0	15,0
130	-	-	-	-	25,0	25,0	20,0	20,0	15,0
135	-	-	-	-	25,0	25,0	25,0	20,0	20,0
140	-	-	-	-	-	25,0	25,0	20,0	20,0
145	-	-	-	-	-	25,0	25,0	20,0	20,0
150	-	-	-	-	-	25,0	25,0	20,0	20,0
155	-	-	-	-	-	25,0	25,0	20,0	20,0
160	-	-	-	-	-	25,0	25,0	25,0	20,0
165	-	-	-	-	-	25,0	25,0	25,0	20,0
170	-	-	-	-	-	-	25,0	25,0	20,0
175	-	-	-	-	-	-	25,0	25,0	20,0
180	-	-	-	-	-	-	25,0	25,0	20,0
185	-	-	-	-	-	-	25,0	25,0	20,0
190	-	-	-	-	-	-	25,0	25,0	20,0
195	-	-	-	-	-	-	25,0	25,0	20,0
200	-	-	-	-	-	-	25,0	25,0	25,0
205	-	-	-	-	-	-	25,0	25,0	25,0
210	-	-	-	-	-	-	25,0	25,0	25,0
215	-	-	-	-	-	-	-	25,0	25,0
220	-	-	-	-	-	-	-	25,0	25,0
225	-	-	-	-	-	-	-	25,0	25,0
230	-	-	-	-	-	-	-	25,0	25,0
235	-	-	-	-	-	-	-	25,0	25,0
240	-	-	-	-	-	-	-	25,0	25,0

R120									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	-	-	-	-	-	-	-	25,0	25,0
250	-	-	-	-	-	-	-	25,0	25,0
255	-	-	-	-	-	-	-	25,0	25,0
260	-	-	-	-	-	-	-	25,0	25,0
265	-	-	-	-	-	-	-	25,0	25,0
270	-	-	-	-	-	-	-	25,0	25,0
275	-	-	-	-	-	-	-	-	25,0
280	-	-	-	-	-	-	-	-	25,0
285	-	-	-	-	-	-	-	-	25,0
290	-	-	-	-	-	-	-	-	25,0
295	-	-	-	-	-	-	-	-	25,0
300	-	-	-	-	-	-	-	-	25,0
305	-	-	-	-	-	-	-	-	25,0
310	-	-	-	-	-	-	-	-	25,0
315	-	-	-	-	-	-	-	-	25,0
320	-	-	-	-	-	-	-	-	25,0
325	-	-	-	-	-	-	-	-	25,0
330	-	-	-	-	-	-	-	-	25,0
335	-	-	-	-	-	-	-	-	25,0
340	-	-	-	-	-	-	-	-	25,0
345	-	-	-	-	-	-	-	-	25,0
350	-	-	-	-	-	-	-	-	-
355	-	-	-	-	-	-	-	-	-



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Anlage 1 - einlagige Stahlbekleidung

R150									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	-	-	-	15,0	15,0	15,0	12,5	12,5	12,5
55	-	-	-	15,0	15,0	15,0	12,5	12,5	12,5
60	*	*	*	20,0	20,0	15,0	15,0	12,5	12,5
65	-	-	-	20,0	20,0	20,0	15,0	12,5	12,5
70	-	-	-	25,0	25,0	20,0	15,0	15,0	12,5
75	-	-	-	25,0	25,0	20,0	20,0	15,0	15,0
80	-	-	-	25,0	25,0	20,0	20,0	15,0	15,0
85	-	-	-	-	-	25,0	20,0	20,0	15,0
90	-	-	-	-	-	25,0	20,0	20,0	15,0
95	-	-	-	-	-	25,0	25,0	20,0	15,0
100	-	-	-	-	-	-	25,0	20,0	20,0
105	-	-	-	-	-	-	25,0	20,0	20,0
110	-	-	-	-	-	-	25,0	20,0	20,0
115	-	-	-	-	-	-	25,0	25,0	20,0
120	-	-	-	-	-	-	25,0	25,0	20,0
125	-	-	-	-	-	-	25,0	25,0	20,0
130	-	-	-	-	-	-	-	25,0	20,0
135	-	-	-	-	-	-	-	25,0	25,0
140	-	-	-	-	-	-	-	25,0	25,0
145	-	-	-	-	-	-	-	25,0	25,0
150	-	-	-	-	-	-	-	25,0	25,0
155	-	-	-	-	-	-	-	25,0	25,0
160	-	-	-	-	-	-	-	-	25,0
165	-	-	-	-	-	-	-	-	25,0
170	-	-	-	-	-	-	-	-	25,0
175	-	-	-	-	-	-	-	-	25,0
180	-	-	-	-	-	-	-	-	25,0
185	-	-	-	-	-	-	-	-	25,0
190	-	-	-	-	-	-	-	-	25,0
195	-	-	-	-	-	-	-	-	25,0
200	-	-	-	-	-	-	-	-	25,0
205	-	-	-	-	-	-	-	-	25,0
210	-	-	-	-	-	-	-	-	25,0
215	-	-	-	-	-	-	-	-	-
220	-	-	-	-	-	-	-	-	-
225	-	-	-	-	-	-	-	-	-
230	-	-	-	-	-	-	-	-	-

R180									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	-	-	-	-	-	20,0	15,0	15,0	15,0
55	-	-	-	-	-	20,0	15,0	15,0	15,0
60	-	-	-	-	-	20,0	20,0	15,0	15,0
65	-	-	-	-	-	25,0	20,0	15,0	15,0
70	-	-	-	-	-	25,0	20,0	20,0	15,0
75	-	-	-	-	-	25,0	25,0	20,0	15,0
80	-	-	-	-	-	-	25,0	20,0	20,0
85	-	-	-	-	-	-	25,0	25,0	20,0
90	-	-	-	-	-	-	-	25,0	20,0
95	-	-	-	-	-	-	-	25,0	20,0
100	-	-	-	-	-	-	-	25,0	25,0
105	-	-	-	-	-	-	-	-	25,0
110	-	-	-	-	-	-	-	-	25,0
115	-	-	-	-	-	-	-	-	25,0
120	-	-	-	-	-	-	-	-	25,0
125	-	-	-	-	-	-	-	-	25,0
130	-	-	-	-	-	-	-	-	25,0
135	-	-	-	-	-	-	-	-	25,0
140	-	-	-	-	-	-	-	-	25,0
145	-	-	-	-	-	-	-	-	-
150	-	-	-	-	-	-	-	-	-
155	-	-	-	-	-	-	-	-	-
160	*	*	*	*	*	*	*	*	*
165	-	-	-	-	-	-	-	-	-
170	-	-	-	-	-	-	-	-	-
175	-	-	-	-	-	-	-	-	-
180	-	-	-	-	-	-	-	-	-
185	-	-	-	-	-	-	-	-	-
190	-	-	-	-	-	-	-	-	-
195	-	-	-	-	-	-	-	-	-
200	-	-	-	-	-	-	-	-	-
205	-	-	-	-	-	-	-	-	-
210	-	-	-	-	-	-	-	-	-
215	-	-	-	-	-	-	-	-	-
220	-	-	-	-	-	-	-	-	-
225	-	-	-	-	-	-	-	-	-
230	-	-	-	-	-	-	-	-	-

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Anlage 1 - einlagige Stahlbekleidung

R210

Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	-	-	-	-	-	-	20,0	20,0	15,0
55	-	-	-	-	-	-	20,0	20,0	15,0
60	-	-	-	-	-	-	25,0	20,0	15,0
65	-	-	-	-	-	-	25,0	20,0	20,0
70	-	-	-	-	-	-	25,0	25,0	20,0
75	-	-	-	-	-	-	-	25,0	20,0
80	-	-	-	-	-	-	-	25,0	25,0
85	-	-	-	-	-	-	-	-	25,0
90	-	-	-	-	-	-	-	-	25,0
95	-	-	-	-	-	-	-	-	-
100	-	-	-	-	-	-	-	-	-
105	-	-	-	-	-	-	-	-	-
110	-	-	-	-	-	-	-	-	-
115	-	-	-	-	-	-	-	-	-
120	-	-	-	-	-	-	-	-	-
125	-	-	-	-	-	-	-	-	-
130	-	-	-	-	-	-	-	-	-
135	-	-	-	-	-	-	-	-	-
140	-	-	-	-	-	-	-	-	-
145	-	-	-	-	-	-	-	-	-
150	-	-	-	-	-	-	-	-	-
155	-	-	-	-	-	-	-	-	-
160	-	-	-	-	-	-	-	-	-
165	-	-	-	-	-	-	-	-	-
170	-	-	-	-	-	-	-	-	-
175	-	-	-	-	-	-	-	-	-
180	-	-	-	-	-	-	-	-	-
185	-	-	-	-	-	-	-	-	-
190	-	-	-	-	-	-	-	-	-
195	-	-	-	-	-	-	-	-	-
200	-	-	-	-	-	-	-	-	-
205	-	-	-	-	-	-	-	-	-
210	-	-	-	-	-	-	-	-	-
215	-	-	-	-	-	-	-	-	-
220	-	-	-	-	-	-	-	-	-
225	-	-	-	-	-	-	-	-	-
230	-	-	-	-	-	-	-	-	-

R240

Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	-	-	-	-	-	-	-	20,0	20,0
55	-	-	-	-	-	-	-	20,0	20,0
60	-	-	-	-	-	-	-	25,0	20,0
65	-	-	-	-	-	-	-	25,0	20,0
70	-	-	-	-	-	-	-	25,0	25,0
75	-	-	-	-	-	-	-	-	25,0
80	-	-	-	-	-	-	-	-	-
85	-	-	-	-	-	-	-	-	-
90	-	-	-	-	-	-	-	-	-
95	-	-	-	-	-	-	-	-	-
100	-	-	-	-	-	-	-	-	-
105	-	-	-	-	-	-	-	-	-
110	-	-	-	-	-	-	-	-	-
115	-	-	-	-	-	-	-	-	-
120	-	-	-	-	-	-	-	-	-
125	-	-	-	-	-	-	-	-	-
130	-	-	-	-	-	-	-	-	-
135	-	-	-	-	-	-	-	-	-
140	-	-	-	-	-	-	-	-	-
145	-	-	-	-	-	-	-	-	-
150	-	-	-	-	-	-	-	-	-
155	-	-	-	-	-	-	-	-	-
160	-	-	-	-	-	-	-	-	-
165	-	-	-	-	-	-	-	-	-
170	-	-	-	-	-	-	-	-	-
175	-	-	-	-	-	-	-	-	-
180	-	-	-	-	-	-	-	-	-
185	-	-	-	-	-	-	-	-	-
190	-	-	-	-	-	-	-	-	-
195	-	-	-	-	-	-	-	-	-
200	-	-	-	-	-	-	-	-	-
205	-	-	-	-	-	-	-	-	-
210	-	-	-	-	-	-	-	-	-
215	-	-	-	-	-	-	-	-	-
220	-	-	-	-	-	-	-	-	-
225	-	-	-	-	-	-	-	-	-
230	-	-	-	-	-	-	-	-	-

siniat

Leistungserklärung

gem. Bauproduktenverordnung (EU) Nr. 305/2011

Nr. SI-A1-1607200

Anlage 1 - einlagige Stahlbekleidung

R270									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	-	-	-	-	-	-	-	-	20,0
55	-	-	-	-	-	-	-	-	20,0
60	-	-	-	-	-	-	-	-	25,0
65	-	-	-	-	-	-	-	-	25,0
70	-	-	-	-	-	-	-	-	-
75	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-
85	-	-	-	-	-	-	-	-	-
90	-	-	-	-	-	-	-	-	-
95	-	-	-	-	-	-	-	-	-
100	-	-	-	-	-	-	-	-	-
105	-	-	-	-	-	-	-	-	-
110	-	-	-	-	-	-	-	-	-
115	-	-	-	-	-	-	-	-	-
120	-	-	-	-	-	-	-	-	-
125	-	-	-	-	-	-	-	-	-
130	-	-	-	-	-	-	-	-	-
135	-	-	-	-	-	-	-	-	-
140	-	-	-	-	-	-	-	-	-
145	-	-	-	-	-	-	-	-	-
150	-	-	-	-	-	-	-	-	-
155	-	-	-	-	-	-	-	-	-
160	-	-	-	-	-	-	-	-	-
165	-	-	-	-	-	-	-	-	-
170	-	-	-	-	-	-	-	-	-
175	-	-	-	-	-	-	-	-	-
180	-	-	-	-	-	-	-	-	-
185	-	-	-	-	-	-	-	-	-
190	-	-	-	-	-	-	-	-	-
195	-	-	-	-	-	-	-	-	-
200	-	-	-	-	-	-	-	-	-
205	-	-	-	-	-	-	-	-	-
210	-	-	-	-	-	-	-	-	-
215	-	-	-	-	-	-	-	-	-
220	-	-	-	-	-	-	-	-	-
225	-	-	-	-	-	-	-	-	-
230	-	-	-	-	-	-	-	-	-

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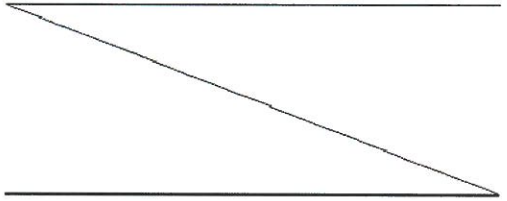
Anlage 2 - zweilagige Stahlbekleidung

Annex D
Thickness of fire protection (fire protective kit based on boards Flamtex A1 applied on structural steel members as dcuble layer protection) material to maintain temperature below design temperature Valid for columns from A_m/V=50 m^{-1} and beams from A_m/V=55 m^{-1}

R15									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
55	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
60	25,0	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	25,0
70	25,0	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	25,0
80	25,0	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	25,0
90	25,0	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	25,0
100	25,0	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	25,0
110	25,0	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	25,0
120	25,0	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	25,0
130	25,0	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	25,0
140	25,0	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	25,0
150	25,0	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	25,0
160	25,0	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	25,0
170	25,0	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	25,0
180	25,0	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	25,0
190	25,0	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	25,0
200	25,0	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	25,0
210	25,0	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	25,0
220	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0

R15									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
225	25,0	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	25,0
235	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
240	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
245	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
250	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
255	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
260	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
265	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
270	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
275	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
280	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
285	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
290	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
295	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
300	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
305	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
310	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
315	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
320	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
325	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
330	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
335	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
340	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
345	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
350	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
355	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0



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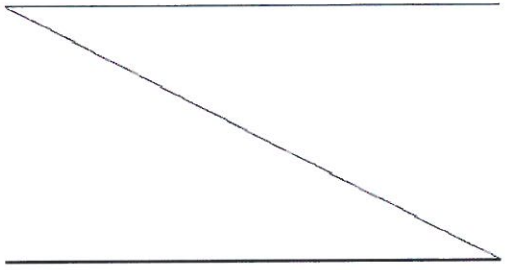
Anlage 2 - zweilagige Stahlbekleidung

R20									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
30	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
35	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
40	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
45	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
50	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
55	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
60	25,0	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	25,0
70	25,0	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	25,0
80	25,0	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	25,0
90	25,0	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	25,0
100	25,0	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	25,0
110	25,0	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	25,0
120	25,0	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	25,0
130	25,0	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	25,0
140	25,0	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	25,0
150	25,0	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	25,0
160	25,0	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	25,0
170	25,0	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	25,0
180	25,0	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	25,0
190	25,0	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	25,0
200	25,0	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	25,0
210	25,0	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	25,0
220	25,0	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	25,0
230	25,0	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	25,0
240	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0

R20									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
250	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
255	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
260	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
265	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
270	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
275	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
280	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
285	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
290	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
295	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
300	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
305	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
310	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
315	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
320	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
325	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
330	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
335	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
340	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
345	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
350	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
355	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0



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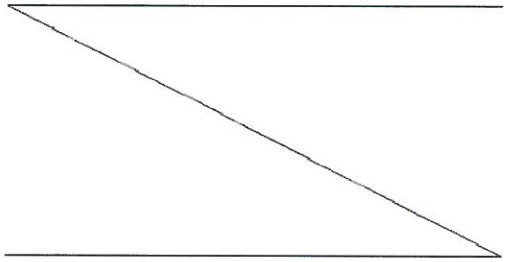
Anlage 2 - zweilagige Stahlbekleidung

R30									
Design tempeature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
55	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
60	25,0	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	25,0
70	25,0	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	25,0
80	25,0	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	25,0
90	25,0	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	25,0
100	25,0	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	25,0
110	25,0	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	25,0
120	25,0	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	25,0
130	25,0	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	25,0
140	25,0	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	25,0
150	25,0	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	25,0
160	25,0	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	25,0
170	25,0	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	25,0
180	25,0	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	25,0
190	25,0	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	25,0
200	25,0	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	25,0
210	25,0	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	25,0
220	25,0	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	25,0
230	25,0	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	25,0
240	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0

R30									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
250	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
255	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
260	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
265	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
270	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
275	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
280	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
285	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
290	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
295	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
300	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
305	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
310	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
315	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
320	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
325	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
330	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
335	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
340	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
345	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
350	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
355	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0



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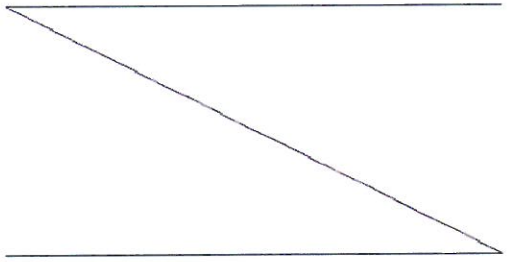
Anlage 2 - zweilagige Stahlbekleidung

R45									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
55	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
60	25,0	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	25,0
70	25,0	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	25,0
80	25,0	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	25,0
90	25,0	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	25,0
100	25,0	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	25,0
110	25,0	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	25,0
120	25,0	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	25,0
130	25,0	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	25,0
140	25,0	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	25,0
150	25,0	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	25,0
160	25,0	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	25,0
170	25,0	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	25,0
180	25,0	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	25,0
190	25,0	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	25,0
200	25,0	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	25,0
210	25,0	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	25,0
220	25,0	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	25,0
230	25,0	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	25,0
240	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0

R45									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
250	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
255	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
260	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
265	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
270	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
275	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
280	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
285	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
290	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
295	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
300	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
305	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
310	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
315	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
320	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
325	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
330	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
335	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
340	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
345	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
350	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
355	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0



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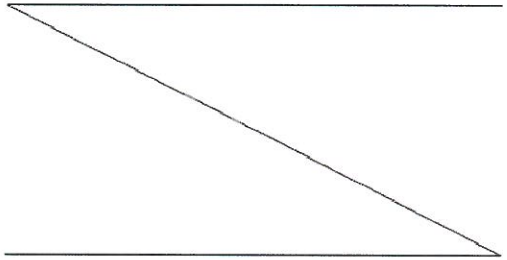
Anlage 2 - zweilagige Stahlbekleidung

R60									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
55	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
60	25,0	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	25,0
70	25,0	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	25,0
80	25,0	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	25,0
90	25,0	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	25,0
100	25,0	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	25,0
110	25,0	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	25,0
120	25,0	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	25,0
130	25,0	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	25,0
140	25,0	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	25,0
150	25,0	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	25,0
160	25,0	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	25,0
170	25,0	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	25,0
180	25,0	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	25,0
190	25,0	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	25,0
200	25,0	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	25,0
210	25,0	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	25,0
220	25,0	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	25,0
230	25,0	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	25,0
240	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0

R60									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
250	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
255	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
260	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
265	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
270	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
275	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
280	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
285	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
290	27,5	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0
295	27,5	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0
300	27,5	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0
305	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0	25,0
310	27,5	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
315	27,5	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
320	27,5	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
325	27,5	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
330	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
335	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
340	30,0	27,5	27,5	27,5	27,5	25,0	25,0	25,0	25,0
345	30,0	27,5	27,5	27,5	27,5	25,0	25,0	25,0	25,0
350	30,0	27,5	27,5	27,5	27,5	25,0	25,0	25,0	25,0
355	30,0	30,0	27,5	27,5	27,5	27,5	25,0	25,0	25,0



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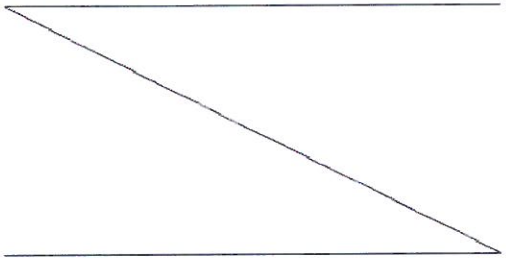
Anlage 2 - zweilagige Stahlbekleidung

R90									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
55	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
60	25,0	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	25,0
70	25,0	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	25,0
80	25,0	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	25,0
90	25,0	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	25,0
100	25,0	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	25,0
110	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
115	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
120	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
125	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
130	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
135	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
140	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
145	27,5	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0
150	27,5	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0
155	27,5	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0
160	27,5	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0
165	27,5	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0
170	30,0	27,5	27,5	25,0	25,0	25,0	25,0	25,0	25,0
175	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
180	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
185	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
190	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
195	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
200	30,0	30,0	27,5	27,5	25,0	25,0	25,0	25,0	25,0
205	30,0	30,0	27,5	27,5	25,0	25,0	25,0	25,0	25,0
210	30,0	30,0	27,5	27,5	25,0	25,0	25,0	25,0	25,0
215	30,0	30,0	27,5	27,5	25,0	25,0	25,0	25,0	25,0
220	30,0	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0
225	30,0	30,0	30,0	27,5	27,5	25,0	25,0	25,0	25,0
230	32,5	30,0	30,0	30,0	27,5	27,5	25,0	25,0	25,0
235	32,5	30,0	30,0	30,0	27,5	27,5	25,0	25,0	25,0
240	32,5	30,0	30,0	30,0	27,5	27,5	25,0	25,0	25,0

R90									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	32,5	30,0	30,0	30,0	27,5	27,5	25,0	25,0	25,0
250	32,5	30,0	30,0	30,0	27,5	27,5	25,0	25,0	25,0
255	32,5	32,5	30,0	30,0	27,5	27,5	27,5	25,0	25,0
260	32,5	32,5	30,0	30,0	27,5	27,5	27,5	25,0	25,0
265	32,5	32,5	30,0	30,0	27,5	27,5	27,5	25,0	25,0
270	32,5	32,5	30,0	30,0	30,0	27,5	27,5	25,0	25,0
275	32,5	32,5	30,0	30,0	30,0	27,5	27,5	25,0	25,0
280	32,5	32,5	32,5	30,0	30,0	27,5	27,5	27,5	25,0
285	32,5	32,5	32,5	30,0	30,0	30,0	27,5	27,5	25,0
290	35,0	32,5	32,5	32,5	30,0	30,0	27,5	27,5	25,0
295	35,0	32,5	32,5	32,5	30,0	30,0	27,5	27,5	25,0
300	35,0	32,5	32,5	32,5	30,0	30,0	27,5	27,5	27,5
305	35,0	32,5	32,5	32,5	30,0	30,0	27,5	27,5	27,5
310	35,0	32,5	32,5	32,5	30,0	30,0	30,0	27,5	27,5
315	35,0	35,0	32,5	32,5	30,0	30,0	30,0	27,5	27,5
320	35,0	35,0	32,5	32,5	32,5	30,0	30,0	27,5	27,5
325	35,0	35,0	32,5	32,5	32,5	30,0	30,0	27,5	27,5
330	35,0	35,0	32,5	32,5	32,5	30,0	30,0	27,5	27,5
335	35,0	35,0	32,5	32,5	32,5	30,0	30,0	27,5	27,5
340	35,0	35,0	35,0	32,5	32,5	32,5	30,0	30,0	27,5
345	35,0	35,0	35,0	35,0	32,5	32,5	30,0	30,0	27,5
350	37,5	35,0	35,0	35,0	32,5	32,5	30,0	30,0	27,5
355	37,5	35,0	35,0	35,0	32,5	32,5	30,0	30,0	27,5



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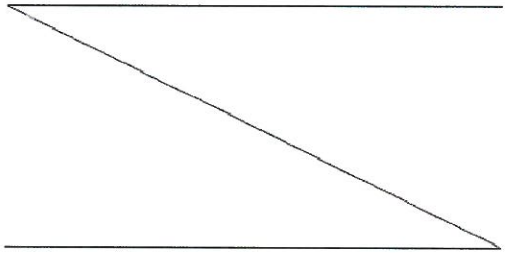
Anlage 2 - zweilagige Stahlbekleidung

R120									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
55	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
60	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
65	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0	25,0
70	27,5	27,5	25,0	25,0	25,0	25,0	25,0	25,0	25,0
75	27,5	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
80	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
85	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0	25,0
90	30,0	27,5	27,5	27,5	27,5	25,0	25,0	25,0	25,0
95	30,0	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0
100	32,5	30,0	27,5	27,5	27,5	27,5	25,0	25,0	25,0
105	32,5	30,0	27,5	27,5	27,5	27,5	25,0	25,0	25,0
110	32,5	30,0	30,0	27,5	27,5	27,5	25,0	25,0	25,0
115	32,5	30,0	30,0	30,0	27,5	27,5	25,0	25,0	25,0
120	35,0	32,5	30,0	30,0	27,5	27,5	25,0	25,0	25,0
125	35,0	32,5	30,0	30,0	27,5	27,5	27,5	25,0	25,0
130	35,0	32,5	30,0	30,0	27,5	27,5	27,5	25,0	25,0
135	35,0	32,5	30,0	30,0	30,0	27,5	27,5	25,0	25,0
140	37,5	32,5	30,0	30,0	30,0	27,5	27,5	25,0	25,0
145	37,5	35,0	32,5	30,0	30,0	27,5	27,5	25,0	25,0
150	37,5	35,0	32,5	30,0	30,0	27,5	27,5	25,0	25,0
155	37,5	35,0	32,5	32,5	30,0	30,0	27,5	25,0	25,0
160	37,5	35,0	32,5	32,5	30,0	30,0	27,5	25,0	25,0
165	37,5	35,0	32,5	32,5	30,0	30,0	27,5	25,0	25,0
170	37,5	37,5	32,5	32,5	30,0	30,0	27,5	27,5	25,0
175	37,5	37,5	35,0	32,5	30,0	30,0	27,5	27,5	25,0
180	37,5	37,5	35,0	32,5	32,5	30,0	30,0	27,5	25,0
185	37,5	37,5	35,0	32,5	32,5	30,0	30,0	27,5	25,0
190	37,5	37,5	35,0	35,0	32,5	30,0	30,0	27,5	25,0
195	37,5	37,5	35,0	35,0	32,5	30,0	30,0	27,5	25,0
200	37,5	37,5	35,0	35,0	32,5	30,0	30,0	27,5	25,0
205	40,0	37,5	35,0	35,0	32,5	30,0	30,0	27,5	25,0
210	40,0	37,5	37,5	35,0	32,5	30,0	30,0	27,5	27,5
215	40,0	37,5	37,5	35,0	32,5	32,5	30,0	27,5	27,5
220	40,0	37,5	37,5	35,0	35,0	32,5	30,0	30,0	27,5
225	40,0	37,5	37,5	35,0	35,0	32,5	30,0	30,0	27,5
230	40,0	37,5	37,5	37,5	35,0	32,5	30,0	30,0	27,5
235	40,0	40,0	37,5	37,5	35,0	32,5	32,5	30,0	27,5
240	40,0	40,0	37,5	37,5	35,0	32,5	32,5	30,0	27,5

R120									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	40,0	40,0	37,5	37,5	35,0	32,5	32,5	30,0	27,5
250	40,0	40,0	37,5	37,5	35,0	32,5	32,5	30,0	27,5
255	40,0	40,0	37,5	37,5	35,0	32,5	32,5	30,0	30,0
260	40,0	40,0	37,5	37,5	35,0	32,5	32,5	30,0	30,0
265	40,0	40,0	40,0	37,5	37,5	32,5	32,5	30,0	30,0
270	45,0	40,0	40,0	37,5	37,5	32,5	32,5	32,5	30,0
275	45,0	40,0	40,0	37,5	37,5	35,0	32,5	32,5	30,0
280	45,0	40,0	40,0	37,5	37,5	35,0	32,5	32,5	30,0
285	45,0	40,0	40,0	40,0	37,5	35,0	32,5	32,5	30,0
290	45,0	40,0	40,0	40,0	37,5	35,0	35,0	32,5	30,0
295	45,0	45,0	40,0	40,0	37,5	35,0	35,0	32,5	30,0
300	45,0	45,0	40,0	40,0	37,5	35,0	35,0	32,5	32,5
305	45,0	45,0	40,0	40,0	37,5	35,0	35,0	32,5	32,5
310	45,0	45,0	40,0	40,0	37,5	35,0	35,0	32,5	32,5
315	45,0	45,0	40,0	40,0	40,0	35,0	35,0	35,0	32,5
320	45,0	45,0	45,0	40,0	40,0	35,0	35,0	35,0	32,5
325	45,0	45,0	45,0	40,0	40,0	35,0	35,0	35,0	32,5
330	45,0	45,0	45,0	42,0	40,0	37,5	35,0	35,0	32,5
335	45,0	45,0	45,0	45,0	40,0	37,5	35,0	35,0	32,5
340	45,0	45,0	45,0	45,0	40,0	37,5	35,0	35,0	32,5
345	45,0	45,0	45,0	45,0	40,0	37,5	37,5	35,0	35,0
350	45,0	45,0	45,0	45,0	40,0	37,5	37,5	35,0	35,0
355	45,0	45,0	45,0	45,0	40,0	37,5	37,5	35,0	35,0



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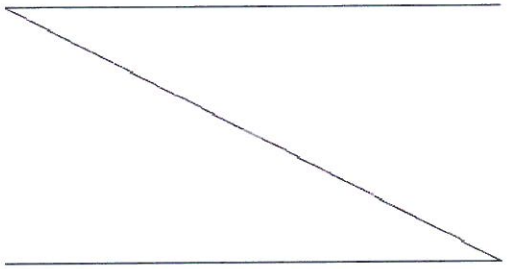
Anlage 2 - zweilagige Stahlbekleidung

R150									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	30,0	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0
55	30,0	30,0	27,5	27,5	27,5	25,0	25,0	25,0	25,0
60	32,5	30,0	27,5	27,5	27,5	27,5	25,0	25,0	25,0
65	32,5	30,0	30,0	27,5	27,5	27,5	27,5	25,0	25,0
70	35,0	32,5	30,0	27,5	27,5	27,5	27,5	27,5	25,0
75	35,0	32,5	30,0	30,0	30,0	27,5	27,5	27,5	27,5
80	37,5	32,5	32,5	30,0	30,0	30,0	27,5	27,5	27,5
85	37,5	35,0	32,5	30,0	30,0	30,0	27,5	27,5	27,5
90	37,5	35,0	32,5	32,5	32,5	30,0	30,0	27,5	27,5
95	37,5	37,5	35,0	32,5	32,5	30,0	30,0	27,5	27,5
100	37,5	37,5	35,0	32,5	32,5	30,0	30,0	30,0	27,5
105	37,5	37,5	35,0	32,5	32,5	32,5	30,0	30,0	27,5
110	37,5	37,5	37,5	35,0	35,0	32,5	30,0	30,0	27,5
115	37,5	37,5	37,5	35,0	35,0	32,5	32,5	30,0	30,0
120	37,5	37,5	37,5	35,0	35,0	32,5	32,5	30,0	30,0
125	37,5	37,5	37,5	35,0	35,0	35,0	32,5	30,0	30,0
130	40,0	37,5	37,5	37,5	37,5	35,0	32,5	32,5	30,0
135	40,0	37,5	37,5	37,5	37,5	35,0	32,5	32,5	30,0
140	40,0	37,5	37,5	37,5	37,5	35,0	35,0	32,5	30,0
145	40,0	37,5	37,5	37,5	37,5	35,0	35,0	32,5	30,0
150	40,0	37,5	37,5	37,5	37,5	37,5	35,0	32,5	30,0
155	40,0	40,0	37,5	37,5	37,5	37,5	35,0	32,5	32,5
160	40,0	40,0	37,5	37,5	37,5	37,5	35,0	32,5	32,5
165	40,0	40,0	37,5	37,5	37,5	37,5	37,5	35,0	32,5
170	40,0	40,0	40,0	37,5	37,5	37,5	37,5	35,0	32,5
175	40,0	40,0	40,0	37,5	37,5	37,5	37,5	35,0	32,5
180	45,0	40,0	40,0	37,5	37,5	37,5	37,5	35,0	32,5
185	45,0	40,0	40,0	37,5	37,5	37,5	37,5	35,0	32,5
190	45,0	40,0	40,0	40,0	40,0	37,5	37,5	35,0	32,5
195	45,0	40,0	40,0	40,0	40,0	37,5	37,5	37,5	35,0
200	45,0	40,0	40,0	40,0	40,0	37,5	37,5	37,5	35,0
205	45,0	40,0	40,0	40,0	40,0	40,0	40,0	37,5	35,0
210	45,0	40,0	40,0	40,0	40,0	40,0	40,0	37,5	35,0
215	45,0	45,0	40,0	40,0	40,0	40,0	40,0	37,5	35,0
220	45,0	45,0	40,0	40,0	40,0	40,0	40,0	37,5	35,0
225	45,0	45,0	45,0	40,0	40,0	40,0	40,0	37,5	35,0
230	45,0	45,0	45,0	40,0	40,0	40,0	40,0	37,5	35,0
235	45,0	45,0	45,0	40,0	40,0	40,0	40,0	37,5	35,0
240	45,0	45,0	45,0	40,0	40,0	40,0	40,0	37,5	37,5

R150									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	45,0	45,0	45,0	40,0	40,0	40,0	40,0	37,5	37,5
250	45,0	45,0	45,0	45,0	45,0	45,0	45,0	37,5	37,5
255	45,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0	37,5
260	45,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0	37,5
265	45,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0	37,5
270	45,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0	37,5
275	45,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0	37,5
280	50,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0	37,5
285	50,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0	37,5
290	50,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0	37,5
295	50,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0	40,0
300	50,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0	40,0
305	50,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0	40,0
310	50,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0	40,0
315	50,0	45,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0
320	50,0	45,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0
325	50,0	45,0	45,0	45,0	45,0	45,0	45,0	45,0	40,0
330	50,0	50,0	50,0	50,0	50,0	50,0	50,0	45,0	40,0
335	-	50,0	50,0	50,0	50,0	50,0	50,0	45,0	40,0
340	-	50,0	50,0	50,0	50,0	50,0	50,0	45,0	40,0
345	-	50,0	50,0	50,0	50,0	50,0	50,0	45,0	40,0
350	-	-	50,0	50,0	50,0	50,0	50,0	45,0	45,0
355	-	-	50,0	50,0	50,0	50,0	50,0	45,0	45,0



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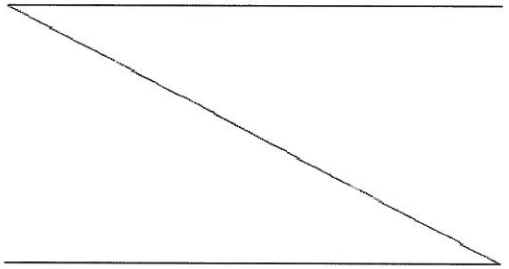
Anlage 2 - zweilagige Stahlbekleidung

R180									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	35,0	32,5	32,5	32,5	30,0	30,0	27,5	27,5	27,5
55	35,0	32,5	32,5	32,5	30,0	30,0	27,5	27,5	27,5
60	37,5	35,0	32,5	32,5	32,5	30,0	30,0	30,0	27,5
65	37,5	37,5	35,0	32,5	32,5	32,5	30,0	30,0	30,0
70	40,0	37,5	35,0	35,0	32,5	32,5	32,5	30,0	30,0
75	40,0	37,5	37,5	35,0	35,0	32,5	32,5	30,0	30,0
80	45,0	40,0	37,5	37,5	35,0	35,0	32,5	32,5	30,0
85	45,0	40,0	37,5	37,5	37,5	35,0	35,0	32,5	32,5
90	45,0	40,0	40,0	37,5	37,5	35,0	35,0	32,5	32,5
95	45,0	45,0	40,0	37,5	37,5	37,5	35,0	35,0	32,5
100	45,0	45,0	45,0	40,0	37,5	37,5	37,5	35,0	32,5
105	50,0	45,0	45,0	40,0	37,5	37,5	37,5	35,0	35,0
110	50,0	45,0	45,0	40,0	37,5	37,5	37,5	35,0	35,0
115	50,0	45,0	45,0	45,0	40,0	37,5	37,5	37,5	35,0
120	50,0	45,0	45,0	45,0	40,0	37,5	37,5	37,5	35,0
125	50,0	50,0	45,0	45,0	40,0	37,5	37,5	37,5	37,5
130	50,0	50,0	50,0	45,0	40,0	37,5	37,5	37,5	37,5
135	50,0	50,0	50,0	45,0	40,0	37,5	37,5	37,5	37,5
140	50,0	50,0	50,0	45,0	40,0	40,0	40,0	37,5	37,5
145	50,0	50,0	50,0	45,0	45,0	40,0	40,0	37,5	37,5
150	50,0	50,0	50,0	45,0	45,0	40,0	40,0	37,5	37,5
155	50,0	50,0	50,0	50,0	45,0	40,0	40,0	37,5	37,5
160	50,0	50,0	50,0	50,0	45,0	40,0	40,0	37,5	37,5
165	50,0	50,0	50,0	50,0	45,0	40,0	40,0	37,5	37,5
170	50,0	50,0	50,0	50,0	45,0	40,0	40,0	37,5	37,5
175	-	50,0	50,0	50,0	45,0	40,0	40,0	40,0	37,5
180	-	50,0	50,0	50,0	45,0	45,0	45,0	40,0	37,5
185	-	50,0	50,0	50,0	45,0	45,0	45,0	40,0	37,5
190	-	50,0	50,0	50,0	45,0	45,0	45,0	40,0	40,0
195	-	50,0	50,0	50,0	45,0	45,0	45,0	40,0	40,0
200	-	50,0	50,0	50,0	50,0	45,0	45,0	40,0	40,0
205	-	-	50,0	50,0	50,0	45,0	45,0	40,0	40,0
210	-	-	50,0	50,0	50,0	45,0	45,0	40,0	40,0
215	-	-	50,0	50,0	50,0	45,0	45,0	40,0	40,0
220	-	-	50,0	50,0	50,0	45,0	45,0	40,0	40,0
225	-	-	50,0	50,0	50,0	45,0	45,0	40,0	40,0
230	-	-	50,0	50,0	50,0	45,0	45,0	40,0	40,0
235	-	-	50,0	50,0	50,0	45,0	45,0	45,0	40,0
240	-	-	50,0	50,0	50,0	45,0	45,0	45,0	40,0

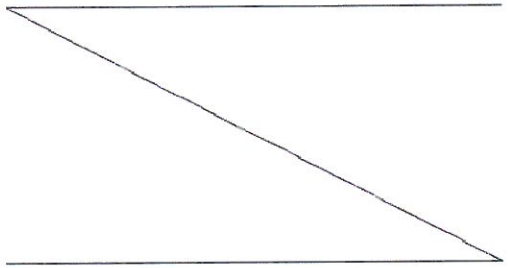
R180									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	-	-	50,0	50,0	50,0	45,0	45,0	45,0	40,0
250	-	-	50,0	50,0	50,0	45,0	45,0	45,0	45,0
255	-	-	50,0	50,0	50,0	45,0	45,0	45,0	45,0
260	-	-	50,0	50,0	50,0	50,0	50,0	45,0	45,0
265	-	-	50,0	50,0	50,0	50,0	50,0	45,0	45,0
270	-	-	-	50,0	50,0	50,0	50,0	45,0	45,0
275	-	-	-	50,0	50,0	50,0	50,0	45,0	45,0
280	-	-	-	50,0	50,0	50,0	50,0	45,0	45,0
285	-	-	-	50,0	50,0	50,0	50,0	45,0	45,0
290	-	-	-	50,0	50,0	50,0	50,0	45,0	45,0
295	-	-	-	50,0	50,0	50,0	50,0	45,0	45,0
300	-	-	-	50,0	50,0	50,0	50,0	45,0	45,0
305	-	-	-	50,0	50,0	50,0	50,0	45,0	45,0
310	-	-	-	50,0	50,0	50,0	50,0	45,0	45,0
315	-	-	-	50,0	50,0	50,0	50,0	45,0	45,0
320	-	-	-	50,0	50,0	50,0	50,0	45,0	45,0
325	-	-	-	-	-	50,0	50,0	45,0	45,0
330	-	-	-	-	-	50,0	50,0	45,0	45,0
335	-	-	-	-	-	50,0	50,0	45,0	45,0
340	-	-	-	-	-	50,0	50,0	45,0	45,0
345	-	-	-	-	-	-	-	45,0	45,0
350	-	-	-	-	-	-	-	45,0	45,0
355	-	-	-	-	-	-	-	50,0	45,0



Anlage 2 - zweilagige Stahlbekleidung

R210									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	45,0	40,0	35,0	35,0	35,0	32,5	32,5	32,5	30,0
55	45,0	40,0	35,0	35,0	35,0	32,5	32,5	32,5	32,5
60	45,0	45,0	40,0	37,5	35,0	35,0	32,5	32,5	32,5
65	50,0	45,0	45,0	40,0	37,5	35,0	35,0	32,5	32,5
70	50,0	50,0	45,0	45,0	40,0	37,5	35,0	35,0	35,0
75	50,0	50,0	50,0	45,0	40,0	37,5	37,5	35,0	35,0
80	50,0	50,0	50,0	50,0	45,0	40,0	37,5	37,5	35,0
85	50,0	50,0	50,0	50,0	45,0	40,0	37,5	37,5	37,5
90	50,0	50,0	50,0	50,0	50,0	45,0	40,0	37,5	37,5
95	50,0	50,0	50,0	50,0	50,0	45,0	40,0	37,5	37,5
100	50,0	50,0	50,0	50,0	50,0	45,0	40,0	40,0	37,5
105	50,0	50,0	50,0	50,0	50,0	45,0	40,0	40,0	37,5
110	50,0	50,0	50,0	50,0	50,0	50,0	45,0	40,0	37,5
115	-	50,0	50,0	50,0	50,0	50,0	45,0	40,0	37,5
120	-	50,0	50,0	50,0	50,0	50,0	45,0	45,0	37,5
125	-	50,0	50,0	50,0	50,0	50,0	45,0	45,0	40,0
130	-	-	50,0	50,0	50,0	50,0	45,0	45,0	40,0
135	-	-	50,0	50,0	50,0	50,0	45,0	45,0	40,0
140	-	-	50,0	50,0	50,0	50,0	45,0	45,0	40,0
145	-	-	50,0	50,0	50,0	50,0	50,0	45,0	40,0
150	-	-	50,0	50,0	50,0	50,0	50,0	45,0	40,0
155	-	-	50,0	50,0	50,0	50,0	50,0	45,0	40,0
160	-	-	-	50,0	50,0	50,0	50,0	50,0	40,0
165	-	-	-	50,0	50,0	50,0	50,0	50,0	45,0
170	-	-	-	50,0	50,0	50,0	50,0	50,0	45,0
175	-	-	-	50,0	50,0	50,0	50,0	50,0	45,0
180	-	-	-	-	-	50,0	50,0	50,0	45,0
185	-	-	-	-	-	50,0	50,0	50,0	45,0
190	-	-	-	-	-	50,0	50,0	50,0	45,0
195	-	-	-	-	-	50,0	50,0	50,0	45,0
200	-	-	-	-	-	50,0	50,0	50,0	45,0
205	-	-	-	-	-	50,0	50,0	50,0	45,0
210	-	-	-	-	-	50,0	50,0	50,0	45,0
215	-	-	-	-	-	-	-	50,0	45,0
220	-	-	-	-	-	-	-	50,0	45,0
225	-	-	-	-	-	-	-	50,0	45,0
230	-	-	-	-	-	-	-	50,0	45,0
235	-	-	-	-	-	-	-	50,0	45,0
240	-	-	-	-	-	-	-	50,0	45,0

R210									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
245	-	-	-	-	-	-	-	50,0	45,0
250	-	-	-	-	-	-	-	50,0	50,0
255	-	-	-	-	-	-	-	50,0	50,0
260	-	-	-	-	-	-	-	50,0	50,0
265	-	-	-	-	-	-	-	50,0	50,0
270	-	-	-	-	-	-	-	50,0	50,0
275	-	-	-	-	-	-	-	-	50,0
280	-	-	-	-	-	-	-	-	50,0
285	-	-	-	-	-	-	-	-	50,0
290	-	-	-	-	-	-	-	-	50,0
295	-	-	-	-	-	-	-	-	50,0
300	-	-	-	-	-	-	-	-	50,0
305	-	-	-	-	-	-	-	-	50,0
310	-	-	-	-	-	-	-	-	50,0
315	-	-	-	-	-	-	-	-	50,0
320	-	-	-	-	-	-	-	-	50,0
325	-	-	-	-	-	-	-	-	50,0
330	-	-	-	-	-	-	-	-	-
335	-	-	-	-	-	-	-	-	-
340	-	-	-	-	-	-	-	-	-
345	-	-	-	-	-	-	-	-	-
350	-	-	-	-	-	-	-	-	-
355	-	-	-	-	-	-	-	-	-



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Anlage 2 - zweilagige Stahlbekleidung

R240									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	-	-	-	50,0	45,0	37,5	35,0	35,0	35,0
55	-	-	-	50,0	45,0	37,5	35,0	35,0	35,0
60	-	-	-	50,0	50,0	45,0	37,5	37,5	35,0
65	-	-	-	50,0	50,0	50,0	40,0	37,5	37,5
70	-	-	-	50,0	50,0	50,0	45,0	40,0	37,5
75	-	-	-	50,0	50,0	50,0	45,0	45,0	40,0
80	-	-	-	50,0	50,0	50,0	50,0	45,0	45,0
85	-	-	-	50,0	50,0	50,0	50,0	50,0	45,0
90	-	-	-	50,0	50,0	50,0	50,0	50,0	45,0
95	-	-	-	50,0	50,0	50,0	50,0	50,0	50,0
100	-	-	-	50,0	50,0	50,0	50,0	50,0	50,0
105	-	-	-	50,0	50,0	50,0	50,0	50,0	50,0
110	-	-	-	50,0	50,0	50,0	50,0	50,0	50,0
115	-	-	-	50,0	50,0	50,0	50,0	50,0	50,0
120	-	-	-	50,0	50,0	50,0	50,0	50,0	50,0
125	-	-	-	-	-	50,0	50,0	50,0	50,0
130	-	-	-	-	-	50,0	50,0	50,0	50,0
135	-	-	-	-	-	50,0	50,0	50,0	50,0
140	-	-	-	-	-	50,0	50,0	50,0	50,0
145	-	-	-	-	-	-	-	50,0	50,0
150	-	-	-	-	-	-	-	50,0	50,0
155	-	-	-	-	-	-	-	50,0	50,0
160	*	*	*	*	*	*	*	50,0	50,0
165	-	-	-	-	-	-	-	50,0	50,0
170	-	-	-	-	-	-	-	50,0	50,0
175	-	-	-	-	-	-	-	-	50,0
180	-	-	-	-	-	-	-	-	50,0
185	*	*	*	*	*	*	*	*	50,0
190	-	-	-	-	-	-	-	-	50,0
195	-	-	-	-	-	-	-	-	50,0
200	-	-	-	-	-	-	-	-	50,0
205	-	-	-	-	-	-	-	-	-
210	-	-	-	-	-	-	-	-	-
215	-	-	-	-	-	-	-	-	-
220	-	-	-	-	-	-	-	-	-
225	-	-	-	-	-	-	-	-	-
230	-	-	-	-	-	-	-	-	-

R270									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
50	-	-	-	-	-	-	-	50,0	45,0
55	-	-	-	-	-	-	-	50,0	45,0
60	-	-	-	-	-	-	-	50,0	50,0
65	-	-	-	-	-	-	-	50,0	50,0
70	-	-	-	-	-	-	-	50,0	50,0
75	-	-	-	-	-	-	-	50,0	50,0
80	-	-	-	-	-	-	-	50,0	50,0
85	-	-	-	-	-	-	-	50,0	50,0
90	-	-	-	-	-	-	-	50,0	50,0
95	-	-	-	-	-	-	-	50,0	50,0
100	-	-	-	-	-	-	-	50,0	50,0
105	-	-	-	-	-	-	-	50,0	50,0
110	-	-	-	-	-	-	-	50,0	50,0
115	-	-	-	-	-	-	-	50,0	50,0
120	-	-	-	-	-	-	-	50,0	50,0
125	-	-	-	-	-	-	-	50,0	50,0
130	-	-	-	-	-	-	-	-	50,0
135	-	-	-	-	-	-	-	-	50,0
140	-	-	-	-	-	-	-	-	50,0
145	-	-	-	-	-	-	-	-	50,0
150	-	-	-	-	-	-	-	-	-
155	-	-	-	-	-	-	-	-	-
160	*	*	*	*	*	*	*	*	*
165	-	-	-	-	-	-	-	-	-
170	-	-	-	-	-	-	-	-	-
175	-	-	-	-	-	-	-	-	-
180	-	-	-	-	-	-	-	-	-
185	-	-	-	-	-	-	-	-	-
190	-	-	-	-	-	-	-	-	-
195	-	-	-	-	-	-	-	-	-
200	-	-	-	-	-	-	-	-	-
205	-	-	-	-	-	-	-	-	-
210	-	-	-	-	-	-	-	-	-
215	-	-	-	-	-	-	-	-	-
220	-	-	-	-	-	-	-	-	-
225	-	-	-	-	-	-	-	-	-
230	-	-	-	-	-	-	-	-	-

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Anlage 2 - zweilagige Stahlbekleidung

R300									
Design temperature [°C]	350	400	450	500	550	600	650	700	750
A_m/V [m^{-1}]	Thickness of fire protection material to maintain temperature below design temperature [mm]								
30	-	-	-	-	-	-	-	-	50,0
35	-	-	-	-	-	-	-	-	50,0
40	-	-	-	-	-	-	-	-	50,0
45	-	-	-	-	-	-	-	-	50,0
50	-	-	-	-	-	-	-	-	50,0
55	-	-	-	-	-	-	-	-	50,0
60	-	-	-	-	-	-	-	-	50,0
65	-	-	-	-	-	-	-	-	50,0
70	-	-	-	-	-	-	-	-	50,0
75	-	-	-	-	-	-	-	-	50,0
80	-	-	-	-	-	-	-	-	50,0
85	-	-	-	-	-	-	-	-	50,0
90	-	-	-	-	-	-	-	-	50,0
95	-	-	-	-	-	-	-	-	50,0
100	-	-	-	-	-	-	-	-	50,0
105	-	-	-	-	-	-	-	-	50,0
110	-	-	-	-	-	-	-	-	50,0
115	-	-	-	-	-	-	-	-	-
120	-	-	-	-	-	-	-	-	-
125	-	-	-	-	-	-	-	-	-
130	-	-	-	-	-	-	-	-	-
135	-	-	-	-	-	-	-	-	-
140	-	-	-	-	-	-	-	-	-
145	-	-	-	-	-	-	-	-	-
150	-	-	-	-	-	-	-	-	-
155	-	-	-	-	-	-	-	-	-
160	-	-	-	-	-	-	-	-	-
165	-	-	-	-	-	-	-	-	-
170	-	-	-	-	-	-	-	-	-
175	-	-	-	-	-	-	-	-	-
180	-	-	-	-	-	-	-	-	-
185	-	-	-	-	-	-	-	-	-
190	-	-	-	-	-	-	-	-	-
195	-	-	-	-	-	-	-	-	-
200	-	-	-	-	-	-	-	-	-
205	-	-	-	-	-	-	-	-	-
210	-	-	-	-	-	-	-	-	-
215	-	-	-	-	-	-	-	-	-
220	-	-	-	-	-	-	-	-	-
225	-	-	-	-	-	-	-	-	-
230	-	-	-	-	-	-	-	-	-

siniat

MONTAGE-ANLEITUNG

ST71–74 A1

Stahlträger- und
Stahlstützenbekleidung
nach ETA-18/0209

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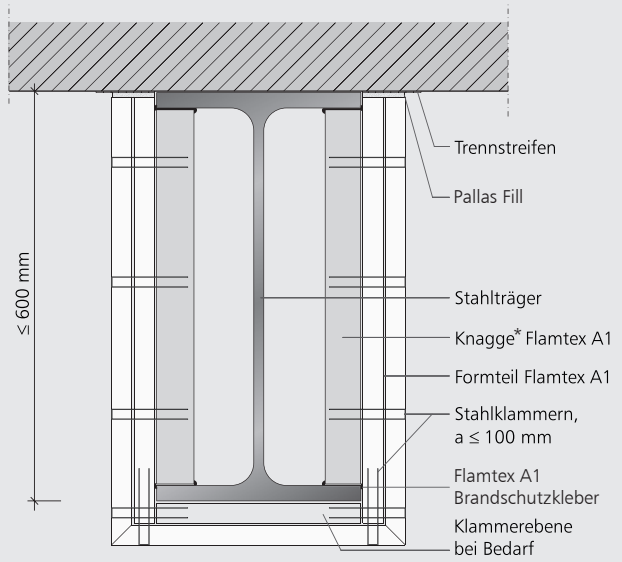
VARIANTE 1

Knaggenmontage für Stahlträger- und Stahlstützen mit Flamtex A1 Brandschutzkleber



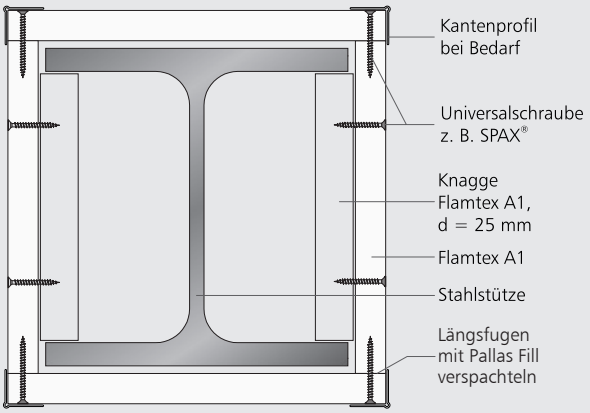
* Knaggen müssen press eingebaut werden und mit Flamtex A1 Brandschutzkleber im Flansch fixiert werden.

- **Knaggen schneiden**
  Knaggen (25 mm Flamtex A1) werden auf Maß geschnitten: b = 150mm, h = lichtes Maß zwischen den Flanschen
- **Brandschutzkleber auftragen**
  Auf die obere und untere Kante der Knagge wird ein ca. 8 mm breiter Streifen des Flamtex A1 Brandschutzklebers aufgetragen. Die Knaggen werden genau eingepasst.
- **Bekleidung schrauben / klammern**
  Anschließend kann die Flamtex A1 Bekleidung geschraubt oder geklammert werden. Bei Bedarf können Kantenprofile verwendet werden.
- **Mit Pallas Fill verspachteln**
  Die Fugen und Stöße müssen mit Pallas Fill überspachtelt werden. Eine Verspachtelung der Schraubenköpfe ist nicht erforderlich.

ST74 ST OU20 Stahlträgerbekleidung, 3-seitig; Formteile aus Flamtex A1; 2-lagig; geklammert

VARIANTE 2

Knaggenmontage für Stahlstützen

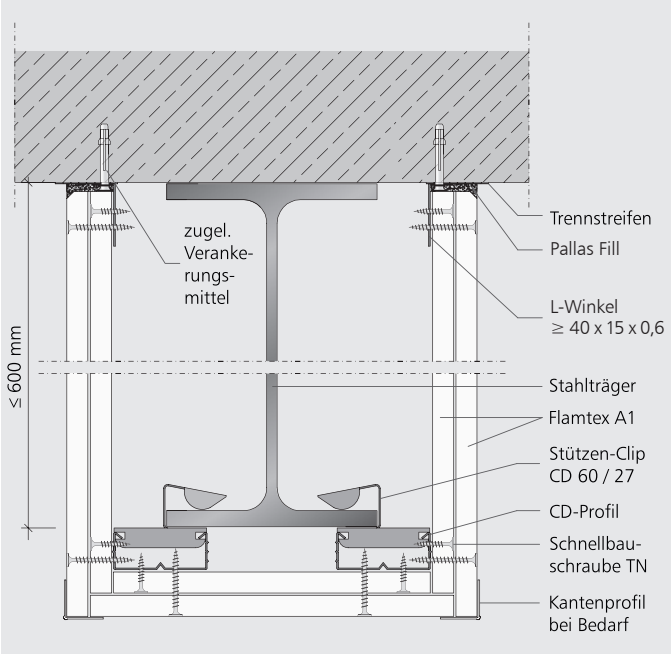


- **Knaggen schneiden**
  Knaggen (25 mm Flamtex A1) werden auf Maß geschnitten: b = 150mm, h = lichtes Maß zwischen den Flanschen. Die Knaggen werden genau eingepasst.
- **Bekleidung schrauben / klammern**
  Anschließend kann die Flamtex A1 Bekleidung geschraubt oder geklammert werden. Bei Bedarf können Kantenprofile verwendet werden.
- **Mit Pallas Fill verspachteln**
  Die Fugen und Stöße müssen mit Pallas Fill überspachtelt werden. Eine Verspachtelung der Schraubenköpfe ist nicht erforderlich.

ST72 SP OU10 Stahlstützenbekleidung, 4-seitig; Zuschnitte aus Flamtex A1; 1-lagig; geschraubt

VARIANTE 3

Stahlträger und Stahlstützenbekleidung mit Unterkonstruktion

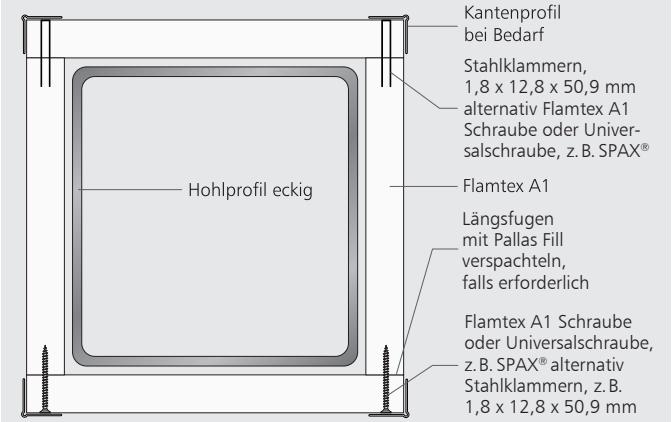


- **Stützen-Clips stecken**
  Flamtex A1 Stützen-Clips werden auf den Flansch (t ≤ 17 mm) gesteckt. Maximaler Abstand 1000 mm. An die Stützen-Clips werden CD60/27 Profile geklickt.
- **L-Winkel befestigen**
  L-Winkel an Außenkante der CD-Profile ausrichten und an der Decke befestigen.
- **Bekleidung befestigen**
  Die Befestigung der Bekleidung erfolgt an der Metall-Unterkonstruktion mit Schnellbauschrauben im Abstand a ≤ 200 mm. Bei Bedarf können Kantenprofile verwendet werden.
- **Mit Pallas Fill verspachteln**
  Die Fugen und Stöße müssen mit Pallas Fill überspachtelt werden. Eine Verspachtelung der Schraubenköpfe ist nicht erforderlich.

ST73 ST MU10 Stahlträgerbekleidung, 3-seitig; Zuschnitte aus Flamtex A1; 2-lagig; geschraubt

VARIANTE 4

Bekleidung von Stahlhohlprofilen



- **Bekleidung schrauben / klammern**
  Flamtex A1 Bekleidung wird umlaufend geklammert oder geschraubt (mind. 15 mm Dicke). Bei Bedarf können Kantenprofile verwendet werden.
- **Mit Pallas Fill verspachteln**
  Die Fugen und Stöße müssen mit Pallas Fill überspachtelt werden. Eine Verspachtelung der Schraubenköpfe ist nicht erforderlich.

ST72 SP OU11 Stahlhohlprofilbekleidung, 4-seitig; Zuschnitte aus Flamtex A1; einlagig; geklammert / geschraubt

FREIWILLIGE ÜBEREINSTIMMUNGSERKLÄRUNG DES HERSTELLERS DES BAUTEILS

Name und Anschrift des Unternehmens, das die Konstruktion erstellt hat (Hersteller/Fachunternehmer): _____

Baustelle / Objekt / Gebäude: _____

Datum der Herstellung: _____

Bauteilbezeichnung: Bekleidung von Stahlbauteilen

Feuerwiderstandsklasse des erstellten Bauteils: z.B. R30

Hiermit wird bestätigt, dass die zuvor genannte Siniat Konstruktion ST71-74 gemäß der Leistungserklärung bzw. Declaration of Performance (DoP) Nr. SI-MC-1607201 hinsichtlich aller Einzelheiten fachgerecht und unter Einhaltung aller Bestimmungen der Europäisch Technischen Bewertung bzw. European Technical Assesment (ETA) Nr. ETA-18/0209 - 12.08.2019 sowie den Verarbeitungsvorschriften der Etex Building Performance GmbH hergestellt und eingebaut wurde.

Ort, Datum, Stempel / Unterschrift

_____

Stand: 10/2020

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