# Wärmedämmsysteme

# Safety in practical work

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Die Moody International Certification GmbH bescheinigt hiermit	, dass die Firma
WEITHERM Wärmedämmsysteme	
Dießemer Bruch 114 f, D - 47805 Kre	feld
ein Qualitätsmanagementsystem entsprechend der	Norm
DIN EN ISO 9001:2000	
eingeführt hat und anwendet	
Geltungsbereich:	
Vertrieb und Montage von Hochtemperatur-Wärmedä	nmsystemen
Registriernummer: 02021	(무) (무) (무) (무)
Gültigkeitszeitraum: 23.02.2008 bis 22.02.2011	
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The declared quality policy of Messrs. WEITHERM is , that all products and services made respectively offered, correspond to every requirement towards quality both in the sense of products or services and specific requirements of the customer, normes and safety regulations. Quality, exact time scheduling and a qualified advice are the main tasks of our business activities. The requirements towards quality apply to the entire production, but either to the life of the product and type of application. In addition the task appears for the quality management to co-ordinate, to settle and to survey all activities to secure the quality.

Thanks to our quality management system we offer our customers an additional "safety for practice".



WEITHERM disposes of decades of experience on the field of high-temperature insulation. Please take advantage of our experience and our entire service.



You require "safety for practice?"

We stick to this with our name.

Your requirement means a challenge for us!

Our demand for quality does not only apply to the entire production, but to the entire service towards our customers. Well-known companies belong to our satisfied customers. Thanks to our entire service in combination with our broad product range we offer the best safety for practice.

# Range of works:

advice of experts and best solutions found by our specialists who work in this industry for decades.

systematic solutions and energysaving light-weight construction systems for industrial furnaces and equipment.

economic solutions through WEITHERM - high-temperature insulating systems already tested in practice.

safety **for practice**, from practice and experience by the quality management DIN EN ISO 9001:2000.

**calculation**, construction und planning with **CAD** to support our applicants.

WEITHERM

**installation-service** through people specialized and experienced in using lightweight construction systems.



warehousing und logistics particularlydeveloped for our customers are part of our service range.

**guaranty** up to 24 months in case of new assembly and entire redevelopment.



# Shuttle-kiln hammer furnace 1320 °C

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# WEITHERM



# WEITHERM Wärmedämmsysteme: Safety in practical work



# HPH - top hat facility



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# HPH - top hat facility





# User oriented insulating systems S1 - S5 For industrial furnaces and installations

**WEITHERM insulating systems** are energy saving and economic ff-lightweight installations for industrial furnaces and installations up to 1600° C.

This catalogue is considered to facilitate planning and construction works. If lenables the applicant to work out, in a quick and easy way, solutions for ff-lightweight installations with **WEITHERM insulating systems.** 

The selection of economic high-temperature insulating materials using ff-lightweight installations requires new methods and ways of how to install them.

Our made-to-order **WEITHERM insulating systems S1 - S5** for industrial furnaces and installations provide extraordinary support.

All **WEITHERM** insulating systems are ff-lightweight systems entirely tested in practice.

Our industry expects efficient insulating systems. In this connection cost effectiveness is very important, even if it is for a single application.

Well-known companies of the industrial furnace and installation industry belong to our customers. The good reputation of **WEITHERM insulating systems** is based on the quality supplied and the efficiency linked to our goods. A great number of customers in Germany and abroad rely on our product range.

# HPH - top hat facility







# General information on WEITHERM insulating systems S1 - S5

# The layer modular construction system (S1 - S3)

Maximum application temperature up to 1150 °C and at a flow rate of up to 25 m/sec

This type of insulation consists of fibre materials which are stuck to the steel jacket in a parallel way and fixed by means of set screws or bayonet fixings and front clips. Due to the best selection of the single layers and a reasonable combination of different fibre materials this layer modular construction system is very economic in its applications.



# Fibre stripes and modules (S4 - S5) Maximum application temperature up to 1350 °C and at a flow rate of up to 25 m/sec

As for this type of insulation the fibre material is generally stuck to the steel jacket in a vertical direction. In this case fibre blankets were cut into stripes or fixed to modules. During installation works **WEITHERM CFH** fibre blanket stripes are compressed up to a density of 150 kg/m<sup>3</sup>. In case of higher densities of up to 220 kg/m<sup>3</sup> fibre blanket stripes are supplied as pre-compressed modules (<sup>WEITHERM</sup> **CFG, CFS, CFM**).

The modules can either be fixed to the steel jacket with a special glue (**WEITHERM glue "A**") or mechanically with high-temperature resistant anchor systems.

This type of insulation was particularly developed to insulate the front side even if the facility to be equipped does not have a geometric shape.

This system is used in high-temperature installations of up to 1350  $^{\circ}\text{C}.$ 

fibre blanket stripes

Steel jacket



# The layer modular construction system (S1 - S3)

# Maximum application temperature up to 1150 °C and at a flow rate of up to 25 m/sec

Considering the favourable combination of technical properties together with a broad product range like

# WEITHERM CTV boards WEITHERM CTM blankets WEITHERM CMF boards

The system made of fibre blanket layers offers the advantage of an economic and diversified application, which the market is looking for nowadays.

To choose the right system, please, apply to the following technical features:

# Layer modular construction system

# technical features

System S1	up to 550 °C Maximum 25 m/sec	high flow rate of up to 25 m/sec and low application temperature of up to 550 $^\circ \! C$
System S2	up to 1150 °C Maximum 12 m/sec	low flow rate of up to 12 m/sec and high application temperature of up to 1150 °C
System S5	up to 1150 °C Maximum 25 m/sec	high flow rate of up to maximum 25 m/sec and high application temperature of up to $1150$ °C.

# System composition S1

# System composition S2





- 1 WEITHERM CMF 750/100-200
- 2 WEITHERM CFM 750/325
- 3 WEITHERM CTM 1260/100
- 4 WEITHERM CTM 1260/130
- 5 WEITHERM CTV 1260/260

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# The layer modular construction system S1 Maximum application temperature up to 550 °C and

at a flow rate of up to 25 m/sec

The system S1 offers the advantages of the **WEITHERM CMF** - mineral fibre products both with respect to technical and economic applications.

WEITHERM CMF 750/325 mineral fibre boards include an inorganic binder which makes them self-supporting, non-abrasive and rigid. They are installed at the facing wall and allow a flow rate of up to approximately 25 m/sec.

In addition, the surface of these boards can be treated with **WEITHERM CH 1260**-rigidizer. The backside insulation consists of **CONTEHRM CMF 750/100-200** semi-rigid mineral boards which are based on an organic binder. Due to their low thermal conductivity they represent a very good economic type of insulation.

# **Application fields:**

Furnaces for thermal treatment of up to 550 °C High-temperature dryers, protection to radiation, installation, recuperators, channels with high flow rates etc.

# Type of fastening:

Set screws M5 and facing pin D38/M5 made of WN 1.4828. The backside insulation is fixed with an installation clip MTC 035, material "C60".





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# The layer modular construction system S1

Maximum application temperature up to 550 °C and at a flow rate of up to 25 m/sec

Qw	t <sub>w</sub>			tota	al thicknes	s of wall =	°C				
W/m²	°C	200	250	300	350	400	450	500	550		
260	40	42				92	112	142	172		
300	45		42			82	92	112	142		
350	50			42	42 82 92						
430	55				42		72	82	102		
465	60							72	82		
535	65								72		
600	70										
650	75										
720	80										
Area 1 2											
1 WEITHERM CMF 750/325 = 42 mm CMF 750/325											
2 WEITHERM CMF 750/325 = 42 mm WEITHERM CMF 750/150 = x mm total thickness of wall = mm											
$\begin{array}{ccc} T_{i} & = \\ Q_{w} & = \\ T_{w} & = \end{array}$	internal t loss of re temperat	emperatu flection ure at out	re side wall			CMF	of wall fro	m inside t	to outside		
The follow transmiss	ving calcu sion coeffi	lations ar cient of al	e based o pha a = <sup>-</sup>	on an amb 12 W/m²K	oient temp	erature o	f 20 °C an	id a heat			
Example	: inter	nal tempe	erature	550	O <sup>°</sup> C						
	outs	ide wall	de wall 60 °C								
	Acco Tota	ording to o I thicknes	chart: s of wall		82 mr	n					
	Stru	cture of w	all range	2 X	42 mr = _40 mr	n N	WEITHER WEITHER	M CMF 7 M CMF 7	750/325 750/150		

82 mm

All data indicated are reference values.

Conductors of heat were not taken into account.





# The layer modular construction system S2 Maximum application temperature up to 1150 °C and at a flow rate of up to 12 m/sec

The layer modular construction system S2 consists of **WEITHERM CTM 1260/100-130** blankets and **WEITHERM CMF 750/100-200** boards which form a unit both in technical and economic sense.

Due to the application of flexible **WEITHERM CTM** blankets at the front-side wall in connection with semi-rigid **WEITHERM CMF** boards as backside insulation, geometrically difficult installations can be equipped in an economic sense.

This is a system which is applied for flow rates of up to maximum 12 m/sec and temperatures of up to 1150 °C. At the front-side wall it shows a flexible WEITHERM **CTM 1260**-blanket. In addition the surface can be treated with **WEITHERM CH 1260** rigidizer. The backside insulation is made of semi-rigid **WEITHERM CMF 750/100-200** mineral boards, having an organic binder; thanks to their low thermal heat conductivity values they help to achieve a very good economic heat protection.

# **Application fields:**

Furnaces for thermal treatment, annealing furnaces, annealing hoods, holding furnaces, roller channel, covering tempering furnaces, hardening furnace, walls to protect against radiation

# Manner of fastening:

With set screws Ø 5 mm and at the front-side with facing pins D60 or D38, made of steel: WN 1.4828 up to  $1050 \,^{\circ}C$  WN 1.4841 up to  $1100 \,^{\circ}C$  WN 2.4851 up to  $1150 \,^{\circ}C$ 

The backside insulation is fixed with the installation clip MTC 035, made of "C 60"





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# The layer modular construction system S2

Maximum application temperature up to 1160 °C and at a flow rate of 12 m/sec

Qw	tw					tot	al thick	ness of	wall=	°C				
W/m <sup>2</sup>	°C	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150
360	50	100	120	150	180	210	250							
420	55	80	100	120	150	180	210	235						
465	60		80	100	130	150	180	195	235					
535	65			90	110	130	150	175	205	220				
600	70				90	110	130	155	175	190	210	240		
650	75					100	120	135	155	170	200	220	240	
720	80					90	110	125	145	160	180	200	220	240
770	85						100	115	125	150	160	180	200	220
		-												
Area			1 2 3										4	
1	1WEITHERM CTM 1260/130 WEITHERM CMF 750/150 total thickness of wall= 50 mm3WEITHERM CTM 1260/130 WEITHERM CTM 1260/100 WEITHERM CMF 750/200 total thickness of wall= 50 mm1WEITHERM CMF 750/200 total thickness of wall= 50 mm = x mm total thickness of wall= 50 mm = 50 mm = x mm wEITHERM CMF 750/200 total thickness of wall= 50 mm = 50 mm = x mm													
2	WEITH WEITH WEITH total th	HERM HERM HERM	CTM 1 CTM 1 CMF 7 s of wa	<b>260/13</b> <b>260/10</b> <b>50/150</b> all	30 = 00 = 0 =	= 50 n = 25 n = x m = n	חm חm חm חm	4 W W W tot	EITHE EITHE EITHE tal thicl	RM CI RM CI RM CI	TM 126 TM 126 MF 750 of wall	50/130 50/100 0/200	= =1 = =	50 mm 00 mm x mm mm
t <sub>i</sub>	= inte	ernal te	mpera	ture			S	tructur	e of wa	all from	ı inside	e to out	tside	

 $Q_w = loss of reflection$ 

 $t_{w}$  = temperature of outside wall

The following calculations are based on an ambient temperature of 20  $^{\circ}$ C and a heat transmission coefficient of alpha a = 12 W/m<sup>2</sup>K.

Example:	internal temperature required temperature of outside wall	900 °C 65 °C	
	according to chart: total thickness of wall	205 mm	
	structure of wall range 2	50 mm 25 mm X = <u>130 mm</u>	WEITHERM CTM 1260/130 WEITHERM CTM 1260/100 WEITHERM CMF 750/150
		205 mm	

All data indicated are reference values. Conductors of heat were not taken into account.



# Fibre layer modular construction system S3 Maximum application temperature of up to 1150 °C and at a flow rate of up to 25 m/sec

Due to front-side application of high quality **WEITHERM CTV** boards based on aluminiumsilica-fibres (classification temperature up to 1600 °C) as technically superior high-temperature insulation at flow rates of up to 25 m/sec, you can use layer modular construction systems up to 1150 °C. In connection with <sup>WEITHERM</sup> **CTM**-blankets and **WEITHERM CMF**-boards as backside insulation you achieve an economic **WEITHERM high insulation system**, which also resists to high requirements of the chemical industry.

The front-side insulation is made with **WEITHERM CTV** (vacuum formed) fibre boards. They have an inorganic binder which makes them self-supporting, abrasive resistant and rigid.

In addition **WEITHERM CTV** fibre boards can be supplied under pre-annealated or rigidized form.

Thanks to the outstanding insulating properties and high chemical resistance of **WEITHERM CTV** fibre boards in connection with a backside insulation made of **WEITHERM CTM** blankets and **WEITHERM CMF** mineral fibre boards, a various number of applications are met in an economic sense.



# **Application fields:**

Top cover of aluminium installations, aluminium industry in general, heat treatment furnaces, Dryers and construction industries, recuperators, channels, protections against reflection, gas and oil furnaces etc.

# Type of fastening:

With set screws M6 and facing clip D38/M6 made of: WN 1.4828 up to  $1050 \,^{\circ}C$  WN 1.4841 up to  $1100 \,^{\circ}C$  WN 2.4851 up to  $1150 \,^{\circ}C$ 

The backside insulation is fixed with the assembly pin MTC 045, made of "C 60".



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# The layer modular construction system S3

Maximum application temperature up to 1160 °C and at a flow rate of 25 m/sec

Qw	t <sub>w</sub>					tot	al thick	ness of	wall =	°C				
W/m <sup>2</sup>	² °C	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150
360	50	100	110	140	170	200	240							
420	55	80	90	110	140	170	200	225						
465	60		80	90	110	140	170	185	215					
535	65			08	100	120	140	165	195	200	200	220		
650	70				80	00	110	140	1/15	160	200	230	230	
720	80					<u>90</u> 80	100	105	135	140	170	190	230	240
770	85					00	90	100	115	130	150	100	190	220
		· · · · ·					00			100	100		100	
Area				1				2	2		}		4	
1 WEITHERM CTV 1260/260 = 25 mm 3 WEITHERM CTV 1260/260 = 25 mm   WEITHERM CTM 1260/130 = 25 mm WEITHERM CTM 1260/130 = 25 mm WEITHERM CTM 1260/130 = 25 mm   WEITHERM CMF 750/150 = x mm WEITHERM CTM 1260/100 = 25 mm = 25 mm   total thickness of wall = mm WEITHERM CMF 750/200 = x mm = 50 mm   total thickness of wall = mm total thickness of wall = mm mm												25 mm 25 mm 50 mm x mm mm		
2 t <sub>i</sub>	2 WEITHERM CTV 1260/260 WEITHERM CTM 1260/130 WEITHERM CTM 1260/100 WEITHERM CTM 1260/100 WEITHERM CMF 750/150 total thickness of wall = mm total thickness of wall = mm										= = =1 = =	25 mm 25 mm 00 mm x mm mm		
Q <sub>w</sub> t <sub>w</sub>	$Q_w = loss of reflection$ Structure of wall from inside to outside t <sub>w</sub> = temperature of outside wall										de			
The following calculations are based on an ambient temperature of 20 $^{\circ}$ C and a heat transmission coefficient of alpha a = 12 W/m <sup>2</sup> K.														
Exam	ple:	inte rec out	ernal te quired f tside w	empera temper vall	ature ature (	of		900 65	°C ℃					

according to chart: total thickness of wall	195 mm	
structure of wall range 2	$\begin{array}{r} 25 \text{ mm} \\ 25 \text{ mm} \\ 25 \text{ mm} \\ 25 \text{ mm} \\ 120 \text{ mm} \\ 195 \text{ mm} \end{array}$	WEITHERM CTM 1260/260 WEITHERM CTM 1260/130 WEITHERM CTM 1260/100 WEITHERM CMF 750/150

All data indicated are reference values. Conductors of heat were not taken into account.

# WEITHERM Wärmedämmsysteme: Safety in practical work



# Fibre layer modular construction systems S4 Maximum application temperature up to 1250 °C and at a flow rate of up to 25 m/s

The lightweight construction system **WEITHERM CFH/CFG 1260 \* 1430/150** was particularly developed for high temperature insulation. It shows a high spalling resistance, has a low weight (150 kg/m<sup>3</sup>) and a low heat accumulation. Due to its high flexibility it can be installed in geometrically difficult parts, like combustion chambers, pipes, top hats etc. Thanks to its low heat conductivity values in connection with its numerous advantages the light-weight construction systems WEITHERM **CFH/CFG 1260 \* 1430/150** are the economic solution for many application fields.

**WEITHERM CFH 1260 \* 1430/150** consists of single stripes, which during installation works are compressed to a raw density of approx. 150 kg/m<sup>3</sup>.

**WEITHERM CFG 1260 \* 1430/150** are precompressed modules (150 kg/m<sup>3</sup>), made of single stripes. They are kept together with gauze. In addition the surface can be hardened with WEITHERM CH 1260 rigidizer.



Furnaces for thermal treatment, annealing furnaces, annealing hoods, holding furnaces, tempering furnaces, hardening furnaces, regenerative post-combustion and TNV installations, recuperators, cover of roller tables, exhaust gas pipes, protection against reflection etc.

# Manner of fastening:

With the aid of expanded metal and **WEITHERM glue** "**A**" or heat-resistant anchor systems

Made of WN 1.4828, which are welded or screwed to the steel jacket.



WEITHERM CFG module fastened with anchor "A"

WEITHERM CFH/CFG Wall thickness Wall thickness WeITHERM binder "A" Expanded metal grid Steel jacket



# Fibre layer modular construction system S4

Maximum application temperature up to 1250 °C and at a flow rate of up to 25 m/sec

# WEITHERM CFH /CFG 1260 \* 1430/150

Qw	t <sub>w</sub>		total thickness of wall = °C											
W/m²	°C	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250
380	50	150	175	200	230	270	290	330	380					
420	55		150	175	200	225	260	290	330	360				
480	60			150	175	200	225	260	290	320	360			
550	65				150	180	200	225	270	280	320	360		
600	70					160	180	200	230	250	280	320	360	
670	75						160	185	200	230	260	290	320	360
730	80							170	190	210	240	260	290	320
790	85								175	200	220	240	270	300
850	90									180	200	220	250	275

Area

2 WEITHERM CFH/CFG 1430/150 classification temperature 1430 °C, raw density 150 kg/m<sup>3</sup>

- t<sub>i</sub> = internal temperature
- Q<sub>w</sub> = loss of reflection
- t<sub>w</sub> = temperature at outside wall

The calculations are based on an ambient temperature of 20  $^{\circ}$ C and a heat transmission coefficient of alpha a= 12 W/m<sup>2</sup>K.

Considering some technical, economic and practical views the above mentioned table shows a selection of **WEITHERM CFH/CFG 1260** \* **1430/150** products.

The mentioned insulating systems are also available with a backside insulation made of **WEITHERM CTV 1260/26**0 boards or **WEITHERM CTM 1260/130** blankets.

All data indicated are reference values. Conductors of heat were not taken into account.

<sup>1</sup> WEITHERM CFH/CFG 1260/150 classification temperature 1260 °C, raw density 150 kg/m<sup>3</sup>



# Fibre layer modular construction systems S5 Maximum application temperature up to 1350 °C and at a flow rate of up to 25 m/s

These are particularly developed modules **WEITHERM CFS/CFM 1260** \* **1430/175-220** for application in high-temperature resistant light-weight construction. They dispose of a high spalling resistance. Due to the low weight (175 220 kg/m<sup>3</sup>) heat accumulation is very low. Their high flexibility offers the advantage of installation in either geometrically difficult installations, like combustion chambers, exhaust gas pipes and regenerative post-combustion plants. Due to their low heat conductivity in connection with their numerous properties **WEITHERM CFS/CFM 1260** \* **1430/175-220** modules are an economic solution for many application fields.

WEITHERM CFS 1260 \* 1430/175-220 are pre-compressed modules (175-220 kg/m<sup>3</sup>), made of single blanket stripes. Depending on the density these stripes are stuck together with gauze or plywood pieces with tightening straps around. Fastening is made with the aid of anchors, stuck through the module and tightened from aside.

WEITHERM CFM 1260 \* 1430/175-220 is the same like before except the way of fastening. Here, the anchors are to be found in the middle of the module.

# **Application fields:**

Heat treatment furnaces, annealing furnaces, annealing hoods, tempering and hardening furnaces, hammer furnaces, regenerative postcombustion and TNV installations, recuperators, loss against reflection, cover of roller channels, exhaust gas pipes etc.

# Type of fastening:

**WEITHERM CFS** modules are generally fastened with two plug-in anchors made of WN 1.4828, which are directly welded or screwed to the steel jacket.

**WEITHERM CFM** modules are fastened with the aid of a set-screw, which is welded to the steel jacket for fixing the module. After installation of the module the system is fixed by a nut made of WN 1.4828.



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# Fibre layer modular construction systems S5

Maximum application temperature up to 1350 °C and at a flow rate of up to 25 m/s

# WEITHERM CFS/CFM 1260 \* 1430/175-220

Тур	Qw	tw				total tl	hicknes	s of wal	I= °C			
CFS / CFM	W/m²	°C	900	950	1000	1050	1100	1150	1200	1250	1300	1350
	560	65	180	200	230	250	280	310				
1260/175	660	75	150	170	190	210	230	250				
	770	85	125	140	160	175	190	215				
	550	65				235	260	290				
1260/200	670	75				190	215	235				
	790	85				160	180	200				
	660	75					260	290				
1430/150	780	85					220	240				
	890	95					190	210				
	670	75					230	250				
1430/175	780	85					190	215				
	890	95					170	185				
	660	75							260	280	310	340
1430/200	780	85							220	240	260	290
	900	95							190	210	230	250
	660	75							260	280	310	340
1430/220	780	85							220	240	260	290
	900	95							190	210	230	250

t<sub>i</sub> = internal temperature

Q<sub>w</sub> = loss of reflection

t<sub>w</sub> = temperature at outside wall

All calculations are based on an ambient temperature of 20  $^{\circ}$ C and a heat transmission coefficient of alpha a= 12 W/m<sup>2</sup>K.

Considering some technical, economic and practical views the above mentioned table shows a selection of **WEITHERM CFS/CFM 1260 \* 1430/175-200** products.

The mentioned insulating systems are also available with a backside insulation made of **WEITHERM CTV 1260/260** boards or **WEITHERM CTM 1260/130** blankets.

All data indicated are reference values. Conductors of heat were not taken into account.



# Shuttle kiln hammer furnace 1320 °C



Equipment at the front side with **WEITHERM CFS 1430/220** - modules. Backside installation with **WEITHERM CTV** 1260/260 - boards.



WEITHERM Wärmedämmsysteme: Safety in practical work

# **Product denomination**

**WEITHERM FS 750** is a non-asbestos fibre silica board showing good mechanical properties up to 750 °C. The big size insulating board has a very fine surface and a homogenous structure. The surface is smooth and does not get moistened with non-ferrous metals. It is thermically pre-treated and thus, the shrinkage is very low. So a lateron pre-heating in advance of first application in not necessary. In neutral basic media it is chemically stable, but reactive in acids. Its properties are best fit to the application needed in insulation industry.

# **Product properties**

big size very high mechanical resistance very fine homogenous structure not moistened with non-ferrous metals good spalling resistance low heat conductivity non-asbestos thermically pre-treated low shrinkage no organic parts non inflammable

# Application fields:

non-ferrous metallurgy construction and engineering of industrial furnaces construction and engineering of apparatus and vessels mechanical engineering construction and engineering of drying apparatus

# Treatment

WEITHERM FS 750 insulating boards can be treated with wood working machines according to contours defined. The board can be drilled, cut and sanded. Depending on the quantity of dust an extraction system is recommended.

# **Application fields:**

WEITHERM FS 750 products are supplied as form shapes for the non-ferrous industry: where nozzles and floats are made of them. Due to their high mechanical stability they are used for many applications, e.g. as spreader and compression resistant backside insulation. WEITHERM FS 750 boards offers many applications for technically demanding construction works in the following industries:



WEITHERM Wärmedämmsysteme: Safety in practical work



General technical data		
denomination		WEITHERM FS 750
classification temperature	°C	750
	1 / 2	050
density	kg/m³	850
flectional resistance	MPa	8
compression resistance	MPa	15
shrinkage after 12 h at 750° C	%	0,4
colour		white
chemical analysis (%)	calcium-silica	95,7
	R <sub>x</sub> O <sub>x</sub>	1,2
loss of ignition	%	3,1
heat conductivity	400 °C	0,23
at medium temperature	500 °C	0,24
in W/mK	600 °C	0,25
	700 °C	0,26

# Standard dimensions:

# **Tolerances:**

thickness of boards (mm):	Tolerances on size of	standard
12.7 * 19.2 * 25.4 * 38.1 * 50.8	boards in mm:	
length x width (mm)	length and width:	+/- 3.0
1220 x 1500	thickness:	+/- 0.4

# Die-cut shapes / Formed shapes

Upon request according to drawing



# **Product description**

**WEITHERM CMF 750/325** is a solid, big size board made of mineral fibres. Due to its organic/inorganic binder it shows good compressing properties. The great advantages of **WEITHERM CMF 750/325** mineral fibre boards are its good mechanical stability, good insulating properties and a temperature resistance up to 750 °C. This mineral fibre board can be installed exposed to flames. Furtheron it has a low weight and shows a good spalling resistance. Thanks to its good homogeneity and regular fibre structure it disposes of a high permanent temperature resistance. As this board does not contain any asbestos nor formaldehyde it is not subject to any restriction with view to work hygiene.

# **Product properties**

low thermal conductivity good spalling resistance low weight low heat accumulation of big size high thermic stability self-supporting easy to treat and process die-cut shapes according to requirements does not contain any asbestos or formaldehyde acoustic insulation easy to install not inflammable

# Processing

This mineral fibre board can be treated with wood working machines or manually. It can be drilled, cut and sanded. Depending on the quantity of dust an extraction system is recommended.

# **Application fields:**

Due to the inorganic binder this mineral fibre board can be installed for many application purposes as front side insulation up to a permanent temperature of up to 550 °C. It is also applicable as a kind of protection against reflection up to a temperature of approx. 750 °C, however, for a short time only.

WEITHERM CMF 750/325 is an economic insulating board. In combination with other products it offers many application purposes as layer construction system, like:

construction and engineering of apparatus and vessels construction and engineering of high temperature equipment construction and engineering of drying apparatus furnace for heat treatment high-temperature channels protection against heat and reflection mechanical engineering

### **Standard dimensions**

thickness of boards ( mm ) 15, 20, 30, 35, 40 width x length ( mm ) 1250 x 2500

Thicknesses more than 30 mm are made of boards stick together of 15 and 20 mm.



WEITHERM Wärmedämmsysteme: Safety in practical work



General technical data		
denomination		WEITHERM CMF 750/325
classification temperature	°C	700
compression resistance	kg/m³	325
density	N/mm²	0,4
colour		light brown
building material category according to DIN 4102		B1, not inflammable
shrinkage at 700° C after 12 h	%	< 2
thermal conductivity	50 °C	0,058
at medium temperature	100 °C	0,061
in W/mK	200 °C	0,068
	300 °C	0,079
	400 °C	0,095



WEITHERM CMF 750/325 with backside insulation made of WEITHERM CMF 750/100-200



**Die-cut shapes / form shapes** 

According to drawings, upon request



# **Product description**

WEITHERM CMF 750/100-200 mineral fibre boards consist of purely inorganic fibres, which are produced at high temperatures of melted rock wool (basalt or diabase). These fibres made in an extrusion blown process are transformed to boards while adding a low content of binder (less 2 %). WEITHERM CMF 750/100-200 boards show good heat insulating properties, are non-rotten and free from parts developing corrosion. Prerequisite for low thermal conductivity and high permanent temperature resistance are the good homogeneity and the regular structure. These boards are available with different densities which provides for best application in any case of technical heat insulation.

# **Product properties**

low thermal conductivity low weight good spalling resistance low heat accumulation die-cut shapes made upon request easy to treat and process high thermal stability self-supporting non-rotten asbestos-free acoustic insulation not inflammable easy to install

### **Application fields**

The product properties of **WEITHERM CMF 750/100-200** mineral fibre boards are well-suited to any kind of requirement towards an economic backside insulation for the following application fields:

construction and engineering of apparatus and vessels construction and engineering of industrial furnaces construction and engineering of drying apparatus mechanical engineering ventilation equipment air-conditioning equipment

# Treatment

This mineral fibre board can be treated with wood working machines or manually. It can be drilled, cut and sanded. Depending on the quantity of dust an extraction system is recommended.

### **Additional stuff**

**WEITHERM glue** "**B**" as a kind of installation aid.

Heat resistance pins and screws

### **Standard dimensions**

thickness of boards ( mm ) 30, 40, 50, 60, 80, 100 width x length ( mm ) 500 x 1250

WEITHERM CMF 750 -bulk

15 kg/bag

# **Die-cut shapes/form shapes**

According to drawings, upon request



WEITHERM Wärmedämmsysteme: Safety in practical work



General technical data		
denomination		WEITHERM CMF 750/100 - 200
classification temperature	°C	750
permanent application temperature	°C	700
density	kg/m³	100 - 200
steam diffusion coefficient µ		1-1,5
specific heat capacity c	kJ/kgK	0,84
volatility of binder		exceeding 250° C
colour		yellow/green
building material category according	to DIN 4102	A1, not inflammable

Thermal conductivity					
denomination		WEITHERM	WEITHERM	WEITHERM	WEITHERM
		CMF 750/100	CMF 750/120	CMF 750/150	CMF 750/200
at medium temperature	100 °C	0,047	0,047	0,048	0,050
in W/mK	200 °C	0,064	0,064	0,064	0,068
	300 °C	0,082	0,083	0,086	0,084
	400 °C	0,110	0,105	0,104	0,104
	500 °C	0,160	0,150	0,140	0,125
	600 °C	0,220	0,200	0,180	0,150



WEITHERM CMF 750/100-200 as backside insulation



**Die-cut shapes/form shapes** 

According to drawings, upon request





WEITHERM CTF Boards and form shapes



WEITHERM BFA 750 - 1000 Thread curtains



WEITHERM BTV 1100/260 Leadthrough



WEITHERM BTF 1100/220 Seal

4-01

WEITHERM Wärmedämmsysteme: Safety in practical work



# **Product description**

**WEITHERM BTF** mineral fibre boards and form-shapes are vacuum-formed products made of earthy-base silicate fibres with organic binders. They feature high spalling resistance, light weight, and, due to the organic binding, are not applicable at the flame side. High permanent thermal stability and low heat accumulation in combination with low heat conductivity qualify this mineral fibrous insulation material for a great variety of applications. Because of their homogeneous structure and uniform fibre distribution, **WEITHERM BTF** products are easy to work on and to process. Since available with different apparent densities, they can be made to optimally match specific application requirements in technical thermal insulation. Excellent thermal insulation properties and chemical stability allow their use for a great variety of economical applications under high temperature conditions.

# **Product properties**

free of ceramic fibre low thermal conductivity low weight good spalling resistance low heat accumulation ready-made shapes easy to work on and to process high thermal stability low shrinkage asbestos-free formed shapes upon request homogeneous structure not inflammable easy to install

# Treatment

**WEITHERM** BTF products can be worked on by hand, or with wood-working machinery. They can be drilled, cut, diecut, and sanded. Depending on the dust formation, an extraction system is recommended.

# **Application fields**

The properties of **WEITHERM** BTF products are made to suit for requirements like: termal shocks low heat accumulation high flexibility. Thanks to these properties, an economical heat insulation is obtained, also in combination with other heat insulation systems. In high-temperature insulation, WEITHERM BTF products are appropriate for a great variety of applications in the following industry branches: engineering and construction of industrial furnaces plants for heat treatment engineering and construction of apparatuses and production plants foundries steel production petrochemical industry machine engineering/ construction

# Accessories

WEITHERM binder "C" Up to 1550 0C

# **Standard formats**

(board form) for all qualities board thickness (mm) 5, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 width x length (mm) 500 x 1000 oder 600 x 1000

# **Tolerances for boards**

Length and width: +/-1,5 mm thickness: +/-3,0 mm

# Die-cut shapes / Formed shapes

Upon request according to drawing



General	technical	data
donominal	lion	

denomination						
		WEITHERM	WEITHERM	WEITHERM	WEITHERM	
		BTF 1100/170	BTF 1100/220	BTF 1250/170	BTF 1250/220	
classification temperature	°C	1100	1100	1250	1250	
maximum applicatio temp.	°C	1000	1000	1100	1100	
colour		green/white	green/white	blue/white	blue/white	
melting point	°C	1330	1330	1500	1500	
Chemical analysis						
Al <sub>2</sub> O <sub>3</sub>	%	1	1	-	-	
MgO	%	2,5-6,5	2,5-6,5	19 -26	19 -26	
SiO <sub>2</sub>	%	61-67	61-67	72-77	72-77	
CaO	%	27-33	27-33	-	-	
organic components	%	3	3	2,5	2,5	
raw density	kg/m³	170	220	170	220	
spez. thermal capacity	kJ/kgK	0,9	0,9	1,1	1,1	
shrankage at 24 h						
bei 1000 °C	%	< 2	< 2	< 2,5	< 2,5	
bei 1100°C	%	< 5	< 5			
bei 1200°C	%	-	-			
bei 1250°C	%	-	-	< 5	< 5	
bei 1400°C	%	-	-	-	-	
bei 1500°C	%	-	-	-	-	
thermal conductivity	400 °C	0,06	0,08	0,09	0,12	
at medium temperature	600 °C	0,09	0,11	0,14	0,17	
in W/mK	800 °C	0,14	0,16	0,19	0,22	
	1000 °C	-	-	0,28	0,31	
	1100 °C	-	-	0,35	0,38	



WEITHERM BTF 1100/220 boards/form shapes



WEITHERM BTF 1100/220 Seal

# WEITHERM Wärmedämmsysteme: Safety in practical work



# **Product description**

**WEITHERM CTF** mineral fibre boards and form-shapes are vacuum-formed products made of earthy-base silicate fibres with organic binders. They feature high spalling resistance and light weight. Due to the organic binding, they are not applicable at the flame side. High permanent thermal stability, low heat accumulation in combination with low heat conductivity, qualify this mineral fibrous insulation material for a great variety of applications. Due to their homogeneous structure and uniform fibre distribution, **WEITHERM** CTF products are easy to work on and to process. Since available with different apparent densities, they can be made to optimally match specific application requirements in technical thermal insulation. Excellent thermal insulation properties and chemical stability allow their use for a great variety of economical applications under high temperature conditions.

# **Product properties**

low thermal conductivity low weight good spalling resistance low heat accumulation ready-made shapes easy to work on and to process high thermal stability low shrinkage asbestos-free form-shapes upon request homogeneous structure not inflammable easy to install

# **Application fields**

The properties of **WEITHERM** CTF products are made to suit for requirements like: high flexibility termal shocks low heat accumulation.

Thanks to these properties, an economical heat insulation is obtained, also in combination with other heat insulation systems. In high-temperature insulation, **WEITHERM CTF** products are appropriate for a great variety of applications for high-temperature insulation in the following industry branches:

# Treatment

**WEITHERM** BTF products can be worked on by hand, or with wood-working machinery. They can be drilled, cut, diecut, and sanded. Depending on the dust formation, an extraction system is recommended. The technical rules relative to dangerous matter have to be observed. engineering and construction of industrial furnaces plants for heat treatment engineering and construction of apparatuses and production plants foundries steel production petrochemical industry machine engineering/ construction

# Accessories

WEITHERM binder "C" Up to 1550 0C

# Standard formats

(board form) for all qualities board thickness (mm) 5, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 width x length (mm) 500 x 1000 oder 600 x 1000

# **Tolerances for boards**

Length and width: +/-1,5 mm thickness: +/-3,0 mm

# Die-cut shapes / Formed shapes

Upon request according to drawing



General technical data				
denomination				
		WEITHERM	WEITHERM	WEITHERM
		CTF 1260/170	CTF 1400/160	CTF 1600/140
classification temperature	°C	1260	1400	1600
maximum application temp.	°C	1100	1300	1500
colour		weiß	weiß	weiß
melting point	°C	1780	1800	2000
Chemical analysis				
Al <sub>2</sub> O <sub>3</sub>	%	46	52	62
SiO <sub>2</sub>	%	53	47	37
organic components	%	1	1	1
raw density	kg/m³	170	160	140
spec. thermal capacity	kJ/kgK	1,1	1,1	1,1
shrankage at 24 h				
bei 1100°C	%	2,5		
bei 1200°C	%	-	2	-
bei 1250°C	%	4	2,5	-
bei 1400°C	%	-	4	1
bei 1500°C	%	-	-	2,5
thermal conductivity	400 °C	0,08	0,08	-
at medium temperature	600 °C	-	0,13	-
in W/mK	3° 008	0,17	0,17	-
	1000 °C	0,24	0,24	0,24
	1100 °C	0,28	0,28	0,28
	1250 °C	-	-	0,32
	1400 °C	-	_	0.40



WEITHERM CTF Boards and form shapes



Homogeneous thicknesses up to 100 mm

WEITHERM Wärmedämmsysteme: Safety in practical work



# **Product description**

**WEITHERM CS 900, CS 1000, CS 1100** are high temperature resistant insulation boards showing high compression resistance and low weight in addition to a low thermal conductivity. These boards are made of calcium-silica. They are often used as backside insulation while the front side is being equipped with high-temperature resistant concrete, fire-clay refractory bricks or breeze bricks. These insulation boards are poor in iron, free from sulphur and very resistant to inert gas. Due to their low spalling resistance these insulation boards are not to be suited as front side equipment.

# **Product properties**

high compression resistance low weight low heat accumulation high temperature resistance low shrinkage poor in iron, free from sulphur asbestos-free not inflammable easy to handle and to process ready-made die-cut shapes good chemical stability solid and rigid resistant to inert gas  $CH_4$ , CO,  $NH_3$ ,  $H_2$ ,  $N_2$ easy to install

# Treatment

These insulation boards are easy to handle with wood working machines. In case of high dust development an extraction system is fundamentally recommended. Please consider the MAK values.

# **Application fields**

WEITHERM CS 900, CS 1000, CS 1100 insulation boards are used for backside insulation where boards resistant to compression and showing a high thermal stability are needed. Due to high thermal insulation and low densities only low thicknesses of walls with low heat accumulation are necessary. These insulation boards are suited for the following fields:

furnaces for heat treatment steel industry glass industry constructiona and engineering of industrial furnaces in general concrete industry process equipment ceramic industry

### **Standard dimensions**

thickness( mm ) 25,30, 40, 50, 60, 70, 75, 80, 90, 100

width x length (mm) 500 x1250

# **Tolerances**

tolerances in size of standard boards (mm) Length +/-5 width : +/-3 thickness : +/-2



General technical data					
denomination		WEITHERM CS 900	WEITHERM CS 1000	WEITHERM CS 1100	
classification temperature	°C	950	1000	1100	
density	kg/m³	275	250	250	
compression resistance (blue)	N/mm²	1,8	1,3	1,4	
colour		white	white	white	
specific heat capacity	kJ/kgK	0,8 - 1,2	0,8 - 1,2	0,8 - 1,2	
chem.analysis	CaO	42,0	42,0	44,0	
	SiO <sub>2</sub>	45,0	44,0	45,0	
	$Fe_2O_3$	0,2	0,2	0,2	
shrinkage after 12 h					
at 900°C	%	1			
at 1000°C	%		1,5		
at 1050°C	%			1,5	
reversible thermal expansion	m/mK	5,4x10 <sup>-6</sup>	5,4x10 <sup>-6</sup>	5,5x10 <sup>-6</sup>	
thermal conductivity	200 °C	0,08	0,09	0,09	
at medium temperature	400 °C	0,10	0,11	0,11	
in W/mK	600 °C	0,12	0,13	0,13	
	0° 008	0,15	0,15	0,15	
resistance to inert gas		CO, NH <sub>3</sub> , H <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> atmosphere			



# **Die-cut shapes / Formed shapes**

Upon request according to drawing

WEITHERM Wärmedämmsysteme: Safety in practical work



# **Product description**

**WEITHERM BFA** thread curtains are products free of ceramic fibre. Depending on the application temperature they are made of PTFE film, glass-fibre cloth, or silicon. They are of very low weight, and suitable for use at the flame side. High thermal stability, flexibility and thermal insulation, qualify the **WEITHERM BFA** products for a great variety of applications.

When passing a product through the thread-curtain, the uniform arrangement of the threads ensures that it opens just as much as necessary, and closes again immediately behind the product. Thus, radiation is reduced to a minimum, which avoids costly energy losses.

# **Product properties**

free of ceramic fibre good spalling resistance low heat accumulation ready-made shapes high thermal stability low shrinkage asbestos-free uniform thread arrangement not inflammable easy to install

### **Application fields**

The properties of **WEITHERM** BFA products are made to suit for requirements like:

high heat protection low radiation losses high flexibility.

low protective gas losses Thanks to these properties, an economical heat insulation of the open spaces of production plants is obtained. In thermal insulation, the **WEITHERM** BFA products are suitable for a great variety of applications in the following industry branches:

- engineering and construction of industrial furnaces
- · plants for heat treatment
- engineering and construction of apparatuses and production plants
- steel production
- machine engineering/ construction



# Die-cut shapes

Upon request according to drawing




#### Available qualities of thread curtains with hollow bond:

Threads	max. temperature	Bond	max. temperature
PTFE	260 °C	PTFE film	260 °C
C-Glass	450 °C	Glass cloth	500 °C
E-Glass	500 °C	Glass cloth	500 °C
HAT-Glas	750 °C	Silicium	1000 °C
Silicium	100 <sup>0</sup> °C	Silicium	1000 °C

Should you wish an offer, we need the following data:

Temperature of application

Wanted dimensions:

total height (max. 700 mm) = free length of threads + bond height

width: at your option

WEITHERM Wärmedämmsysteme: Safety in practical work

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# Shuttle-kiln 1150 °C



Installation of shuttle-kiln with backside insulation made of **WEITHERM CS 1000** calcium-silica boards

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WEITHERM Wärmedämmsysteme: Safety in practical work

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# Shuttle-kiln 1150 °C



Side walls and ceiling with **WEITHERM CTM** - blankets, backside insulation with **WEITHERM CMF 750** - mineral fibre boards.

Labyrinth insulation made of **WEITHERM CTM -** form shapes, fixed with heat resistant anchor system.



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WEITHERM BTM glass fibre blankets are products made of alkaline earth and silica fibres. Their chemical composition is similar to that of rock wool and glass wool. Due to their reduced bioresistance they represent a good alternative towards the hitherto used ceramic fibre blankets. The maximum application temperatures have to be considered carefully and are not to be exceeded, since glass fibre blankets do react very easily to excess of temperature. They show a good spalling resistance, are flexible, lightweight and applicable at the flame side. The spun fibres are mechanically needled, so that you will receive a blanket with a high tensile strength. Due to their good resistance to high continuous temperatures, low heat accumulation in connection with a low heat conductivity WEITHERM BTM glass fibre blankets are suitable for a great number of different application purposes. They are available in different densities which offers best solutions for each single application of technical heat insulation. The very good heat insulation and flexibility of blankets offer a broad range of economic application fields:

#### **Product properties**

of light weight and flexible reduced bio-resistance low thermal conductivity low weight good spalling resistance low heat accumulation ready made die-cut pieces easy to handle high thermal resistance low shrinkage homogenous structure acoustic insulation not inflammable

#### Treatment

WEITHERM BTM products can be worked on manually i.e. with a knife or with wood working machines. They can be drilled or cut. Depending on the quantity of dust an extraction system is fundamentally recommended.

#### **Application fields**

The properties of **WEITHERM BTM 1100/1250** products are fit to requirements like: flame-side application at high continuous temperature change of temperature flow rate of up to 10 m/sec

Thanks to these properties an economic heat insulation is also possible in combination with other heat insulation systems. WEITHERM BTM products offer a great number of application purposes for the following application fields: domestic appliances industry industral furnace industry installations made for heatment construciotn and engineering of apparatus and installations foundries steel production petrochemical industry ceramic industry mechanical industry protection against reflection exhaust gas pipes and channels

#### **Additional stuff**

WEITHERM glue "B" up to 1350 °C.

WEITHERM CH 1260 (rigidizer of surface)

Heat resistant pins and set screws etc.

# Die-cut shapes / form shapes

According to drawings, upon request.

# WEITHERM BTM 1100, BTM 1250

high temperature resistant glass fibre blankets, 1100 °C bis 1250 °C, free from ceramic fibres



General technical dat	а				
denomination		WEITHERM BTM 1100/100	WEITHERM BTM 1100/130	WEITHERM BTM 1250/100	WEITHERM BTM 1250/130
classification temperature	°C	1100	1100	1250	1250
maximum application temp.	°C	1000	1000	1100	1100
raw density	kg/m³	100	130	100	130
melting point	°C	> 1330	> 1330	> 1330	> 1330
colour		white	white	white	white
recommended chemical	SiO <sub>2</sub>	61 - 67	61 - 67	< 69	< 69
analysis (%)	CaO	27 - 33	27 - 33	16 - 20	16 - 20
	MgO	2,5 - 6,5	2,5 - 6,5	11 - 15	11 - 15
	$AI_2O_3$	< 1,0	< 1,0	< 0,2	< 0,2
	$Fe_2O_3$	< 0,6	< 0,6	-	-
	ZrO <sub>2</sub>	-	-	< 10	< 10
thermal conductivity	300 °C	0,07	0,06	0,11	0,10
at medium temperature	400 °C	0,09	0,08	0,13	0,12
in W/mK	500 °C	0,11	0,10	0,15	0,14
	600 °C	0,14	0,12	0,18	0,16
	700 °C	0,17	0,15	0,22	0,19
	800 °C	0,22	0,18	0,26	0,22
	1000 °C	0,32	0,26	0,36	0,31
linear shrinkage after	1000 °C	< 2	< 2	_	_
24 h in % at	1100 °C	< 4	< 4	-	_
	1200 °C	-	-	< 2 0	< 2 0
	1250 °C	-	-	< 2,5	< 2,5
dimensions available	Х	= available			
12,7 x 610 x 14.640	mm	X	X	Х	Х
19,1 x 610 x 10.000	mm	-	-	х	Х
25,4 x 610 x 7.320	mm	Х	х	х	х
38,1 x 610 x 5.000	mm	х	х	х	х
50,8 x 610 x 3.660	mm	Х	Х	Х	Х

The above mentioned qualitites are aolso available as bulk WEITHERM BTW 1100 WEITHERM BTW 1250.

Sales unit: 20 kg/bags



WEITHERM BTM 1100/130 HT - Glas fibre blankets

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**WEITHERM CTM 1260 - fibre blankets** are made of aluminium and silica oxide. They show a good spalling resistance, are flexible, of light weight and applicable at the flame side. The spun fibres are mechanically needled, so that you receive a blanket showing a very high tensile strength. Due to their good resistance to high continuous temperatures, low heat acumulation in connection with a low heat conductivity **WEITHERM CTM 1260 - fibre blankets** are suitable for a great number of different application purposes. They are available in different densities which offers best solutions for each single application of technical heat insulation. The very good heat insulation and flexibility of blankets offer a broad range of economic application fields.

#### **Product properties**

flexible and of low weight high tensile strength low weight low thermal conductivity good spalling resistance low heat accumulation ready-made shapes eays to handle and to process high thermal resistance low shrinkage homogenous structure acoustic insulation not inflammable no organic binder

#### Treatment

#### WEITHERM CTM 1260 -

**p**roducts can be worked on manually i.e. with a knfe or with wood working machines. They can be drilled or cut out. Depending on the quantity of dust an extraction system is fundamentally recommended. The technical restrictions for dangerous gods (TRGS in Germany) have to be considered carefully.

#### **Application fields**

The properties of **WEITHERM CTM 1260** products go well with requirements like:

application at the flameside at high continuous tepmerature

change of temperature flow rate of up to 10 m/s. Thanks to these properties an economic heat insulation is possible with other insulating systems, too. **WEITHERM CTM 1260 -** products offer a great number of application purposes like:

domestic industry construction and engineering of industrial furnaces plants for heat treatment construction and engineering of apparatus and plants foundries steel production petrochemical industry ceramic industry mechanical industry protection against reflection exhaust fas pipes and channels

#### **Additional stuff**

WEITHERM glue "B" up to 1350 °C.

#### WEITHERM CH 1260

( rigidizer of surface ). Heat resistant pins and set screws etc.

# Die-cut shapes / form shapes

Available upon request according to drawings supplied.



<b>General technica</b>	I data				
denomination		WEITHERM CTM 1260/64	WEITHERM CTM 1260/100	WEITHERM CTM 1260/130	WEITHERM CTM 1260/160
classification temperatur	e °C	1260	1260	1260	1260
raw density	kg/m³	64	100	130	160
tensile strength	kPa	35	55	75	90
melting point	°C	1780	1780	1780	1780
colour		white	white	white	white
recommended chemical	$AI_2O_3$	46 - 49	46 - 49	46 - 49	46 - 49
analysis (%)	SiO <sub>2</sub>	51 - 44	51 - 44	51 - 44	51 - 44
linear shrinkage	%				
after 24 h	at 1100°C		1	,9	
	at 1200°C		2	,9	
	at 1250°C		3	,3	
thermal conductivity	300 °C	0,09	0,08	0,06	0,05
at medium temperature	400 °C	0,11	0,10	0,08	0,07
in W/mK	500 °C	0,12	0,11	0,10	0,09
	600 °C	0,18	0,15	0,12	0,11
	700 °C	0,23	0,18	0,15	0,12
	800 °C	0,27	0,21	0,18	0,16
	1000 °C	0,42	0,36	0,28	0,21
dimensions available	X÷	= avaliable			
6,4 X 610 X 21.960	mm	-	X	X	-
12,7 X 610 X 14.640	mm	-	X	X	-
19,1 X 610 X 10.000	mm	-	X	X	-
25,4 X 610 X 7.320	mm	X	X	X	X
38,1 X 610 X 5.000	mm	X	X	X	-
50,8 X 610 X 3.660	mm	X	X	X	-

The above mentioned qualities are also available as bulk **WEITHERM CTW 1260** 

Sales unit: 20 kg/bags



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**WEITHERM BTS 800 D und BTS 800 F** consist of inorganic H T - glass yarns. Their maximum application temperature amounts to 750  $^{\circ}$ C. Their are available as round twisted ropes (D) or round and square-braided packings (F).

#### **Product properties**

high spalling resistance low organic parts less 1 % flexible and low of weight low shrinkage high tensile strength easy to handle and to process DIN 4102, fire category A toxicologically completely harmless non-asbestos



Further products upon request.

#### **Application fields**

WEITHERM BTS 800 - ropes and packings are used as gaskets for the following applications:

boiler industry construction and engineering of industrial furnaces domestic aplliances industry construction and engineering of apparatus and installations foundries steel production petrochemical industry ceramic industry mechanical engineering

#### **Resistance against**

oil, grease, water, steam (short-time), organic and several lightly organic acids, organic solvents.

#### **Additional stuff**

Glue upon request

All textiles are also available with graphite.



General technic									
denomination	W B	EITHER	M ) *			WEITH BTS 8	IERM 00 F *		
max. application									
temperature		750 °C				750	°C		
dimensions	roi	und twiste	ed	sq	uare braid	b	rc	ound brai	d
available	Ø mtr	roll g	mtr	Ø mtr	roll g	mtr	Ø mtr	roll g	mtr
	3	500	7	4 x 4	100	28			
	4	250	14	6 x 6	100	40	6	100	34
	5	250	31	8 x 8	50	65	8	50	55
	6	200	34	10 x 10	50	100	10	50	85
	8	100	40	12 x 12	50	120	12	50	102
	10	100	50	15 x 15	20	200	15	20	170
	12	50	80	20 x 20	20	380	20	20	322
	15	50	130	25 x 25	10	550	25	10	466
	20	50	180	30 x 30	10	630	30	10	534
	25	25	280	40 x 40	5	1340	40	5	1100
	30	25	385	50 x 50	5	1700	50	5	1700
	40	10	750						
	50	10	900						

\* D = twisted

F = braided (packing)



WEITHERM BTS 800D/F Textiles made of glass fibre

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**WEITHERM BTS 1100 DG/DS/FG/FS** products consist of earth alkaline and silica fibres with an organic percentage of approx. 16 %. Their maximum application temperature amounts to aprox. 1050 °C while having a chrome-steel coreg (S) and to 500 °C with glass core (G). They are available as round twisted (D) ropes and round or square braided (F) packings. **WEITHERM BTS 1100** products are produced of artificial mineral fibres (high-temperature resistant glass fibre), which, in case of entering the human body, are soluble.

#### **Product properties**

reduced bio-resistance high spalling resistance flexible and low of weight high tensile strength easy to work on and to process toxicologically completely harmless non-asbestos



#### **Application fields**

Further products upon request.

### WEITHERM BTS 1100 ropes

and packings are used as gaskets for the following application purposes:

boiler industry construction and engineering of industrial furnaces domestic appliances industry construction and engineering of apparatus and plants foundries steel production petrochemical industry ceramic industry mechanical engineering

#### **Resistance to**

oil, water, steam (short time) as well as different chemicals, with the exception of hydrofluoric acid, phosphoric acid and some strong alkaline solutions. Resistant to liquid metals.

#### Additional stuff

Glue can be supplied upon request.

All textiles are available with graphite.



General technic	cal data								
denomination	WEITHERM BTS 1100 DG <sub>*</sub> BTS 1100 DS <sub>*</sub>					WEITH BTS 11 BTS 11	IERM 00 FG∗ 00 FS∗		
max. application									
temperature	500	°C / 1050	)°C			500 °C / ′	1050 °C		
melting point		1200 °C				1200	) °C		
dimensions	round twisted			sq	uare brai	b	ro	ound brai	d
avail able	Ømtr	roll g	mtr	Ø mtr	roll g	mtr	Ømtr	roll g	mtr
	4	125	8	6 x 6	100	27	6	100	22
	5	125	11	8 x 8	100	40	8	100	35
	6	100	15	10 x 10	40	55	10	40	65
	8	50	24	12 x 12	25	80	12	25	75
	10	50	33	15 x 15	20	120	15	20	110
	12	50	50	20 x 20	20	215	20	20	180
	15	50	85	25 x 25	10	340	25	10	310
	20	50	140	30 x 30	10	460	30	10	400
	25	25	190	40 x 40	5	880	40	5	850
	28	25	280	50 x 50	5	1200	50	5	1100
	30	25	350						
	35	10	500						
	40	10	600						
	50	10	850						

- \* D = twisted
  - F = braided (packing)
  - G = with glass core temperature resistant up to 500  $^{\circ}$ C
  - S = with chrome-steel core temperature resistant up to 1050  $^{\circ}$ C



WEITHERM BTS 1100 DG/DS/FG/FS Textiles made of H T - glass fibres



**WEITHERM CTS 1260 DG/DS/FG/FS** products are made of ceramic yarns with an additional percentage of organic parts of up to 18 %. In case of chrome-steel wire core (S) the maximum application temperature amounts to 1150 °C in contrast to 500 °C for glass core (G). They are available as round twisted rope (D) of square/round braided (F) packings. The chemical composition and purposes of the pure ceramic fibre are the same as those of our product **WEITHERM CTM 1260**.

#### **Product properties**

high spalling resistance flexible and low of weight low shrinkage high tensile strength easy to work on and process non-asbestos



WEITHERM CTS 1260 DG/DS twisted rope

#### **Application fields**

WEITHERM CTS 1260 DG/DS/FG/FS ropes and packings are used as gaskets for the following application fields:

Hboiler industry construction and engineering of industrial furnaces domestic appliances industry construction and engineering of apparatus and plants foundries steel production

#### **Resistance**

These products are resistant to oil, water, steam (short time) as ell as to different chemicals with the exception of hydrofluoric acid, phosphoric acid and some strong alkaline solutions. Resistant to liquid metals.

#### **Additional stuff**

Glue upon request.

All textiles are available with graphite.



General technic	cal data								
denomination	WEITHERM CTS 1260 DG * CTS 1260 DS *					WEITH CTS 120 CTS 120	ERM 60 FG * 60 FS *		
max. application									
temperature	500	°C / 1150	)°C		ļ	500°C / 1	150 °C		
dimensions	rou	und twiste	ed	squ	are braic	1	r	ound brai	d
available	Ø mtr	roll g	mtr	Ømtr	roll g	mtr	Ø mtr	roll g	mtr
	3	500	6	4 x 4	100	12	4	100	15
	4	250	8	6 x 6	100	27	6	100	22
	5	250	11	8 x 8	100	40	8	100	35
	6	200	15	10 x 10	40	55	10	40	65
	8	100	24	12 x 12	25	80	12	25	75
	10	100	33	15 x 15	20	120	15	20	110
	12	50	50	20 x 20	20	215	20	20	180
	15	50	85	25 x 25	10	340	25	10	310
	20	50	140	30 x 30	10	460	30	10	400
	25	25	190	35 x 35	10	600	35	10	550
	30	25	350	40 x 40	5	880	40	5	850
	35	25	500	45 x 45	5	980	45	5	960
	40	10	600	50 x 50	5	1200	50	5	1100
	50	10	850	60 x 60	5	1750	60	5	1600
				70 x 70	5	2200	70	5	2140
				80 x 80	5	3000	80	5	2800
				100 x 100	5	4700	100	5	4100

- \* D = twisted
  - F = braided (packing)
  - G = with glass core temperature resistant up to 500  $^{\circ}$ C
  - S = with inconel wire insertion temperature resistant up to 1050  $^{\circ}$ C



WEITHERM CTS 1260 FG / FS Rounded braided packing



WEITHERM CTS 1260 FG / FS Square braided packing (rectangular sizes also available upon request)



The moist pack blankets are made of fibre blankets **WEITHERM BTM 1100** and **CTM 1260** and an inorganic binder. The blankets are supplied in a fictile condition; in connection with air they become a solid and rigid insulating material. So they are a very good product for difficult insulating application. **WEITHERM BTM 1100 F** and **CTM 1260 F** dispose of a low thermal conductivity, low heat accumulation but a high thermal resistance. They are of low weight, flexible and show a good saplling resistance.

#### **Product properties**

#### **Application fields**

flexible and low of weight high tensile strength low heat conductivity low weight good spalling resistance low heat accumulation easy to work on and to process high thermal resistance low shrinkage not inflammable without organic binder

lining of combustion chambers lining of exhaust gas channels insulation of gas turbines insulation of hightemperature pipes and tubes models of vacuum formed shapes insulation of heat-resistant anchor systems in furnaces for heat treatment

#### Treatment

WEITHERM BTM and CTM products can be worked on manually i.e. with a knife or with wood working machines. They can be drilled or cut. Depending on the quantity of dust an extraction system is fundamentally recommended. The technical restrictions for dangerous goods (TRGS in Germany) have to be considered.

General technical data			
denomination		WEITHERM CTM 1260 F	WEITHERM BTM 1100 F
classification temperature	°C	1260	1100
raw density dry condition	kg/m³	190 - 290	190 - 290
moist condition	kg/m³	1000 - 1100	1000 - 1100
shrinkage			
after 24 hours at 1260° C	%	4,6	
after 24 hours at 1100° C	%		4,6
recommended chemical	$AI_2O_3$	36	< 0,2
analysis (%)	$SiO_2$	64	> 69
	CaO		> 16
	MgO		> 10
	ZrO <sub>2</sub>		> 10
dimensions avai lable			
length x width	mm	2400 x 610	1200 x 610
thickness	mm	6 and 12	25



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# Shuttle-kiln 1150 °C

Dimensions	width	:	5 m
	length	:	10 m
	height	:	3 m
	constructed in	:	1999



Side walls and ceiling at the front side equipped with **WEITHERM CTV 1260/260** - fibre boards.

Backside insulation with WEITHERM CTM fibre blankets and WEITHERM CMF

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**WEITHERM BTV fibreboard and form shapes** are vacuum-formed products made of earthybase silicate fibres with a combination of organic and anorganic binders. They feature high spalling resistance, light weight, and, due to the organic binding, are applicable at the flame side. High permanent thermal stability, low heat accumulation in combination with the low heat conductivity qualify this mineral fibrous insulation material for a great variety of applications. Due to their homogeneous structure and uniform fibre distribution, **WEITHERM** BTV products are easy to work on and to process. Since available with different apparent densities, they can be made to optimally match specific application requirements in technical thermal insulation. Excellent thermal insulation properties allow their use for a great variety of economical applications under high temperature conditions.

#### **Product properties**

free of ceramic fibre low thermal conductivity low weight good spalling resistance low heat accumulation die-cut shapes easy to treat and process high thermal stability self-supporting low shrinkage asbestos-free formed shapes upon Request homogeneous structure not inflammable easy to install

#### Treatment

**WEITHERM BTV** products can be treated manually, or with wood-working machinery. They can be drilled, cut, and sanded. Depending on the dust formation, an extraction system is recommended.

#### **Application fields**

The properties of **WEITHERM BTV** products are made to suit for requirements like: installation at the flame side

thermal shocks flow rate up to 25 m / s.

Thanks to these properties an economical heat insulation is obtained, also in combination with other heat insulation systems. In high-temperature insulation, **WEITHERM BTV** products are suitable for a great variety of applications in the following industry branches:

engineering and construction of industrial furnaces plants for heat treatment engineering and construction of apparatuses and production plants foundries steel production petrochemical industry protection from radiation flue gas ducts

#### Accessories

WEITHERM binder "C" Up to 1550 °C

WEITHERM CH 1260 (surface hardener) heat resistant headless pins and installation clips

#### **Standard formats**

(board form) for all qualities

board thickness (mm) 5, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100

width x length (mm) 500 x 1000 oder 600 x 1000

#### **Tolerances for boards**

Length and width: +/-1,5 mm thickness: +/-3,0 mm

# Die-cut shapes / Formed shapes

Upon request according to drawing



### **General technical data**

denomination		WEITHERM BTV 1100/260	WEITHERM BTV 1100/300	WEITHERM BTV 1250/260	WEITHERM BTV 1250/300
classification temperature	°C	1100	1100	1250	1250
max. Anwendungstemperatur	°C	1000	1000	1100	1100
colour		beige	beige	weiß	weiß
melting point	°C	1330	1330	1500	1500
Chemical Analysis					
MgO	%	2,5-6,5	2,5-6,5	18-27	18-27
SiO <sub>2</sub>	%	61-67	61-67	70-80	70-80
CaO	%	27-33	27-33	-	-
ZrO <sub>2</sub>	%	-	-		
organic parts	%	4	4	5 - 7	5 - 7
raw density	kg/m³	260	300	260	300
specific heat capacity	kJ/kgK	0,9	0,9	1,1	1,1
shrinkage after 24 hours					
bei 1000 °C	%	< 1	< 1	2	2
bei 1100°C	%	< 4	< 4	-	-
bei 1200°C	%	-	-	3	3
thermal conductivity	400 °C	0,06	0,06	0,073	0,073
at medium temperature	600 °C	0,09	0,09	0,100	0,100
in W/mK	800 °C	0,14	0,14	0,126	0,126
	1000 °C	-	-	0,155	0,155





WEITHERM BTV 1250/260 Ladle

WEITHERM BTV 1100/260 Closing plug

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**WEITHERM CTV** fibre boards and form shapes are vacuum formed products made of ceramic fibres in combination with organic and inorganic binders. They show a very good spalling resistance, have a low weight and due to the inorganic binder they are applicable at the flame side. Thanks to their high temperature resistance, low heat accumulation in connection with a low heat conductivity these fibre insulating materials are applicable for many different purposes. Due to their homogenous structure and regular fibre content **WEITHERM CTV** products are easy to work on and to process. They are available in different densities which enables them to be applied in the best way for each technical heat insulation. As for their excellent heat insulation and chemical resistance these products offer numerous application purposes in economic sense.

#### **Product properties**

low thermal conductivity low weight good spalling resistance low heat accumulation ready-made shapes easy to work on and to process high thermal resistance self-supporting low shrinkage asbestos-free available as vacuum shapes homogenous structure not inflammable easy to install

### Treatment

WEITHERM CTV products can be worked on manually or with wood working machines. They can be drilled, cut and sanded. Depending on the quantity of dust an extraction system is fundamentally recommended. The technical restrictions for dangerous goods (TRGS in Germany) have to be considered. Application fields All properties of WEITHERM CTV 1260/260 \* 300, CTV 1430/260 \* 300, CTV 1600/240 go well with requirements like: installation at the flame side at high permanent application temperature

flow rate of up to 25 m / s. Due to these requirements an economic heat insulation is also given with other insulating systems. WEITHERM CTV

change of temperature

products offer many application fields like: construction and engineering of industrial furnaces plants for heat treatment construction and engineering of apparatus

plants for heat treatment construction and engineering of apparatus and plants foundries steel production petrochemical industry mechanical industry protectiona against reflection exhaust gas channels Additional stuff

pins.

WEITHERM glue "C" up to 1550 °C,

WEITHERM CH 1260 ( rigidizer of surface ) Heat resistant set screws and

### **Standard dimensions**

( for boards ) for all qualities thickness ( mm ) 5, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100 width x length ( mm ) 500 x 1000 oder 600 x 1000

#### **Tolerances on boards**

length and width : +/-1,5 mm thickness : +/-3,0 mm

#### **Die-cut shapes/form shapes**

Available according to the request of the customer



General technical data						
denomination		WEITHERM CTV 1260/260	WEITHERM CTV 1260/300	WEITHERM CTV 1430/260	WEITHERM CTV 1430/300	WEITHERM CTV 1600/240
classification temperature	°C	1260	1260	1430	1430	1600
max.application temperature	°C	1100	1100	1300	1300	1400
colour		white	white	white	white	white
chemical analysis						
$AI_2O_3$	%	45,8	45,8	29	29	60
SiO <sub>2</sub>	%	53	53	53	53	40
ZrO <sub>2</sub>	%			15	15	
organic parts	%	5 - 7	5 - 7	5 - 7	5 - 7	-
raw density	kg/m³	260	300	260	300	240
specific heat capacity	kJ/kgK	1,1	1,1	1,1	1,1	1,1
shrinkage after 24 hours						
at 1000 °C	%	2,1	2,1	1,8	1,8	0,1
at 1200 °C	%	4,1	4,1	2,5	2,9	1,3
at 1350 °C	%	-	-	-	3,8	2,5
thermal conductivity	400 °C	0,80	0,07	0,08	0,08	0,10
at medium temperature	600 °C	0,11	0,11	0,11	0,11	0,13
in W/mK	800 °C	0,15	0,15	0,15	0,15	0,18
	1000 °C	0,20	0,20	0,20	0,20	0,19
	1200 °C			0,25	0,25	0,21



WEITHERM CTV boards and form shapes



Homogenous Thickness up to 100 mm

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WEITHERM CTM 1400 and CTM 1430 fibre blankets are made of aluminium and silicon dioxide. WEITHERM CTM 1430 fibre blankets do have an additional content of zircon oxide. WEITHERM CTM 1600 fibre blankets are based on mullite and corundum. All these blankets dispose of a good spalling resistance; they are flexible, of low weight and applicable at the flame side. The spun fibres which the blankets are made of, are mechanically needled to get a blanket with a high tensile strength.

Thanks to their high temperature resistance, low heat accumulation in connection with a low heat conductivity **WEITHERM CTM 1400 1600 fibre blankets** are applicable for many different purposes. They are available in different densities which enables them to be applied in the best way for each technical heat insulation. As for their excellent heat insulation and flexibility these products offer numerous application purposes in economic sense.

#### **Product properties**

flexible and of low weight high tensile strength low heat conductivity low weight good spalling resistance low heat accumulation ready-made shapes easy to work on and to process high thermal resistance low shrinkage homogenous structure acoustic insulation not inflammable no organic binder

#### **Application fields**

All properties of **WEITHERM CTM 1400-1600** products go well with the following requirements:

installation at the flameside at high application temperatures change of temperature flow rate of up to 10 m / s.

Due to these requirements an economic heat insulation is also given with other insulating systems. **WEITHERM CTM 1400-1600** offer many application fields like:

domestic appliances construction and engineering of industrial furnaces plants for heat treatment construction and engineering of apparatrus and plants foundries steel production petrochemical industry ceramic industry mechanical engineering protectiona against reflection exhaust gas channels

#### Treatment:

#### WEITHERM CTM 1400-1600

products can be worked on manually or with wood working machines. They can be drilled, cut and sanded. Depending on the quantity of dust an extraction system is fundamentally recommended. The technical restrictions for dangerous goods (TRGS in Germany) have to be considered.

#### **Additional stuff**

**WEITHERM glue "B" up to** 1350 °C.

#### **Die-cut shapes/form shapes**

Available according request to customer



General technical	data				
denomination		WEITHERM	WEITHERM	WEITHERM	WEITHERM
		CTM 1400/130	CTM 1430/130	CTM 1430/160	CTM 1600/130
classification temperatu	re °C	1400	1430	1430	1600
raw density	kg/m³	130	130	160	130
tensile strength	kPa	30	70	90	103
melting point	°C	1800	1740	1740	2000
colour		white	white	white	white
recommended chem ica	$I Al_2O_3$	50 - 54	29 - 31	29 - 31	72
analysis (%)	SiO <sub>2</sub>	46 - 50	53 - 55	53 - 55	28
	ZrO <sub>2</sub>	-	15 - 17	15 - 17	-
Linear shrinkage	%				
after 24 h	bei 1200°C	3,1	2,1	2,1	-
	bei 1300°C	3,3	2,5	2,5	-
	bei 1400°C	3,8	2,6	2,6	1
	bei 1500°C	-	-	-	2
	bei 1600°C	-	-	-	3
	400.00		0.00		
thermal conductivity	400 °C	0,09	0,09	0,09	0,08
at medium temperature	500 °C	0,12	0,12	0,11	0,09
in W/mK	600 °C	0,14	0,14	0,13	0,12
	700 °C	0,18	0,17	0,16	0,14
	0° 008	0,20	0,19	0,18	0,17
	1000 °C	0,28	0,27	0,25	0,24
	1200 °C	0,41	0,36	0,33	0,33
	1400 °C	-	-	-	0,48
dimensions available	v	= available			
	Λ				
12,7 x 610 x 3.600	mm	-	-	-	х
12,7 x 610 x 14.640	mm	X	Х	Х	-
19,1 x 610 x 10.000	mm	Х	Х	-	-
25,4 x 610 x 3.600	mm	-	-	-	х
25,4 x 610 x 7.320	mm	х	х	х	-
38,1 x 610 x 5.000	mm	Х	Х	-	-
50,8 x 610 x 3.660	mm	Х	х	-	-

The above mentioned qualitites are also available as bulk WEITHERM CTW 1400 WEITHERM CTW 1430 WEITHERM CTW 1600

Sales unit: bags of 20 kg



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# Shuttle-kiln 1150 °C



Side walls with **WEITHERM CTM** - blankets Labyrinth insulation made of **WEITHERM CTM** - form shapes



Top of exhaust gas duct equipped with **WEITHERM CTM** - blankets and anchor system.



# Shuttle-kiln annealing furnace 1150 °C



Side walls equipped with **WEITHERM CFS** - modules Ceiling and door with layer contruction system

Shuttle-kiln hammer furnace 1320 °C

Front-Side installation with **WEITHERM CFS 1430/220 -** modules Backside insulation with **WEITHERM CTV 1260/260 -** boards

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The lightweight contruction systems **WEITHERM CFH/CFG 1260 \* 1430 \* 1600/130 - 150** were particularly developed for high temperatur insulation. They show a good spalling resistance, have a low weight and dispose of a low heat accumulation. Since they are flexible they are applied for in geometrically difficult installations like tubes, quarter bends, combustion chambers or recuperators. The main direction of fibres is edgewise to the installation place. These products are a developed form of **WEITHERM CTM 1260/130, CTM 1430/130 und CTM 1600/100 -** ceramic fibre blankets. Installation to the steel jacket is made both either with **WEITHERM glue "A"** and expanded metal or mechanically with heat resistant anchors, which are directly welded to the steel jacket or only screwed to it. It is also possible to stick these products on to ff-building materials with a **WEITHERM glue "C"** which was particularly developed for this application purpose. Thanks to their low heat conductivity in connection with the great number of advantages these light-weight construction systems **WEITHERM CFH/CFG 1260 \* 1430 \* 1600/130 - 150** are an economic solution for many application fields.

**WEITHERM CFG 1260 \* 1430 \* 1600/150** are pre-comressed modules with a density of 150 kg/m<sup>3</sup>, made of single blanket stripes and put together with a gauze.

#### **Product properties**

flexible and of low weight low rate of up to 25m/sec low heat conductivity low weight good spalling resistance low heat accumulation ready-made shapes easy to work on and to process high thermal resistance low shrinkage homogenous structure acoustic insulation economic installation no metallic anchors inside the proper furnace no instructions for preheating

#### **Application fields**

WEITHERM CFH/CFG products were developed for a large number of application purposes in nearly every field of industry. Due to these properties an economic heat insulation is also possible in combination with other heat insulating systems. WEITHERM CFH/CFG products can be applied on the following fields: construction and engineering of industrial furnaces plants for heat treatment construction and engineering of apparatus and plants foundries steel production petrochemical industry ceramic industry mechanical engineering protection to reflection

#### Treatment

WEITHERM **CFH/CFG** products can be worked on manually or with wood working machines. They can be drilled, cut and sanded. Depending on the quantity of dust an extraction system is fundamentally recommended. The technical restrictions for dangerous goods (TRGS in Germany) have to be considered

#### Additional stuff

WEITHERM glue "A" up to 900 °C, to stick an expanded material

### WEITHERM glue "C"

up to 1550 °C, to stick on to ffbuilding materials

#### WEITHERM CH 1260

(rigidizer) heat resistant anchor systems

### **Die-cut shapes/form shapes**

upon request of customer according to plans supplied



General technical da	ta		
denomination		WEITHERM CFG	WEITHERM CFH
		fibre modules	fibre blanket stripes
classification temperature	°C	1260 / 1430 / 1600	1260 / 1430 / 1600
raw density	kg/m³	150 / 160 / 175 (condensed)	130 / 160 (non-condensed)
chemical analysis (%)	a	according to WEITHERM CTM	1 blankets applied for
raw density	kg/m³	150	165 175
thermal conductivity	200 °C	0,064	0,063 0,060
at medium temperature	400 °C	0,103	0,094 0,090
in W/mK	600 °C	0,156	0,140 0,138
	800 °C	0,225	0,201 0,197
	1000 °C	0,319	0,273 0,268
	1200 °C	0,444	0,354 0,346

dimensions available			
	raw density kg/m <sup>3</sup>	length x width (mm)	thickness (mm)
WEITHERM CFG 1260	150 / 165 / 175	300 x 300 / 600 x 150	40 - 350
WEITHERM CFG 1430	150 / 165 / 175	300 x 300 / 600 x 150	40 - 350
WEITHERM CFG 1600	150 / 165 / 175	300 x 300 / 600 x 150	40 - 350
WEITHERM CFH 1260	130 / 160	25 x 610	40 - 400
WEITHERM CFH 1430	130 / 160	25 x 610	40 - 400
WEITHERM CFH 1600	130 / 160	25 x 610	40 - 400

further dimensions upon request

#### WEITHERM CFH 1260 \* 1430 \*

**1600/130** consists of single blanket stripes which are compressed during installation ofa.150 kg/m<sup>3</sup>





**WEITHERM CFG** module with anchor system type "A".

### WEITHERM Wärmedämmsysteme: Safety in practical work

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WEITHERM CFH / CFG 1260 \* 1430 \* 1600/130 - 150 fibre blanket stripes and module systems 1260  $^\circ\text{C}$  - 1600  $^\circ\text{C}$ 

# HPH - top head facility



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# Lid of pit furnace 1350 °C



Installation of **WEITHERM CFS** - modules on to back-side insulation with **WEITHERM CTV** - boards.



Installation of highly comressed (220 kg/m<sup>3</sup>) WEITHERM CFS 1430/220 - modules



WEITHERM **CFS/CFM 1260 \* 1430 \* 1600/175 - 220** lightweight construction systems are highly compressed module systems with a density of 175 - 220 kg/m<sup>3</sup>. This is to reduce shrinkage in connection with impact of heat. These modules were particulary developed for applications where high temperatures occur. The main fibre direction runs upright towards the place to be insulated. For these products we use an additionally treated type of WEITHERM **CTM 1260/130, CTM 1430/130 and CTM 1600/100 -** ceramic fibre blankets. Due to their flexibility these lightweight construction systems can also be applied for in case of geometrically difficult plants. They show a high spalling resistance in contrast to their low weight. As a positive effect they show a low heat accumulation.

**WEITHERM CFS** - modules are generally fixed with two plug-in anchors each module (WN 1.4828 up to a temperature of 1050 °C).

**WEITHERM CFM -** modules dispose of a central fixing device, which are fit into the module. Fastening to the steel jackets is made by the aid of set screws, which are previously welded to the steel jacket. After installing the module the entire system is fixed by a nut. Thanks to their various types **WEITHERM CFS/CFM -** modules are a safe and economic solution for a large number of application fields.

#### **Product properties**

flexible and of low weight flow rate of up to 25 m/sec low heat conductivity low weight good spalling resistance low heat accumulation ready-made shapes easy to work on and to process high thermal resistance low shrinkage homogenous structure acoustic insulation economic installation no metallic anchors inside the proper furnace no instructions for preheating

#### **Application fields**

The properties of WEITHERM **CFS/CFM -** module systems fit well with all plants being subject to high thermical impacts. Thanks to these properties it is possible to achieve an economic heat insulation, also in combination with other heat insulating systems.

WEITHERM **CFS/CFM** module systems can be used for the following application fields:

construction and engineering of industrial furnaces plants for heat treatment construction and engineering of apparatus and plants foundries steel production petrochemical industry ceramic industry mechanical engineering protection to reflection exhaust gas channels

#### **Treatment**

#### WEITHERM CFS/CFM -

products can be worked on manually or with wood working machines. They can be drilled, cut and sanded. Depending on the quantity of dust an extraction system is fundamentally recommended. The technical restrictions for dangerous goods (TRGS in Germany) have to be considered.

#### Additional stuff

#### WEITHERM CH 1260

(rigidizer) heat resistant anchor systems, set screws and nuts

#### **Die-cut shapes/form shapes**

upon request acc. to plans of the customer



General technical data						
denomination		WEITHERM CFS	WE	EITHERM CFM		
classification temperature	°C	1260 / 1430 / 1600	1	260 / 1430 / 1600		
raw density	kg/m³	175 / 200 / 220		175 / 200 / 220		
chemical analysis (%)	a	ccording to WEITHERM	CTM blankets ap	plied for		
raw density	kg/m³	175	200	220		
thermal conductivity	200 °C	0,062	0,061	0,063		
at medium temperature	400 °C	0,090	0,087	0,086		
in W/mK	600 °C	0,138	0,127	0,123		
	800 °C	0,197	0,181	0,175		
	1000 °C	0,268	0,248	0,240		
	1200 °C	0,346	0,326	0,320		

dimensions available			
	raw density kg/m <sup>3</sup>	length x width (mm)	thickness (mm)
WEITHERM CFS 1260	175 / 200 / 220	300 x 300 / 600 x 150	100 - 375
WEITHERM CFS 1430	175 / 200 / 220	300 x 300 / 600 x 150	100 - 375
WEITHERM CFS 1600	175 / 200 / 220	300 x 300 / 600 x 150	100 - 375
WEITHERM CFM 1260	175 / 200 / 220	300 x 300 / 300 x 400	100 - 375
WEITHERM CFM 1430	175 / 200 / 220	300 x 300 / 300 x 400	100 - 375
WEITHERM CFM 1600	175 / 200 / 220	300 x 300 / 300 x 400	100 - 375

further dimensions upon request



WEITHERM CFM Module with central fixing device



**COMTHERM CFS** Module with plug-in anchor system

## WEITHERM Wärmedämmsysteme: Safety in practical work

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The **WEITHERM** light-weight construction systems **CBS/CBM** 1260 \* 1430 /160 240 are highly compressed modular systems of 160 - 240 kg/m<sup>3</sup> bulk density. Developed especially for high-temperature insulation, they counteract thermal shrinkage. Because of their flexibility these light-weight construction systems are used also for equipment shapes of difficult geometry. Due to their good spalling resistance and low weight, their heat accumulation is low.

**WEITHERM CBS** modular systems usually are fastened with two plug-in anchors (WN 1.4828 up to 1050 °C) per module. At choice, these can be either welded, or screwed directly onto the steel jacket.

**WEITHERM CBM** modular systems dispose of central fastening means incorporated in the module. For their fastening on the steel jacket, a headless set screw is used that is welded on before. After module installation, the system is secured with a nut. Because of their manifold variants, the **WEITHERM CBS/CBM** modular systems provide a safe and economical solution for many fields of appl

#### **Product properties**

light weight and flexibility flow rate admissible up to 10 m/slow thermal conductivity low weight good spalling resistance low heat accumulation ready-made shapes easy to work on and to process high thermal stability low shrinkage homogeneous structure sound absorbing economical installation no metal anchors inside the furnace space proper no heating-up presc

#### **Application fields**

The properties of **WEITHERM CBS/CBM** modular systems are made to match for thermally highly stressed plants of all industry branches. Due to these properties an economical heat insulation can be realized, also in combination with other heat insulation systems.

In high-temperature insulation the **WEITHERM CBS/CBM** modular systems are appropriate for a great variety of applications in the following industry branches:

engineering and construct. of industrial furnaces plants for heat treatment engineering and construc. of apparatuses and production plants foundries steel production petrochemical industry ceramics industry machine engineering and construction protection against radiation flue gas ducts

#### **Treatment**

#### The WEITHERM CBS/CBM

products can be worked on by hand (e.g., with a knife), or with wood-working machinery Depending on the dust formation, an extraction system is recommended. The technical rules relative to dangerous matter have to be observed.

#### Accessories

#### WEITHERM CH 1260

(surface hardener) heat-resistant anchors, headless set screws, nuts

#### **Die-cut shapes/form shapes**

upon request acc. to plans of the customer



General technical dat	ta			
denomination	WEIT	HERM CBS	WEITHI	ERM CBM
classification temp.	°C	1260 / 1430	1	260 / 1430
raw density	kg/m³ 16	60 / 190 / 240	16	0 / 190 / 240
chemical analysis (%)		1260	1430	
	$AI_2O_3$	52	36	
	SiO <sub>2</sub>	48	47	
	ZrO <sub>2</sub>	0	15	
	<u> </u>			
raw densitv	ka/m³	160	190	
thermal conductivity	200 °C	0,081	0,071	
at medium temperature	400 °C	0,108	0,099	
in W/mK	600 °C	0,175	0,162	
	800 °C	0,248	0,232	
	1000 °C	0,342	0,313	
	1200 °C	0,461	0,433	
Standart shapes				
	raw density kg/n	n <sup>3</sup> length x wi	idth (mm) thi	ckness (mm)
WEITHERM CBS 1260	160 / 190 / 240	) 300 x 300 /	600 x 150	100 - 375
WEITHERM CBS 1430	160 / 190 / 240	) 300 x 300 /	600 x 150	100 - 375
	400 / 400 / 040	200	200 100	400 075
	160 / 190 / 240	300 x 300 /	300 X 400	100 - 375
WEITHERM CBM 1430	160 / 190 / 240	300 x 300 /	300 X 400	100 - 375
		۲+۱		auaat



WEITHERM CBS Module with plug-in anchor type "A"



**WEITHERM CBM** Module with central fastening means



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# **Combustion chamber 1200 °C example for application**



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**WEITHERM CTP** die-cut shapes made of ceramic fibre paper



WEITHERM CPT - die-cut shapes made of ceramic fibre paper self-adhesive on one side





WEITHERM BMA and WEITHERM CMA - fibre compounds

**WEITHERM CTP** - ceramic fibre paper (standard roll)

WEITHERM Wärmedämmsysteme: Safety in practical work

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**WEITHERM BTP** fibre paper is a light-weight, solid paper made of washed earthy-base silicate fibres. It is easy to wind, to shape, to cut, or to die-cut. **WEITHERM BTP** features low heat conductivity, low heat accumulation, and high thermal stability.

It is fabricated also in form of narrow stripes, and with self-adhesive finish, so that speedy installation of these sealing tapes is sure.

#### **Product properties**

free of ceramic fibre light weight and flexibility high tensile strength low thermal conductivity low weight good spalling resistance low heat accumulation ready-made die-cut shapes easy to work on and process high thermal resistance low shrinkage homogenous structure acoustic insulation not inflammable



**WEITHERM BTP** - Fibre paper Die-cuts and fibre strips with self-adhesive finish on one side

#### Additional stuff

WEITHERM glue "B" up to a temperatur of 1350 °C

#### **Die-cut shapes/form shapes**

upon request acc. to plans of the customer

#### **Application fields**

automotive industry domestic appliances industry construction and engineering of industrial furnaces plants for heat treatment construction and enginieering of apparatus and plants foundries steel production petrochemical industry ceramic industry mechanical engineering

#### Treatment

**WEITHERM BTP -** products can be worked on manually or with wood working machines. They can be drilled, cut and sanded. Depending on the quantity of dust an extraction system is fundamentally recommended.





WEITHERM BTP - Fibre paper Die-cuts



WEITHERM

WEITHERM BTP - Fibre paper Standard roll

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WEITHERM Wärmedämmsysteme: Safety in practical work

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**WEITHERM CTP** ceramic fibre paper is a rigid paper with a low weight which is made of washed ceramic fibres. It can easily be rolled, formed, die-cut or cut.

**WEITHERM CTP** ceramic fibre paper disposes of a low thermal conductivity, a low heat accumulation and high thermal resistance. It is a product made of aluminium-silicia oxides. It is both manufactured in small stripes and with self-adhesive equipment. These self-adhesive insulating tapes provide for a quick installation.

#### **Product properties**

flexible and low weight high tensile strength low thermal conductivity low weight good spalling resistance low heat accumulation ready-made die-cut shapes easy to work on and process high thermal resistance low shrinkage homogenous structure acoustic insulation not inflammable



WEITHERM CTP - Die-cuts and fibre strips with selfadhesive finish on one side

#### **Additional stuff**

WEITHERM glue "B" up to a temperatur of 1350 °C

#### **Application fields**

automotive industry domestic appliances industry construction and engineering of industrial furnaces plants for heat treatment construction and enginieering of apparatus and plants foundries steel production petrochemical industry ceramic industry mechanical engineering

#### **Treatment**

WEITHERM CTP - products can be worked on manually or with wood working machines. They can be drilled, cut and sanded. Depending on the quantity of dust an extraction system is fundamentally recommended. The technical restrictions for

dangerous goods (TRGS in Germany) have to be considered.

### WEITHERM Wärmedämmsysteme: Safety in practical work

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General technical data				
denomination		W	EITHERM C	TP
		1260	1430	1600
classification temperature	°C	1260	1430	1600
raw density	kg/m³	210	210	210
recommended chemical	$AI_2O_3$	47	38	95
analysis (%)	SiO <sub>2</sub>	51	46	3
	ZrO <sub>2</sub>	-	15	-
dimensions avai lable				
length (rolls of)	m		10 - 40	
width	mm	500	, 610, 1000, <sup>-</sup>	1220
thickness	mm	1,	2, 3, 4, 5, 6,	8

#### **Die-cut shapes/form shapes**

Upon request according to plan of customer



**WEITHERM CTP** - ceramic fibre paper (standard roll)



Die-cut shapes made of **WEITHERM CTP** - ceramic fibre paper

WEITHERM Wärmedämmsysteme: Safety in practical work



#### **Product description**

All fibre compounds supplied consist of the same raw materials as the fibre blankets **WEITHERM CTM** and **WEITHERM BTM.** They are manufactured with an additional inorganic binder and are ready for application. All fibre compounds are fictile and dry in connection with air to a rigid and solid insulating matrial. So they are a very good insulating material for difficult plants. Due to their high continuous heat resistance and low heat accumulation in connection with a low thermal conductivity these fibre compounds can be used in many ways.

#### **Product properties**

#### Application fields

flexible and low of weight low thermal conductivity low weight good spalling resistance low heat accumulation easy to work on and process high thermal resistance low shrinkage homogenous structure acoustic insulation not inflammable no organic binder WEITHERM BMA and CMA products offer many application fields in case of high temperature insulation, as for: construction and engineering of industrial furnaces plants for heat treatment construction and engineering of apparatus and plants foundries steel production petrochemical industry ceramic industry

mechanical engineering

#### **Treatment**

All fibre compounds can be filled in, put on with a brush or a bricklayer's trowel. It is possible to change the consistency of the compound by adding some clean water. In case of **WEITHERM CMA 1260 - 1600** products the technical restrictions for dangerous goods (TRGS in Germany) have to be considered.

General technical data					
denomination		WE	ITHERM C	AN	WEITHERM BMA
		1260	1450	1600	1100
classification temperature	°C	1260	1450	1600	1100
recommended chemical	$AI_2O_3$	50	74	85	7
analysis (%)	SiO <sub>2</sub>	49	25	14	64
	CaSi	-	-	-	13
	MgO	-	-	-	17
	, , , , , , , , , , , , , , , , , , ,				
material requirements	g/cm³	1,5	1,5	1,5	1,5
	_				
storage		free fro	om frost, 6 n	nonths	free from frost, 6 months
dimensions available		buck	ets of 5 kg, 1	l0 kg	buckets of 5 kg, 10 kg



## Lead bath furnace 750 °C

Construction year: 1996



Substructure 750 °C with **WEITHERM FL** - bricks and **WEITHERM CFS** - modules



Bearing surface for lead bath tubs with **WEITHERM FL** - bricks und **WEITHERM CTM** - blankets

WEITHERM Wärmedämmsysteme: Safety in practical work



#### **Product description**

WEITHERM FL - bricks are individually made according to the requirements towards a modern and economic installation of light-weight construction materials in case of construction and engineering of industrial furnaces and plants. The quality of the bricks has been constantly improved due to the best adaption to the furnace atmosphere of electrically heated furnaces. WEITHERM FL - bricks meet the international requirements of ASTM, ISO and DIN norms. WEITHERM dispose of a comprehensive knowledge and computer-controlled programmes to optimise all applications of these bricks and to achieve economic solutions.

#### **Product properties**

high application temperatur application at the front-side low termal conductivity low  $Fe_2O_3$ -content, < 2% homogenous structure good spalling resistance low heat accumulation high compression resistance grinded at all sites easy to work on and process

#### **Application fields**

WEITHERM FL - bricks are mainly used in continuously working plants as front-side or backward insulation. Due to the reduction of alkalis (CaO and Fe<sub>2</sub>O<sub>3</sub>) WEITHERM</sub> FL - bricks can be used for demanding high temperatur insulation purposes. Thanks to these properties an economic heat insulation is possible in combination with other heat insulating systems. They can be applied for:

construction and engineering of industrial furnaces heat treatment plants foundries steel production ceramic industrie construction and engineering of apparatus and plants

#### Treatment

WEITHERM FL - bricks can be worked on with wood working machines which are addinionally equipped with hard metal pieces. They can both be drilled, cut and grinded. Depending on the quantity of dust an extrection system is fundamentally recommended.

#### **Additional stuff**

#### WEITHERM - glue "C"

up to a temperature of 1550 °C. heat resistant fastenings, upon requests

Availability										
		NF1	NF1/76	NF2						
thickness	(mm)	64	76	64						
width	(mm)	114	114	124						
lenght	(mm)	230	230	250						
special di	men sio	ns								
deep arch	bricks a	nd side a	arch bricks	s upon						
requests										
Tolerance	S									
thickness:			± 1,0 mm	1						
width and	lenght:		± 1,2 mm							



General technical data										
denomination					WEI	THER	/ FL			
		22	23	24	24 W	25	26	28	30	32
classification temperature	°C	1200	1260	1320	1320	1370	1430	1540	1650	1760
raw density	g/cm³	0,6	0,5	0,75	1,05	0,9	0,8	0,94	1,07	1,3
application temperature	°C	1170	1230	1290	1290	1340	1400	1500	1600	1700
application temperature	%	1	1	1	1	1	1	1	1	1
compression resistance (blue)	N/mm²	3	2	5	8	7	5	3	4	7,5
reversible heat expansion at 1000° C	mm/m	5	5	5	5	5	5	6	6	6
heat conductivity	200 °C	0,17	0,14	0,25	0,41	0,28	0,26	0,32	0,38	0,52
at medium temperature in W/mK	400 °C 600 °C	0,20 0,22	0,16 0,18	0,27 0,30	0,44 0,48	0,32 0,34	0,28 0,31	0,34 0,37	0,40 0,42	0,55 0,58
	800 °C 1000 °C	0,25 0,29	0,21 0,25	0,34 0.37	0,52 0,56	0,36 0,39	0,35 0,38	0,40 0,43	0,44 0,49	0,60 0.62
	1200 °C	-	-	-	-	0,46	0,43	0,45	0,51	0,66
recommended chemical	$AI_2O_3$	30	40	40	37	43	53	60	67	75
analysis (%)	Fe <sub>2</sub> O <sub>3</sub>	1,3	1	1,3	1,3	1,3	1	0,8	0,5	0,4
	CaO	9	12							
at 1000° C heat conductivity at medium temperature in W/mK recommended chemical analysis (%)	mm/m 200 °C 400 °C 600 °C 800 °C 1000 °C 1200 °C Al <sub>2</sub> O <sub>3</sub> Fe <sub>2</sub> O <sub>3</sub> CaO	5 0,17 0,20 0,22 0,25 0,29 - 30 1,3 9	5 0,14 0,16 0,18 0,21 0,25 - 40 1 12	5 0,25 0,27 0,30 0,34 0,37 - 40 1,3	5 0,41 0,44 0,48 0,52 0,56 - 37 1,3	5 0,28 0,32 0,34 0,36 0,39 0,46 43 1,3	5 0,26 0,28 0,31 0,35 0,38 0,43 53 1	6 0,32 0,34 0,37 0,40 0,43 0,45 60 0,8	6 0,38 0,40 0,42 0,44 0,49 0,51 67 0,5	

Lead bath furnace  $t_i = 750$  °C

Installation with WEITHERM **FL** - bricks and **WEITHERM CFS** - modules



WEITHERM Wärmedämmsysteme: Safety in practical work



#### **Product description**

WEITHERM CAST 1000 - 1600 are unformed refractory products for monolithic installations up to a temperature of 1600 °C.

These different products correspond to the requirements of an economic installation for the construction and engineering of industrial furnaces and plants.

**Application fields** 

#### **Product properties:**

temperature

resistance

easy to work on

high application good spalling resistance high compression homogenous microcrystalline structure low shrinkage good heat insulating values available as finished building fabrics hydraulic bond

The properties of WEITHERM **CAST** - products go well with: flame-side application at high permanent temperatures, change in temperatures and mechanical load. Due to these properties a modern heat insulation is also possible in connection with other heat insulating systems.

They can be used for the following application purposes: construction and engineering of industrial furnaces plants for heat treatment construction and engineering of apparatus and plants foundries steel production



Solid oven and burner block with WEITHERM CAST - refractory concrete





General technical data	ral technical data refractory light-weight concrete					e		
denomination		WEITHERM CAST 1000/0,9	WEITHERM CAST 1100/1.0	WEITHERM CAST 1200/0,9	WEITHERM CAST 1300/1,5	WEITHERM CAST 1400/1,5	WEITHERM CAST 1500/1,2	WEITHERM CAST 1600/1,5
classification temperature	°C	1000	1100	1200	1300	1400	1500	1600
raw density	g/cm³	0,95	1	0,9	1,5	1,5	1,15	1,5
material requirements compression resistance (blue)	to/m <sup>3</sup>	1	1,05	0,95	1,55	1,55	1,2	1,55
after drying process at 110° C	N/mm²	5	3	1,5	12	12	4	(
after fire impact at	°C N/mm²	800 2	800 1,5	800 1	800 6	1200 5	1200 2,5	1200 4,5
irreversible heat expansion after fire impact at	°C %	1000 -0,8	1100 -0,9	1150 -1,4	1250 -0,8	1350 -0,4	1400 +0,1	1400 +0,6
reversible heat expansion at 1000 °C	mm/m	5	5	5	5	6	6	6
heat conductivity at medium temperature in W/mK	200°C 400°C 600°C 800°C	0,26 0,21 0,22 0,25	0,27 0,22 0,23 0,27	0,25 0,19 0,20 0,24	0,55 0,49 0,49 0,53	0,55 0,49 0,49 0,53	0,33 0,28 0,28 0,32	0,55 0,49 0,49 0,53
	1000°C 1200°C	-	-	-	0,59 -	0,59 0,64	0,37 0,44	0,59 0,64
recommended chemical analysis (%)	CaO Al <sub>2</sub> O <sub>3</sub> Fa O	26 13	11 23	11,5 33,5	12 37	9 43 3 5	5,6 54,5	5 58
	1 6203	4	0	5,5	7,5	3,5	1,1	1
type of setting		hydr.						
graining	(mm)	8	8	1,25	8	8	1,25	1,6
sales unit (bag of)	kg	48 20	48 20	20	25 25	27 25	38 20	38 20
handling by					casting			

#### **Additional stuff**

Additive "A" for accelerated setting Additive "C" for decelerated setting

Heat resistant anchor systems

#### **Form shapes**

upon request according to plans of customer

WEITHERM Wärmedämmsysteme: Safety in practical work



General technical data refractory concrete							
denomination		WEITHERM CAST 1350/2,1	WEITHERM CAST 1450/2,3	WEITHERM CAST 1550/2,3	WEITHERM CAST 1600/2,7	WEITHERM GUN 1500/2,2	WEITHERM GUN 1600/2,3
classification temperature	°C	1350	1450	1550	1600	1500	1600
raw density	g/cm³	2,1	2,3	2,3	2,7	2,2	2,3
material requirements compression resistance (blue)	to/m³	2,15	2,35	2,35	2,75	2,25	2,35
after drying process at 110° C compression resistance (blue)	N/mm²	85	95	110	130	80	25
after fire impact at	°C N/mm²	800 70	800 75	1200 90	1200 110	1200 45	1200 15
irreversible heat expansion after fire impact at	°C %	1300 -0,5	1300 -0,5	1500 -0,4	1400 -0,3	1200 -0,3	1600 +1,2
reversible heat expansion at 1000° C	mm/m	5	5	5	5	6	6
heat conductivity	600°C	0,81	1,24	1,11	2,13	0,91	1,23
at medium temperature	800°C	0,83	1,22	1,13	2,10	1,00	1,21
in W/mK	1000°C	0,85	1,20	1,15	1,95	1,05	1,30
	1200°C	0,92	1,22	1,17	2,10	1,10	1,33
recommended chemical analysis (%)	CaO	4,8	4,3	3	3,1	7,5	2,5
	$AI_2O_3$	37,5	42,6	46	77,7	51,5	56
	Fe <sub>2</sub> O <sub>2</sub>	3,2	2,9	1	1	1	1,2
time of patting		ha sa la	ام، دما بر	ام، دما بر	ام، دما بر	by colur	ام، دما بر
araining	(mm)	nyur.	10 10	10 10	nyur.	nyur.	nyur.
amount of water required	(1111) 1/100 kg	8	7	65	75	11	10
sales unit (bag of)	kg	25	25	25	25	25	25
handling by			cas	ting		spra	ying



### **Example for application for WEITHERM CAST - refractory concrete**

Shuttle-kiln 1150 °C

Application field: solid oven / burner block



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### Shuttle-kiln 1150 °C

Dimensions	width:	:	5 m
	length:	:	10 m
	height:	:	3 m



Front side of shuttle-kiln and burner block with **WEITHERM CAST 1350/2.1** Back-side insulation witht **WEITHERM CS1000** 

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WEITHERM products: glue, rigidizer, coatings



**WEITHERM** fastening systems



#### WEITHERM glue "A"

#### **Product description**

WEITHERM glue "'A" is a self-hardening glue to glue together upright standing fibres of WEITHERM CFH, CFG 1260 and WEITHERM CFH, CFG 1430 on steel plates with expansion metal. Just before application the glue hat to be mixed with water. The glue powder already comprises binder and hardener in the right proportion.

#### WEITHERM glue "B"

#### **Product description**

WEITHERM glue "B" is a ready-to-use, self-hardening glue for application temperatures of up to 1350 °C. This high-temperature resistant glue is particulary suitable for gluing together upright standing fibres of WEITHERM CFH, CFG 1260 und WEITHERM CFH, CFG 1430 on steel plates with expansion metal.

#### WEITHERM glue"C"

#### **Product description**

WEITHERM glue "C" is a ready-to-use, self-hardening glue for application temperatures up to1550 °C. This higt-temperature resistant glue is particulary suitable for gluing together of upright standing fibres and ffconcretes and ff-bricks as well as for gluing together of fire light bricks.

#### **Product properties**

temperature resistant up to 900 °C viscosity variable depending on how much water is added to the powder excellent adhesion on metallic grounds inorganic composition hardening subject to low shrinkage resistant to sour condensates no initiation regulations

#### Treatment

Please consider the respective instructions for application

#### **Product properties**

temperature resistant up to 1350 °C ready-to-use excelent adhesion on metallic grounds inorganic composition hardening subjekt to low shrinkage hydraulic setting no initiation regulations

#### **Product properties**

temperature resistant up to 1550 °C ready-to-use excelent adhesion on metallic grounds hardening subjekt to low shrinkage chemical-ceramic setting resistant to inert gas no initiation regulations



General technical data				
denomination		W	EITHERM gl	ue
		'A'	'B'	'C'
classification temperature	°C	900	1350	1550
colour		white	grey	beige
water to be added	%	16	-	-
processing temperature	°C	10 - 40	10 - 40	10 - 40
processing time	h	0,5 - 1,0	0,5 - 1,5	0,5 - 1,5
storage		free fr	om frost, 6 m	onths
dimensions available		bucket	bucket	bucket
	kg	25	25	25
dry		Х		
ready-to-use			Х	Х



WEITHERM Wärmedämmsysteme: Safety in practical work

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10-03



#### WEITHERM CTC Coating

#### **Product description**

#### WEITHERM CTC Coating

consists of milled ceramic fibres of which an inorganic binder is added. The coating hardens at the air. After drying process it is rigid and resistant to erosion.

Due to its high material resistance WEITHERM CTC **Coating** prevents the base material to wear of. Further application fields are given due to its good resistance towards wetting by many nonferrous metals. The coating is applied for as cover of poriferous and non-poriferous materials including many products of WEITHERM product range. In addition, WEITHERM CTC Coating shows an excellent thermal reflection and electrical disruptive strength. In excess of 870 °C the coating experiances an additional hardening due to the starting ceramic setting.

#### WEITHERM CH 1260

#### **Product description**

WEITHERM CH 1260 is a hardening stuff based on a hydrous solution of silicic acid. It is used to rigidize the surface of fibre-made products. The rigidizer hardens the product and makes it more resistant towards erosion. Consequently the inflammability considerably increases. Setting is given soon as the water has been evaporated. The drving process can be accelerated by rise of the temperature.

#### **Product properties**

temperature resistance up to 1260 °C viscosity variable depending on how much water is added to the powder inorganic composition hardening subject to low shrinkage ready-to-us no initiation regulations



#### **Product properties**

temperature resistance up to 1430 °C viscosity variable depending on how much water is added to the powder inorganic composition hardening subject to low shrinkage ready-to-us no initiation regulations



### **WEITHERM CTC - Coating**

General technical data			
denomination		WEITHERM CTC 1260	WEITHERM CTC 1430
classification temperature	°C	1260	1430
colour		white	white
chemical analysis	$AI_2O_3$	41	67
	SiO <sub>2</sub>	57	30
material requirements	l/m²	2	2
processing temperature	°C	5 - 40	5 - 40
storage		free from frpst, 6 months	free from frpst, 6 months
dimensions available		buckets of each 5 I or 20 I	buckets of each 5 I or 20 I
Application			

The coating can be easily put on using brush, roller or a spraying machine. In case of working with spraying machines a suction plant is necessary.

### **WEITHERM CH - rigidizer**

General technical data		
denomination	V	VEITHERM CH 1260
		1000
classification temperature	Ъ°	1260
		nink
coloui		ршк
consumption approx.	l/m²	0,4 - 0,8
	° <b>0</b>	5 40
processing temperature	°C	5 - 40
storage	fi	ree from frost, 6 montl
dimensions avai lable		buckets of each 5 Itr

#### Application

The rigidizer can be easily put on using a brush or a roller. It is also possible to use it for dyeing or spraying processes. In case of working with spraying machines a suction plant is necessary.



### Fastening systems for layer contruction systems



10-06

WEITHERM Wärmedämmsysteme: Safety in practical work



### Fastening systems for layer contruction systems

All fastening materials are available in the following qualities:

 WN 1.4301
 (up to 500 °C)

 WN 1.4828
 (up to 1050 °C)

 WN 1.4841
 (up to 1100 °C)

 WN 2.4851
 (up to 1200 °C)

Material of installation clip: spring stell



### Fastening systems for fibres blanket stripes and modules

General technical data			expansio	on metal	
denomination		SG 1	SG 2	SG 3	SG 4
quality		St 12.03	St 12.03	WN 1.4301	WN 1.4828
max. application temperature	°C	250	250	500	1050
weight	kg/m²	2	3	2	2
dimensions avai lable					
thickness	mm	1	1,5	1	1
length x wide	mm	1000 x 5000	1000 x 5000	1000 x 3600	1000 x 3600
size of meshes	mm	28 x 12	28 x 12	28 x 12	28 x 12

WEITHERM Wärmedämmsysteme: Safety in practical work



Basic sizes and units		
Basic size	basic unit	abbreviation
Length	metre	m
Weight	kilogram	kg
Time period	second	s
Intensity of current	ampere	Α
Thermal dynamic temperature	kelvin	К
Amount of substance	mol	mol
Luminous intensity	candela	cd

Prefixes to units		
Prefix	abbreviation	meaning
Tera-	Т	1.000.000.000 = 1012
Giga-	G	1.000.000.000 = 109
Mega-	М	1.000.000 = 106
Kilo-	k	1.000 = 103
Hecto-	h	100 = 102
Deca-	da	10 = 101
		1 = 100
Deci-	d	0,1 = 10-1
Centi-	С	0,01 = 10-2
Milli-	m	0,001 = 10-3
Micro-	μ	0,000.001 = 10-6
Nano-	n	0,000.000.001 = 10-9
Pico-	р	0,000.000.000.001 = 10-12
Femto-	f	0,000.000.000.000.001 = 10-15
Atto-	а	0,000.000.000.000.000.001 = 10-18

Derived SI units			
Unit	abbreviation equation of units		
Newton	Ν	$N = kg \times m/s^2$	power
Joule	J	$J = N \times m = W \times s = kg \times m^2/s^2$	energy, work, quantity of heat
Watt	W	$W = J/s = N \times m/s = kg \times m^2/s^2$	output, Poynting factor, heat flow
Pascal	ра	$Pa = N/m^2 = kg/s^2 \times m$	mechanical electric tension, pressure

units of heat				
abbreviation	Denomination	new	old	conversion factor
Q	Loss of heat referring to			
	A surface unit	W/m²	kcal/m²h	1.163 x kcal/m <sup>2</sup> h = W/m <sup>2</sup>
	Heat conductivity	W/mk	kcal/m h grd	1.163 x kcal/m h grd = W/mK
	Heat transmission coefficient	W/m <sup>2</sup> K	kcal/m²h grd	1.163 x kcal/m <sup>2</sup> h grd = W/m <sup>2</sup> K
С	Specific heat	kJ/kgK	kcal/kg°C	4.2 kcal/kg°C = kJ/kgK

**10-08** For all data no liability assumed.



units of force						
N	dyn	kp	Мр	р		
1	10 <sup>5</sup>	0,102	1,02 x 10 <sup>-4</sup>	102		
10 <sup>-5</sup>	1	1,02 x 10 <sup>-6</sup>	1,02 x 10 <sup>-9</sup>	1,02 x 10 <sup>-3</sup>		
9,81	9,81 x 10 <sup>5</sup>	1	10 <sup>-3</sup>	10 <sup>3</sup>		
9,81 x 10 <sup>3</sup>	9,81 x 10 <sup>8</sup>	10 <sup>3</sup>	1	10 <sup>6</sup>		
9,81 x 10 <sup>-3</sup>	981	10 <sup>-3</sup>	10 <sup>-6</sup>	1		

Units of energy and power					
J (=W x s)	kpm	kWh	kcal	eV	
1	0,102	2,78 x 10 <sup>-7</sup>	2,39 x 10 <sup>-4</sup>	6,24 x 10 <sup>18</sup>	
10 <sup>-7</sup>	1,02 x 10 <sup>-8</sup>	2,78 x 10 <sup>-14</sup>	2,39 x 10 <sup>-11</sup>	6,24 x 10 <sup>11</sup>	
9,81	1	2,72 x 10 <sup>-6</sup>	2,34 x 10 <sup>-3</sup>	6,12 x 10 <sup>19</sup>	
3,60 x 10 <sup>6</sup>	3,67 x 10 <sup>5</sup>	1	860	2,25 x 10 <sup>25</sup>	
4187	427	1,16 x 10 <sup>-3</sup>	1	2,61 x 10 <sup>22</sup>	
1,6 x 10 <sup>-19</sup>	1,63 x 10 <sup>-20</sup>	4,45 x 10 <sup>-26</sup>	3,83 x 10 <sup>-23</sup>	1	

#### Units of output

W	kW	kpm/s	PS	kcal/s	kcal/h
1	10 <sup>-3</sup>	0,102	1,36 x 10 <sup>-3</sup>	2,39 x 10 <sup>-4</sup>	0,86
10 <sup>3</sup>	1	102	1,36	0,239	860
9,81	9,81 x 10 <sup>-3</sup>	1	1,33 x 10 <sup>-2</sup>	2,34 x 10 <sup>-3</sup>	8,43
735,5	0,7355	75	1	0,1757	632
4187	4,19	427	5,69	1	3600
1,16	1,16 x 10 <sup>-3</sup>	0,119	1,58 x 10 <sup>-3</sup>	2,78 x 10 <sup>-4</sup>	1

Units of pressure						
kp/cm <sup>2</sup> (=at)	atm	bar	Pa (=N/m²)	N/mm <sup>2</sup>	Torr	cm WS
1	0,968	0,981	98100	0,098	736	1000
1,033	1	1,0133	101330	0,101	760	1033
1,02	0,987	1	10 <sup>5</sup>	0,1	750	1020
1,02 x 10 <sup>-5</sup>	9,87 x 10 <sup>-6</sup>	10 <sup>-5</sup>	1	10 <sup>-6</sup>	75 x 10⁻⁴	1,02 x 10 <sup>-2</sup>
10,19	9,87	10	10 <sup>6</sup>	1	7,5 x 10 <sup>3</sup>	1,02 x 10 <sup>4</sup>
1,36 x 10 <sup>-3</sup>	1,32 x 10 <sup>-3</sup>	1,33 x 10 <sup>-3</sup>	133	1,33 x 10 <sup>-4</sup>	1	1,36
10 <sup>-3</sup>	9,68 x 10 <sup>-4</sup>	9,81 x 10 <sup>-4</sup>	98,1	9,81 x 10 <sup>-5</sup>	0,736	1

Units of temperature							
K	O°	°R	°F				
n	n - 273	4/5 (n-273)	9/5 (n-273) + 32				
n + 273	n	4/5 n	9/5 n + 32				
5/4 n + 273	5/4 n	n	9/4 n + 32				
5/9 (n-32) + 273	5/9 (n-32)	4/9 (n-32)	n				

For all data no liability assumed.

### WEITHERM Wärmedämmsysteme: Safety in practical work



Special conditions for building works (BLB) with reference to technical installations

- 1. Generals
- (1) Our general terms on trade are the only terms which are subject to the contracts withour customers(AGB).
- (2) In addition, these special conditions for building works (BLB)
- (3) In addition, the performance conditions (GLB)
- (4) The order for contraction of works for the management of works (VOB), part B and C as well as the specified DIN norms for personal contribution of the customer and all works to be performed by Weitherm.
- (5) We are entitled to have performed all works or parts of them by Subcontractors.
- 2. Prices andbasis of contract
- (1) Building works are carried out according to the prices mentioned in the order acknowledgement (plus VAT valid at that time) as well as the conditions mentioned.
- (2) Building works not explicitly mentioned in the order acknowledgement, are subject to the weekly working time fixed in the tariff conditions. Works which are required by the customer in addition to those already agreed upon, are charged with reference to the common extra charges for works performed on Sundays and bank holidays.
- (3) Performances or waiting times, which are carried out in addition to the performances already mentioned in the order acknowledgement, are to be charged additionally. These charges comprise wages and additionallabour costs, release charges, mileage, and accommodation charges.
- (4) The distance between the storage place of goods and the constructionsite should not be more than 30 metres. Aggravating circumstances or longer ways for transportation are charged separately due to additional performances.
- (5) Acceptance tests, which are not explicitly mentioned in the order acknowledgement, are at the charge of the customer.
- 3. Performances of the customer
- (1) all underneath mentioned performances or liabilities of the customer are madefree of chargefor us
- (2) Performances of the customer:
- introduction of special safety regulations or regulations for prevention faccidents of the company
- proof of accommodation facilities
- to provide for social rooms and hygienic facilities to be used by the workers during breaks and waiting time. In case of injuries a sanitaryengineering has to be available.
- the customer has to provide for proper ventilation at the construction site and to secure that no toxicgas develops.
- the customer has to provide for light, heating, electrical power, water, steam and compressed air.
- the customer has to provide for storage space for all equipment and material needed at the construction site, yet burglar-proofed.
- the customer has to inform about the supply network, cables and plugs resp. fittings.
- the customer must provide dry heating according to DIN 285 or he has to dry with reference to the instructions given by Messrs. Weitherm.
- the customer has to provide a construction site which is frost-free and protected against bad weather.
- the customer has to provide for containers for waste materials which are not more than 10 metres away from the construction site.
- the customer has to provide for a crane, forklift or elevator if necessary.

- carried out according to the valid technical regulations
- (2) in case of a warranty claim Weitherm prerequisites the followings: that all documentation and data mentioned in our conditions on guarantee (GLB) are available before inspection of construction site and that the instructions for first heating were followed in detail.
- that all materials supplied by the customer are of good quality and free of defects. In case of a defect arising from goods supplied by the customer, Weitherm is not liable for the damage occurred thereof. Consequential damages hereof which
- · lead to a damage to goods or performances supplied by Weitherm are paid by the customer.
- that no alteration at the plant was made without the acceptance of Weitherm or that an inappropriate treatment or wrong maintenance according to GLBor an excessive stress with chemical stuff or combustibles was carried out
- that the defect is not subject to a claim of the customer towards Weiherm to carry out or modify special constructions. And it is not subject to the fact that performances had to be made upon the explicit demand of the customer at times when danger of frost was given.
- (3) Defects are going to be repaired free of charge within an appropriate time insofar the defect is subject to a guarantee. In case of the supplier refusing to repair the defect, trying to repair a defect without success or postponing the repair for an unacceptable period of time, the customeris allowed to reduce. The price already agreed upon in the order acknowledgement. The right of withdrawal of the contract is excluded.
- Compensation claims of the customer, no matter which legal basis (4) he refers to, are only accepted in case of malicious and reckless violation of the contract (§ 11 no. 7 of the law about the regulation of the right of the general terms of trade [AGBG in German]), in case of default or impossibility by us either in malicious or reckless sense (§ 11 no. 8bAGBG), in case of the customer not being interested in the contract to exist any longer due to partial default or partial impossibility (§ 11 no. 9 AGBG). However, these compensation claims are only accepted if they were caused by us maliciously or recklessly, and in case of inappropriate properties confirmed in a malicious of reckless way as well as in cases of maliciously and recklessly committed prohibited actions. In addition, compensation claims for substitution are accepted in this connection for so-called mediate defaults respectively consequential loss defaults, but only to the extent of being recognisable by us at the time of signing the contract or at the time of granting it. By the way, in case of violation of contract we do only compensate for those claims the contractual duties were supposed to prevent. In case of supporting the site supervision of our customer during installation or at the time of putting the plant in operation, we are only liable for choosing staff being specialised and trained on the job and for the staff giving all necessary and correct advice. Any kind of claim for compensation expire by limitation 6 months after the day the site has been inspected and approved, insofar no other period for compensation has been fixed in writing, however, at latest 6 months and 12 days after finishing the works if no inspection and approval was required. Curing a default does not cause a renewal of limitation period, it merely hampers the termination of the original limitation period.
- 5. Payment terms

Payment has to be effected at least 10 days after date of invoice net, if no other conditions have been fixed in the order acknowledgement.

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- 4. Guarantee and other liabilities
- (1) for all performances done by Weitherm, we guarantee that they are
- 10-10



#### General terms and conditions of trade (AGB)

Generals

All business relations with our customers are subject exclusively to the following General (1)Terms and Conditions of Trade (AGB), as well as to the Special conditions for construction works (BLB), and the warranty provisions (GLB). Any other regulations, particularly our customers' general terms and conditions of trade, are valid only if explicitly confirmed by us in writing.

Our General Terms and Conditions of Trade are considered as approved latest upon the acceptance of the delivery. They are also regarded as by the customer approved within the

- framework of permanent business relations. Our offers are without engagement. Technical data and descriptions of the object(s) mentioned in our offers, brochures and other information material are without any obligation. (2)Orders, contracts, alterations of, or amendments to contracts and any other agreements or valid before explicitly confirmed by us in writing (see below terms on delivery times, paragraph II(2)).
- (3) In case the customer provides plans or samples, he will be liable towards us for the fact that their use will not injure any right of any third party. The customer will furthermore be liable for the technical correctness, faultlessness, and usability of the drawings and/or samples. We shall not be liable for any defects of goods manufactured according to these
- drawings and/or samples, except in case of gross fault. Subsequent alterations of drawings or orders entitle us to charge the customer for the by such caused additionalcosts. (4)
- Moulds will remain our property, even if the customer paid for a part of the costs of mould manufacture. Wooden moulds are stored for 2 years, metal moulds for 5 years, always (5) counted from thedate of thefirst delivery.
- Any alterations to these General Terms and Conditions of Trade (AGB), and/or the contract stipulations, require the written form. (6)
- The invalidity of single contract provisions shall not affect the validity of any of the other (7)
- If not otherwise agreed, the place of performance for all payments and all further contract obligations shall be our company's registered domicile. The place of performance for deliveries shall be the place of dispatch. (8)
- For all litigations that involve merchants entered in the commercial register bill and check proceedings included -, Krefeld shall be the exclusive jurisdiction. We, however, reserve the right to sue a customer at law also at his registered domicile. (9)
- Shall be effective the law of the Federal Republic of Germany, but not the Hague Convention Relating to a Uniform Law on the International Sale of Goods, and not the UN (10) Convention on Contracts for the International Sale of Goods (commercial law - CISG). This will also be valid in case the customer's registered domicile is abroad, or in case the contract object isdelivered toabroad. (see also belowparagraph IV(9))
- (11)Our customers' contractual rights are not assignable

#### Deliveries, passage of risk, default

- (1) The scope of our delivery commitments results solely from our written offer, and/or our written order confirmation. In addition the customer will have to accept and to pay for those bricks that, due to production reasons particularly because of the risk of breakage - have been produced in addition to the ordered quantity. This will be valid for up to 5 % of the number of bricks ordered per item, or up to 10 % in case of difficult form-bricks, or in case of orders for less than 100 pieces. We will make every effort to stick to the specified delivery times and/or dates. But without
- (2) we will have every enorm back to the specified delivery times and/or dates but will ob-explicit written guarantee, the by us specified delivery times will be approximate indications only, and will particularly be subject to the reserve of in-time and correct deliveries by our subsuppliers. The delivery times given in our order confirmations cannot pass for guaranteed. Provided no other written agreement has been explicitly made, the delivery time will begin with the mailing of the order confirmation. In every case will be prerequisite for the meeting of the dates that all the documents to be provided by the customer will be available meeting of the dates that all the documents to be provided by the customer will be available at time, and that the customer will meet the agreed terms of payment and further obligations. As far as partial deliveries can reasonably be expected, they can be carried out and invoiced separately. In case of call-off orders, the customer will have to accept delivery within three months. There must be an adequate time of at least one month between the call-off and the vector delivery. wanted delivervtime.
- In case of the occurrence of extraordinary circumstances beyond our influence, and/or the influence of our subsuppliers, the delivery time will be prolonged by an adequate period of time. If, due to such circumstances, delivery will become impossible or unreasonable, we will moreover be entitled to partially or entirely-resign from the contract. A delivery delayed, or without be entitled to partially or entirely the time to the contract. (3) indicate the function of the standard of plantary of entry of the standard and plantary of entry of the standard of plantary of entry of the set of the standard of plantary of the set of the standard of the set of the se operational troubles/stoppages, strikesand lockouts, lackof raw materials, or abnormal price increases for raw materials, transport means or labour, traffic hold-ups, bans on exports, imports or transits, as well as shipwreck, or other damages at transport means, irrespective of whether they occurred in the country of origin, country of transit, or the country of destrict the strike of t of destination.
- As regards export or import business, we will be entitled to withdraw from the contract, if the required authorizations arenot granted. (4)
- If, according to our information, a customer does not sufficiently prove his solvency, what (5) may also result from a non-fulfilment of his payment obligations for a previous delivery, we will be entitled to refuse delivery until the customer will have effected his counter-performance, or provided security for it. After an ineffectual invitation to do so, we will be entitled to withdraw from the contract.
- In case of default in delivery, the customer will only be entitled to withdraw from the contract if, after commencement of the default in delivery, he will have granted in writing an adequate grace period of minimum four weeks, and simultaneously will have warned of his (6)
- withdrawal from the contract in case the goods should not be supplied within the stipulated time period. Withdrawal from the contract will have to be effected in writing. If, upon our reminder, a customer will be in default of calling-off the acceptance or collection of the goods, or will exceed the fixed dates, or be responsible for a delay in the dispatch or the handing-out, we will, without prejudice to further claims, be entitled to: (7)
- store the goods at the customer's charge and risk in our warehouse, or with a third party, and to charge him the storage fees amounting, per full or broken week of storage, to a minimum of 0.5~% of the amount invoiced for the not accepted goods, or to sell the not a) accepted goods elsewhere after a by us fixed grace period; in the latter case the customer

will be liable for the difference between the agreed purchase price and the proceeds of the sale elsewhere, and/or

- b) after the by us fixed grace period we will be entitled to withdraw from the contract for
- Scope that corresponds to the notaccepted goods. Dispatch/shipment will be made to the customer's account. Inasfar as invoicing will not be made gross for net, packaging and packing material will be charged at cost price. Pallets are excluded from this provision. It is left to the customer to conclude possible transport or other insurances, provided no explicit different agreement will have been made in writing. (2)
- If not otherwise agreed, railway transport will be done in covered carriages, or as mixed cargo consignment. (3)
- If cost clauses will be employed, and as far as nothing different results from the present General Terms and Conditions of Trade (AGB), will be valid the notions and definitions of (4)INCOTERMS 2000.
- For all deliveries also for CIF or FOB deliveries, or goods collection by the purchaser the (5) risk of transport will pass to the customer as soon as the goods will have left the supplying factory or our warehouse, or will have been loaded onto transportation means our own ones included or will have, on the premises or storage ground, been delivered to a forwarding agent or a carrier, irrespective of who bears the cost of freight. In case of paragraph (7) the risk will pass to the customer already with our advice on the goods' readiness for dispatch. In case of railway transport, the by a near authority officially weighed out weight of the goods to be invoiced shall determine the freight costs. In all other cases the in the factory weighed out
- be involced shall determine the freight costs. In all other cases the in the factory weighed out weight shall be binding. Should a customer exceptionally enter with us a claim for compensation of transport damages or losses, he can only assert such if, prior to freight payment, he will have caused the entry of correctdamage-, and/orloss notationson thefreight documents, and the correct drawing up of a record, and provided he will have informed us, or the forwarding agent/carrier, of such damages or losses within a prescriptive period of 10 days after arrival of the goods at their place of destination or, in case of non-arrival, after the receipt of the advice on the goods' readiness for dispatch, and provided he will have kept the goods and the packing material at ur disposed for checking.
- The pallets, that will remain our property together with the accessory implements, shall be sent back within 30 days, if they will not be bartered, in which case the customer will bear the barter fees. In case this time limit should be exceeded, we will have the right to ask for an adequate remuneration for their utilization. For damaged pallets the cost of repair, and for lost (7) pallets the cost of their new acquisition will have to be refunded.
- Prices, terms of payment, securities III.
- The supplies will be effected at the prices specified in the order confirmation (plus the current rate of VAT). If, at the day of delivery, or at the day the goods are placed at disposal (1)current rate of VA1). If, at the day of delivery, or at the day the goods are placed at disposal for collection, the valid list price is higher than the price specified in the order confirmation, we will be entitled to invoice the higher price. Invoices, also for partial deliveries, will be issued with the date of the day when delivery began. If no order confirmation will be made out, the prices specified in the delivery note will be valid. The prices do not include packing costs, and not the freight for delivery ex our warehouse. Inasfar as nothing different has explicitly been agreed in writing, we will be entitled to increase the agreed purchase price by subsequently newly introduced, or the increases of taxes, duties, or other charges imposed on the goods, in particular EClevies/duties, and anti-dumping- and countervaling duties, or paining ones. This will be analy for changes of exchange nearities shuld the case occur. If it similar ones. This will also apply for changes of exchange parities, should the case occur. If it will be necessary to make a model, the costs for materials, or a share of the model costs will be separately invoiced.
- If no different written agreement exists, payments shall be effected latest 10 days after delivery, or after invoicing less 2 % discount, or within 30 days net cash, or by bank transfer. (2)
- delivery, or arter invoicing less 2 % discount, or within 30 days net cash, or by bank transfer. Payments will be regarded as effected the day we can dispose of the amount. Bills of exchange will be accepted as payment only after previous explicit agreement, and this under the exclusion of our liability for timeliness and correctness of presentation and protest, and only if they will be eligible for rediscounting, and if the taxes will have been correctly paid. Credit entries for payments by bills of exchange and/or cheques will be made (3) with reservation that their receipt and value must bebooked the day when the money will be at our disposal. Discount fees, encashment charges, as well as other disbursements and expenses, bill of exchange stamp duties included, will be at the customer's charge. We will on process, since a soluting or standing or standing of the solution of the so
- (4) not have the right to determine for what debt he pays. According to §§ 366, paragraph 2, 367 BGB (German Civil Code), we can appropriate incoming payments, together with costs and interest to the customer's liabilities
- In case of a non-observance of due dates, we will, without prejudice to further claims, be (5) entitled to invoice interest on arrears at the rate that we on our part have to pay for credits taken, and this at a minimum rate of 3 % above the then current discount rate of the Deutsche Bundesbank.
- All debt claims, including those for which we will have taken bills of exchange in, will fall (6) due with immediate effect in case the customer should get in default of payment, fail to fulfill other essential obligations of the contract or of these General Terms and Conditions of Trade, or if circumstances should become known to us that are suitable to diminish the customer's credit standing, in particular suspension of payments, proceedings for composition or in bakruptcy. In these cases we will, according to paragraph II (5), be entitled to retain still pending delliveries, or to effect such solely against advance payment or securities. In such case we will furthermore have the right to request the restoration of unpaid goods at the customer's costs. This, however, shallnot pass as a withdrawalfrom thecontract. In case of default of payment, we will, after having granted an adequate grace period, also be entitled to withdraw from the contract, or to claim damages because of failure to perform.
- (7)

# WEITHERM

- (8) The set-off against other counterclaims established as uncontested, or res judicata, will be inadmissible. Our customer will not be entitled to contend a right of retention, in particular not because of his warranty claims. In case the customer nevertheless keeps a good in an unjustified way, itsuse will be inhibited to him.
- Retention of title
- Retention of title The goods supplied will remain our property (goods under reserve) up to the definite payment of all the existing and impending simple contract debts resulting from the purchase contract, in case payment will be effected by bill of exchange or by cheque, as long as we will have the liability in these cheque and bill of exchange transactions. In case of several debts or continuing account, the retention of tille will constitute a security for the balance claim, (1)
- even if a single delivery will already have been paid. The customer will be entitled to re-sell the goods solely under retention of title, and only in (2)ordinary commercial intercourse, but will not be allowed to give them in pledge, or as a chattel mortgage, or for any other extraordinary dispositions. All claims resulting from re-selling are already now transferred to us in a concerted action. The customer will be allowed to collect them, but he will have to administer the received amounts for us on a trust basis under separate booking and deposit. If the customer, within the scope of his direct debit authorization, for the purpose of collection, tranfers his debt claims resulting from the re-sale to a third party, he consequently already now transfers his debt claims toward the third party in a concerted action to us. The customer will have to support us in a comprehensive way while introducing us. For this end he will have to give us all necessary information, and to remit all the documents required. In case the goods under reserve wil be resold together with other goods, the agreed assignment of the future claim will only be valid up to the amount of the goods under reserve. Eventual processing of the goods will be carried out by the customer without any obligation
- (3) for us. In case of processing, linking, mixing, blending of the goods under reserve with other goods, on principle will arise for us a partial property of the new product, that, in case of processing, corresponds to the proportion between the value (= gross amount of invoice including all ancillary costs and taxes) of the goods under reserve and the value of all other goods. For the case the customer should become the sole proprietor, he already now grants goods. For the case the customer should become the sole proprietor, he already now grants us the co-ownership according to the proportion of the specified values, and he will store the goods free of charge on our behalf. If the processed goods are resold, the as above agreed assignment of future claims will be valid also for the customer's debt resulting from the resale, but only in the amount of the value of the goods under reserve. The customer shall insure the goods under reserve against the usual risks, store them separately, treat them carefully and, upon our request, mark them. Damage claims against the insurance company are already now assigned to us in a concerted action in the amount of the value of the goods under reserve.
- (4)
- Attachment of the goods under reserve, or any other seizures by third parties, have immediately to be advised to us in writing, together with the name and address of the attachment of the goods under reserve, and address of the attachment of the goods under reserve, and make use of lf the customer should make default in payment, or not fulfil other essential contract obligations, we can demand the restoration of the goods under reserve, and make use of the goods under reserve, and the reserve and the goods under reserve and the (5)
- (6) them after having given warning. The customer will have to tolerate the removal and to allow the entering into his office and business premises for this purpose. The removal will not pass for a withdrawal from the contract. However, if we will have fixed a period of time under threat or refusal, and thereafter sell the goods, the customer will be liable for the difference between the purchase price and the proceeds from the sale. In addition he will bear the costs for the taking back of the goods concerned.
- If the amount of all securities will exceed the amount of the secured debt claims by more than 20 %, the customer can to such extent demand the release of by us chosen securities. (7)
- (8)
- 20 %, the customer can to such extent demand the release of by us chosen securities. The conclusion of financing contracts (e.g. leasing contracts) that include the transfer of our goods under reserve, will need our previous written consent, if the contract does not oblige the financing institution to pay the to us due share of the purchase price to us directly. In case legal actions should be filed in connection with the retention of title, we will be free to have recourse to a foreign customer before the court of law at his place of venue, and under the laws of his homeland. For the latter case that regulation on the retention of title will be (9) regarded as agreed that is economically the nearest to the herein agreed regulation referring to the retention of title.
- II. Guarantee and other warranties
- Jarantee and other warranties For examinations of goods shall apply the the by us normally used examination/testing methods; in which, as a general principle, the Deutsche Industrienormen (DIN) (German industrial standards) are employed. The quality assurance for refractory material will be realized in form of a statistical quality control as permanently performed in the seller's factories, or with his subsuppliers. Additional material testings of any kind will be performed by us only if explicitly agreed. The by us effected quality control does not substitute the customer's duty of examination, and not the requirement to make a complaint in respect of a defectimmediately upon receipt of the goods. (1)
- detect immediately upon receipt of the goods. Immediately upon receipt of every delivery the customer will have to check each one thoroughly and completely. At the inspection recognizable defects, or missing parts, will have to be notified in writing within seven days after receipt of the goods. This will also be valid for divergencies that exceed the tolerances according to paragraph (3) below. Otherwise the complete delivery will be regarded as approved. In case a defect that was not recognizable at (2) the initial examination should show up later, the customer will have to inform us immediately When lodging a complaint, the customer will have to detailedly describe the affirmed defect in writing, and will particularly have to inform on how and under what circumstances this
- If for the refractory goods to be supplied a certain content of alumina (Al<sub>2</sub>O<sub>2</sub>) will have been If for the refractory goods to be supplied a certain content of alumina (Al<sub>2</sub>O<sub>2</sub>) will have been (3) agreed upon, a tolerance of minus 2 percent is admissible (e.g., instead of 40 % only 38 % of alumina). The refractability may be 1 fusion cone less. Furthermore shall be valid the tolerances specified in our detailed data sheets.
- tolerances specified in our detailed data sheets. Our guarance will apply to the warranted properties of the goods, and to their faultlessness with respect to the materials and the processing of these materials in accordance with the current state of the art. A warranty obligation will not be made effective in case of unessential or usual commercial variations in colour, sizes and/or other features of quality and performance of the goods, except in case an exactly defined colour, size, quality, or an other (4) quality characteristic will have been warranted explicitly in writing. In particular, no warranty is made for the durability of refractory materials, except if warranted in writing.
- Before returning the goods of which defectiveness has been notified to us, the customer will have to request our written consent to it. For this purpose he will have to send us those (5) documents (order confirmation, delivery note, invoice, and similar papers) which show that his warranty claim is legitimate. Upon receipt of our written consent, he shall send back the defective goods in their original packing, or, should this be no more available, in a packing that is as safe as the origininal one. If he will not dispose of our written approval, we will be allowed to refuse the acceptance of the returned goods. Justified defects that have correctly been notified to us, oblige us to at our choice either eliminate the defects, or to replace the

defective part, or the defective goods, within a reasonable delivery time, or to refund the

Amount of the defective goods to the customer. The risk of transport for outward and return consignment will in all cases be borne by the customer. The transport costs for outward and return consignment, material- and labour will be at our charge

- The customer will only be entitled to withdraw from the contract, or to reduce the price, if we (6)will refuse to eliminate the defects or to exchange the goods, or if we should not react to his justified complaint within an adequate period of time of minimum three weeks. He will also be entitled to withdraw from the contract if we should not succeed in eliminating the defect, respectively if the replacement delivery should also defective, and he will have correctly made his claim in the sense of paragraph 2 above. Under the prerequisite of sentence 1, the customer can only annul the contract, if justly he cannot be expected to take of the goods at a reduced price
- In case of disputes on quality guarantees given by the seller, an officially authorized experimental/research center for this field shall be consulted for an expertise. Random samples shall be taken by seller and purchaser in common. The costs for the examination (7)
- samples shall be borne by the unsuccessful party. If delivery plus the installation of refractory materials will have been agreed upon, our stipulations for construction work (BLB) will apply. These will also be valid if we will also undertake the putting into service, or the execution of other works. Damage claims of the customer, irrespective of the statutory basis they base on, will exist
- (9) only in cases of contract violation by deliberate action, or gross negligence (§11 no. 7 of the law regulating the rights of the General Terms and Conditions of Trade (AGBG), or in case of default or impossibility (§ 11 No. 8b AGBG) caused by deliberate action or gross negligence that we will be responsible for, or in case of a cessation of the customer's interest due to partial default and partial impossibility (§11 no. 9 AGBG), but also in this case only inasfar as partial default and partial impossibility (§11 no. 9 AGBG), but also in this case only inastar as we will deliberately, or due to gross negligence be at fault for it, and also in cases of intentionally or by gross negligence falsely assured properties, as well as in cases of deliberately or by gross negligence committed illicit actions. In addition will exist, also in these cases, a right to replacement of/indemnification for so-called consquential, damages, respectively consequential harm caused by a defect, but only to the degree as such was foreseeable, respectively recognizable by us at contract conclusion, or at the assurance of properties. In case of a violation of the contract obligation was supposed to avoid. To all claims based on defacts will anoly the leard participation.
- To all claims based on defects will apply the legal period of limitation. The above regulations will also be valid for supplies of different goods than those aggred upon
  - We will explicitly be liable up to the maximum amount of the order value.