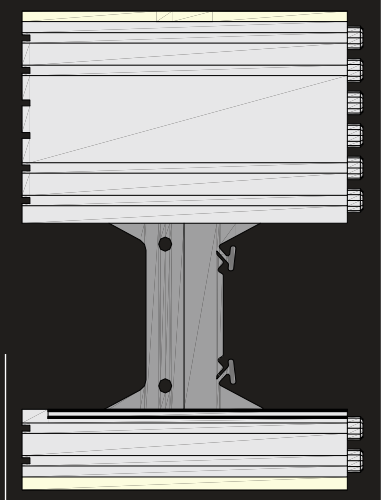
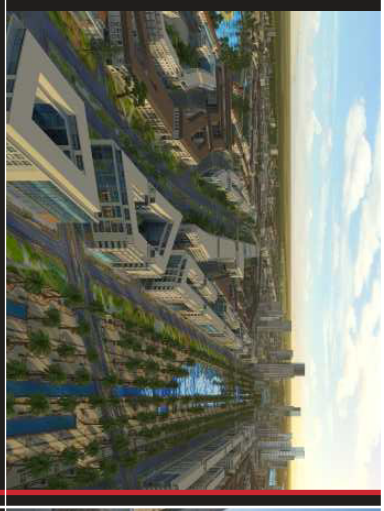
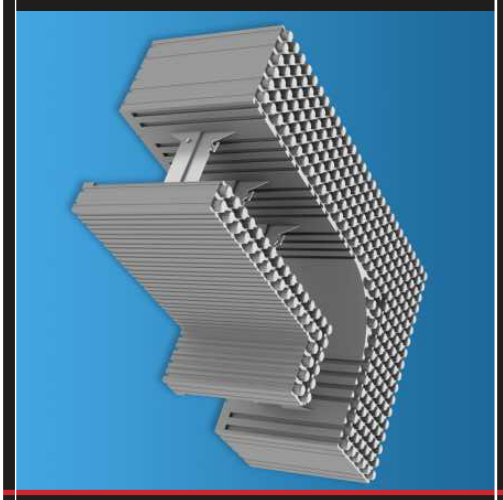
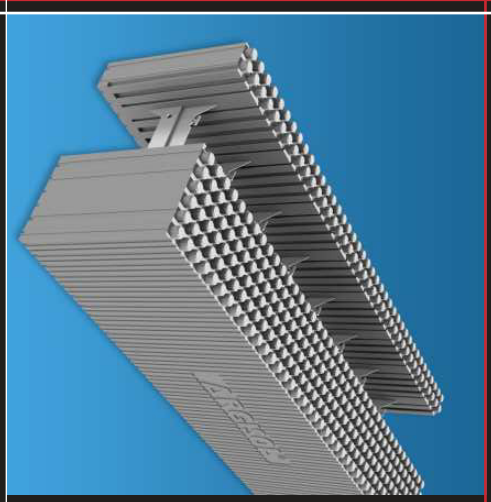
ARGISOL®

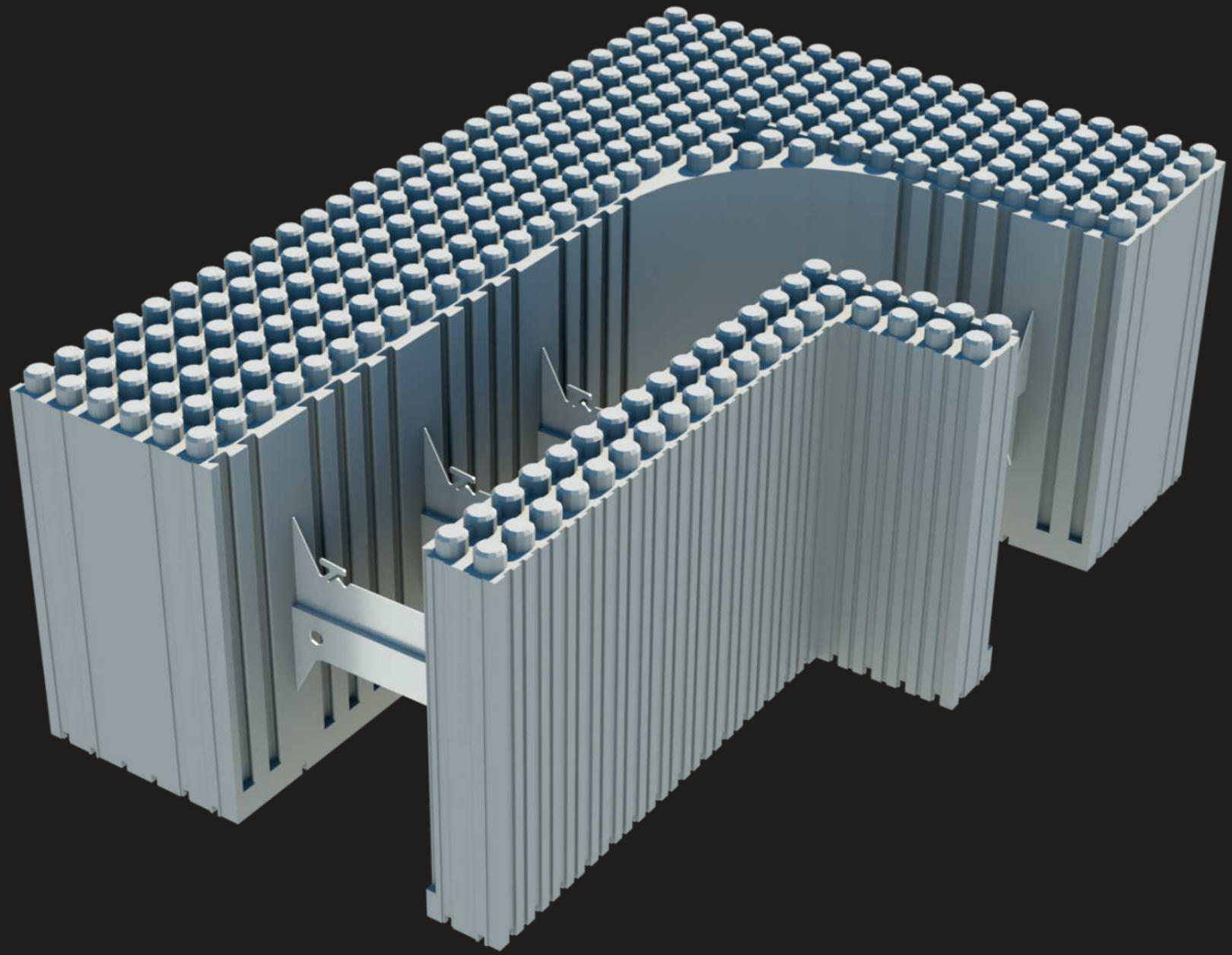








THE BLOCK

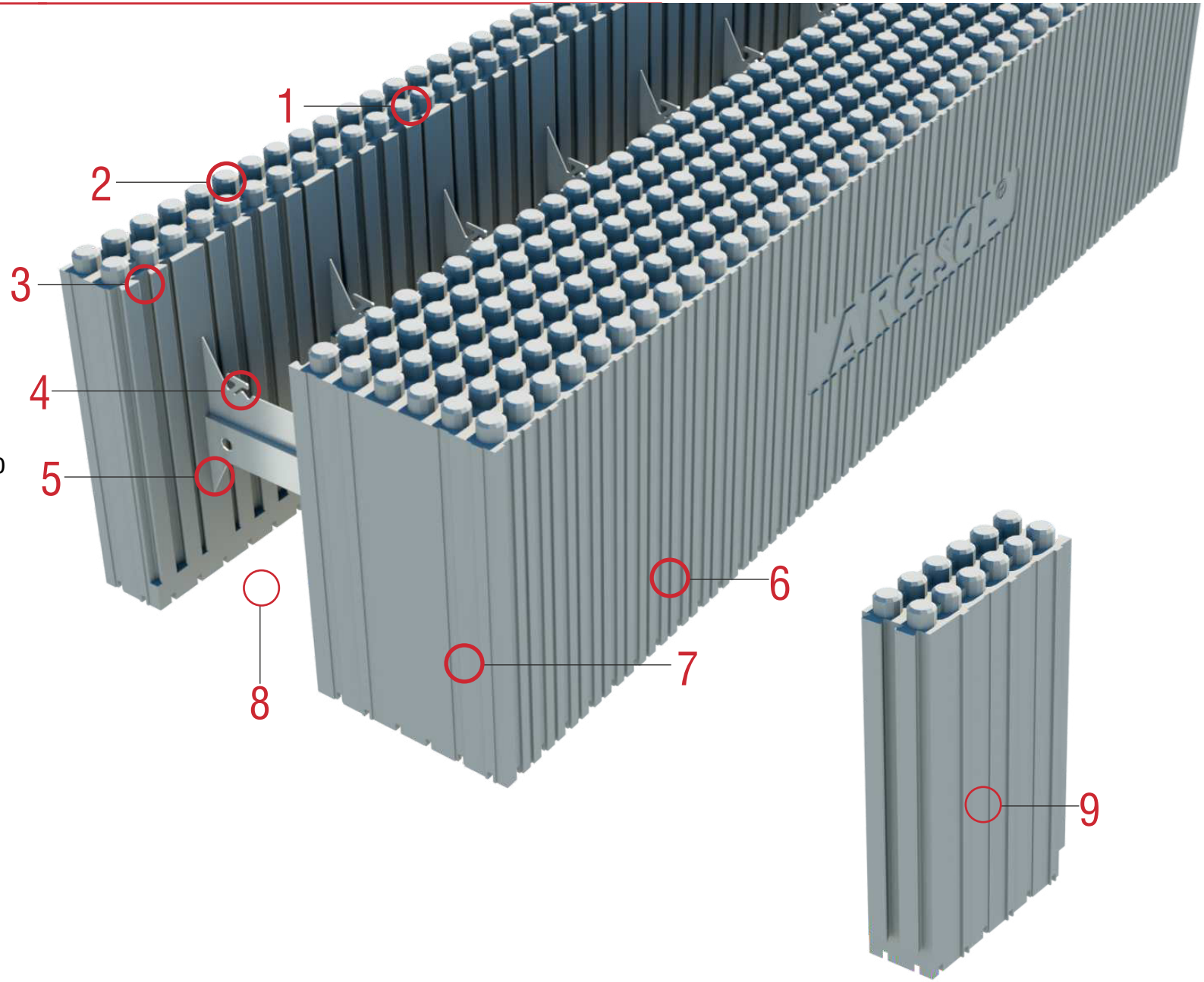


Innovation for the Future of Modern Building Wall

ARGISOL® – easy, flexible, forward-looking

The ARGISOL® - Standard Element

1. Sealing ribs prevent cement milk from leaking out and therefore eliminate the danger of thermal bridges
2. Nubs at a short distance permit aligned and exact fitting
3. Dove tail shaped inner surface provides perfect bonding to concrete
4. Spacer supports for reinforcing bars
5. Sheet metal inserts are precisely fused into the NEOPOR®
6. Spacing grooves allow for easy trimming of the building blocks in grids of 2,5 cm
7. Due to the different thickness of insulation excellent inside and outside performance from the point of view of construction physics
8. Filling material concrete C25/30 XC4 XF1 XA1 F3 8
9. Separation or end elements for insertion between the two NEOPOR® panels



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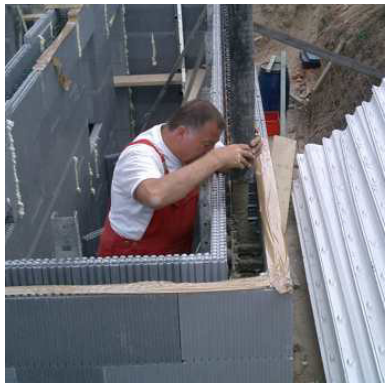
Uncompromising Stability and Insulation in one Operation

Build-up...



Concreting...

Finish!

ARGISOL® AFRICA

ARGISOL BUILDING SYSTEMS LTD (Nigeria)

ARGISOL BUILDING SYSTEMS PTY LTD (South Africa)

Production and Sale of ARGISOL® Building Elements

ARGISOL® - International GmbH

TECHNICAL IMPLEMENTATION AND SUPPORT®

Delivering Turnkey ARGISOL® Manufacturing Solutions






Standard element wall system 25 cm

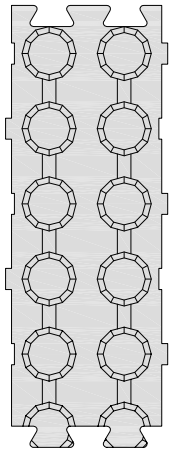
U-value: 0,27 W/m²K

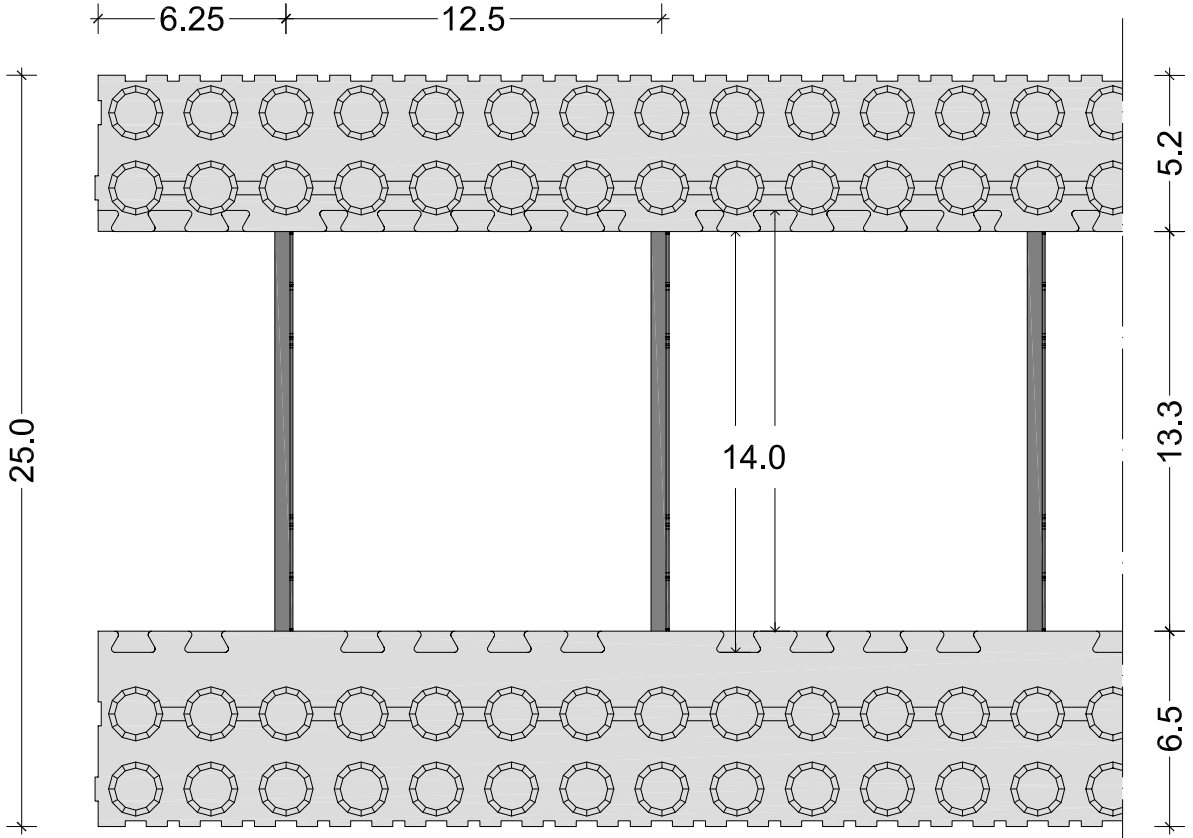
Our product range...

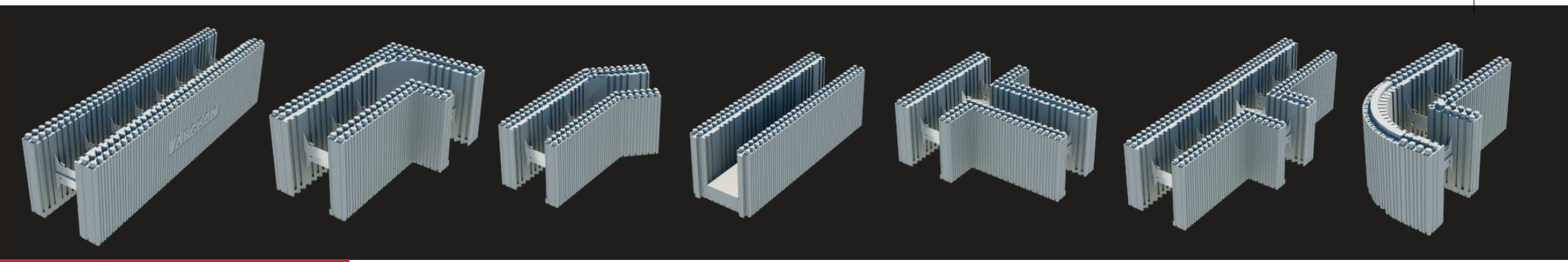
Wall system 25 cm

1.	Standard element	(100,0 x 25,0 x 25,0)
2.	Height compensation element	(50,0 x 5,0 x 5,0)
3.	End element	(14,0 x 5,0 x 25,0)
4.	ARGISOL dowel	
5.	T-element	(50,0 x 62,5 x 25,0)
		(100,0 x 37,5 x 25,0)
6.	Angle element 45°	(50,0 x 25,0 x 25,0)
7.	Corner element	(60,0 x 35,0 x 25,0)
8.	Rounded corner element	(60,0 x 35,0 x 25,0)
9.	End profile for ceilings	(75,0 x 10,0 x 20,0)
10.	Single boards	
	inside	(100,0 x 4,5 x 25,0)
	outside	(100,0 x 6,5 x 25,0)
11.	Lintel element	(75,0 x 25,0 x 25,0)

Length x width x heights (all measurements in cm)

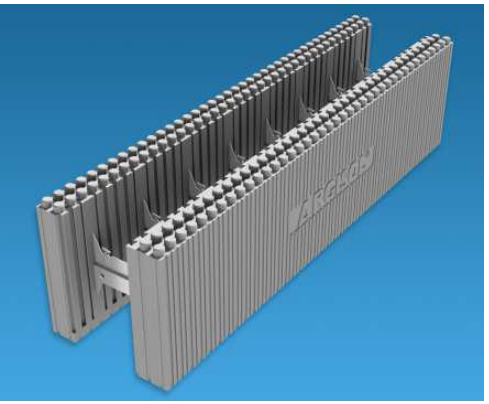


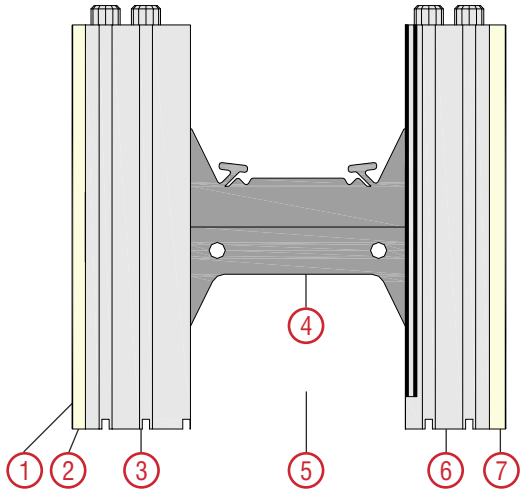




... for almost unlimited freedom in planning

Technical Specifications ARGISOL®-Element 25





1. Plastering /Synthetic resin plaster 3 mm
2. Reinforcement or insulation plaster 5 - 7 mm
3. NEOPOR® exterior shell 65 mm
4. Sheet metal insert
5. Concrete core 133 mm
6. NEOPOR® inner shell 52 mm
7. Interior plaster 10 mm

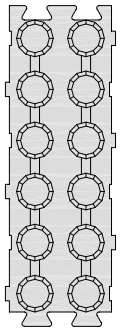
Thickness of the wall:	25 cm, not rendered
Weight of the wall:	330 kg/m², not rendered 360 kg/m², rendered both sides
Amount of concrete:	140 l/m² (0,14 m³/m²) wall space Concrete C25/30 XC4 XF1 XA1 F3 8 according to EN 206 (formerly B25/08 KR)
Material:	Expandable polystyrol rigid foam board made from NEOPOR®, flame resistant, specific gravity 30 kg/m³ with laid in galvanized metal bars
Weight of building elements:	Standard element 25 cm: 1 m long, 25 cm high, 25 cm wide, approximately 1,3 kg
U-Value:	U = 0,27 W/m²K
Thermal conductivity:	λ = 0,031 W/mK
Water vapor diffusion resistance coefficient:	μ = 60
Heat storage capacity:	1500 J/kgK
Sound absorption:	Proven sound absorption parameter for buildings of R'W = 45 dB, Test certificate of the Swiss Federal Laboratories for Materials Science and Technology (EMPA) in Dübendorf
Reaction to fire :	Classification REI 90 (F90), Licensed for high-rise building levels, licensed to be used as a fire wall, certified by the Material Testing Office for the Building Industry, Braunschweig
Authorization:	ETA - 05/0170, German Institute for Construction Technology (DIBt)

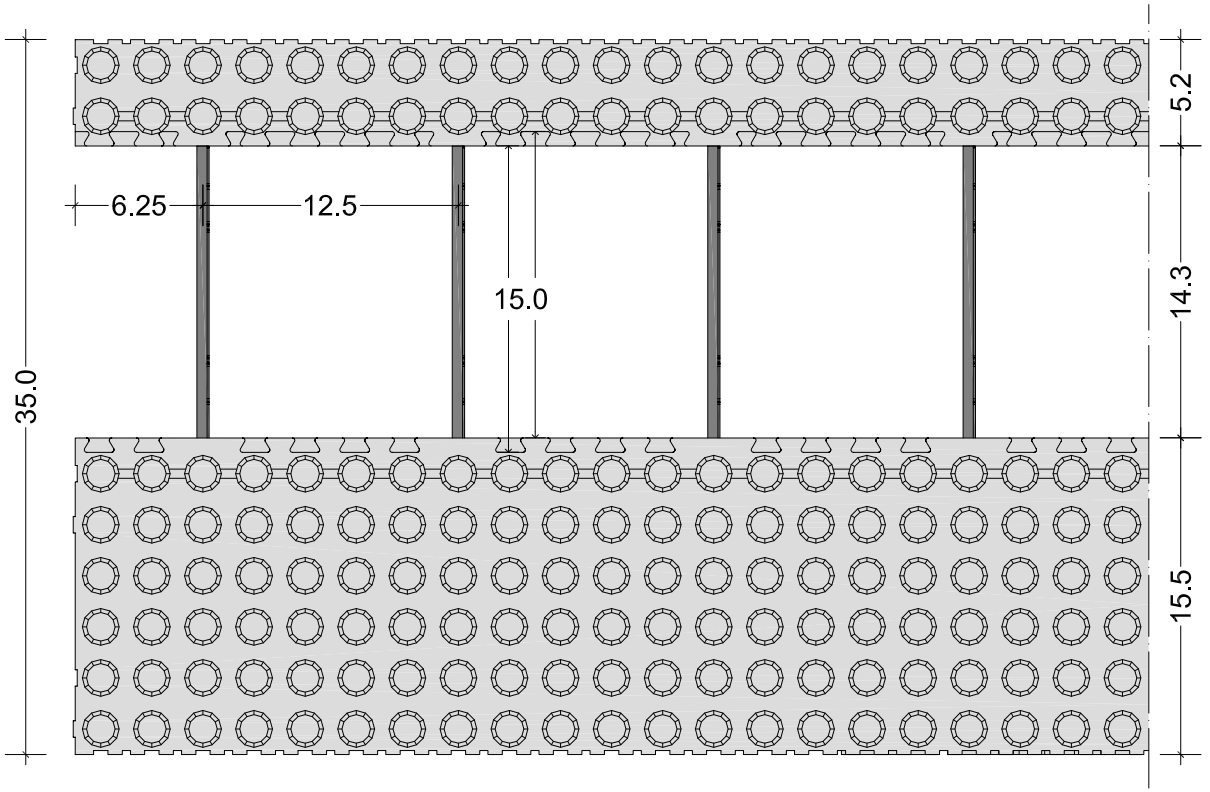
NEOPOR® = registered trademark of BASF SE

Wall system 35 cm

Standard element wall system 35 cm

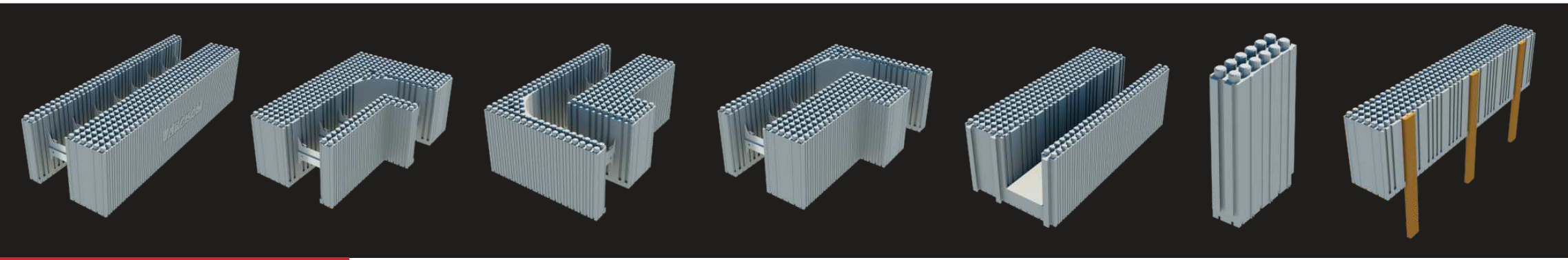
U-value: 0,15 W/m²K

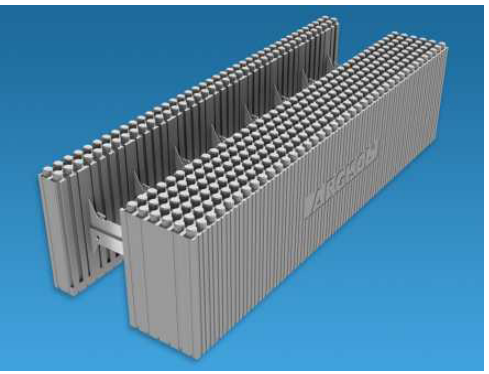


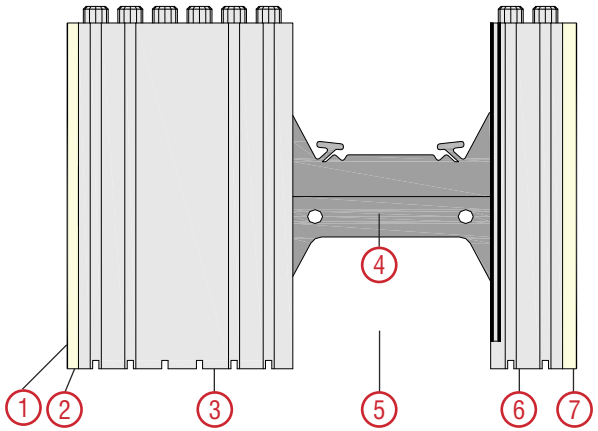


1. Standard element (100,0 x 35,0 x 25,0)
2. Corner element (70,0 x 45,0 x 25,0)
3. Internal corner element (70,0 x 45,0 x 25,0)
4. Lintel element (75,0 x 35,0 x 25,0)
5. End element (15,0 x 5,0 x 25,0)
6. Single board outside (100,0 x 15,5 x 25,0)

Length x width x height (all measurements in cm)







1. Plastering /Synthetic resin plaster 3 mm
2. Reinforcement or insulation plaster 5 - 7 mm
3. NEOPOR® exterior shell 155 mm
4. Sheet metal insert
5. Concrete core 143 mm
6. NEOPOR® inner shell 52 mm
7. Interior plaster 10 mm

Thickness of the wall:	35 cm, not rendered
Weight of the wall:	350 kg/m², not rendered 380 kg/m², rendered both sides
Amount of concrete:	150 l/m² (0,15 m³/m²) wall space Concrete C25/30 XC4 XF1 XA1 F3 8 according to EN 206 (formerly B25/08 KR)
Material:	Expandable polystyrol rigid foam board made from NEOPOR®, flame resistant, specific gravity 30 kg/m³ with laid in galvanized metal bars
Weight of building elements:	Standard element 35 cm: 1 m long, 25 cm high, 35 cm wide, approximately 2,1 kg
U-Value:	U = 0,15 W/m²K
Thermal conductivity:	λ = 0,031 W/mK
Water vapor diffusion resistance coefficient:	μ = 60
Heat storage capacity:	1500 J/kgK
Sound absorption:	Proven sound absorption parameter for buildings of R'W = 45 dB, Test certificate of the Swiss Federal Laboratories for Materials Science and Technology (EMPA) in Dübendorf
Reaction to fire :	Classification REI 90 (F90), Licensed for high-rise building levels, licensed to be used as a fire wall, certified by the Material Testing Office for the Building Industry, Braunschweig
Authorization:	ETA - 05/0170, German Institute for Construction Technology (DIBt)

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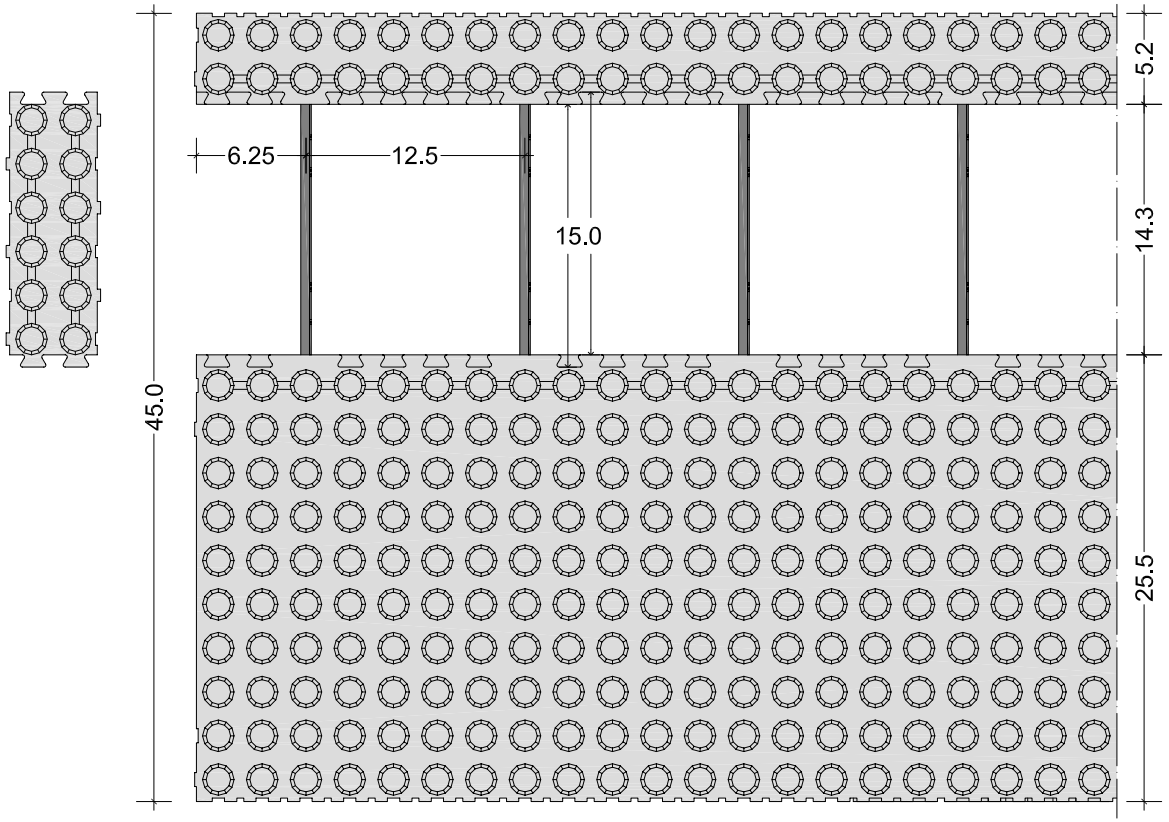
Standard element wall system 45 cm

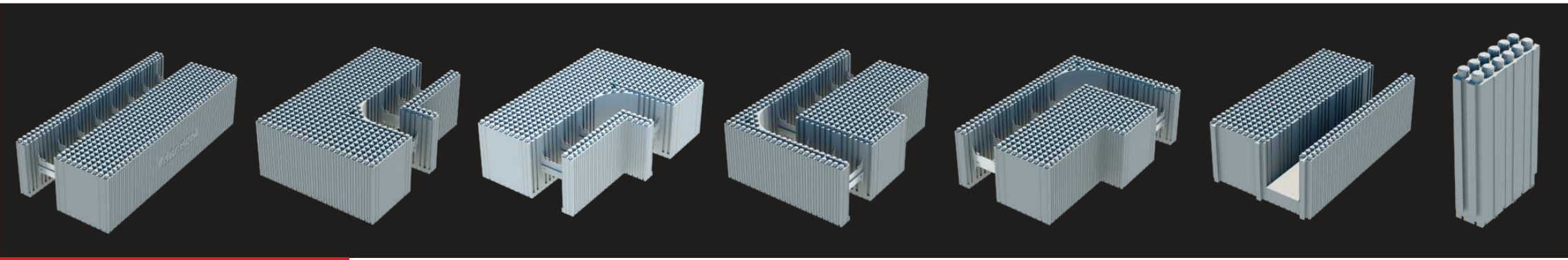
U-value: 0,10 W/m²K



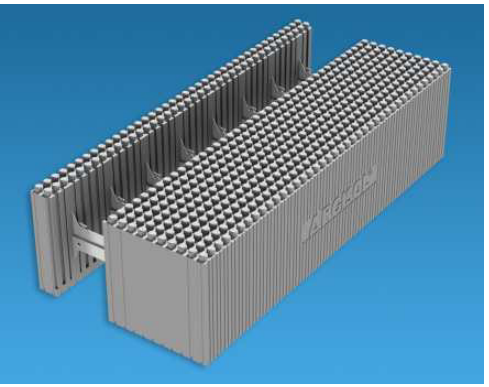
Wall system 45 cm

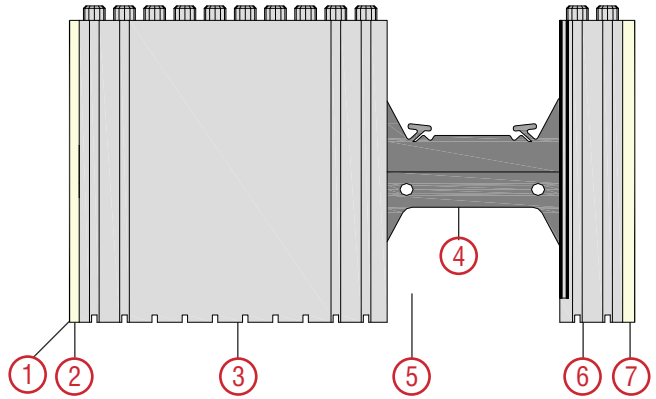
1. Standard element (100,0 x 45,0 x 25,0)
2. Corner element (70,0 x 55,0 x 25,0)
3. Internal corner element (70,0 x 55,0 x 25,0)
4. Lintel element (75,0 x 45,0 x 25,0)
5. End element (15,0 x 5,0 x 25,0)

Length x width x height (all measurements in cm)



Technical Specifications ARGISOL®-Element 45

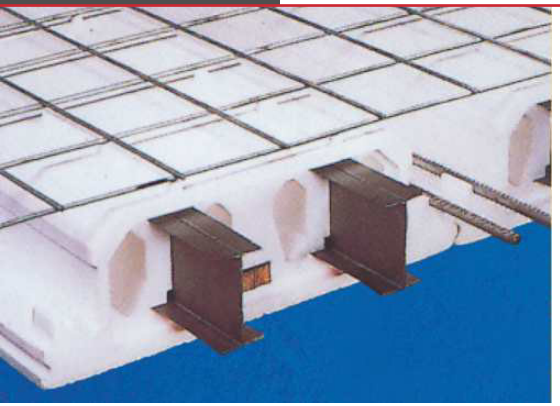




1. Plastering /Synthetic resin plaster 3 mm
2. Reinforcement or insulation plaster 5 - 7 mm
3. NEOPOR® exterior shell 255 mm
4. Sheet metal insert
5. Concrete core 143 mm
6. NEOPOR® inner shell 52 mm
7. Interior plaster 10 mm

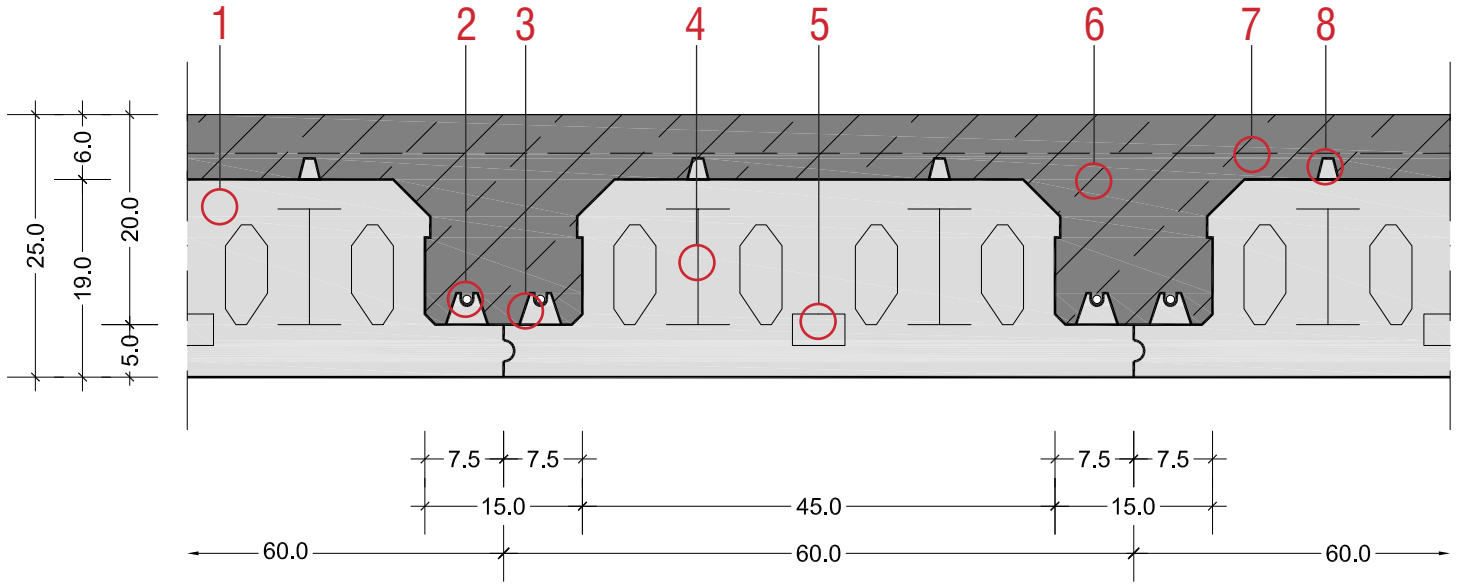
Thickness of the wall:	45 cm, not rendered
Weight of the wall:	360 kg/m², not rendered 390 kg/m², rendered both sides
Amount of concrete:	150 l/m² (0,15 m³/m²) wall space Concrete C25/30 XC4 XF1 XA1 F3 8 according to EN 206 (formerly B25/08 KR)
Material:	Expandable polystyrol rigid foam board made from NEOPOR®, flame resistant, specific gravity 30 kg/m³ with laid in galvanized metal bars
Weight of building elements:	Standard element 45 cm: 1 m long, 25 cm high, 45 cm wide, approximately 2,8 kg
U-Value:	U = 0,10 W/m²K
Thermal conductivity:	λ = 0,031 W/mK
Water vapor diffusion resistance coefficient:	μ = 60
Heat storage capacity:	1500 J/kgK
Sound absorption:	Proven sound absorption parameter for buildings of R'W = 45 dB, Test certificate of the Swiss Federal Laboratories for Materials Science and Technology (EMPA) in Dübendorf
Reaction to fire :	Classification REI 90 (F90), Licensed for high-rise building levels, licensed to be used as a fire wall, certified by the Material Testing Office for the Building Industry, Braunschweig
Authorization:	ETA - 05/0170, German Institute for Construction Technology (DIBt)

NEOPOR® = registered trademark of BASF SE



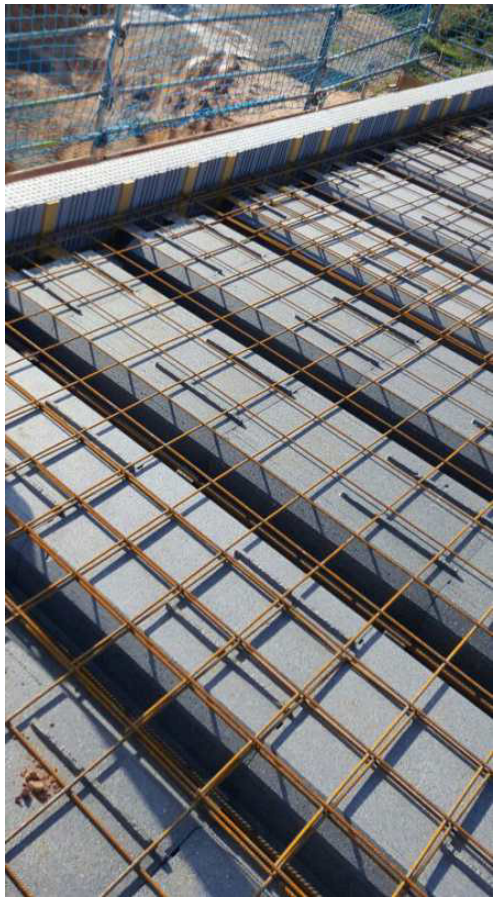
ARGISOL® Eurorip-ceiling element

U-value: 0,25 W/m²K



1. ARGISOL®-Eurorip-ceiling element (shuttering body)
2. Rib reinforcement according to static calculations
3. Spacers for reinforcement rib
4. Double I-beam made of sheet steel
5. Insertion option for wooden slats
6. in-situ concrete C25/30 XC4 XF1, rule consistency, granulation 0/08
7. Transverse reinforcement according to Eurocode 2
8. Spacer for mesh reinforcement

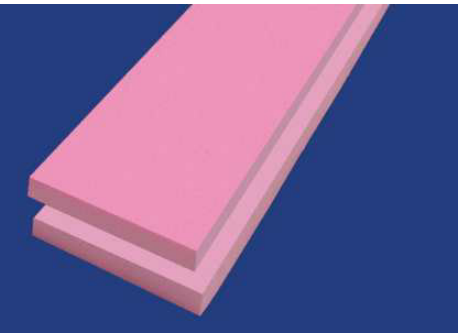
- Ribbed slab according to Eurocode 2: Carrying capacity of the ceiling by individual reinforcement of the ribs and the plate
- Underside of the ceiling surface can be plastered or smoothed over.
- Easiest possible assembly of coverings and wooden ceilings by inserting roof slats from the side of the building
- It takes just 1 minute to put up one sqm (two people), thus making it the fastest ever ceiling to put up.

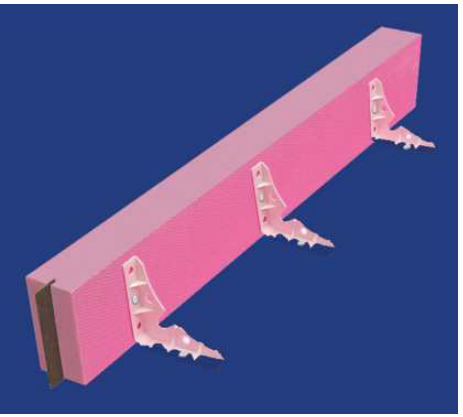


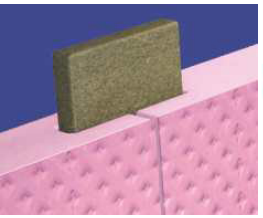
From static point of view, ARGISOL® Eurorip-ceiling element are permanent shutterings of rib ceilings according to Eurocode 2.

Widths/elements:	60 cm
Heights/elements:	19 cm (without covering concrete slab)
Lengths/elements:	Factory tailored to building or room dimensions. Rule length 6,00 m; Special lengths possible
Rib height:	20 cm
Rib width:	15 cm
Weight/element:	ca. 4,8 kg/lfm
Material/element:	Polystyrene rigid foam, flame resistant, volumetric weight 22 kg/m³
Material/double-T plates:	ST 52 d = 1 mm
Self-bearing capacity during assembly:	(incl. 6 cm concrete cover and man load) max. 3,00 m
Concrete needs at 6 cm concrete cover:	95 l/m² (0,095 m³/m²)
Concrete quality:	Concrete C25/30 XC4 XF1 XA1 F3 8 according to EN 206 (formerly B25/08 KR)
Steel quality:	Rib reinforcement BST 420/500 Slab reinforcement BSTG 500/500
Board thickness (with concrete cover):	6 cm or more according to static requirements
Fire protection:	according to DIN 4102
Soundproofing:	according to DIN 4109
Heat protection:	according to DIN 4108

Thermo System - Base Plates Insulation Panelling







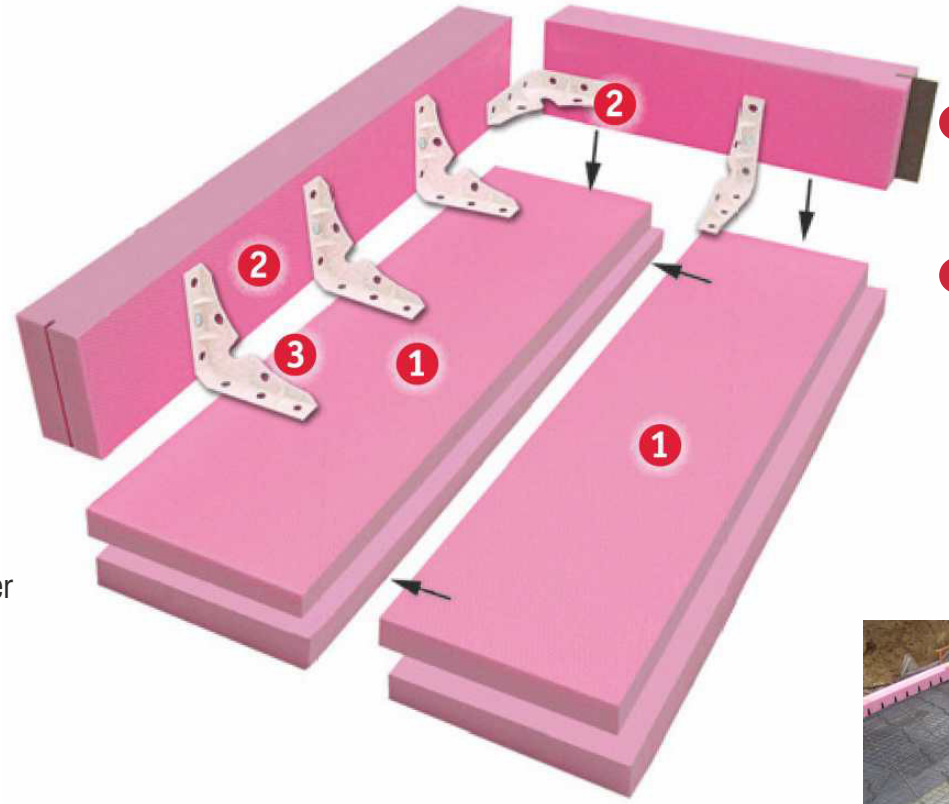
Thermo system floor element XPS 300

Insulation:
extruded polystyrene (XPS),
Thickness:
100-160 mm
(other thicknesses on request);
shiplap, smooth surface,
Compressibility:
300 kPa
(500 kPa + 700 kPa on request)
Floor element:
1250 x 600 mm

Thermo system edge board XPS 300

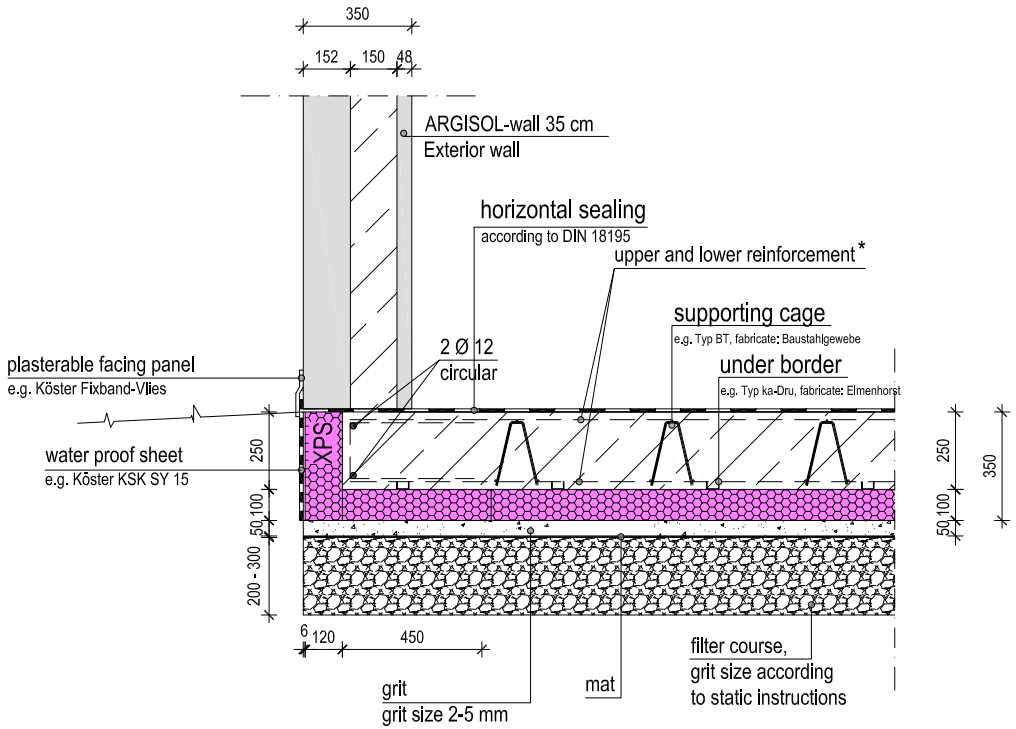
Insulation:
extruded polystyrene (XPS),
Thickness:
50/60/120 mm
(other thicknesses on request);
shiplap, honeycomb surface,
Compressibility:
300 kPa
(500 kPa + 700 kPa on request)
Element length:
1250 mm, three angle brackets per element pre-installed
Accessories:
speed screws for fastening on the bottom plate and plug springs for connecting the edge board

Floor element 10 cm: ***U-value: 0,339 W/m²K***
Edge board 12 cm: ***U-value: 0,285 W/m²K***



Assembling the base plate formwork

1. The floor elements with shiplap are assembled to complete the base plate
2. Edge boards with plug springs are placed and plugged together
3. Angle brackets and speed screws connecting the edge boards and floor elements securely to each other



Base plates insulation panelling with ARGISOL®- wallsystem 35 cm

– WITHOUT CELLAR –

Horizontal and vertical sealing of the bottom plate and the ARGISOL-wall are in accordance to DIN 18195!
The execution shall take place under control of the project management only and after evaluation of soil conditions.
The presentation given here does not apply to the execution actually required.

* Type description for lower and upper reinforcement, such as cross section/dimension according to static instructions

Insulation:	extruded polystyrene (XPS), shiplap, smooth surface (floor element) honeycomb surface (edge board)
Compressibility:	300 kPa (500 kPa + 700kPa on request)
Load capacity group:	BG 30
Thermal conductivity:	0,035 W/mK (30 - 60 mm) 0,036 W/mK (70-120 mm) 0,038 W/mK (140-220 mm)
Minimum density:	≥ 30 kg/m³
Compressive stress at 10%:	CS(10/Y) 300 kPa = 30 t/m²
Creep: (according to EN 1606 corresponding permissible continuous compressive strength of 50 years)	CC(2/1,5/50) 130 kPa = 13 t/m²
Closed cells:	≥ 95 %
Modulus of elasticity:	12 N/mm² = 12000 kPa
Capillary water absorption:	0
Water absorption by diffusion:	WD(V)3 Vol.%
Freeze-thaw cycle resistance:	FTCD 1
Flammability:	B1
Smoke density class:	Q3
Drop formation class:	Tr1
Fire behavior EN 13501-1:	E

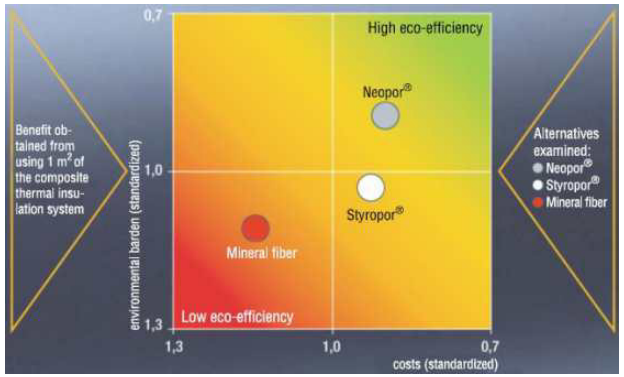
Better Insulation with NEOPOR® - the New Silver-Grey Insulation Material by BASF

Benefits NEOPOR®

- up to 30% better insulating performance than conventional EPS
- proven high environmental efficiency and cost
- water repellent, non-aging and non-rotting, stable and dimensionally
- easy to use and processing

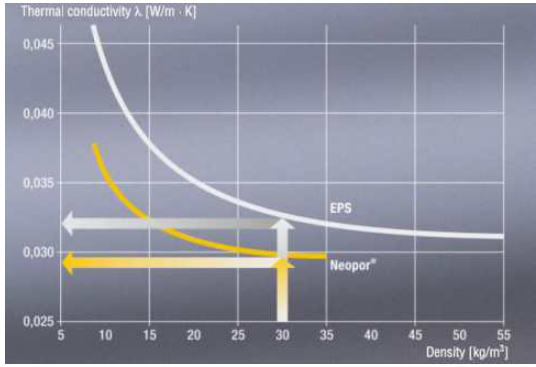
Building materials compared

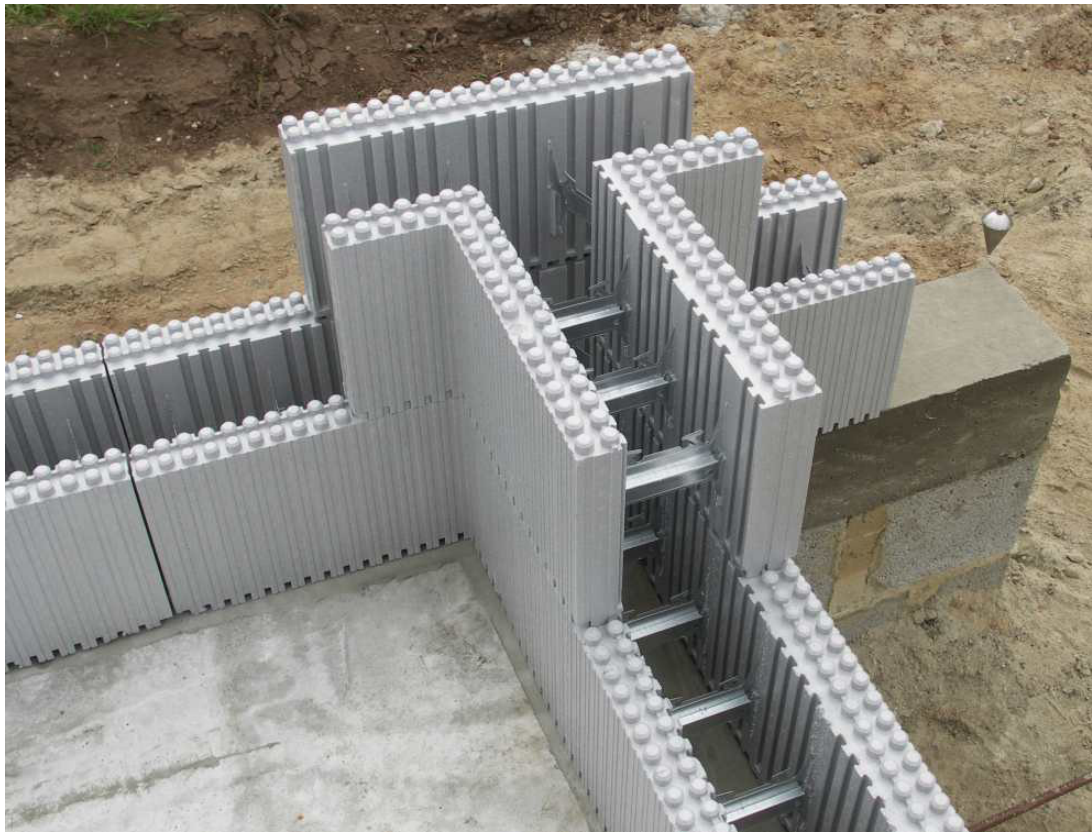
Compared to alternative materials NEOPOR® requires up to 50% less raw materials, which reduces cost as well as pollution. Using NEOPOR® the same insulation performance is achieved by a reduced insulation thickness of 15-20%. According eco-efficient solutions achieve an up-to-date thermal protection.



Better thermal conductivity

NEOPOR® - products with a foam density of 30 kg/m³ (like ARGISOL® shuttering elements) achieve a coefficient of thermal conductivity parameter of 0,029 W/mK. Using regular EPS with the same foam density a heat conduction parameter of only 0,032 W/mK is achieved.





Building with ARGISOL® Represents a Sum of Convincing Advantages

1. Energy-conscious

Building in a traditional way means that high demands on heat protection can only be met by using additional heat insulation. Using double-sided® NEOPOR® shuttering ARGISOL achieves an incredible **U-result of 0,15 W/m²K** (35 cm wall). With ARGISOL® you will always get a low-energy house.

2. Fast, easy, cost-efficient

One decisive advantage of skin concrete building are low wage costs: they are only 1/3 in comparison to traditional ways of building. To build with ARGISOL® is child's play: due to the nubs even a layman is able to build in a truly aligned and plump way. Futhermore, elements are very lightweight and therefore make heavy building work much easier. ARGISOL® shuttering elements can be set up and filled in shortest time compared to brick walls. Last but not least, the ARGISOL® building system is more cost-efficient than traditional ways of building.

3. Comfortable room atmosphere

By insulating the inside wall, the wall surface temperature differs only by 1° Celsius from the room temperature. As a result, there is hardly any air circulation caused by temperature differences in the room. Therefore a comfortable feeling is achieved at any season of the year, summer and winter alike.
Due to the solid concrete core a reliable sound absorption parameter of Rw = 45 dB is achieved – a guarantee for quiet living.

4. Effective building

ARGISOL® provides an optimum of heat and sound insulation although the wall thickness is only 25 cm. Your advantage, an increase in **living space**! With an assumed floor space of 100 m² about 4,5 m² space is gained in comparison to a 36,5 cm wall.

5. Creatively planning

ARGISOL® building elements can be shortened in grids of 2,5 cm by a simple saw. The diversity of ARGISOL® special elements (corner, angle and arched elements) allows realisation of any ground-plan.

6. Building for the future

The ARGISOL® building system fulfills all demands, which are addressed nowadays to a recent construction material. Certification and inspection reports confirm the technological superiority of the ARGISOL® construction system.

Pictures of the ARGISOL-Show Home „BOSTON“

ARGISOL® - Approvals, Expert's Report and Test Reports

Deutsches Institut für Bautechnik DIBt

Member of EOTA www.eota.eu

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

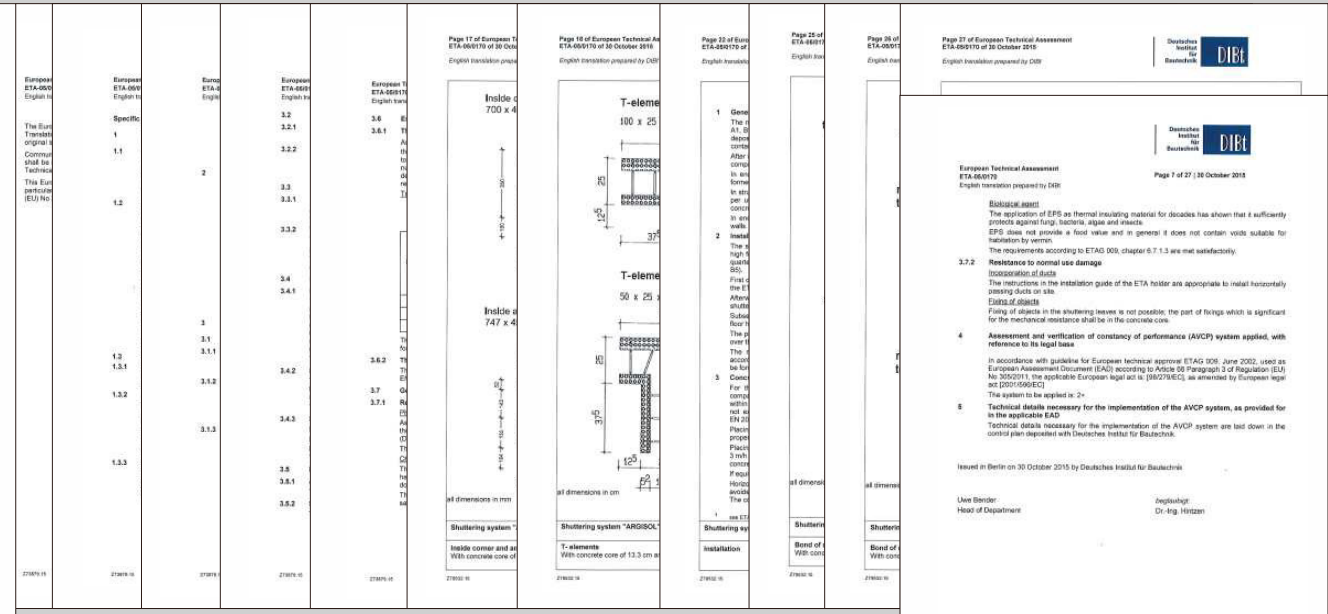
European Technical Assessment ETA-05/0170 of 30 October 2015

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	ARGISOL
Product family to which the construction product belongs	Non load bearing shuttering kit "ARGISOL" based on shuttering elements of EPS
Manufacturer	BEWA GmbH ARGISOL-Bausysteme Grünstadter Straße 2 67271 Obersülzen
Manufacturing plant	BEWA GmbH ARGISOL-Bausysteme Grünstadter Straße 2a 67271 Obersülzen DEUTSCHLAND
This European Technical Assessment contains	27 pages including 20 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	Guideline for European technical approval of "Nonload-bearing permanent shuttering systems based on hollow blocks or panels of insulating materials and sometimes concrete", ETAG 009, June 2002, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

Deutsches Institut für Bautechnik
Kolonnenstraße 30 B | 10829 Berlin | GERMANY | Phone: +49 30 78730-0 | Fax: +49 30 78730-320 | Email: dibt@dibt.de | www.dibt.de



Dipl.-Ing. Karl Kiefer, (*EUR.*-Ing.), Bausachverständiger
Beratender Ingenieur für das Bauwesen
Certification de Fédération Européen Association National Ingénieur (FEANI)
D-67141 Neuhofen, Benzstr. 1A

Certificate of earthquake security of the ARGISOL®- method of building

Object of certificate: ARGISOL-sample house "Fichtenweg 122" consisting of ground floor and attic made by ARGISOL-shuttering elements for walls and ceilings

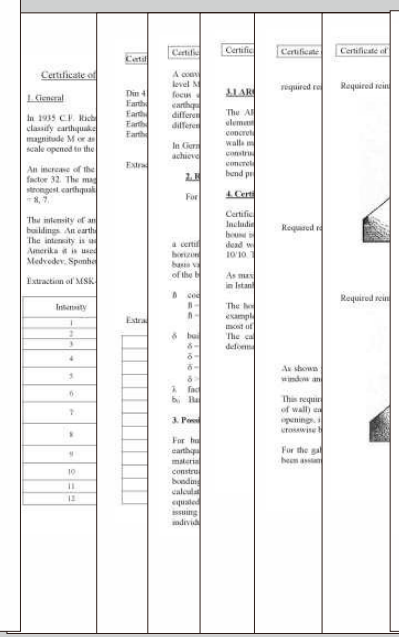
Factor of certificate: maximum acceleration b = 0,5 g of earthquake load

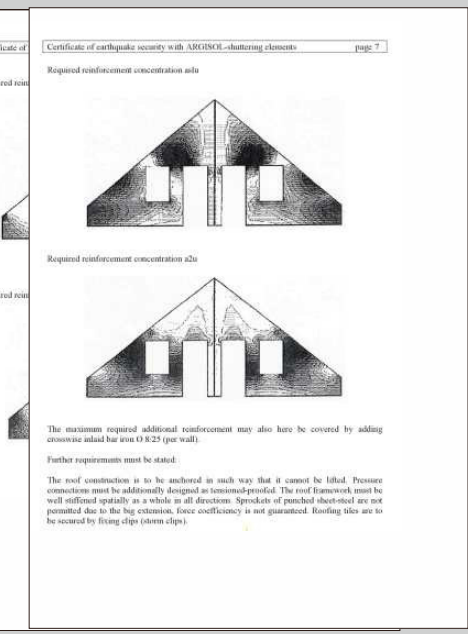
Result of earthquake: earthquake security up to the intensity of level X (10) of Richter scale

Indication of expertise: decisive criterions for the aimed test result.
- storey high concreting is possible therefore joints of concrete may be avoided.
- force coefficient (tension and compression resistant) connection of walls among each other by special angle and T-elements (without interruption of concrete core by polystyrene parts).
- excellent hardening possibility of concrete by embedding within the polystyrene shell.
- force coefficient connection of foundations (bottom slab), walls and ceilings.

Certificate documentation: 10 pages of certificate of earthquake security with ARGISOL-shuttering elements

extended on 22/09/06





iBMB MPA TU BRAUNSCHWEIG

Institute of Building Materials, Concrete Construction and Fire Protection | Braunschweig Civil Engineering Materials Testing Institute

Materialprüfanstalt für das Bauwesen · Beethovenstrasse 52 D-38106 Braunschweig

BEWA GmbH
ARGISOL-Bausysteme
Grünstadter Straße 2
D-67271 Obersülzen

Letter 13615/2016

Our ref.: (2101/555/16)-Schm
Customer No.: 5073
Official in charge: Mr Schmieder
Dept.: 55
Contact: +49 (0)531-391-8246
s.schmieder@ibmb.tu-bs.de

Your ref.: Mr Becker
Your message of: 13/07/2016

Date: 20/07/2016

Validity of the expert opinion no. 20245/2011 of 21/11/2011

Dear Sir/Madam,

In response to your query of 13/07/2016, we are writing to inform you that the statements relating to fire protection made in expert opinion no.20245/2011 of 21/11/2011 regarding

> designing load-bearing firewalls using prefabricated formwork elements made from expanded polystyrene (EPS) with sheet steel spacers in conjunction with a wall core made from reinforced concrete (in-situ concrete) based on DIN 4102-4 : 1994-03 and in conjunction with DIN 4102-22 : 2004-11

are still valid.

As regards designing the load-bearing firewalls using prefabricated formwork elements made from expanded polystyrene (EPS) with sheet steel spacers in conjunction with a wall core made from reinforced concrete (in-situ concrete) in accordance with the boundary conditions laid out in expert opinion no. 20245/2011 of 21/11/2011, MPA Braunschweig recommends that this design continue to be evaluated as presenting "a non-essential deviation" from DIN 4102-4 : 1994-03 and in conjunction with DIN 4102-22 : 2004-11.

Expert opinion no. 20245/2011 of 21/11/2011 can therefore only be used together with DIN 4102-4 : 1994-03 in building authority procedures as a basis for a certificate of compliance.

Materialprüfanstalt (MPA) für das Bauwesen Beethovenstrasse 52 38106 Braunschweig, Germany
Phone+49 (0)531-391-5400 Fax +49 (0)531-391-5900 info@mpa.tu-bs.de www.mpa.tu-bs.de
Norddeutsche LB Hannover IBAN: DE58 2505 0000 0106 0200 50 BIC: NOLADE2H VAT ID No.: DE183500654 Tax Reg. No.: 14/201/22859
Notified body (0761-CPR)- Approved as a civil engineering testing, inspection and certifying body as well as notified as a civil engineering testing and certifying body.

The manufacturer of the structure is responsible for issuing a certificate of compliance for it (indicating that it presents a "non-essential" deviation from the construction principles and boundary conditions in accordance with the abovementioned standard of fire protection).

Advisory opinion no. 20245/2011 of 21/11/2011 and this letter shall cease to be valid on 19/07/2021.

The period of validity of this expert opinion can be extended upon request and depending on the current level of technology.

This document is the translated version of Letter 2101/555/16 dated 20/07/2016 . The legally binding text is the aforementioned German Letter.

With kind regards

i.A.
Dipl.-Ing. S. Schmieder
Deputy head of section

i.A.
Dipl.-Ing. M. Weingarten
Official in charge

iBMB MPA TU BRAUNSCHWEIG

Institute of Building Materials, Concrete Construction and Fire Protection | Braunschweig Civil Engineering Materials Testing Institute

Materialprüfanstalt für das Bauwesen · Beethovenstrasse 52 D-38106 Braunschweig

BEWA GmbH
ARGISOL-Bausysteme
Mr Hans-Jürgen Becker
Grünstadter Straße 2
D-67271 Obersülzen

Letter 20245/2011

Our ref.: (3450/726/11)-Schm
Customer No.: 5073
Official in charge: Mr. Schmieder
Dept.: 55
Contact: s.schmieder@ibmb.tu-bs.de

Your ref.: Mr. Becker
Your message of: 20/10/2011

Date: 21/11/2011

Expert opinion on designing load-bearing firewalls using prefabricated formwork elements made from expanded polystyrene (EPS) with sheet steel spacers in conjunction with a wall core made from reinforced concrete (in-situ concrete) in compliance with DIN 4102-4 : 1994-03 and in conjunction with DIN 4102-22 : 2004-11

Dear Mr Becker,

MPA Braunschweig was commissioned by BEWA GmbH, Obersülzen, in writing on 20/10/2011 to provide an expert opinion on designing load-bearing firewalls using prefabricated formwork elements made from expanded polystyrene (EPS) with sheet steel spacers in conjunction with a wall core made from reinforced concrete (in-situ concrete) in compliance with DIN 4102-4 : 1994-03 and in conjunction with DIN 4102-22 : 2004-11.

The expert opinion is required because proof of fire protection as a firewall (e.g. DIN 4102-4 : 1994-03 in conjunction with DIN 4102-22 : 2004-11) is not always given in all structural details for the abovementioned formwork walls.

1 Documents and basis for the expert opinion

The expert opinion for the load-bearing firewalls using prefabricated formwork elements made from expanded polystyrene (EPS) with sheet steel spacers in conjunction with a wall core made from reinforced concrete (in-situ concrete) is based on

- DIN 4102-4 : 1994-03 in conjunction with DIN 4102-22 : 2004-11 and

Materialprüfanstalt (MPA) für das Bauwesen Beethovenstrasse 52 38106 Braunschweig, Germany
Phone+49 (0)531-391-5400 Fax +49 (0)531-391-5900 info@mpa.tu-bs.de www.mpa.tu-bs.de
Norddeutsche LB Hannover IBAN: DE58 2505 0000 0106 0200 50 BIC: NOLADE2H VAT ID No.: DE183500654 Tax Reg. No.: 14/201/22859
Notified body (0761-CPR)- Approved as a civil engineering testing, inspection and certifying body as well as notified as a civil engineering testing and certifying body.

- European Technical Approval No. ETA-05/0170.

Alongside these documents, the fire protection evaluation also incorporates MPA Braunschweig's considerable testing experience in firewall structures, reinforced concrete wall structures and formwork block structures.

2 Description of the structure

The following description is based on the information provided by the customer. Only the details that are relevant from a fire protection point of view are described below:

In contrast to DIN 4102-4 ; 1994-03, Section 4.8, standard concrete is used in accordance with DIN 1045-1 and in conjunction with an in-situ concrete reinforcement between prefabricated formwork elements made from expanded polystyrene (EPS) with sheet steel spacers.

Other details about the structural design of the wall structure made using prefabricated formwork elements made from expanded polystyrene (EPS) with sheet steel spacers in conjunction with a wall core made from reinforced concrete (in-situ concrete) can be found in European Technical Approval No. ETA-05/0170.

3 Fire protection evaluation

Based on DIN 4102-4 : 1994-03 and in conjunction with DIN 4102-22 : 2004-11, European Technical Approval No. ETA-05/0170 and based on MPA Braunschweig's testing experience in firewall structures, reinforced concrete wall structures and formwork block structures, the wall structure described in Section 2 made using prefabricated formwork elements made from expanded polystyrene (EPS) with sheet steel spacers in conjunction with a wall core made from reinforced concrete (in-situ concrete) can be classified as a

"firewall" in accordance with DIN 4102-3 ; 1977-09

because it complies with the temperature-time curve (standardized), despite its deviations from DIN 4102-4 : 1994-03.

As regards the design of the wall structure described in Section 2, there is no reason from a fire protection point of view to believe that the criteria of

- Loadbearing capacity

4.2 This expert opinion only applies to matters relating to fire protection. Further requirements – e.g. building physics, statics, electrical engineering, ventilation engineering and similar – can be found in the technical building regulations applicable to the firewall and the relevant state building code or regulations for special structures.

4.3 The overall fire protection concept does not form a component of this expert opinion.

4.4 The abovementioned fire protection evaluation only applies if the load-bearing components have at least the same fire resistance time as the firewall.

4.5 Amendments and addenda to structural details (taken from this expert opinion) are only possible after consultation with MPA Braunschweig.

4.6 The executing company is solely responsible for proper implementation.

4.7 This expert opinion shall cease to be valid on 21/11/2016 at the latest and can be extended depending on the current level of technology.

This document is the translated version of Letter 3450/726/11 dated 21/11/2011 . The legally binding text is the aforementioned German Letter.

With kind regards

i.A.
Dipl.-Ing. Mittmann
Deputy Head of department

i.A.
Dipl.-Ing. Schmieder
Official in charge

- Integrity and
- Temperature

will not be fulfilled in accordance with DIN 4102-2 : 1977-09, even if the firewall structure causes an additional horizontal impact load in accordance with DIN 4102-3 : 1977-09.

This requires the following:

- the unaffected cross-section of concrete is at least d = 140 mm thick;
- the centre distance of the reinforcement (measured from the inside of the formwork block) is at least u = 25 mm;
- the slenderness is no more than $h_s/d = 25$ and
- the load-bearing and strutting members supporting the firewall comply with fire resistance class "F 90" as a minimum in accordance with DIN 4102-2 : 1977-09.

Moreover, to determine the load factor α_i at a structural safety proof in accordance with DIN 1045-1 : 2008-08, the design value of the standard force in a fire $N_{fi,d}$ in accordance with DIN 1055-100 must be divided by the loadbearing capacity N_{Rd} in accordance with DIN 1045-1 and multiplied by $\alpha^* = 2.0$, based on Section 5.2 of DIN 4102-22 : 2004-11.

$$\alpha_i = (N_{fi,d} / N_{Rd}) \times \alpha^*$$

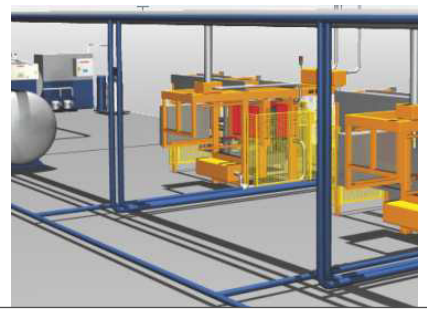
Owing to the unaffected cross-section of concrete with the sheet steel spacers, no flammable construction materials penetrated through the firewall, meaning there is no risk of fire and smoke passing through the wall structure via the flammable formwork elements.

This does not affect the other general requirements for firewalls outlined in other countries' building authority provisions.

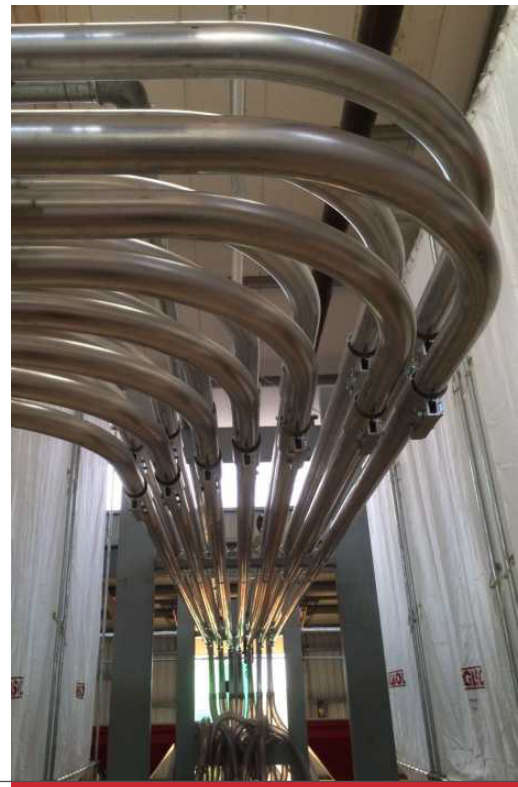
4 Special references

4.1 This expert opinion can be used in conjunction with DIN 4102-4 : 1994-03 and DIN 4102-22 : 2004-11 in building authority procedures as a basis for the certificate of compliance, since the deviations from the abovementioned standards are evaluated as "non-essential" from a fire protection point of view. The manufacturer of the structure is responsible for issuing a certificate of compliance for it (indicating that it presents a "non-essential" deviation from the construction principles and boundary conditions in accordance with the abovementioned standards of fire protection).

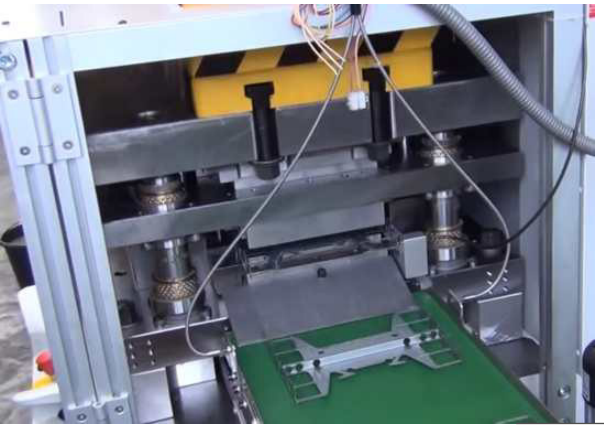
ARGISOL® - Manufacturing Plant



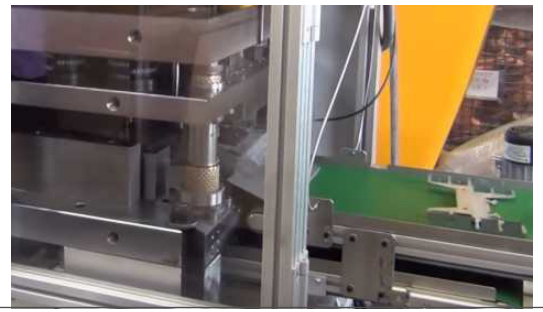

ARGISOL
ARGISOL



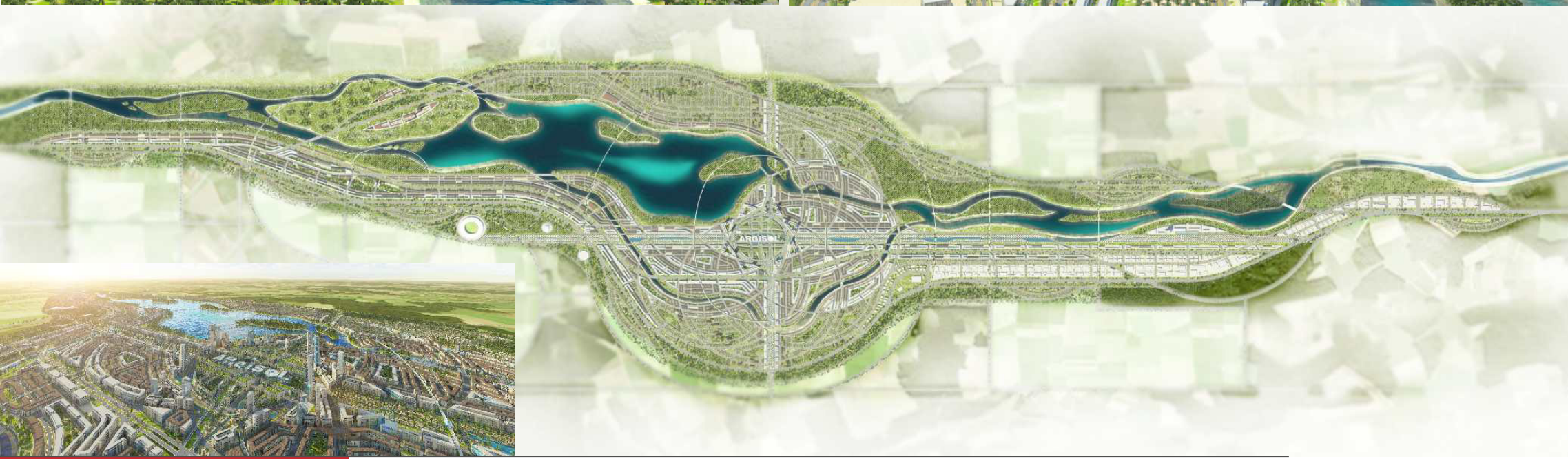
ARGISOL® - Machine AR 1412 for Standard Elements



Punching Machine



ARGISOL® - Development

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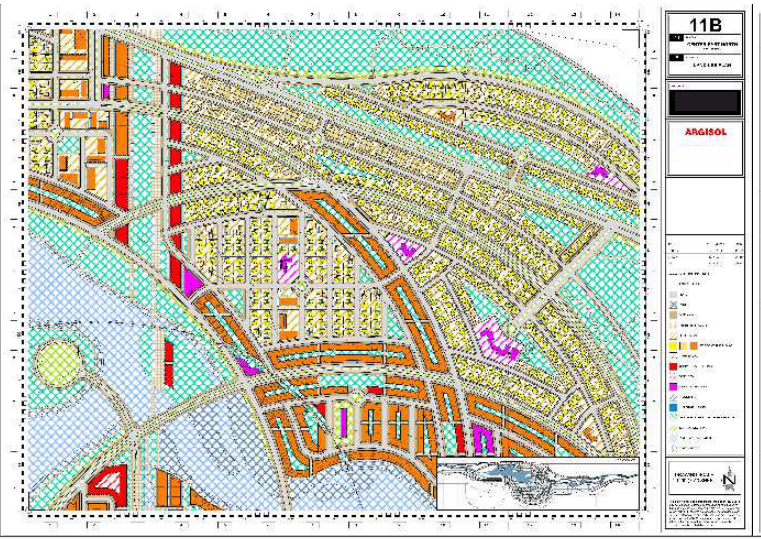
ARGISOL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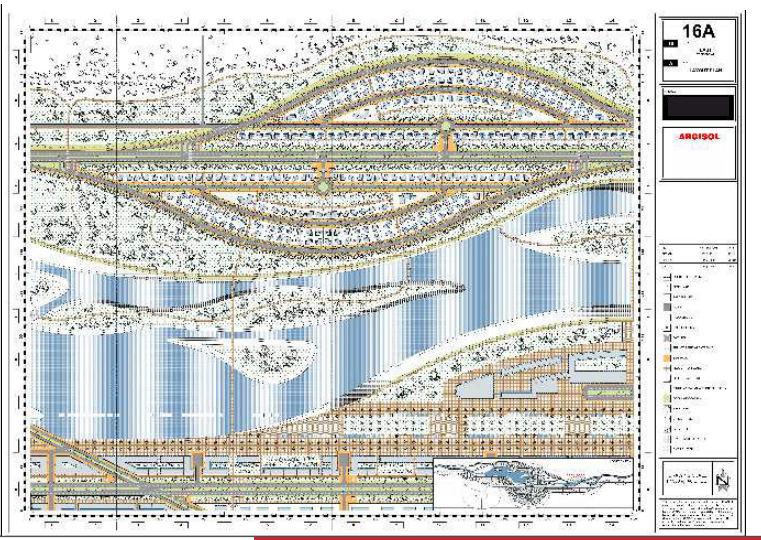
ARGISOL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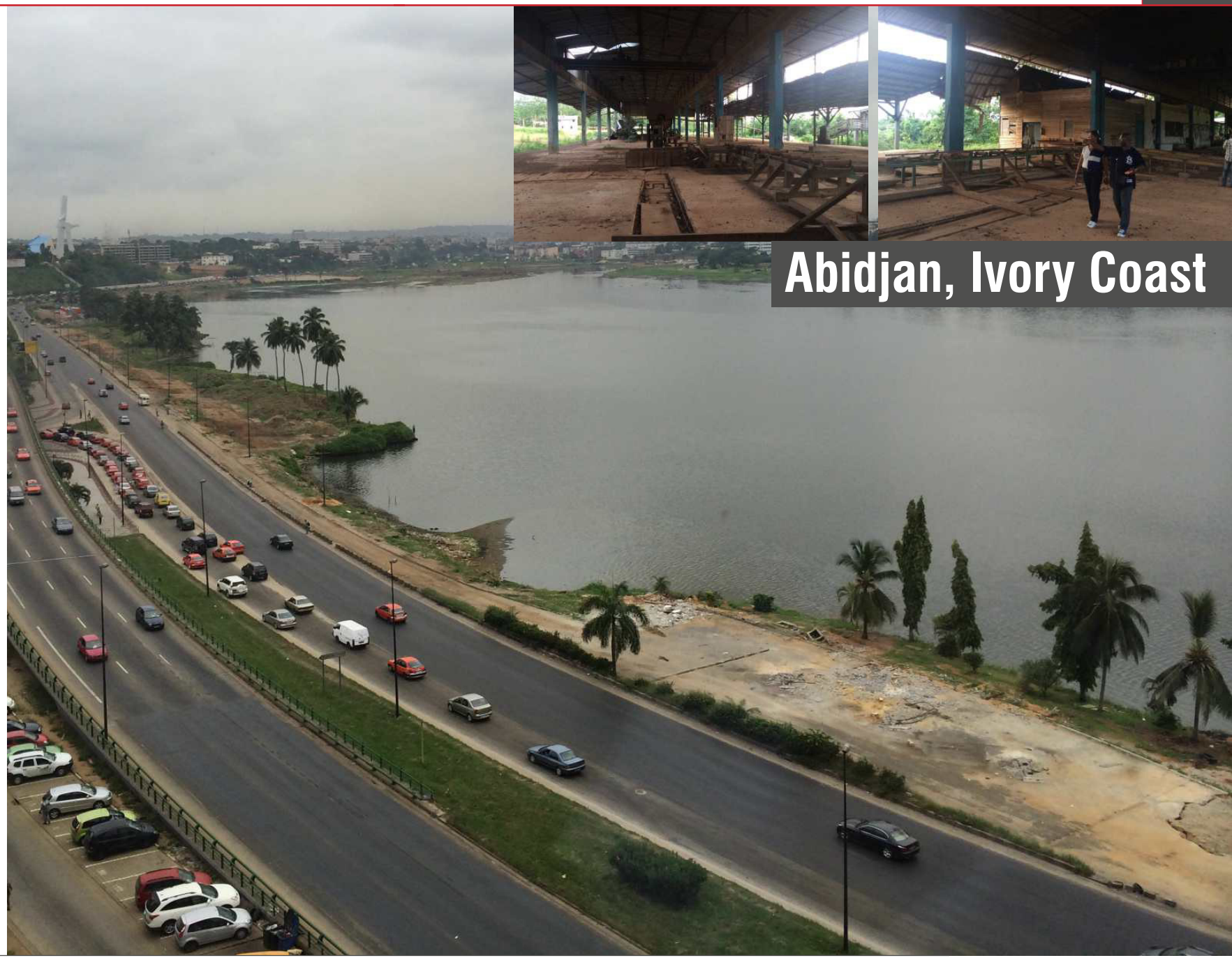
ARGISOL

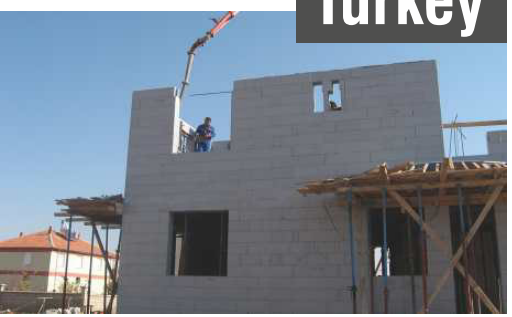


Abidjan, Ivory Coast

Romania

Rio de Janeiro

Turkey



Ireland





Abu Dhabi









Sudan

Greece

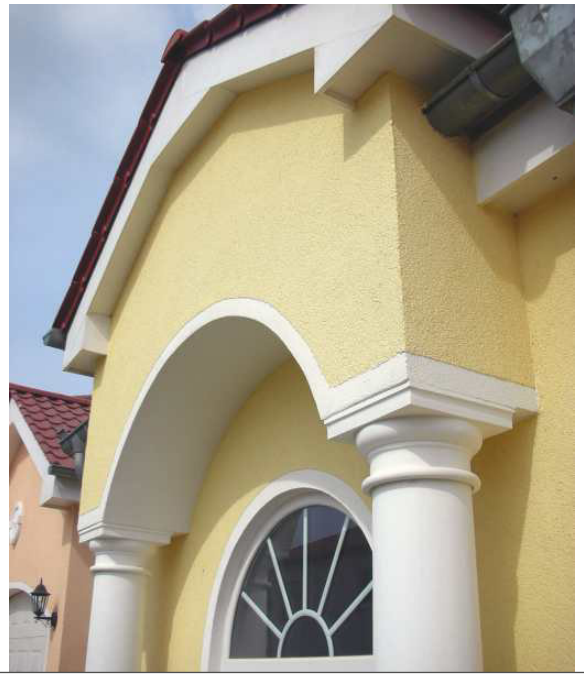
Portugal

















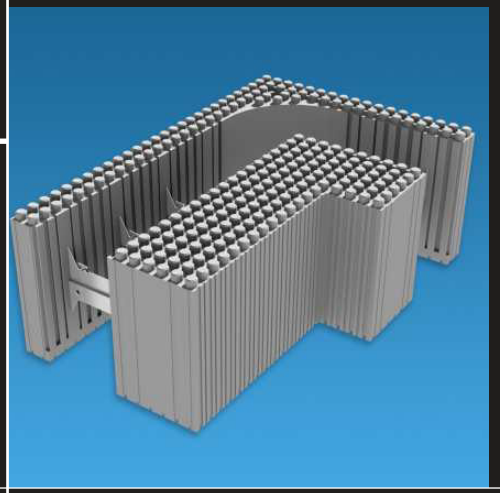


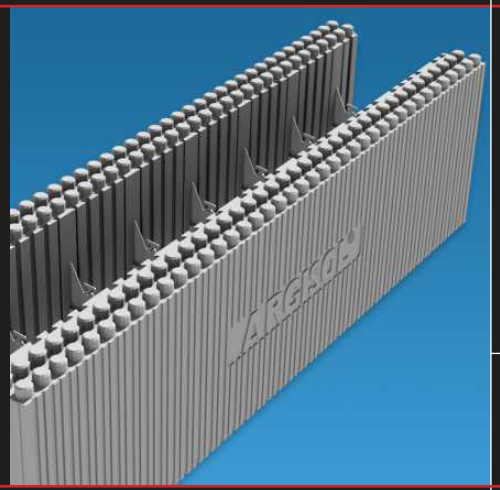




Multi-Family House "Ludwigshafen - Melm“


ARGISOL
06359 – 93 26 22
Käthe-Burkhardt-Weg





... *count on* **ARGISOL®**

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