K-KONTROL®

BUILDING SYSTEM

- the best solution for your wooden house
- effective construction with optimum use of architectural volume
- convenient use for construction of low energy or passive house
- for wall, ceiling and roof structures

CZECH PAN

K-KONTROL® BUILDING SYSTEM

K-KONTROL® building system is a universal system for constructing walls, floors and roofs of different types of buildings. This style may be involved in so-called SIP (structural insulated panel) systems which use a self-supporting sandwich panel as the basic structural component. This panel consists of two OSB boards (skins) and insulating core made from stabilized self-extinguishing EPS polystyrene. Thanks to its excellent heat insulation properties, simple and highly varied utilization, and mainly thanks to its considerate impact on environment in all construction phases, it is a convenient system for contemporary modern constructions.

K-KONTROL® may be used for constructing family houses or flat-buildings, for sheating sports halls, for constructing administration buildings, housing objects, cottages, and secondary residence. It is possible to design it as the only system for the whole building, alternatively as individual engineering constructions together with another building systems.

The system has been tested by accredited institutions such as TZÚS, PAVÚS, CSI, FIRES, and certified by VVUD in Prague. The production in the city of Varnsdorf, CZ as well as the building sides (using the K-KONTROL System) are being monitored by authorized body according to the ISO 9001:2001 quality system and environment ISO 14001:2005.

The K-KONTROL Detail Catalogue is used for constructions design. There are valid general rules for wooden constructions design.

The K-KONTROL Detail Catalogue used for building the 1st. Czech Polar Station in the Antarctic extreme conditions is the best recommendation for using the same system for building low-energy or even passive constructions; not only in extreme environment but throughout the whole Europe.

K-KONTROL® wall type panels

Panel	Modular widths [mm]				Corner panels [mm]		Height [mm]
Construction M module	4M	3M	2M	1M	2M + ½ T	2M - ½ T	V
K-KONTROL® 120	1252	939	626	313	686	566	3000
K-KONTROL® 170					711	541	
K-KONTROL® 210					731	521	

K-KONTROL® roof type panels

Panel	Modular widths [mm]		Corner wall connection [mm]		Height [mm]
K-KONTROL® 210	1252	626	2500	3000	5000
K-KONTROL® 230					
K-KONTROL® 270					
K-KONTROL® 330					

K-KONTROL® connecting and hemming type elements

K-KONTROL® PANEL		120	170	210	230	270	330
	Length [mm]	Profile [mm]					
Impregnated sleeper	4000	50 x 120	50 x 170	50 x 210	–	–	–
K-KONTROL® Tongue	3000	15 x 100					
K-KONTROL® Joint	3000	80 x 88	80 x 140	80 x 180	–	–	–
K-KONTROL® PowerBoard	3000	–	–	30 x 180	30 x 200	30 x 240	30 x300
		–	–	45 x 180	45 x 200	45 x 240	45 x300
K-KONTROL® PowerEdge	3000	–	–	53 x 180	53 x 200	53 x 240	53 x 300
		–	–	68 x 180	68 x 200	68 x 240	68 x 300
KVH Edging Joist	4270	38 x 88	38 x 140	38 x 180			–
KVH Joining Joist	13000	76 x 88 *)	80 x 140	80 x 180	60 x 200	60 x 240	–
DUO, TRIO Static Joint	13000	152 x 88 *)	140 x 140	180 x 180	–	–	–
I-OSB™ Beam	13000	–	–	–	89 x 200	89 x 240	89 x 300

*) *a prism created by folding and fixing the hemming boarding joist*

K-KONTROL® SYSTEM ACCESSORIES

CONNECTING MATERIAL

Metal connecting materials are used for connecting and fixation of K-KONTROL® panels, these are:

- **K-KONTROL® Clips** – steel electro-plated activated staples with a 1.9 mm wire and 44 mm length.
- **K-KONTROL® Screws** – a screw with a large screw head for connecting individual structures made for SIP panels (available up to 630 mm long).
- **Screws, nails, anchors** are used for making of all joints of carcassing.

The K-KONTROL system includes a wide range of anchoring and connecting materials.

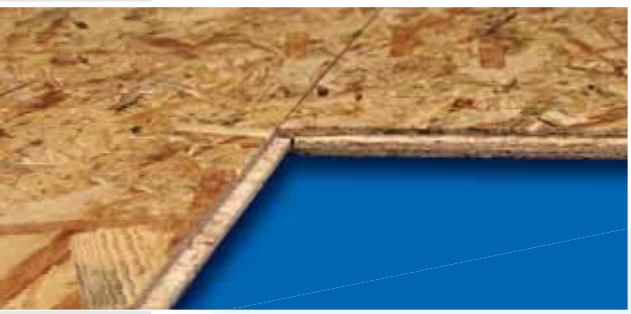
FOAM AND ADHESIVE

- **K-KONTROL® Foam** is used for any space needed between EPS and wooden parts; or between panels in the tongue & groove and/or the joint connections.
- **K-KONTROL® Adhesive** is used for connections between wooden parts of the construction; or between wood and leaf from the skin OSB boards.

Both connecting sources are used for all connections between panels as well as for each hemming of panels. Foam and adhesive are applied with an foam application gun.

BOARDS

The components of the K-KONTROL construction system are OSB construction boards delivered in tongue/groove (T&G) design or with standard edge (SE). Due



to their excellent physical and mechanical properties, the boards can be used universally. The boards alone are most used in horizontal constructions for structural decking in ceiling and roofs. The boards are delivered in thickness from 8 to 25 mm and dimensions from 675 mm x 2500 mm up to 1250 mm x 5000 mm. Additional materials for the K-KONTROL Construction System used for buildings are LDF, MDF or HDF boards, as well as wood-fibre boards, panels from compressed straw or natural/mineral boards (OXYPAN®)

WOODEN SUPPORTING ELEMENTS

K-KONTROL® system offers for the main and additional supporting panel structures:

- **I-OSB Beams** with wooden flanges and a web from OSB boards. Height of the beam from 160 to 550 mm, max. length of 13 m.
- **Structural Wooden Ellements like KVH, DUO and TRIO** are available in the following sizes: 160/240 mm, max. 13m long.

Glued Laminated Wood BSH – this material is used in case when carrying-capacity of KVH, DUO and TRIO structural elements is insufficient. It is available in the following sizes: 200 to 1000 mm of height; length upon request.

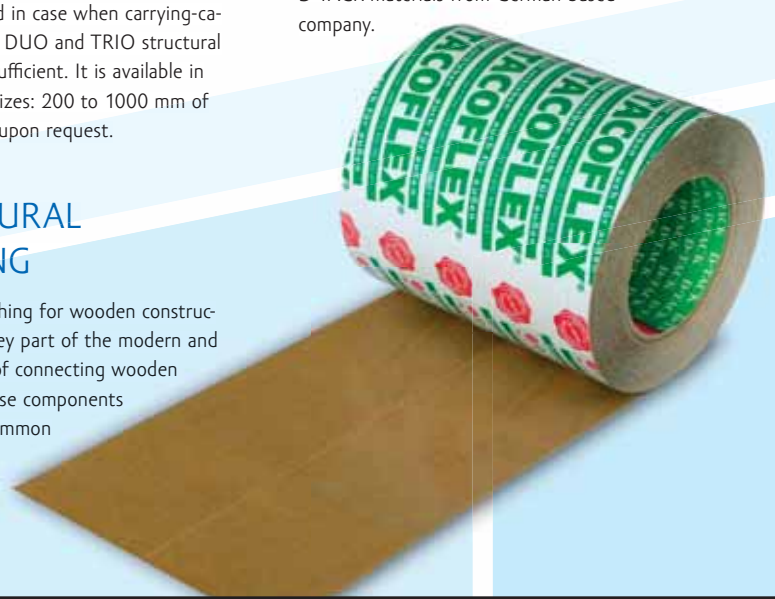
STRUCTURAL SMITHING

Structural smithing for wooden constructions are the key part of the modern and effective way of connecting wooden structures. These components are valid for common or statically challenging joints. All components of structural smithing are made from steel, zinc coated steel. There are specially made strenght wood screws, anchor nails and steel fasteners, which are used for fixing structural smithing parts.
K-KONTROL® offers the following components of structural smithing:

- **Stirrups for joists**
- **Angles**
- **Hidden Girder Joints**
- **Wind Tapes**
- **Socle Under Columns**
- **Beam Girder Brackets**
- **Bulldogs, etc.**

SEALING MATERIAL

Airtight construction of a house is the basic assumption for achieving of requested energy values of Passive and/or Zero Buildings. The principle of the K-KONTROL Building System is designed so, that the risk of incorrect fabrication is eliminated to minimum. The final fabrication according to the assembly instructions results in excellent tightness conforming the requirements for low-energy houses.
To achieve the airtightness requirements for Passive and/or Zero Houses, we offer a full range of sealing tapes, adhesives and cements. At the same time, we offer know-how for sealing of all the details and passages present on the construction sites. For sealing of the constructions, we deliver D-TACK materials from German-based company.

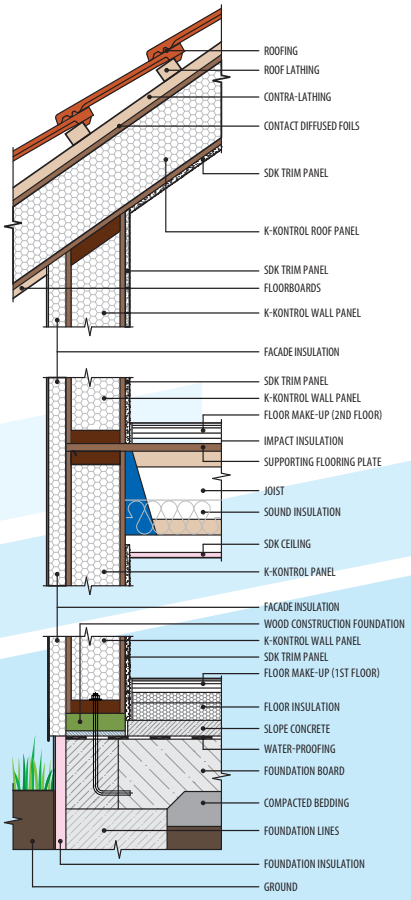


WORKING PROCESS WHILE USING K-KONTROL® BUILDING SYSTEM

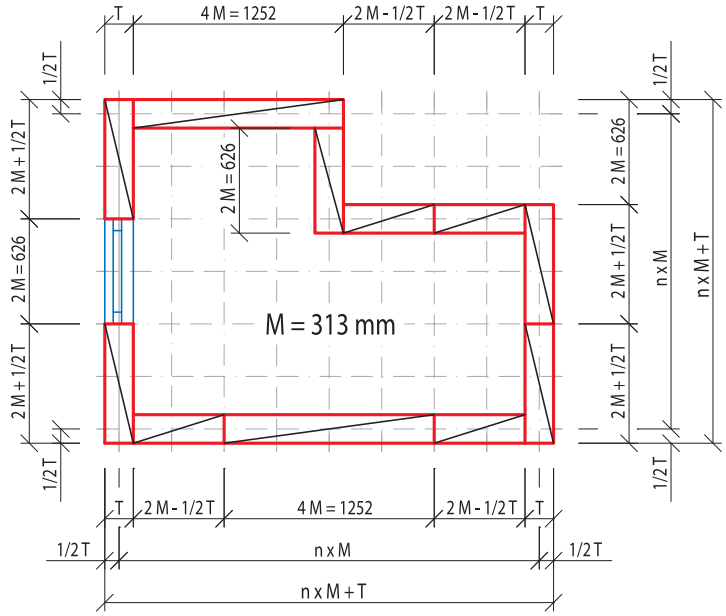
It is necessary to follow a project concept deriving from principles and requirements of the used style before building a new house. This procedure will simplify assembly and use maximum possibilities offered by the system; as it is with the K-KONTROL® Detail Catalogue. Therefore, it is essential to make a structural module raster consisting of all supporting structures of the building.

Its assembly begins with anchoring a deep impregnated foundation sleeper together with a bottom hemming inline wooden component to an anchor water-proofing plate. During concreting, the anchor bolts at specified distances are installed. It is necessary to make a precise direction and height measurement and to found the construction with an accuracy of ± 3 mm (in height) while sinking wood sleepers. Such procedure ensures easy assembly of the carcassing and avoids further problems. Increasingly popular is founding of the wood structure using ground screws onto which the foundation plate manufactured from K-KONTROL panels is placed.

Scheme – Vertical profile of a house constructed from K-KONTROL® Building System



Scheme – Modular Grid for Designing of Constructions from K-KONTROL® Building System



Assembly of walls in the first floor starts in the corner with mounting and connecting two corner panels. Then the panels are laid one after another while they are connected with prescribed panel joints. The window or door hall is omitted with a sill. All panel joints as well as anchoring of hemming wooden components into the panel`s rim are made with K-KONTROL® clasp.

When assembly of all supporting structures in the first floor is finished, it is convenient to start with mounting the ceilings. After some necessary measurement – we can fasten coupling stirrups while using steel staples. Joists are put vertically into stirrups and they are fixed with steel spins. After all joists are sunk, we can start to mount a subfloor from OSB boards. The boards are fastened to joists with staples. It is essential to glue all parts of the floor, which later avoids screeching noise of floors in the final construction.

Wall assembly in higher floors always starts on the finished floor above the lower floor. The panels have to be sunk before they are mounted; plus it is also important to fasten the bottom hemming wooden component carefully. The following procedure is the same as previously described.

When the supporting wall structures are mounted and purlin pockets are cut out, we are ready to assemble columns and purlins. Then roof panels are laid, a roof deck is assembled; plus openings for dormers, chimneys and skylights are made and lined.

Photo – Detail of founding the construction in corner.

Physical features of K-KONTROL® panels

K-KONTROL® PANEL	T		120	170	210	230	270	330
Quantity		Unit	Value					
OSB leaf thickness	T_O	mm	2 x 15					
EPS core thickness	T_E	mm	90	140	180	200	240	300
Weight	m	kg/m²	22,0	22,9	23,6	24,0	24,7	25,8
Thermal resistance	R	m².K/W	2,486	3,736	4,736	5,236	6,236	7,736
Heat transmission coefficient	U	W/m².K	0,377	0,256	0,204	0,185	0,156	0,126
Diffusion resistance	R_d	x 10^{-9} m/s	76,81	90,09	100,71	106,02	116,65	132,59

Physical features of elementary K-KONTROL® panel components

Quantity		Unit	OSB leaf	PU glue	EPS core
Density	r	kg/m³	680	1200	20
Specific thermal capacity	c	J/kg.K	800	600	1270
Thermal conductivity coefficient	l	W/m.K	0,130	0,200	0,040
Diffusion resistance factor	m	-	250	2460	50

Fire endurance of K-KONTROL® style contructions

Tested structure	Construction type		Resistance	Protocol
Walls made from K-KONTROL® panels	Supporting inside structure without facing **)		REI 15	VVÚD č.j. PKO 049/10
	Supporting inside structure with facing RB 12,5 **)		REI 30; EI 45	
	Supporting inside structure with facing RF 15 **)		REI 45	
	Load-bearing interior wall c/w thermal insulation and gypsum wall board 12,5 **)		REI 120	
	Supporting cladding construction with facing **)	inside	REW 45	
		outside	REI 30	
Roof made from K-KONTROL® Panels	Supporting floor with facing **)		REI 30	
Rooftop made from K-KONTROL® Panels	Supporting roof structure with facing **)		REI 30	

***) Detailed information concerning fire endurance and structure of tested constructions is quoted in fire endurance protocols which may be submitted upon request.*

Air transmission loss of K-KONTROL® constructions

Tested structure	Structure type	Size	Weighted transmission loss
Non-sheathed supporting K-KONTROL® wall	K-KONTROL® 170 panel	170 mm	R_w 30 dB
Inside sheathed K-KONTROL® wall	plaster board 12,5 mm	195 mm	R_w 37 dB
	K-KONTROL® 170 panel		
	plaster board 12,5 mm		
Inside double sheathed K-KONTROL® wall	double plaster board 12,5	220 mm	R_w 41 dB
	K-KONTROL® 170 panel		
	double plaster board 12,5		
Outer circumferential wall K-KONTROL®	plaster board 12,5	238 mm	R_w 38 dB
	K-KONTROL® 170 panel		
	EPS ETICS facade insulation system 50 mm		

Detailed information concerning air transmission loss of K-KONTROL structures is quoted in a protocol No. 215/04 CSI according to ČSN EN ISO 140-3, which may be submitted upon request.

CONSTRUCTION OF THE 1ST. CZECH POLAR STATION ON JAMES ROSS ISLAND FROM KONTROL® SYSTEM.

Typical projects of family homes build from K-KONTROL building system

Albies

Alnus

Betula

Castanea

Cydonia

Quercus

Salix

Thuja

Dřevařský ústav
Timber Institute

Certified ISO 9001 by BVQI S 3100

Certified ISO 14001 by BVQI S 3122

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