fire protective encasement **for timber load-bearing structures**

The fire protection encasement system for timber load-bearing structures was developed in order to increase safety of the objects raised fully, or partly, according to the timber frame technology. Apart from the fire protection function, the solutions based on the Nida type DF boards serve the aesthetic function as well. This system was based on direct installation of the specialised Nida Ogień Plus type DF and Nida Ogień Kompakt type DF boards to the timber structure. Application of the innovative fire protective Nida Fire (A1) gypsum putty is required for finishing of the joints between the boards and full finish of the surface. Owing to application of the aforementioned specialised products manufactured by Siniat, such fire protective encasements meet the requirements of the highest R30-R120 fire resistance classes.

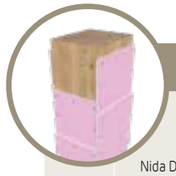
chapter contents

nida Drewno / index of systems

Page	Nida Drewno system name	Plasterboard sheathing			Fixing of Nida plasterboards	Static parameters of structural element			Cross-section modulus	Number of fire-protected sides	Weight of 1 linear metre of encasement	Fire resistance class [4]	Special system
		Nida	Thickness [mm]	Marking acc. to standard		Protection against buckling	Coefficient of effort [α_N]	The way of working of a structural element	[b/h]		[kg]	[min]	
THE SYSTEM OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER THE LOAD-BEARING STRUCTURES (4-SIDED ENCASEMENT)													
1269	FBDB/15/Ogień+	Ogień Plus [3]	15,0 [1]	DF	direct	yes	1,0	bending	1,0	4	13,5	R30	●
1269	FBDB/30/Ogień+	Ogień Plus [3]	2x15,0 [1]	DF	direct	yes	1,0	bending	1,0	4	23,0	R60	●
1269	FBDB/50/Kompakt	Ogień Kompakt [3]	2x25 [2]	DF	direct	yes	1,0	bending	1,0	4	33,5	R120	●
1271	FBDB/18/Ogień+	Ogień Plus [3]	18,0 [1]	DF	direct	no	0,7	bending	0,5	4	14,0	R30	●
1271	FBDB/30/Ogień+	Ogień Plus [3]	2x15,0 [1]	DF	direct	no	0,7	bending	0,5	4	23,0	R60	●
1271	FBDB/50/Kompakt	Ogień Kompakt [3]	2x25 [2]	DF	direct	no	0,7	bending	0,5	4	33,5	R120	●

Page	Nida Drewno system name	Plasterboard sheathing			Fixing of Nida plasterboards	Static parameters of structural element			Cross-section modulus	Number of fire-protected sides	Weight of 1 linear metre of encasement	Fire resistance class [4]	Special system
		Nida	Thickness [mm]	Marking acc. to standard		Protection against buckling	Coefficient of effort [α_N]	The way of working of a structural element	[b/h]		[kg]	[min]	
THE SYSTEM OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER THE LOAD-BEARING STRUCTURES (3-SIDED ENCASEMENT)													
1273	FBDB/15/Ogień+	Ogień Plus [3]	15,0 [1]	DF	direct	yes	1,0	bending	1,0	3	11,0	R30	●
1273	FBDB/25/Kompakt	Ogień Kompakt [3]	25,0 [1]	DF	direct	yes	1,0	bending	1,0	3	14,5	R60	●
1273	FBDB/50/Kompakt	Ogień Kompakt [3]	2x25 [2]	DF	direct	yes	1,0	bending	1,0	3	33,5	R120	●
1275	FBDB/15/Ogień+	Ogień Plus [3]	15,0 [1]	DF	direct	no	0,7	bending	0,5	3	11,0	R30	●
1275	FBDB/30/Ogień+	Ogień Plus [3]	2x15,0 [1]	DF	direct	no	0,7	bending	0,5	3	14,5	R60	●
1275	FBDB/50/Kompakt	Ogień Kompakt [3]	2x25 [2]	DF	direct	no	0,7	bending	0,5	3	33,5	R120	●

[1] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=60 mm].
[2] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=100 mm].
[3] Utilisation of other Nida type DF boards is acceptable in order to provide additional characteristics, e.g.: Nida Twarda - increased mechanical strength.
[4] Fire classification ITB 01060/20/R147NZP.



Page	Nida Drewno system name	Plasterboard sheathing			Fixing of Nida plasterboards	Static parameters of structural element				Cross-section modulus	Number of fire-protected sides	Weight of 1 linear metre of encasement	Fire resistance class [5]	Special system
		Nida	Thickness [mm]	Marking acc. to standard		Slenderness [λ_{min}]	Protection against buckling	Coefficient of effort [α_N]	The way of working of a structural element	[b/h]		[kg]	[min]	
THE SYSTEM OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER THE LOAD-BEARING STRUCTURES														
1277	FSDB/18/Ogień+	Ogień Plus [4]	18,0 [1]	DF	direct	40	no	1,0	compression	1,0	4	15,5	R30	●
1277	FSDB/18/Ogień+	Ogień Plus [4]	18,0 [2]	DF	direct	55	no	1,0	compression	1,0	4	15,5	R30	●
1277	FSDB/18/Ogień+	Ogień Plus [4]	18,0 [3]	DF	direct	70	no	1,0	compression	1,0	4	15,5	R30	●
1277	FSDB/30.5/Ogień+	Ogień Plus [4]	12,5 + 18,0 [1]	DF	direct	40	no	1,0	compression	1,0	4	24,0	R60	●
1277	FSDB/30/Ogień+	Ogień Plus [4]	2x15,0 [2]	DF	direct	55	no	1,0	compression	1,0	4	25,5	R60	●
1277	FSDB/30.5/Ogień+	Ogień Plus [4]	12,5 + 18,0 [3]	DF	direct	70	no	1,0	compression	1,0	4	24,0	R60	●
1277	FSDB/50/Kompakt	Ogień Kompakt [4]	2x25 [3]	DF	direct	40	no	1,0	compression	1,0	4	37,5	R120	●
1279	FSDB/15/Ogień+	Ogień Plus [2]	15,0 [1]	DF	direct	thick column	yes	0,6 - 1,0	compression	1,0	4	15,0	R30	●
1279	FSDB/25/Kompakt	Ogień Kompakt [2]	25,0 [1]	DF	direct	thick column	yes	0,6 - 1,0	compression	1,0	4	21,0	R60	●
1279	FSDB/27,5/Ogień+	Ogień Plus [2]	12,5 + 15,0 [1]	DF	direct	thick column	yes	0,6 - 1,0	compression	1,0	4	23,0	R60	●
1279	FSDB/50/Kompakt	Ogień Kompakt [2]	2x25 [1]	DF	direct	thick column	yes	0,6 - 1,0	compression	1,0	4	37,5	R120	●

[1] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=60 mm].
[2] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=80 mm].
[3] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=170 mm].
[4] Utilisation of other Nida type DF boards is acceptable in order to provide additional characteristics, e.g.: Nida Twarda - increased mechanical strength.
[5] Fire classification ITB 01060/20/R147NZP.

Page	Nida Drewno system name	Plasterboard sheathing			Fixing of Nida plasterboards	Static parameters of structural element		Cross-section modulus	Number of fire-protected sides	Weight of 1 linear metre of encasement	Fire resistance class [8]	Special system
		Nida	Thickness [mm]	Marking acc. to standard		Coefficient of effort [α_N]	Sposób pracy elementu konstrukcyjnego	[b/h]		[kg]	[min]	
THE SYSTEM OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER THE LOAD-BEARING STRUCTURES												
1281	FKDB/15/Ogień+	Ogień Plus [7]	15,0 [6]	DF	direct	1,0	tension	1,0	4	13,5	R30	●
1281	FKDB/25/Kompakt	Ogień Kompakt [7]	25,0 [6]	DF	direct	1,0	tension	1,0	4	21,0	R60	●
1281	FKDB/27,5/Ogień+	Ogień Plus [7]	12,5 + 15,0 [6]	DF	direct	1,0	tension	1,0	4	23,0	R60	●
1281	FKDB/50/Kompakt	Ogień Kompakt [7]	2x25,0 [6]	DF	direct	1,0	tension	1,0	4	37,5	R120	●

[6] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=60 mm].
[7] Utilisation of other Nida type DF boards is acceptable in order to provide additional characteristics, e.g.: Nida Twarda - increased mechanical strength.
[8] Fire classification ITB 01060/20/R147NZP.

FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES

nida Drewno

Fire resistance class: R30, R60, R120

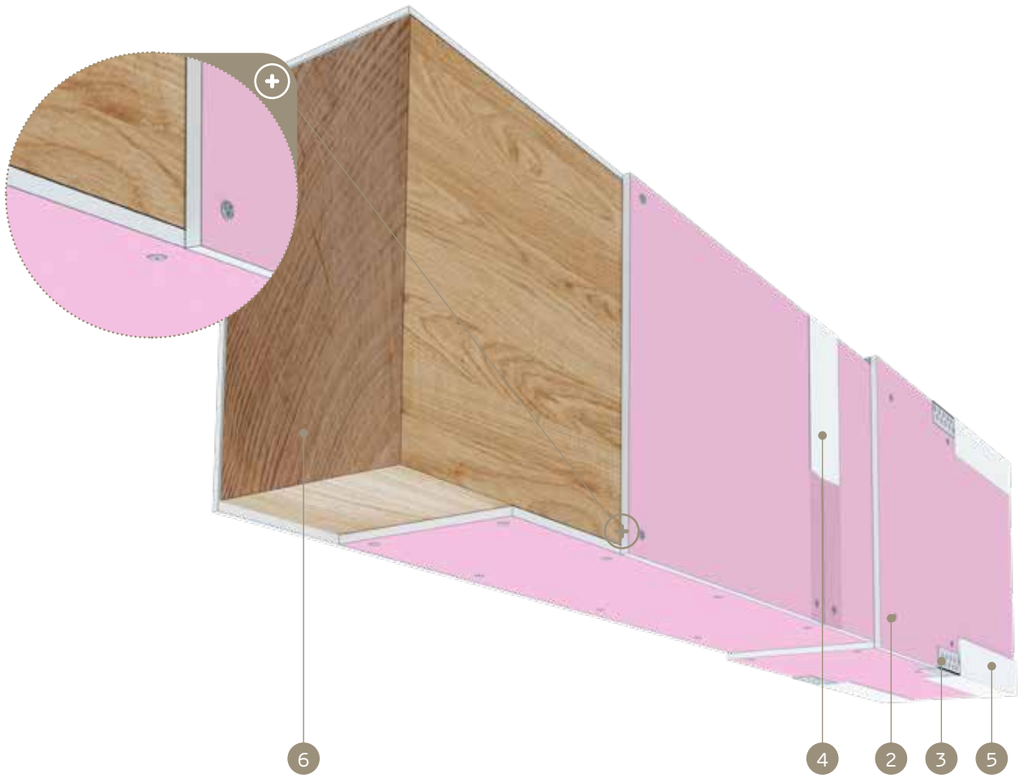
Weight of 1 linear metre of encasement: 13,5-33,5 kg

Number of related document: ITB fire classification

ITB fire classification: ITB 01060/20/R147NZP

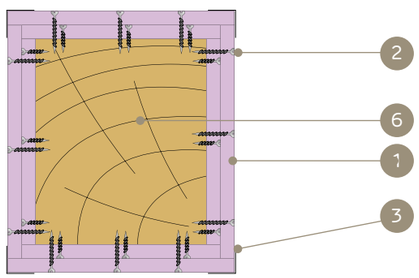
SYSTEMS:

FBDB/15; FBDB/30; FBDB/50



MATERIALS:

1. Nida type DF plasterboard
2. Nida wood screws
3. Nida perforated aluminium corner profile
4. The joint between the plasterboards filled with the Nida Fire (A1) gypsum compound with the Nida reinforcement tape
5. Nida Fire (A1) gypsum putty
6. Element of timber load-bearing structure



THE SYSTEM OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER THE LOAD-BEARING STRUCTURES (BEAMS PROTECTED AGAINST BUCKLING)

TECHNICAL PARAMETERS OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES - NIDA DREWNO (BEAMS PROTECTED AGAINST BUCKLING - 4-SIDED ENCASEMENT)

Nida Drewno system name	Plasterboard sheathing			Fixing of Nida plasterboards	Static parameters of structural element			Cross-section modulus	Weight of 1 linear metre of encasement	Fire resistance class [4]	Special system
	Nida	Thickness [mm]	Marking acc. to standard		Protection against buckling	Coefficient of effort [α_w]	The way of working of a structural element	[b/h]	[kg]	[min]	
FBDB/15/Ogień+	Ogień Plus [3]	15,0 [1]	DF	direct	yes	1,0	bending	1,0	13,5	R30	●
FBDB/30/Ogień+	Ogień Plus [3]	2x15,0 [1]	DF	direct	yes	1,0	bending	1,0	23,0	R60	●
FBDB/50/Kompakt	Ogień Kompakt [3]	2x25 [2]	DF	direct	yes	1,0	bending	1,0	33,5	R120	●

[1] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=60 mm].
[2] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=80 mm].
[3] Utilisation of other Nida type DF boards is acceptable in order to provide additional characteristics, e.g.: Nida Twarda - increased mechanical strength.
[4] Fire classification ITB 01060/20/R147NZP.
The weight of 1 linear metre of encasement was calculated for a structural element of the cross-section 100x200 mm.

CONSUMPTION OF MATERIAL PER 1 LINEAR METRE OF THE NIDA DREWNO FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURESLOAD-BEARING STRUCTURES

Material name	UM	Nida Drewno system name		
		FBDB/15/Ogień+	FBDB/30/Ogień+	FBDB/50/Kompakt
		Consumption of material per 1 linear metre		
Nida Ogień Plus 15,0 mm plasterboard	m^2	x+0,1	2x+0,2	-
Nida Ogień Kompakt 25,0 mm plasterboard	m^2	-	-	2x+0,2
Nida 3,5x35 mm wood screws	pcs.	48,0	24,0	-
Nida 3,5x45 mm wood screws	pcs.	-	-	24,0
Nida 3,5x55 mm wood screws	pcs.	-	48,0	-
Nida 4,2x70 mm wood screws	pcs.	-	-	48,0
Nida Fire (A1) gypsum putty	kg	4,0 [5]	4,0 [5]	4,0 [5]
Nida reinforcement tape	lm	0,9x	0,9x	0,9x
Nida perforated aluminium corner profile	lm	4,0	4,0	4,0

[5] Approximate consumption standard.
IMPORTANT: How the "X" value is calculated. X=2b+2h (where: b - width of the beam cross-section (basis), h - hight of the beam cross-section).
The standards concerning the amount of utilised material do not cover the loss of the material.

The diagram and cross-section markings for the element accepted for calculations.

FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES

nida Drewno

Fire resistance class: R30, R60, R120

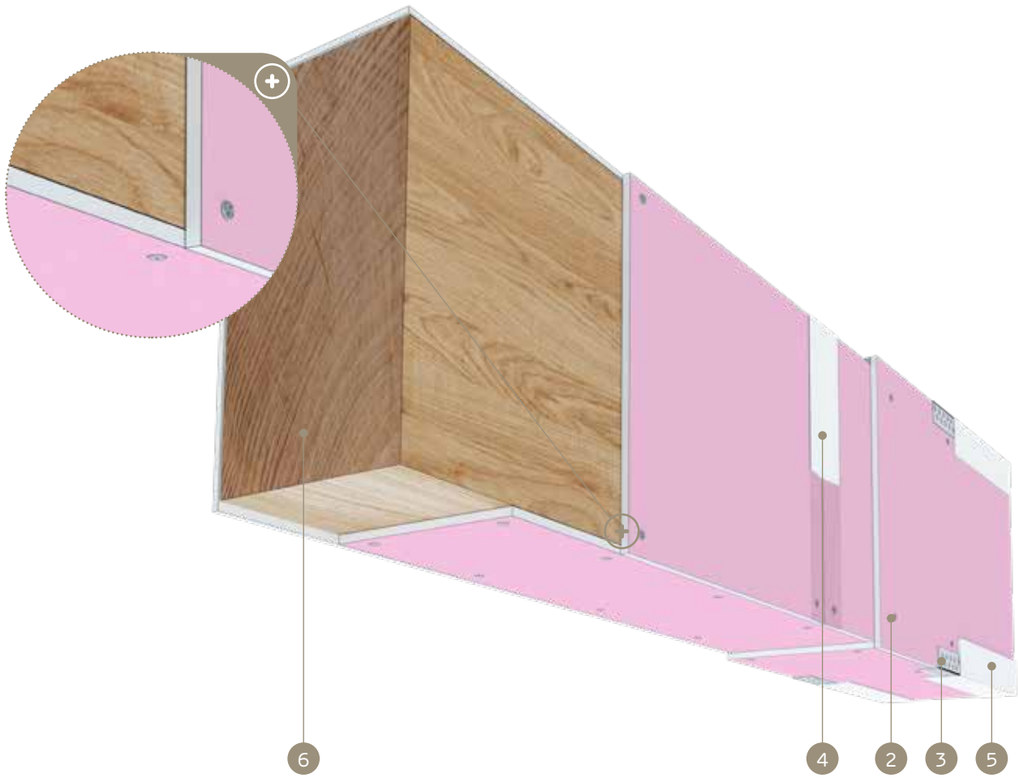
Weight of 1 linear metre of encasement: 14,0-33,5 kg

Number of related document: ITB fire classification

ITB fire classification: ITB 01060/20/R147NZP

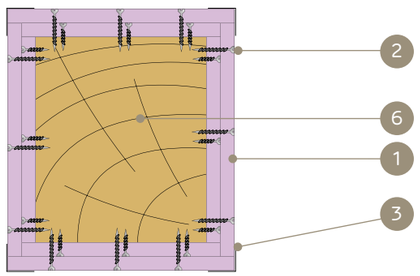
SYSTEMS:

FBDB/18; FBDB/30; FBDB/50



MATERIALS:

1. Nida type DF plasterboard
2. Nida wood screws
3. Nida perforated aluminium corner profile
4. The joint between the plasterboards filled with the Nida Fire (A1) gypsum compound with the Nida reinforcement tape
5. Nida Fire (A1) gypsum putty
6. Element of timber load-bearing structure



THE SYSTEM OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER THE LOAD-BEARING STRUCTURES (BEAMS NOT PROTECTED AGAINST BUCKLING)

TECHNICAL PARAMETERS OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES - NIDA DREWNO (BEAMS NOT PROTECTED AGAINST BUCKLING - 4-SIDED ENCASEMENT)

Nida Drewno system name	Plasterboard sheathing			Fixing of Nida plasterboards	Static parameters of structural element			Cross-section modulus	Weight of 1 linear metre of encasement	Fire resistance class [4]	Special system
	Nida	Thickness [mm]	Marking acc. to standard		Protection against buckling	Modification factor [k_{mod}]	The way of working of a structural element	[b/h]	[kg]	[min]	
FBDB/18/Ogień+	Ogień Plus [3]	18,0 [1]	DF	direct	no	0,7	bending	0,5	14,0	R30	●
FBDB/30/Ogień+	Ogień Plus [3]	2x15,0 [1]	DF	direct	no	0,7	bending	0,5	23,0	R60	●
FBDB/50/Kompakt	Ogień Kompakt [3]	2x25 [2]	DF	direct	no	0,7	bending	0,5	33,5	R120	●

[1] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=60 mm].
[2] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=80 mm].
[3] Utilisation of other Nida type DF boards is acceptable in order to provide additional characteristics, e.g.: Nida Twarda - increased mechanical strength.
[4] Fire classification ITB 01060/20/R147NZP.
The weight of 1 linear metre of encasement was calculated for a structural element of the cross-section 100x200 mm.

CONSUMPTION OF MATERIAL PER 1 LINEAR METRE OF THE NIDA DREWNO FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURESLOAD-BEARING STRUCTURES

Material name	UM	Nida Drewno system name		
		FBDB/18/Ogień+	FBDB/30/Ogień+	FBDB/50/Kompakt
		Consumption of material per 1 linear metre		
Nida Ogień Plus 15,0 mm plasterboard	m^2	-	2x+0,2	-
Nida Ogień Plus 18,0 mm plasterboard	m^2	x+0,1	-	-
Nida Ogień Kompakt 25,0 mm plasterboard	m^2	-	-	2x+0,2
Nida 3,5x35 mm wood screws	pcs.	-	24,0	-
Nida 3,5x45 mm wood screws	pcs.	48,0	-	24,0
Nida 3,5x55 mm wood screws	pcs.	-	48,0	-
Nida 4,2x70 mm wood screws	pcs.	-	-	48,0
Nida Fire (A1) gypsum putty	kg	4,0 [5]	4,0 [5]	4,0 [5]
Nida reinforcement tape	lm	0,9x	0,9x	0,9x
Nida perforated aluminium corner profile	lm	4,0	4,0	4,0

[5] Approximate consumption standard.
IMPORTANT: How the "X" value is calculated. X=2b+2h (where: b - width of the beam cross-section (basis), h - hight of the beam cross-section).
The standards concerning the amount of utilised material do not cover the loss of the material.

The diagram and cross-section markings for the element accepted for calculations.

FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES

nida Drewno

Fire resistance class: R30, R60, R120

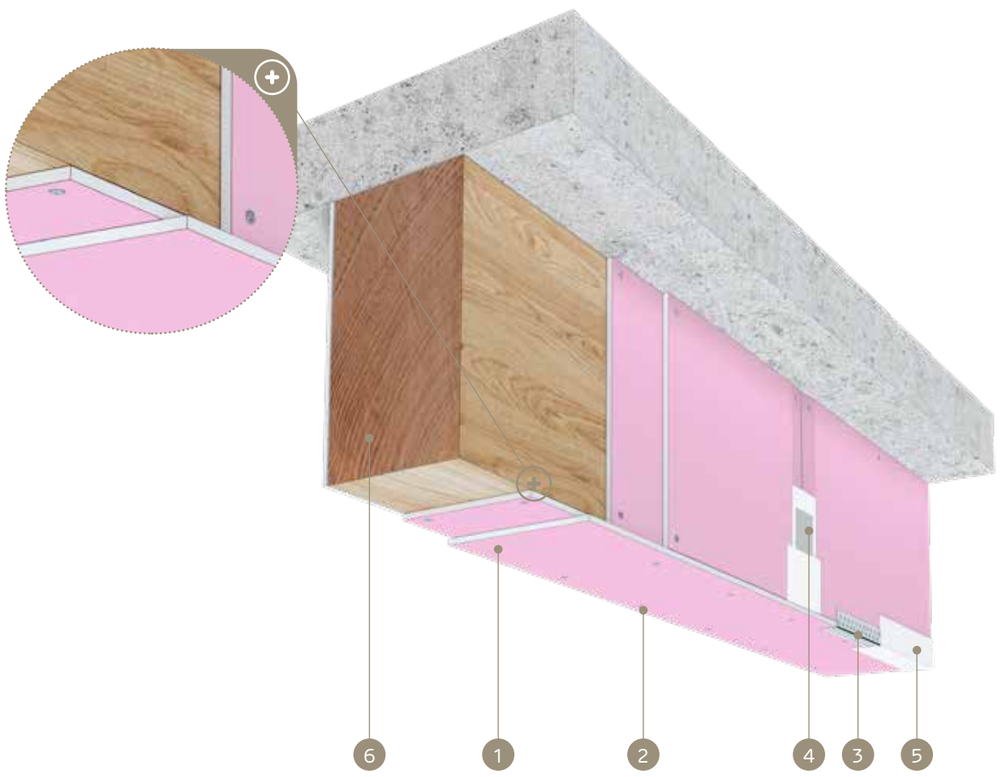
Weight of 1 linear metre of encasement: 11,0-33,5 kg

Number of related document: ITB fire classification

ITB fire classification: ITB 01060/20/R147NZP

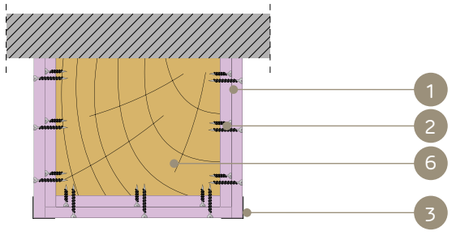
SYSTEMS:

FBDB/15; FBDB/25; FBDB/50



MATERIALS:

1. Nida type DF plasterboard
2. Nida wood screws
3. Nida perforated aluminium corner profile
4. The joint between the plasterboards filled with the Nida Fire (A1) gypsum compound with the Nida reinforcement tape
5. Nida Fire (A1) gypsum putty
6. Element of timber load-bearing structure



THE SYSTEM OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER THE LOAD-BEARING STRUCTURES (BEAMS PROTECTED AGAINST BUCKLING)

TECHNICAL PARAMETERS OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES - NIDA DREWNO (BEAMS PROTECTED AGAINST BUCKLING - 3-SIDED ENCASEMENT)

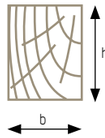
Nida Drewno system name	Plasterboard sheathing			Fixing of Nida plasterboards	Static parameters of structural element			Cross-section modulus	Weight of 1 linear metre of encasement	Fire resistance class [4]	Special system
	Nida	Thickness [mm]	Marking acc. to standard		Protection against buckling	Coefficient of effort [$\alpha_{y,b}$]	The way of working of a structural element	[b/h]	[kg]	[min]	
FBDB/15/Ogień+	Ogień Plus [3]	15,0 [1]	DF	direct	yes	1,0	bending	1,0	11,0	R30	●
FBDB/25/Kompakt	Ogień Kompakt [3]	25,0 [1]	DF	direct	yes	1,0	bending	1,0	14,5	R60	●
FBDB/50/Kompakt	Ogień Kompakt [3]	2x25 [2]	DF	direct	yes	1,0	bending	1,0	33,5	R120	●

[1] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=60 mm].
[2] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=80 mm].
[3] Utilisation of other Nida type DF boards is acceptable in order to provide additional characteristics, e.g.: Nida Twarda - increased mechanical strength.
[4] Fire classification ITB 01060/20/R147NZP.
The weight of 1 linear metre of encasement was calculated for a structural element of the cross-section 100x200 mm.

CONSUMPTION OF MATERIAL PER 1 LINEAR METRE OF THE NIDA DREWNO FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURESLOAD-BEARING STRUCTURES

Material name	UM	Nida Drewno system name		
		FBDB/15/Ogień+	FBDB/25/Kompakt	FBDB/50/Kompakt
		Consumption of material per 1 linear metre		
Nida Ogień Plus 15,0 mm plasterboard	m^2	x+0,1	-	-
Nida Ogień Kompakt 25,0 mm plasterboard	m^2	-	x+01	2x+0,2
Nida 3,5x35 mm wood screws	pcs.	48,0	-	-
Nida 3,5x45 mm wood screws	pcs.	-	48,0	24,0
Nida 3,5x55 mm wood screws	pcs.	-	-	-
Nida 4,2x70 mm wood screws	pcs.	-	-	48,0
Nida Fire (A1) gypsum putty	kg	2,0 [5]	2,0 [5]	2,0 [5]
Nida reinforcement tape	lm	0,9x	0,9x	0,9x
Nida perforated aluminium corner profile	lm	2,0	2,0	2,0

[5] Approximate consumption standard.
IMPORTANT: How the "X" value is calculated. X=2b+2h (where: b - width of the beam cross-section (basis), h - hight of the beam cross-section).
The standards concerning the amount of utilised material do not cover the loss of the material.



The diagram and cross-section markings for the element accepted for calculations.

FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES

nida Drewno

Fire resistance class: R30, R60, R120

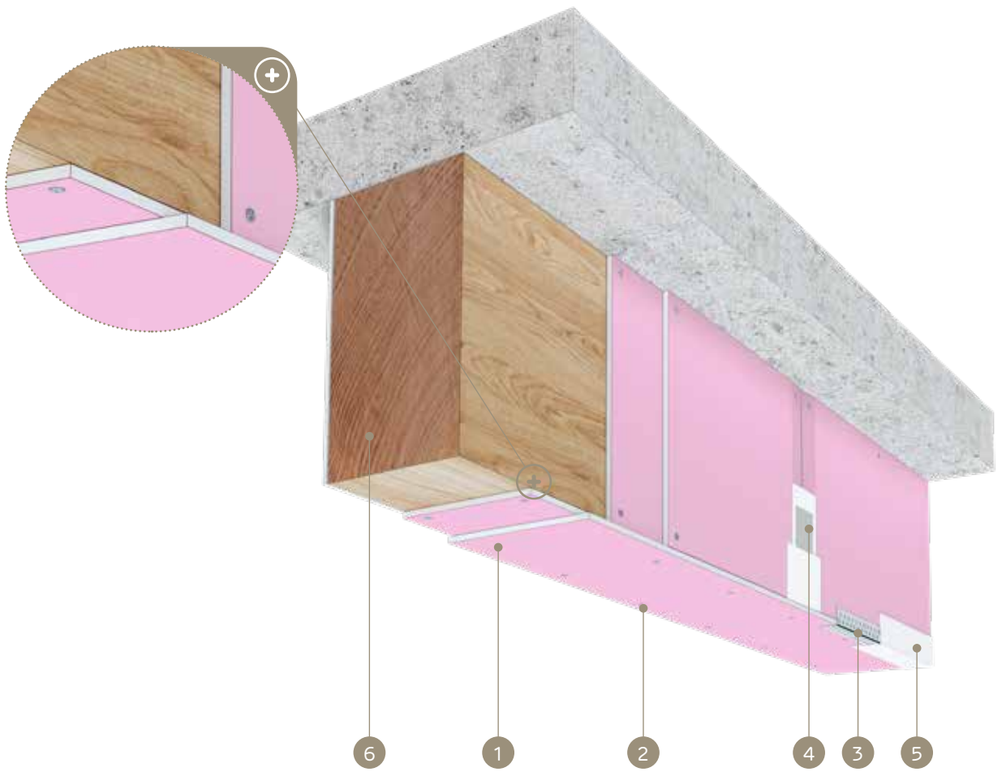
Weight of 1 linear metre of encasement: 11,0-33,5 kg

Number of related document: ITB fire classification

ITB fire classification: ITB 01060/20/R147NZP

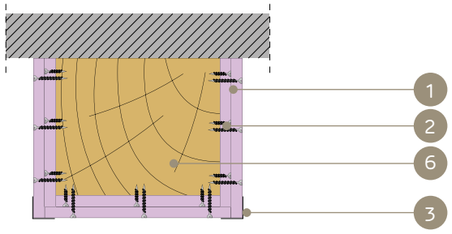
SYSTEMS:

FBDB/15; FBDB/30; FBDB/50



MATERIALS:

1. Nida type DF plasterboard
2. Nida wood screws
3. Nida perforated aluminium corner profile
4. The joint between the plasterboards filled with the Nida Fire (A1) gypsum compound with the Nida reinforcement tape
5. Nida Fire (A1) gypsum putty
6. Element of timber load-bearing structure



THE SYSTEM OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER THE LOAD-BEARING STRUCTURES (BEAMS NOT PROTECTED AGAINST BUCKLING)

TECHNICAL PARAMETERS OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES - NIDA DREWNO (BEAMS NOT PROTECTED AGAINST BUCKLING - 3-SIDED ENCASEMENT)

Nida Drewno system name	Plasterboard sheathing			Fixing of Nida plasterboards	Static parameters of structural element			Cross-section modulus	Weight of 1 linear metre of encasement	Fire resistance class[4]	Special system
	Nida	Thickness [mm]	Marking acc. to standard		Protection against buckling	Modification factor [k_{mod}]	The way of working of a structural element	[b/h]	[kg]	[min]	
FBDB/15/Ogień+	Ogień Plus[3]	15,0[1]	DF	direct	no	0,7	bending	0,5	11,0	R30	●
FBDB/30/Ogień+	Ogień Plus[3]	2x15,0[1]	DF	direct	no	0,7	bending	0,5	14,5	R60	●
FBDB/50/Kompakt	Ogień Kompakt[3]	2x25[2]	DF	direct	no	0,7	bending	0,5	33,5	R120	●

[1] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=60 mm].
[2] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=80 mm].
[3] Utilisation of other Nida type DF boards is acceptable in order to provide additional characteristics, e.g.: Nida Twarda - increased mechanical strength.
[4] Fire classification ITB 01060/20/R147NZP.
The weight of 1 linear metre of encasement was calculated for a structural element of the cross-section 100x200 mm.

CONSUMPTION OF MATERIAL PER 1 LINEAR METRE OF THE NIDA DREWNO FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURESLOAD-BEARING STRUCTURES

Material name	UM	Nida Drewno system name		
		FBDB/15/Ogień+	FBDB/30/Ogień+	FBDB/50/Kompakt
		Consumption of material per 1 linear metre		
Nida Ogień Plus 15,0 mm plasterboard	m^2	x+0,1	2x+0,2	-
Nida Ogień Kompakt 25,0 mm plasterboard	m^2	-	-	2x+0,2
Nida 3,5x35 mm wood screws	pcs.	48,0	24,0	-
Nida 3,5x45 mm wood screws	pcs.	-	-	24,0
Nida 3,5x55 mm wood screws	pcs.	-	48,0	-
Nida 4,2x70 mm wood screws	pcs.	-	-	48,0
Nida Fire (A1) gypsum putty	kg	2,0[5]	2,0[5]	2,0[5]
Nida reinforcement tape	lm	0,9x	0,9x	-
Nida perforated aluminium corner profile	lm	2,0	2,0	2,0

[5] Approximate consumption standard.
IMPORTANT: How the "X" value is calculated. X=2b+2h (where: b - width of the beam cross-section (basis), h - hight of the beam cross-section).
The standards concerning the amount of utilised material do not cover the loss of the material.

The diagram and cross-section markings for the element accepted for calculations.

FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES

nida Drewno

Fire resistance class: R30, R60, R120

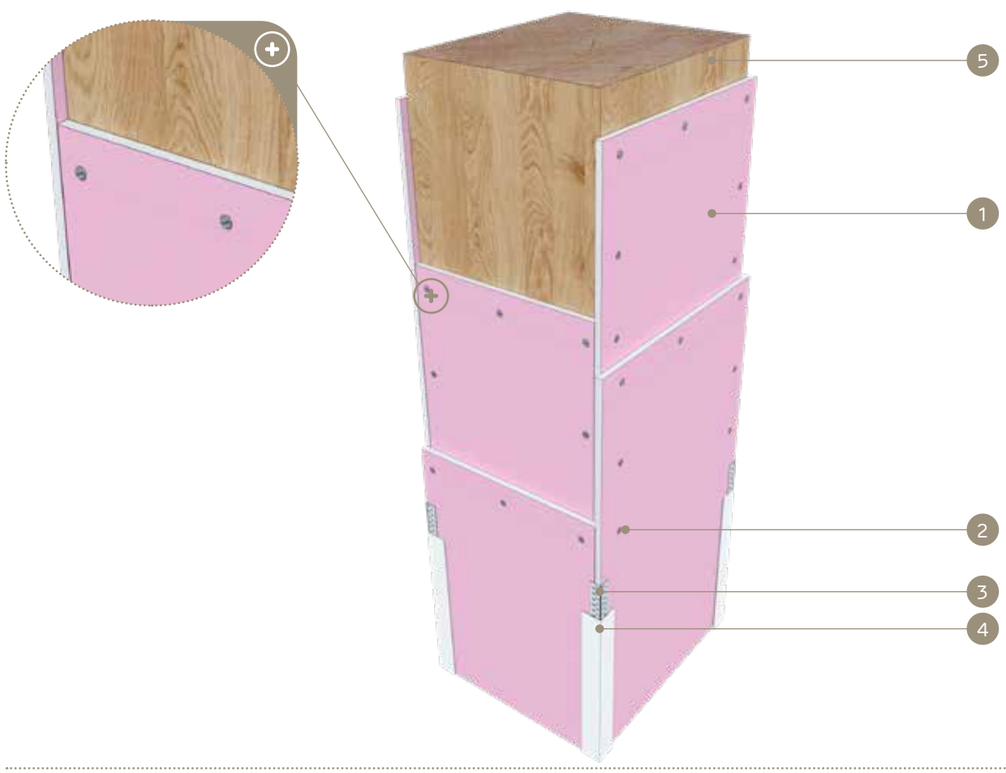
Weight of 1 linear metre of encasement: 15,5-37,5 kg

Number of related document: ITB fire classification

ITB fire classification: ITB 01060/20/R147NZP

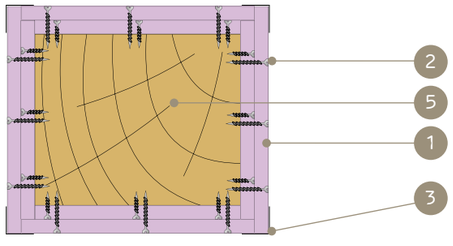
SYSTEMS:

FSDB/18; FSDB/30.5; FSDB/30; FSDB/50



MATERIALS:

1. Nida type DF plasterboard
2. Nida wood screws
3. Nida perforated aluminium corner profile
4. Nida Fire (A1) gypsum putty
5. Element of timber load-bearing structure



THE SYSTEM OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER THE LOAD-BEARING STRUCTURES (SLENDER COLUMNS NOT PROTECTED AGAINST BUCKLING)

TECHNICAL PARAMETERS OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES - NIDA DREWNO (SLENDER COLUMNS NOT PROTECTED AGAINST BUCKLING - 4-SIDED ENCASEMENT)

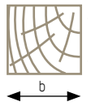
Nida Drewno system name	Plasterboard sheathing			Fixing of Nida plasterboards	Static parameters of structural element				Cross-section modulus	Weight of 1 linear metre of encasement	Fire resistance class [5]	Special system
	Nida	Thickness [mm]	Marking acc. to standard		Slenderness [λ_{max}]	Protection against buckling	Coefficient of effort [α_N]	The way of working of a structural element	[b/h]	[kg]	[min]	
FSDB/18/Ogień+	Ogień Plus [4]	18,0 [1]	DF	direct	40	no	1,0	compression	1,0	15,5	R30	●
FSDB/18/Ogień+	Ogień Plus [4]	18,0 [2]	DF	direct	55	no	1,0	compression	1,0	15,5	R30	●
FSDB/18/Ogień+	Ogień Plus [4]	18,0 [3]	DF	direct	70	no	1,0	compression	1,0	15,5	R30	●
FSDB/30.5/Ogień+	Ogień Plus [4]	12,5 + 18,0 [1]	DF	direct	40	no	1,0	compression	1,0	24,0	R60	●
FSDB/30/Ogień+	Ogień Plus [4]	2x15,0 [2]	DF	direct	55	no	1,0	compression	1,0	25,5	R60	●
FSDB/30.5/Ogień+	Ogień Plus [4]	12,5 + 18,0 [3]	DF	direct	70	no	1,0	compression	1,0	24,0	R60	●
FSDB/50/Kompakt	Ogień Kompakt [4]	2x25 [3]	DF	direct	40	no	1,0	compression	1,0	37,5	R120	●

[1] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=60 mm].
[2] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=80 mm].
[3] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=170 mm].
[4] Utilisation of other Nida type DF boards is acceptable in order to provide additional characteristics, e.g.: Nida Twarda - increased mechanical strength.
[5] Fire classification ITB 01060/20/R147NZP.
The weight of 1 linear metre of encasement was calculated for a structural element of the cross-section 200x200 mm.

CONSUMPTION OF MATERIAL PER 1 LINEAR METRE OF THE NIDA DREWNO FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURESLOAD-BEARING STRUCTURES

Material name	UM	Nida Drewno system name			
		FSDB/18/Ogień+	FSDB/30.5/Ogień+	FSDB/30/Ogień+	FSDB/50/Kompakt
		Consumption of material per 1 linear metre			
Nida Ogień Plus 12,5 mm plasterboard	m^2	-	x+0,1	-	-
Nida Ogień Plus 15,0 mm plasterboard	m^2	-	-	2x+0,2	-
Nida Ogień Plus 18,0 mm plasterboard	m^2	x+0,1	x+0,1	-	-
Nida Ogień Kompakt 25,0 mm plasterboard	m^2	-	-	-	2x+0,2
Nida 3,5x35 mm wood screws	pcs.	-	24,0	24,0	-
Nida 3,5x45 mm wood screws	pcs.	48,0	-	-	24,0
Nida 3,5x55 mm wood screws	pcs.	-	48,0	48,0	-
Nida 4,2x70 mm wood screws	pcs.	-	-	-	48,0
Nida Fire (A1) gypsum putty	kg	4,0 [6]	4,0 [6]	4,0 [6]	4,0 [6]
Nida reinforcement tape	lm	0,9x	0,9x	0,9x	0,9x
Nida perforated aluminium corner profile	lm	4,0	4,0	4,0	4,0

[6] Approximate consumption standard.
IMPORTANT: How the "X" value is calculated. X=2b+2h (where: b - width of the beam cross-section (basis), h - hight of the beam cross-section).
The standards concerning the amount of utilised material do not cover the loss of the material.



The diagram and cross-section markings for the element accepted for calculations.

FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES

nida Drewno

Fire resistance class: R30, R60, R120

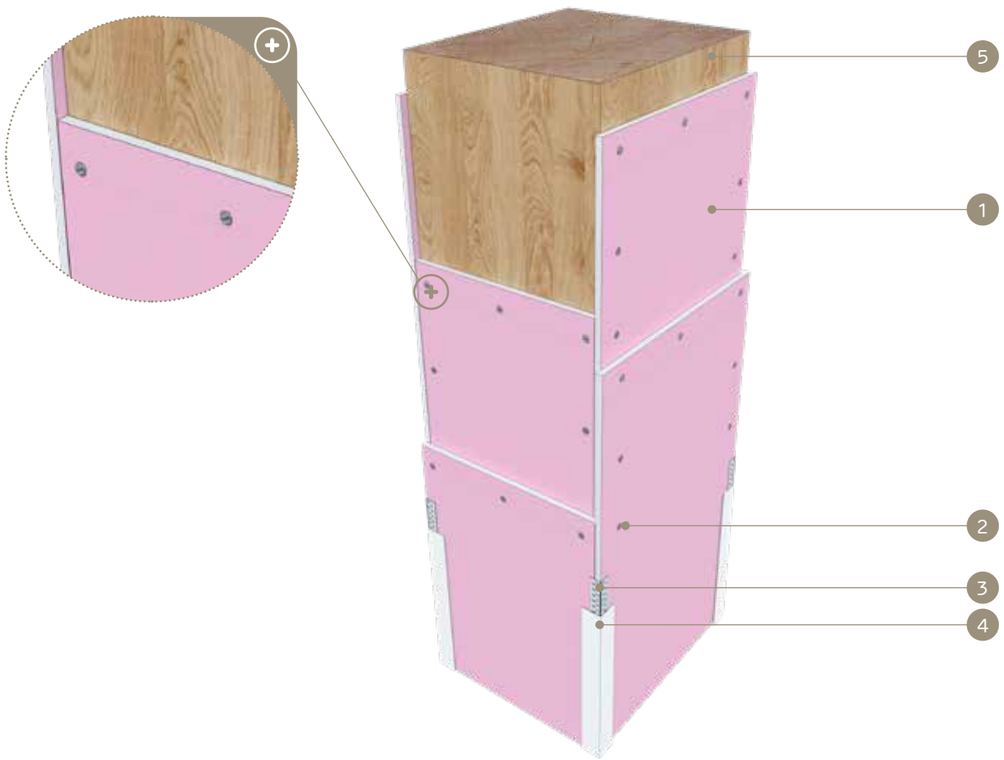
Weight of 1 linear metre of encasement: 15,0-37,5 kg

Number of related document: ITB fire classification

ITB fire classification: ITB 01060/20/R147NZP

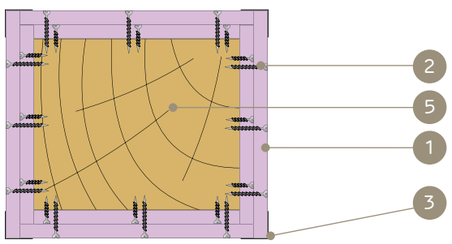
SYSTEMS:

FSDB/15; FSDB/25; FSDB/27,5; FSDB/50



MATERIALS:

1. Nida type DF plasterboard
2. Nida wood screws
3. Nida perforated aluminium corner profile
4. Nida Fire (A1) gypsum putty
5. Element of timber load-bearing structure



THE SYSTEM OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER THE LOAD-BEARING STRUCTURES (THICK COLUMNS: NO POSSIBILITY OF BUCKLING)

TECHNICAL PARAMETERS OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES - NIDA DREWNO (THICK COLUMNS WITHOUT POSSIBILITY OF BUCKLING - 4-SIDED ENCASEMENT)

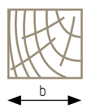
Nida Drewno system name	Plasterboard sheathing			Fixing of Nida plasterboards	Static parameters of structural element			Cross-section modulus	Weight of 1 linear metre of encasement	Fire resistance class [3]	Special system
	Nida	Thickness [mm]	Marking acc. to standard		Protection against buckling	Coefficient of effort [α_N]	The way of working of a structural element	[b/h]	[kg]	[min]	
FSDB/15/Ogień+	Ogień Plus [2]	15,0 [1]	DF	direct	yes	0,6 - 1,0	compression	1,0	15,0	R30	●
FSDB/25/Kompakt	Ogień Komapkt [2]	25,0 [1]	DF	direct	yes	0,6 - 1,0	compression	1,0	21,0	R60	●
FSDB/27,5/Ogień+	Ogień Plus [2]	12,5 + 15,0 [1]	DF	direct	yes	0,6 - 1,0	compression	1,0	23,0	R60	●
FSDB/50/Kompakt	Ogień Kompakt [2]	2x25 [1]	DF	direct	yes	0,6 - 1,0	compression	1,0	37,5	R120	●

[1] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=60 mm].
[2] Utilisation of other Nida type DF boards is acceptable in order to provide additional characteristics, e.g.: Nida Twarda - increased mechanical strength.
[3] Fire classification ITB 01060/20/R147NZP.
The weight of 1 linear metre of encasement was calculated for a structural element of the cross-section 200x200 mm.

CONSUMPTION OF MATERIAL PER 1 LINEAR METRE OF THE NIDA DREWNO FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURESLOAD-BEARING STRUCTURES

Material name	UM	Nida Drewno system name			
		FSDB/15/Ogień+	FSDB/25/Kompakt	FSDB/27,5/Ogień+	FSDB/50/Kompakt
		Consumption of material per 1 linear metre			
Nida Ogień Plus 12,5 mm plasterboard	m^2	-	-	x+0,1	-
Nida Ogień Plus 15,0 mm plasterboard	m^2	x+0,1	-	x+0,1	-
Nida Ogień Kompakt 25,0 mm plasterboard	m^2	-	x+0,1	-	2x+0,2
Nida 3,5x35 mm wood screws	pcs.	48,0	-	24,0	-
Nida 3,5x45 mm wood screws	pcs.	-	48,0	-	24,0
Nida 3,5x55 mm wood screws	pcs.	-	-	48,0	-
Nida 4,2x70 mm wood screws	pcs.	-	-	-	48,0
Nida Fire (A1) gypsum putty	kg	4,0 [4]	4,0 [4]	4,0 [4]	4,0 [4]
Nida reinforcement tape	lm	0,9x	0,9x	0,9x	0,9x
Nida perforated aluminium corner profile	lm	4,0	4,0	4,0	4,0

[4] Approximate consumption standard.
IMPORTANT: How the "X" value is calculated. X=2b+2h (where: b - width of the beam cross-section (basis), h - hight of the beam cross-section).
The standards concerning the amount of utilised material do not cover the loss of the material.



The diagram and cross-section markings for the element accepted for calculations.

FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES

nida Drewno

Fire resistance class: R30, R60, R120

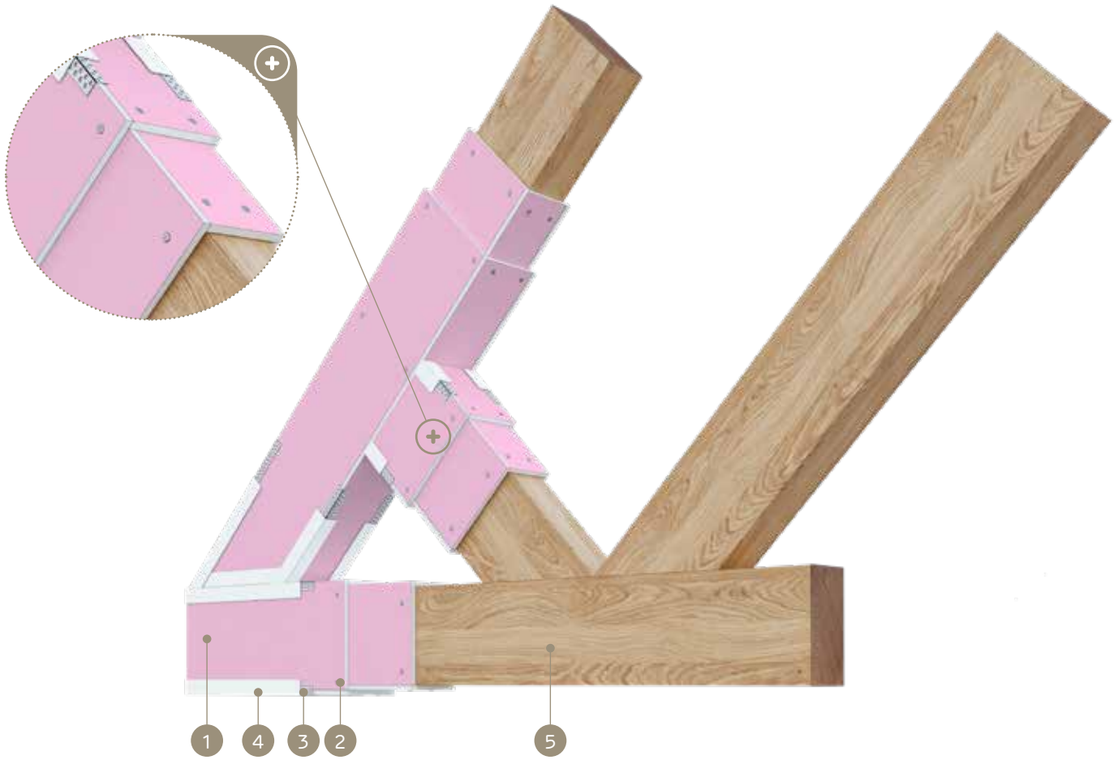
Weight of 1 linear metre of encasement: 13,5-33,5 kg

Number of related document: ITB fire classification

ITB fire classification: ITB 01060/20/R147NZP

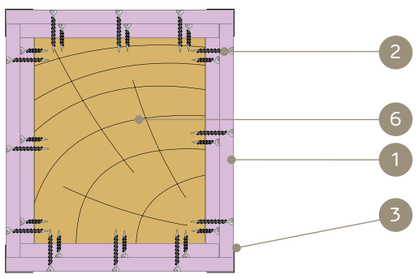
SYSTEMS:

FKDB/15; FKDB/25; FKDB/27,5; FKDB/50



MATERIALS:

1. Nida type DF plasterboard
2. Nida wood screws
3. Nida perforated aluminium corner profile
4. Nida Fire (A1) gypsum putty
5. Element of timber load-bearing structure



THE SYSTEM OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER THE LOAD-BEARING STRUCTURES (BOTTOM CORDS OF TRUSSES, TIES)

TECHNICAL PARAMETERS OF FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURES - NIDA DREWNO (BOTTOM CORDS OF TRUSSES, TIES - 4-SIDED ENCASEMENT)

Nida Drewno system name	Plasterboard sheathing			Fixing of Nida plasterboards	Static parameters of structural element		Cross-section modulus	Weight of 1 linear metre of encasement	Fire resistance class [3]	Special system
	Nida	Thickness [mm]	Marking acc. to standard		Coefficient of effort [α_r]	The way of working of a structural element	[b/h]	[kg]	[min]	
FKDB/15/Ogień+	Ogień Plus [2]	15,0 [1]	DF	direct	1,0	tension	1,0	13,5	R30	●
FKDB/25/Kompakt	Ogień Kompakt [2]	25,0 [1]	DF	direct	1,0	tension	1,0	18,5	R60	●
FKDB/27,5/Ogień+	Ogień Plus [2]	12,5 + 15,0 [1]	DF	direct	1,0	tension	1,0	20,5	R60	●
FKDB/50/Kompakt	Ogień Kompakt [2]	2x25,0 [1]	DF	direct	1,0	tension	1,0	33,5	R120	●

[1] The thickness of the fire protective sheathing was defined for the minimal cross-section of a structural element [b=60 mm].
[2] Utilisation of other Nida type DF boards is acceptable in order to provide additional characteristics, e.g.: Nida Twarda - increased mechanical strength.
[3] Fire classification ITB 01060/20/R147NZP.
The weight of 1 linear metre of encasement was calculated for a structural element of the cross-section 100x200 mm.

CONSUMPTION OF MATERIAL PER 1 LINEAR METRE OF THE NIDA DREWNO FIRE PROTECTIVE ENCASEMENT FOR TIMBER LOAD-BEARING STRUCTURESLOAD-BEARING STRUCTURES

Material name	UM	Nida Drewno system name			
		FKDB/15/Ogień+	FKDB/25/Kompakt	FKDB/27,5/Ogień+	FKDB/50/Kompakt
		Consumption of material per 1 linear metre			
Nida Ogień Plus 12,5 mm plasterboard	m^2	-	-	x+0,1	-
Nida Ogień Plus 15,0 mm plasterboard	m^2	x+0,1	-	x+0,1	-
Nida Ogień Kompakt 25,0 mm plasterboard	m^2	-	x+0,1	-	2x+0,2
Nida 3,5x35 mm wood screws	pcs.	48,0	-	24,0	-
Nida 3,5x45 mm wood screws	pcs.	-	48,0	-	24,0
Nida 3,5x55 mm wood screws	pcs.	-	-	48,0	-
Nida 4,2x70 mm wood screws	pcs.	-	-	-	48,0
Nida Fire (A1) gypsum putty	kg	4,0 [4]	4,0 [4]	4,0 [4]	4,0 [4]
Nida reinforcement tape	lm	0,9x	0,9x	0,9x	0,9x
Nida perforated aluminium corner profile	lm	4,0	4,0	4,0	4,0

[4] Approximate consumption standard.
IMPORTANT: How the "X" value is calculated. X=2b+2h (where: b - width of the beam cross-section (basis), h - hight of the beam cross-section).
The standards concerning the amount of utilised material do not cover the loss of the material.

The diagram and cross-section markings for the element accepted for calculations.

fire protective encasements **for timber load-bearing structures**

The system of the fire protective encasements for timber load-bearing structures is an innovative design developed in co-operation with the Fire Research Department of the Building Research Institute in Warsaw. It is the first such enterprise of this scale in Europe, which takes place in co-operation between industry and a Notified Body, following the latest and the strictest standards, such as PN-EN 1991-1-2 (Eurocode 1) " Actions on structures – Part 1-2: General – Actions on structures exposed to fire"; PN-EN 1995-1-1 (Eurocode 5) "Design of timber structures. Part 1-1: General. Common rules and rules for buildings"; PN-EN 1995-1-2 (Eurocode 5) "Design of timber structures. Part 1-2: General Structural Fire Design".

All the systems described herein incorporate the new Nida Ogień Plus DF type fire protection gypsum plasterboards (according to the standard PN-EN 520) and the Nida Ogień Kompakt DF type (also according to the standard PN-EN520) with thickness 12.5; 15.0; 18.0; 20.0; 25.0 mm which are fixed according to the direct method.

The available passive fire protection systems provide a unique combination of aesthetics and high fire protection performance. The specialised solutions provide timber load-bearing structures with the class R30, R60 and R120 fire protection.

Terminology referring to fire protection encasements for timber load-bearing structures

In order to facilitate the process of selecting the system appropriate for your applications with respect to the required fire resistance, the structural element types, and the configuration of sheathing, we are presenting examples of markings with a detailed description of its individual elements.

Nida Drewno FBDB / 15 /OGIEN+

Nida system name

Timber structure type:
- FBDB - timber beam
- FSDB - timber column
- FKDB - element of timber truss

Overall sheathing thickness [mm]:
- 12,5 = 1x12,5
- 15,0 = 1x15,0
- 18,0 = 1x18,0
- 20,0 = 1x20,0
- 25,0 = 2x12,5 / 1x25,0
- 27,5 = 12,5 + 15,0
- 30,0 = 2x15,0
- 30,5 = 12,5 + 18,0
- 33,0 = 15,0 + 18,0
- 36,0 = 2x18,0
- 38,0 = 18,0 + 20,0
- 40,0 = 2x20,0
- 42,0 = 18,0 + 25,0
- 45,0 = 20,0 + 25,0
- 50,0 = 2x25,0

Nida sheathing type:
- Ogień Plus
- Ogień Kompakt

tables for selection of fire protective **encasements for timber load-bearing structures**

In order to facilitate the process of selecting the appropriate Nida Drewno fire protection solutions for various timber load-bearing structures we compiled two sets of tables. Those tables were developed taking into account the character of the static loads acting on individual structural elements (bending, compression, tension, and shearing), not the subdivision of the timber product types.

The first set is a simplified version which could be utilised when we do not possess knowledge concerning a number of important static criteria and parameters (such as the coefficient of effort, slenderness, modifiers, buckling factor). This table is applicable mainly in the case of structures which already exist at the construction site (modernisation), for which the structural design details are not available.

When the process of selecting the appropriate solution is performed at the design stage, the detailed table presented as the second set is more applicable. Owing to the fact that the range of the individual criteria is very wide, selection of the required and safe protection system will be very precise, which might also account for the economic aspect. It is also important that the detailed tables enable providing protection for the timber load-bearing structures in an unlimited range (spatial arrangements – timber truss structures, glued timber elements, ancillary assemblies – angle braces, stirrups) owing to the fact that we focus on the type of stress, not the type of timber structure.

Guidelines for tables utilisation

It is advised to apply those solutions which are the safest among the set indicated in the tables.
Example:
When analysing a timber beam subjected to the bending stress, with cross section b=15 cm, h=34 cm (b/h=0.44) stressed with the effort value α_M= 0,9, designed for the k_{mod}=0,7 index, with 4-sided exposition to heating, protected against buckling, in order to determine the requirements for the R60 class we utilise the data presented in Tables 1 and 2, whose adequate fragments are presented below.

Table 1 (fragment) for α_M = 1,0

b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
140	0,7	12,5	0	0	20	**18**	15	20+25	18+25	20+20
170	0,7	12,5	0	0	18	18	15	18+25	18+20	15+20

Table 1 (fragment) for α_M = 0,8

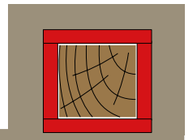
b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
140	0,7	12,5	0	0	18	15	15	20+25	20+20	18+18
170	0,7	0	0	0	18	12,5	0	18+25	18+18	15+18

The appropriate and safe solution is the indicated sheathing thickness dp = 18 mm (a single layer of plasterboards, thickness 18 mm).

simplified tables for selection of fire protection encasements for timber load-bearing structures

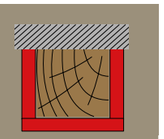
The data compiled in the following tables was accepted according to the Fire Classification by ITB 01060/20/R147NZP

BEAMS UNDER BENDING STRESS. The case of 4-sided exposition to heating; beams protected against buckling. Estimated thickness of the protective layer of the Nida Ogień Plus, Nida Ogień Kompakt plasterboards.



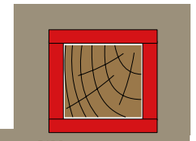
b [mm]	R30			R60			R120		
	b/h			b/h			b/h		
	1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	15	15	12,5	15+15	12,5+15	12,5+12,5	NA	25+25	25+25
80	15	12,5	12,5	25	25*	20	25+25	25+25	20+25
100	12,5	12,5	12,5	25*	25*	20	25+25	20+25	20+25
120	12,5	12,5	12,5	20	20	18	25+25	20+25	18+25
140	12,5	12,5	0	20	18	18	20+25	18+25	18+25
170	12,5	0	0	20	18	15	20+25	18+25	18+20
200	12,5	0	0	18	15	12,5	18+25	18+20	18+18

BEAMS UNDER BENDING STRESS. The case of 3-sided exposition to heating; beams not protected against buckling. Estimated thickness of the protective layer of the Nida Ogień Plus, Nida Ogień Kompakt.



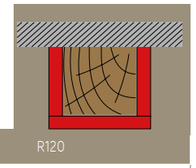
b [mm]	R30			R60			R120		
	b/h			b/h			b/h		
	1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	15	12,5	12,5	25	25	25	25+25	25+25	25+25
80	12,5	12,5	12,5	20	20	20	25+25	20+25	20+25
100	12,5	12,5	12,5	20	20	18	20+25	20+25	20+25
120	12,5	12,5	0	20	18	18	20+25	18+25	18+25
140	12,5	0	0	18	18	15	18+25	18+25	20+20
170	0	0	0	18	15	12,5	18+25	18+20	18+18
200	0	0	0	15	12,5	0	20+20	15+20	15+18

BEAMS UNDER BENDING STRESS. The case of 4-sided exposition to heating; beams not protected against buckling (h ≥ b). The estimated thickness of the protective layer of the Nida Ogień Plus, Nida Ogień Kompakt plasterboards.



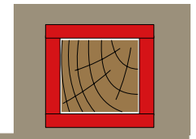
b [mm]	R30	R60	R120
60	18	15+15	NA
80	15	15+15	NA
100	15	25/12,5+15	25+25
120	12,5	20/12,5+12,5	25+25
140	12,5	20/12,5+12,5	25+25
170	12,5	20/12,5+12,5	20+25
200	12,5	20/12,5+12,5	20+25

BEAMS UNDER BENDING STRESS. The case of 3-sided exposition to heating; beams not protected against buckling (h ≥ b). The estimated thickness of the protective layer of the Nida Ogień Plus, Nida Ogień Kompakt plasterboards.

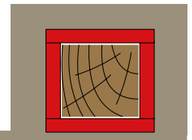


b [mm]	R30	R60	R120
60	15	15+15	NA
80	15	25/12,5+15	NA
100	12,5	25/12,5+12,5	25+25
120	12,5	20/12,5+12,5	25+25
140	12,5	20/12,5+12,5	20+25
170	12,5	18	20+25
200	12,5	18	20+25

Element under tension (e.g. bottom cords of truss, tie bars). The case of 4-sided exposition to heating. The estimated thickness of the protective layer of Nida Ogień Plus, Nida Ogień Kompakt.

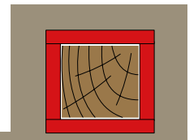


b [mm]	R30			R60			R120		
	b/h			b/h			b/h		
	1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	15	12,5	12,5	25/12,5+15	25	20	25+25	25+25	25+25
80	12,5	12,5	12,5	25	20	20	25+25	20+25	20+25
100	12,5	12,5	12,5	20	20	18	20+25	20+25	20+25
120	12,5	0	0	20	18	18	20+25	20+25	18+25
140	12,5	0	0	20	18	15	18+25	18+25	20+20
170	0	0	0	18	15	12,5	18+25	20+20	15+20
200	0	0	0	15	12,5	0	20+20	15+20	15+18



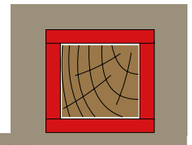
SLENDER COMPRESSED COLUMNS. The estimated thickness of the protective layer of the Nida Ogień Plus, Nida Ogień Kompakt plasterboards.

b [mm]	R30			R60			R120		
	λ			λ			λ		
	40	55	70	40	55	70	40	55	70
60	18	18	NA	12,5+18	15+15	NA	NA	NA	NA
80	15	18	NA	12,5+18	12,5+18	NA	NA	NA	NA
100	15	18	18	25/12,5+15	15+15	12,5+18	25+25	NA	NA
120	12,5	18	18	25/12,5+15	15+15	12,5+18	25+25	NA	NA
140	12,5	18	18	25/12,5+12,5	15+15	12,5+18	25+25	NA	NA
170	12,5	15	18	18	25/12,5+15	12,5+18	20+25	NA	NA
200	0	15	18	18	25/12,5+15	15+15	15+25	25+25	NA



COMPRESSED THICK COLUMNS (no possibility of buckling). The estimated thickness of the protective layer of the Nida Ogień Plus, Nida Ogień Kompakt plasterboards.

b [mm]	R30	R60	R120
60	15	25/ 12,5+15	25+25
80	12,5	25	25+25
100	12,5	20	20+25
120	12,5	20	20+25
140	12,5	20	18+25
170	0	18	18+25
200	0	15	20+20



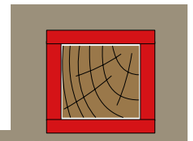
AREAS SUBJECTED TO SHEARING. The estimated thickness of the protective layer of the Nida Ogień Plus, Nida Ogień Kompakt plasterboards.

b [mm]	R30			R60			R120		
	b/h			b/h			b/h		
	1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	15	12,5	12,5	25/12,5+15	25	20	25+25	25+25	25+25
80	12,5	12,5	12,5	25	20	20	25+25	20+25	20+25
100	12,5	12,5	12,5	20	20	18	20+25	20+25	20+25
120	12,5	0	0	20	18	18	20+25	20+25	18+25
140	12,5	0	0	20	18	15	18+25	18+25	20+20
170	0	0	0	18	15	12,5	18+25	20+20	15+20
200	0	0	0	15	12,5	0	20+20	15+20	15+18

detailed tables for selection of fire protection encasements for **timber load-bearing structures**

The data compiled in the tables was accepted according to Fire Classification.

ELEMENTS UNDER BENDING STRESS – BEAMS



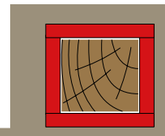
BEAMS AND OTHER MEMBERS SUBJECT TO BENDING.
The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt. Bending – 4-sided exposition to heating – beams protected against buckling
Effort α_M = 0,8

b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	0,9	15	15	12,5	15+15	12,5+15	12,5+12,5	NA	25+25	25+25
	0,7	15	12,5	12,5	25	25*	20	NA	25+25	20+25
80	0,9	15	12,5	12,5	25	25*	20	25+25	25+25	20+25
	0,7	12,5	12,5	12,5	25*	20	20	25+25	20+25	20+25
100	0,9	12,5	12,5	12,5	25*	25*	20	25+25	20+25	20+25
	0,7	12,5	12,5	12,5	20	20	18	20+25	20+25	18+25
120	0,9	12,5	12,5	12,5	20	20	18	25+25	20+25	18+25
	0,7	12,5	12,5	0	20	18	18	20+25	18+25	18+25
140	0,9	12,5	12,5	0	20	18	18	20+25	18+25	18+25
	0,7	12,5	0	0	20	18	15	20+25	18+25	20+20
170	0,9	12,5	0	0	20	18	15	20+25	18+25	18+20
	0,7	12,5	0	0	18	18	15	18+25	18+20	15+20
200	0,9	12,5	0	0	18	15	12,5	18+25	18+20	18+18
	0,7	0	0	0	18	15	0	18+25	15+20	15+15

Notes:
„12.5 + 15" – means: internal layer 12.5 mm + external layer 15 mm.
NA – not possible to protect with 2 layers of boards.
"0" – protection not required.
α_M – the coefficient of effort for the bending stress refers to the cross-section and it is determined for the designed values of internal forces and strength in the normal conditions.
* 25 mm thick boards can be replaced with 2 layers of 12.5+12.5 mm.

BEAMS AND OTHER MEMBERS SUBJECT TO BENDING.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Bending – 4-sided exposition to heating – beams protected against buckling
Effort α_M = 0,8

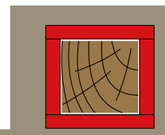


b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	0,9	15	12,5	12,5	25	25	20	NA	25+25	20+25
	0,7	15	12,5	12,5	25	20	20	25+25	20+25	20+25
80	0,9	12,5	12,5	12,5	25	20	20	25+25	20+25	20+25
	0,7	12,5	12,5	12,5	20	20	18	25+25	20+25	18+25
100	0,9	12,5	12,5	12,5	25	20	18	25+25	20+25	20+25
	0,7	12,5	12,5	0	20	18	18	20+25	18+25	18+25
120	0,9	12,5	12,5	0	20	18	18	20+25	20+25	18+25
	0,7	12,5	0	0	20	18	15	20+25	18+25	20+20
140	0,9	12,5	0	0	20	18	15	20+25	20+25	18+20
	0,7	12,5	0	0	18	15	15	20+25	20+20	18+18
170	0,9	12,5	0	0	18	15	12,5	18+25	18+20	18+18
	0,7	0	0	0	18	12,5	0	18+25	18+18	15+18
200	0,9	0	0	0	18	12,5	0	18+25	15+20	15+15
	0,7	0	0	0	15	12,5	0	20+20	15+18	12,5+15

Notes:
„12.5 + 15" – means: internal layer 12.5 mm + external layer 15 mm.
NA – not possible to protect with 2 layers of boards.
"0" – protection not required.
α_M – the coefficient of effort for the bending stress refers to the cross-section and it is determined for the designed values of internal forces and strength in the normal conditions.
* 25 mm thick boards can be replaced with 2 layers of 12.5+12.5 mm.

BEAMS AND OTHER MEMBERS SUBJECT TO BENDING.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Bending – 4-sided exposition to heating – beams protected against buckling
Effort α_M = 0,6

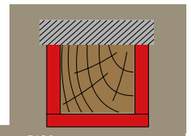


b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	0,9	15	12,5	12,5	25	25	20	NA	25+25	20+25
	0,7	12,5	12,5	12,5	25	20	20	25+25	20+25	20+25
80	0,9	12,5	12,5	12,5	25	20	20	25+25	20+25	20+25
	0,7	12,5	12,5	12,5	20	20	18	20+25	18+25	18+25
100	0,9	12,5	12,5	12,5	25	20	18	25+25	20+25	20+25
	0,7	12,5	0	0	20	18	18	20+25	18+25	20+20
120	0,9	12,5	12,5	0	20	18	18	20+25	20+25	18+25
	0,7	12,5	0	0	18	15	15	18+25	20+20	18+20
140	0,9	12,5	0	0	20	18	15	20+25	20+25	18+20
	0,7	12,5	0	0	18	12,5	12,5	18+25	18+20	15+20
170	0,9	12,5	0	0	20	15	12,5	18+25	18+20	18+18
	0,7	0	0	0	15	12,5	0	15+25 / 20+20	15+18	15+15
200	0,9	0	0	0	18	12,5	0	18+25	15+20	15+15
	0,7	0	0	0	12,5	0	0	18+20	15+15	20

Notes:
„12.5 + 15" – means: internal layer 12.5 mm + external layer 15 mm.
NA – not possible to protect with 2 layers of boards.
"0" – protection not required.
α_M – the coefficient of effort for the bending stress refers to the cross-section and it is determined for the designed values of internal forces and strength in the normal conditions.
* 25 mm thick boards can be replaced with 2 layers of 12.5+12.5 mm.

BEAMS AND OTHER MEMBERS SUBJECT TO BENDING.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt. Bending – 3-sided exposition to heating – beams protected against buckling
Effort α_M = 1,0

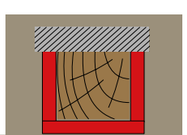


b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	0,9	15	12,5	12,5	25	25	25	25+25	25+25	25+25
	0,7	12,5	12,5	12,5	25	25	25	25+25	20+25	20+25
80	0,9	12,5	12,5	12,5	20	20	20	25+25	20+25	20+25
	0,7	12,5	12,5	12,5	20	20	20	20+25	20+25	20+25
100	0,9	12,5	12,5	12,5	20	20	18	20+25	20+25	20+25
	0,7	12,5	12,5	0	20	18	18	20+25	18+25	18+25
120	0,9	12,5	12,5	0	20	18	18	20+25	18+25	18+25
	0,7	12,5	0	0	18	18	15	18+25	18+25	20+20
140	0,9	12,5	0	0	18	18	15	18+25	18+25	20+20
	0,7	0	0	0	18	15	12,5	18+25	20+20	18+20
170	0,9	0	0	0	18	15	12,5	18+25	18+20	18+18
	0,7	0	0	0	15	12,5	12,5	20+20	18+18	15+18
200	0,9	0	0	0	15	12,5	0	20+20	15+20	15+18
	0,7	0	0	0	12,5	0	0	18+18	15+15	12,5+15

Notes:
"18 + 20" – means: internal layer 18 mm + external layer 20 mm
"0" – protection not required
α_M –the coefficient of effort for the bending stress refers to the cross-section and it is determined for the designed values of internal forces and strength in the normal conditions

BEAMS AND OTHER MEMBERS SUBJECT TO BENDING.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Bending – 3-sided exposition to heating – beams protected against buckling
Effort α_M = 0,8

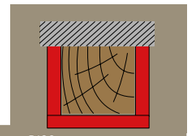


b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	0,9	12,5	12,5	12,5	25	25	25	25+25	20+25	20+25
	0,7	12,5	12,5	12,5	20	20	20	25+25	20+25	20+25
80	0,9	12,5	12,5	12,5	20	20	20	20+25	20+25	20+25
	0,7	12,5	12,5	12,5	20	18	18	20+25	20+25	20+25
100	0,9	12,5	12,5	0	20	18	18	20+25	18+25	18+25
	0,7	12,5	0	0	18	18	18	18+25	18+25	18+25
120	0,9	12,5	12,5	0	20	18	18	20+25	18+25	18+25
	0,7	0	0	0	18	15	15	18+25	20+20	18+20
140	0,9	0	0	0	18	15	12,5	18+25	20+20	18+20
	0,7	0	0	0	15	12,5	12,5	20+20	18+20	18+18
170	0,9	0	0	0	15	12,5	12,5	20+20	18+18	15+18
	0,7	0	0	0	12,5	0	0	18+18	15+18	15+15
200	0,9	0	0	0	12,5	0	0	18+18	15+15	12,5+15
	0,7	0	0	0	12,5	0	0	15+18	12,5+15	12,5+12,5

Notes:
"18 + 20" – means: internal layer 18 mm + external layer 20 mm.
"0" – protection not required.
α_M – the coefficient of effort for the bending stress refers to the cross-section and it is determined for the designed values of internal forces and strength in the normal conditions.

BEAMS AND OTHER MEMBERS SUBJECT TO BENDING.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Bending – 3-sided exposition to heating – beams protected against buckling
Effort α_M = 0,6

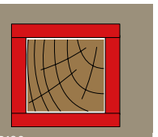


b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	0,9	12,5	12,5	12,5	20	20	20	25+25	20+25	20+25
	0,7	12,5	12,5	12,5	20	20	20	25+25	20+25	20+25
80	0,9	12,5	12,5	12,5	20	18	18	20+25	20+25	20+25
	0,7	12,5	12,5	0	20	18	18	20+25	18+25	18+25
100	0,9	12,5	0	0	18	18	18	18+25	18+25	18+25
	0,7	0	0	0	18	15	15	18+25	20+20	20+20
120	0,9	0	0	0	18	15	15	18+25	20+20	18+20
	0,7	0	0	0	15	12,5	12,5	20+20	18+25	18+18
140	0,9	0	0	0	15	12,5	12,5	20+20	18+20	18+18
	0,7	0	0	0	12,5	12,5	12,5	18+20	18+18	15+18
170	0,9	0	0	0	12,5	0	0	18+18	15+18	15+15
	0,7	0	0	0	12,5	0	0	15+18	25	25
200	0,9	0	0	0	12,5	0	0	15+18	12,5+15	12,5+12,5
	0,7	0	0	0	12,5	0	0	25	20	18

Notes:
"18 + 20" – means: internal layer 18 mm + external layer 20 mm.
"0" – protection not required.
α_M – the coefficient of effort for the bending stress refers to the cross-section and it is determined for the designed values of internal forces and strength in the normal conditions.

BEAMS AND OTHER MEMBERS SUBJECT TO BENDING.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Bending – 4-sided exposition to heating k_{mod} = 0,7;
Calculations for b/h = 0,5



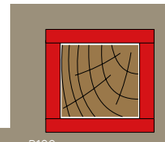
b [mm]	k_{crit}	R30		R60		R120	
		α_M		α_M		α_M	
		0,8	0,6	0,8	0,6	0,8	0,6
60	0,8	15	15	25/12,5+15	12,5+15	NA	25+25
	0,6	18	15	15+15	15+15	NA	NA
80	0,8	12,5	12,5	25/12,5+15	25/12,5+12,5	25+25	25+25
	0,6	15	15	15+15	25/12,5+15	NA	25+25
100	0,8	12,5	12,5	20/12,5+12,5	20/12,5+12,5	25+25	20+25
	0,6	15	12,5	25/12,5+15	25/12,5+12,5	25+25	25+25
120	0,8	12,5	12,5	20/12,5+12,5	20/12,5+12,5	20+25	20+25
	0,6	12,5	12,5	20/12,5+12,5	20/12,5+12,5	25+25	20+25
140	0,8	12,5	12,5	20/12,5+12,5	18/12,5+12,5	20+25	18+25
	0,6	12,5	12,5	20/12,5+12,5	20/12,5+12,5	25+25	18+25
170	0,8	12,5	0	18	18	20+25	18+25
	0,6	12,5	12,5	20/12,5+12,5	18	20+25	18+25
200	0,8	0	0	18	15	20+25	15+25
	0,6	12,5	12,5	20/12,5+12,5	18	20+25	18+25

Notes:
"18+25" – means: internal layer 18 mm + external layer 25 mm.
"0" – protection not required.
NA – not possible to protect with 2 layers of boards.
α_M – the coefficient of effort for the bending stress refers to the cross-section and it is determined for the designed values of internal forces and strength in the normal conditions.
k_{crit} – the reduction coefficient for strength in the case of buckling, acc. to EN 1995-1-1 p.6.3.3 is determined for the normal conditions.
Those values can be treated as safe estimations for other b/h dimensions and kmod coefficient values.

Elements under tensile stress – trusses, ties

BOTTOM CORDS OF TRUSSES, TIES

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Tensile stress – heated from 4 sides
Effort α_T = 1,0

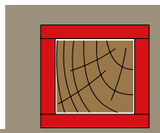


b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	0,9	15	12,5	12,5	25/12,5+15	25*	20	25+25	25+25	25+25
	0,7	12,5	12,5	12,5	25/12,5+15	20	20	25+25	20+25	20+25
80	0,9	12,5	12,5	12,5	25*	20	20	25+25	20+25	20+25
	0,7	12,5	12,5	12,5	25*	20	20	20+25	20+25	20+25
100	0,9	12,5	12,5	12,5	20	20	18	20+25	20+25	20+25
	0,7	12,5	12,5	0	20	18	18	20+25	20+25	18+25
120	0,9	12,5	0	0	20	18	18	20+25	20+25	18+25
	0,7	12,5	0	0	18	18	15	20+25	20+25	20+20
140	0,9	12,5	0	0	20	18	15	18+25	18+25	20+20
	0,7	0	0	0	18	15	12,5	18+25	18+20	18+20
170	0,9	0	0	0	18	15	12,5	18+25	20+20	15+20
	0,7	0	0	0	15	12,5	12,5	20+20	18+18	15+18
200	0,9	0	0	0	15	12,5	0	20+20	15+20	15+18
	0,7	0	0	0	12,5	0	0	18+18	15+15	15+15

Notes:
"18+25" – means: internal layer 18 mm + external layer 25 mm.
"0" – protection not required.
25* – 25 mm thick boards can be replaced with 2 layers of 12.5+12.5 mm.
α_T – the coefficient of effort under the tensile stress is determined for the designed values of internal forces and strength in the normal conditions.
The same requirements apply to the elements under the tensile stress with cross-section dimension bxh, regardless of the orientation of the sides (vertical, or horizontal).

BOTTOM CORDS OF TRUSSES, TIES.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Tensile stress – 4-sided exposition to heating.
Effort α_T = 0,8

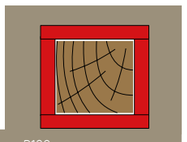


b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	0,9	12,5	12,5	12,5	25/ 12,5+15	20	20	25+25	20+25	20+25
	0,7	12,5	12,5	12,5	25*	20	20	25+25	20+25	20+25
80	0,9	12,5	12,5	12,5	25*	20	20	20+25	20+25	20+25
	0,7	12,5	12,5	12,5	20	18	18	20+25	18+25	18+25
100	0,9	12,5	12,5	0	20	18	18	20+25	20+25	18+25
	0,7	12,5	0	0	20	18	18	18+25	18+25	18+25
120	0,9	12,5	0	0	20	18	15	20+25	20+25	20+20
	0,7	12,5	0	0	18	15	15	18+25	20+20	18+20
140	0,9	0	0	0	18	15	12,5	18+25	18+20	18+20
	0,7	0	0	0	18	12,5	12,5	20+20	18+18	18+18
170	0,9	0	0	0	15	12,5	12,5	20+20	18+18	15+18
	0,7	0	0	0	12,5	12,5	0	18+20	15+18	15+15
200	0,9	0	0	0	15	0	0	18+18	15+15	15+15
	0,7	0	0	0	12,5	0	0	15+18	12,5+15	12,5+15

Notes:
"18+25" – means: internal layer 18 mm + external layer 25 mm.
"0" – protection not required.
25* – 25 mm thick boards can be replaced with 2 layers of 12.5+12.5 mm.
α_T – the coefficient of effort under the tensile stress is determined for the designed values of internal forces and strength in the normal conditions.
The same requirements apply to the elements under the tensile stress with cross-section dimension bxh, regardless of the orientation of the sides (vertical, or horizontal).

BOTTOM CORDS OF TRUSSES, TIES.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Tensile stress – 4-sided exposition to heating.
Effort α_T = 0,6



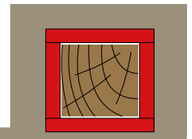
b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	0,9	12,5	12,5	12,5	25*	20	20	25+25	20+25	20+25
	0,7	12,5	12,5	12,5	20	20	20	20+25	20+25	20+25
80	0,9	12,5	12,5	12,5	20	18	18	20+25	18+25	18+25
	0,7	12,5	12,5	12,5	20	18	18	20+25	18+25	18+25
100	0,9	12,5	0	0	20	18	18	18+25	18+25	18+25
	0,7	12,5	0	0	18	18	15	18+25	20+20	20+20
120	0,9	12,5	0	0	18	15	15	18+25	20+20	18+20
	0,7	0	0	0	18	15	12,5	18+25	18+20	18+18
140	0,9	0	0	0	18	12,5	12,5	20+20	18+18	18+18
	0,7	0	0	0	15	12,5	12,5	18+20	15+20	15+18
170	0,9	0	0	0	12,5	12,5	0	18+20	15+18	15+15
	0,7	0	0	0	12,5	0	0	15+20	15+15	25/ 12,5+15
200	0,9	0	0	0	12,5	0	0	15+18	12,5+15	12,5+15
	0,7	0	0	0	12,5	0	0	15+15	20/ 12,5+12,5	18/ 12,5+12,5

Notes:
"18+25" – means: internal layer 18 mm + external layer 25 mm.
"0" – protection not required.
25* – 25 mm thick boards can be replaced with 2 layers of 12.5+12.5 mm.
α_T – the coefficient of effort under the tensile stress is determined for the designed values of internal forces and strength in the normal conditions.
The same requirements apply to the elements under the tensile stress with cross-section dimension bxh, regardless of the orientation of the sides (vertical, or horizontal).

Elements under the compressive stress - slender and thick columns

COMPRESSIVE STRESS – SLENDER COLUMNS.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Compressive stress – heated from 4 sides
Slenderness λ_{min} = 40 - 70; b=h; Effort α_N = 1,0

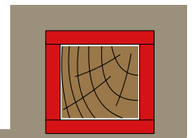


b [mm]	k_{mod}	R30			R60			R120		
		λ			λ			λ		
		40	55	70	40	55	70	40	55	70
60	0,9	18	NA	NA	12,5+18	NA	NA	NA	NA	NA
	0,7	18	18	NA	12,5+18	15+15	NA	NA	NA	NA
80	0,9	18	18	NA	12,5+18	15+15	NA	NA	NA	NA
	0,7	15	18	NA	12,5+18	12,5+18	NA	NA	NA	NA
100	0,9	18	18	NA	12,5+18	15+15	NA	NA	NA	NA
	0,7	15	18	18	25/ 12,5+15	15+15	12,5+18	25+25	NA	NA
120	0,9	15	18	NA	15+15	15+15	NA	NA	NA	NA
	0,7	12,5	18	18	25/12,5+15	15+15	12,5+18	25+25	NA	NA
140	0,9	15	18	NA	25/ 12,5+15	15+15	NA	NA	NA	NA
	0,7	12,5	18	18	25/12,5+12,5	15+15	12,5+18	25+25	NA	NA
170	0,9	15	18	18	25/12,5+15	15+15	15+18	25+25	NA	NA
	0,7	12,5	15	18	18	25 /12,5+15	12,5+18	20+25	NA	NA
200	0,9	12,5	18	18	25/ 12,5+12,5	15+15	15+18	25+25	NA	NA
	0,7	0	15	18	18	25/12,5+15	15+15	15+25	25+25	NA

Notes:
"18+25" – means: internal layer 18 mm + external layer 25 mm.
"0" – protection not required.
NA – not possible to protect with 2 layers of boards.
α_N – the coefficient of effort under the compressive stress refers to the cross-section and it is determined for the designed values of internal forces and strength in the normal conditions.
The data presented in the Table can be safely applied to the rectangular cross-sections b x h, different from the square cross-sections.

COMPRESSIVE STRESS - SLENDER COLUMNS.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Compressive stress – heated from 4 sides
Slenderness λ_{min} = 40 - 70; b=h; Effort α_N = 0,8

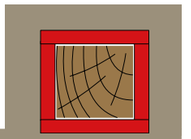


b [mm]	k_{mod}	R30			R60			R120		
		λ			λ			λ		
		40	55	70	40	55	70	40	55	70
60	0,9	18	18	NA	12,5+18	15+15	NA	NA	NA	NA
	0,7	18	18	NA	12,5+18	15+15	NA	NA	NA	NA
80	0,9	15	18	NA	12,5+18	12,5+18	NA	NA	NA	NA
	0,7	15	18	18	12,5+15	15+15	15+15	NA	NA	NA
100	0,9	15	18	18	25/ 12,5+15	15+15	12,5+18	25+25	NA	NA
	0,7	12,5	15	18	25/ 12,5+15	15+15	15+15	25+25	NA	NA
120	0,9	12,5	18	18	25/ 12,5+15	15+15	12,5+18	25+25	NA	NA
	0,7	12,5	15	18	25/ 12,5+12,5	12,5+15	15+15	25+25	NA	NA
140	0,9	12,5	18	18	25/ 12,5+12,5	15+15	12,5+18	25+25	NA	NA
	0,7	12,5	15	18	20/ 12,5+12,5	12,5+15	15+15	20+25	25+25	NA
170	0,9	12,5	15	18	18	25 /12,5+15	12,5+18	20+25	NA	NA
	0,7	0	12,5	18	18	12,5+12,5	15+15	18+25	25+25	NA
200	0,9	0	15	18	18	25/ 12,5+15	15+15	15+25	25+25	NA
	0,7	0	12,5	18	15	20/ 12,5+12,5	15+15	15+25	20+25	NA

Notes:
"18+25" – means: internal layer 18 mm + external layer 25 mm.
"0" – protection not required.
NA – not possible to protect with 2 layers of boards.
α_N – the coefficient of effort under the compressive stress refers to the cross-section and it is determined for the designed values of internal forces and strength in the normal conditions.
The data presented in the Table can be safely applied to the rectangular cross-sections b x h, different from the square cross-sections.

COMPRESSIVE STRESS – SLENDER COLUMNS.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Compressive stress – heated from 4 sides
Slenderness λ_{min} = 40 - 70; b=h; Effort α_N = 0,6

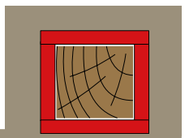


b [mm]	k_{mod}	R30			R60			R120		
		λ			λ			λ		
		40	55	70	40	55	70	40	55	70
60	0,9	18	18	NA	12,5+18	15+15	NA	NA	NA	NA
	0,7	15	18	18	12,5+15	15+15	15+15	NA	NA	NA
80	0,9	15	18	18	12,5+15	15+15	15+15	NA	NA	NA
	0,7	12,5	15	18	12,5+15	12,5+15	15+15	25+25	NA	NA
100	0,9	12,5	15	18	25/12,5+15	15+15	15+15	25+25	NA	NA
	0,7	12,5	15	15	20/12,5+12,5	12,5+15	15+15	20+25	25+25	NA
120	0,9	12,5	15	18	25/12,5+12,5	12,5+15	15+15	25+25	NA	NA
	0,7	12,5	12,5	15	18	12,5+12,5	12,5+15	20+25	25+25	NA
140	0,9	12,5	15	18	20/12,5+12,5	12,5+15	15+15	20+25	25+25	NA
	0,7	12,5	12,5	15	18	12,5+12,5	12,5+15	18+25	20+25	25+25
170	0,9	0	12,5	18	18	12,5+12,5	15+15	18+25	25+25	NA
	0,7	0	12,5	12,5	18	20/12,5+12,5	12,5+15	15+25	20+25	25+25
200	0,9	0	12,5	18	15	20/12,5+12,5	15+15	15+25	20+25	NA
	0,7	0	0	12,5	15	18	12,5+12,5	12,5+25	18+25	25+25

Notes:
"18+25" – means: internal layer 18 mm + external layer 25 mm.
"0" – protection not required.
NA – not possible to protect with 2 layers of boards.
α_N – the coefficient of effort under the compressive stress refers to the cross-section and it is determined for the designed values of internal forces and strength in the normal conditions.
The data presented in the Table can be safely applied to the rectangular cross-sections b x h, different from the square cross-sections.

COMPRESSIVE STRESS - SLENDER COLUMNS.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Compressive stress – heated from 4 sides
Slenderness λ_{min} = 40 - 70; b=h; Effort α_N = 0,4

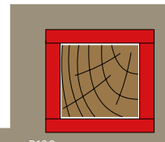


b [mm]	k_{mod}	R30			R60			R120		
		λ			λ			λ		
		40	55	70	40	55	70	40	55	70
60	0,9	15	18	18	12,5+15	15+15	15+15	NA	NA	NA
	0,7	15	15	18	12,5+15	12,5+15	15+15	25+25	NA	NA
80	0,9	12,5	15	18	12,5+15	12,5+15	15+15	25+25	NA	NA
	0,7	12,5	12,5	15	20/12,5+12,5	12,5+15	12,5+15	25+25	25+25	NA
100	0,9	12,5	15	15	20/12,5+12,5	12,5+15	15+15	20+25	25+25	NA
	0,7	12,5	12,5	12,5	20/12,5+12,5	12,5+12,5	12,5+15	20+25	25+25	25+25
120	0,9	12,5	12,5	15	18	12,5+12,5	12,5+15	20+25	25+25	NA
	0,7	12,5	12,5	12,5	18	12,5+12,5	12,5+12,5	18+25	20+25	25+25
140	0,9	12,5	12,5	15	18	12,5+12,5	12,5+15	18+25	20+25	25+25
	0,7	0	12,5	12,5	28	18	12,5+12,5	18+25	18+25	20+25
170	0,9	0	12,5	12,5	18	20/12,5+12,5	12,5+15	15+25	20+25	25+25
	0,7	0	0	12,5	15	18	18	12,5+25	18+25	20+25
200	0,9	0	0	12,5	15	18	12,5+12,5	12,5+25	18+25	25+25
	0,7	0	0	0	12,5	15	18	12,5+25	15+25	20+25

Notes:
"18+25" – means: internal layer 18 mm + external layer 25 mm.
"0" – protection not required.
NA – not possible to protect with 2 layers of boards.
α_N – the coefficient of effort under the compressive stress refers to the cross-section and it is determined for the designed values of internal forces and strength in the normal conditions.
The data presented in the Table can be safely applied to the rectangular cross-sections b x h, different from the square cross-sections.

THICK COLUMNS (NO POSSIBILITY OF BUCKLING).

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Compressive stress – heated from 4 sides
Calculations for b=h; Effort α_N = 0,6 ÷ 1,0



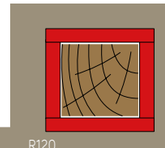
b [mm]	k_{mod}	R30			R60			R120		
		α_N			α_N			α_N		
		0,6	0,8	1	0,6	0,8	1	0,6	0,8	1
60	0,9	12,5	12,5	15	25*	25/ 12,5+15	25/ 12,5+15	25+25	25+25	25+25
	0,7	12,5	12,5	12,5	20	25*	25/ 12,5+15	20+25	25+25	25+25
80	0,9	12,5	12,5	12,5	20	25*	25*	20+25	20+25	25+25
	0,7	12,5	12,5	12,5	20	20	25*	20+25	20+25	20+25
100	0,9	12,5	12,5	12,5	20	20	20	18+25	20+25	20+25
	0,7	12,5	12,5	12,5	18	20	20	18+25	18+25	20+25
120	0,9	12,5	12,5	12,5	18	20	20	18+25	20+25	20+25
	0,7	0	12,5	12,5	18	18	18	18+25	18+25	18+25
140	0,9	0	0	12,5	18	18	20	20+20	18+25	18+25
	0,7	0	0	0	15	18	18	18+20	20+20	18+25
170	0,9	0	0	0	12,5	15	18	18+20	20+20	18+25
	0,7	0	0	0	12,5	12,5	15	15+20	18+20	20+20
200	0,9	0	0	0	12,5	15	15	15+18	18+18	20+20
	0,7	0	0	0	12,5	12,5	12,5	15+15	15+18	18+18

Notes:
"18+25" – means: internal layer 18 mm + external layer 25 mm.
"0" – protection not required.
25* – 25 mm thick boards can be replaced with 2 layers of 12.5+12.5 mm.
α_N – the coefficient of effort under the compressive stress refers to the cross-section and it is determined for the designed values of internal forces and strength in the normal conditions.
The data presented in the Table can be safely applied to the rectangular cross-sections b x h, different from the square cross-sections.

ELEMENTS UNDER SHEARING STRESS – AREAS PROXIMAL TO SUPPORTS

SHEARING – AREAS PROXIMAL TO SUPPORTS.

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Shearing stress – heated from 4 sides
Effort α_V = 1,0

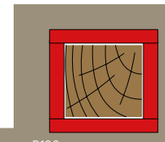


b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	0,9	15	12,5	12,5	25/ 12,5+15	25*	20	25+25	25+25	25+25
	0,7	12,5	12,5	12,5	25/ 12,5+15	20	20	25+25	20+25	20+25
80	0,9	12,5	12,5	12,5	25*	20	20	25+25	20+25	20+25
	0,7	12,5	12,5	12,5	25*	20	20	20+25	20+25	20+25
100	0,9	12,5	12,5	12,5	20	20	18	20+25	20+25	20+25
	0,7	12,5	12,5	0	20	18	18	20+25	20+25	18+25
120	0,9	12,5	0	0	20	18	18	20+25	20+25	18+25
	0,7	12,5	0	0	20	18	15	20+25	20+25	20+20
140	0,9	12,5	0	0	20	18	15	18+25	18+25	20+20
	0,7	0	0	0	18	15	12,5	18+25	18+20	18+20
170	0,9	0	0	0	18	15	12,5	18+25	20+20	15+20
	0,7	0	0	0	15	12,5	12,5	20+20	18+18	15+18
200	0,9	0	0	0	15	12,5	0	20+20	15+20	15+18
	0,7	0	0	0	15	0	0	18+18	15+15	15+15

Notes:
"18+25" – means: internal layer 18 mm + external layer 25 mm.
"0" – protection not required.
25* – 25 mm thick boards can be replaced with 2 layers of 12.5+12.5 mm.
α_V – the coefficient of effort under the shearing stress is determined for the designed values of internal forces and strength in the normal conditions.

SHEARING – AREAS PROXIMAL TO SUPPORTS

The required sheathing thickness of the Nida Ogień Plus, Nida Ogień Kompakt.
Shearing stress – heated from 4 sides
Effort α_V = 0,6



b [mm]	k_{mod}	R30			R60			R120		
		b/h			b/h			b/h		
		1	0,5	0,25	1	0,5	0,25	1	0,5	0,25
60	0,9	12,5	12,5	12,5	25/ 12,5+15	20	20	25+25	20+25	20+25
	0,7	12,5	12,5	12,5	25*	20	20	25+25	20+25	20+25
80	0,9	12,5	12,5	12,5	25*	20	20	20+25	20+25	20+25
	0,7	12,5	12,5	12,5	20	18	18	20+25	18+25	18+25
100	0,9	12,5	12,5	0	20	18	18	20+25	20+25	18+25
	0,7	12,5	0	0	20	18	18	18+25	18+25	18+25
120	0,9	12,5	0	0	20	18	15	20+25	20+25	20+20
	0,7	12,5	0	0	18	15	15	18+25	20+20	18+20
140	0,9	0	0	0	18	15	12,5	18+25	18+20	18+20
	0,7	0	0	0	18	12,5	12,5	20+20	18+18	18+18
170	0,9	0	0	0	15	12,5	12,5	20+20	18+18	15+18
	0,7	0	0	0	12,5	12,5	0	18+20	15+18	15+15
200	0,9	0	0	0	15	0	0	18+18	15+15	15+15
	0,7	0	0	0	12,5	0	0	15+18	12,5+15	12,5+15

Notes:
"18+25" – means: internal layer 18 mm + external layer 25 mm.
"0" – protection not required.
25* – 25 mm thick boards can be replaced with 2 layers of 12.5+12.5 mm.
α_V – the coefficient of effort under the shearing stress is determined for the designed values of internal forces and strength in the normal conditions.