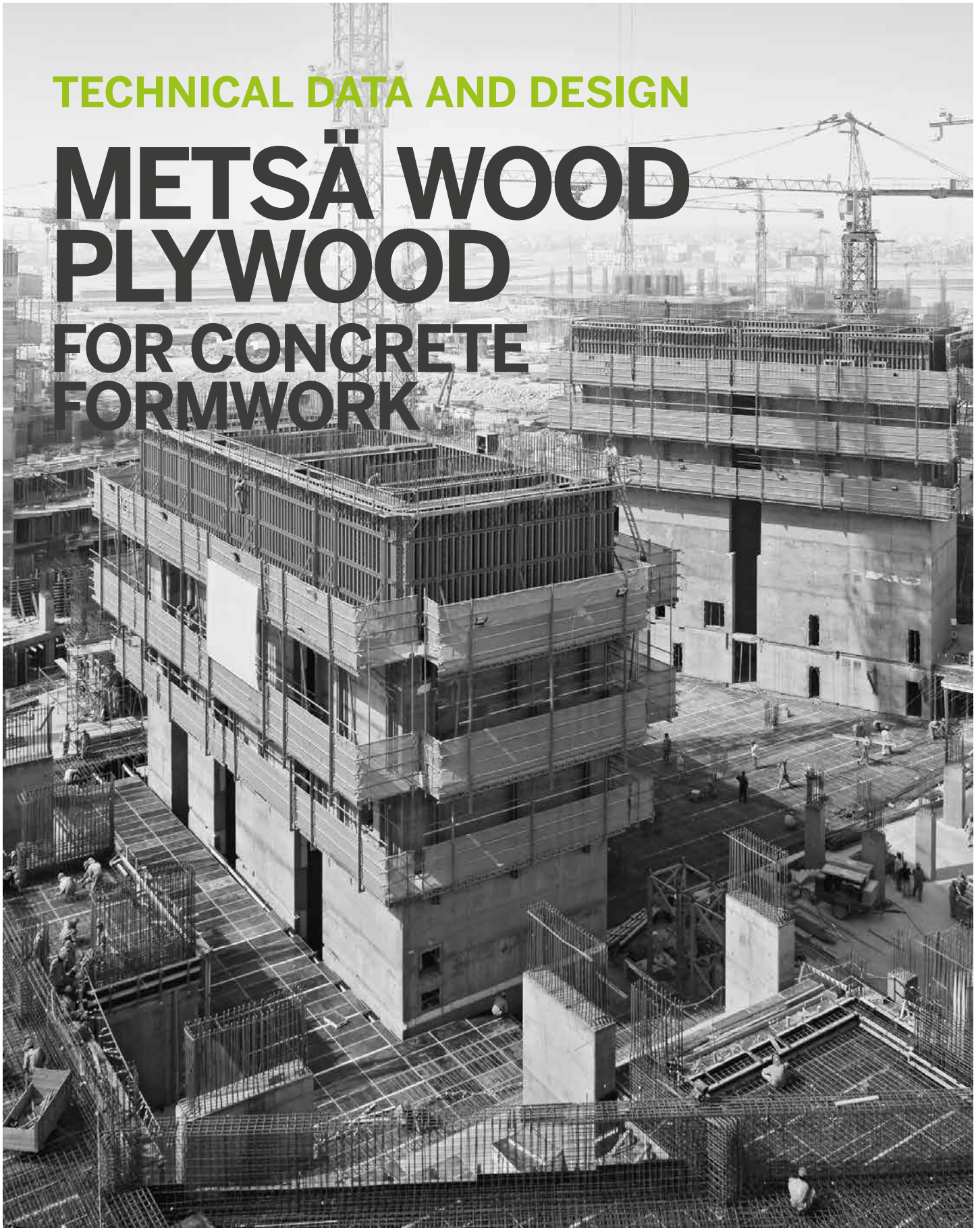
TECHNICAL DATA AND DESIGN

METSÄ WOOD PLYWOOD FOR CONCRETE FORMWORK



MetsäWood

METSÄ WOOD PLYWOOD

PREMIUM PANELS FOR CONCRETE FORMWORK

Metsä Wood plywood products and solutions are widely recognized for their quality thanks to the premium Nordic raw material, their up-to-date and technologically advanced production processes and for the decades of experience in manufacturing plywood.

The Metsä Wood concrete formwork product range includes a wide variety of panels for different concreting applications. Being able to deliver the right formwork panel for each type of casting, whether it is a shuttering system or loose panel formwork, slab or wall casting, flat or curved surfaces, our product portfolio suits all applications. Metsä Wood Formwork panels can be used both in building site casting and in the manufacture of prefabricated concrete elements. All Metsä Wood concrete formwork panels have been designed to meet the requirements of different types of castings in order to achieve the highest quality finish. In addition to plywood standard sizes, Metsä Wood offers XL and KingSize panels that enable large concrete surfaces with fewer joints.

TECHNICAL DATA AND DESIGN

The high-quality birch plywood core of Metsä Wood Form, Form-PLUS, XL and KingSize panels combines the exceptional stiffness and strength values of a birch plywood panel but with the lightness of a wooden panel. Moreover, the high-quality Spruce plywood core of Metsä Wood Spruce III+/III panel enables exceptionally lightweight, easy-to-use, stiff and strong formwork. Metsä Wood plywood panels withstand high concrete pressures with ease.

The "Metsä Wood Plywood for Concrete Formwork – Technical Data & Design" -brochure provides technical information and design guides for all Metsä Wood plywood panels for Concrete Formwork. The information includes: Strength and Elastic properties, Permissible Concrete Pressure tables as well as Design nomograms.

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- 2. Metsä Wood XL and KingSize 8
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1. METSÄ WOOD FORM AND METSÄ WOOD FORMPLUS

Strength and elastic properties of Metsä Wood Form and FormPLUS plywood

Table 1.1

PRODUCT	NOMINAL THICK-NESS [mm]	THICKNESS TOLERANCE MIN. [mm]	THICKNESS TOLERANCE MAX. [mm]	MODULUS OF ELASTICITY BENDING E_m a [N/mm²]	MODULUS OF ELASTICITY BENDING E_m b [N/mm²]	CHARACTERISTIC STRENGTH BENDING f_m a [N/mm²]	CHARACTERISTIC STRENGTH BENDING f_m b [N/mm²]	MODULUS OF RIGIDITY PLANAR SHEAR G_r a [N/mm²]	MODULUS OF RIGIDITY PLANAR SHEAR G_r b [N/mm²]	CHARACTERISTIC STRENGTH PLANAR SHEAR f_r a [N/mm²]	CHARACTERISTIC STRENGTH PLANAR SHEAR f_r b [N/mm²]	APPROX. WEIGHT [kg/m²]	FACE VENEER DIRECTION
METSÄ WOOD FORM AND FORMPLUS	9	8,8	9,5	6105	11395	32,1	45,6	155	206	2,35	2,68	6,1	b
	12	11,5	12,5	6781	10719	33,2	42,9	170	207	2,22	2,78	8,2	b
	15	14,3	15,3	7184	10316	33,8	41,3	178	207	2,39	2,62	10,2	b
	18	17,1	18,1	7452	10048	34,1	40,2	183	206	2,34	2,67	12,2	b
	21	20,0	20,9	7642	9858	34,3	39,4	186	206	2,41	2,59	14,3	b
	24	22,9	23,7	7783	9717	34,4	38,9	189	206	2,39	2,62	16,3	b
	27	25,2	26,8	7893	9607	34,5	38,4	190	205	2,43	2,57	18,4	b
	30	28,1	29,9	7981	9519	34,6	38,1	192	205	2,41	2,59	20,4	b
METSÄ WOOD FORM AND FORMPLUS S2	15	14,3	15,3	10413	7087	48,9	28,3	240	161	2,31	2,92	10,2	b
	18	17,1	18,1	10852	6648	49,6	26,6	220	174	2,36	2,83	12,2	b
	21	20,0	20,9	11047	6453	49,5	25,8	212	183	2,46	2,60	14,3	b

EN 789 values. Moisture content MC 12%.

a = Panel lenghtwise direction
b = Panel crosswise direction

Design data for Metsä Wood Form and FormPLUS plywood
Permissible concrete pressures

STANDARD CONSTRUCTION, DIRECTION a

Table 1.2 METSÄ WOOD FORM AND FORMPLUS PLYWOOD. PERMISSIBLE CONCRETE PRESSURE q [kN/m²]. Triple-span plate strip. Panel lengthwise direction (a) parallel to the span. Uniform load. Deflection d [mm] with max. span/300 deflection limitation. Moisture content MC 27%.

	9 MM / 7 PLY		12 MM / 9 PLY		15 MM / 11 PLY		18 MM / 13 PLY		21 MM / 15 PLY		24 MM / 17 PLY		27 MM / 19 PLY		30 MM / 21 PLY	
SPAN [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]
200	17,2 d	0,7	36,0 d	0,7	61,3 d	0,7	74,3 t	0,6	85,9 t	0,5	98,0 t	0,4	109,7 t	0,4	121,3 t	0,4
250	9,6 d	0,8	21,0 d	0,8	37,3 d	0,8	56,6 d	0,8	68,8 t	0,7	78,4 t	0,6	87,7 t	0,6	97,1 t	0,5
300	5,9 d	1,0	13,2 d	1,0	24,1 d	1,0	37,6 d	1,0	53,4 d	1,0	65,3 t	0,9	73,1 t	0,8	80,9 t	0,7
350	3,8 d	1,2	8,7 d	1,2	16,3 d	1,2	26,0 d	1,2	37,7 d	1,2	51,6 d	1,2	62,7 t	1,1	69,3 t	1,0
400	2,6 d	1,3	6,1 d	1,3	11,5 d	1,3	18,6 d	1,3	27,4 d	1,3	38,1 d	1,3	49,9 d	1,3	60,7 t	1,3
450	1,9 d	1,5	4,4 d	1,5	8,4 d	1,5	13,7 d	1,5	20,4 d	1,5	28,8 d	1,5	38,2 d	1,5	48,4 d	1,5
500	1,4 d	1,7	3,2 d	1,7	6,3 d	1,7	10,3 d	1,7	15,6 d	1,7	22,2 d	1,7	29,7 d	1,7	38,1 d	1,7
600	0,8 d	2,0	1,9 d	2,0	3,8 d	2,0	6,3 d	2,0	9,6 d	2,0	13,9 d	2,0	18,8 d	2,0	24,5 d	2,0

d = Deflection limitation, t = Shear strength limitation

STANDARD CONSTRUCTION, DIRECTION b

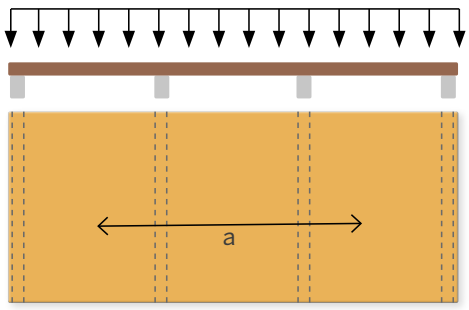
Table 1.3 METSÄ WOOD FORM AND FORMPLUS PLYWOOD. PERMISSIBLE CONCRETE PRESSURE q [kN/m²]. Triple-span plate strip. Panel crosswise direction (b) parallel to the span. Uniform load. Deflection d [mm] with max. span/300 deflection limitation. Moisture content MC 27%.

	9 MM / 7 PLY		12 MM / 9 PLY		15 MM / 11 PLY		18 MM / 13 PLY		21 MM / 15 PLY		24 MM / 17 PLY		27 MM / 19 PLY		30 MM / 21 PLY	
SPAN [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]
200	29,5 d	0,7	50,6 t	0,6	62,6 t	0,5	74,3 t	0,5	85,9 t	0,4	98,0 t	0,4	109,7 t	0,4	121,3 t	0,3
250	16,9 d	0,8	31,1 d	0,8	49,8 d	0,8	59,4 t	0,7	68,8 t	0,6	78,4 t	0,6	87,7 t	0,5	97,1 t	0,5
300	10,5 d	1,0	19,8 d	1,0	32,7 d	1,0	47,7 d	1,0	57,3 t	0,9	65,3 t	0,8	73,1 t	0,7	80,9 t	0,7
350	6,9 d	1,2	13,3 d	1,2	22,4 d	1,2	33,4 d	1,2	46,1 d	1,2	56,0 t	1,1	62,7 t	1,0	69,3 t	0,9
400	4,8 d	1,3	9,3 d	1,3	15,9 d	1,3	24,1 d	1,3	33,8 d	1,3	45,4 d	1,3	54,8 t	1,3	60,7 t	1,1
450	3,4 d	1,5	6,7 d	1,5	11,7 d	1,5	17,9 d	1,5	25,4 d	1,5	34,6 d	1,5	44,6 d	1,5	53,9 t	1,5
500	2,5 d	1,7	5,0 d	1,7	8,8 d	1,7	13,6 d	1,7	19,5 d	1,7	26,8 d	1,7	34,9 d	1,7	43,9 d	1,7
600	1,5 d	2,0	3,0 d	2,0	5,3 d	2,0	8,3 d	2,0	12,1 d	2,0	16,9 d	2,0	22,3 d	2,0	28,5 d	2,0

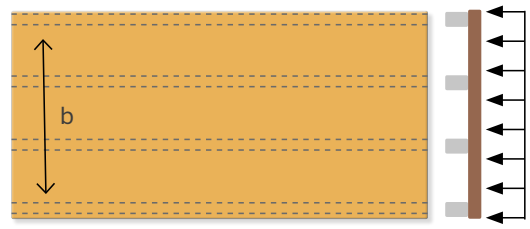
d = Deflection limitation, t = Shear strength limitation

Design nomograms

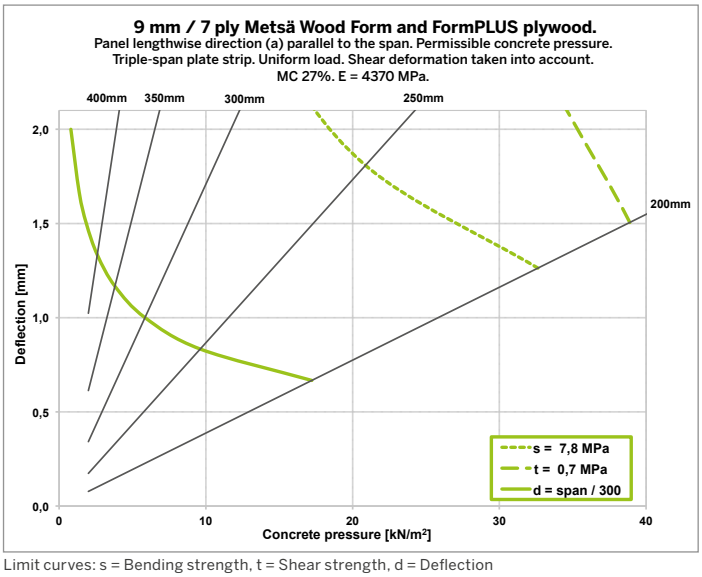
STANDARD CONSTRUCTION, DIRECTION a



STANDARD CONSTRUCTION, DIRECTION b

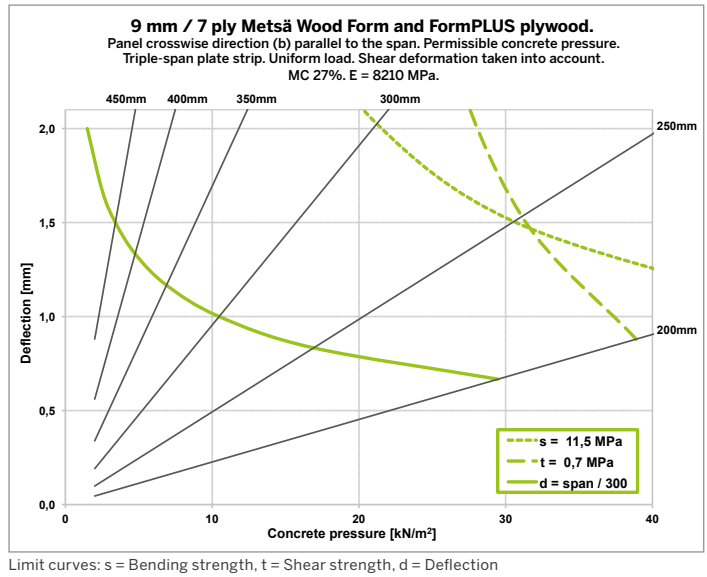


Graph 1.1



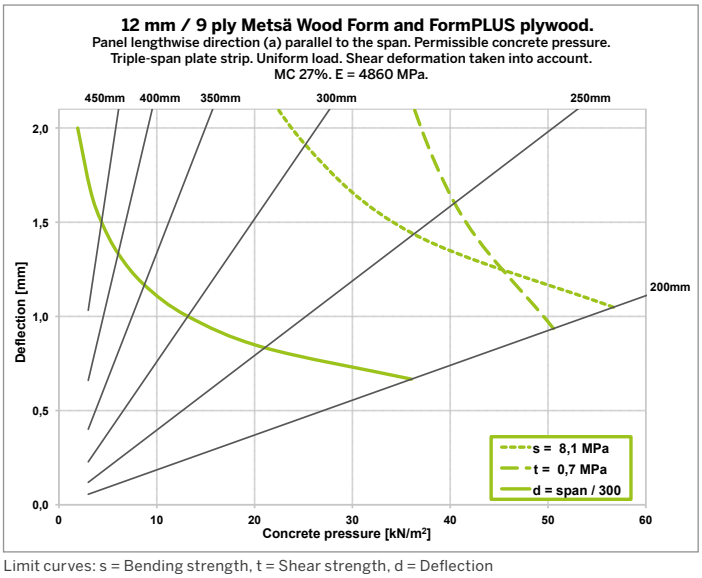
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 1.2



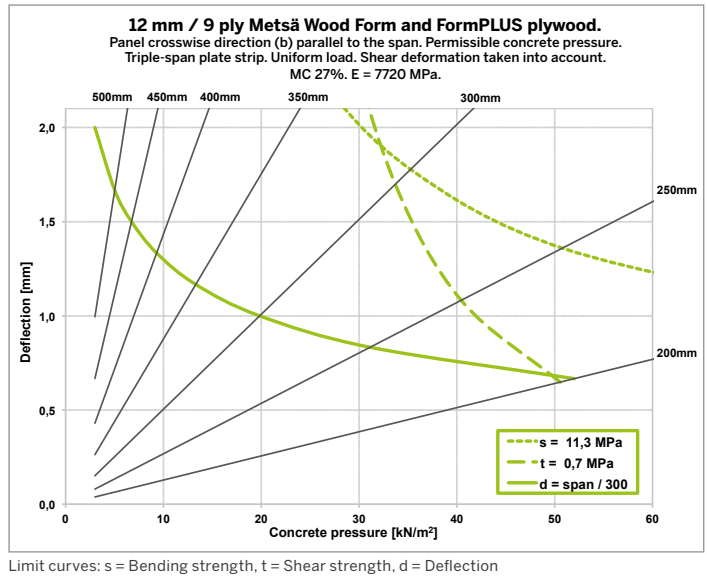
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 1.3



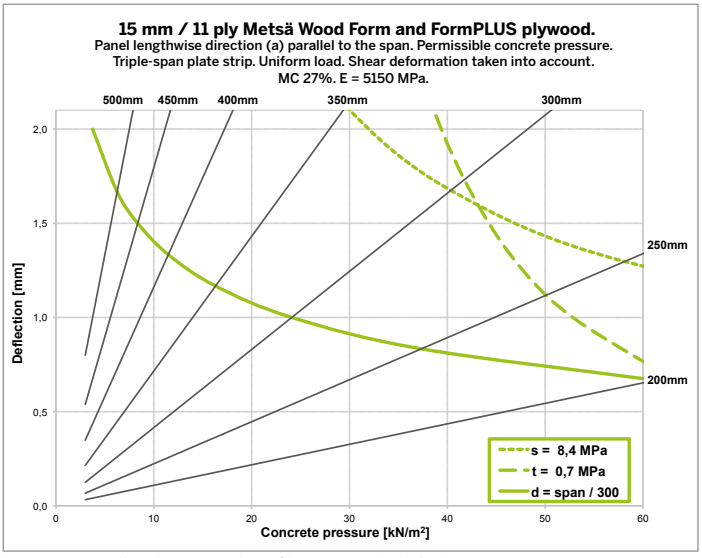
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 1.4



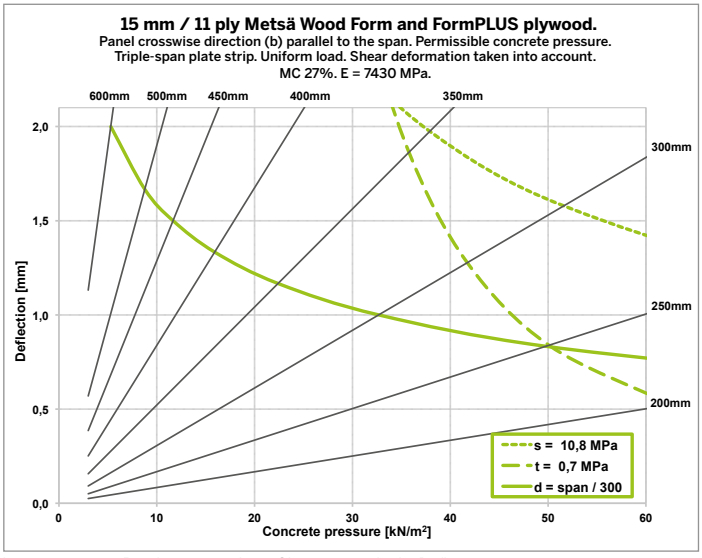
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 1.5



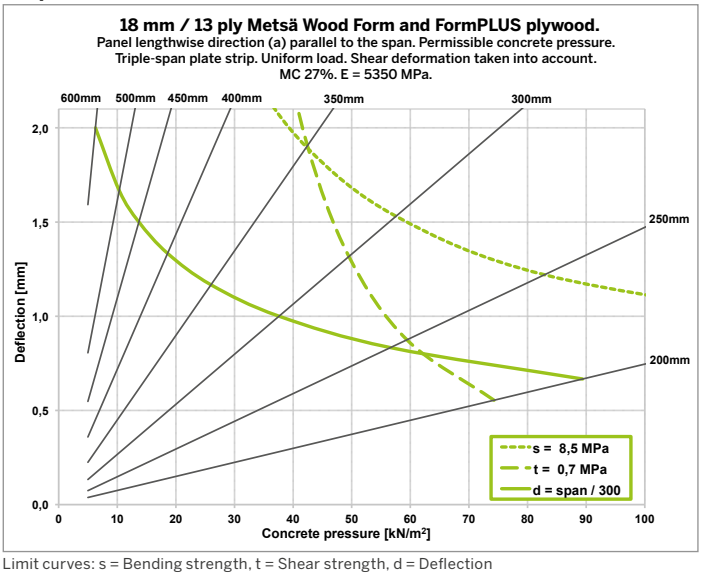
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 1.6



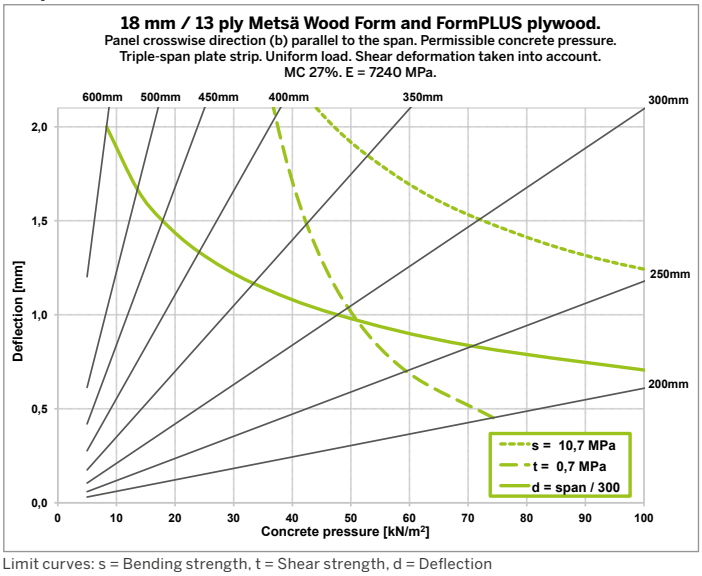
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 1.7



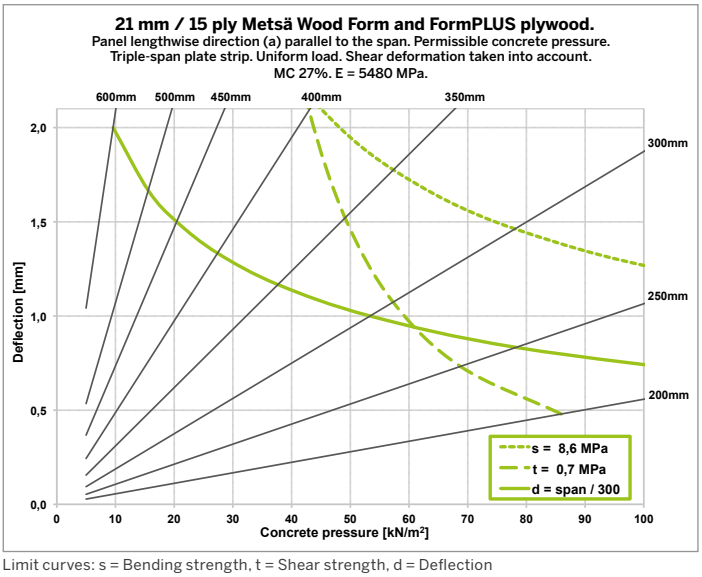
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 1.8



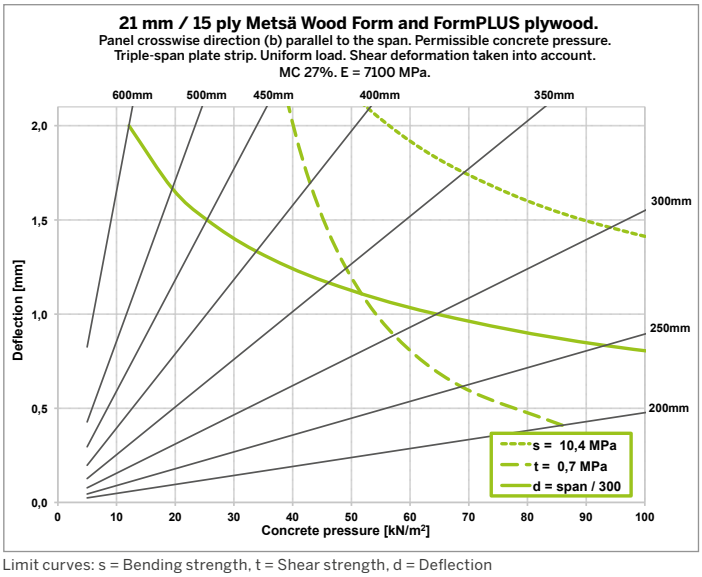
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 1.9



Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 1.10



Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Design data for Metsä Wood Form and FormPLUS S2 construction

Permissible concrete pressures

S2 CONSTRUCTION, DIRECTION **a**

Table 1.4 METSÄ WOOD FORM AND FORMPLUS S2 PLYWOOD. PERMISSIBLE CONCRETE PRESSURE q [kN/m²].

Triple-span plate strip. Panel lengthwise direction (a) parallel to the span. Uniform load.

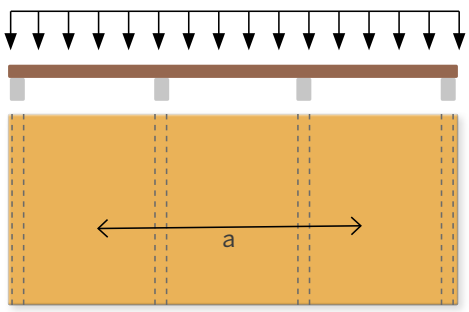
Deflection d [mm] with max. span/300 deflection limitation. Moisture content MC 27%.

	15 MM / 11 PLY		18 MM / 13 PLY		21 MM / 15 PLY	
SPAN [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]
200	62,6 t	0,5	74,3 t	0,4	85,9 t	0,4
250	50,1 t	0,8	59,4 t	0,7	68,8 t	0,6
300	34,3 d	1,0	49,5 t	1,0	57,3 t	0,8
350	23,3 d	1,2	35,7 d	1,2	49,1 t	1,1
400	16,4 d	1,3	25,8 d	1,3	36,9 d	1,3
450	12,0 d	1,5	19,2 d	1,5	27,8 d	1,5
500	9,0 d	1,7	14,6 d	1,7	21,4 d	1,7
600	5,4 d	2,0	8,9 d	2,0	13,4 d	2,0

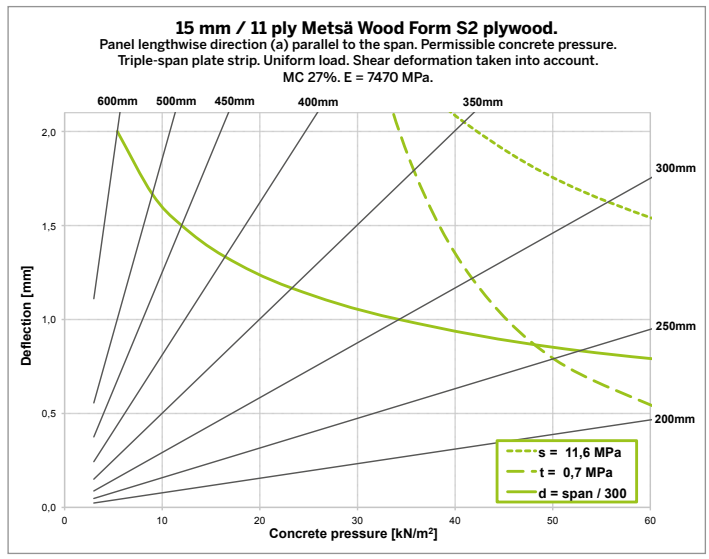
d = Deflection limitation, t = Shear strength limitation

Design nomograms

S2 CONSTRUCTION, DIRECTION **a**

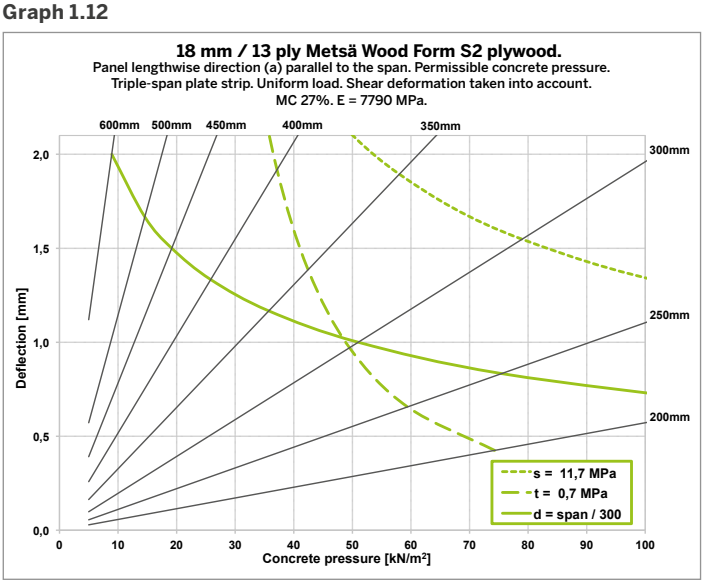


Graph 1.11



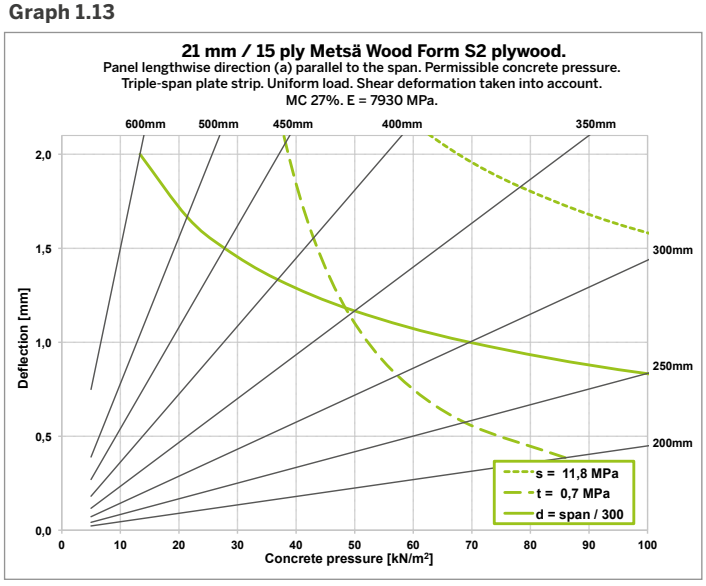
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 1.12



Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 1.13



Limit curves: s = Bending strength, t = Shear strength, d = Deflection

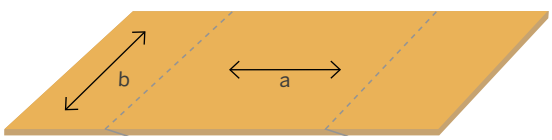
2. METSÄ WOOD XL AND KINGSIZE

Strength and elastic properties of Metsä Wood XL and KingSize plywood

Table 2.1

PRODUCT	NOMINAL THICK-NESS [mm]	THICKNESS TOLERANCE MIN. [mm]	THICKNESS TOLERANCE MAX. [mm]	MODULUS OF ELASTICITY BENDING E_m a [N/mm²]	MODULUS OF ELASTICITY BENDING E_m b [N/mm²]	CHARACTERISTIC STRENGTH BENDING f_m a [N/mm²]	CHARACTERISTIC STRENGTH BENDING f_m b [N/mm²]	MODULUS OF RIGIDITY PLANAR SHEAR G_r a [N/mm²]	MODULUS OF RIGIDITY PLANAR SHEAR G_r b [N/mm²]	CHARACTERISTIC STRENGTH PLANAR SHEAR f_r a [N/mm²]	CHARACTERISTIC STRENGTH PLANAR SHEAR f_r b [N/mm²]	APPROX. WEIGHT [kg/m²]	FACE VENEER DIRECTION
METSÄ WOOD XL AND KINGSIZE	18	16,9	18,1	10048	7452	28,1	34,1	206	183	2,67	2,34	12,2	a
	21	19,8	20,9	9858	7642	27,6	34,3	206	186	2,59	2,41	14,3	a
	27	25,0	26,8	9607	7893	26,9	34,5	205	190	2,57	2,43	18,4	a

EN 789 values. Moisture content MC 12%.



a = Panel lenghtwise direction
b = Panel crosswise direction

Design Data for Metsä Wood XL and KingSize Plywood

Permissible concrete pressures

DIRECTION a

Table 2.2 METSÄ WOOD XL AND KINGSIZE. PERMISSIBLE CONCRETE PRESSURE q [kN/m²].

Triple-span plate strip. Panel lengthwise direction (a) parallel to the span. Uniform load. Deflection d [mm] with max. span/300 deflection limitation. Moisture content MC 27%.

	18 MM / 13 PLY		21 MM / 15 PLY		27 MM / 19 PLY	
SPAN [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]
200	74,3 t	0,5	85,9 t	0,4	109,7 t	0,4
250	59,4 t	0,7	68,8 t	0,6	87,7 t	0,5
300	45,0 d	1,0	57,3 t	0,9	73,1 t	0,7
350	31,3 d	1,2	43,4 d	1,2	62,7 t	1,0
400	22,5 d	1,3	31,7 d	1,3	54,7 d	1,3
450	16,6 d	1,5	23,7 d	1,5	41,9 d	1,5
500	12,6 d	1,7	18,1 d	1,7	32,7 d	1,7
600	7,7 d	2,0	11,2 d	2,0	20,8 d	2,0

d = Deflection limitation, t = Shear strength limitation

DIRECTION b

Table 2.3 METSÄ WOOD XL AND KINGSIZE. PERMISSIBLE CONCRETE PRESSURE q [kN/m²].

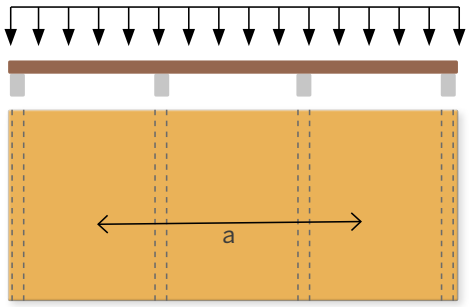
Triple-span plate strip. Panel crosswise direction (b) parallel to the span. Uniform load. Deflection d [mm] with max. span/300 deflection limitation. Moisture content MC 27%.

	18 MM / 13 PLY		21 MM / 15 PLY		27 MM / 19 PLY	
SPAN [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]
200	74,3 t	0,6	85,9 t	0,5	109,7 t	0,4
250	56,6 d	0,8	68,8 t	0,7	87,7 t	0,6
300	37,6 d	1,0	53,4 d	1,0	73,1 t	0,8
350	26,0 d	1,2	37,7 d	1,2	62,7 t	1,1
400	18,6 d	1,3	27,4 d	1,3	49,9 d	1,3
450	13,7 d	1,5	20,4 d	1,5	38,2 d	1,5
500	10,3 d	1,7	15,6 d	1,7	29,7 d	1,7
600	6,3 d	2,0	9,6 d	2,0	18,8 d	2,0

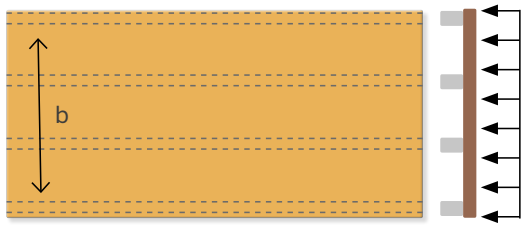
d = Deflection limitation, t = Shear strength limitation

Design nomograms

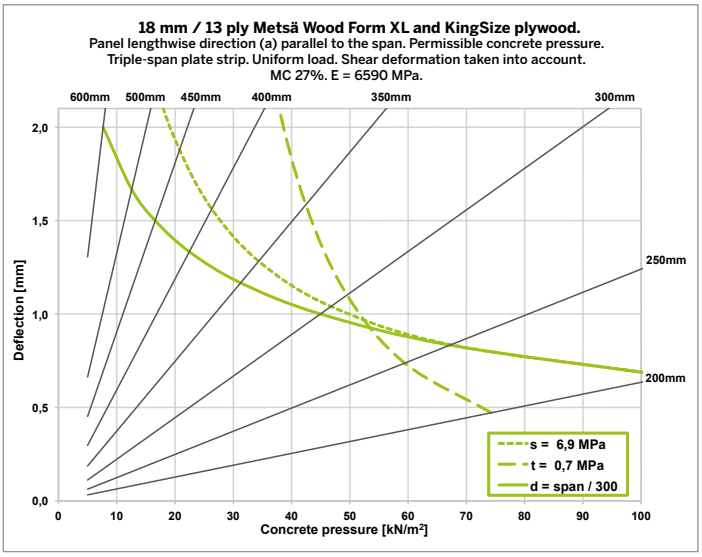
DIRECTION a



DIRECTION b

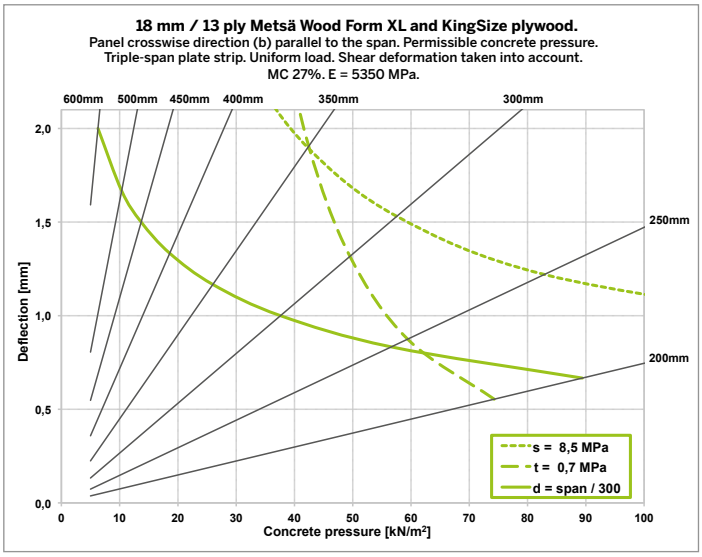


Graph 2.1



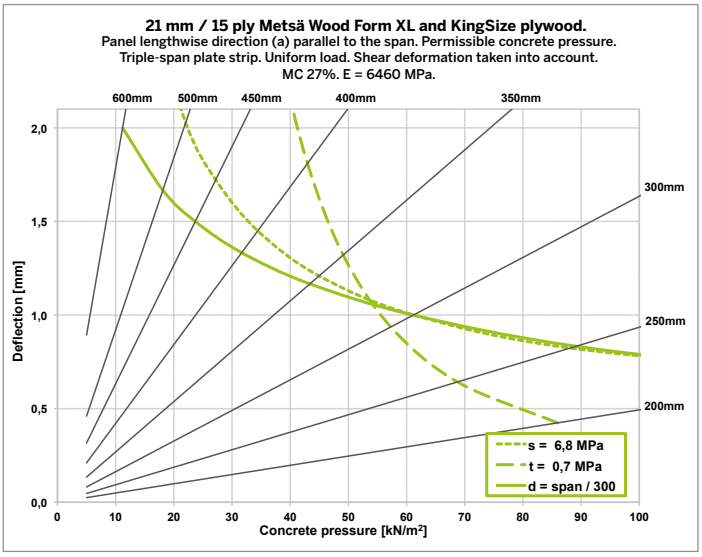
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 2.2



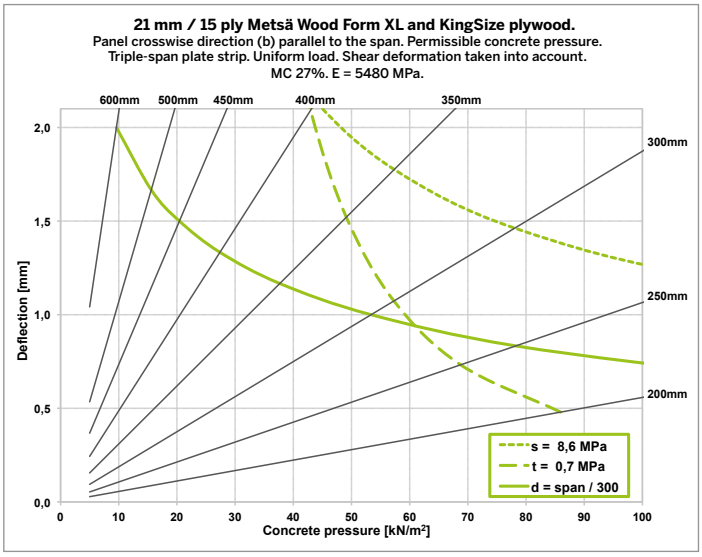
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 2.3



Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 2.4



Limit curves: s = Bending strength, t = Shear strength, d = Deflection

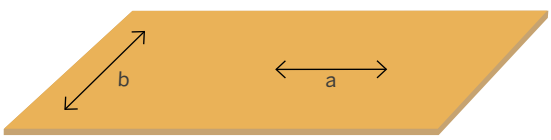
3. METSÄ WOOD SPRUCE III+/III

Strength and elastic properties of Spruce III+/III plywood

Table 3.1

PRODUCT	NOMINAL THICK-NESS [mm]	THICKNESS TOLERANCE MIN. [mm]	THICKNESS TOLERANCE MAX. [mm]	MODULUS OF ELASTICITY BENDING $E_m a$ [N/mm²]	MODULUS OF ELASTICITY BENDING $E_m b$ [N/mm²]	CHARACTERISTIC STRENGTH BENDING $f_m a$ [N/mm²]	CHARACTERISTIC STRENGTH BENDING $f_m b$ [N/mm²]	MODULUS OF RIGIDITY PLANAR SHEAR $G_r a$ [N/mm²]	MODULUS OF RIGIDITY PLANAR SHEAR $G_r b$ [N/mm²]	CHARACTERISTIC STRENGTH PLANAR SHEAR $f_r a$ [N/mm²]	CHARACTERISTIC STRENGTH PLANAR SHEAR $f_r b$ [N/mm²]	APPROX. WEIGHT [kg/m²]	FACE VENEER DIRECTION
METSÄ WOOD SPRUCE III+/III	12	11,5	12,5	8237	1363	20,6	6,5	35,5	-	0,94	-	5,5	a
	15	14,3	15,3	9237	2763	23,1	11,1	50,5	29,1	1,63	0,87	6,9	a
	18	17,1	18,1	8615	3385	21,5	12,3	71,4	24,9	1,76	0,64	8,3	a
	21	20,0	20,9	8277	3723	20,7	12,7	51,8	37,4	1,41	1,18	9,7	a

EN 789 values. Moisture content MC 10%.



a = Panel lenghtwise direction
b = Panel crosswise direction

Design Data for Metsä Wood Spruce III+/III plywood

Permissible concrete pressures

DIRECTION a

Table 3.2 METSÄ WOOD SPRUCE III+/III.
PERMISSIBLE CONCRETE PRESSURE q [kN/m²].

Triple-span plate strip. Panel lengthwise direction (a) parallel to the span. Uniform load. Deflection d [mm] with max. span/300 deflection limitation. Moisture content MC 27%.

	12 MM / 4 PLY		15 MM / 5 PLY		18 MM / 6 PLY		21 MM / 7 PLY	
SPAN [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]
200	19,0 d	0,7	31,5 t	0,6	37,9 t	0,4	44,5 t	0,5
250	12,8 d	0,8	25,2 d	0,8	30,3 t	0,6	35,6 t	0,7
300	8,9 d	1,0	17,9 d	1,0	25,3 t	0,8	29,7 t	0,9
350	6,4 d	1,2	13,1 d	1,2	21,6 t	1,2	24,9 d	1,2
400	4,7 d	1,3	9,8 d	1,3	16,2 d	1,3	19,3 d	1,3
450	3,6 d	1,5	7,5 d	1,5	12,3 d	1,5	15,2 d	1,5
500	2,8 d	1,7	5,8 d	1,7	9,6 d	1,7	12,1 d	1,7
600	1,7 d	2,0	3,7 d	2,0	6,0 d	2,0	8,0 d	2,0

d = Deflection limitation, t = Shear strength limitation

DIRECTION b

Table 3.3 METSÄ WOOD SPRUCE III+/III.
PERMISSIBLE CONCRETE PRESSURE q [kN/m²].

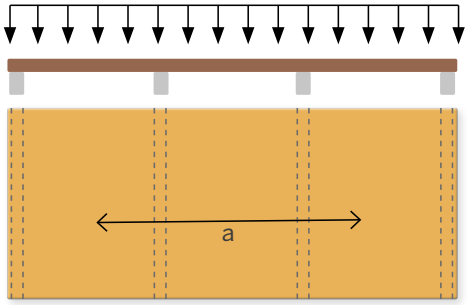
Triple-span plate strip. Panel crosswise direction (b) parallel to the span. Uniform load. Deflection d [mm] with max. span/300 deflection limitation. Moisture content MC 27%.

	12 MM / 4 PLY		15 MM / 5 PLY		18 MM / 6 PLY		21 MM / 7 PLY	
SPAN [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]	q [kN/m²]	d [mm]
200	8,6 s	0,6	16,7 d	0,7	22,0 d	0,7	39,4 d	0,7
250	4,8 d	0,8	10,7 d	0,8	15,3 d	0,8	27,3 d	0,8
300	2,8 d	1,0	7,2 d	1,0	11,0 d	1,0	19,6 d	1,0
350	1,8 d	1,2	5,0 d	1,2	8,1 d	1,2	14,4 d	1,2
400	1,2 d	1,3	3,6 d	1,3	6,1 d	1,3	10,8 d	1,3
450	0,8 d	1,5	2,7 d	1,5	4,6 d	1,5	8,3 d	1,5
500	0,6 d	1,7	2,0 d	1,7	3,6 d	1,7	6,5 d	1,7
600	0,3 d	2,0	1,2 d	2,0	2,3 d	2,0	4,1 d	2,0

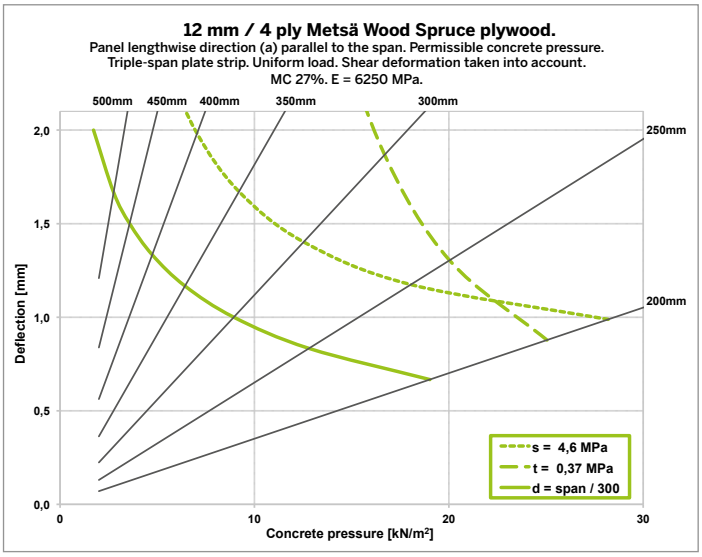
d = Deflection limitation, t = Shear strength limitation, s = Bending strength limitation

Design nomograms

DIRECTION a

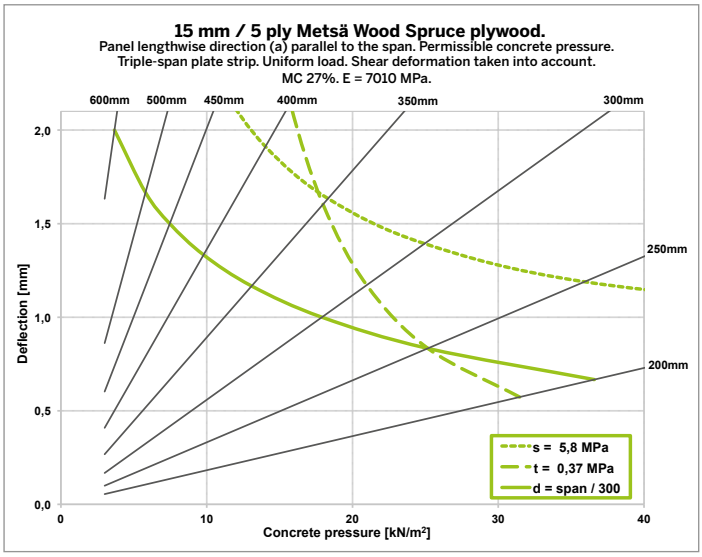


Graph 3.1



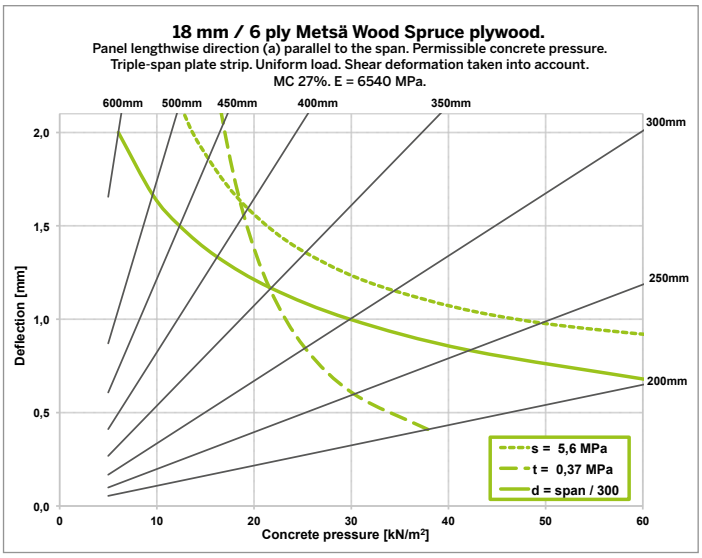
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 3.2



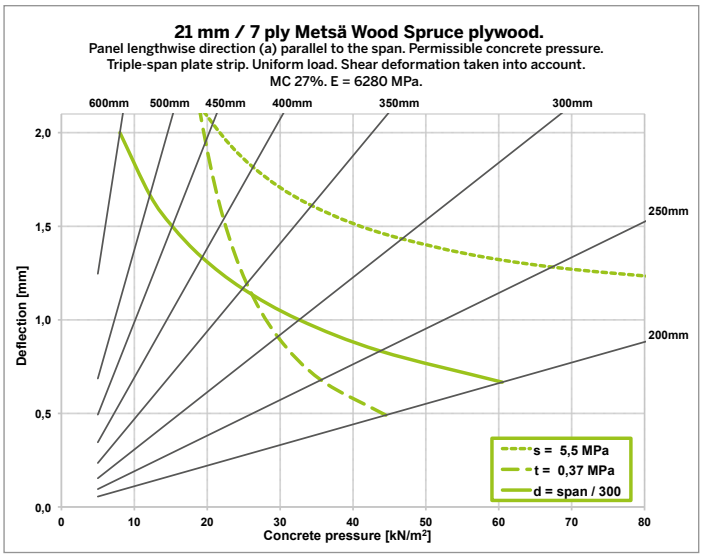
Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 3.3



Limit curves: s = Bending strength, t = Shear strength, d = Deflection

Graph 3.4



Limit curves: s = Bending strength, t = Shear strength, d = Deflection

MetsäWood

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Metsä Wood offers competitive and eco-efficient wood-based solutions for industrial construction customers, other industrial customers and the home and lifestyle sectors. We manufacture products from Nordic wood, a sustainable raw material of premium quality. Metsä Wood is part of Metsä Group.

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