



 LIGNATUR®

WORKBOOK

Characteristic properties

Charakteristische Eigenschaften

Propriétés caractéristiques

Proprietà caratteristiche

Eurocode 5 C24	SIA 265 (2002) C24	DIN 1052 (2008-12) C24
		$f_d = f_k \cdot k_{mod} / \gamma_m$
$f_{m,k} = 24.0$	$f_{m,d} = 14.0$	$f_{m,d} = 14.77$
$f_{t,0,k} = 14.0$	$f_{t,0,d} = 8.0$	$f_{t,0,d} = 8.62$
$f_{t,90,k} = 0.4$	$f_{t,90,d} = 0.1$	$f_{t,90,d} = 0.25$
$f_{c,0,k} = 21.0$	$f_{c,0,d} = 12.0$	$f_{c,0,d} = 12.92$
$f_{c,90,k} = 2.5$	$f_{c,90,d} = 1.8$	$f_{c,90,d} = 1.54$
$f_{v,k} = 2.0$	$f_{v,d} = 1.5$	$f_{v,d} = 1.23$
	$E_{0,mean} = 11'000$ $E_{90,mean} = 370$ $G_{mean} = 690$	
		$f_{d,fi} = f_{k,fi} \cdot k_{mod,fi} / \gamma_{m,fi}$
$f_{k,fi} = f_k \cdot k_{fi}$	$f_{d,fi} = 1.8 \cdot f_d$	
$k_{fi} = 1.25$		
$f_{m,k,fi} = 30.0$	$f_{m,d,fi} = 25.2$	$f_{m,d,fi} = 30.0$
$f_{t,0,k,fi} = 17.5$	$f_{t,0,d,fi} = 14.4$	$f_{t,0,d,fi} = 17.5$
$f_{t,90,k,fi} = 0.5$	$f_{t,90,d,fi} = 0.2$	$f_{t,90,d,fi} = 0.5$
$f_{c,0,k,fi} = 26.3$	$f_{c,0,d,fi} = 21.6$	$f_{c,0,d,fi} = 26.3$
$f_{c,90,k,fi} = 3.1$	$f_{c,90,d,fi} = 3.2$	$f_{c,90,d,fi} = 3.1$
$f_{v,k,fi} = 2.5$	$f_{v,d,fi} = 2.7$	$f_{v,d,fi} = 2.5$

The strength characteristics and the stiffness characteristics of the sawn timber comply with Class C24 as per Eurocode 5.

Please refer to the SIA and DIN columns as examples of how to calculate the rated strength values based on Eurocode 5 according to the SIA national standards (Switzerland) and DIN (Germany).

Die Festigkeitskennwerte und die Steifigkeitskennwerte des eingesetzten Schnittholzes entsprechen der Klasse C24 gemäss Eurocode 5.

Entnehmen Sie den Spalten SIA und DIN als Beispiel, wie Sie basierend auf dem Eurocode 5 nach den nationalen Normen SIA (Schweiz) und DIN (Deutschland) die Bemessungswerte der Festigkeiten ermitteln können.

Les valeurs caractéristiques de résistance et de rigidité du bois utilisé correspondent à la classe C24 conformément à l'Eurocode 5.

Utilisez les colonnes SIA et DIN à titre d'exemple pour définir les valeurs de calcul des résistances en vous basant sur l'Eurocode 5, conformément aux normes nationales SIA (Suisse) et DIN (Allemagne).

I valori di resistenza e rigidità del legname da taglio impiegato corrispondono alla classe C24 secondo l'Eurocodice 5.

Prendete come esempio le colonne SIA e DIN per rilevare i valori di misurazione delle resistenze in base all'Eurocodice 5 secondo le norme nazionali SIA (Svizzera) e DIN (Germania).

	Norm Strength class	Norm Festigkeitsklasse	Norme Classe de résistance	Norma Classe di resistenza
	Strength characteristics in N/mm ²	Festigkeitskennwerte in N/mm ²	Valeurs caractéristiques de résistance en N/mm ²	Valori di resistenza in N/mm ²
	Bending	Biegung	Flexion	Flessione
	Tension parallel to the fibre	Zug parallel zur Faser	Traction parallèle aux fibres	Trazione parallela alle fibre
	Tension perpendicular to the fibre	Zug senkrecht zur Faser	Traction perpendiculaire aux fibres	Trazione perpendicolare alle fibre
	Compression parallel to the fibre	Druck parallel zur Faser	Compression parallèle aux fibres	Compressione parallela alle fibre
	Compression perpendicular to the fibre	Druck senkrecht zur Faser	Compression perpendiculaire aux fibres	Compressione perpendicolare alle fibre
	Shear	Schub	Effort tranchant	Forza al taglio
	Assumption for determining the design values according to DIN $k_{mod} = 0.80, \gamma_m = 1.30$	Annahme zur Ermittlung der Bemessungswerte nach DIN $k_{mod} = 0.80, \gamma_m = 1.30$	Hypothèse pour définir les valeurs de calcul selon DIN $k_{mod} = 0.80, \gamma_m = 1.30$	Presupposto per il rilevamento dei valori di dimensionamento secondo DIN $k_{mod} = 0.80, \gamma_m = 1.30$
	Stiffness characteristics in N/mm ²	Steifigkeitskennwerte in N/mm ²	Valeurs caractéristiques de rigidité en N/mm ²	Valori di rigidità in N/mm ²
	Modulus of elasticity parallel to the fibre Modulus of elasticity perpendicular to the fibre Shear modulus	Elastizitätsmodul parallel Elastizitätsmodul rechtwinklig Schubmodul	Module d'élasticité parallèle Module d'élasticité perpendiculaire Module de tranchement	Modulo di elasticità parallelo alle fibre Modulo di elasticità perpendicolare alle fibre Modulo al taglio
	Strength characteristics under fire load in N/mm ²	Festigkeitskennwerte unter Brandbelastung in N/mm ²	Valeurs caractéristiques de résistance lors d'une exposition à un incendie en N/mm ²	Valori di resistenza con carico di incendio in N/mm ²
	Factor (20% fractile value)	Faktor (20%-Fraktilwert)	Facteur (valeur fractile 20%)	Fattore (20%-valore frattile)
	Bending	Biegung	Flexion	Flessione
	Tension parallel to the fibre	Zug parallel zur Faser	Traction parallèle aux fibres	Trazione parallela alle fibre
	Tension perpendicular to the fibre	Zug senkrecht zur Faser	Traction perpendiculaire aux fibres	Trazione perpendicolare alle fibre
	Compression parallel to the fibre	Druck parallel zur Faser	Compression parallèle aux fibres	Compressione parallela alle fibre
	Compression perpendicular to the fibre	Druck senkrecht zur Faser	Compression perpendiculaire aux fibres	Compressione perpendicolare alle fibre
	Shear	Schub	Effort tranchant	Forza al taglio
	Assumption for determining the design values according to DIN $k_{mod, fi} = 1.00, \gamma_{m, fi} = 1.00$	Annahme zur Ermittlung der Bemessungswerte nach DIN $k_{mod, fi} = 1.00, \gamma_{m, fi} = 1.00$	Supposition pour définir les valeurs de calcul selon DIN $k_{mod, fi} = 1.00, \gamma_{m, fi} = 1.00$	Presupposto per il rilevamento dei valori di dimensionamento secondo DIN $k_{mod, fi} = 1.00, \gamma_{m, fi} = 1.00$

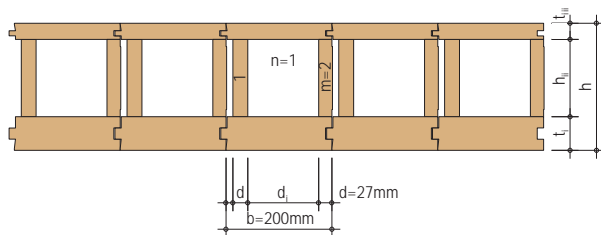


Characteristics of LIGNATUR box element

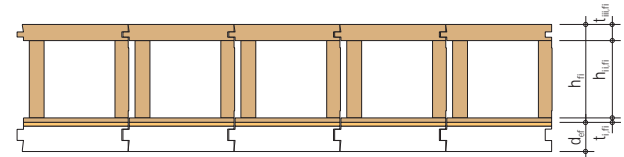
Kennwerte LIGNATUR-Kastenelement

Valeurs caractéristiques du caisson madrier LIGNATUR

Valori caratteristici elemento scatolare LIGNATUR



$\rho_{\text{Holz}} = 470\text{kg/m}^3$



REI 30	h	g	t _{III}	t _I	A _n	I _y	R _{vz,k}	R _{m,y,k}	R _{vz,d,SIA}	R _{m,y,d,SIA}
	mm	kN/m ²	mm	mm	mm ² /m ¹	mm ⁴ /m ¹ · 10 ⁶	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
	120	0.37	31	31	77'660	132.1	48	52.9	36	30.8
	140	0.39	31	31	83'060	199.8	57	68.5	43	40.0
	160	0.42	31	31	88'460	284.1	66	85.2	50	49.7
	180	0.44	31	31	93'860	386.0	75	102.9	56	60.1
	200	0.47	31	31	99'260	506.8	84	121.6	63	71.0
	220	0.49	31	31	104'660	647.4	93	141.2	70	82.4
	240	0.52	31	31	110'060	808.9	101	161.8	76	94.4
	280	0.63	40	40	134'000	1'342.7	118	230.2	88	134.3
	320	0.68	40	40	144'800	1'889.7	135	283.5	101	165.3

d _{ef}	h _{fi}	t _{I,fi}	R _{vz,k,fi}	R _{m,y,k,fi}	R _{vz,d,fi,SIA}	R _{m,y,d,fi,SIA}
mm	mm	mm	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
31	89	0	40	14.1	43	14.1
31	109	0	49	21.2	53	17.8
31	129	0	59	29.7	64	25.0
31	149	0	69	39.7	75	33.3
31	169	0	79	51.0	85	42.8
31	189	0	89	63.5	96	53.4
31	209	0	99	77.4	107	65.0
31	249	9	126	146.5	136	123.0
31	289	9	146	189.5	158	159.2

REI 60	h	g	t _{III}	t _I	A _n	I _y	R _{vz,k}	R _{m,y,k}	R _{vz,d,SIA}	R _{m,y,d,SIA}
	mm	kN/m ²	mm	mm	mm ² /m ¹	mm ⁴ /m ¹ · 10 ⁶	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
	160	0.53	31	64	112'550	306.3	63	84.5	47	49.3
	180	0.55	31	64	117'950	422.9	71	102.8	54	60.0
	200	0.58	31	64	123'350	562.4	80	122.4	60	71.4
	220	0.61	31	64	128'750	726.1	89	143.2	67	83.5
	240	0.63	31	64	134'150	915.0	98	165.1	73	96.3
	280	0.68	31	64	144'950	1'373.1	115	212.1	87	123.7
	320	0.73	31	64	155'750	1'945.9	133	263.3	100	153.6

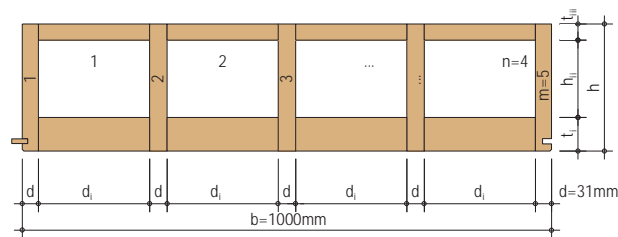
d _{ef}	h _{fi}	t _{I,fi}	R _{vz,k,fi}	R _{m,y,k,fi}	R _{vz,d,fi,SIA}	R _{m,y,d,fi,SIA}
mm	mm	mm	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
55	105	9	53	33.8	57	28.4
55	125	9	63	45.2	68	38.0
55	145	9	74	58.0	80	48.7
55	165	9	84	72.1	91	60.5
55	185	9	95	87.4	102	73.4
55	225	9	115	121.7	124	102.2
55	265	9	135	160.7	146	135.0

Characteristics of LIGNATUR surface element

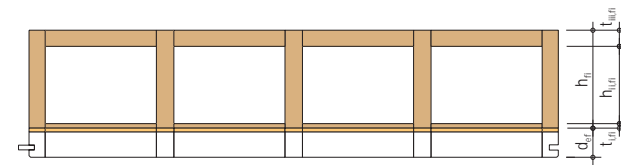
Kennwerte LIGNATUR-Flächenelement

Valeurs caractéristiques du caisson multiple LIGNATUR

Valori caratteristici elemento di superficie LIGNATUR



$\rho_{\text{Holz}} = 470\text{kg/m}^3$



REI 30

h	g	t _{iii}	t _i	A _n	I _y	R _{v,z,k}	R _{m,y,k}	R _{v,z,d,SIA}	R _{m,y,d,SIA}
mm	kN/m ²	mm	mm	mm ² /m ¹	mm ⁴ /m ¹ · 10 ⁶	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
120	0.33	31	31	70'990	130.3	28	52.1	21	30.4
140	0.35	31	31	74'090	195.3	33	66.9	25	39.1
160	0.36	31	31	77'190	275.1	39	82.5	29	48.1
180	0.38	31	31	80'290	370.3	45	98.7	33	57.6
200	0.39	31	31	83'390	481.6	50	115.6	37	67.4
220	0.41	31	31	86'490	609.6	55	133.0	42	77.6
240	0.42	31	31	89'590	754.9	61	151.0	46	88.1
280	0.45	31	31	95'790	1'099.8	71	188.5	53	110.0
320	0.48	31	31	101'990	1'521.4	82	228.2	61	133.1

d _{ef}	h _{fi}	t _{lfi}	R _{v,z,k,fi}	R _{m,y,k,fi}	R _{v,z,d,fi,SIA}	R _{m,y,d,fi,SIA}
mm	mm	mm	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
31	89	0	22	8.9	24	7.5
31	109	0	28	13.2	30	11.1
31	129	0	33	18.5	36	15.6
31	149	0	39	24.8	42	20.8
31	169	0	45	32.0	48	26.9
31	189	0	51	40.0	55	33.6
31	209	0	56	48.8	61	41.0
31	249	0	68	68.9	74	57.8
31	289	0	80	92.0	86	77.3

REI 60

160	0.49	31	64	105'075	299.2	37	81.0	28	47.3
180	0.51	31	64	108'175	410.2	42	97.5	31	56.9
200	0.52	31	64	111'275	541.7	47	114.9	35	67.0
220	0.54	31	64	114'375	694.5	53	133.1	39	77.6
240	0.55	31	64	117'475	869.2	58	152.0	43	88.7
280	0.58	31	64	123'675	1'287.1	69	192.0	51	112.0
320	0.61	31	64	129'875	1'801.0	79	234.7	59	136.9

55	105	9	31	29.4	34	24.7
55	125	9	38	38.4	41	32.3
55	145	9	44	48.4	48	40.6
55	165	9	50	59.2	54	49.7
55	185	9	57	70.8	61	59.4
55	225	9	69	96.3	75	80.9
55	265	9	81	124.8	88	104.8

REI 90

200	0.63	40	82	134'090	589.9	46	128.3	34	74.9
220	0.64	40	82	137'190	762.5	51	149.2	38	87.0
240	0.66	40	82	140'290	961.1	56	171.0	42	99.7
280	0.69	40	82	146'490	1'439.0	67	217.0	50	126.6
320	0.72	40	82	152'690	2'029.4	78	266.1	58	155.2

79	121	3	34	23.5	37	19.7
79	141	3	39	30.6	43	25.7
79	161	3	45	38.6	49	32.5
79	201	3	57	57.5	61	48.3
79	241	3	68	79.9	74	67.1

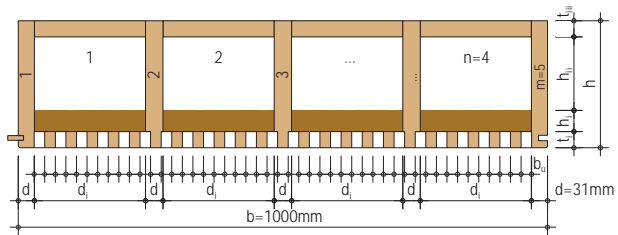


Characteristics of LIGNATUR surface element acoustics type 3

Kennwerte LIGNATUR-Flächenelement Akustiktyp 3

Valeurs caractéristiques du caisson multiple LIGNATUR type acoustique 3

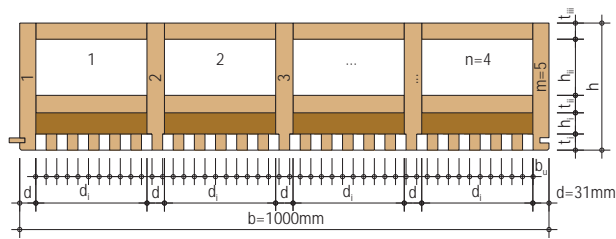
Valori caratteristici elemento di superficie LIGNATUR tipo acustica 3



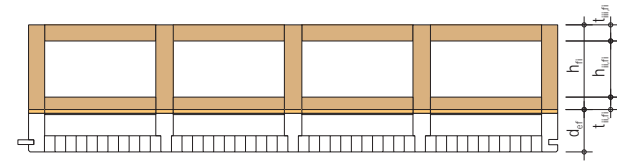
$$\rho_{\text{Holz}} = 470\text{kg/m}^3$$

$$\rho_{\text{Absorber}} = 110\text{kg/m}^3$$

h	g	t _{III}	h _I	t _I	b _u	A _n	I _y	R _{v,z,k}	R _{m,y,k}	R _{v,z,d,SIA}	R _{m,y,d,SIA}
mm	kN/m ²	mm	mm	mm	mm	mm ² /m ¹	mm ⁴ /m ¹ · 10 ⁹	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
120	0.37	31	40	31	480	56'110	91.8	27	30.7	21	17.9
140	0.39	31	40	31	480	59'210	138.8	33	39.8	25	23.2
160	0.40	31	40	31	480	62'310	197.2	38	49.6	28	28.9
180	0.41	31	40	31	480	65'410	267.7	43	60.1	32	35.0
200	0.43	31	40	31	480	68'510	351.1	48	71.2	36	41.5
220	0.44	31	40	31	480	71'610	447.9	54	82.9	40	48.4
240	0.46	31	40	31	480	74'710	558.8	59	95.2	44	55.6
280	0.49	31	40	31	480	80'910	825.5	69	121.6	52	71.0
320	0.52	31	40	31	480	87'110	1'156.4	79	150.3	59	87.7



$\rho_{\text{Holz}} = 470\text{kg/m}^3$
 $\rho_{\text{Absorber}} = 110\text{kg/m}^3$



REI 30

h	g	t _{III}	t _{II}	h _I	t _I	b _u	A _n	I _y	R _{v,z,k}	R _{m,y,k}	R _{v,z,d,SIA}	R _{m,y,d,SIA}
mm	kN/m ²	mm	mm	mm	mm	mm	mm ² /m ¹	mm ⁴ /m ¹ · 10 ⁸	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
200	0.56	31	33	40	31	480	96'395	372.5	44	81.7	33	47.7
220	0.57	31	33	40	31	480	99'495	486.1	49	99.0	37	57.8
240	0.59	31	33	40	31	480	102'595	619.1	54	117.6	40	68.6
280	0.62	31	33	40	31	480	108'795	946.0	64	158.1	48	92.2
320	0.65	31	33	40	31	480	114'995	1'358.4	74	202.4	55	118.0

REI 60

200	0.56	31	33	40	31	480	96'395	372.5	44	81.7	33	47.7
220	0.57	31	33	40	31	480	99'495	486.1	49	99.0	37	57.8
240	0.59	31	33	40	31	480	102'595	619.1	54	117.6	40	68.6
280	0.62	31	33	40	31	480	108'795	946.0	64	158.1	48	92.2
320	0.65	31	33	40	31	480	114'995	1'358.4	74	202.4	55	118.0

d _{ef}	h _{fi}	t _{fl,fi}	R _{v,z,k,fi}	R _{m,y,k,fi}	R _{v,z,d,fi,SIA}	R _{m,y,d,fi,SIA}
mm	mm	mm	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
80	120	24	36	58.8	39	49.4
80	140	24	43	74.8	46	62.8
80	160	24	49	91.5	53	91.5
80	200	24	63	127.4	68	107.0
80	240	24	76	166.1	82	166.1

104	96	0	25	10.3	26	8.6
104	116	0	30	15.0	32	12.6
104	136	0	35	20.6	38	17.3
104	176	0	47	34.7	51	29.1
104	216	0	58	52.1	63	43.8

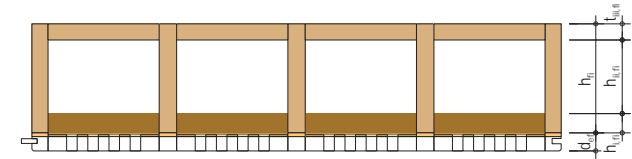
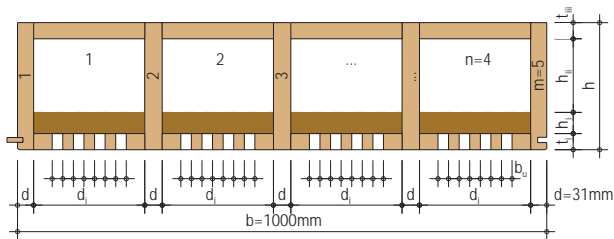


Characteristics of LIGNATUR surface element acoustics type 3.1

Kennwerte LIGNATUR-Flächenelement Akustiktyp 3.1

Valeurs caractéristiques du caisson multiple LIGNATUR type acoustique 3.1

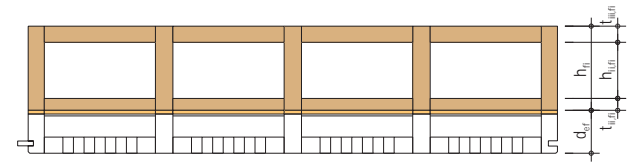
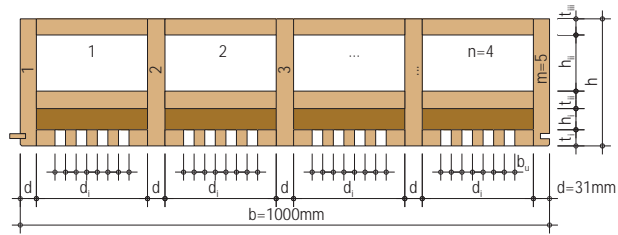
Valori caratteristici elemento di superficie LIGNATUR tipo acustica 3.1



$\rho_{\text{Holz}} = 470 \text{ kg/m}^3$
 $\rho_{\text{Absorber}} = 110 \text{ kg/m}^3$

REI 30	h	g	t_{fl}	h_{fl}	t_{fl}	b_{fl}	A_{fl}	I_{fl}	$R_{\text{v,z,k}}$	$R_{\text{m,y,k}}$	$R_{\text{v,z,d,fl,SIA}}$	$R_{\text{m,y,d,fl,SIA}}$
	mm	kN/m ²	mm	mm	mm	mm	mm ² /m ²	mm ⁴ /m ² · 10 ⁹	kN/m ²	kNm/m ²	kN/m ²	kNm/m ²
120	0.37	31	40	31	320	61'070	106.6	28	38.1	21	22.2	
140	0.39	31	40	31	320	64'170	160.4	33	49.1	25	28.6	
160	0.40	31	40	31	320	67'270	226.9	39	60.8	29	35.5	
180	0.41	31	40	31	320	70'370	306.7	44	73.2	33	42.7	
200	0.43	31	40	31	320	73'470	400.4	49	86.3	37	50.3	
220	0.44	31	40	31	320	76'570	508.7	54	99.9	41	58.3	
240	0.46	31	40	31	320	79'670	632.3	60	114.1	45	66.5	
280	0.49	31	40	31	320	85'870	927.5	70	144.2	52	84.1	
320	0.52	31	40	31	320	92'070	1'291.1	80	176.5	60	103.0	

d_{ef}	h_{fl}	h_{fl}	$R_{\text{v,z,k,fl}}$	$R_{\text{m,y,k,fl}}$	$R_{\text{v,z,d,fl,SIA}}$	$R_{\text{m,y,d,fl,SIA}}$
mm	mm	mm	kN/m ²	kNm/m ²	kN/m ²	kNm/m ²
34	86	37	21	8.3	23	7.0
34	106	37	27	12.5	30	10.5
34	126	37	33	17.7	35	14.9
34	146	37	38	23.8	41	20.0
34	166	37	44	30.8	47	25.9
34	186	37	50	38.7	54	32.5
34	206	37	55	47.4	60	39.8
34	246	37	67	67.2	73	56.5
34	286	37	79	90.1	85	75.7



$\rho_{\text{Holz}} = 470 \text{ kg/m}^3$
 $\rho_{\text{Absorber}} = 110 \text{ kg/m}^3$

	h	g	t_{iii}	t_{ii}	h_i	t_i	b_u	A_n	I_y	$R_{v,z,k}$	$R_{m,y,k}$	$R_{v,z,d,\text{SIA}}$	$R_{m,y,d,\text{SIA}}$
	mm	kN/m ²	mm	mm	mm	mm	mm	mm ² /m ¹	mm ⁴ /m ¹ · 10 ⁸	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
REI 60	200	0.56	31	33	40	31	320	101'355	414.5	46	94.9	35	55.4
	220	0.57	31	33	40	31	320	104'455	535.9	51	113.9	38	66.4
	240	0.59	31	33	40	31	320	107'555	677.6	55	134.2	41	78.3
	280	0.62	31	33	40	31	320	113'755	1'024.2	65	173.1	49	101.0
	320	0.65	31	33	40	31	320	119'955	1'459.7	75	212.4	56	123.9

d_{ef}	h_{fi}	$t_{\text{ii,fi}}$	$R_{v,z,k,fi}$	$R_{m,y,k,fi}$	$R_{v,z,d,fi,\text{SIA}}$	$R_{m,y,d,fi,\text{SIA}}$
mm	mm	mm	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
81	119	23	35	58.9	38	47.8
81	139	23	42	72.5	46	60.9
81	159	23	49	88.8	53	74.6
81	199	23	63	123.8	68	104.0
81	239	23	76	161.6	82	135.8

	h	g	t_{iii}	t_{ii}	h_i	t_i	b_u	A_n	I_y	$R_{v,z,k}$	$R_{m,y,k}$	$R_{v,z,d,\text{SIA}}$	$R_{m,y,d,\text{SIA}}$
	mm	kN/m ²	mm	mm	mm	mm	mm	mm ² /m ¹	mm ⁴ /m ¹ · 10 ⁸	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
REI 90	200	0.67	40	42	40	40	320	121'290	457.4	45	100.9	34	58.9
	220	0.68	40	42	40	40	320	124'390	591.2	50	121.6	37	70.9
	240	0.70	40	42	40	40	320	127'490	749.0	55	144.1	41	84.1
	280	0.73	40	42	40	40	320	133'690	1'139.0	64	193.7	48	113.0
	320	0.75	40	42	40	40	320	139.890	1'632.7	74	241.7	55	141.0

d_{ef}	h_{fi}	$t_{\text{ii,fi}}$	$R_{v,z,k,fi}$	$R_{m,y,k,fi}$	$R_{v,z,d,fi,\text{SIA}}$	$R_{m,y,d,fi,\text{SIA}}$
mm	mm	mm	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
104	96	18	28	35.9	30	30.1
104	116	18	34	48.2	37	40.5
104	136	18	41	61.5	44	51.7
104	176	18	54	91.1	58	76.5
104	216	18	67	123.9	72	104.1

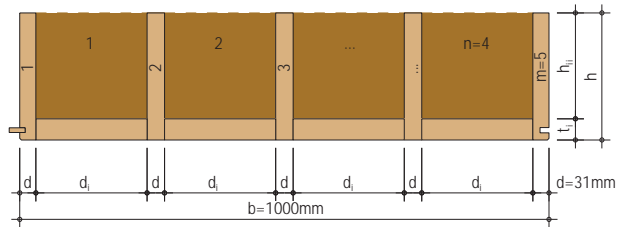


Characteristics of LIGNATUR shell element

Kennwerte LIGNATUR-Schalenelement

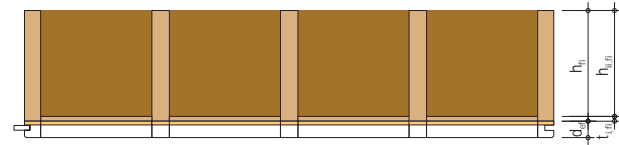
Valeurs caractéristiques de la coque LIGNATUR

Valori caratteristici elemento a guscio LIGNATUR



$$\rho_{\text{Holz}} = 470 \text{ kg/m}^3$$

$$\rho_{\text{Isolation}} = 55 \text{ kg/m}^3$$



h	g	t _i	A _n	I _y	R _{v,z,k}	R _{m,y,k}	R _{v,z,d,SIA}	R _{m,y,d,SIA}
mm	kN/m ²	mm	mm ² /m ¹	mm ⁴ /m ¹ · 10 ⁶	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
200	0.35	31	57'195	206.8	43	35.8	32	20.9
240	0.40	31	63'395	348.5	52	51.3	39	29.9

d _{ef}	h _{fi}	t _{l,fi}	R _{v,z,k,fi}	R _{m,y,k,fi}	R _{v,z,d,fi,SIA}	R _{m,y,d,fi,SIA}
mm	mm	mm	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
31	169	9	48	29.3	51	24.6
31	209	9	59	43.6	64	36.6

REI 30	h	g	t _i	A _n	I _y	R _{v,z,k}	R _{m,y,k}	R _{v,z,d,SIA}	R _{m,y,d,SIA}
	mm	kN/m ²	mm	mm ² /m ¹	mm ⁴ /m ¹ · 10 ⁶	kN/m ¹	kNm/m ¹	kN/m ¹	kNm/m ¹
	200	0.38	40	64'800	211.3	42	35.8	32	20.9
	240	0.43	40	71'000	360.2	51	51.6	38	30.1

31	169	9	48	29.3	51	24.6
31	209	9	59	43.6	64	36.6

Overview of formulas

Übersicht Formeln

Récapitulatif des formules

Panoramica delle formule

A_n	$= b \cdot h - (n \cdot d) \cdot (h_{ii} + h_i) - b_u \cdot t_i$
A_k	$= (b - m \cdot d) \cdot h_{ii}$
A_A	$= (b - m \cdot d) \cdot h_i$
g	$= (A_b \cdot \rho_{Holz} + A_k \cdot \rho_{Isolation} + A_A \cdot \rho_{Absorber}) / 1000^2 / b \cdot 1000$
s_y	$= (m \cdot d \cdot h^2 / 2 + (n \cdot d_i - b_u) \cdot t_i^2 / 2 + n \cdot d_i \cdot t_{ii} \cdot (t_i + h_i + t_{ii} / 2) + n \cdot d_i \cdot t_{iii} \cdot (h - t_{iii} / 2)) / A_n$
l_y	$= m \cdot d \cdot h^3 / 12 + m \cdot d \cdot h \cdot (h / 2 - s_y)^2 + (n \cdot d_i - b_u) \cdot t_i^3 / 12 + (n \cdot d_i - b_u) \cdot t_i \cdot (s_y - t_i / 2)^2 + n \cdot d_i \cdot t_{ii}^3 / 12 + n \cdot d_i \cdot t_{ii} \cdot (s_y - t_i - h_i - t_{ii} / 2)^2 + n \cdot d_i \cdot t_{iii}^3 / 12 + n \cdot d_i \cdot t_{iii} \cdot (h - s_y - t_{iii} / 2)^2$
S_y ($s_y \leq t_i$)	$= m \cdot d \cdot s_y^2 / 2 + (n \cdot d_i - b_u) \cdot s_y^2 / 2$
S_y ($t_i < s_y \leq t_i + h_i$)	$= m \cdot d \cdot s_y^2 / 2 + (n \cdot d_i - b_u) \cdot t_i \cdot (s_y - t_i / 2)$
S_y ($t_i + h_i < s_y \leq t_i + h_i + t_{ii}$)	$= m \cdot d \cdot s_y^2 / 2 + (n \cdot d_i - b_u) \cdot t_i \cdot (s_y - t_i / 2) + n \cdot d_i \cdot (s_y - (t_i + h_i))^2 / 2$
S_y ($t_i + h_i + t_{ii} < s_y \leq h - t_{iii}$)	$= m \cdot d \cdot (h - s_y)^2 / 2 + n \cdot d_i \cdot t_{iii} \cdot (h - s_y - t_{iii} / 2)$
S_y ($h - t_{iii} \leq s_y$)	$= m \cdot d \cdot (h - s_y)^2 / 2 + n \cdot d_i \cdot (h - s_y)^2 / 2$
A_w	$= m \cdot d \cdot l / S_y$
$R_{v,z,k}$	$= A_w \cdot f_{v,k}$
$R_{m,y,k}$	$= \text{MIN}(l_y / (h - s_y) \cdot f_{m,k}'; l_y / S_y \cdot f_{m,k})$
$R_{v,z,d,SIA}$	$= A_w \cdot f_{v,d}$
$R_{m,y,d,SIA}$	$= \text{MIN}(l_y / (h - s_y) \cdot f_{m,d}'; l_y / S_y \cdot f_{m,d})$
$A_{n,fi}$	$= b \cdot h_{fi} - (n \cdot d) \cdot (h_{ii} + h_{i,fi}) - b_u \cdot t_{i,fi}$
$s_{y,fi}$	$= (m \cdot d \cdot h_{fi}^2 / 2 + (n \cdot d_i - b_u) \cdot t_{i,fi}^2 / 2 + n \cdot d_i \cdot t_{ii,fi} \cdot (t_{i,fi} + h_{i,fi} + t_{ii,fi} / 2) + n \cdot d_i \cdot t_{iii,fi} \cdot (h_{fi} - t_{iii,fi} / 2)) / A_{n,fi}$
$l_{y,fi}$	$= m \cdot d \cdot h_{fi}^3 / 12 + m \cdot d \cdot h_{fi} \cdot (h_{fi} / 2 - s_{y,fi})^2 + (n \cdot d_i - b_u) \cdot t_{i,fi}^3 / 12 + (n \cdot d_i - b_u) \cdot t_{i,fi} \cdot (s_{y,fi} - t_{i,fi} / 2)^2 + n \cdot d_i \cdot t_{ii,fi}^3 / 12 + n \cdot d_i \cdot t_{ii,fi} \cdot (s_{y,fi} - t_{i,fi} - h_{i,fi} - t_{ii,fi} / 2)^2 + n \cdot d_i \cdot t_{iii,fi}^3 / 12 + n \cdot d_i \cdot t_{iii,fi} \cdot (h_{fi} - s_{y,fi} - t_{iii,fi} / 2)^2$
$S_{y,fi}$ ($s_{y,fi} \leq t_{i,fi}$)	$= m \cdot d \cdot s_{y,fi}^2 / 2 + (n \cdot d_i - b_u) \cdot s_{y,fi}^2 / 2$
$S_{y,fi}$ ($t_{i,fi} < s_{y,fi} \leq t_{i,fi} + h_{i,fi}$)	$= m \cdot d \cdot s_{y,fi}^2 / 2 + (n \cdot d_i - b_u) \cdot t_{i,fi} \cdot (s_{y,fi} - t_{i,fi} / 2)$
$S_{y,fi}$ ($t_{i,fi} + h_{i,fi} < s_{y,fi} \leq t_{i,fi} + h_{i,fi} + t_{ii,fi}$)	$= m \cdot d \cdot s_{y,fi}^2 / 2 + (n \cdot d_i - b_u) \cdot t_{i,fi} \cdot (s_{y,fi} - t_{i,fi} / 2) + n \cdot d_i \cdot (s_{y,fi} - (t_{i,fi} + h_{i,fi}))^2 / 2$
$S_{y,fi}$ ($t_{i,fi} + h_{i,fi} + t_{ii,fi} < s_{y,fi} \leq h_{fi} - t_{iii,fi}$)	$= m \cdot d \cdot (h_{fi} - s_{y,fi})^2 / 2 + n \cdot d_i \cdot t_{iii,fi} \cdot (h_{fi} - s_{y,fi} - t_{iii,fi} / 2)$
$S_{y,fi}$ ($h_{fi} - t_{iii,fi} \leq s_{y,fi}$)	$= m \cdot d \cdot (h_{fi} - s_{y,fi})^2 / 2$
$A_{w,fi}$	$= m \cdot d \cdot l_{y,fi} / S_{y,fi}$
$R_{v,z,k,fi}$	$= A_{w,fi} \cdot f_{v,k,fi}$
$R_{m,y,k,fi}$	$= \text{MIN}(l_{y,fi} / (h_{fi} - s_{y,fi}) \cdot f_{m,k,fi}'; l_{y,fi} / S_{y,fi} \cdot f_{m,k,fi})$
$R_{v,z,d,fi,SIA}$	$= A_{w,fi} \cdot f_{v,d,fi}$
$R_{m,y,d,fi,SIA}$	$= \text{MIN}(l_{y,fi} / (h_{fi} - s_{y,fi}) \cdot f_{m,d,fi}'; l_{y,fi} / S_{y,fi} \cdot f_{m,d,fi})$





6th edition
6. Auflage
6^{ème} édition
6^a edizione

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