N141DZW0/7749 HEL

Certificate No.:

Test Certificate for Plywood

Page 1 of 1 General Data Plandienst, Tannheim, Germany VSO17111 Ordered by Order no. Koskisen Oy, birch product industry, Hirvensalmi, Finland Manufacturer Aviation plywood Item 136/306,0 2017-02-23 total number / area Date of test Test requirements Rules for classification and Construction, II – Materials and Welding, Part 2, Chapter 2. Marking by Angular GL stamp Manufacturer's symbol Aircraft plywood Koskisen Oy Quality Strength group F 1 **Thickness** Ply Birch GL I / II Type Germanischer Lloyd Date 2017-02-23

Remarks The results of the individual testing are available at Germanischer Lloyd. The attached list gives information on type of plywood, plate scantlings and numbers of plates, as well as mean values of plywood and gluing strength of tested plates.

This is to certify that the material as described in the attached Particulars has been tested by our Surveyor / DNV GL Representative. The test results complied with the Material Rules of Germanischer Lloyd.

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This Certification is only valid in connection with the attached document. F149AE

Certificate no.

Helsinki/2017-04-20

Place/Date

yrki Viherto

Stamp Name and Signature of DNV GL Representative

Enclosures 2 pcs

DNV-GL

Listing of the tested plywood

Supplemental sheet 1 for certificate No.:

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Wood type of	Number	Specimen	Plywoo	d strength	Glue	Order No.			
the outer layer	dimension	of	No.	-		bonding			
	[cm]	panels				strength			
Birch GL I / II	150x150	I: 12 II: -	1	126,7	75,7	4,21	17111 17111		
Birch GL I / II	150x150	I: 12 II: -	2	135,0	72,8	3,96			
1.0 mm Birch 3 Ply GL I / II 1.2 mm Birch		I: 51 II: -	3	111,2	75,5	3,60	17111		
Birch GL I / II	150x150	I: 23 II: -	4	108,4	81,3	2,93	17111		
Birch GL I / II	150x150	I: 16 II: -	5	88,4	83,4	4,01	17111		
Birch GL I / II	150x150	l: 11 ll: -	9	83,2	96,9	3,05	17111		
Birch GL I / II	150x150	I: 10 II: 1	10	78,6	79,5	3,79	17111		
							EGUARO		
,						MENT	18/		
						Z OR	DNV-GL		
	Birch GL I / II	[cm] Birch GL I / II Birch 150x150 GL I / II Birch 150x150 GL I / II Birch 150x150	[cm] panels Birch 150x150 I: 12 GL I / II II: - Birch 150x150 I: 12 GL I / II II: - Birch 150x150 I: 51 GL I / II II: - Birch 150x150 I: 23 GL I / II II: - Birch 150x150 I: 16 GL I / II II: - Birch 150x150 I: 16 GL I / II II: - Birch 150x150 I: 11 Birch 150x150 I: 11 Birch 150x150 I: 11 Birch 150x150 I: 11	Birch 150x150 I: 12 1 GL I / II 150x150 I: 12 2 Birch 150x150 I: 51 3 GL I / II 150x150 I: 51 3 GL I / II 150x150 I: 23 4 GL I / II 150x150 I: 16 5 GL I / II II: - 9 Birch 150x150 I: 11 9 GL I / II II: - 150x150 I: 10 10	[cm] panels Birch 150x150 I: 12 1 126,7 GL I / II 150x150 I: 12 2 135,0 GL I / II 150x150 I: 51 3 111,2 Birch 150x150 I: 23 4 108,4 GL I / II 150x150 I: 16 5 88,4 GL I / II 150x150 I: 11 9 83,2 GL I / II II: - 150x150 I: 10 10 78,6	[cm] panels	Com panels		

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Germanischer Lloyd

Moisture;	P9 15,0 4.0 mm 8 Ply	P5 25,0 1.5 mm 5 Ply 16 Sheet Moisture	P4 25,0 1.2 mm 3 Ply 23 Sheet Moisture	1.0 mm 3 Ply 51 Sheet Moisture	P2 25,0 0.8 mm 3 Ply 12 sheet Moisture	P1 25,0 0.6 mm 3 Ply 12 Sheet Moisture	Requirements Test No Width	Aircraft Plywood
5,10 %	4,000	5,2 %	5,40 %	5,20 %	5,70 %	5,50 %	Thickness Area	Manu
	60,0 5	37,5	30,0	25,0 2	20,0	15,0	Plywoo Longitu Added N	Manufacturer:
Added	5159,52 8 4473,73 7 5340,25 8	3340,75 8 3385,75 9 3224,02 8	3216,72 10 3111,52 10 3431,83 11 Added	2692,33 10 2828,76 11 2818,07 11 Added	2674,50 13 2884,92 14 2540,51 12 Added	2036,66 13 1862,19 12 1801,21 12 Added	d - Tensile Idinal N/m	
180	86,0 74,6 89,0	89,1 90,3 86,0 87,0 87,0 88,0	107,2 103,7 114,4 2d 189,8	107,7 113,2 112,7 112,7 186,7	133,7 144,2 127,0 127,0 207,8	135,8 124,1 120,1 120,1 ad 202,4	test 70,0 N/mm² 140,0 N/mm² m2 Average	Test Report Koskisen Oy
180,0 N/mm ²	5272,80 83,2 6437,42 5724,95	88,4 3085,86 3169,33 171,9 N/mm ²	2323,89 108,4 2466,55 2528,66 189,8 N/mm ²	2076,01 1,2 1715,11 1870,36 3,7 N/mm ²	1382,14 135,0 1580,75 1405,25 207,8 N/mm ²	1148,22 126,7 1018,04 1240,03 202,4 N/mm ²	Transverse N	eport n oy
6 X 6	87,9 107,3 95,4	83, <u>5</u> 82, <u>3</u> 84, <u>5</u>	77,5 82,2 84,3	83,0 68,6 74,8	69,1 79,0 70,3	76,5 67,9 82,7	45,0 N/mm ² N/mm2 Average	
	96,9	83,4	81,3	75,5	72,8	75,7	n ² Lap-Si age Width	
	25,0 6	25,0] 4	25,0] 4	25,0	25,0	25,0	shear test Length	,
	6,0 150,0	4,0 100,0	4,0 100,0	4,0 100,0	4,0 100,0	3,0 75,0	Area	Appendix t Supplemer
450,00 505,00		419,00 440,00 378,00 407,00 362,00	315,00 308,00 281,00 292,00 271,00	344,00 380,00 355,00 350,00 372,00	288,00 296,00 285,00 285,00 332,00	317,00 303,00 314,00 346,00 300,00	Wet test	Appendix to Certificate No Supplemental sheet 2
3,0 3,4	2,9 2,9	3,8 4,1 3,6	3,2 3,1 2,8 2,9 2,7	3,6 3,5 3,7	3,8 3,8 3,8 4,4	4,2 4,0 4,0 4,0	2,0 N/mm² N/mm2 Bondin	from
100 100		100	100	100	100 100 100 100	100 100 100 100	N/mm ² Bonding % Average	7749 HEL 2017-02-23
10	3,05 AAR	4,01	2,93	3,60	3,96	4,21	age	

Germanischer Lloyd

					8.0 mm 16 Ply	P10	Test No Width	Requirements
Moisture	4.	Moisture		Moisture:		5.0	Width	nents
%		%		4,50 %			Thickness Area	×
Added		Added		Added		2935 97	Added N/m	Plywood - Tensile test Longitudinal 70
				led 158,1 N/mm²	81,8 80,7	4		,0 N/mm ²
N/mm ²		N/mm ²		V/mm²	83,4 77,2	3115 77	N N/mm2 Averag	Transverse 45,0 N/mm²
. n	, .		1.2		79,5	25.0 0.0 0.0 0.0 0.00 0.00	Width	Lap-Shear test
				825,00 858,00	875,00 870,00	27, 0	Z	Wet test
				3,7 100 3,8 100	3,9 100 3,9 100	bonding %	Donding 0/	2,0 N/mm ²
					3,79	Average		



	Moisture	2	Π		Moisture					Moisture		ß.				Moisture					
Järvelä														1							
Järvelä and Hirvensalmi	%				%					%			1.5	1		%				_	
ısalmi		ГТ					_					_					Г			u.	
	Added				Added					Added						Added	-				
Plandienst																	-			-	
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	N/mm ²				N/mm ²					N/mm ²	Angle a					N/mm ²					
Syrki Vihe																		30			
Jyrki Viherto July DNV-GL	1925													1						_	
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