

CONFIDENTIAL

Test report: Chilt/P02001

**Report on the testing of Strebord doorsets, in
accordance with DD171 : 1987, Draft for
development guide to specifying performance
requirements for hinged or pivoted doors**

Test For: Falcon Panel Products Ltd
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Date: February 2003

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1 Introduction

Following enquiries from Mr M Percival of Falcon Panel Products Ltd, Chiltern Dynamics was commissioned to undertake testing of 4No doorsets to Clauses 4 and 5 of DD171: 1987, Draft for development guide to specifying performance requirements for hinged or pivoted doors. The door blanks were delivered to the Chiltern Dynamics testing laboratory in High Wycombe on 18 June 2002. Chiltern Dynamics constructed the doorsets to the client's detailed specification.

Testing was conducted at the Chiltern Dynamics testing laboratory from 31 October 2002 to 6 December 2002.

2 Objective

To determine progressively the level of performance of the doorsets and to assign to them a category of duty dependent upon their performance for each of a number of relevant attributes based on the results of the strength tests, Clause 4, and operation tests, Clause 5, of the British Draft for development DD 171: 1987.

See Appendix 1 for description of categories of duty.

3 Description of doors

Details of the specimen are shown in Appendix 3.

The specimens were identified as being Falcon 44mm Strebord doorsets with overall leaf dimensions of 915mm wide x 2135mm high x 44mm thick. The specimens were not lockable.

3.1 Door leaves

	Material/type	Dimensions (mm)	Density (kg/m ³)
Core	44mm Strebord fine surface wood particleboard	44 thick	630*
Adhesive	Lippings PU adhesive	-	-
Lippings	Sapele on all edges	10 thick	640**
Finish	Bare Strebord	-	-

* Stated density, not checked by laboratory

** Nominal density

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3.2 Door frame

	Material/type	Dimensions (mm)	Density (kg/m ³)
Head & Jambs	Sapele	94 thick x 60 wide	640**
Stops	Moulded from the solid frame	20 wide x 38 deep	-
Threshold	None fitted	-	-
Joints	Mortise and tenon with PVA adhesive with 3 inch steel wood screw through corner at 45°	-	-

* Stated density not checked by laboratory

** Nominal density

3.3 Ironmongery

	Make/type	Size (mm)	Fixing details (dimensions in mm)
Hinges	Royde & Tucker 102 Hi load	105 high x 35 wide	Standard fixings supplied by the manufacturer (No 10 1¼in) to frame No 10 1½in fully threaded twinfast chipboard screws in pre-drilled holes and offset 3°
Latch mechanism	Dorma Door Controls Ltd 515 latch with 55mm back set	18 wide	Fixed with standard wood screws supplied with unit, 2No 3.5 x 24 wood screws
Keep	Dorma Door Controls Ltd Art 19 strike plate 24mm radiused design	75 high x 25 wide	Fixed with standard wood screws supplied with unit, 2No 4 x 30 wood screws
Handles	Ogro ZS8100 lever sets and Ogro ZS7020L back plate	144 long x 20 Diameter	2No M5 x 50 machine screws
Door closer	Dorma Door Controls Ltd TS83	292 wide x 60 high x 54 deep	The fixing plate was fixed to the door leaf with 4No 1¼ inch No 10 chipboard screws, closer body fixed to plate with 4No M5 x 50 machine screws

3.4 Perimeter sealing details

	Make/type	Size (mm)	Location
Door edges	None fitted	-	-
Frame reveal - head & jambs	Lorient Polyproducts Ltd IS1025	10 wide	Rebate upstand of frame
Around hinges	Uninterrupted	-	-

The above description was supplied by the client, and verified where possible by a Chiltern Dynamics engineer.

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4 Test preparation

Installation

The 4No doorsets were marked Chilt/P02001/01, Chilt/P02001/02, Chilt/P02001/03 and Chilt/P02001/04 by Chiltern Dynamics, and fitted into timber sub-frames, nominal dimensions 100mm x 50mm fixed as specified in the manufacturer's fitting instructions. The sub-frames were fitted flush with the internal face of the door frame.

Specimens were fitted into the test rigs plumb square and without twist or bends. The surround in the test rig was stiff enough to withstand the test pressures without deflecting significantly, thereby simulating the support provided by the building to the doorframe.

The ambient temperature at the beginning of the test was 23°C.

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5 Test procedure and results

Individual results for the mechanical tests are detailed in Appendix 2. A summary of results is compared with the British Draft Standard duty grading in Appendix 1.

Test Standard Clause	DD171 : 1987 Performance Requirement	Category of duty achieved
4.3 Slamming shut impact test	As specified in clause 4.2, table 2 of the standard	Severe duty
4.4 Slamming open impact test	As specified in clause 4.2, table 3 of the standard	Severe duty
4.5 Heavy body impact test	As specified in clause 4.2, table 4 of the standard and the maximum deformation at any point should not exceed 2mm	Severe duty
4.6 Hard body impact test	As specified in clause 4.2, table 5 of the standard and the maximum indentation should not exceed 1.25mm	Severe duty
4.7 Torsion test	As specified in clause 4.2, table 7 of the standard and the additional deformation should not exceed 3mm in any case	Severe duty
4.8 Downward deformation test	As specified in clause 4.2, table 8 of the standard and the residual deformation should not exceed 1mm	Severe duty
4.9 Closure against obstruction test	As specified in clause 4.2, table 9 of the standard	Severe duty
4.10 Resistance to jarring and vibration test	As specified in clause 4.2, table 9 of the standard	Severe duty
4.11 Abusive forces on door handles test	As specified in clause 4.2, table 10 of the standard and there should be no loosening of the hardware fixings	Severe duty
5.0 Operating forces test	As specified in clause 5, table 11 of the standard	5-7 years old
Overall duty rating		Severe duty

The results only relate to the performance of the samples under the particular conditions of test.

	Written by:	Checked by:
Signature:	The hard copy of this includes both signatures	
Name:	Paul Andrews	Jonathan Osborn
Title:	Test Engineer	Technical Manager
Date of issue:		

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Appendix 1

Duty grading

The British Draft standard grading are defined as follows:

LD - Light Duty

Low frequency of use by those with a high incentive to exercise care, eg by private house owners - small chance of accident occurring or of misuse.

MD - Medium Duty

Medium frequency of use primarily by those with some incentive to exercise care - some chance of accident occurring or of misuse.

HD - Heavy Duty

High frequency of use by public and others with little incentive to exercise care. Chance of accident occurring and of misuse.

SD - Severe Duty

Subject to frequent violent usage.

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Appendix 2

Results of Clause 4.3 slamming shut impact test

	Door 1	Door 2	Door 3	Door 4
Number of impacts	150	150	150	150
Damage to doorset	No apparent damage	No apparent damage	No apparent damage	No apparent damage
Duty category based on table below	Severe duty	Severe duty	Severe duty	Severe duty
Overall duty rating	Severe duty			

Slamming shut impact test duty category

Door grade	Number of impacts
Light duty	10
Medium duty	20
Heavy duty	100
Severe duty	150

Results of Clause 4.4 slamming open impact test

	Door 1	Door 2	Door 3	Door 4
Impact energy	50Nm	50Nm	50Nm	50Nm
Damage to doorset	No apparent damage	No apparent damage	No apparent damage	No apparent damage
Duty category based on table below	Severe duty	Severe duty	Severe duty	Severe duty
Overall duty rating	Severe duty			

Slamming open impact test duty category

Door grade	Impact energy (Nm)
Light duty	5
Medium duty	25
Heavy duty	50
Severe duty	50

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Appendix 2

Results of Clause 4.5 heavy body impact test

	Door 1	Door 2	Door 3	Door 4
Impact energy	150Nm	150Nm	150Nm	150Nm
Damage to doorset	No apparent damage	No apparent damage	No apparent damage	No apparent damage
Duty category based on table below	Severe duty	Severe duty	Severe duty	Severe duty
Overall duty rating	Severe duty			

Heavy body impact test duty category

Door grade	Impact energy (Nm)
Light duty	20
Medium duty	40
Heavy duty	100
Severe duty	150

Results of Clause 4.6 hard body impact test

	Door 1	Door 2	Door 3	Door 4
Impact energy	8Nm	8Nm	8Nm	8Nm
Damage to doorset	No apparent damage	No apparent damage	No apparent damage	No apparent damage
Duty category based on table below	Severe duty	Severe duty	Severe duty	Severe duty
Overall duty rating	Severe duty			

Hard body impact test duty category

Door grade	Impact energy (Nm)
Light duty	2
Medium duty	3
Heavy duty	5
Severe duty	8

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Appendix 2

Results of Clause 4.7 torsion test

	Door 1	Door 2	Door 3	Door 4
Applied force	400N	400N	400N	400N
Damage to doorset	No apparent damage	No apparent damage	No apparent damage	No apparent damage
Duty category based on table below	Severe duty	Severe duty	Severe duty	Severe duty
Overall duty rating	Severe duty			

Torsion test duty category

Door grade	Applied force
Light duty	} 400 N
Medium duty	
Heavy duty	
Severe duty	

Results of Clause 4.8 downward deformation test

	Door 1	Door 2	Door 3	Door 4
Applied force	500N	500N	500N	500N
Damage to doorset	No apparent damage	No apparent damage	No apparent damage	No apparent damage
Duty category based on table below	Severe duty	Severe duty	Severe duty	Severe duty
Overall duty rating	Severe duty			

Downward deformation test duty category

Door grade	Applied force
Light duty	} 500 N
Medium duty	
Heavy duty	
Severe duty	

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Results of Clause 4.9 closure against obstruction test

	Door 1	Door 2	Door 3	Door 4
Applied force	200N	200N	200N	200N
Damage to doorset	No apparent damage	No apparent damage	No apparent damage	No apparent damage
Duty category based on table below	Severe duty	Severe duty	Severe duty	Severe duty
Overall duty rating	Severe duty			

Closure against obstruction duty category

Door grade	Applied force
Light duty	} 200 N
Medium duty	
Heavy duty	
Severe duty	

Results of Clause 4.10 resistance to jarring and vibration test

	Door 1	Door 2	Door 3	Door 4
Number of impacts	200	200	200	200
Damage to doorset	No apparent damage	No apparent damage	No apparent damage	No apparent damage
Duty category based on table below	Severe duty	Severe duty	Severe duty	Severe duty
Overall duty rating	Severe duty			

Resistance to jarring and vibration duty category

Door grade	Number of impacts
Light duty	50
Medium duty	100
Heavy duty	150
Severe duty	200

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Results of Clause 4.11 resistance of hardware to abusive forces test

	Door 1	Door 2	Door 3	Door 4
Applied force	750N	750N	750N	750N
Damage to doorset	No apparent damage	No apparent damage	No apparent damage	No apparent damage
Duty category based on table below	Severe duty	Severe duty	Severe duty	Severe duty
Overall duty rating	Severe duty			

Resistance to abusive forces duty category

Door grade	Applied force
Light duty	} 750 N
Medium duty	
Heavy duty	
Severe duty	

Results of Clause 5 operating forces test

	Door 1	Door 2	Door 3	Door 4
Force required to open the door	7.7N	5.1N	72.4*	74*
Force required to close the door	21.2N	5.7N	0*	0*
Duty category based on the table below	5-7 years old	5-7 years old	N/A	N/A
Overall duty rating				

* these forces were taken with the closer engaged

Operating forces test duty rating

Age group (years old)	Levels of max force to open and close, push or pull	
	Level handle (N)	Small knob (N)
5-7	30	20
8-11	70	35
60-75		

These are the maximum allowed forces at any level of duty.

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Appendix 3

Schematic drawing of the doorset showing overall dimensions

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Appendix 3

Schematic drawing of the doorset identifying components

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Appendix 4

Photograph showing external face of doorset



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Appendix 5

List of testing apparatus

Ref No	Description
T7.19	Door test rig (security rig)
T5.149	Measuring tape
T6.34	Torque wrench with key fitting
T5.163	Force gauge
T6.14 series	100N load bags
T5.167	Angle template
T6.15 series	2No 50N load bags
T6.7k	1No 15kg load bag
T5.86 series	Stop watch
T6.7L	Soft body impactor 30 kg
T6.1E	50mm diameter steel ball
T6.1A	Release tower
T6.1B	Release tower
T6.1C	Release tower
T6.1D	Release tower
T5.122-1	Digital depth indicator
	A dry hard wood slip, 50mm by 50mm by 10mm and a mass between 15 and 20g.
	Timber support frame for hard body drop test
	Laser height gauge

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