

Handled by, department
Klas Johansson
Building Technology and Mechanics
+46 33 16 53 54, klas.johansson@sp.se

BFT SpA
Via Lago di Vico 44
IT 36015 Schio
Italy

Measuring of crushing forces on garage door, EN 13241-1

Summary

Table 1 Summary of test results according to EN 12445 and EN 12453

Machinery	Speed/Force	Bottom seal	Door	Fulfil ¹⁾ req.
BFT EOS 60 chain/(belt) Software 3.3	Low speed / Force 54 %	Flexiforce 1039	Flexiforce RES+80kg	Yes

i) EN 12453 "Safety in use of power operated door -- Requirements". The maximum allowed force between closing edges is 400 N within a period of time of maximum 0.75 s and unload the force within 5 s (reverse).

1 Introduction

SP has been commissioned by Flexiforce to perform crushing force tests on power operated doors. This report is a complement report to P403076 dated 2005-02-07.

Place of testing: Flexiforce test site in Barneveld, Holland

Test date: 2005-06-15

2 Test door

Door	Balancing system	Hard-ware	No of panels	Size (B x H) [mm]	Mass [kg]	Position of additional mass
Flexiforce RES+80kg	2 springs	Flexiforce RES 200	5 (P1-P5)	2500 x 2610 P1 H=610 and P2-P5 H=500	80 +80	20 kg on P2-P5

Note: P1 is upper panel and P5 is lower panel

3 Test performance crushing force

After the door had been mounted in a rigid frame by the client the crushing forces were measured in accordance with *EN 12445 Safety in use of power operated door – test methods*. The measuring equipment used was in accordance with the same standard.

The points of measuring were selected in accordance with what the standard describes for vertical moving doors. The crushing forces were therefore measured between the main closing edges of the door and floor according to Table 2a. The measurements were performed, at ambient temperature, in opening gaps of 50, 300 and 2 050 mm. The maximum allowed force is specified in *EN 12453 Safety in use of power-operated door – Requirements*.

SP Swedish National Testing and Research Institute

Postal address
SP
Box 857
SE-501 15 Borås
SWEDEN

Office location
Västeråsen
Brinellgatan 4
Borås

Phone / Fax / E-mail
+46 33 16 50 00
+46 33 13 55 02
info@sp.se

Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEDAC) under the terms of Swedish legislation. This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.



4 Test results crushing force

The results from the tests are shown in Table 2a

*Table 2a Machinery: BFT EOS 60 chain/(belt) Software3.3 Force:54% Speed: Low
Bottom seal: Flexiforce1039 Door:Flexiforce RES+80kg*

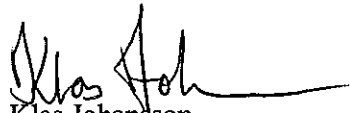
Position, from inside	Height from floor [mm]	Crushing force [N]	Time while force > 150 N [ms]	Unload within 5 s
Left	50	352	597	Yes
Centre	50	314	507	Yes
Right	50	363	623	Yes
Left	300	255	109	Yes
Centre	300	275	324	Yes
Right	300	261	116	Yes
Left	2 050	366	389	Yes
Centre	2 050	359	328	Yes
Right	2 050	379	355	Yes

5 Measurement uncertainty

The total calculated measurement uncertainty for the crush load < 1.5%, for the time < 5 ms and for the horizontal movements < 2 mm. Reported uncertainty corresponds to an approximate 95 % confidence interval around the measured value. The interval has been calculated in accordance with GUM (The ISO guide to the expression of uncertainty in measurements), which is normally accomplished by quadratic addition of the actual standard uncertainties and multiplication of the resulting combined standard uncertainty by the coverage factor $k=2$.

**SP Swedish National Testing and Research Institute
Building Technology and Mechanics - Solid Mechanics and Structures**


Erica Waller
Technical Manager


Klas Johansson
Technical Officer