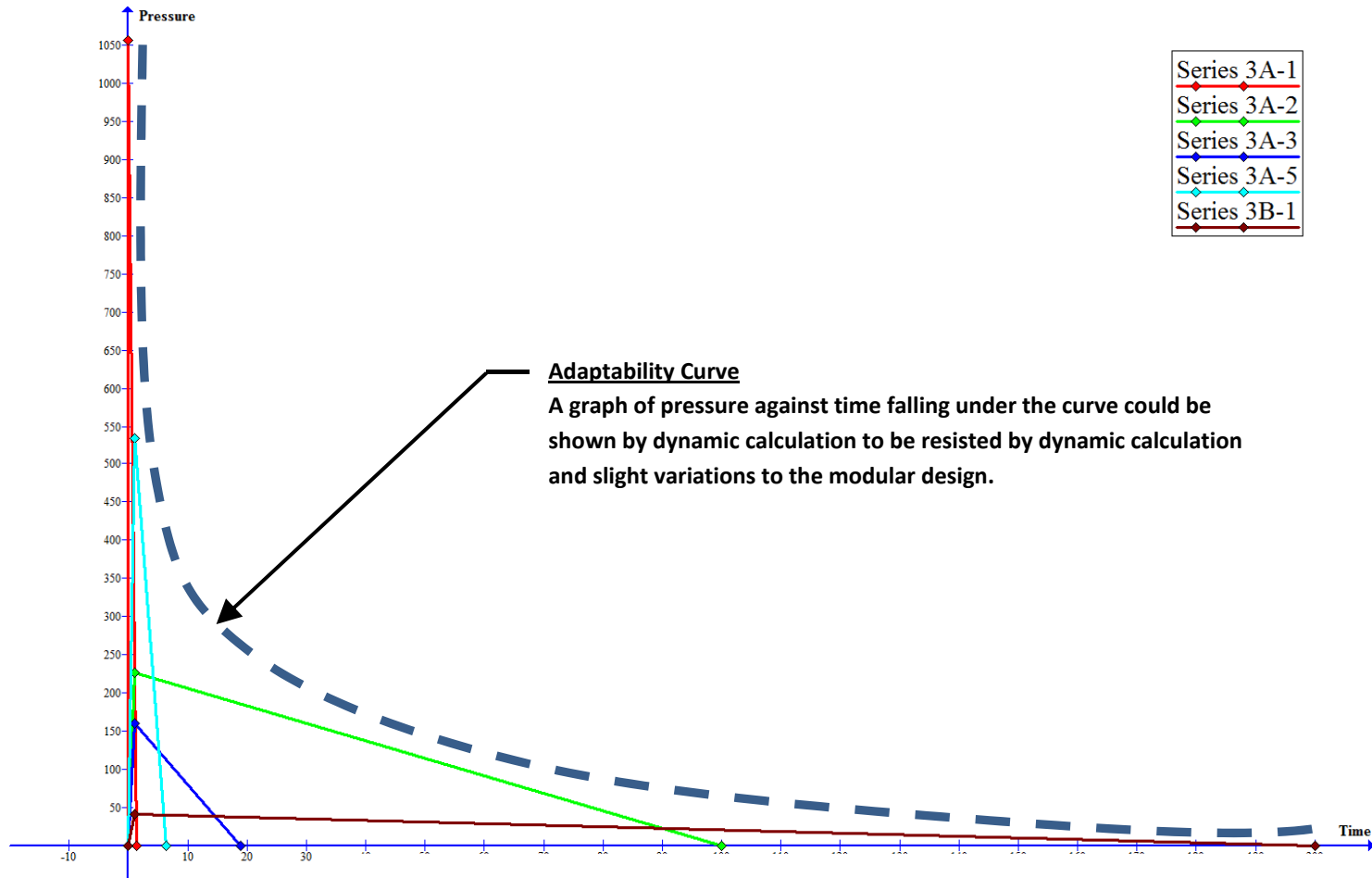


## Protectex Door Matrix

The following table is a brief overview of our protectex range of doors showing typically high blast levels. The Series 3 Protectex range of doors can however be tailored to suit project specific requirements where doors and windows are required to provide a high level of protection from various threats. The range is in continual development and improvement as shown in the table under “planned development”.

■	Proven	Quick reference					Glazing / Panel				Blast			Fire		Ballistic	Forced Entry
	Planned development																
Series	Description	Blast	Fire	Ballistic	Forced Entry	Thermal break	Solid	Vision panel	Half Glazed	Fully Glazed	Peak (kPa)	Duration (msec)	Impulse (kPa msec)	Integrity (minutes)	Insulation (minutes)	level	Level
3A-1	Steel Blast Door	■	□	■	■	□	■	■			1056	1.4	728			BR7	
3A-2	Steel Blast Door	■	□	■	■	□	■	■			227	100	11350			BR6	US DOS 60 minute 15 with VP
3A-3	Steel Blast Door	■	□			□	■		■		160	19	1500				
3A-4	Steel Blast Window	■	□	■	□	□	■		■		227	100	11350			BR7	
3A-5	Steel Blast Door	■	□	■	■	□	■	■			534	6.4	1707			BR4	
3B-1	Steel Blast and Fire Door	■	■	■		□	■	■	■	■	41	200	4100	136	28	BR4	

## Series 3 Pressure / Time Graphs



## Series 3a-1 Steel Blast Door (1056/1.4)

The protectex 3A-1 door system has been certified by calculation is 1056kPa peak pressure 1.4 msec duration. This is a TNT equivalent charge placed within close proximity to the door resulting in extremely high pressures.

Calculations were produced by TPS Consult. In conjunction with TPS we also work closely with our fixing suppliers, in this instance Hilti, who were able to help calculate and specify fixings to resist the load criteria determined by TPS.



Pensher Skytech  
Renown Group

Protectex 1056/7  
External Blast and Ballistic Steel Doors  
Addendum - 1



Prepared by Daniel Pullan MEng  
Graduate Consultant

Approved by Colin Mortonson  
BSc(Msc) PhD CEng FICE  
Technical Director

Prepared for Matthew Butchard  
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Pensher Skytech, Renown Group  
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23 April 2012  
Our ref. 112142/0003A1 - Rev B

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T 0208 256 4000  
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www.tpsconsult.co.uk

PAGE 1



www.hilti.co.uk  
Company: TPS Consult Ltd Page: Profile 3-1056/7  
Address: M D Pullan Project: Protection Point  
Phone/Fax: 1 Fabrication Point  
E-Mail: 1 Date: 10/04/2012

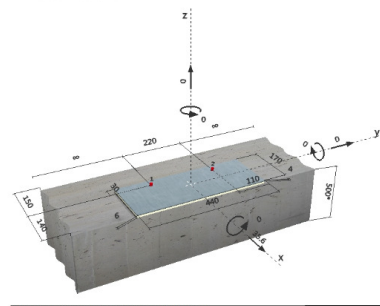
Specifier's comments:

### 1 Input data

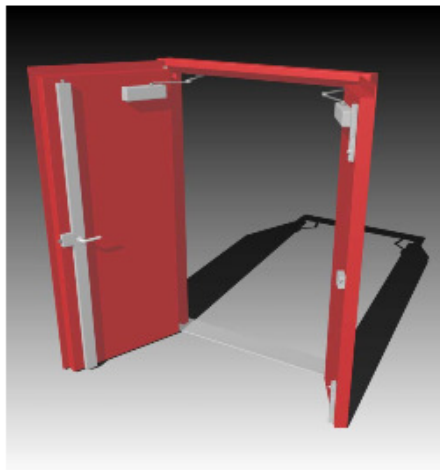
Anchor type and size: HDA-F 8x160x160  
Effective embedment depth:  $a_{ef} = 100 \text{ mm}$ ,  $a_{min} = 107 \text{ mm}$   
Material: B5  
Approval No.: ETA 19/0020  
Issued / Valid: 15/12/2010 / 25/09/2013  
Proof: design method ETAG No. 001 Annex GG(2)(b)  
Stand-off installation: without casting (anchor), minimum level anchor point:  $2 \cdot d$ ,  $a_{ef} = 6 \text{ mm}$ ,  $l = 4 \text{ mm}$   
Hilti Group, precision:  $f_{t,design} = 30.00 \text{ N/mm}^2$   
Anchor plate:  $l \cdot l \cdot l = 170 \text{ mm} \times 440 \text{ mm} \times 4 \text{ mm}$  (Recommended plate thickness: not calculated)  
Profile: no profile  
Base material: uncracked concrete, C30/37,  $f_{ctk} = 37.00 \text{ N/mm}^2$ ,  $n = 500 \text{ mm}$   
Reinforcement: no reinforcement or Reinforcement spacing  $\leq 150 \text{ mm}$  (any  $d$ ) or  $\leq 100 \text{ mm}$  ( $d \geq 10$ )  
no longitudinal edge reinforcement



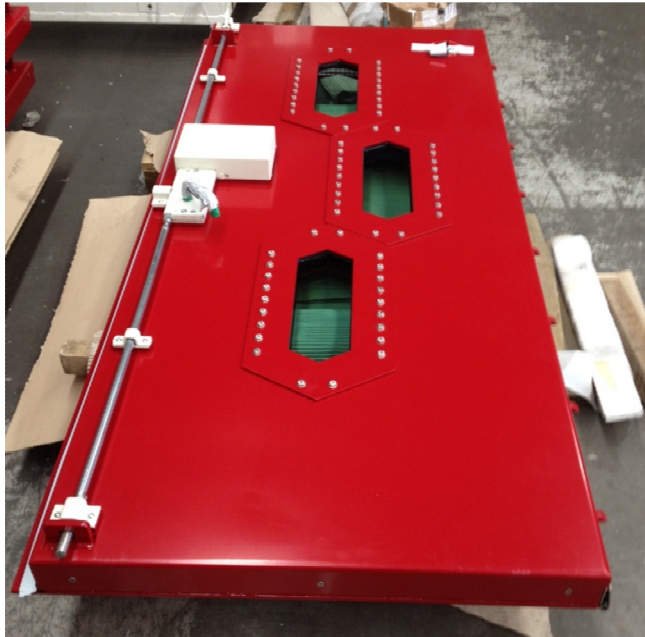
### Geometry [mm] & Loading [kN, kNm]



Illustrate and describe in detail for approval with the loading conditions with the specified Hilti Anchor 1-1000 (2010) for the anchor. Hilti is a registered trademark of the Hilti Group.



The Protectex doors shown in the image below have been upgraded with Ballistic armour which has been live tested to resist to BR7. Using the same design principals as our live BR6 test in which we also successfully resisted several BR7 rounds.



BR7 10MM

### LABORATORY REPORT

**Ballistic Resistance Tests**

FAO: Paul Fieldhouse,  
Bradlee,  
Davies Lane,  
Southhope,  
DN6 1DN.

**Precision Engineering**  
*Established in the range of Green Products*

**Date of Testing** 24th September 2018  
**Client** Order: Bra18m01 VJM.VF  
**Ambient Temperature** 16.5 °C  
**Ambient Pressure** 30.86 " Hg 70% Hum  
**Procedure Standard** Customer Specification  
**Report Number** G7486

### Ballistic Test Report

**Test Equipment**

Brite Universal Receiver and appropriate calibre barrels, 2/4 electronic camera firing system, mounted on a machine rest providing shots of zero degree obliquity. Shots are fired through an electronic chronograph mounted on the sand-lag rest.

<b>Ballistic Test Number</b>		HBT7486						
<b>Specification</b>		Armour plate B555 10.0mm 500mm x 500mm test piece						
<b>Identity / DOM</b>		27502.029.12	N/S					
<b>Manufacturer / Supplier</b>		Bracklen						
Shot	Angle	Weight	Veloc	Calibre	Projectile	Velocity	Perf	Spall
1	45°	Test barrel	Y	7.62x51	5.4g AP	800 m/s	NP	NS
2	45°	Test barrel	Y	7.62x51	5.8g AP	818 m/s	NP	NS
3	45°	Test barrel	Y	7.62x51	8.8g AP	821 m/s	NP	NS

Sheet 1 of 1

