VITRACLAD
VITREOUS ENAMELLED STEEL CLADDING PANELS

BULLET RESISTANCE TESTS

Johannesburg
June 2007
(1) BACKGROUND:

A request to provide an indication of the potential bullet resistance of our Vitraclad panels was received from an architectural practice in Dublin (Ireland).

The Client was looking specifically at the cladding panels located around a Cashier Counter in a Railway Station. The cladding panels were to be used on the public side of the Ticket Office, with a standard dry wall system forming the core and the internal wall of the office.

Vitrex prepared two (2) test panels and with the assistance of the South African Air Force carried out a series of tests, under controlled conditions, at one of their facilities.

We include herein details of the tests and the corresponding results.

(2) TEST No. 1:

Panel Reference No.: 1

Colour of Enamel: Pure White (LM1674/9)

Panel Construction: Size 300 x 300 mm
Heavy Gauge
Front Plate = 1.6 mm EQ Steel
Core = 12 mm Calcium Silicate
Backer = 3 mm Galvanised MS plate
Weight of Panel = 5.5 kg

Weapons Fired: Handguns = 40 Calibre, 9 mm
Rifles = 223 Hunting Rifle, 3006 Hunting Rifle

Distance to Target: Handguns = 20 m
Rifles = 50 m

Results of Test: Handgun rounds deformed the front plate of the panel but did not penetrate through the same.
Rifle rounds penetrated straight through the panel.

Ballistics Information: S.N. = Soft Nose

3006 Hunting Rifle ≡ R1 and AK47 Assault Rifles
223 Hunting Rifle ≡ R4 and R5 Assault Rifles
TEST PANEL No. 1 - Front Face

TEST PANEL No. 1 - Rear Face
(3) TEST No. 2:

Panel Reference No.: 2

Colour of Enamel: Mint Turquoise (LM2269/7)

Panel Construction: Size 300 x 300 mm
Heavy Gauge
Front Plate = 1.6 mm EQ Steel
Core = 9 mm Nutec fibre cement + 3 mm Mild Steel plate + 9 mm Nutec fibre cement + 3 mm Mild Steel plate
Backer = 0.5 mm Galvanised MS plate
Weight of Panel = 9.7 kg

Weapons Fired: Handguns = Not utilised due to results in Test No. 1
Rifles = 223 and 243 Hunting Rifles, 3006 Hunting Rifle

Distance to Target: Rifles = 50 m

Results of Test: Rifle rounds penetrated through the front plate of the panel but did not penetrate through the panel itself.

Ballistics Information: H.O.P. = Hollow point
F.M.J. = Full Metal Jacket
S.N. = Soft Nose
Mono H.P. = Monolithic Hollow Point
Burger Target = Professional Target Professional Round

3006 Hunting Rifle ≡ R1 and AK47 Assault Rifles

223 and 243 Hunting Rifles ≡ R4 and R5 Assault Rifles
TEST PANEL No. 2 - Front Face

TEST PANEL No. 2 - Rear Face
(4) COMMENTS AND CONCLUSION:

a. The tests were not conducted in accordance with any specific code or standard.

b. The tests were undertaken to provide us with an indication of the bullet resistance of the cladding panels.

c. The bullet resistance of the cladding panels can be improved by changing the construction details of the panels, primarily by altering the composition of the core of the panels.

d. The weight of the panels however increases dramatically, with practical implications relating to transport, substructure, handling and installation.

e. We believe that further work is required in developing a suitable core for the panels, where different materials with a more appropriate strength to weight ratio are used.

f. In addition, the possibility of providing added protection by introducing a protective layer within the dry wall system itself could be investigated.

g. One of the Vitrex divisions, Bitcon Industries, is involved in the manufacture of security doors and we can avail ourselves of their expertise in this field should this be required.

h. Further design and appropriate test can be conducted when necessary, for client or project specific requirements.

i. Please address any queries or comments to Cristian Cottino (cristian@vitrex.co.za).