

**5" SlowStop Store Front Bollard**  
**IBC 1607.8.3 Testing**  
**21-MAY-2021**



**Purpose:**

To confirm conformance to International Building Codes and anchoring strength of the SlowStop 5" Store Front Bollard when installed with anchors with an embedment less than 4".

**Experiment Design:**

Shortened Hilti KH-EZ anchors were used to simulate pull out resistance in 4" residential concrete slab. 3/4" Hilti KH-EZ anchors with a length of 4-1/2" were used to anchor the SlowStop 5" Store Front Bollard in the concrete. The SS5Y-42-SF Bollard has a base plate thickness 5/8", causing each anchor to have a 3.875" embedment in the concrete.



**Figure 1 – Anchor Length**



Figure 2 – Eyelet Height



Figure 3 – Bollard Rigging

A production SS5Y-42-SF SlowStop Store Front Bollard was installed in 3000-3500 psi 6" thick concrete. A hole was drilled in the bollard pipe to connect rigging to pull (in effect a push due to the connection point on the opposite side) the bollard with 6,500 pounds of force using a lever chain hoist. An S type load cell was rigged in line with the pulling force in order to measure actual force.

**Results:**

The SS5Y-42-SF was held at approximately 6,500 pounds of force for 5 minutes. The resulting concrete after the test was left unmarred with no signs of spalling or cracking near the critical anchors.



Figure 4 – Cement After Test

**Conclusion:**

Given the resulting data, it may be concluded that the SS5Y-42-SF is suitable to be used in residential slabs confirming conformance with IBC 1607.8.3 when the 5" SlowStop Store Front Bollard is anchored properly in 4" thick residential concrete.

**APPENDIX A – Load Cell Calibration Certificates**

**S-Type Pull Force**

OMEGA ENGINEERING I N C.

LOAD CELL  
FINAL CALIBRATION

0.00 - 10000.00 LBS  
Excitation 10.000 vdc

Job: WHM0030957    Serial: 381452  
Model: LCCD-10K    Tested By: ED  
Date: 5/22/2019     Temperature Range: +0 to +150 F  
Calibrated: 0.00 - 10000.00 LBS    Specfile: LCCD

Force LBS	Unit Data mVdc	Normalized Data
0.00	- 0.070	0.000
5000.00	14.939	15.009
10000.00	29.950	30.020
5000.00	14.947	15.017
0.00	- 0.070	0.000

Balance - 0.070 mVdc  
Sensitivity 30.020 mVdc  
In Resist 447.00 Ohms  
Out Resist 352.30 Ohms  
59K Shunt 14.913 mVdc

Change at 0.00 LBS (-INPUT to -OUTPUT)

Calibration Factors:  
Sensitivity = 3.002 mV/V      59K Shunt = 1.491 mV/V

ELECTRICAL LEAKAGE: PASS  
ELECTRICAL WIRING/CONNECTOR: RED = +EXCITATION  
    BLACK = -EXCITATION  
    GREEN = +OUTPUT  
    WHITE = -OUTPUT

This Calibration was performed using Instruments and Standards that are traceable to the United States National Institute of Standards Technology.

S/N	Description	Range	Reference	Cal Cert
177438-A	20K LB LOAD STD TEN	0 - 10000.00 LBS	C-2740	C-2740
3146A2022B	34401A DMM UUT	Unit Under Test	C-2404	WCS44931L
US36107898	34401A DMM STD	Pressure Monitor	C-3006	WCS41717L

Q.A. Representative : *El Sachser Jr*    Date: 5/22/2019

This transducer is tested to & meets published specifications. After final calibration our products are stored in a controlled stock room & considered in bonded storage. Depending on environment & severity of use factory calibration is recommended every one to three years after initial service installation date.  
COMMENTS: FINAL TEST IN TENSION.

Omega Engineering Inc., 800 Connecticut Ave., Norwalk, CT 06854  
http://www.omega.com    email: info@omega.com    phone (800) 826-6342