

DO NOT USE the WingIt Grab Bar Fastening Systems in CEILING drywall (gypsum) applications. TEST DATA IS TO BE INTERPRETED FOR WALL APPLICATIONS ONLY. There are no warranties, either actual or implied, for the installation of Grab Bar WingIts in Ceiling materials. Call company for additional details.

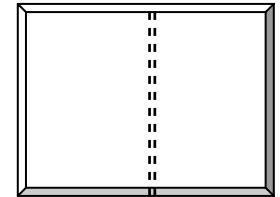
TEST METHODOLOGY – INCLUDING MULTIPLE LOAD, VECTOR, and VIBRATORY FORCES.

Grab Bars are fastened to varied wall sections utilizing an embodiment of the WingIt Fastening Technology. The TEST METHOD consists of a Hydraulic Lift and a Hydraulic Scale used to measure vertical loading. Hydraulics are utilized because of the minimal travel requirements to achieve desired weight loads, the high level of control over specific load settings, and the relative accuracy (deviation <2%). PULL OUT (HORIZONTAL) FORCES ARE MEASURED BY USING A SPRING BIASED SCALE. Pull Type Spring Biased Scales are accurate (deviation <1%) and are not affected by gravitational pull. The long travel required to tension the spring biased scale is helpful in accurately gauging forces on the horizontal when applying additional forces on the vertical.

The wall samples range in height from 32” to 48” and from 32” to 96” in width.

The FRAMING consisted of 2x3 or 2x4 studs - wood or 25-gauge steel. The stud span ranged from 16” to 24” on center. Assembly of the frame was made with standard drywall screws.

The SUBSTRATE was attached to the Frame utilizing standard drywall screws or nails, meeting specifications required under ASTM C840-99 and C954-98.



TESTED SUBSTRATES - TESTS THAT INCLUDE PULL OUT (Horizontal) and concurrent MULTIPLE COMPOUND FORCES (including Horizontal) have the substrates attached to the framing in accordance with one or more of the following specifications prescribed by the American Society for Testing and Materials – ASTM :

C36/C36M-99e1 - Standard Specification for Gypsum Wallboard

C442/C442M-99a - Standard Specification for Gypsum Backing Board.

C514-96 Standard - Specification for Nails for the Application of Gypsum Board

C557-99 Standard - Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing

C842-99 Standard - Specification for Application of Interior Gypsum Plaster

C840-99a Standard - Specification for Application and Finishing of Gypsum Board

C954-98 Standard - Specification for Steel Drill Screws for the Application of Gypsum Panel Products

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TESTING –

Standardized testing in accordance with ASTM F446-85. Loads are applied to the center 3 ½” section of grab bars and handrails of all lengths. An initial load of 50 pounds is applied to allow the Test Coupon to “settle”. Instrumentation capable of detecting 0.001” intervals is then attached to the outer most point of the Grab Bar or Handrail to measure deflection. Singular directional loads are applied for a minimum of 5 minute intervals - at 250 pounds (1,112 Newtons), then 300 pounds (1,335 Newtons). Test Coupons are either disassembled or brought to failure, then they are examined to determine force distribution efficiencies.

Additional Test procedures subject Grab Bars, Handrails, and Bath Accessories to *Horizontal* (Pull Out), *and Vertical* (Downward) *Forces*. The objective was to develop testing that mimics real life use – multi directional forces of varying intensity. **The following data also represents testing done to verify the WingIt Grab Bar Fastening System’s structural integrity when subject to Horizontal Loading (Pull Out) during No Load and COMPOUND Load Testing (Vertical loads in accordance with ASTM F446-85 and Horizontal Loading, concurrently).**

Note: Wall substrates, installed to ASTM specifications, showed little deviation in structural integrity or deflection of the substrate under loading regardless of the installation location of the WingIt Grab Bar Fastening System.

Tested Substrate – 5/8” Drywall screwed to 25 gauge steel studs 24" on center. Ceramic tile, 4" x 4", contractor grade, attached to the wall in accordance with ANSI A108.4 using standard adhesive and grout. Source - Home Depot. Cure times – mastic 24 hours, non-sanded grout – 24 Hours. Open wall coupon – 011/98.

Humidity / Temp	WingIt Embodiment	Bar Length	Tube Length	Tape	Vertical Load	Horizontal Load	Deflection (1)	Time minutes	Wall Substrate Failure
34% - 52	Std – 5 th	24"	0.625	Y	404 #	300 #	Nominal	5	No
34% - 52	Std – 5 th	24"	0.625	Y	404 #	300 #	Nominal	10	No
34% - 52	Std – 5 th	24"	0.625	Y	0 #	300 #	Nominal	15	No
34% - 52	Std – 5 th	24"	0.625	Y	100 #	300 #	Nominal	30	No
34% - 52	Std – 5 th	24"	0.625	N	100 #	300 #	Nominal	6	No

(1) - Deflection was measured on the Vertical and Horizontal load. Deflection of the grab bar, less than 0.250” in considered nominal. Measurements of deflection above 0.250” is noted as the additional dimension.

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Tested Substrate – 5/8” Drywall nailed to wood studs 16” on center. Open wall coupon – 11/98, 12/98

Humidity / Temp	Winglt Embodiment	Bar Length	Tube Length	Tape	Vertical Load	Horizontal Load	Deflection (1)	Time minutes	Wall Substrate Failure
34% - 52	Std – 5 th	24”	0.625	Y	0 #	260 #	Nominal	5	No
34% - 52	Std – 5 th	24”	0.625	Y	100 #	260 #	Nominal	5	No
34% - 52	Std – 5 th	24”	0.625	Y	0 #	260 #	Nominal	10	No
34% - 52	Std – 5 th	24”	0.625	Y	100 #	260 #	Nominal	6	No
42% - 56	Std – 5 th	24”	0.625	N	100 #	260 #	Nominal	6	No
42% - 56	Std – 5 th	24”	0.625	Y	0 #	260 #	Nominal	6	No
42% - 56	Std – 5 th	24”	0.625	Y	100 #	260 #	+ 0.037	10	No
42% - 56	Std – 5 th	24”	0.625	Y	(2)	(2)	(2)	N/A	(2)
35% - 62	Std – 5 th	24” (3)	0.625	Y	0 #	260 #	(3)	10	No
35% - 62	Std – 5 th	24” (3)	0.625	Y	100 #	260 #	(3)	10	No

Tested Substrate – One piece tub surround – nominal wall thickness at 1/4” – no plywood blocking. The free standing tub surround was stabilized at the nailing flanges (top and entry edges) – similar to “real world” application. Not a wall coupon –10/98

Humidity / Temp	Winglt Embodiment	Bar Length	Tube Length	Tape	Vertical Load	Horizontal Load	Deflection (1)	Time minutes	Wall Substrate Failure
N/A	Std – 5 th	18 ”	0.625	Y	250 #	404 #	Nominal	5	No
N/A	Std – 5 th	18 ”	0.625	Y	100 #	404 #	Nominal	10	No
N/A	Std – 5 th	18 ”	0.625	Y	0 #	404 #	Nominal	15	No

(1) - Deflection was measured on the Vertical and Horizontal load. Deflection of the grab bar, less than 0.250” in considered nominal. Measurements of deflection above 0.250” is noted as the additional dimension.

(2) – Testing on this coupon was specific to show deflection on the substrate as vertical and horizontal forces are continually increased. The total loading to failure was more than 425 force/pounds applied to the grab bar.

(3) – Testing on vertically mounted grab bar – singular wall bay (16” O/C). Deflection was less than 0.350”.