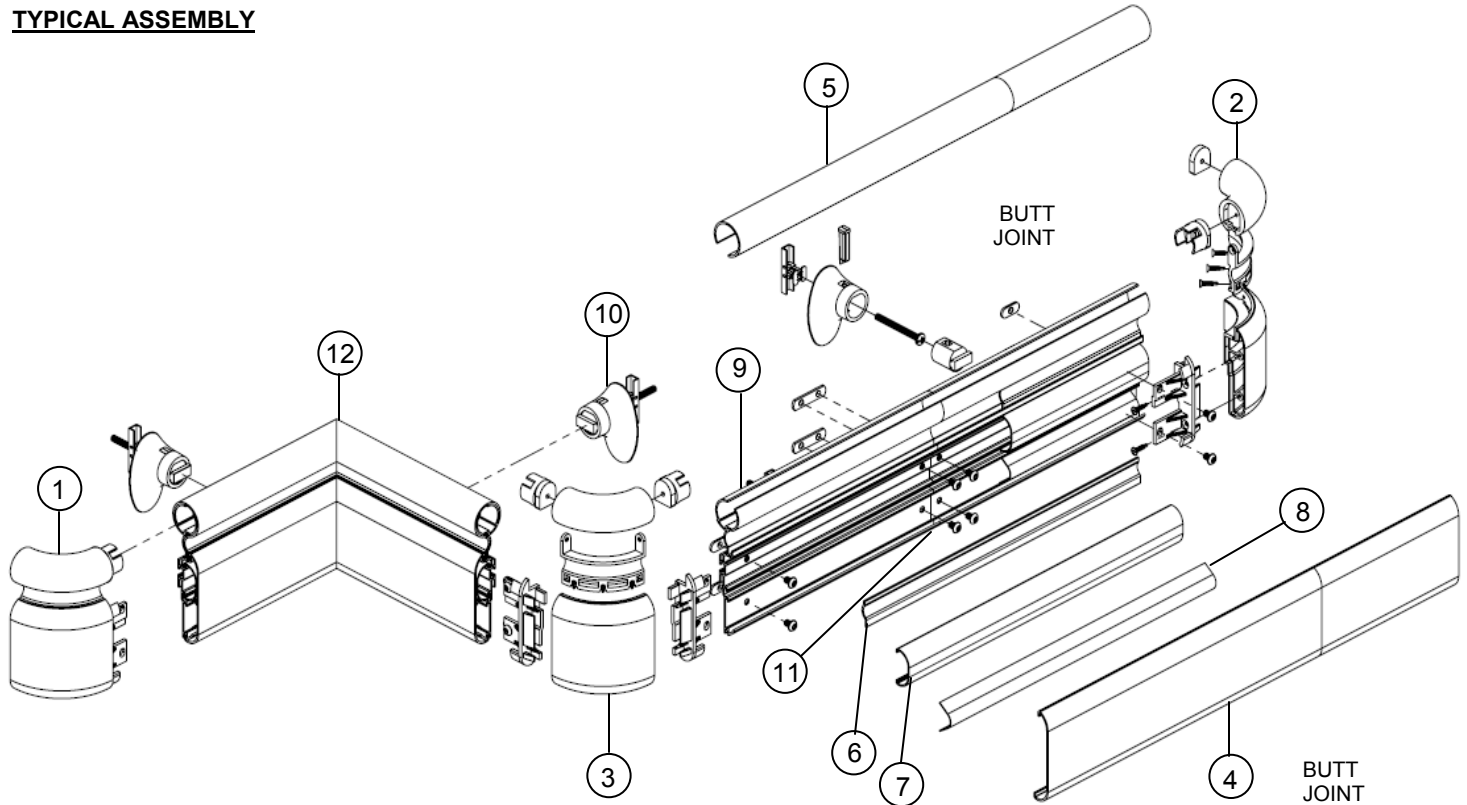


TYPICAL ASSEMBLY



COMPONENT LIST

- | | |
|------------------------|------------------------------|
| 1 LEFT RETURN | 7 UPPER IMPACT ABSORBER |
| 2 RIGHT RETURN | 8 LOWER IMPACT ABSORBER |
| 3 OUTSIDE CORNER | 9 ALUMINUM RETAINER |
| 4 SNAP ON VINYL COVER | 10 MOUNTING BRACKET |
| 5 VINYL HANDGRIP COVER | 11 SPLICE |
| 6 ACCENT STRIP | 12 FIELD MITRE INSIDE CORNER |

TOOLS REQUIRED FOR HANDRAIL ASSEMBLY

Level
 Chalk Line
 Tape Measure
 Phillips Screw Driver
 Compound Mitre Saw with an 80-100 tooth carbide blade
 Drill
 1/4" Drill Bit
 1/2" Drill Bit
 Socket wrench and socket set
Note: Drill bit sizes may differ for Masonry and other substrate applications, see instructions on the appropriate fasteners for the substrate (provided by others).

HARDWARE DETAILS (Provided by others)

End Cap and Corner Assembly:

#8 Self tapping screw
 1/4-20x3/8" button head fastener
 1/4-20 slot nut

Standoff Assembly;

For standard steel stud and drywall applications

Toggler® brand anchor
 1/4-20x4" Phillips head screw

Aluminum Retainer Splice Connections;

Aluminum retainer splice
 1/4-20x3/8" button head fastener

STORAGE & HANDLING

The handrails are shipped unassembled. Upon receipt, immediately check all material for any damage that may have occurred in transit and verify that all of the items and quantities are correct. The handrail covers should be stored in the horizontal position at room temperature (65 - 75° F). This is a finished product; store in a protected, clean, dry area away from direct sunlight.

DO NOT WALK ON THIS PRODUCT OR STORE ANYTHING ON TOP OF IT.

Check to ensure the anchors supplied by the factory will work with the type of wall substrate on the project.

CUTTING

All materials are supplied in stock 12' lengths and are to be field cut using quality equipment to insure that all cuts are square. When cutting materials Nudo recommends using a 80-100 tooth carbide tipped saw blade or equivalent. **NOTE:** Stock Length material does not always have squared ends and may require squaring in the field. If space is available use a minimum 12' long cutting bench to allow the installer to cut the material without having to turn it around.

IMPORTANT!

The factory recommends using back up channels at stud wall conditions (Figure 1).

SPLICES

When splices occur (runs over 12'-0"), always splice the aluminum retainers, vinyl covers, and impact cushion at different locations along the run. The minimum required spacing between the splice locations is 6".

INSTALLATION

Install the longest run of the handrail first, use scrap for shorter runs. The handrail requires a minimum of 2 standoffs per unit/run. See **Minimum Layout Configuration** (Page 5) for minimum handrail layouts and sizes.

STEP 1. Using the correct plans, layout guides and local code requirements layout and mark the location of the handrail on the wall at the appropriate height above the finished floor. Measure 3-3/4" down from the desired top of the handrail and mark this location at each end of the run (See Figure 2). Snap a chalk line, or use a laser level to mark the height of the standoff fasteners.

STEP 2. Once the handrail is laid out, mark any required cuts to each aluminum retainer and cut to correct length. See **Cutting Adjustment and Schedule** (Page 5) for adjustments to the aluminum retainer length that are required for end caps, inside corners, and outside corners. Refer to **Minimum Layout Configurations** (Page 5) for additional information concerning spacing and minimum wall guard length requirements.

Important: All cuts must be square and deburred.

STEP 3. Layout the aluminum retainer "face up", mark and drill the mounting bracket hole locations, using the groove in the retainer to locate the centerline of the retainer (Figure 3, page 3).

Mounting bracket holes must be spaced:

- 32" on center maximum spacing
- 1-1/2" to 6" from the end of the aluminum retainer at returns and corners
- A minimum of 4" from the end of the retainer at splices to avoid interference with splice hardware (Figure 7, page 3)
- If a backing channel is not provided, the mounting brackets must line up with wall studs

NOTE: observe all safety precautions when drilling to avoid all utilities and re-bar.

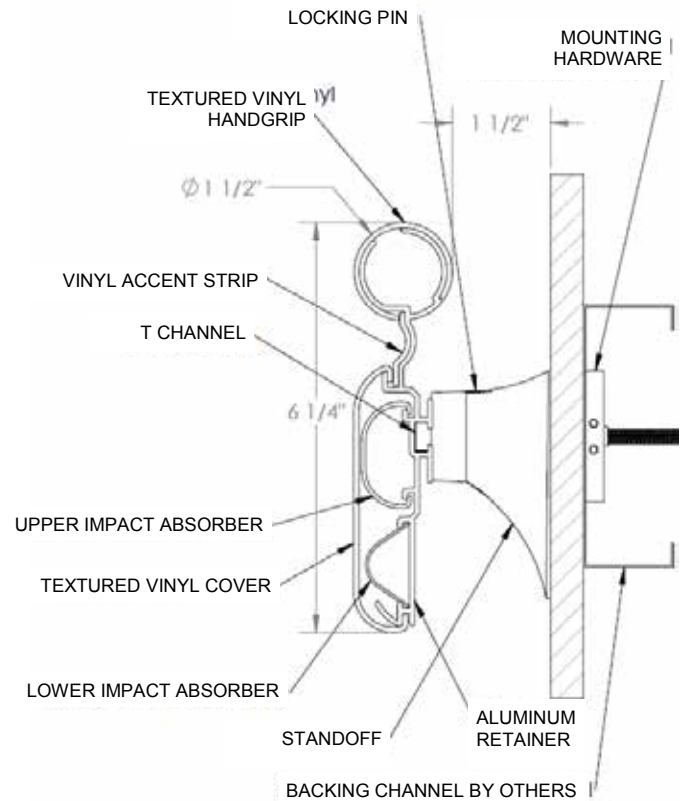


Figure 1

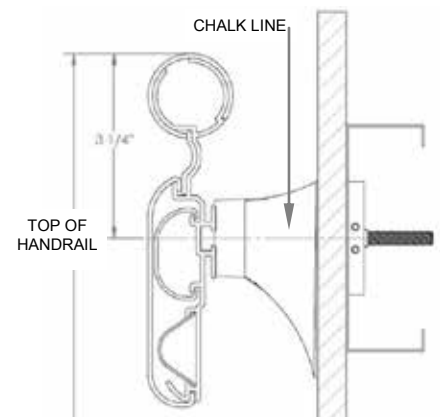


Figure 2

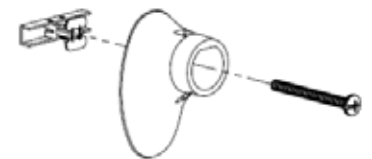


Figure 3

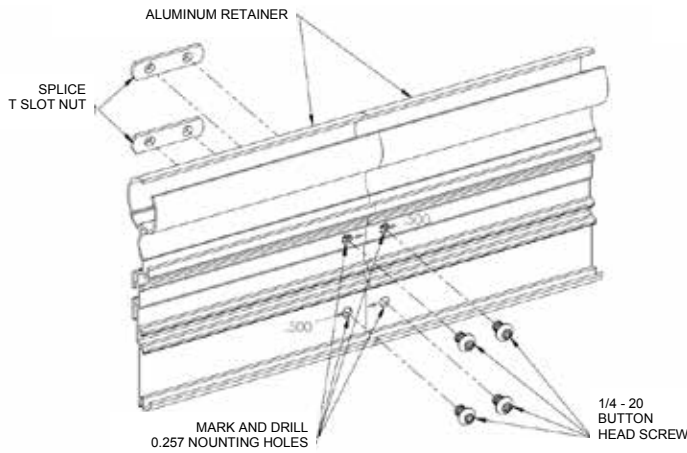


Figure 4

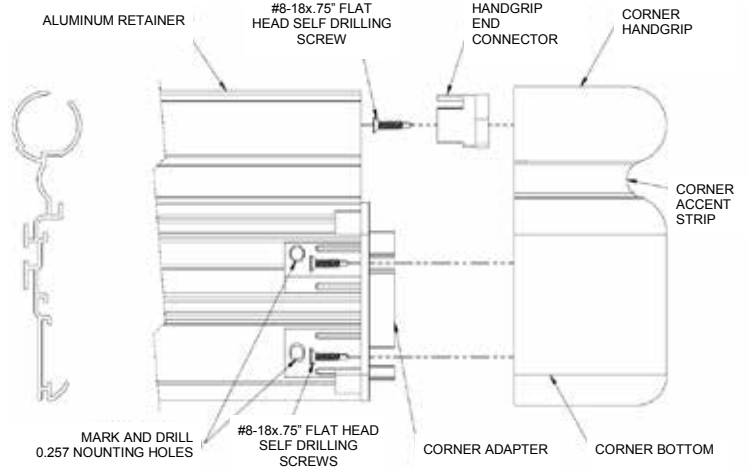


Figure 5

STEP 4. Locate and drill the mounting bracket holes in the wall construction using the aluminum retainer as a template or by careful measurement. Choice of hardware will dictate the required hole diameter.

STEP 5. Insert molded accessories into the end of the corresponding aluminum retainer, press firmly to ensure that the molded part is seated squarely against the end of the retainer. Drill, or mark and drill, the accessory mounting holes using the accessory as a template (See Figure 4, above).

STEP 6. Measure and cut the flexible impact cushion to fit comfortably between the molded accessories that are to be attached to the retainer. Then slide the impact cushion into the track located on the aluminum retainer (See Figure 5).

STEP 7. Attach the molded returns and corners to the aluminum retainer with the accessory seated firmly and squarely to the retainer while tightening. Fasten with a 1/4" bolt, slat washer, and nylon lock nut provided.

Caution: Do not use a lock washer, use flat washer only. Always place a flat washer between the nut and the molded tab. Tighten to 10 ft-lbs maximum torque (See Figure 6).

STEP 8. Mount the assembly to the wall with the mounting brackets and the appropriate hardware according to the wall construction. See Step 9 for splicing information.

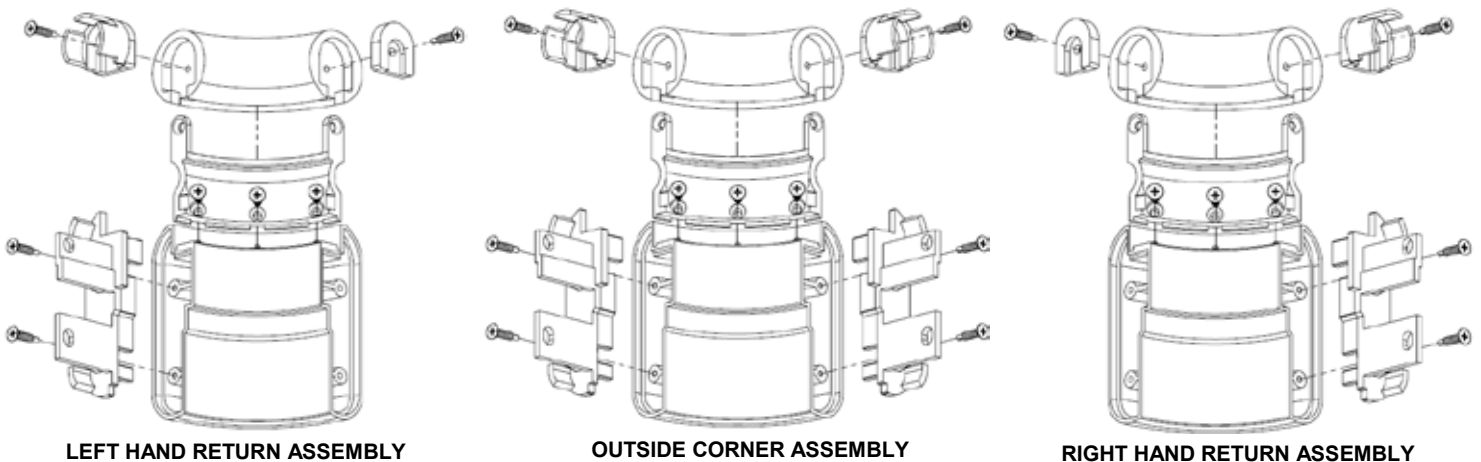
Suggested Hardware:

Drywall: Toggler® brand toggle bolts (See Page 6)

Masonry: Plastic Alligator® inserts or appropriate Tapcon®

STEP 9. When splicing is required always locate the splice joints a minimum of 4" from mounting bracket locations. For additional splicing detail see Figure 7 below. Offset the butt joint in the cover, handrail grip, accent strip, aluminum retainer, and impact cushion (See Typical Assembly Illustration, page 1)

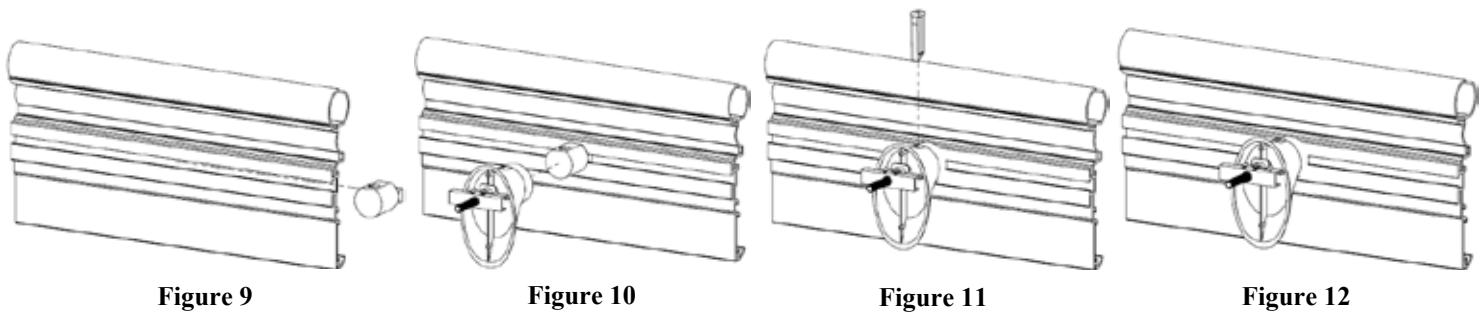
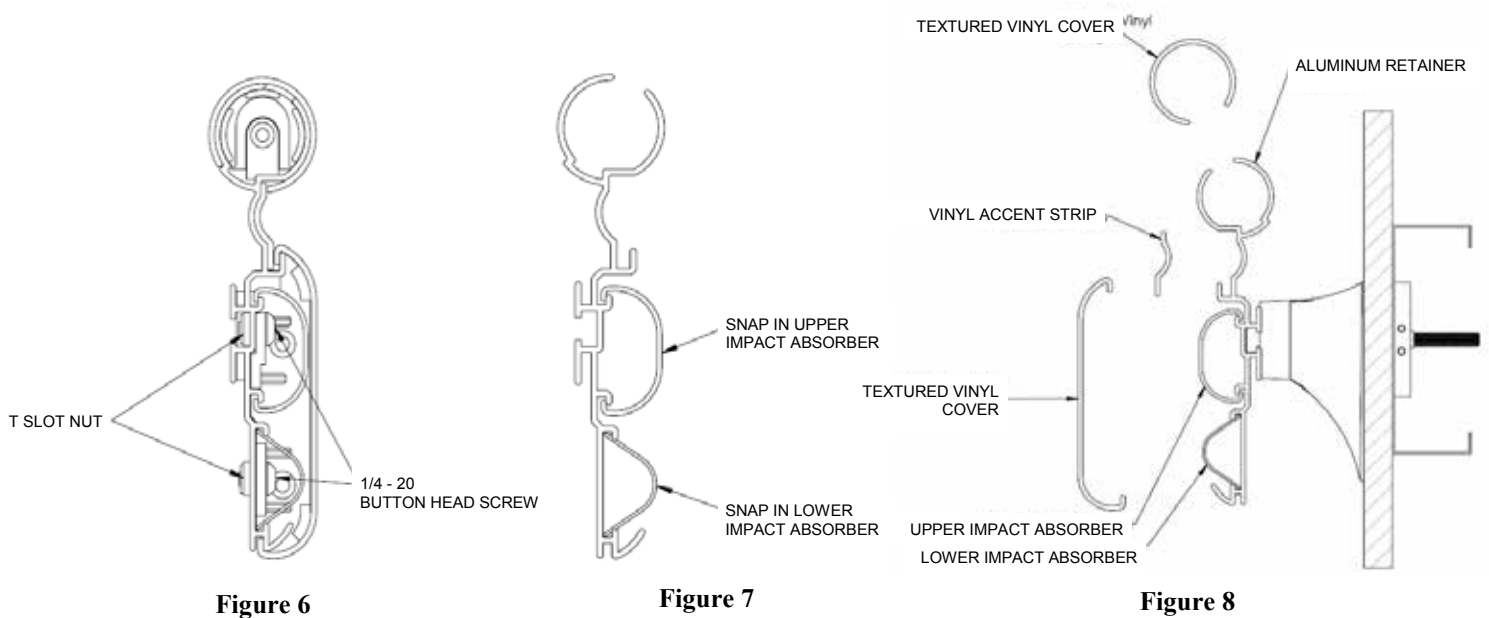
OUTSIDE CORNER, LEFT HAND AND RIGHT HAND RETURN DIAGRAMS



STEP 10. Measure between accessories (corners and returns) and cut the corresponding vinyl cover, accent strip, and handgrip profiles to the correct size. Cut the profiles so that they will span any retainer butt joints/splices.

Important: All cuts must be square and deburred.

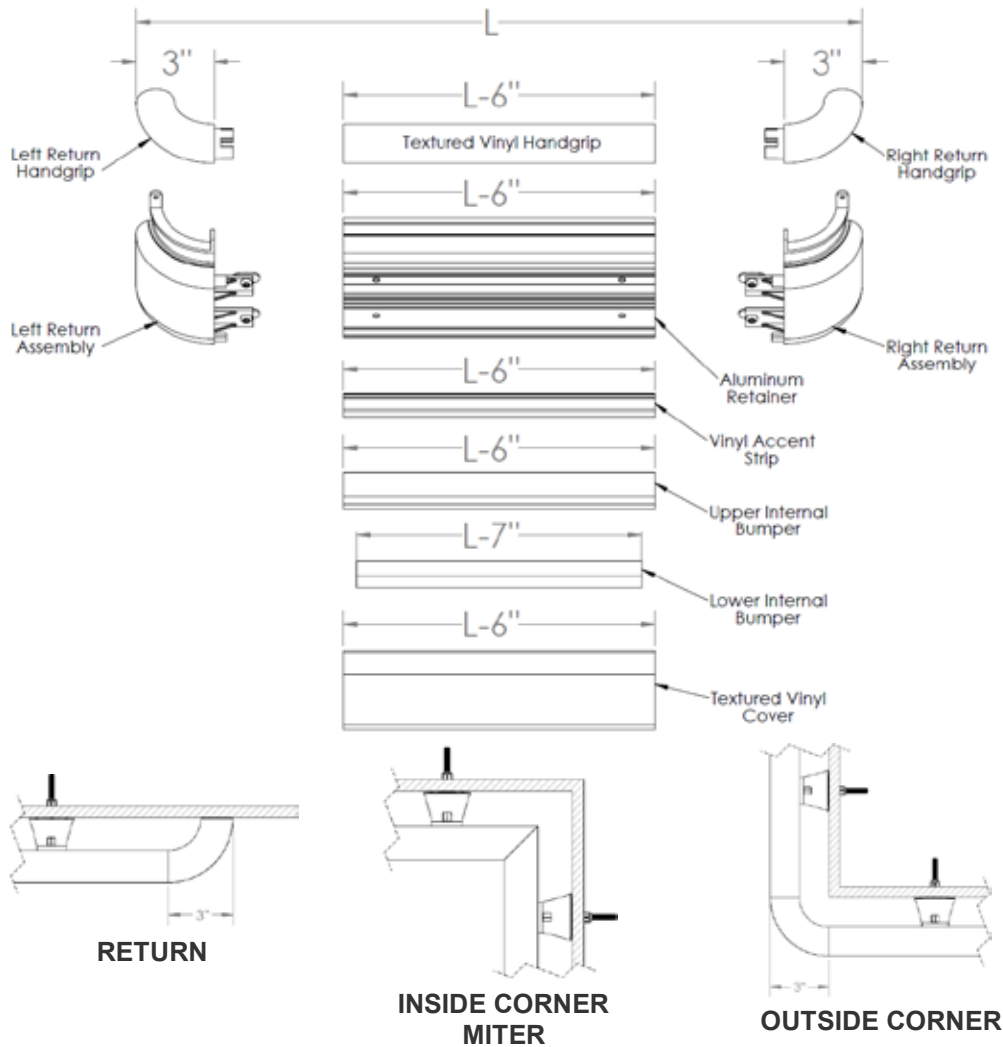
STEP 11. Place the accent strip in the finger groove of the aluminum retainer, ID mark down (See Figure 8, below). Snap the handgrip cover into place on the retainer, then snap the lower vinyl cover into place by hooking the upper leg first, then pushing downward snap the lower hook into position.



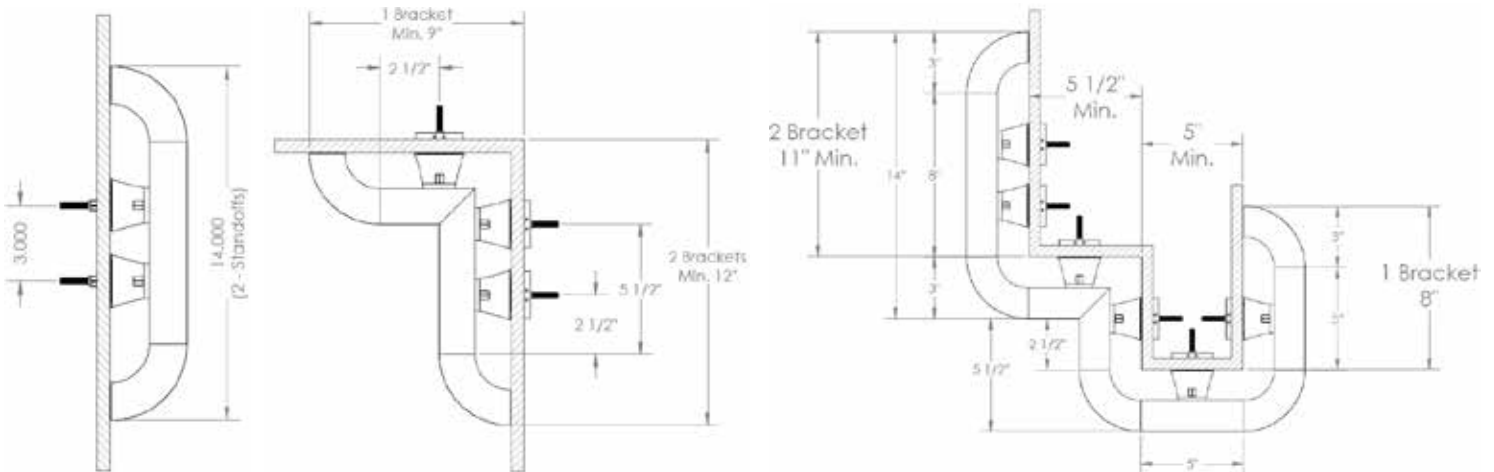
CLEANING INSTRUCTIONS

1. For best results, the use of liquid cleaners such as "409", "Fantastic", "Mr. Clean", etc. are recommended. The use of powder cleansers is not recommended, use of such cleaners can leave residue which is difficult to remove.
2. Do not use chlorinated or aromatic hydrocarbons, esters or ketones to clean Nudo vinyl products. Avoid the use of heavy degreasers, compounds containing surfactants, and abrasive compounds or cleaning devices.

CUTTING ADJUSTMENT DIAGRAMS AND SCHEDULE

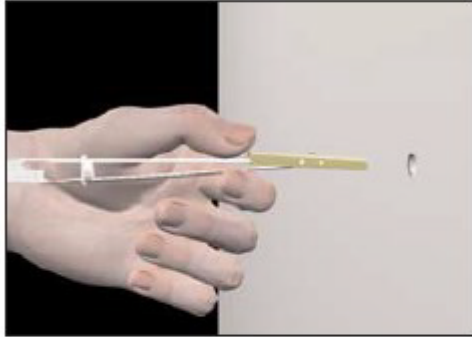


MINIMUM LAYOUT CONFIGURATIONS



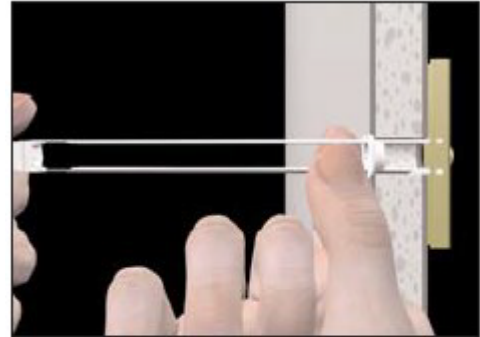
TOGGLE INSTALLATION INSTRUCTIONS & TECHNICAL DATA

STEP 1



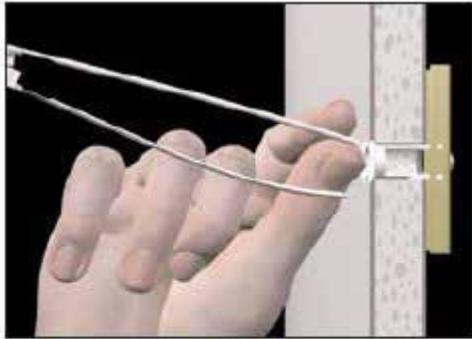
Drill appropriate size hole (1/2"). Hold metal channel flat alongside plastic strips and slide channel through the hole. Minimum clearance behind wall: only 1-7/8".

STEP 2



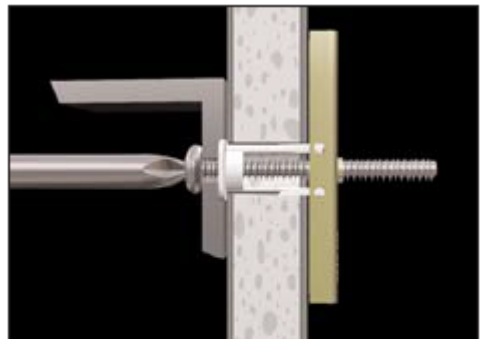
Hold ends of straps together between thumb and forefinger and pull toward you until channel rests behind the wall. Ratchet cap along the straps with other hand until flange of the cap is flush with wall.

STEP 3



Place thumb between the straps at the wall. Push thumb side to side, snapping off the straps level with the flange of the cap.

STEP 4



Place standoff to the wall over the flange. Using 1/4, 20 tap bolt, Insert tap and tighten until snug against the standoff, then stop.

Ultimate Tensile Pull-out Values (lb)

UNC Thread	Drill dia.	1/2" Drywall	5/8" Drywall	*1/2" with 25 gauge stud	*5/8" with 25 gauge stud	Concrete block	1/2" Steel plate
1/4"-20	1/2"	265	356	425	464	1080	1288 ²

* Failure measured as breakage of drywall portion

² Hardened bolts used

Ultimate Shear (lb)

UNC Thread	Drill dia.	1/2" Drywall	5/8" Drywall
1/4"-20	1/2"	241	324

- For maximum shear holding, orient channels vertically to the floor.
- Use hardened or stainless bolts for maximum weight load.
- Enlargement of specified insertion holes size will reduce anchor effectiveness.
- All toggle anchors meet requirements of Type V anchors in Federal Specification FF-B-588-D (superseded). 1/4-20 x 4" tap bolt/screw (fully threaded) meeting or exceeding ASTM A307 Grade A and SAE J429 Grade 1 requirements.