

The expiration date of this document has been extended until 6/30/13.



**SIMPSON**

**Strong-Tie**

®

**MASA**

**Cast-in-Place  
Mudsill Anchor**

**F-MASA10**

**Now approved  
to the 2006 and  
2009 I Codes,  
and listed under  
ICC-ES ESR-2555**



## CAST-IN-PLACE MUDSILL ANCHOR

### All the Strength of an Anchor Bolt with Less Work

Mudsill anchors have always been a time-saving alternative to anchor bolts, and the new MASA anchors provide even greater load-carrying capacity than our original MAS. Through the reinforcement of key sections of the connector, and additional fasteners which have been incorporated into the design, performance has been significantly improved. As a result, the MASA provides an alternative for 5/8" and 1/2" mudsill anchor bolts on 2x, double-2x and 3x mudsills. It also eliminates the need for 3" square plate washers for seismic design and, in some cases, has load capacities that meet or exceed the parallel and perpendicular to plate shear capacity of other cast-in-place anchors. In addition, when compared to MAS mudsill anchors, fewer MASA anchors are required to achieve the same performance. Two versions of the MASA are available – the standard MASA for installation on standard forms and the MASAP for panelized forms.

The MASA and MASAP are code listed by ICC-ES under the 2006 IBC® and IRC® and have been tested to meet the requirements of ICC-ES acceptance criteria AC-398 for cracked and uncracked concrete. New test data is reflected in this flier.



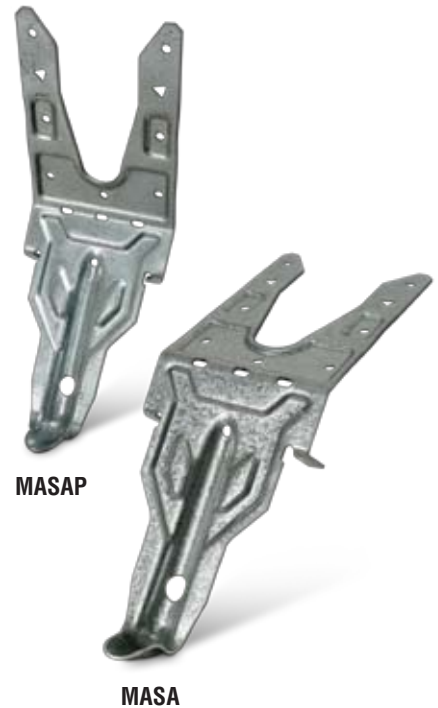
Eliminating anchor bolts makes finishing easier and results in a flatter slab

### MASA Mud sill Anchor: The Time-Saving Alternative for Concrete Contractors

- Attaches easily to the concrete form
- Lays flat on the top of the form board, eliminating the need to finish around anchor bolts
- MASAP available for panelized forms
- Available in ZMAX® coating

### MASA Mud sill Anchor: The Hassle-Free Alternative for Framers

- No plate drilling required
- Flat design helps avoid time-consuming modifications of pre-fabricated walls or rim joists to account for off-center bolt installations
- Eliminates the need for 3" square plate washers which are now required for use with all sill bolts in seismic design categories D-F by the 2006 and 2009 International Residential Code® and International Building Code®
- Available in ZMAX® coating



MASAP

MASA



Unlike anchor bolts, the MASA requires only one tool: a hammer

### THE MASA MUDSILL ANCHOR SAVES TIME FOR THE FRAMER



No more pre-drilling sill plates to accommodate cast-in-place bolts

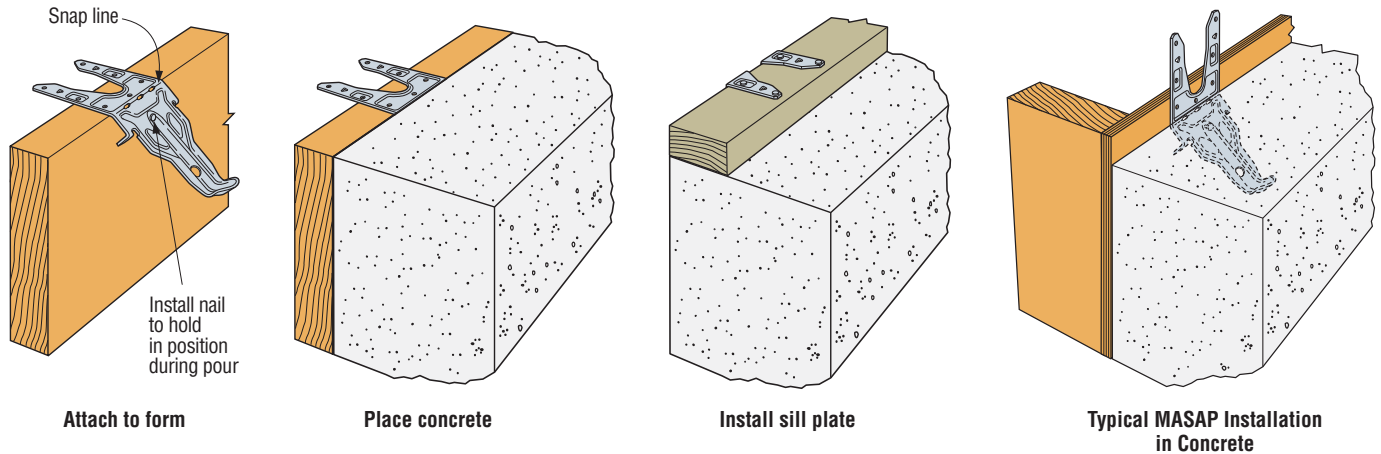


Eliminates the need to notch studs due to bolt interference



Reduces the need to retrofit anchors to account for misplaced anchor bolts

# CAST-IN-PLACE MUDSILL ANCHOR



## MASA Mudsill Anchors: Proven to Perform

In addition to component testing per the new ICC-ES Acceptance Criteria AC-398, Simpson Strong-Tie performed full-scale cyclic testing of shearwalls using MASA anchors on 2x and 3x plates. This testing was performed at the state-of-the-art Simpson Strong-Tie® Tyrell Gilb Research Laboratory. This testing showed no splitting of the sill plates nor cross-grain bending failures. The MASA was shown to be an effective sill plate anchorage device and contributed to good overall shearwall performance when resisting cyclic lateral loads.

Simpson Strong-Tie recommends the MASA anchor for use in shearwalls in Seismic Design Categories (SDC) A through F. Further recommendations for using MASA anchors in shearwalls are as follows:

- Minimum stemwall width shall equal 6" with a minimum concrete  $f'_c = 2500$  psi
- Minimum concrete end distance = 4"
- Minimum anchor spacing = 8"
- Maximum sill plate end distance = 12"
- MASA anchors can be installed on either 2x or 3x sill plates
- A 3x sill plate shall be used when the wall's shear load exceeds 600 plf in Seismic Design Categories D through F



Simpson Strong-Tie performed full-scale shearwall cyclic tests using MASA mudsill anchors at the Tyrell Gilb Research Laboratory

## Prescriptive Spacing for MASA/MASAP to Replace Sill Anchor Bolts

Anchor Bolt Size	Anchor Bolt Spacing	DF 2x4 Sill Plate		HF 2x4 Sill Plate	
		Wind & SDC A&B	SDC C - E	Wind & SDC A&B	SDC C - E
½" Diameter	6' o.c.	6'-0"	6'-0"	6'-0"	6'-0"
	4' o.c.	4'-0"	4'-0"	4'-0"	4'-0"
⅝" Diameter	6' o.c.	6'-0"	5'-0"	5'-8"	4'-7"
	4' o.c.	4'-0"	3'-4"	3'-9"	3'-1"

1. "Prescriptive" denotes designs per the IRC or conventional provisions of the IBC.
2. Detached one- and two-family dwellings in SDC C may use the "Wind & SDC A&B" spacing.
3. Spacing is based on the parallel to plate load direction only.
4. ⅝" diameter AB required in SDC E.

# CAST-IN-PLACE MUDSILL ANCHOR

## MASA/MASAP Allowable Loads

Model No.	Sill Size	Fasteners		Allowable Loads (lbs) <sup>1,2,3,4,5,6</sup>											
				Non Cracked						Cracked					
		Sides	Top	Wind and SDC A & B <sup>5,6</sup>			SDC C-F <sup>6</sup>			Wind and SDC A & B <sup>5,6</sup>			SDC C-F <sup>6</sup>		
				Uplift	F <sub>1</sub>	F <sub>2</sub>	Uplift	F <sub>1</sub>	F <sub>2</sub>	Uplift	F <sub>1</sub>	F <sub>2</sub>	Uplift	F <sub>1</sub>	F <sub>2</sub>
<b>STANDARD INSTALLATION – Attached to DF/SP Sill Plate</b>															
MASA or MASAP	2x4, 2x6	3-10dx1½	6-10dx1½	920	1515	1095	745	1235	1045	785	1515	910	660	1235	765
	3x4, 3x6	5-10dx1½	4-10dx1½	650	1215	725	550	1020	725	495	1215	725	415	1020	640
<b>ONE LEG UP INSTALLATION – Attached to DF/SP Sill Plate</b>															
MASA or MASAP	2x4, 2x6	6-10dx1½	3-10dx1½	785	1005	995	660	845	995	595	1005	965	500	845	810
<b>BOTH LEGS OVER MAX. ½" PLYWOOD OR OSB INSTALLATION – Attached to DF/SP Sill Plate</b>															
MASA or MASAP	2x4, 2x6	9-10dx1½	—	880	1150	900	740	965	755	665	1150	660	560	965	550
<b>DOUBLE 2x INSTALLATION – Attached to DF/SP Sill Plate</b>															
MASA or MASAP	Dbl 2x4, Dbl 2x6	5-10dx1½	2-10dx1½	875	1075	785	735	900	785	660	1075	785	555	900	785
<b>STANDARD INSTALLATION – Attached to HF Sill Plate</b>															
MASA or MASAP	2x4, 2x6	3-10dx1½	6-10dx1½	790	1305	940	640	1060	900	675	1305	785	570	1060	660
	3x4, 2x6	5-10dx1½	4-10dx1½	560	1045	625	475	875	625	425	1045	625	355	875	550
<b>ONE LEG UP INSTALLATION – Attached to HF Sill Plate</b>															
MASA or MASAP	2x4, 2x6	6-10dx1½	3-10dx1½	675	865	855	565	725	855	510	865	830	430	725	695
<b>BOTH LEGS OVER MAX. ½" PLYWOOD OR OSB INSTALLATION – HF Sill Plate</b>															
MASA or MASAP	2x4, 2x6	9-10dx1½	—	570	990	775	635	830	650	570	990	565	480	830	475
<b>DOUBLE 2x INSTALLATION – Attached to HF Sill Plate</b>															
MASA or MASAP	Dbl 2x4, Dbl 2x6	5-10dx1½	2-10dx1½	750	925	675	630	775	675	660	925	675	555	775	675

For SI: 1 inch = 25.4 mm, 1 pound = 4.45 N, 1 psi = 6.895 kPa

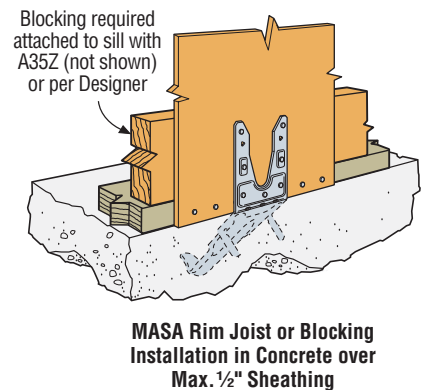
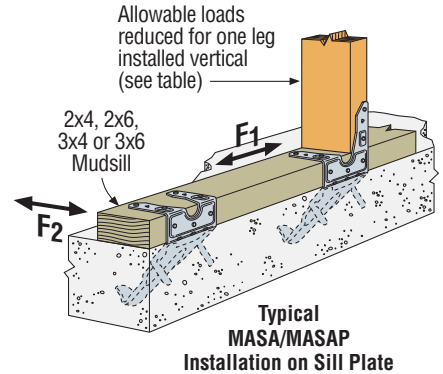
1. Loads are based on allowable stress design (ASD) and include the load duration factor C<sub>D</sub> (with C<sub>D</sub> = 1.6) for wind/earthquake loading. No further increase is allowed. Reduce where other loads govern.
2. Minimum concrete compression strength, f<sub>c</sub> is 2500 psi.
3. Allowable loads are based on a minimum stemwall width of 6".
4. For simultaneous loads in more than one direction, the connector must be evaluated using the Unity Equation.
5. Per Section 1613 of the 2006 IBC, detached one- and two-family dwellings in SDC C may use the "Wind and SDC A&B" allowable loads.

6. In SDC D-F a 3x sill plate is required when the allowable design shearwall shear load is equal to or greater than 600 plf. If the allowable design shear load is greater than 350 plf but less than 600 plf, it is acceptable to use a 2x sill plate provided that the sill is anchored using double the number of MASA mudsill anchors required by design.
7. MASA/P loads are based on testing procedures and calculations from ICC-ES Acceptance Criteria, AC398.
8. **NAILS:** 10dx1½" = 0.148" dia. x 1½" long.

## Bolt Allowable Shear and MASA Spacing for Engineered Design at Shearwalls

Allowable Shear <sup>1</sup> (plf)	2x DF Sill Plate				3x DF Sill Plate				
	Wind and SDC A&B <sup>3</sup>		SDC C-F		Allowable Shear <sup>1</sup> (plf)	Wind and SDC A&B <sup>3</sup>		SDC C-F	
	Anchor Bolt Spacing	MASA Spacing	Anchor Bolt Spacing	MASA Spacing		Anchor Bolt Spacing	MASA Spacing	Anchor Bolt Spacing	MASA Spacing
<b>½" DIAMETER SILL ANCHOR BOLT</b>									
175	6'-0"	6'-0"	6'-0"	6'-0"	205	6'-0"	5'-11"	6'-0"	4'-11"
260	4'-0"	4'-0"	4'-0"	4'-0"	310	4'-0"	3'-11"	4'-0"	3'-3"
390	2'-8"	2'-8"	1'-4" <sup>4</sup>	1'-4" <sup>4</sup>	460	2'-8"	2'-7"	2'-8"	2'-2"
520	2'-0"	2'-0"	1'-0" <sup>4</sup>	1'-0" <sup>4</sup>	615	2'-0"	1'-11"	2'-0"	1'-7"
780	1'-4"	1'-4"	NP <sup>5</sup>	NP <sup>5</sup>	925	1'-4"	1'-3"	1'-4"	1'-1"
1040	1'-0"	1'-0"	NP <sup>5</sup>	NP <sup>5</sup>	1230	1'-0"	0'-11"	1'-0"	0'-9"
<b>¾" DIAMETER SILL ANCHOR BOLT</b>									
250	6'-0"	6'-0"	6'-0"	5'-0"	315	6'-0"	3'-10"	6'-0"	3'-2"
370	4'-0"	4'-0"	2'-0" <sup>4</sup>	1'-8" <sup>4</sup>	470	4'-0"	2'-7"	4'-0"	2'-2"
560	2'-8"	2'-8"	1'-4" <sup>4</sup>	1'-1" <sup>4</sup>	710	2'-8"	1'-8"	2'-8"	1'-5"
745	2'-0"	2'-0"	NP <sup>5</sup>	NP <sup>5</sup>	945	2'-0"	1'-3"	2'-0"	1'-0"
1115	1'-4"	1'-4"	NP <sup>5</sup>	NP <sup>5</sup>	1415	1'-4"	0'-10"	1'-4"	0'-8"
1490	1'-0"	1'-0"	NP <sup>5</sup>	NP <sup>5</sup>	1890	1'-0"	0'-7"	1'-0"	0'-6"

1. Allowable shear is the allowable parallel to plate load for the bolt in wood value, per the 2005 NDS, based on the noted spacing.
2. MASA spacing is the spacing required to match the bolt allowable shear capacity in the F<sub>1</sub> direction.
3. Per Section 1613 of the 2006 IBC, detached one- and two-family dwellings in SDC C may use "Wind and SDC A&B" allowable loads.
4. When the SDC C-F design shear is greater than 350 plf but less than 600 plf, 2 times the number of anchors are required when using a 2x sill plate per IBC Table 2306.4.1. These spacings account for that.
5. NP (not permitted). For SDC C-F design shears greater than 600 plf, a 3x sill is required.
6. ¾" diameter anchor bolt required in SDC E&F.



This flier is effective until ~~January 31, 2012~~, and reflects information available as of January 1, 2010. This information is updated periodically and should not be relied upon after ~~January 31, 2012~~; contact Simpson Strong-Tie for current information and limited warranty or see [www.strongtie.com](http://www.strongtie.com).