SEISMIC ANCHOR STUDS with NUT & WASHER

SAS & SASE

Anchorage of equipment in seismic zones is an important part of system restraint. When anchoring to concrete there are a variety of methods available. One excellent method is the wedge type expansion anchor. Since it is load assisted, it provides excellent resistance to vibration and shock loads. Its slip potential is actually a positive feature in seismic applications, giving early warning of potential failure whereas other anchors just fail catastrophically. Mason's SAS seismic anchor stud is a wedge anchor for suspension applications such as our SCB, seismic cable brace system, for use on piping and suspended equipment. In many parts of the country concrete-filled steel decking is used for floor slabs. The new SAS anchor is approved for use attached to the underside of a concrete filled steel deck in either the upper or lower flutes of the steel deck. Use SASE when you need greater length.

The Mason SAST anchor, on the next page, is a concrete screw. Equipment can be moved into position and the SAST's hole can be drilled through the equipment plate and the anchor screwed in similar to a self tapping steel screw. They can be removed and re-installed in the same hole. This is useful for equipment that must be removed and inspected periodically.

Another excellent device is an Adhesive Anchor. Our Type SRA anchor uses either standard A-307 Grade C or high strength A-193 Grade B7 threaded rod. The new adhesive is a two-component high-solids, epoxy-based anchoring system. It can be used in all non-overhead applications to give you high load capacity. This adhesive will anchor the SRA for higher load capabilities. Another advantage is the lower reduction factors for closer spacings and edge distances. The SRA anchor is weather resistant and can even be installed in water filled holes.

All three of these anchors have been tested in accordance with ACI 355.2 and have obtained ICC Evaluation Services test reports. ACI 355.2 is a testing procedure that includes both cracked and uncracked concrete. The cracked testing is used to evaluate the anchor for seismic installations, and yields lower allowable values.

TYPE SAS STANDARD LENGTH ANCHOR STUD RATINGS BASED ON ALLOWABLE STRESS DESIGN (ASD)

Installed into 2500 psi (17.2 Mpa) Normal Weight or Sand – Lightweight Concrete*

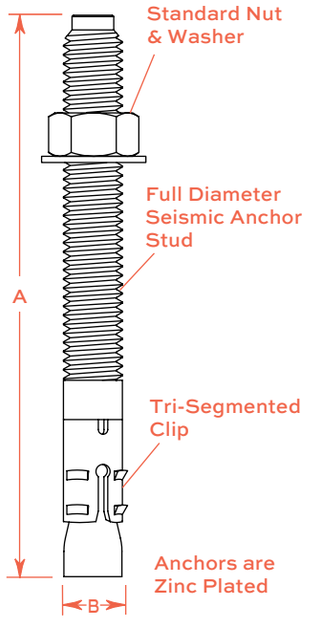
Type & Size	Embedment Depth (in)	Embedment Depth (mm)	Normal Weight Concrete Tension† (lb)	Normal Weight Concrete Tension† (kg)	Normal Weight Concrete Shear (lb)	Normal Weight Concrete Shear (kg)	Lightweight Concrete Tension† (lb)	Lightweight Concrete Tension† (kg)	Lightweight Concrete Shear (lb)	Lightweight Concrete Shear (kg)
SAS-3/8	2	51	445	200	650	295	360	165	390	175
SAS-1/2	2 3/4	70	980	445	1055	480	590	270	635	290
SAS-5/8	3 3/8	86	1325	600	2845	1290	795	360	1710	775
SAS-3/4	4 1/8	105	1520	690	3870	1755	915	415	2325	1055
SAS-1	5 1/4	133	2220	1005	5960	2705	1335	605	3575	1620

TYPE SASE EXTENDED LENGTH ANCHOR STUD RATINGS BASED ON ALLOWABLE STRESS DESIGN (ASD)

Installed into 2500 psi (17.2 Mpa) Normal Weight or Sand – Lightweight Concrete*

Type & Size	Embedment Depth (in)	Embedment Depth (mm)	Normal Weight Concrete Tension† (lb)	Normal Weight Concrete Tension† (kg)	Normal Weight Concrete Shear (lb)	Normal Weight Concrete Shear (kg)	Lightweight Concrete Tension† (lb)	Lightweight Concrete Tension† (kg)	Lightweight Concrete Shear (lb)	Lightweight Concrete Shear (kg)
SASE-3/8	2 7/8	73	950	430	820	390	690	315	820	370
SASE-1/2	3 7/8	98	1275	580	2960	1340	1080	490	2325	1055
SASE-5/8	5 1/8	130	2355	1070	4520	2050	1660	755	3580	1625
SASE-3/4	5 3/4	146	2740	1245	6980	3165	1645	745	4190	1900

SAS & SASE



Anchors have the following Code Reports:

- ICC-ES-ESR-1771 and City of Los Angeles RR25705 for cracked & uncracked concrete
- Florida Statewide Product Approval FL11506.6

NOTES

1. All values are for single anchors with no edge distance or spacing reduction.
2. Anchorage must be designed in accordance with ACI 318-11 Appendix D.
3. Allowable loads are for the attachment of non-structural components.
4. Allowable loads are based on 100% seismic loading in seismic design categories C-F.

*These values are applicable when the anchors are installed with periodic special inspection as set forth in Section 1701.5.2 and Section 1704.13 of the IBC.

†The Tension values may be increased for greater compressive strength, up to 8500 psi (58.6 Mpa), by multiplying the value by $(F'c/2500)^{0.5}$, where F'_C is the specified strength of concrete in psi.

For example: SAS-1/2 in 4000 psi normal weight concrete $T = \left(\frac{4000}{2500}\right)^{0.5} \times 980 \text{ lb} = 1240 \text{ lb}$

TYPE SAS & SASE ANCHOR STUD RATINGS BASED ON ALLOWABLE STRESS DESIGN (ASD)

Type & Size	Embedment Depth (in)	Embedment Depth (mm)	Tension (lb)	Tension (kg)	Shear (lb)	Shear (kg)
SAS-3/8	2	51	430	195	725	330
SASE-3/8	3 3/8	86	760	345	1590	720
SAS-1/2	2 3/4	70	695	315	970	440
SASE-1/2	4 1/2	114	930	420	2085	945
SAS-5/8	3 3/8	86	890	405	1200	545
SASE-5/8	5 5/8	143	1700	770	3185	1445

Installed in the Soffit of 3000 psi (20.7 Mpa) Normal Weight or Sand - Lightweight Concrete-Filled Profile Steel Deck Assemblies*.

Anchors must be installed in either the lower or upper flutes of the profile deck.

For combined allowable stress design tension and shear forces on anchors, use the following equation:

$$\frac{\text{T Applied}}{\text{T Allowable (ASD)}} + \frac{\text{V Applied}}{\text{V Allowable (ASD)}} \leq 1.2$$

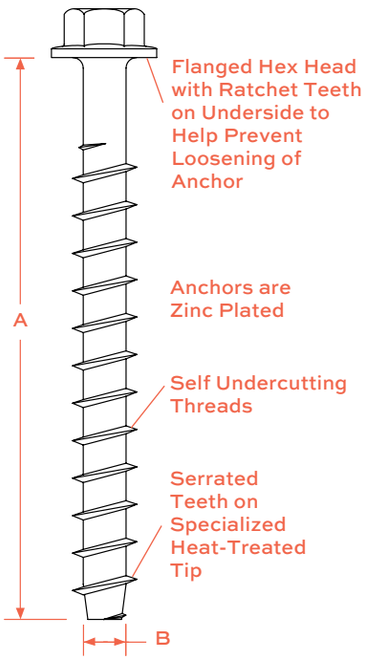
TYPE SAS & SASE ANCHOR STUD DIMENSIONS

Type & Size	A (in)	A (mm)	B (in)	B (mm)	Maximum Tightening Torque (Ft-lb)	Maximum Tightening Torque (N-m)
SAS-3/8	3 1/2	89	3/8	10	30	41
SAS-1/2	4 3/4	121	1/2	13	50	68
SAS-5/8	5	127	5/8	16	85	116
SAS-3/4	6 1/4	159	3/4	19	180	244
SAS-1	7	178	1	25	230	312
SASE-3/8	5	127	3/8	10	30	41
SASE-1/2	5 1/2	140	1/2	13	50	68
SASE-5/8	7	178	5/8	16	85	116
SASE-3/4	8 1/2	216	3/4	19	180	245

SEISMIC ANCHOR SELF-TAPPING & SEISMIC ROD ANCHORS

SAST & SRA

SAST
SEISMIC ANCHOR SELF-TAPPING



TYPE SAST ANCHOR BOLT RATINGS BASED ON ALLOWABLE STRESS DESIGN (ASD)
Installed into 2500 psi (17.2 Mpa) Normal Weight or Lightweight Concrete*

Type & Size	Embedment Depth (in)	Embedment Depth (mm)	Normal Weight Concrete Tension† (lb)	Normal Weight Concrete Tension† (kg)	Normal Weight Concrete Shear (lb)	Normal Weight Concrete Shear (kg)	Lightweight Concrete Tension† (lb)	Lightweight Concrete Tension† (kg)	Lightweight Concrete Shear (lb)	Lightweight Concrete Shear (kg)	Max. Tightening Torque (Ft-lb)	Max. Tightening Torque (N-m)
SAST-3/8	3 1/4	83	920	410	1160	525	555	250	695	315	50	68
SAST-1/2	4	102	1500	680	2010	910	900	405	1205	545	65	88
SAST-5/8	4 1/2	114	1810	820	3870	1755	1085	490	2325	1055	140	190
SAST-3/4	5 1/2	140	2070	940	3925	1780	1245	565	2355	1065	150	205

See NOTES below.

For combined allowable stress design tension and shear forces on anchors, use the following equation:

$$\frac{\text{T Applied}}{\text{T Allowable (ASD)}} + \frac{\text{V Applied}}{\text{V Allowable (ASD)}} \leq 1.2$$

*These values are applicable when the anchors are installed with periodic special inspection as set forth in Section 1701.5.2 and Section 1704.13 of the IBC.

†The Tension values may be increased for greater compressive strength, up to 8500 psi (58.6 Mpa), by multiplying the value by $(F'c/2500)^{0.5}$, where F'_c is the specified strength of concrete in psi.

For example: SAST-1/2 in 4000 psi normal weight concrete $T = \left(\frac{4000}{2500}\right)^{0.5} \times 1500 \text{ lb} = 1895 \text{ lb}$

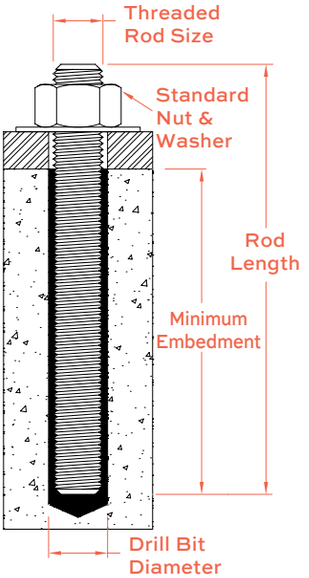
TYPE SAST ANCHOR BOLT DIMENSIONS

Type & Size	A (in)	A (mm)	B (in)	B (mm)
SAST-3/8	4	102	3/8	10
SAST-1/2	5	127	1/2	13
SAST-5/8	6	152	5/8	16
SAST-3/4	7	178	3/4	19

Anchors have the following Code Reports:

- ICC-ES-ESR-2713 and City of Los Angeles Report RR25741 for cracked & uncracked concrete
- ICC-ES-ESR-1056 and City of Los Angeles Report RR25560 for CMU (Concrete Masonry Units)
- Florida Statewide Approval FL11506.7
- Factory Mutual 3017082

SRA
SEISMIC ROD ANCHOR



TYPE SRA ANCHOR DATA

Type & Size	Threaded Rod Size	Rod Length (in)	Rod Length (mm)	Embedment Depth (in)	Embedment Depth (mm)	Drill Bit Dia. (in)	Minimum Concrete Thickness (in)	Minimum Concrete Thickness (mm)	Maximum Tightening Torque After Curing (Ft-lb)	Maximum Tightening Torque After Curing (N-m)	Number of Anchors that can be Installed per 22oz of Adhesive
SRA-3/8	3/8-16 UNC	6	152	4	102	1/2	5 7/8	149	10	14	40
SRA-1/2	1/2-13 UNC	7	178	5	127	5/8	7 1/2	190	20	27	30
SRA-5/8	5/8-11 UNC	8	203	6	152	3/4	9 1/4	235	30	41	20
SRA-3/4	3/4-10 UNC	9	229	7	178	7/8	10 3/4	273	45	61	14
SRA-1	1-8 UNC	11	280	9	229	1 1/8	14	355	80	108	7

CURE SCHEDULE †

Concrete Temperature °F	Concrete Temperature °C	Cure Time (Hrs)
50	10	72
70	21	24
90	32	24
110	43	24

†For water saturated concrete, these times should be doubled.

For combined allowable stress design tension and shear forces on anchors, use the following equation:

$$\frac{\text{T Applied}}{\text{T Allowable (ASD)}} + \frac{\text{V Applied}}{\text{V Allowable (ASD)}} \leq 1.2$$

Anchors have the following Code Reports:

- ICC-ES-ESR-2508 and City of Los Angeles Report RR25744 for cracked & uncracked concrete
- NSF/ANSI Standard 61 (216 in^2 / 1000 gal)

NOTES

1. All values are for single anchors with no edge distance or spacing reduction.
2. Anchorage must be designed in accordance with ACI 318-11 Appendix D.
3. Allowable loads are for the attachment of non-structural components.
4. Allowable loads are based on 100% seismic loading in seismic design categories C-F.

TYPE SRA ANCHOR RATINGS BASED ON ALLOWABLE STRESS DESIGN (ASD)
Installed into 2500 psi (17.2 Mpa) Normal Weight Concrete*

Type & Size	A307 Grade C Threaded Rod Tension (lb)	A307 Grade C Threaded Rod Tension (kg)	A307 Grade C Threaded Rod Shear (lb)	A307 Grade C Threaded Rod Shear (kg)	A193 Grade B7 Threaded Rod Tension (lb)	A193 Grade B7 Threaded Rod Tension (kg)	A193 Grade B7 Threaded Rod Shear (lb)	A193 Grade B7 Threaded Rod Shear (kg)	A193 Grade B6 Stainless Steel (Type 410) Threaded Rod Tension (lb)	A193 Grade B6 Stainless Steel (Type 410) Threaded Rod Tension (kg)	A193 Grade B6 Stainless Steel (Type 410) Threaded Rod Shear (lb)	A193 Grade B6 Stainless Steel (Type 410) Threaded Rod Shear (kg)	A193 Grade B8 Stainless Steel (Type 18-8, 304) Threaded Rod Tension (lb)	A193 Grade B8 Stainless Steel (Type 18-8, 304) Threaded Rod Tension (kg)	A193 Grade B8 Stainless Steel (Type 18-8, 304) Threaded Rod Shear (lb)	A193 Grade B8 Stainless Steel (Type 18-8, 304) Threaded Rod Shear (kg)
SRA-3/8	1585	720	895	405	1585	720	1930	880	1585	720	1350	615	1585	720	700	320
SRA-1/2	2360	1070	1595	720	2360	1070	3440	1560	2360	1070	3410	1545	2360	1070	2325	1055
SRA-5/8	2440	1105	2540	1150	2440	1105	5475	2480	2440	1105	5425	2460	2440	1105	3700	1680
SRA-3/4	4780	2165	3755	1700	4780	2165	8095	3670	3820	1730	8015	3635	3820	1730	5465	2480
SRA-1	7270	3295	6815	3090	7270	3295	14685	6660	7270	3295	14560	6610	7270	3295	9925	4500