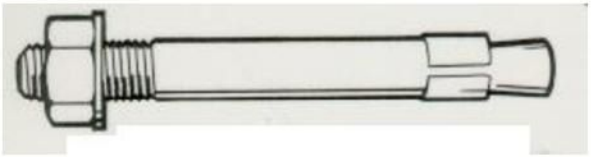
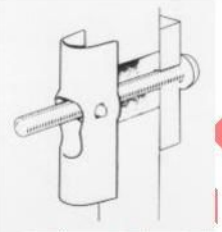
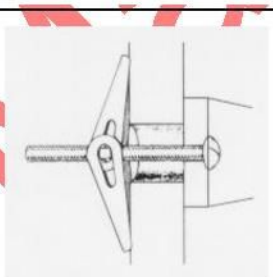
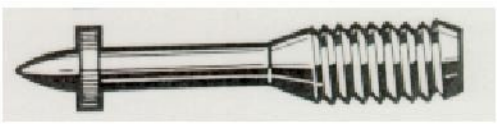
Topics 1- 4 Fix and Secure Electrotechnology Equipment

1. What are the following FASTENERS and state where they are used in industry?

	Item name Bugle Head Item use Fixing to wood or light guage steel
	Item name Dyna Bolt/ Sleave anchor/Masonary anchor Item use Fixing to concrete
	Item name Flat blade counter sunk wood screw Item use Fixing heavier equipment to wood
	Item name Gravity toggle Item use fixing light weight items to walls
	Item name Spring toggle Item use Fixing light weight items to ceilings
	Item name Powder actuated fixing Item use Fixing into concrete or steel

2. A coach screw is: (tick the most correct answer)
   a) metal thread screw for fixing metal brackets
   b) used to fix into sheet metal to sheet metal
   c) a masonry device
   d) used for heavy duty fixing in to timber

3. Brick work is drilled using: (tick the most correct answer)
   a) a spade bit
   b) a twist drill
   c) a bradawl
   d) a tungsten tipped drill

4. A through fixing is: (tick the most correct answer)
   a) a fixing that penetrates a wall
   b) a fixing made through the item to be supported
   c) only used for hollow walls
   d) a chemical type fixing

5. Self-tapping screws are used for fixing: (tick the most correct answer)
   a) into plasterboard or timber
   b) into sheet metal or timber
   c) into concrete or sheet metal
   d) into brick mortar or plasterboard

6. Chemical anchors are used where: (tick the most correct answer)
   a) fixing into sheet metal near an edge is required
   b) fixing into plasterboard near an edge is required
   c) fixing into timber near an edge is required
   d) fixing into masonry near an edge is required

7. This question relates to the 3 types of fixing devices described on the next 3 pages.

   Fill in the missing information in the table below

Fixing devices	Anchor size	Length minimum	Drill size in concrete	Hole size in fixture	Embed depth	Tension	Shear
SPIKE	6.5 mm	25 mm	6.5 mm	8 mm	25 mm	127 kg	252 kg
HAMMER SCREW	6.5 mm	32 mm	6.5 mm	6.5 mm	29 mm	153 kg	204 kg
SCREW BOLT	16 mm	65 mm	16 mm	19 mm	65 mm	948 kg	1550 kg
SPIKE	5 mm	25 mm	5 mm	6.5 mm	22 mm	97 kg	148 kg
SCREW BOLT	10 mm	60 mm	10 mm	12 mm	40 mm	500 kg	663 kg

Product description

The SPIKE® anchor is a patented, one-piece, tamper-proof, vibration resistant anchor for use in cocrete, block, brick or stone. Several head styles and anchor materials are available. The SPIKE® anchor is formed with an "S" shaped configuration at the working end of the anchor to create an expansion mechanism. Since the anchor is pre-expanded, there is no secondary operation required which greatly reduces the overall cost of an anchor installation

Size range

Head style	Anchor size	Ø mm	mm
Mushroom	5	5	25,32,38,50
	6.5	6.5	25,38,50,63,75,102
	3/8"	10	2",2-1/2",3",4"
Countersunk	5	5	65,75,100
	6.5	6.5	38,50,65,75,100

Note: The sizes in RED are also available in 316 stainless steel.

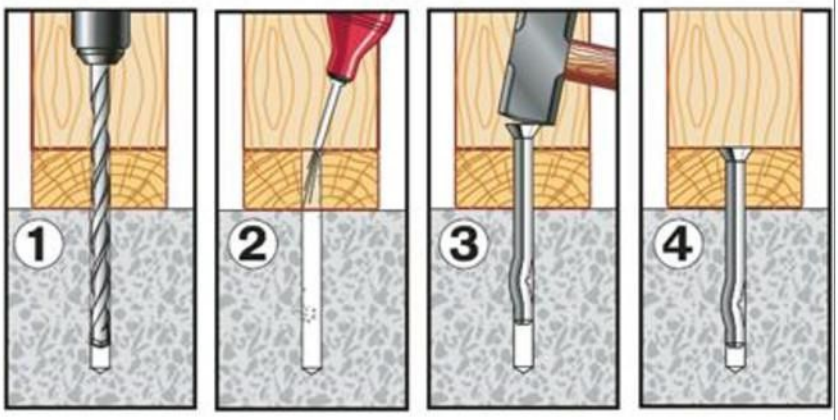
Suitable base materials

Concrete Block Brick Stone

Allowable working loads for carbon steel SPIKE®

Anchor Size mm	Drill Ø in concrete mm	Hole Ø in fixture mm	Embed. Depth mm	30 MPa Concrete	
				Tension kg	Shear kg
5	5	6.5	22	97	148
6.5	6.5	8	25	127	252
3/8"	10	11	45	329	793
5 SS	5	6.5	22	97	140
6.5 SS	6.5	8	25	117	265
3/8" SS	10	11	45	278	716

Installation



1 Drill hole with the correct drill to the embedment depth
2 Clean hole from debris
3 Hammer in SPIKE®
4 Installed SPIKE®.

Product description

Blue-Tip Screwbolt is one-piece unit featuring a finished hex head formed with an integral washer, a patented dual lead thread and a chamfered tip. Blue-Tip Screwbolt anchors are versatile and can be used in a variety of base materials. The anchor cuts a thread into base material, exerting no expansion force to the base material. These anchors can be installed closer to the edge/edges than tradtional mechanical anchors without damaging the base material. Dual thread design facilitate faster installation and double the mechanical engagement than single lead thread of the same helix angle.

Size range

Anchor size mm	Ø mm	T mm
5	5	50
6.5	6.5	30, 50, 75, 100
8	8	50, 75, 100
10	10	60, 75, 100, 120
12	12	75, 100, 150
16	16	100,150

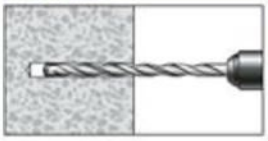
Suitable base materials

Concrete Block Brick Stone

Allowable working loads

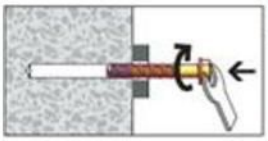
Anchor Size mm	Drill Ø in concrete mm	Hole Ø in fixture mm	Embed. Depth mm	Torque Nm	30 MPa Concrete	
					Tension kg	Shear kg
5	5	7	25	8	82	163
6.5	6.5	8	25	15	245	286
8	8	10	35	45	408	479
10	10	12	40	55	500	663
12	12	15	50	80	734	1010
16	16	19	65	100	948	1550

Installation



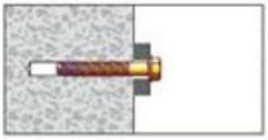
Using the proper diameter bit, drill a hole into the base material to a depth of at least one to two anchor diameters deeper than the embedment required.

Blow the hole clean of dust and other material.



- Insert the anchor through the fixture into the anchor hole.
- Begin tightening the anchor by applying forward pressure when engaging the first thread.

Additional initial forward pressure may be required for installation in high strength, dense base materials.



- Continue tightening the anchor until the head is firmly seated against the fixture.
- Be sure the anchor is at the required embedment depth.
- Don't exceed the maximum clamping torque.
- The installation is now complete.

Product description

The Zamac Hammer-Screw® is a unique, one-step drive anchor featuring a No. 2 Phillips type head and a screw thread for use in concrete, block, brick or stone. This anchor is an improvement over standard Nailin anchor. Unlike, standard Nailin anchors, the Zamac Hammer-Screw® has a Phillips head screw which facilitate the removal of the complete anchor, if required, and provide higher load capacity.

Size range

Part No	Description	Ø mm	mm	mm	qty	qty
ZHSA6525	6.5 x 25mm		25	10		
ZHSA6532	6.5 x 32mm		32	13		
ZHSA6538	6.5 x 38mm	6.5	38	22	100	500
ZHSA6550	6.5 x 50mm		50	28		
ZHSA6575	6.5 x 75mm		75	35		

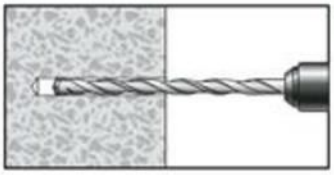
Suitable base materials

Concrete Block Brick Stone

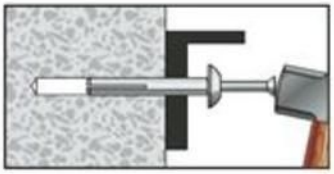
Allowable working loads

Anchor Size mm	Drill Ø in concrete mm	Hole Ø in fixture mm	Embed. Depth mm	30 MPa Concrete	
				Tension kg	Shear kg
			16	96	
			22	133	
6.5	6.5	6.5	29	153	204
			35	173	
			48	184	

Installation

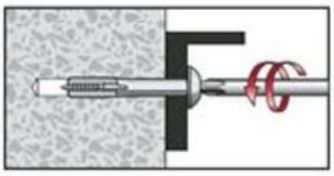


Drill a hole to the size and embedment required.



Insert the anchor through the fixture.

Hammer the screw into the anchor body to expand it. Be sure the head is seated firmly against the fixture and that the anchor is at the proper embedment.



To remove – Press a Phillips screw driver firmly into the screw head and turn counter clockwise. Remove the screw from the anchor body, then pry out the fixture and anchor body simultaneously by working the claw of a hammer under the fixture.

8. Who is responsible for housekeeping in the workplace?
(1 mark)

All staff and management

9. List the OH&S precautions that would be needed when using equipment to affix Hollow wall fixings.

Ensure correct PPE and check that the wall for services

10. List the safety precautions when using a pneumatic drill

Ensure correct PPe including eye protection, hearing, and watch for Circulation problems and vibration

11. Name three different types of adhesives and give an application for each.

Epoxies – these are made of resin base and hardeners. Setting a heavy duty fixing
Acrylic – they require exposure to UV to cure properly. Where impact needs to be considered
Film adhesives –They have special paper which needs to be peeled off. Labelling
There are others

12. There are four different methods of cleaning the surfaces which are to be bonded using adhesive. Name two of these cleaning methods.

Clean with either detergents or chemical
Abarde/ rough up to allow for better bond and remove hard films

13. What installation method would you use to ensure the maximum strength of a joint using double sided tape?

Cleaning would first using solvents and abraiding may be required. Make sure surface Is sealed and free of moisture

14. Before climbing a ladder to install fixings what precautions must observed

You are trained for working at heights. The ladder is not too far from the work so you are not stretching or leaning from the ladder

15. When using a drill bit to prepare for fixing, what consideration must be given to speed of the drill compared to the bit size and material being drilled.
Please also list what PPE should be used and why

The drill should be adjusted so that the bigger the bit the slower the speed
and the correct bit should be used eg masonry for masonry wood for wood
Safety glasses and hair tied back if required, as well as ear protection if necessary

16. In addition to gas operated fastening tools there are powder tools. Please name both types of powder tools.

Direct acting – usually requires licence as the fixings travels down the barrel
Indirect acting - licence not required as the piston strikes the fixing in place