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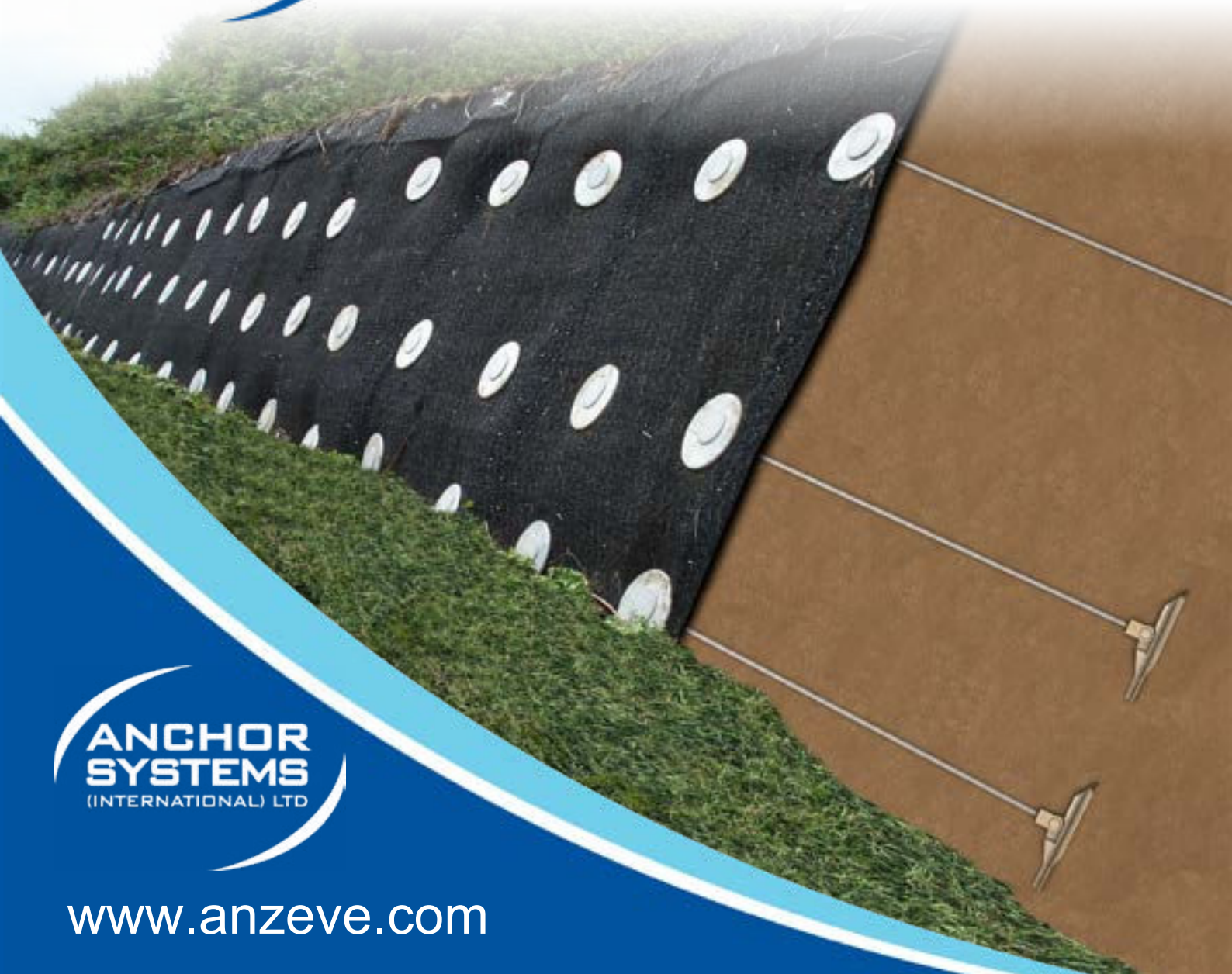
Vulcan Earth Anchors®

Load Range 1 - 450 kN

PRODUCTS, APPLICATIONS AND TECHNICAL INFORMATION

VULCAN® EARTH ANCHOR SYSTEMS



ANCHOR SYSTEMS (INTERNATIONAL) LTD

www.anzeve.com

Home of the Vulcan Earth Anchor®

MADE IN BRITAIN

ANCHOR SYSTEMS (INTERNATIONAL) LTD

ABOUT ANCHOR SYSTEMS (INTERNATIONAL) LTD

Anchor Systems (International) Ltd specialises in the design, manufacture and supply of earth anchoring systems and solutions worldwide. Our Vulcan range of Earth Anchors were designed in house and are the largest and most versatile globally, and have extensively been utilised for many universal applications.

Established in 1995, Anchor Systems have become the 'Go To' experts for mechanical earth anchoring solutions in the civil engineering and geotechnical world. Renowned for providing top quality products along with a first-class service – we have gained a reputation of always providing our clients with trusted solutions to fit their requirements as well as their budget.

At Anchor Systems we pride ourselves on providing full support as part of our service, which we believe goes above and beyond that of our competitors. This starts from the enquiry where we work with our clients to gain a full understanding of what they are trying to achieve and how they like to work. We then offer full support and advice throughout the design and ordering process and even when our client has received their goods – we don't leave it there. We go on to offer support, training and on-site supervision and will always make sure our clients are completely happy throughout the whole process. We can also provide clients with bespoke designed products that can be unique to them and their project.

VULCAN EARTH ANCHORS®

The Vulcan Earth Anchor range was designed by Anchor Systems (International) Ltd as a simple, reliable and cost-effective ground anchoring solution with the ability to provide immediate loading capacities from 1 - 450kN in displaceable ground conditions with extensive applications.

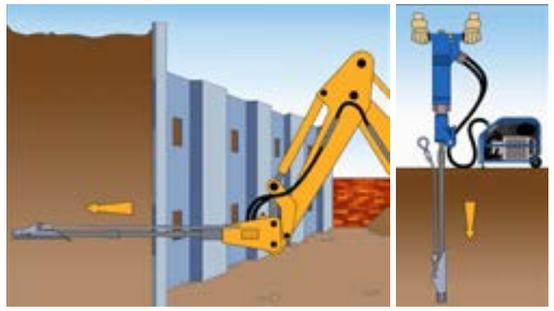
The concept involves a specially designed earth anchor with a larger surface area, attached to high yield tie bars or tendons to suit a variety of conditions, being driven into the ground where it is locked in position. The tensile load is applied, and the exposed end locked off and terminated.

With their ease of use and speed of installation, Vulcan Earth Anchors provide a time and cost saving alternative to more traditional means of anchoring, particularly where tight programme schedules are involved. This, combined with the wide range of sizes available means that the Vulcan Earth Anchor has gained recognition across a vast array of applications internationally.

- Larger surface area allowing the Vulcan Earth Anchor to achieve the greatest holding capacity in all ground conditions
- Rapid installation
- Largest range of anchors in the World ranging from 1 - 450kN+
- We are the only company globally to manufacture and stock fully stainless-steel systems
- Bespoke design available
- Huge stock of plant and products with next day delivery available
- Made in Britain

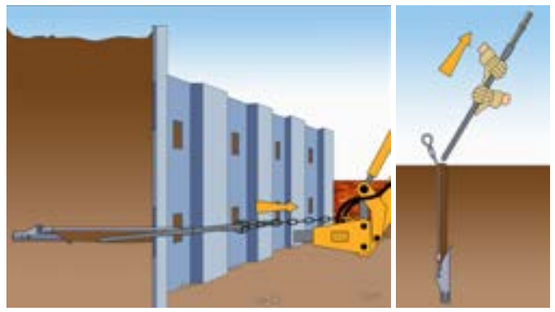
INSTALLATION

MACHINE MOUNTED | **HAND HELD**



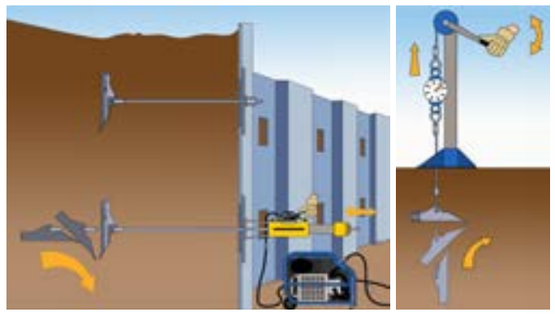
Vulcan anchors are designed to be driven into the ground using hydraulic or percussion equipment, with little or no disruption to the structure or surrounding area.

MACHINE MOUNTED | **HAND HELD**



Once the anchor has been driven to the required depth the drive rod is removed for reuse.

MACHINE MOUNTED | **HAND HELD**



A tensile load is applied to the attached tie bar or tendon. This rotates the anchor into the locked position for maximum load holding capacity. The anchor is then proof tested to the designed loading requirements before the top termination is fitted, as specified by the civil or structural engineer.

APPLICATIONS

CIVIL ENGINEERING & CONSTRUCTION

- Retaining Walls
- Heritage Wall Stabilisation
- Soil Stabilisation
- Permanent & Temporary Structures
- Drainage

MARINE

- Anti-Flotation
- Pipeline Anchoring
- Embankment Stabilisation
- Mooring Anchors

HIGHWAYS

- Sheet Piling
- Gravity Walls
- Road Sign Anchoring

UTILITIES

- Backstay Anchors
- Scaffold Anchoring
- Kentledge alternative

SOLAR

- Solar Panel Anchoring

HORTICULTURE & AGRICULTURE

- Rootball Tree Kits
- Overhead Guying
- Vineyard Trellis Anchors
- Polytunnel Anchoring

RAIL

- Bridge Wall Repairs
- Rockfall Barriers
- Cable Posts
- Walkways & Handrails
- Embankment Protection

DOMESTIC

- Retaining Garden Walls
- Polytunnels
- Garden Room Bases
- Trampoline Anchoring

GEOTEXTILES

- Cliff Face
- Landslip Stabilisation
- Bank Stabilisation

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The Vulcan® Range

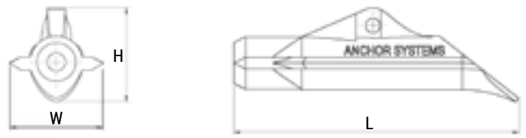
Anchor System	AS01	AS05	AS10	AS20	AS30	AS50	AS90	AS120	AS200	AS300	AS400
Tendon type	3mm	M-8	M-12	16mm HYB	16mm HYB	20mm HYB	20mm HYB	25mm HYB	28mm HYB	30mm HYB	30mm HYB
Independent destructive TEST of mechanical anchor head (kN)	5	30	55	70.74	112.6	195.3	195.3	222.2	356.7	450	500
Ultimate strength of tendon (kN)	6.98	15	64	121	121	188	188	295	370	566	566
Limiting structural strength	4.5	13.5	49.5	63.7	101.3	169.2	169.2	200.0	321.0	405.0	450.0
Anchor head surface area mm2	1,500	3,481	6,781	15,637	21,130	29,093	48,734	104,517	65,886	104,769	216,078

All kN loadings are based upon the optimal tendon choice for the mechanical Anchoring systems to achieve Ultimate Resistance test.

Common Soil Type Description	Blow Count or "SPT"	Ultimate anchor resistance (kN)									
Very Dense and/or Cemented Sands Course Gravel & Cobbles	60 +	4	13	27	63	87	119	169	199	271	405	450
Dense Fine Sand Very Hard Silts & Clays	45 - 60	4	12	24	57	77	106	169	199	242	384	450
Dense Clays, Sands & Gravel Very Stiff to Hard Silts & Clays	35 - 50	4	10	20	48	64	89	149	199	202	322	450
Medium Dense Sandy Gravel Very Stiff to Hard Silts & Clays	25 - 40	3	8	16	38	52	72	120	199	163	259	450
Medium Dense Course Sand & Sandy Gravel; Stiff to Very Stiff Silts & clays	14 - 25	2	5	11	26	35	49	82	177	112	178	367
Loose to Medium Dense Fine to Course Sand; Firm to Stiff Clays & Silts	7 - 14	1	4	7	18	24	33	56	121	76	121	251
Loose Fine Sand; Alluvium;Soft-Firm Clays; Varied Clays; Fill	4 - 8	1	3	6	14	18	26	43	93	58	93	193
Peat, Organic Silts; Inundates Silts Fly Ash	0 - 5	1	2	4	10	14	19	33	71	45	71	148

N.B. For guidance purposes only – True capacity must be tested with a load locker: Previous project tests have shown that if an earth anchor is grouted into poor ground, the results that can be achieved are favorable to increased tensile loading capacity. **Note:** All below ground work should be undertaken after properly reviewing survey documentation on services. It is imperative in all cases that anchors are fully load locked before being out into service.

SIZES AND WEIGHTS



Anchor	L - mm	W - mm	H - mm	Weight kg
AS01	77	26	23	0.03
AS05	127	41	35	0.22
AS10	168	70	72	0.96
AS20	240	76	95	2
AS30	293	88	107	3
AS50	375	98	110	4
AS90	375	178	109	5
AS120	500	300	178	10
AS200	500	172	150	10
AS300	500	300	176	15
AS400	650	450	176	29

Performance

CORROSION SUSCEPTIBILITY OF METALS

LEAST SUSCEPTIBLE TO CORROSIVE ATTACK (more noble)

Platinum
Gold
Silver

Stainless Steel, Type 316 (passive)
Stainless Steel, Type 304 (passive)
Titanium and its alloys
Monel
Copper-nickel alloys
Copper

Aluminium bronzes
Gunmetals
Brasses
Tin
Lead
Stainless steel, Type 316 (active)
Stainless Steel, Type 304 (active)
Lead/tin solder, 50/50
Stainless steel, Type 410 (active)

Cast iron
Mild steel
Cadmium

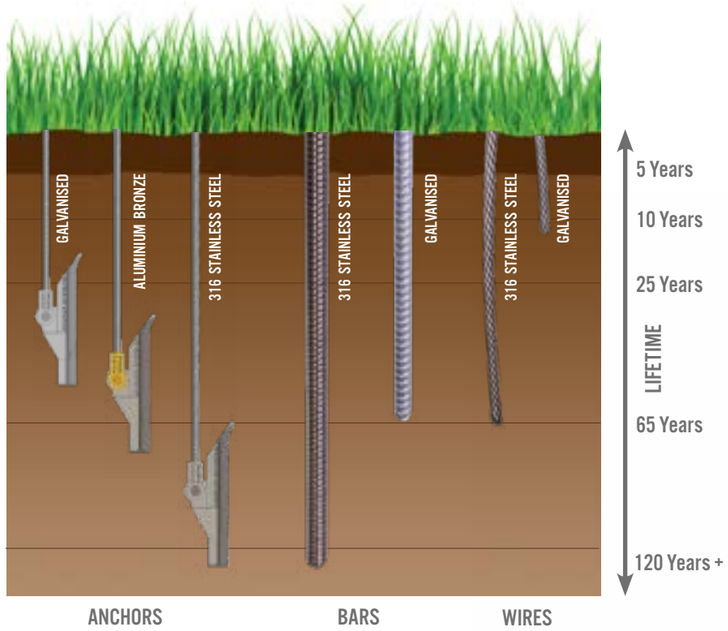
Aluminium and its alloys
Zinc and its alloys
Magnesium and its alloys

MOST SUSCEPTIBLE TO CORROSIVE ATTACK (less noble)

Anchor Systems are the only company globally to offer such an extensive range of mechanical ground anchors with loading capacities from 1-450kN+.

Our Vulcan Earth Anchors are produced from a range of durable materials to accommodate for the varied environments that they are used in.

We produce our systems from a range of high quality materials to provide a system design life from 5 years to 120+ years. These are typically either fully galvanised, a mixture of galvanised, aluminium bronze and stainless steel or a complete 316 stainless steel system.



ANCHOR	ANCHOR TYPE
	AS01 1 - 4 kN
	AS05 2 - 13 kN
	AS10 4 - 27 kN
	AS20 10 - 63 kN
	AS30 14 - 87 kN
	AS50 19 - 119 kN
	AS90 33 - 169 kN
	AS120 71 - 199 kN
	AS200 45 - 271 kN
	AS300 71 - 405 kN
	AS400 148 - 450 kN

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Bars, Wires, & Accessories

All Anchors, Tendons and Terminations are available in the following materials:
Galvanised Steel - Aluminium - Bronze - 316 Stainless Steel - Nylon - Titanium - Mild Steel

Below is a selection of some of our Anchors, Tendons and Accessories. For further information or for a full list of our products and components please get in touch with one of our team members who will be happy to help.

ANCHOR HEAD

AS01

AS05

AS10

AS20

AS30

AS50

AS90

AS120

AS200

AS300

AS400

TENDONS

Stainless Steel Wire

Galvanised Wire

Clear PVC Coated Wire

Black PVC Coated Wire

Paracord

Stainless Steel All Thread Bar

Galvanised All Thread Bar

Webbing Strap

TERMINATIONS & ACCESSORIES

Bull Dog Clips

Soft Eye

Thimbles for Hard Eyes

D-Ring

Barrel & Wedge Grip

Turnbuckle

Wire Joiners

Ratchet Tensioners

Hemi Washers

Load Nut

Domed Load Nut

Couplers

Tapered Washers

Separation Top Hats

Eye Nuts

D-Ring

Ratchet Tensioner

Plates Available

All plates are available in various sizes and materials to accommodate your requirements.

FLAT PATTRESS PLATE
Designed predominately for slope stabilisation where the anchor is driven perpendicular to the slope surface.

COMBI-TECH
An innovative design using the Vulcan mechanical earth anchor technology combined with the sock anchor technology that offers a completely concealed system. This systems allows the original drilled core to be placed back into its original position which entirely hides the anchor termination. Ideal for heritage and conservation works or installations where cosmetics are of paramount importance. This system can be installed at any angle.

FLAT PATTRESS PLATE (WITH WIRE)
This Pattress Plate finish is designed and used in the same way as the Flat Pattress Plate above. Replacing the lock nut with a barrel and wedge grip allows the plate to be used with wire instead of bar.

FORMED PATTRESS PLATE
Designed for retaining walls and slope stabilisation where there is a requirement for a large degree of flexibility of the angle the anchor is to be driven. This plate is used with a Domed Load Nut to terminate the bar.

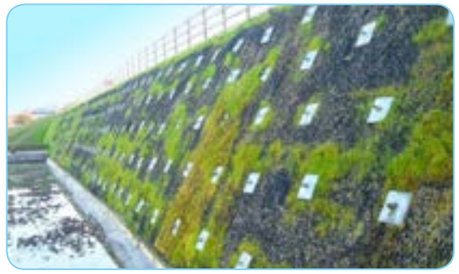
TAPERED WASHER PATTRESS PLATE
For use in applications similar to that of ones that may use a Formed Plate - where there is a requirement for a large degree of flexibility of the angle the anchor is to be driven but require a much higher load to be applied to the plate.

RECESSED PATTRESS PLATE
This Plate is ideal for heritage and conservation works or installations where aesthetics are of great importance. The plate is designed to achieve an attractive, flush finished appearance with the termination completely hidden. This type of plate provides safety for areas of high public traffic where a protruding tendon could injure a pedestrian.

WEDGE BOSS PATTRESS PLATE
A wedge boss allows for installations where there is a requirement to drive the anchor to an angle of up to 45 degrees whilst also allowing for a good degree of flexibility and well as being able to transfer high loads.

ANCHOR DRAIN
The Anchor Drain is installed in the same way as a Vulcan Earth Anchor and is designed to alleviate water pressure in a slope or behind a wall. The system is finished of either by pointing mortar or a bespoke plate design that will allow the water to flow. Please ask one of our team for full details.

Plates in Use



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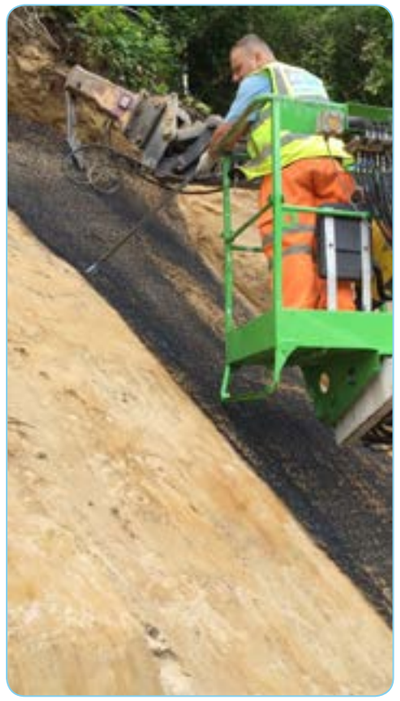
Our Systems

GEOTEXTILES

We offer a wide range of solutions for geotextile, slope stabilisation and erosion control. Our mechanical anchoring systems are designed for any ground, earth and soil stabilisation associated with geotechnical engineering and securing geotextile and geosynthetic materials into position until vegetation can take effect.

Our geotechnical anchoring systems have been developed to integrate with the majority of mesh, geotextile and geofabric solutions available from all the major manufactures. These systems can be installed to supplement, combine with or replace existing installations as well being used to stabilise virgin embankments as the system of choice.

Fast and simple to install, with the ability to provide maximum earth retention immediately whilst allowing the positioning of the geotechnical materials and anchor installation to be carried out simultaneously, achieving instant security, thus, adding value by reducing program and labour resources.

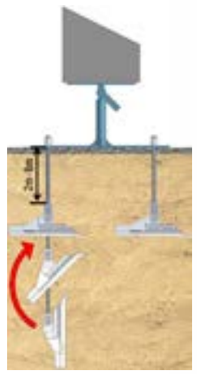


TEMPORARY STRUCTURES

At Anchor Systems we have created and developed our range of systems to provide first-rate foundations to replace concrete systems for an array of temporary and permanent structure applications. Easy and fast to install, they are also easily removed with minimal ground disturbance involved, allowing the ground to be returned to its original state. Anchors used for temporary structures can also very often be reused when works/events are complete and relocated.

Favoured over wet trades due to its ease and speed of installation, with immediate load capacity achieved at time of installation, the Vulcan Earth Anchor offers significant cost and time savings for our clients as well as reduced mobilisation of vehicle and installation plant.

- Air Domes
- Marquees
- Temporary Arenas
- Temporary lighting and staging structures
- Secure site storage
- Pitch Covers



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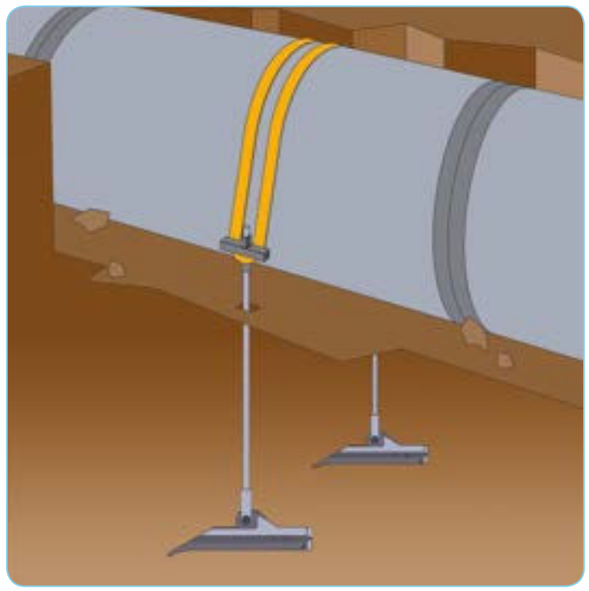
Our Systems cont.

PIPELINES

Anchor Systems have provided bespoke anchoring systems to the pipeline industry for many years and we have technical approval for our products and systems associated with pipeline stabilisation and buoyancy control from GDF Suez.

Whether your installation is above or below ground level or underwater, our Vulcan pipeline anchoring systems come with an array of benefits over traditional systems.

Our pipeline system works with two anchoring points at either side of the pipeline, the strap is looped and connected to the anchors before tensioning with a ratchet tensioner over the pipeline, making installation far easier and more reliable than loading at each anchoring point.



MARINE

Anchor Systems (International) Ltd is the only company worldwide that offers full marine grade Stainless Steel or Duplex systems for marine environments. These systems will give the strength and durability required for such harsh conditions and our installation plant has been built to work in fully submerged/underwater situations in any marine environment. We have also completely eradicated the use of any small plastic parts that can deteriorate or come loose and pollute our oceans, seas and waterways.

We offer several types of systems for erosion control, prevention and protection as well as retaining and stabilisation solutions. Bespoke solutions and systems can also be designed and supplied if required.

ANCHOR DRAINS

Vulcan Anchor Drains are a quick, simple and effective means of reducing water saturation within slopes and behind retaining walls. A length of specialist drainage material is secured to the Vulcan anchor bar by means of cable ties and strain relief nuts. Once the anchor has been installed in the normal way the drive rod is withdrawn and the Anchor Drain provides an instant drainage channel.

- Ideal for road, railway embankments or retaining walls
- Prevents ground becoming saturated
- Retro-fit solution
- Rapidly and easily installed
- Simple, effective and economical
- Helps avoid embankment failure

COMBI-TEC & SOCK ANCHORS

The Sock Anchor comprises of a high strength stainless steel Rib Bar surrounded by a woven elastic polyester Grout Sock, sealed at both ends, which is inserted into a pre-drilled hole in the structure to be stabilised and pressure grouted to form a strong mechanical and chemical reinforcement. The exposed elements can then be fully concealed making it an ideal solution for heritage applications.

Developed by Anchor Systems the Combi-Tec combines a Vulcan Earth Anchor with the Sock Anchor. The Sock is inserted over the Vulcan Anchor before filling with grout to produce a mechanical and chemical bond with the structure. This provides more support that the Sock Anchor alone while allowing the Vulcan Earth Anchor to have a completely concealed top termination.

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Our Systems cont.

TREE KITS

Anchor Systems offer an extensive range of tree kits, providing a discreet anchoring system for securing newly planted trees of all sizes in most situations. Our widely used tree kits are strong, durable, practical and very cost effective. We are constantly developing, innovating and updating our range of unique underground fixing solutions in line with our customer's requirements. Our wide variety of solutions make us first choice for all sapling and tree anchoring needs. Please see our Tree Kit Brochure or website for the full range of systems available.

- Wire or Strap Rootball Systems
- Overhead Guying System
- Dead man and Drop-man Systems
- Containerised Rootball System
- Suitable for small trees under 2m to large trees over 12m
- Innovative rootball protection for direct load transfer and easier installation
- Easy installation with handheld equipment

VINEYARDS

In the past, traditional systems that support the vines have failed due to poor materials and techniques used. We have been supplying vineyard trellis anchoring systems for a number of years and have an extensive knowledge and experience in this field. This knowledge has allowed us to develop systems that are cost effective, simple and rapid to install and achieve a sustained tension to the trellis system to eliminate sagging and failure.

These systems have also been extended to be used across different areas of horticulture, including anchoring for hop farms and orchards as well as being used to secure polytunnels for nurseries.

SOLAR

When installing land solar panels we have a few different options available for helping to make sure the supporting framework is held in place, so it is always best to speak to one of our highly trained members of staff to assist you with your exact requirements. Solutions can be designed using either our patented Anchor Post (please see page 19) or our Vulcan Earth Anchor combined with accessories.

Both systems are far quicker to install than using wet trades and they also have a lower environmental impact. The systems can also be removed allowing the ground if to be returned to its natural state after its design life.

BACK-STAY AND SCAFFOLD

The Vulcan Backstay Anchor has been developed based on the requirements set out in the Energy Networks Association (ENA) Technical Specification (TS) 43-91 - (Stay Fitting for Overhead Poles). Our Backstay Anchor is designed with a continuity band that allows electricity to be safely channelled to ground in the event of a lightning strike.

Our Scaffold Anchor and catenary wire system for overhead line maintenance is widely used for the security and safety of work personnel carrying out works over highways. We have developed a new AS-20 scaffold system to offer an easier, faster installation and load locking process whilst offering a higher factor of safety on the systems components whilst limiting manual handling requirements on site.

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Installation Service & Equipment

When you purchase a product through Anchor Systems there's no need for you to shop around trying to find installation equipment or specialist installers. We can supply you with all the tools and training you need or if you require a complete supply and installation service, we have our very own list of approved and experienced contractors who have undertaken specialist training to install Vulcan Anchors.

SITE TESTING

The chosen anchor system should always be proof tested on site prior to starting work. Site tests are vital, especially when soil test reports are not available as they allow the confirmation of maximum loading achievable in the areas that the ground anchors are to be positioned and also allow for creep testing.

SITE PREPARATION

Before any anchors are installed it is always recommended to use a CAT scanner to the required depth to check for buried services.

PERSONAL PROTECTION EQUIPMENT

At Anchor Systems (International) Ltd we strongly recommend that before you install any type of below ground system that the proper safety equipment is worn. Please see below the recommended personal protection equipment –

- Hard Hat
- Safety Boots
- Goggles
- Overalls
- Ear Defenders
- Gloves

Plant

Anchor Systems (International) Ltd have created specialist installation tools that are fit for the purpose of efficiently installing and tensioning our Ground Anchors. All of our equipment is available to either hire out for the length of time you require it for or to purchase. If you would like to know more about our equipment specifications then we will happily provide you with this on request.

HANDHELD EQUIPMENT

We offer a range of handheld installation and loading equipment that is fit for the purpose of efficiently installing and tensioning our Vulcan Earth Anchors from the AS-05 (5kN) up to an AS-90 (90kN) capacity. We have also tried to keep the individual plant unit weights as low as possible to ensure that our anchoring systems can be installed as easily as possible.

TRUNDLE PACK

Our focus is to ensure that the plant that we provide is both robust and quick for hand held plant installation. With this in mind we have developed the Trundle Pack which contains the installation equipment you need altogether on one easy to manoeuvre trolley. The Trundle Pack has been designed for rough terrain and long-distance sites with poor access meaning there is no need to make multiple trips back and forth to your vehicle when unloading.

- All in one installation pack
- Easy start power pack
- Easy lift points for in and out of vans
- Powerful and light weight
- Compact for tight and restricted areas
- Unleaded fuel, no need to mix up 2 stroke fuel
- Reliable and robust
- Anti-vibration breaker
- Suitable for installing AS-05 to AS-90 anchors

MACHINE MOUNTED

All installations over 90kN would be conducted using machine mounted equipment required for our heavy-duty range of anchors ranging from 120kN to 400kN capacity. We can supply an adaptor pot fit for breaker points up to 110mm, drive adaptor and drive extensions.

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Other Products

HELICAL ANCHORS

Anchor Systems (International) Ltd was the original inventor of the helical anchor to which we hold the UK registered design. Our Helical Anchors can be used as an alternative to our higher capacity Vulcan Earth Anchors in areas where access is difficult and heavily restricted or when wanting to re-use anchors multiple times in quick succession. Helical Anchors are easily installed using a small hand-held bar or lightweight auger equipment making them highly versatile for a wide variety of applications from boat mooring to bank abseiling.

GEO-SCREW®

We have recently developed the Geo-Screw®, a high load ground anchoring screw designed to hold most types of geotechnical materials to most types of ground with a rapid installation time. This product is designed as a replacement to traditional U pins and pegs that can be awkward to install and often pull out of position. Unlike other systems that require the purchase of extra tools and accessories, the Geo-Screw can be easily installed with a universal battery powered drill alone.

- Easy installation with universal drill, no accessory chuck needed
- Achieves a higher load than competition
- Quicker to install compared to conventional pins
- Reduced screws required per square metre
- Easy to handle
- Available in recycled or biodegradable materials
- Close contact between the earth and matting
- Suitable for poor ground conditions
- No need for a separate washer
- Does not unpin
- Cost- effective
- Easily removable
- Discrete

ANCHOR POST

Our patented Anchor Post is a versatile and adaptable foundation system for small to medium light-weight structures and it is ideal for situations that require a fast and efficient installation process due to time and access constraints as it doesn't require the use of heavy machinery. Anchor Posts can usually be driven into the ground, on average, within 1 to 8 minutes and come with the added benefit of being able to mount your structure to the Anchor Post foundation immediately.

Anchor Posts come in a wide variety of sizes and formats for use in different applications but they all work on the same simple principle. The anchor is simply hammer driven straight into the ground, then the alignment plate is secured to the top at surface level and an interface plate of the required specification is bolted into place. It is immediately ready for its desired application. This rapid and economical procedure allows far more posts to be positioned in considerably less time. Please see our Anchor Post Brochure or website for the full range of systems and applications available.

- Cable stiles
- Solar panels
- Signage posts
- Fencing posts
- Barriers
- Rockfall barriers
- Security fencing
- Mooring bollards
- Handrails
- Park benches
- Street furniture
- Trackside cable management (CRMS)
- Park and playground equipment
- Lighting and signalling post foundations
- Embankment steps and walkway foundations

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FOR TECHNICAL ADVICE OR
FURTHER INFORMATION PLEASE CONTACT:

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VULCAN® EARTH ANCHOR SYSTEMS

Certificate Number 6087 ISO 9001 · RISQS AUDITED · RISQS VERIFIED · member of the railalliance · Achilles UVDB QUALIFIED · Constructionline · MADE IN BRITAIN

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