



Palisafe™

Class 1a GRP Composite security and
boundary fencing system

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Palisafe™: Key Features

Palisafe™ is a Class 1A security fence and an aesthetic boundary fence rolled into one. A viable 'whole of life cost' alternative to traditional steel palisade security fencing as well as traditional painted wooden boundary fences: it offers asset owners the ability to replace these short lived traditional materials with a durable and long lasting product that also brings many other advantages

Palisafe™ has been developed to offer an exceptionally long life, good looks and safety from electrical touch potential hence why there's no surprise it is widely adopted for use in rail and power networks.



Various Pale Tops



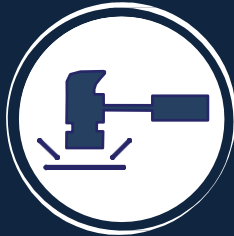
Pass Through Pales cannot be levered from rail

Palisafe™ : Key Features



Assured

Complies with BS1722:12 2016 testing and sizing requirements. All profiles, CNC machining and assembly made in the UK.



Durable

With a design life in excess of 60 years, Palisafe™ is highly impact resistant, will not rot like wood or rust like steel and will keep its' good looks long after traditional alternatives have needed to be replaced.



Secure

Pass through pale to rail design means pales cannot be levered from the rail; a common way of breaching steel palisade fence; especially the case with other GRP



Non-Conductive

Palisafe™ cannot conduct electricity: Eliminating the need for bonding; for which; it is increasingly difficult to get designs approved. It also eliminates the need to annually risk assess and maintain bonding. Removing secondary Health & Safety risk for Rail companies' trackside.



Lightweight

Factory Pre-made panels can easily be handled by two persons. As such; they can be lifted into place and fixed within seconds: Leading to drastically reduced installation times.



Low Carbon Footprint

The materials and process have a much lower carbon footprint than steel with the low temperature energy process, lightweight shipping and limited secondary handling all contributing to a low carbon coefficient



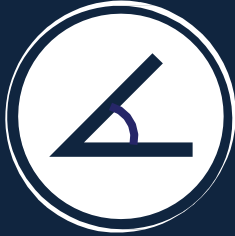
Product Approvals

Already used by Network Rail Off Track RAMs, CrossRail and various Train Operating Companies (TOCs), various Energy Companies including UKPN & by Royal Mail.



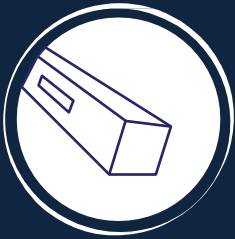
Simple Maintenance

Palisafe™ provides the ability to quickly and easily replace pales on site should accidental damage occur. Otherwise, the fence greatly reduces whole of life maintenance. Fit it and Forget it.



Sloping Sites

Due to its' unique design: Panels provide site adjustment for a 6 percent rake in either fall or raise. As all products are produced in house; more challenging slopes such as rail embankments and steel walls can also be catered for through bespoke produced panels.



Posts

BOXposts™ come pre-slotted for in-line pass through, corner or end post purposes. The BOXpost™ not only provides a stronger post than traditional I-Beams but the finished product is much more attractive. Available in standard buried; with keying post-mix holes or with the QUICKfoot™ for secure, surface mount fixing to hard standings.



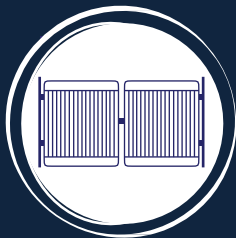
Rails

Box section rails are very strong and delivers a fence that is has no creep/ sag issues like the standard angle rails supplied with other budget GRP fences. This also means fixings are concealed and the finished fence is much more aesthetic



Pales

Top Hat or traditional 'W' and Circular or box are available with many topping designs including standard security 'sharp point', 'rounded' or 'soft flat' being the most popular



Gates

Purpose designed pedestrian and vehicular gates with various hinge and locking options are available.



Options

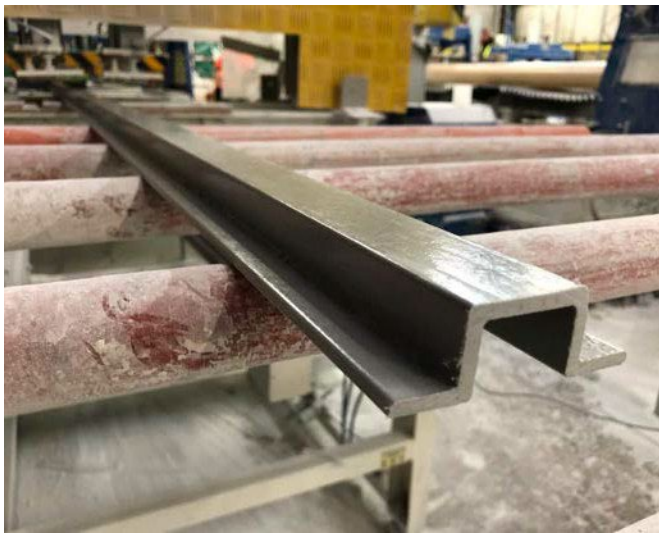
A full range of standard sizes are available with options for bespoke sizes and colours. Different accessories can be added to provide a truly tailored solution to your fence requirements

Palisafe™ Explained : How is it made?

Palisafe™ fencing is entirely manufactured and assembled by UK Pultrusions Limited at its premises in North Wirral.

All profiles used in the system are manufactured using the pultrusion process which combines Polyester resin, Glass fibres and process additives to produce the pale, rail and box post profiles. The Pultrusion process is widely recognised as the best composite process for high strength, providing a continuous production thus allowing for alternative cut lengths and colourings to suit. The materials and process have a much lower carbon footprint than steel with the low temperature energy process, lightweight shipping and limited secondary handling all contributing to the low carbon coefficient.

Additionally, the process greatly reduces environmentally impact unfriendly scrap, generated compared with imported 6 metre profiles that are cut down to size to supply alternative GRP systems.



Pultruding the Profiles



Precision CNC Machining of Components



Hand Assembling the Panels



Palisafe™ Explained: How is it shipped?



Bespoke reusable Stillage's

Produced by Plura; specially to make storing, shipping and moving of fence packs easily



Palisafe™ Explained : On site

Lightweight Sections

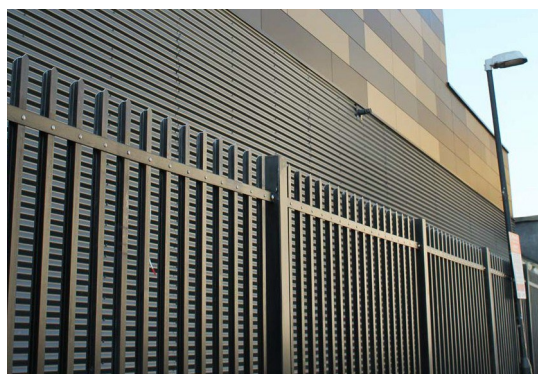
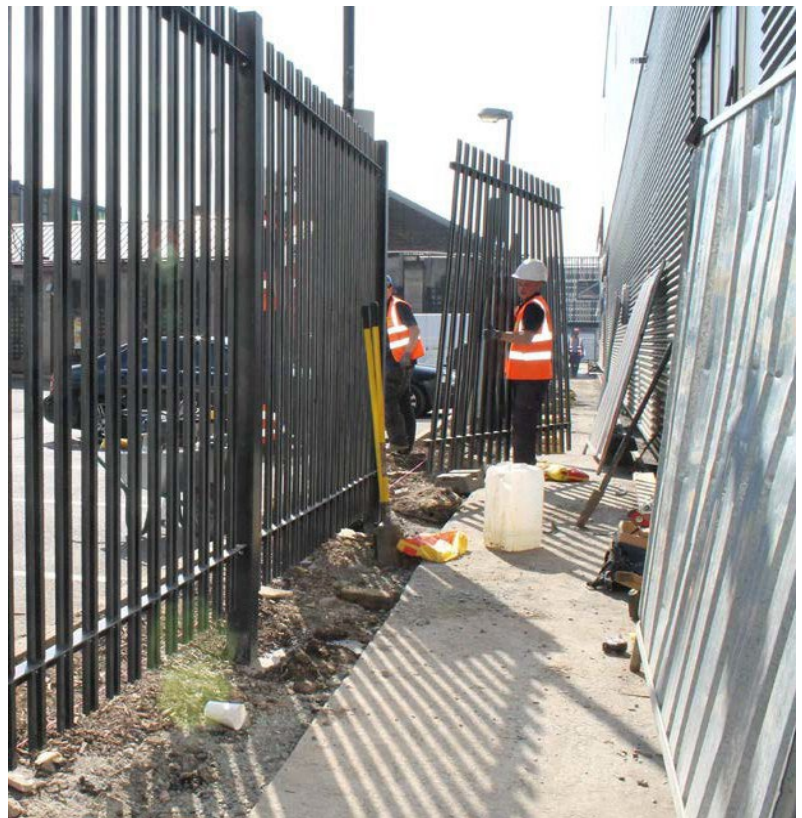
As panels are lightweight, even for the tallest fences; they can easily be lifted by one or two persons onto the fishtail fixings projecting from the posts.

Fast Installation

This in turn greatly reduces installation times when compared with traditional steel fences, which due to their heavy weight, must be installed a single pale at a time.

Secondary benefits of this; reduction of possession times and securing the site in less time.

The resultant installation has not only been installed quicker & provides better security but will far outlast traditional fences and it looks great!



Palisafe™ Explained: Why is it better?

Palisafe™ is the perfect combination of all the features and the installation & maintenance benefits that asset owners require when compared with other fence systems and materials.

The table below highlights this by breaking out and scoring the features asset owners and installers typically look for. Palisafe™ is the only system that scores full points.

| Material / Makeup Y=1 Point N =0 Points ? = Unknown (Given 1 Point) | Palisafe™ | STEEL (e.g. Palisade) | WOOD (e.g. Palisade) | GRP (Face) | GRP (Pass Thru & Glued) |
|--|-----------|--------------------------|-------------------------|---------------|-------------------------------|
| Feature | | | | | |
| Non - Corrosive / Non - Rot | Y | N | N | Y | Y |
| Non - Conductive so requires Zero bonding | Y | N | Y | Y | Y |
| Full colour range: Gy, Gn, Wt, BK, Bu within 4 weeks | Y | Y | Y | N | N |
| Through coloured & cannot peel / chip | Y | N | N | Y | Y |
| Completely manufactured in the UK | Y | ? | ? | ? | ? |
| Security Level 1a (Pales cannot be levered from rails) | Y | N | N | N | Y |
| Compliant with loadings in BS1722:12 2016 | Y | Y | N | ? | ? |
| Gates, pedestrian and vehicular | Y | Y | Y | Y | Y |
| Equally at home as decorative or security fence | Y | N | N | N | ? |
| Features Points total | 9 | 3-4 | 3-4 | 4-6 | 5-8 |
| Installation | | | | | |
| Average time to install each panel in minutes | 5 | 15 | 15-20 | 15-20 | 5 |
| Available as 'Made up Panels' | Y | N | N | ? | Y |
| Available 'Flat Packed' | Y | Y | Y | ? | N |
| Can be Raked for slopes | Y | Y | Y | Y | N |
| Lightweight and therefore easy to transport to site | Y | N | ? | Y | Y |
| Full range of accessories: Fans, Post Feet etc | Y | Y | ? | Y | ? |
| Installation Points total | 6 | 3 | 2-4 | 3-5 | 3-4 |
| Maintenance | | | | | |
| Virtually zero maintenance (not from damage) Pales easily remove & replaced if damaged | Y | N | N | Y | Y |
| Spare parts readily available | Y | Y | Y | Y | N |
| Life expectancy in years | Y | Y | ? | Y | ? |
| | 60+ | 15 | 6-8 | 60+ | 60+ |
| Maintenance Points Total | 4 | 2 | 1-2 | 4 | 2-3 |
| Point Total | 19 | 8-9 | 6-10 | 11-15 | 10-15 |



Corrosion: The killer of assets

Millions of Pounds are spent every year by Rail asset owners, in maintaining fencing. Mainly replacing single components, where the buildup cost over time can be eye watering high! The main reason for replacement? Rotted/Corroded elements. Particularly with wood where environmentally negative preservative treatments are not only being legislated against, but morally; who wants to use a product that has a bad environmental impact these days? GRP provides the perfect 'fit it and forget it' solution to this.



Beware of Imported Products

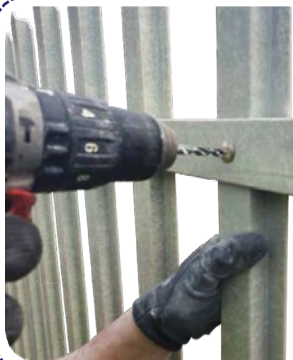


Site drilled and fitted pales are much more susceptible to incorrect pale spacings



Sloping Sites

The pale fixings, when combined with a little oversize tolerance in the pass-through slot; means that Palisafe™ can be raked on a sloping site: A feature any fencing contractor will say is "essential" in a fencing product. Having a fixed panel that can only be used where the site is totally flat is in-practical, or requires the expensive addition of more posts; which is one of the reasons why; when Palisafe™ was designed; UK Pultrusions chose to use stainless steel fixings rather than gluing pales to rails



Future pale removal for Maintenance.

Given the 60 plus year design life for Palisafe™; it is possible that at some point during its' life span a pale; intentionally or otherwise; may become damaged. A fixing means replacement is a relatively simple task; using a tungsten drill bit; the two security fixings for the pale can be drilled out within 10 minutes; the damaged pale slid out and a new pale slid into place; with new fixings applied within a couple more minutes.

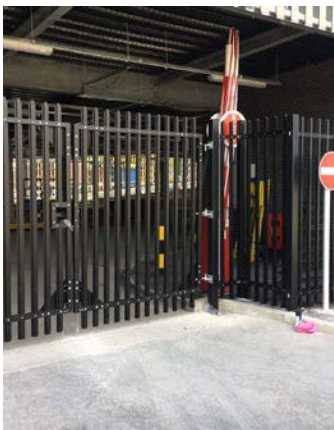
Palisafe™ Explained: Options and Accessories

Palisafe™ truly comes to its' own when the full system is considered and it is this breadth and depth of options and accessories that marks it out from other GRP fence products, which are simply offered as component parts or fixed rigid panels.

Gates

Gates are made using the same pass-through design, so security is not compromised at all. In both single Pedestrian and double Vehicular types; from 900mm up to 5 metre standard widths.

Hinges and Catches are provided; accordingly, with all pedestrians' gates having Tru-close, self-closing hinges as standard and vehicular gates having galvanized steel pin and eye hinges with GRP re-enforcement gussets in gate corners. Locking is as per customer requirements, usually via padlocks.



Non-Standard Panels

In situations where the standard 2.6-metre-wide panel is not a suitable width, or where a greater angle of rake is required than the rake available in our standard Palisafe™ panel; for example, 45 degrees.

QUICKfoot™

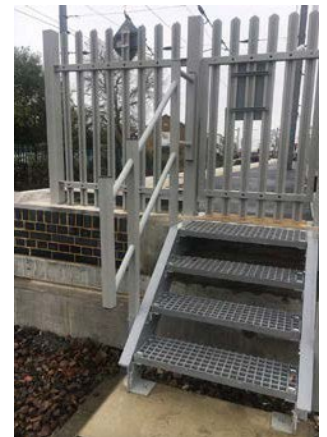
Ideal in hard standing areas or in places where post burial is not an option.

Now in its' 5th design iteration; this fitting keeps post firmly and strongly in place; a clever internal design feature means posts cannot shear if adverse or surcharge loading is applied to the top half of the post.



Steps and Ramps

Ideal for use in the rail sector; stairs and ramps can be incorporated into the fence system using the same GRP materials. These colour match perfectly with the Palisafe™ fence colours.



Palisafe™ Explained: Options and Accessories

One of the real benefits of UK production is the range of accessories seen in standard steel fences; not readily available from importers but fabricated in-house at UK Pultrusions.

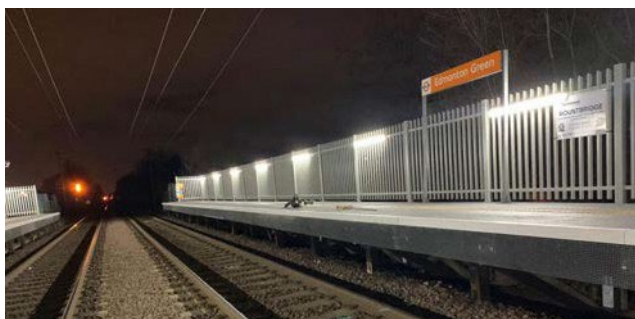
Built in Signposts

Save on the cost of separate sign posts; with an added benefit in rail of 'de-cluttering' station platforms



Built in Lighting Posts

As with the Signposts; de-cluttering of platforms is further possible by combining our BOXposts™ with station lighting. As the post are hollow; they can also be provided with a panel to the rear for cable placement and access.



Specialist Posts

If the fence is to be fitted to an existing structure, such as a platform; Palisafe™ posts can be provided over length & with specialist fixings.



Anti Burrowing

As detailed in BS1722:12 2016; Pales can be extended and buried (standard 350mm). These buried pales will not rot or rust as with traditional materials.



Electrified Fence Top

Palisafe™ is ideal for this use; as it is totally non- conductive and all fixings are factory cnc machined to take the wires. posts will remain in situ: UK Pultrusions work with the market leading suppliers of electrical security topping systems.



Steel Post Insulating Cap

Where POLYsade® is used to break electrical continuity in an existing steel fence run and the existing steel posts will remain in situ: The POSTcap™ can be fixed over any standard steel I beam post to eliminate the danger of touch potential.



Palisafe™: Standard Dimensions

Table 1 : Dimensions for General Purpose GP Palisafe™ Fencing

| British Standard Type Reference | Fence Height above Ground (m) | Posts | | Rails (Horizontal) | | Pales (maximum gap between pales 89mm) | |
|---|-------------------------------------|----------------------------|---------------|------------------------------------|-------------------------|---|------------------------------------|
| | | Embedded Length (mm) | Length (m) | Connector Bolt Diameter (mm) | Oversail Top (mm) | Oversail Bottom (mm) | Connector Bolt Diameter (mm) |
| GP 11 (Not covered in BS 1722-12:2016) | 1.1 | 525 | 2.60 | 10 | 225 | 150 | 6 |
| GP 11 (Not covered in BS 1722-12:2016) | 1.2 | 525 | 2.60 | 10 | 225 | 150 | 6 |
| GP 15 | 1.5 | 525 | 2.60 | 10 | 225 | 150 | 6 |
| GP 18 | 1.60 | 525 | 2.60 | 10 | 225 | 150 | 6 |
| GP 21 | 2.1 | 625 | 2.60 | 10 | 275 | 200 | 6 |
| GP 24 | 2.4 | 725 | 2.60 | 10 | 300 | 210 | 6 |
| GP 27 (Not covered in BS 1722-12:2016) | 2.7 | 825 | 2.40 | 10 | 300 | 210 | 6 |

Table 2 : Dimensions for Security Purpose SP Palisafe™ Fencing

| British Standard Type Reference | Fence Height above Ground (m) | Posts | | Rails (Horizontal) | | Pales (maximum gap between pales 89mm) | |
|------------------------------------|-------------------------------------|----------------------------|---------------|------------------------------------|-------------------------|---|------------------------------------|
| | | Embedded Length (mm) | Length (m) | Connector Bolt Diameter (mm) | Oversail Top (mm) | Oversail Bottom (mm) | Connector Bolt Diameter (mm) |
| SP 30 | 3.0 | 925 | 2.0 | 10 | 475 | 380 | 6 |
| SP 36 | 3.6 | 1125 | 1.5 | 10 | 650 | 550 | 6 |
| | | | | | | | |

Palisafe™ : Example Specification

Example Specification Clause: Fence for Back of Rail Platform Applications

1.0 Basic Fence Makeup

- 1.1 GRP Fence; Pales, Rails, Posts and Fishplates shall be tested in accordance with BS1722-12:2016 and evidenced
- 1.2 Steel components used within the GRP fence structure shall comply with BS11722-12:2016
- 1.3 GRP Fence components shall conform with BS EN 13706 Grade E17
- 1.4 GRP Posts, Rails & Pales shall all match in colour and be to the following RAL numbers: Grey RAL 7040, Green RAL 6005, Black RAL 9005, White RAL 9010
- 1.5 GRP Fence shall be supplied in panels factory constructed under ISO 9001:2015 factory production control FPC
- 1.6 In situations where an unassembled GRP fence is required for reasons of site access; all components shall have all fixing holes pre-made at a factory under ISO 9001:2015 FPC for a consistent site assembly
- 1.7 As per the requirements in BS1722-12:2016: GRP fence shall be supplied with a Certificate of Conformity to this specification
- 1.8 GRP Fence shall have a minimum raking value of 100mm raise or fall for every 2700mm of fence line run
- 1.9 GRP Fence posts shall have the ability to be surface fitted on hard standing in addition to the standard buried method, without loss of performance under 1.1, 1.2, 1.8 or 1.9 in this specification
- 1.10 GRP Fences shall consist of Standard and Non-Standard Panels & Posts, Pedestrian & Vehicular Gates, 45 Degree or similar acute Sloping Panels and End of Fence Fans
- 1.11 GRP Fence shall have the ability to remove and replace any damaged components, specifically the Pales

2.0 Fence Height:

- 2.1 GRP Fence shall be 1.80 metre height

3.0 Application

- 3.1 GRP fence shall comply with BS EN 1991-1-1:2002 Horizontal load requirement Class C5
- 3.2 GRP fence of 1.5 metres or shorter in height shall have a rounded top

Palisafe™ : Case Studies

Palisafe™ having many uses and configurations, has a lot of potential applications. Across the next 4 pages are a collection of case studies showing Palisafe™ (previously Polysade) security Fencing in different situations.

Royal Mail Sorting Office

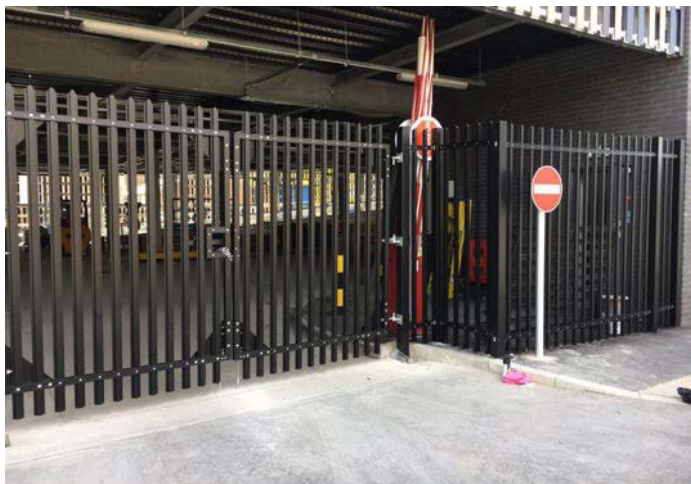
Product: Polysade™ Composite Touchsafe Security Fencing System 2.4m finished height. Iron Black

Project Owner: Royal Mail

Contractor: Volker Fitzpatrick

Project Details: New build Sorting Office in Nine Elms London

Reasons for Use: Long life of asset - Plus 60 years
Secure - no possibility to 'lever' bottoms of pails from the cross rail
Fast installation time - installed in step with the removal of hoardings



Oulton Station

Product: Polysade™ Composite Touchsafe Delineating Fencing System 1.5metres finished height. Polar White.

Project Owner: Abelio Trains Greater Anglia

Contractor: Kier Rail

Project Details: Replacement of wooden picket station fencing as part of station improvements.

Reasons for Use: Elimination of rotting wooden fencing.



UK Power Networks

Product: Polysade Composite Touchsafe Security Fencing System 2.4m finished height. Holly Green

Project Owner: UK Power Networks

Contractor: Four Seasons Fencing Ltd

Project Details: New build of Low Carbon Battery storage facility

Reason For Use: Zero conductivity - No risk of shock to staff and public

Long life of asset - Plus 60 years

Very Secure - No possibility to 'lever' bottom of pales from the cross rail: the only GRP security fence approved by UKPN



Crossrail Hayes

Product: Polysade Composite Touchsafe Security Fencing System 2.4m finished height. Steel Grey.

Project Owner: Network Rail: Crossrail Hayes

Contractor: Carillion

Project Details: Surround to Substation providing power to overhead lines. Overhead lines, Electrical equipment and live rail line all within very close proximity.

Reason For Use: Long life of asset - plus 60 years

Fast installation time

No bonding required



Palisade™ : Case Studies

Edmonton Green

Product: Polysade Composite Touchsafe Security Fencing System 1.80metres finished height. Steel Grey.

Project Owner: Network Rail & Transport for London

Contractor: Cleshar & Hammond Rail

Project Details: Platform & rear fence upgrade Edmonton Green and Silver Street stations

Reasons for Use: Built in lighting & fixings to wooden trestle



Shepreth Station

Product: Polysade Composite Touchsafe Security Fencing System 2.4m finished height with built in sign posts. Trash Screens and End of Platform gates and steps finished in Steel Grey.

Project Owner: Network Rail: Anglia Route

Contractor: Volker Fitzpatrick & Walker Construction Ltd

Project Details: Platform Upgrade

Reasons for Use: Non-Conductivity - no risk of shock to staff and public

Long life of asset - plus 60 years

Complete System - providing the total solution for fencing, signage and access

Fast installation



Palisafe™: Case Studies

Swindon Solar Farm

Product: Polysade Composite Touchsafe Security Fencing System 2.4m finished height. Steel Grey.

Project Owner: British Solar Renewables

Contractor: Renewable Energy Connections connecting to SSE

Project Details: Solar farm near Swindon Wiltshire - Surround to connection point to the grid for substation overhead lines.

Reasons for Use: Gave the ability to place the fencing much closer to the earth mats

Lightweight panels - easy to manoeuvre on a remote site

Fast installation time - was erected in a day



Watford Junction Station

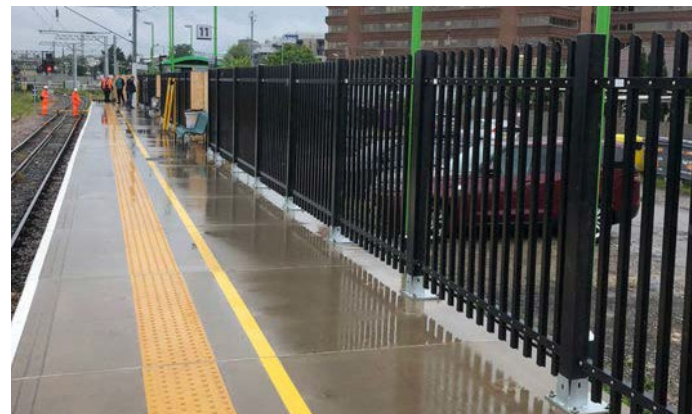
Product: Polysade Composite Touchsafe Security Fencing System 1.8m finished height. Iron Black.

Project Owner: Network Rail

Contractor: Murphys

Project Details: Security fencing running in close proximity to track and overhead electrical cables

Reasons for Use: Zero Conductivity - No risk of touch potential and UK produced



Palisafe™ : How to Order

1.0 Site Information

In order to provide a quotation, we will require information on the client, site location, and fence configuration.

Please fill out the attached form (which can also be found on our website at XXX to provide this information

In some cases, a site survey maybe required where elevation changes, ground conditions and any other special considerations need to be considered for the supply.

2.0 Quotation

A quotation will be provided for the supply of the fence materials

If required a quotation for Installation can be provided direct from our approved list of contractors

A 3d model , dwg drawing and specification including embedded carbon calculations can be provided once an order is received

All enquires should be sent to :-

sales@ukpultrusions.com

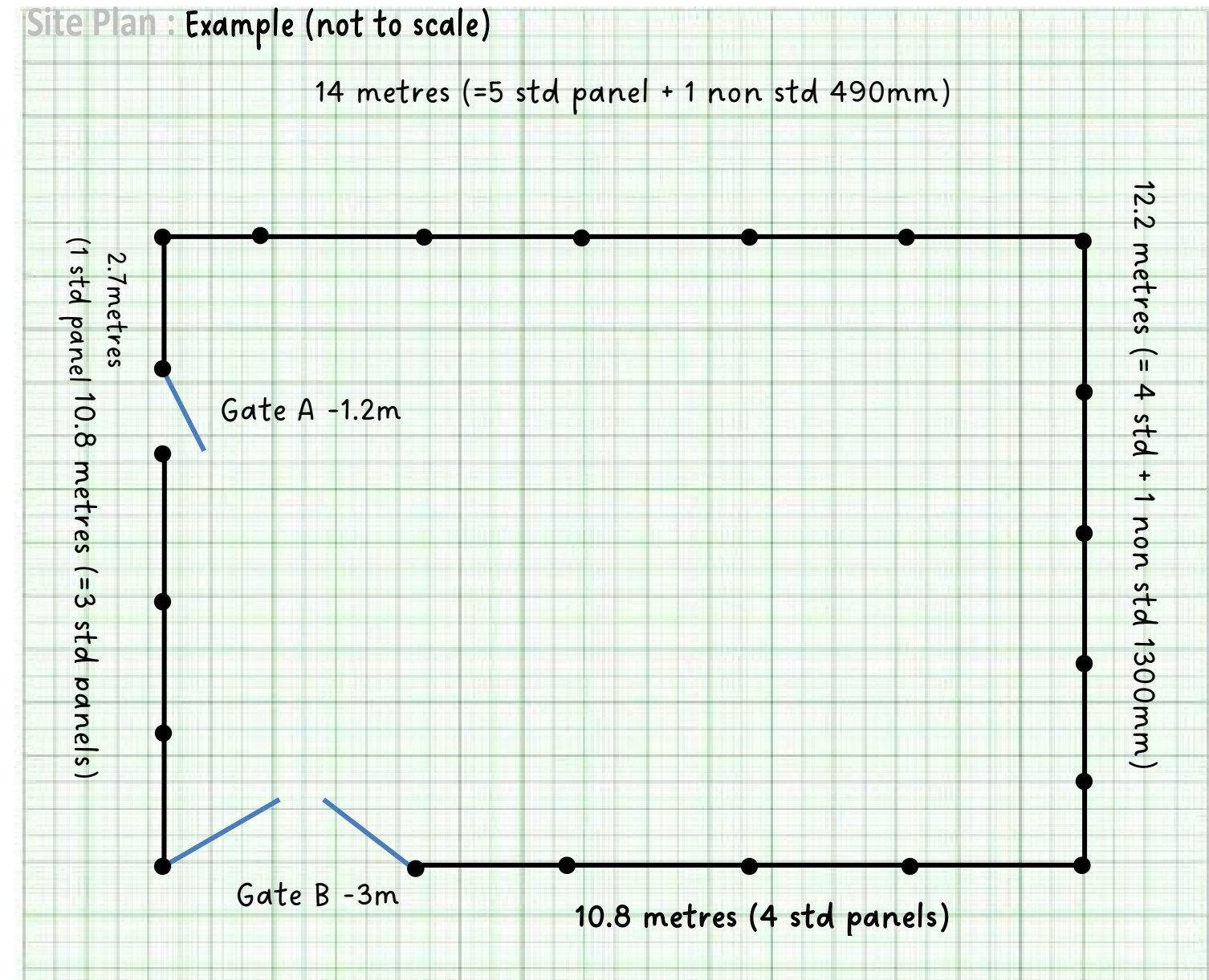
UK Pultrusions Limited
Unit 7 Johnsons Estate
Tarran Way Industrial Estate
Tarran Way South
Moreton
Wirral
CH46 4TP

Telephone : 07935 154251

Palisafe™ : Site Information / Fence Configuration

Please provide the information required for quotation and supply of Palisafe TM fencing system . An example of the information required is provided below and a blank form can be download from our website at

| | | | |
|--|---------------------|---|---|
| Client Name : | ABC Contracting Ltd | | <input checked="" type="checkbox"/> Existing Customer |
| Contact Name: | Joe Smith | Contact Tel : | +44 07777 100000 |
| Site Address : | Site Compound A | Post Code : | CH46 4TP |
| | | | |
| | | | |
| <input checked="" type="checkbox"/> Site Survey Required Elevation changes may require sloped panel | | <input checked="" type="checkbox"/> Special Delivery Requirements : Site requires vehicle Offloading | <input checked="" type="checkbox"/> Installation Required Please provide details of specialist contractors |



Fence Configuration :

| | | | | |
|--|---|---|---|--|
| Fence Application | <input type="checkbox"/> Rail Platform | <input checked="" type="checkbox"/> Power | | <input type="checkbox"/> Other (specify) |
| Total Fence Run | 52.4 | metres | | |
| Type of Fence | <input type="checkbox"/> Picket (PGP) <input checked="" type="checkbox"/> General purpose (GP) | | <input type="checkbox"/> Special purpose (SP) | |
| Height of fence :- | | | | |
| If Picket: | <input type="checkbox"/> 1.2m | <input type="checkbox"/> 1.5m | | |
| If General Purpose: | <input type="checkbox"/> 1.8m | <input type="checkbox"/> 2.1m | <input checked="" type="checkbox"/> 2.4m | <input type="checkbox"/> 2.7m |
| If Special Purpose: | <input type="checkbox"/> 3.0m | <input type="checkbox"/> 3.6m | <input type="checkbox"/> Other (specify) : | |
| Pale Type : | <input checked="" type="checkbox"/> Std | <input type="checkbox"/> 'W' | <input type="checkbox"/> Tube | |
| Pale Top Finish: | <input checked="" type="checkbox"/> Point | <input type="checkbox"/> Round | <input type="checkbox"/> Flat | <input type="checkbox"/> Other : |
| Colour :- | <input checked="" type="checkbox"/> Grey | <input type="checkbox"/> Green | <input type="checkbox"/> Black | <input type="checkbox"/> White |
| | <input type="checkbox"/> Other (specify) : | | | |
| Qty of Standard Panels : | 16 | (All Picket and GP fence is 2.6m Wide / Effective 2.7m with Post) (SP30 width is 2m and SP36 is 1.5m wide) | | |
| Non standard Panels | Width : 490mm | Qty : 1 | Width : 1300mm | Qty : 1 |
| Post Type / Qty : Passthrough (std) End Post Corner Gate Posts | Buried : 14 3 4 | QUICKfoot: | Non Standard Lengths: | |
| Gates Single (0.9-1.5m) Double (1.5-5m) | Width : 1200mm(A) 3000mm(B) | Qty : 1 1 | Width : | Qty : |
| Accessories : | <input type="checkbox"/> Signage <input type="checkbox"/> Post Lighting | | <input type="checkbox"/> Anti-burrowing <input type="checkbox"/> Electrification | |
| Other Information : | | | | |