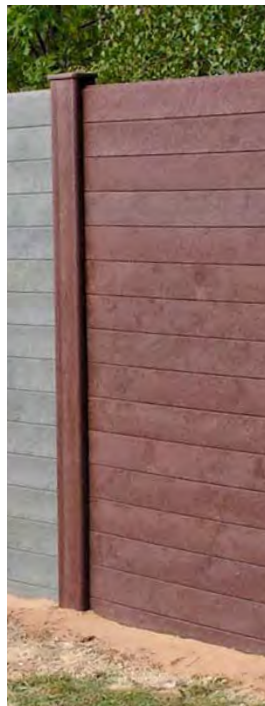
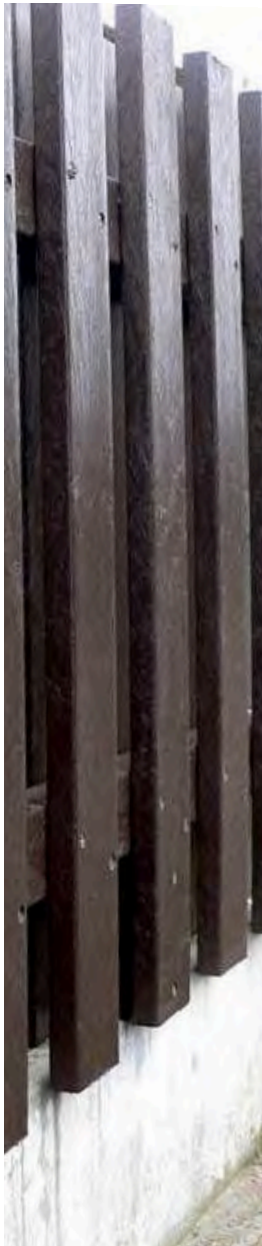




## FENCING SPECIFICATION GUIDE

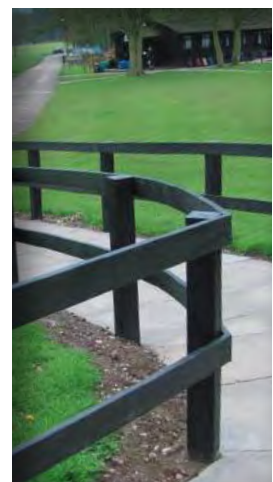


# KEDEL

ECO-FRIENDLY PLASTIC PRODUCTS

100% RECYCLED PLASTIC

- Maintenance Free
- Easy Installation
- Durable & Vandal Resistant
- Splinter Free
- Aesthetically Pleasing
- 100% Recycled & 100% Recyclable



# KEDEL

ECO-FRIENDLY PLASTIC PRODUCTS

100% RECYCLED PLASTIC

## What is Kedel Mixed Plastic ?

Kedel's Recycled Mixed Plastics are well engineered blends of recycled plastics, manufactured to a high standard and independently tested. Our material specifications make our profiles reliable, maintenance free, long life solutions, suitable not only for high quality fencing, but for a wide range of building and construction applications.

Kedel's Mixed Plastic is a unique blend of recycled plastics carefully formulated to offer the appropriate balance of properties for fencing applications. Its formulations are a mixture of polyolefin compounds, which consist of hydrocarbons and contain no softeners, chlorides, cadmium or other additives. They are inert and safe to use even in sensitive nature reserves and do not leach any chemicals into the soil.

Its mixed polymer composition combines the stiffness of polystyrene with the impact resistance of polythene. Manufactured with a unique patented process, it boasts a wide range of advantages over traditional materials such as wood, metal, concrete and virgin plastics, offering a cost effective high performance, long-life solution.

### Benefits

- Maintenance Free
- Easy Installation
- Durable & Long Lasting
- Splinter Free
- Aesthetically Pleasing
- Weather Resistant
- Light Weight
- 100% Recycled & 100% Recyclable



# Kedel Mixed Plastic Tech Data

Test	EN Standard	Result			Ductile Spec	Ultra Spec
3 Point Bend	DIN EN ISO 178	Flexural Stress	-5°C	MPa	21.2	35.1
		Bending E-Modulus	-5°C	MPa	1,289	2,261
		Flexural Stress	+23°C	MPa	11.6	24
		Bending E-Modulus	+23°C	MPa	581	1,424
		Flexural Stress	+65°C	MPa	4.6	16.5
		Bending E-Modulus	+65°C	MPa	162	856
Tensile	DIN EN ISO 527-2	Strength	-	MPa	9.65	15.6
		Elongation	-	%	13.8	1.7
		Tensile E-modulus	-	MPa	659	1,490
Timed Tensile	DIN EN ISO 899-1	Tensile E-modulus	1 hour	MPa	316	1,043
		Tensile E-modulus	24 hours	MPa	-	975
		Tensile E-modulus	100 hours	MPa	202	852
Timed 3 Point Bend	DIN EN ISO 899-2	Bending E-Modulus	1 hour	MPa	380	1,159
		Bending E-Modulus	24 hours	MPa	271	943
		Bending E-Modulus	100 hours	MPa	235	816
Pressure Characteristics	DIN EN ISO 604	Compression Strength	1% Stretch	MPa	1.8	2.5
		Compression Strength	2% Stretch	MPa	3.3	5.3
		Compression Strength	10% Stretch	MPa	13.3	27.9
		Compression Strength	20% Stretch	MPa	18.2	-
		Compression Strength	At yield	MPa	-	29.0
		Pressure E-Modulus	-	MPa	271	815
Charpy Test	DIN EN ISO 179	Impact Resistance	-	kJ/m <sup>2</sup>	412	12
Impact Shore Hardness	DIN EN ISO 868	Shore Hardness	-	-	53	62
Density Test	DIN EN ISO 1183-1	Density	-	g/cm <sup>3</sup>	1.0062	1.0529
Water Absorbtion	DIN EN ISO 62	+23°C, 50% R.I	-	%	<1	<1
		+23°C in water	-	%	<1	<1
		+100°C in water	-	%	<1	<1
Resistance	DIN IEC 60093 <sup>4</sup>	Surface Resistance	-	Ω	3.2 x 10 <sup>13</sup>	1.5 x 10 <sup>14</sup>
		Specific Surface Resistance	-	Ω	3.2 x 10 <sup>14</sup>	1.5 x 10 <sup>15</sup>
		Flow/Contact Resistance	-	Ω	9.0 x 10 <sup>13</sup>	>2.0 x 10 <sup>14</sup>
		Specific Flow/Contact Resistance	-	Ω	4.5 x 10 <sup>14</sup>	>8.4 x 10 <sup>14</sup>
		Resistance	-	-	-	-
Ball Striking Test	DIN EN ISO 2039-1	Ball Striking Hardness	-	N/mm <sup>2</sup>	18.44	39.52
Thermal Expansion	-	Coefficient of Thermal Expansion	-	1 / °C	0.00018993	0.0001510648
Screw Pull Out Force	-	Drilled Material	-	N	7,500	8,230
		Non Drilled Material	-	N	7,500	8,140

# KEDEL

ECO-FRIENDLY PLASTIC PRODUCTS

100% RECYCLED PLASTIC

Kedel Mixed Plastic fencing offers aesthetically pleasing boundaries, with the added benefit of a long product lifetime and zero maintenance. Impact and chemical resistance make it virtually vandal proof. An attractive, cost effective fencing option, for commercial contracts in general and more specifically for education, local authorities and housing associations.

## Durable & Vandal Resistant

- Formulated for strength, durability and stability
- Typical lifetime up to 50 years
- Resistant to chemicals such as cleaning products, oils and grease; graffiti is easy to remove

## Aesthetically Pleasing

- Brown & black
- A Natural, smooth finish
- A variety of sizes and pale top styles

## No Maintenance

- Weather resistant - will never rot
- Waterproof and mould resistant
- No painting, staining or preservative required

## Easy Installation

- Light weight
- Easy cut, screw or bolt on site

## Reduced Life Costs

- Maintenance free
- Whole-life costs halved when compared to wooden fencing

## Eco-Friendly

- 100% recycled and recyclable
- Inert and safe to use in any environment, including sensitive nature reserves



# Comparison of Fencing Types

## Kedel Ultra vs Wood

Fencing Material Properties	Kedel Ultra Fencing	Wood - Oak	Wood - Pine
<b>Lifetime</b>	30 to 50 years	5 to 15 years	5 to 15 years
<b>Strength MPa*</b>	30	30	18
<b>Material Density g/cm<sup>3</sup></b>	1.05	0.64	0.37
<b>Recycled Material</b>	Yes	No	No
<b>Regular Painting/ Staining/Treatment</b>	No	Yes	Yes
<b>Cleaning</b>	Can be easily cleaned. Water and chemical resistant	Absorbs chemicals & moisture	Absorbs chemicals & moisture
<b>End of Life Disposal</b>	Recyclable	Rot/Landfill	Rot/Landfill
<b>Colours</b>	Brown & black	Various (stained colours)	Various (stained colours)

## Kedel Ultra vs Other Plastic Materials

Fencing Material/ Properties	Kedel Ultra Fencing	Polyethylene	Polystyrene	Wood Plastic Composite (WPC)	PVC/ Vinyl
<b>Lifetime</b>	30 to 50 years	30 to 50 years	30 to 50 years	10 to 25 years	30 years
<b>Form</b>	Solid	Solid/hollow	Foamed	Solid/hollow	Hollow/ foamed
<b>Strength MPa*</b>	30	16	30	34	39
<b>Workable Like Wood</b>	Yes	Yes	Yes	Some forms	No (Preformed)
<b>Impact Resistance</b>	Good	Good	Brittle	Tending to be brittle	Hollow section makes it weak
<b>Cleaning</b>	Good	Good	Poor resistance to solvents	Depends on matrix. 3% absorption	Limited resistance



ECO-FRIENDLY PLASTIC PRODUCTS

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# Whole Life Cost

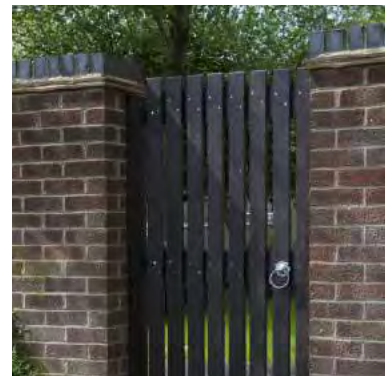
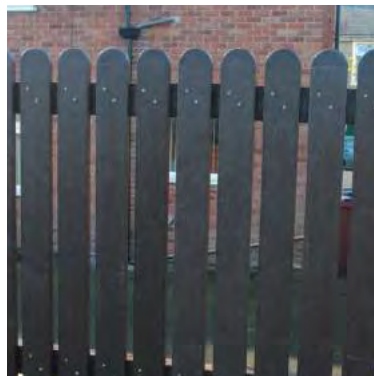
## What does it mean, "Whole Life Cost"?

When planning an investment in any long-term outdoor fixture, the initial installation is not the only expense. Maintenance, Replacement and End-of-Life Disposal all carry very significant cost implications. For a true comparison with traditional materials, it makes sense to include these ongoing costs in your calculations. That's what is meant by Whole-life cost.

## Why Choose Fencing Made from Kedel Mixed Plastic?

Although the initial cost of installing Kedel Recycled Mixed Plastic fencing may be greater than wood, over the course of a fence lifetime wood can be up to twice the cost. Wood needs to be treated every couple of years and will still need replacing in as little as 7 years, according to a cost comparison study conducted by WRAP\*. Kedel's recycled plastic fencing requires no treatment whatsoever, yet lasts for decades. And it stays looking good year in year out.

\* WRAP (Waste Resources Action Programme). Set up in 2000 to promote sustainable waste management and initially funded by all 4 UK Governments. An independent charity since 2014.



## Cost of Kedel Mixed Plastic vs Timber

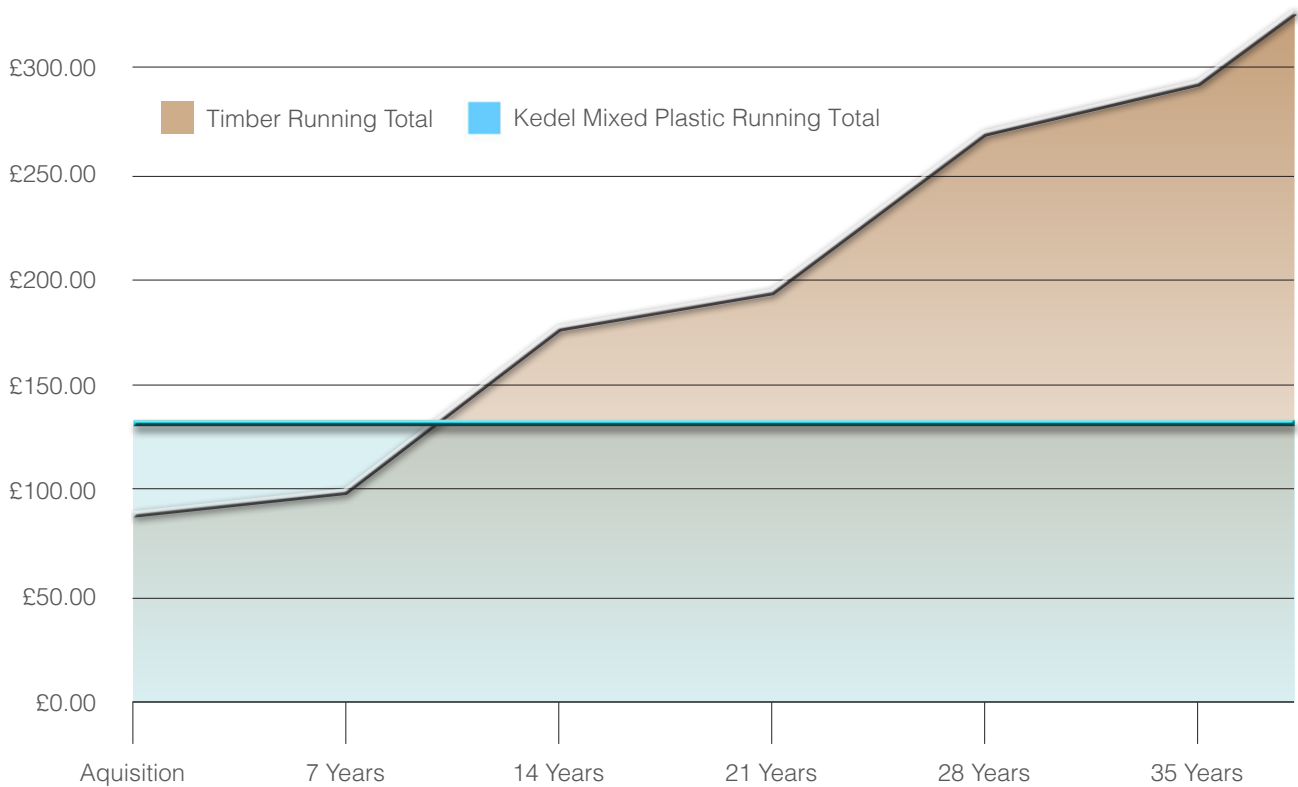
Cost of Kedel Mixed Plastic Vs Timber per Linear Metre	Kedel Ultra	Treated Timber
Cost per Linear Metre*	£53.03	£19.00
Cost of Intallation per Linear Metre*	£81.00	£62.00
Replacement Period	N/A	7-14 years
Cost of Maintenance per Linear Metre*	N/A	£13.00
Maintenance Period	N/A	7 years

\*2015 prices

# Cost of Kedel Mixed Plastic vs Wood (per Linear Metre)

Life of Fence	Aquisition	7 Years	14 Years	21 Years	28 Years	35 Years
Period Cost of Kedel Ultra	£134.03	£0.00	£0.00	£0.00	£0.00	£0.00
Running Total*	£134.03	£134.03	£134.03	£134.03	£134.03	<b>£134.03</b>
Maintenance/Replacement	-	Maintain	Replace	Maintain	Replace	Maintain
Period Cost of Timber*	£81.00	£13.00	£81.00	£13.00	£81.00	£13.00
Timber Running Total*	£81.00	£94.00	£175.00	£188.00	£269.00	<b>£282.00</b>

\*2015 prices





ECO-FRIENDLY PLASTIC PRODUCTS

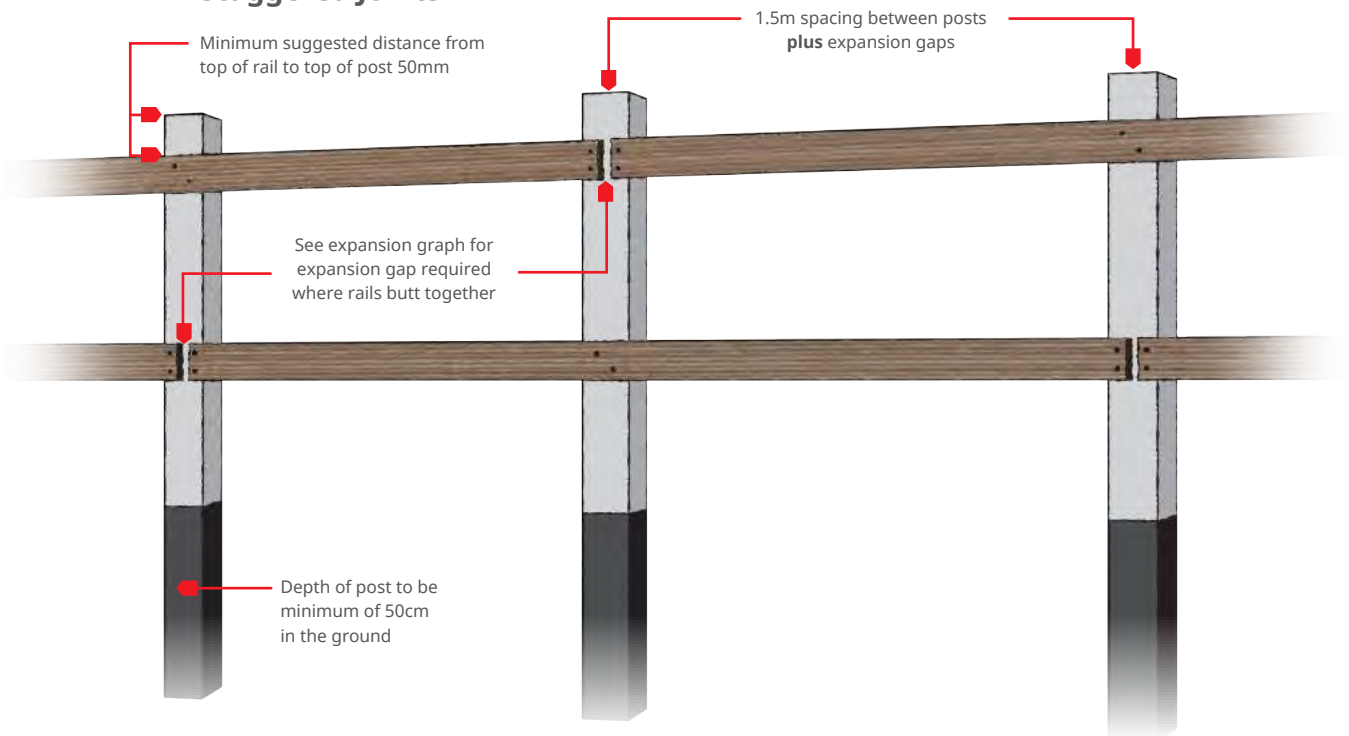
100% RECYCLED PLASTIC

# Fencing Profiles Post and Rail

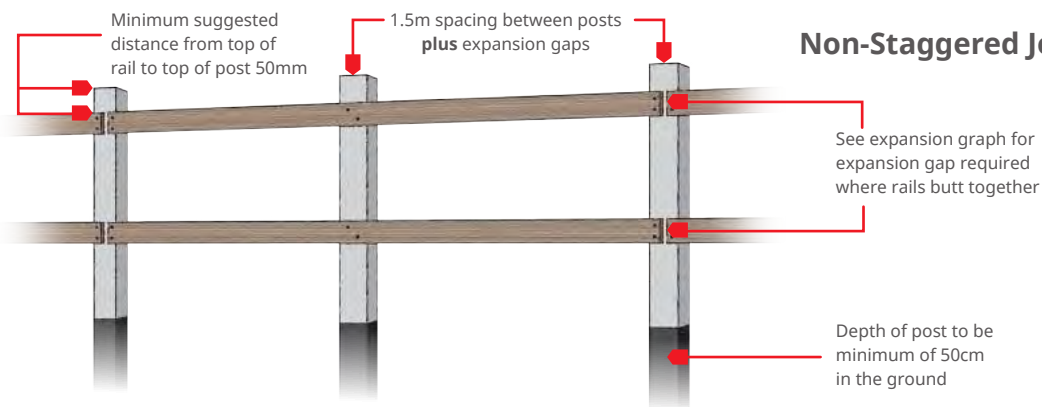
## Post and 2 Rail Components

Height	Post	Rails	Colour
100cm	10 x 10 x 150cm	5.0 x 10 x 300cm	Brown & Black

### Staggered Joints



### Non-Staggered Joints





# KEDEL

ECO-FRIENDLY PLASTIC PRODUCTS

100% RECYCLED PLASTIC

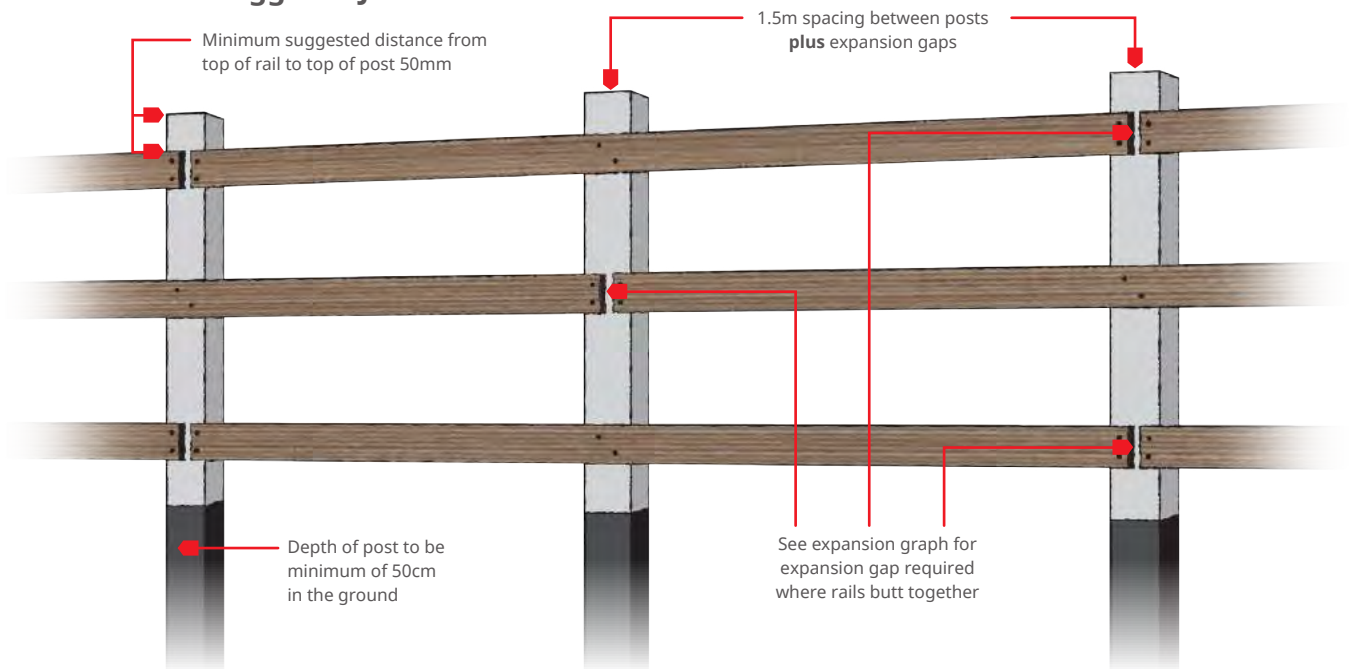
## Fencing Profiles Post and Rail

### Post and 3 Rail Components

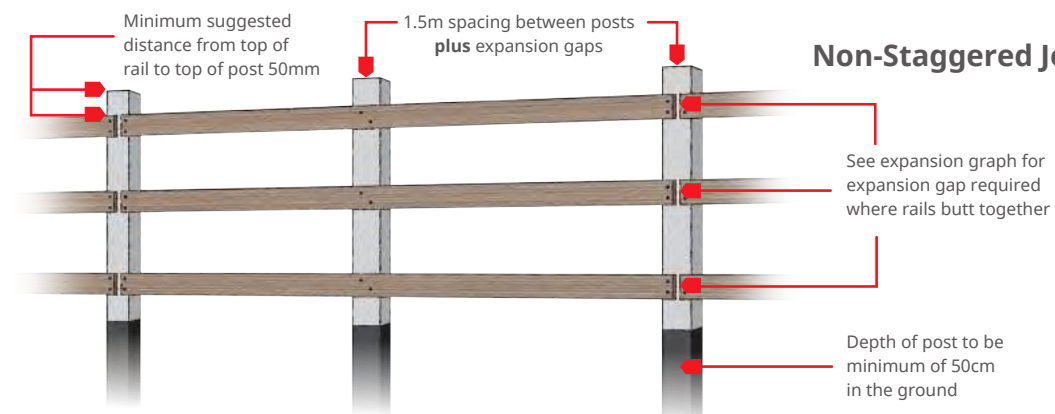
Height	Post	Rails	Colour
125cm	10 x 10 x 175cm	5.0 x 10 x 300cm	Brown & Black



### Staggered Joints



### Non-Staggered Joints





ECO-FRIENDLY PLASTIC PRODUCTS

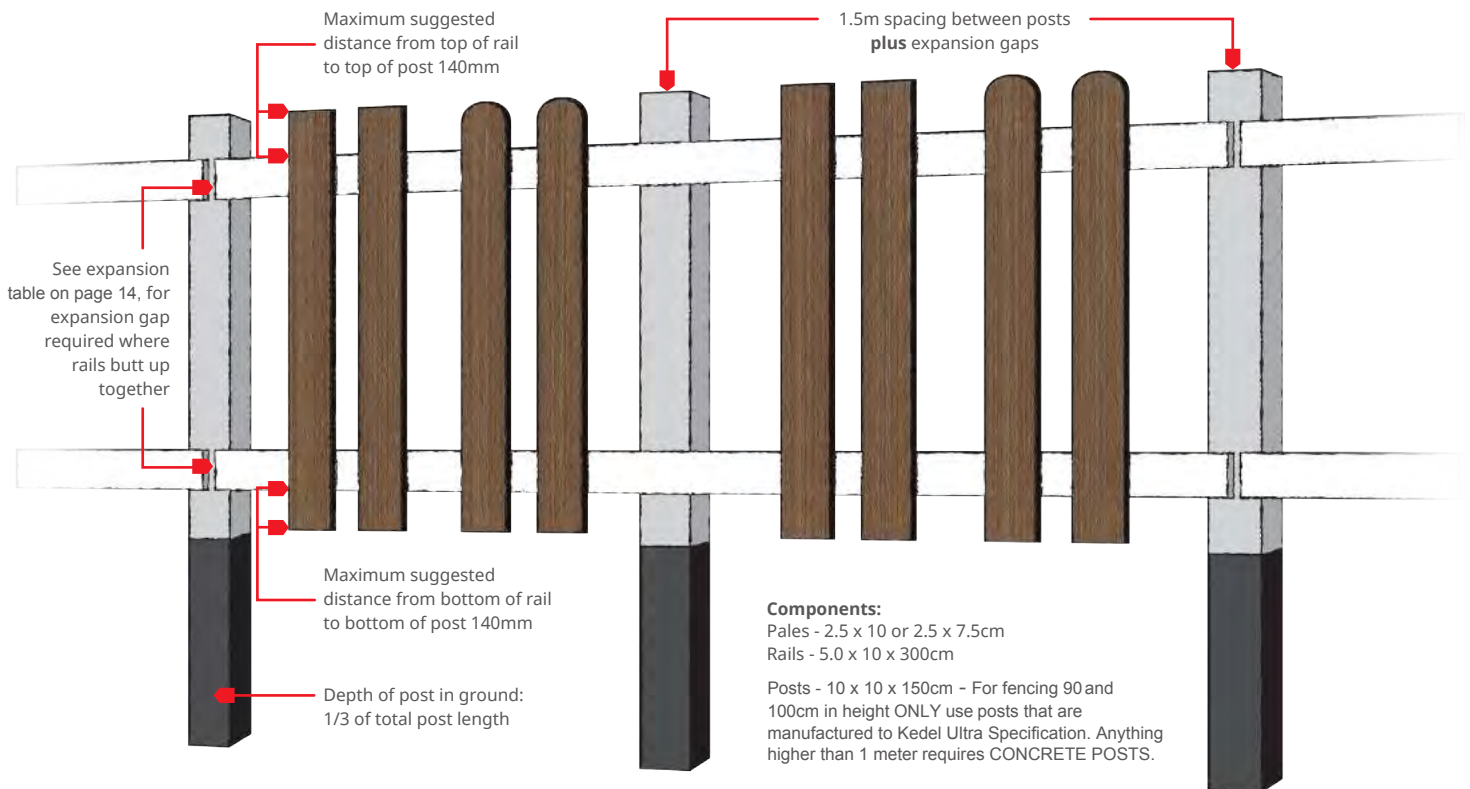
100% RECYCLED PLASTIC

# Fencing Profiles 90cm & 100cm High

Detailed below are the most popular profile options for fencing applications. For all available options please see our website - [www.kedeltrade.co.uk](http://www.kedeltrade.co.uk).

## 90cm & 100cm High Fencing Components

Height	Pales	Top	Rails	Posts	Colour
90cm	2.5 x 7.5cm	-	5.0 x 10 x 300cm (2 per panel)	10 x 10 x 150cm	Brown & Black
	2.5 x 10cm				
100cm	2.5 x 7.5cm	-	5.0 x 10 x 300cm (2 per panel)	10 x 10 x 150cm	Brown & Black
	2.5 x 10cm	-			





# KEDEL

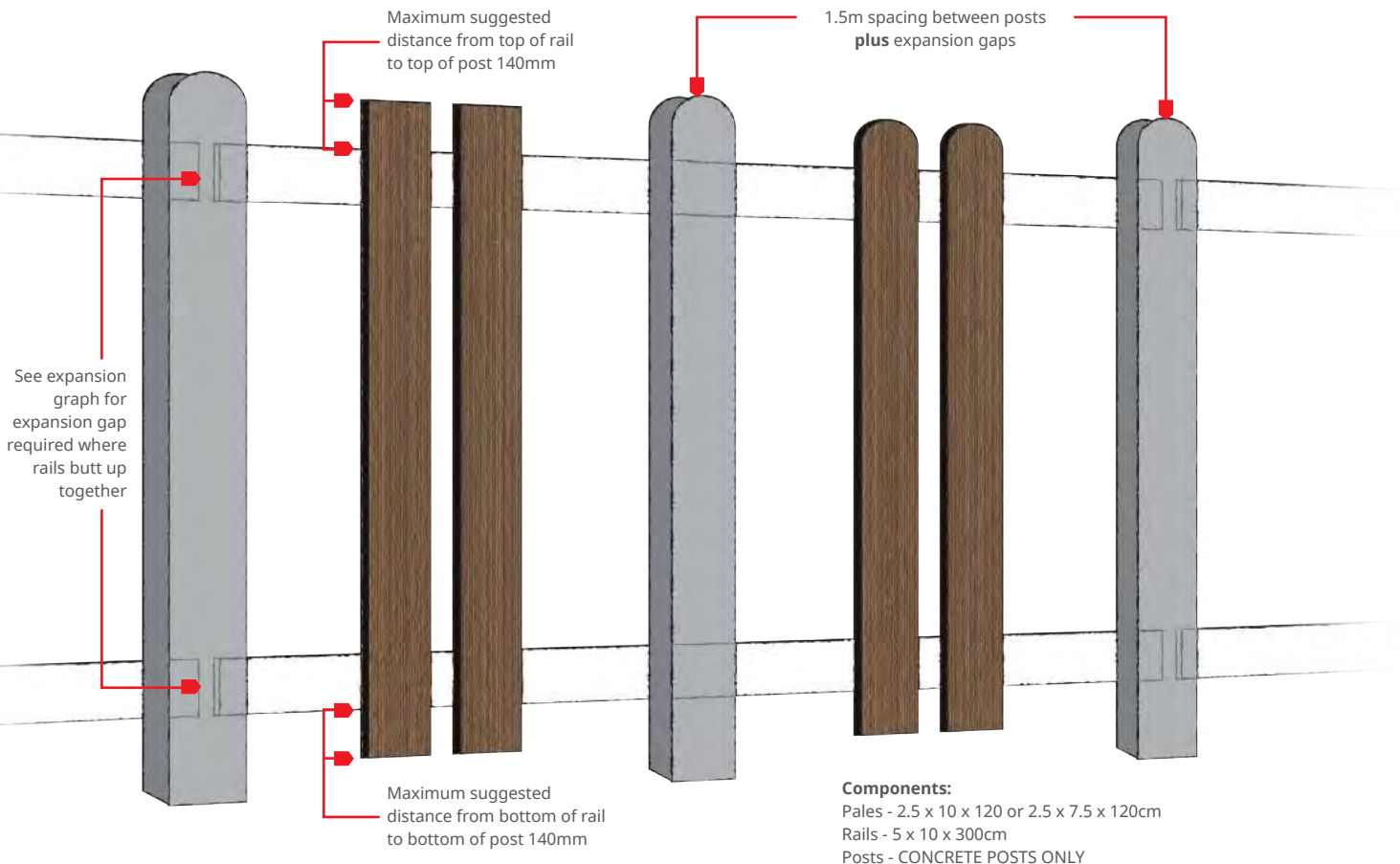
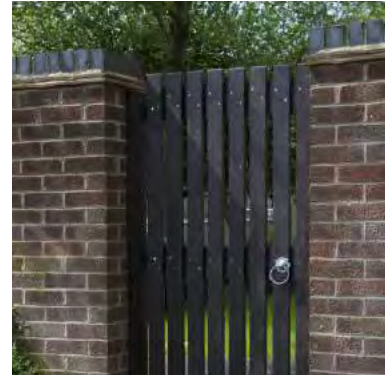
ECO-FRIENDLY PLASTIC PRODUCTS

100% RECYCLED PLASTIC

## Fencing Profiles 120cm High

### 120cm High Fencing Components

Height	Pales	Top	Rails	Posts	Colour
120cm	2.5 x 10cm	 	5.0 x 10 x 300cm (2 per panel)	Concrete	Brown & Black










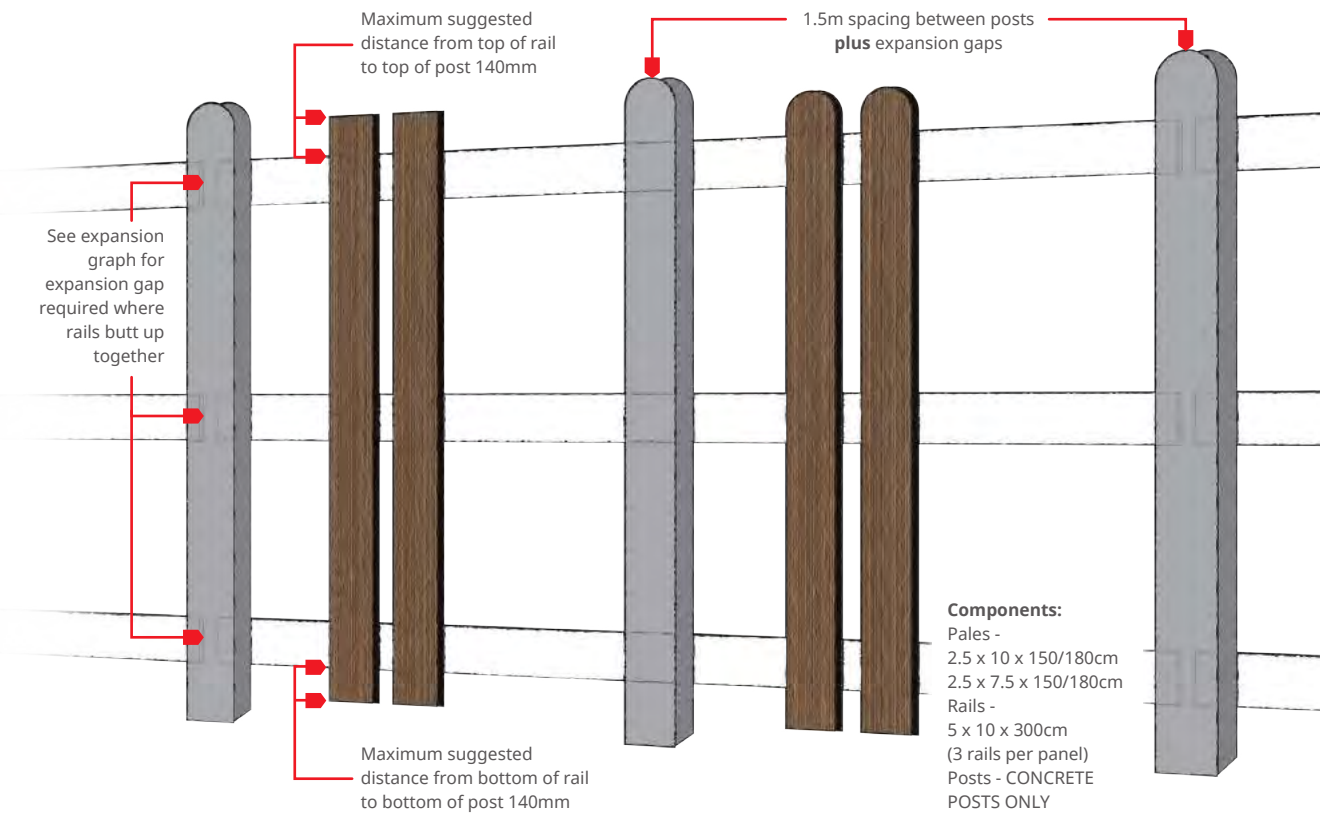
ECO-FRIENDLY PLASTIC PRODUCTS

100% RECYCLED PLASTIC

# Fencing Profiles 150cm & 180cm High

## 150cm & 180cm High Fencing Components

Height	Pales	Top	Rails	Posts	Colour
150cm	2.5 x 7.5cm	- 	5.0 x 10 x 300cm (3 per panel)	Concrete	Brown & Black
	2.5 x 10cm	- 			
180cm	2.5 x 7.5cm	- 	5.0 x 10 x 300cm (3 per panel)	Concrete	Brown & Black
	2.5 x 10cm	 			





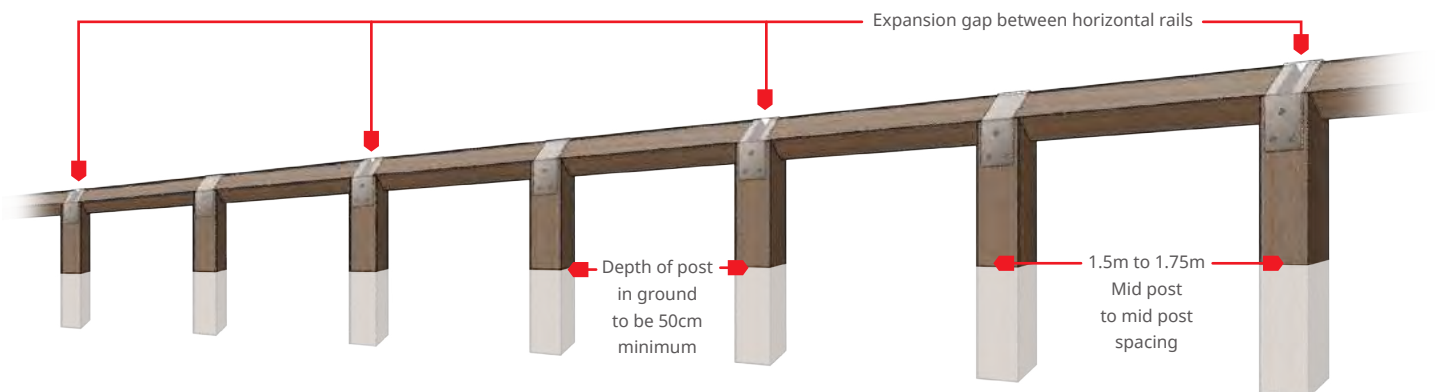
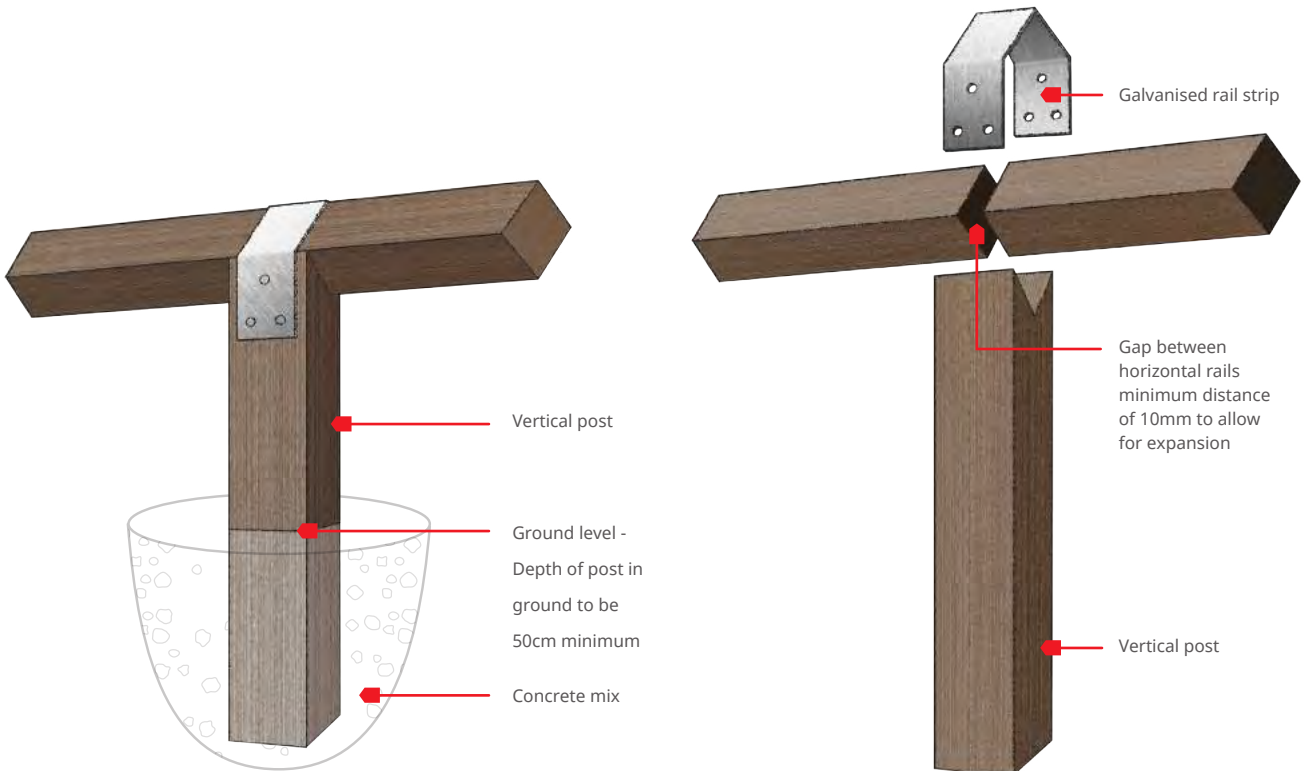
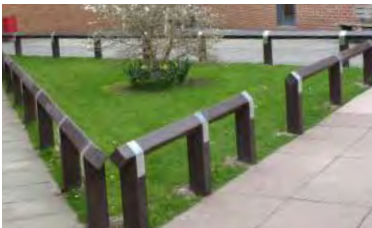
ECO-FRIENDLY PLASTIC PRODUCTS

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# Fencing Profiles Knee Rail

## Knee Rail Fence

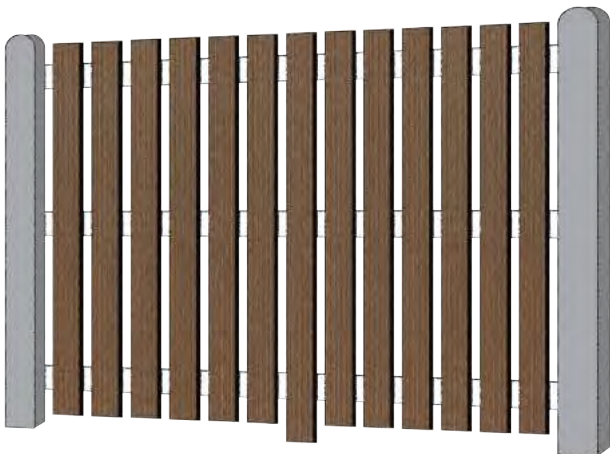
Range	Post with Moulded V-top	Rail	Colour
Standard	10 x 10 x 125cm	8 x 8 x 300cm	Brown & Black
Heavy Duty	14 x 10 x 150cm	10 x 10 x 150/175/300cm	Brown & Black



Standard woodworking equipment is generally sufficient for installing Kedel fencing. However, we recommended that you avoid high cutting speeds when using power tools to prevent meltback from friction heat. Below we give more detailed advice to ensure a successful installation.

## Post Spacing

Spacing between posts should be 1.5 metres plus gaps to allow for expansion. They should not be further apart than recommended. The middle pale of the panel should be extra long, touching the ground, to provide additional support. (see image below)



For Kedel fencing pales higher than 1m, only concrete posts should be used. Posts for gates of any height should also be concrete.

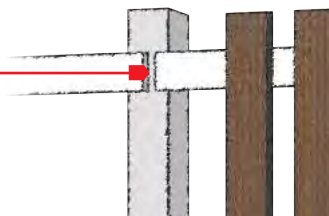
## Rail Expansion & Contraction

Plastic is subject to linear thermal expansion and contraction, hence it's important to make allowances within the design of any Kedel fencing installation.

There are a number of design options available that will allow for thermal movement of the rails.

### Expansion gap

A gap should be left where the rails butt up.



Allow for the maximum expansion with regard to the temperature at the time of installation. The higher the temperature at the time of installation, the smaller the maximum expansion will be. The lower it is, the larger the maximum expansion.

See examples below of maximum expansion per running metre at different installation temperatures:

Expansion Table								
Maximum expansion (contraction) occurring per running metre:								
0°C	5°C	10°C	15°C	20°C	25°C	30°C	35°C	40°C
+7mm	+6.5mm	+6mm	+5.5mm	+5mm	+4.5mm	+4mm	+3.5mm	+3mm
(-2mm)	(-2.5mm)	(-3mm)	(-3.5mm)	(-4mm)	(-4.5mm)	(-5mm)	(-5.5mm)	(-6mm)

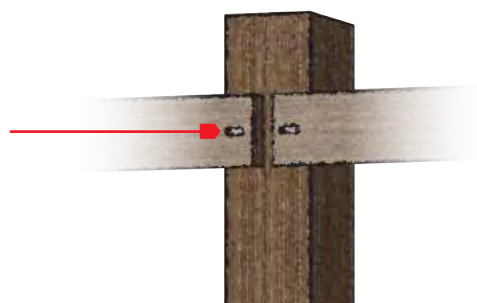
Minimum temperature in Western Europe = -20°C; maximum temperature in the sun of e.g. black boards = 50°C. Assuming that the installation is normally done at a temperature between 10°C to 20°C, the maximum temperature difference will be in the region of +40°C (expansion) and in the region -40°C (contraction). This demonstrates the importance of taking expected expansion and contraction into account.

### Expansion brackets with slotted holes

Brackets with slotted holes allow the rails to move.



### Slotted holes in the rails





## Fixing Rails to Posts

Rails can be attached to the posts with galvanized or stainless steel coach bolts. Counter-sinking the head into the rail will enable the pales to fit over them.

Coach bolts should also be used to connect all fencing to corresponding posts.

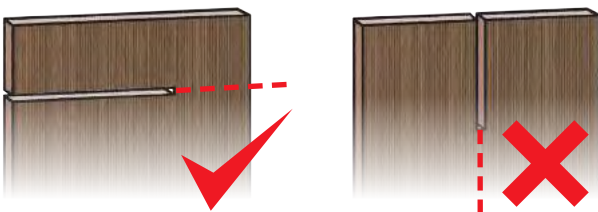
## Fixing Pales to Rails

Pales should be fixed to the rails with screws. Stainless steel screws are preferable, but zinc passivated or galvanized are also adequate. Splitting could occur if screwed within 25mm of an edge.

## Cutting and Sawing

Standard wood working equipment is suitable i.e. handsaw, circular saw or chainsaw. Speeds must be kept low. A coarse blade and wide teeth are recommended, e.g. 500mm diameter blade with 34 teeth.

**IMPORTANT:** Do not cut down the length of the material (the grain) as severe distortion and bowing can occur due to internal stresses inherent in the plastic.



## Screw Fixings

Kedel Mixed Plastic profiles have very good screw retention properties. Use a minimum of 5mm diameter screw. As a general rule Pozi drive screws will suffice although Torque Head screws will give a better bit grip. Counter-sinking is recommended to ensure the screw sits flush with the surface of the profile. We always advise drilling pilot holes and countersinking to avoid mushrooming of the material and to give a better finish to the job.

Nails are not recommended, due to the high density of the plastic, which makes it difficult to penetrate.

If stainless steel screws are used, a pilot hole is advisable thus preventing undue stress on the screw.

## Maintenance

Very minimal maintenance is required. We only recommend a cleaning regime of occasional washing with a medium-pressure hose, simply for aesthetic reasons.

Alternatively it's possible to manually wash the plank surfaces with warm water and a standard household detergent such as washing up liquid, using a non-abrasive cloth.

Please note that cleaning with a pressure washer on a low power is recommended, however the use of a steamer is not advisable.

As Kedel Mixed Plastic fencing is not porous, graffiti will sit on the surface of the material and not be absorbed into the plastic. Thinners applied to a cloth can be used to rub it off.

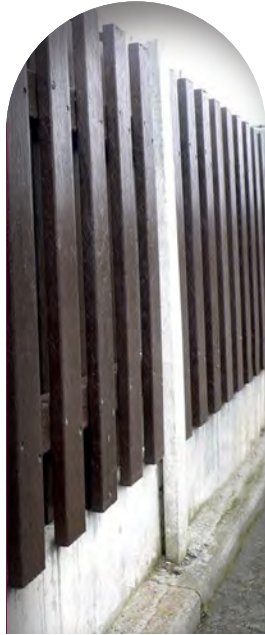
## Waste Disposal

Kedel Mixed Plastic fencing is 100% recyclable.

## 25 Year Guarantee

All Kedel Mixed Plastic products come with a 15 year guarantee. For further details about the guarantee and more information about other Mixed Plastic products please contact Kedel Limited.

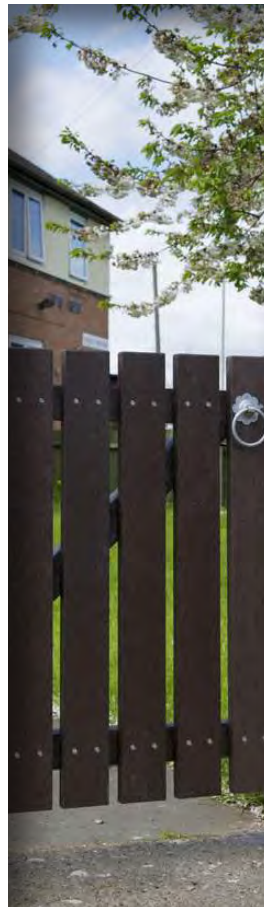




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