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## Data Sheet



**FRP threaded rods and nuts. 18mm diameter.**

- **Waterproof through waterproof concrete because they leave no holes**
  - **They make podium edge forms much easier**
- **Can be resin anchored into concrete underpinning and concrete piles to make double-sided formwork with only one more side**
- **Offcuts and remnants of nuts can be used as a slab levelling system**

## Introduction.

FRP rods and nuts are used together to hold the sides of concrete formwork the required width apart. They withstand the pressure and mass of concrete being poured and compacted inside.

FRP (fibre reinforced plastic) is essentially glass fibre strands and resin compressed to create the threaded rods and nuts.

Compared to the hot drawn steel equivalent, these rods and nuts

- Leave no hole to fill.
- Do not conduct heat.
- Do not corrode.
- Have a surface gripped by fresh, wet concrete as it sets.
- Tapered thread so that it is 100% in contact with concrete.
- Can be glued in a suitable hole with resin.
- Less than a quarter the mass of 16mm dia steel equivalent.
- Each (whole) nut on a rod can safely bear 1.5 tonnes in tension.
- Waterproof bond with concrete.



They are manufactured in China where their more usual use is in coal mines and as ground anchors. Throughout China new tunnels and steep sides are held up with a wire mesh held in place with these rods resin glued into the surrounding rock. A waler plate is held against the wire mesh with these nuts.

## Features and Benefits.

1. No need to fill or repair holes later:
  - a. No waterstop materials required.
  - b. No additional labour required.
  - c. No mistakes.
2. These FRP rods can be used in water resistant concrete (without the usual plastic tube) and left in place certain not to leak, either through or along the rod.
3. The rods and nuts can be cut on site without producing hot sparks.
4. The ultimate load strength of the rod is 150kN. The ultimate load strength of a nut screwed on a rod is 50kN.
5. The safe working load can often be taken as one third the ultimate load strength.

Quite often one nut is sufficient for the load but it won't unscrew because it will be jammed on. The easy way to remove it is to cut through both rod and nut close to the waler. A quick tap against the nut to knock it off the tapered thread and it will undo, ready to be used once more.

Bear in mind that as nuts get shorter they will still work but the safe load reduces proportionately with their length.

6. Where the nuts need to be screwed off to save the rod cast in the concrete two nuts in tandem should be used:
- Where the combined load from the concrete and vibration will be more than 1.5 tonnes.
  - When the rod will be used again in the next lift of formwork.



7. Rods can be cut and coupled together inside formwork with a full-size nut at any point. But the logic in '5' above applies. If near the bottom of a wall have 2 rods not one.

8. Very simple and quick to use. Slice through the nut and rod to strike. Re-use the remaining nut.  
**CAUTION: Don't unscrew nuts while the concrete is still soft. Wait until the rod is solidly held by the concrete before choosing to unscrew nuts, else the bond between concrete and rod can be broken.**

9. Because a plastic tube is not needed inside, the carpenter can easily add another rod through otherwise completed formwork if he spots a weakness in his work.

10. Where rods are to be used again with more formwork higher up they can be left protruding from set concrete. This is especially useful when forming the edge shutter for a podium deck over walls because one row of rods is all that is needed to support the edge shutter (compared to traditional shuttering or expensive system solutions).



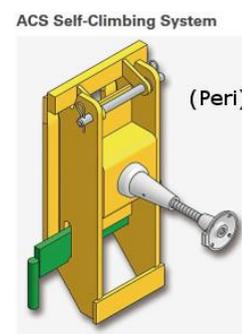
Here we show two images of what is currently used instead of these FRP rods and nuts.



The traditional way of forming the edge of a podium deck requires a lot of timber - compared to a line of rods.

The 'System' alternative would mean buying and casting in anchor points.

Experienced users of these rods save a lot of time and money.



11. The nuts can be cut into thin nuts to use inside a shutter to maintain the width as the nuts outside are screwed up tight.

Whole nuts reduce in size as they are used again and again, the last small bit is worth saving as a thin nut.



12. Where concrete is cast up against concrete piles or concrete underpinning, it is usual to hire in immensely strong (and no doubt expensive) single-sided shutters, such as this:



In this image, you can see that the threaded rods have been drilled and resin-anchored into concrete piles.

The piling becomes the formwork one side. The 'A' frames only hold the timber formwork upright, they don't take any load.



The rods are quite flexible. They can be forced into a hole or slot if needs be.

Please Note.

Concrete in concrete piles is not necessarily particularly strong. You might need more rods than usual and you might need to pour walls in two goes to reduce the pressure near the bottom.

## **Description.**

Rods are 18mm diameter at their widest.

Rods are normally stocked and sold in 2m lengths. Other lengths are sometimes available.

Rods weigh approx. 460g/m.

Nuts are approx. 75mm long when new.

New nuts weigh approx. 84g (3ozs).

Packaging.

The rods do not have any original packaging. Large numbers of rods are supplied on a pallet, otherwise they are delivered loose.

Nuts are in original packaging of 500 nuts. Smaller quantities will be supplied in a bag or sack.

Cut nuts will be supplied in a bag.

General. All construction should conform to current local building regulations and standards.

## **Safety.**

The rods can have splinters that break off in the skin. Therefore, gloves should be worn.

New nuts are smooth. Cut nuts can leave splinters. Gloves should be worn.

When cutting rods or nuts on site use a diamond blade or thin metal cutting blade. Do not breathe the dust. Wear a suitable face mask.

Otherwise usual precautions should be taken as with any building material. Rods and nuts should not be thrown, particularly not at people. Care and consideration to weight should be taken when lifting or moving items.

## **Preparation.**

No preparation is required before using rods or whole nuts.

Thin nuts to use inside a wall form to control width will need to be cut down first from whole nuts.

## **Different formworks work with FRP threaded rods and nuts.**

### 1. DIY systems.

Scaffold boards or 6x2 planks are easy to understand by those with little experience. Photos on our web site show timber used instead of polystyrene in an "ICF" fashion, with a triangular brace to hold the form upright.

The benefit is simplicity and the ease with which more timber can be screwed on if an area looks weak. Screwfix Turbo Coach Screws (M6 need an 8mm hex driver) are usually used with an impact driver so that striking formwork is even easier than putting it together.

ICF is not recommended by us particularly because the waterproof concrete inside cannot be inspected for voids.

Also, ICF is relatively weak and bows/bends/leans/bursts under the weight of concrete vibration.

The major disadvantage of the DIY system is the amount of timber used and moved on to the next project, though many DIYers use the timber later in their build. So this is not always an issue.

2. Plywood and 4x2 formwork.

The FRP threaded rods simply replace the usual steel rods.

3. Hired in systems.

The FRP threaded rods simply replace the usual steel rods.



Technical Support.

Technical support is available from Basement Expert Ltd. Contact details at the top of this document.