



# Power up!

Discover the true potential of our Sm@rt optical cables.



A brand of the

**Prysmian**  
Group

# Discover the true potential of our Sm@rt optical cables.

When the going gets tough, switch to Prymian's Sm@rt Solutions. They'll defeat everything from extremely cramped wet sites and aggressive rodents, to the most hostile environments of Australia. Our smart optical cables will force the communication across. Got the message?



# Meet the superheroes



ARM@CORE®

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SM@RTCORE®

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EXTR@CORE®

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# Size matters.

Small sized SM@RTCORE® cables make room for more.





# SM@RTCORE® fibre cables make room for more.

Our small-sized, waterproof SM@RTCORE® range of fibre optic loose tube cables saves you space, time and money. It's easier to install and you can increase the number of fibres in a duct, lower the number of ducts needed or extend the life of existing ducts. Plus, the strong, still smooth, polyethylene/nylon sheath protects against termites and reduces friction.



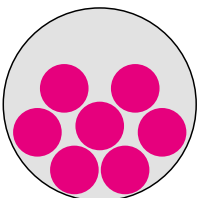
## SM@RTCORE® – Reduced Diameter Loose Tube Cable

Prysmian's SM@RTCORE® range of Fibre Optic Loose Tube Cables are a significant advancement in the technology of Loose Tube Cable manufacture. Using state of the art manufacturing technology and control, we have engineered down the size of our cables to levels well below tradition cable design. This reduction in size offers many benefits for both installers and network owners.

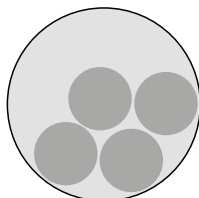
The main focus of developing SM@RTCORE® was to provide a cable that helped alleviate the problem of crowded ducts. This reduction in size offers the potential to increase the number of fibres in a duct, lower the number of ducts needed or extend the life of existing ducts, all of which offer significant cost savings.

Another feature of all SM@RTCORE® cable lies in the fact that it is manufactured with a composite outer jacket comprising a polyethylene sheath to which is bonded an outer layer of Nylon. The bonding is achieved by means of an adhesive tie layer that is extruded between the inner polyethylene sheath and the outer Nylon jacket. The Nylon serves two purposes. Firstly, and primarily, it provides an effective barrier against attack from termites that can cause extensive damage to infrastructure in Australia if not protected by means of a physical barrier. Secondly, the Nylon, owing to its smooth and glossy surface finish, provides a worthwhile reduction in the friction between cable and duct during hauling allowing longer lengths to be hauled without exceeding the maximum cable tension.

### 50 mm Conduit with 50% Occupancy



7 by 144F SM@RTCORE®  
Loose Tube Cables



4 by 144F Conventional  
Loose Tube Cables

One of the problems that has always existed with Nylon is that due to its physical characteristics (hard and tough) it needs to be applied as a very thin layer or the cable becomes very in-flexible and too stiff to handle. An additional complication arises if the Nylon is made too thin in that it wrinkles very easily when the cable is bent as may occur when storing spare cable in a pit. This effect reduces significantly the cable's protection from termite attack. This means then that conventional Polyethylene / Nylon jackets are a compromise in thickness to avoid excessive stiffness (of the cable) and to prevent wrinkling when bent. By bonding the two layers together the Nylon jacket can be made thinner and the thicker polyethylene sheath acts as

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a substrate to support the Nylon. Prysmian's Dee Why facility is equipped with state of the art machinery that allows the simultaneous application of the composite three layer sheath in a single process while closely controlling all critical dimensional parameters.

**Other less obvious benefits of bonded Nylon are:**

- No possibility of water passage between sheath and outer jacket avoiding the need to remove the Nylon before applying sealing heat-shrink to splice closures the heat-shrink can be applied directly to the Nylon. It is advisable to abrade the Nylon with emery first but this is not absolutely necessary provided the jacket is free from grease and oil.
- Risk of air passage between sheath and Nylon eliminated allowing installation by means of air blowing.
- Eliminates damage to Nylon by caterpillar drives during air blowing cable installation.
- Improved cable flexibility.

Similarly to Riser and Breakout cables all SM@RTCORE® designs encompass today's widely proven Dry water blocking technology using high absorption performance (Super absorbent corrosion inhibitor polymers) protection against longitudinal water penetration. In its state-of-the-art manufacturing processes Prysmian

developed dry water blocking technology to a new level. On contact with water, dry elements swell instantly sealing all existent voids and jacket breaches and upon drying, the coating will re-generate and continue to provide protection (cycling action).

The smaller SM@RTCORE® cables also offer the potential to fit longer lengths on a given size drum. For longer runs this can lower installation costs by maximising run lengths between drum change overs. It also minimises the transition point between fibre runs thus lowering splicing and connectivity cost and protects power budgets.

A smaller, lighter and more flexible cable is also easier and quicker to install. It is now the cable for choice for most Telco's and Contractors in Australia. The SM@RTCORE® range is available in fibre counts from 2 to 624 fibres, and cables with tube counts over 12 use Prysmian's striped tube technology. Using a stripe on any tube greater than 12 means we can offer a unique coding system on all tubes. The old method of repeating colours has long caused issues and expensive mistakes during termination, and the use of a unique colour code on each tube minimises the potential for mistakes significantly.

Available in a full range of fibre counts and fibre types including Prysmian's bend insensitive fibre - BendBrightXS

SM@RTCORE® - the smart cable.

Why not give it a try?

# Stop the rat race.

Choose ARM@CORE® - rodent proof cables.







## Choose rodent proof cables.

Terminate the rat battle with heavy armour. Our all dielectric ARM@CORE® fibre optic cables are fully protected against ruthless Australian rodents. Despite the solid hardware these loose tube cables are still surprisingly light-weight, flexible and easy to handle.



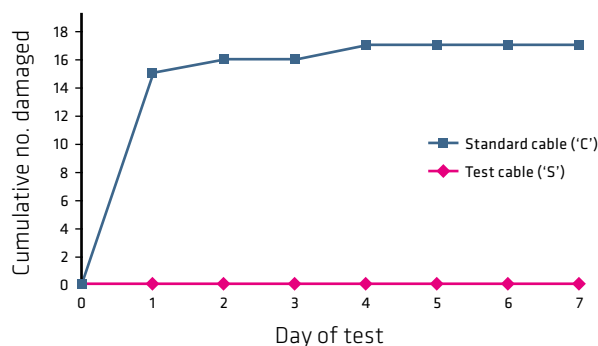
### ARM@CORE - Rodent Proof Non Metallic Cable

A nylon sheath will provide a good level of resistance to white ant / termite attack but will provide little or no resistance to rodent attack. Any cable that needs to be rodent proof will need to be physically armoured with a material that can stop rats and other rodents from penetrating it. The two options are a Glass Reinforced Plastic rod (GRP) armour or metallic Corrugated Steel Tape (CST) armour. The first option has the advantage of being non metallic, so if an all dielectric cable is needed it is the

best option. It is also significantly smaller than a CST armoured cable which maximises run lengths and is easier to handle. This design of cable is armoured by non metallic GRP flat rods. It offers very good crush resistance and is rodent proof. We call this cable our ARM@CORE Rodent Proof All Dielectric Cable. The photos below are taken from an independent report Prysmian commissioned to test the performance of the ARM@CORE design, (please contact Prysmian for a copy of the full report)\*.



Rodent attack comparison: Severest attack examples. ARM@CORE (S) vs. Conventional Loose Tube Cable (C)



(Above) A simple graph from the report showing the damage done to each cable over the 7 day test period. C is the Conventional loose tube cable and S is the ARM@CORE cable. The cable at the top of the photo above shows the ARM@CORE design (S). The rats can penetrate

through the outer sheath but cannot penetrate through the GRP armour. This means the inner core of the cable is fully protected from rodent attack. The bottom cable in the photo is a conventional loose tube cable (C) and was totally destroyed by rats within 7 days. In fact, some standard test cables were destroyed within 24 hours. It also highlights the fact that a nylon sheath offers absolutely no protection from rodent attack.

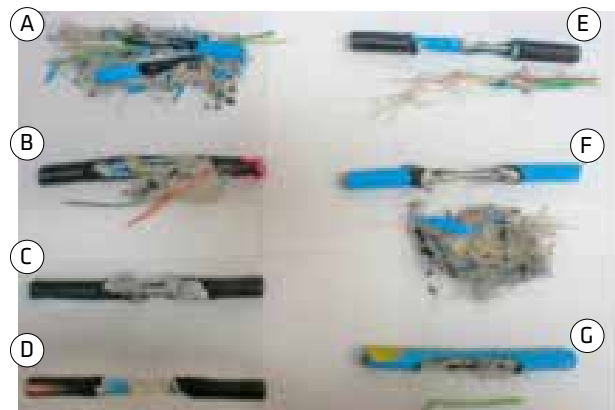
The ARM@CORE cable uses SM@RTCORE reduced diameter technology and offers a rodent proof cable that is not much larger than a conventional loose tube cable (see diagram on below). This means that flexibility and ease of installation is maintained. The all dielectric design means that lightning strikes and high soil resistivity issues that we experience in Australia are negated, and complicated and time consuming earthing requirements are also not needed.



Stages of Rodent attack damage from day 1 (top) to day 7 (bottom) ARM@CORE (S) vs. Conventional Loose Tube Cable (C)

If an all dielectric cable is not required, metallic CST armour can be used to provide a barrier to rodent attack. A GRP or CST armour also provides good crush strength which may be an added advantage depending on installation conditions. For example for a direct buried installation, if the direct plough trench is not back filled with sand, and if the local backfill material is rocky or stony, then the additional armour will provide added protection for the cable during back filling. It may also allow the operation to run faster and also provides some insurance if using low skilled labour, or labour not skilled in optic ploughing. A sacrificial sheath can also be added for additional mechanical strength.

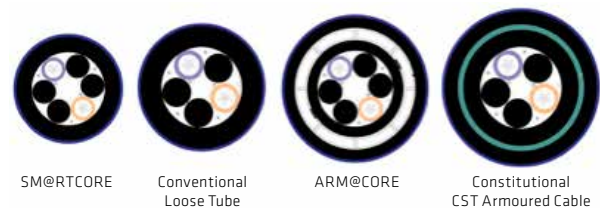
The ARM@CORE design is a heavy duty robust loose tube design that has been designed for Australian conditions and Australian rodents and has been proven both in the field and in the lab. We would recommend that overseas designs be viewed cautiously as many have not been designed with Australian rodents in mind and have not been tested in Australian conditions or in the lab using Australian rodents. On overseas design that is sometimes offered in Australia utilises glass yarns as protection against rats. Prysmian has had this design independently tested using local rodents and found it ineffective against Australian rats. It may work in other countries with different, often smaller, rodents, but offers little rodent protection under local conditions.



Cable A is a standard duct cable for reference. Cables B to G are various "rodent resistant" designs utilising glass yarns to provide the rodent protection. As seen in all cases the glass yarns are ineffective against attack from Australian Rats.

Another area of concern with some overseas designs is in regards to OH&S. The Prysmian ARM@CORE cable uses GRP rods to fully armour the cable and offer the robust protection needed to block rodents. Some overseas designs use a tape that incorporates slivers of glass in the tape. The theory is the rats eat into the tape, experience pain as the glass cuts their mouth, and do not proceed to eat it. This design has been found to be ineffective against Australian Rats. Working within this tape in the field when terminating the cable may also raise OH&S issues.

The cable is a small part of the overall network investment. We recommend that where rats may be a potential concern that an investment is made in a Rodent proof design. The incremental cost of this investment is very small when compared to the total network cost and will mean that the cable is well protected from attack.



Size comparison: SM@RTCORE, Conventional Loose Tube, ARM@CORE and CST Cables.

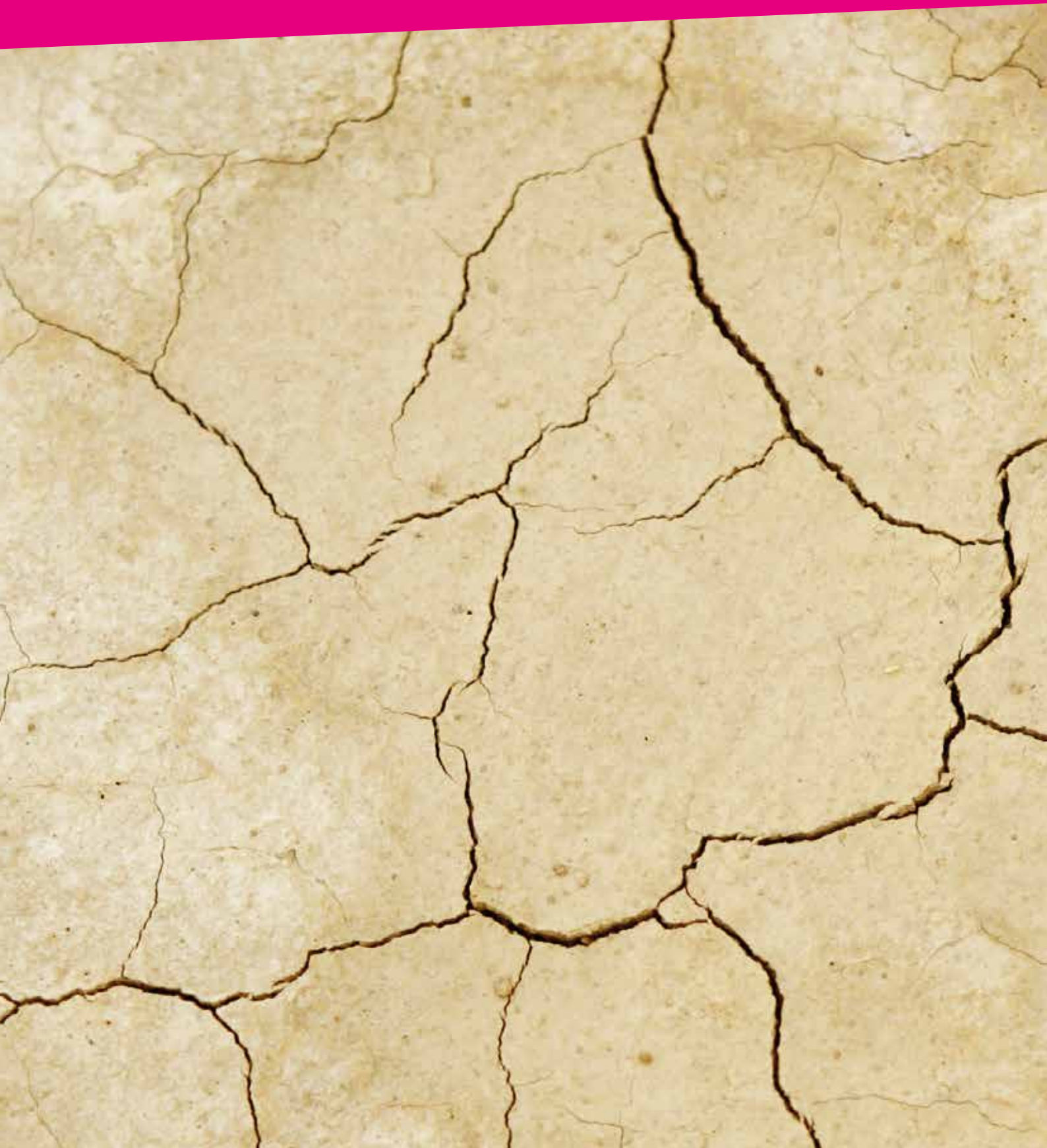
\* Independent report conducted by the Robert Wicks Pest Animal Research Centre, Queensland Government Natural Resources and Mines. Report titled: "Testing Telecommunication Cables for Susceptibility to Damage by Rodents".

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# As tough as they get.

HSe Extr@core® - frontier fibre cables breaking new ground.





# Frontier fibre cables breaking new ground.

Our latest test equipment brings trial and error to a completely new level, replicating forces only found in the most hostile black soil of Australia. The first result, HSe Extr@core®, was above all expectations. It's the toughest direct burial High Strength cable yet. Still it's small and lightweight and available in lengths up to 12 km. It all adds up in reduced installation costs, increased network reliability and reduced power loss. Australian made? Yes, of course!



eXTR@CORE™

## HSe Extr@core®

### - Enhanced High Strength Cable for use in Black or Reactive Soils

HSe Extr@core is Prysmian's Enhanced High Strength cable. It is specifically designed for direct burial in the most hostile black soil environments.

A High Strength cable for use in reactive or black soils needs to be much more than just an enlarged Loose Tube cable. The addition of a thicker sheath and more strength members may increase crush and tensional strength, but does little to protect the cable against the torsional, shear and compressional forces that black soil areas may apply. As the ground contracts and cracks (see photograph below), large shear and compressional forces come into play and any cable running through the soil needs to be designed and tested with these unique conditions in mind. Close control of all major design parameters becomes extremely important if a High Strength cable is to perform successfully. Manufacturing parameters such as cable excess and cable coupling must be managed within very close tolerances and this can only be achieved using state of the art machinery and experienced engineering support that understands these parameters intimately. Prysmian's State of the Art Fibre Optic manufacturing facility in Sydney has the machinery and the experience needed to manufacture true High Strength Cable.



*The cracking effect seen in black soils*

HSe Extr@core has been recently developed by Prysmian and offers the state of the art technology for direct buried cable. This new High Strength cable was designed and qualified using Prysmian's newly developed Axial Compression Resistance (ACR) test. This next generation test equipment was designed in house to specifically replicate the forces exerted in reactive soil environments. It compliments the "Harbour Bridge" test that has long been used to qualify High Strength cables and has enabled Prysmian the ability to fine tune and improve the performance of the High Strength design.

High Strength cables operate in potentially hostile environments so it is critical that a high strength cable will perform as expected. With this in mind, Prysmian can offer 3 key benefits:

- Unparalleled experience in the local market with High Strength cables. The designs have proven themselves in the field in very hostile environments over long periods of time.
- The ability to test the designs in our lab with the recognised “Axial Compression Resistance” and “Harbour Bridge” tests.
- State of the Art manufacturing equipment and close control of all important manufacturing parameters, such as excess fibre and cabling coupling.

Prysmian also offers the option of long runs on steel drums for all High Strength cable supplied. Long runs offer a number of real benefits and cost savings:

- Minimises splicing, connectivity and active components, thus saving significant cost. Longer fibre lengths also help protect the power budget of the design.
- Reduced drum change-overs and set up, which offers installation time and cost savings.
- Significant transport cost savings, especially to remote locations, which is often where a High Strength cable is used.

All High Strength cables are supplied on returnable steel drums. Steel drums hold up to the rigors of outback direct buried installations better than timber. Prysmian offers a returnable service when empty and when combined with Prysmian extensive Australian Logistics network this greatly simplifies project management.

If you are going to invest in a High Strength cable you need to make sure you will actually get a true High Strength cable, and not just a standard cable with a thicker sheath. We supply approximately 90% of Australia's demand for High Strength cables and our facilities and knowledge of the cables are a major reason why we enjoy this position in the market place. We strongly recommend you insist on a cable that is a proven local design, both in the lab and in the field. The insistence on Axial Compression Resistance (ACR) and ‘Harbour Bridge’ qualification testing is an important step for this, as is the choice of a manufacturer who understands the installation environment as well as the cable. At Prysmian we have that knowledge and experience. As the sole supplier of High Strength cable to Australia's largest Telco's, including NBN and Telstra, Prysmian has unparalleled experience in the local market.

If you've got a tough installation that needs a tough cable, go for something with a bit Extr@ – HSe Extr@core.



# Linking the future



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