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OUR STORY

Established in 1921, Haggie operates two manufacturing plants on the outskirts of Johannesburg, South Africa, with a specialty in wire, strand, and ropes.

The **Haggie Wire and Strand** division predominantly manufacture products for the construction industry. These products are marketed and sold in many countries of the world.

The division is equipped with modern low relaxation wire and strand lines, including a plastication line for the sheathing of tendons.

The wire product range consists of plain, indented and crimped PC wire in the stress relieved condition. Stranded products include low relaxation seven wire strand which may be bright, plastic sheathed, galvanised, compacted, or indented.





"FRONT RUNNERS IN STRAND MANUFACTURING"





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PRODUCT OVERVIEW

PLASTIC SHEATHED STRAND FOR POST-TENSIONING APPLICATIONS

Strand in all sizes and grades may be plastic sheathed in order to conform to the recommendations of the Federation Internationale de la Precontrainte (F.I.P.) and the US Post Tensioning Institute (P.T.I.), or to any other standard, such as that issued by the Hong Kong Government Engineers office. In manufacture the strand is corrosion protected by an additive in the stress relieving quench bath. This serves to protect all seven wires, including the king wire. Corrosion resistant high temperature grease, or low slump paraffin wax, is then applied to fill all the voids between wires, and to coat the strand with a protective layer, usually 0,3 mm at the outer wire crowns.

High density polyethylene or polypropylene, fully UV stabilized, is then extruded over the greased strand with thicknesses to specification or customer requirements.

The polymer grade is selected for:

- High impact resistance
- High rigidity
- Chemical stability
- Good resistance to creep
- High abrasion resistance
- High stability at elevated temperatures



STRAND FOR STAY CABLE BRIDGES

Haggie PC strand is suitable for stay cables and conforms to the requirements of the F.I.B. and P.T.I. recommendations for Stay Cables.

The routine control of process parameters during manufacture, particularly with regard to diameter, allows for bridge designers to bundle Haggie strand with confidence. Where individual strand sheathing is required, the Haggie plastication line is capable of applying polymer sheathing in any profile at close thickness tolerances, with prior application of a high temperature low slump grease or other corrosion inhibitors, such as paraffin wax. Fatigue endurance by far exceed the minimum two million cycles under the special test conditions required for stay cable strands.



COMPACT STRAND

DyForm or Compact Strands is a stranding configuration with concentric strands in which each layer is passed through a compacting die to reduce the diameter by approximately 10%.

Compacted prestressing 7-wire strands are where high strength is mandatory. These strands are primarily used in prestressed concrete applications. They play a crucial role in preloaded prefabricated parts, bridge construction, rock anchors in underground mining, large vessel containers, and hoisting technology for lifting heavy loads.



Lintel wire, also known as crimped wire, is a type of wire used for structural support and crack control in lintels and other precast products. It is manufactured from hard drawn wire and plays a crucial role in reinforcing lintels, which are horizontal beams or supports that span openings in walls or between vertical supports.

GALVANISED PC STRAND

For some application, where particularly corrosive conditions may be encountered. Haggie galvanized PC strand provides the additional protection required and can be manufactured to customer requirements. Strand manufactured from drawn-galvanized wire is offered with the same mechanical and physical properties as bright strand.

PC WIRE

Haggie produces PC wire with finishes available in plain, indented and crimped, other special grades are available on request.







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PRODUCT DEVELOPMENT



Haggie Wire and Strand operation has a comprehensive quality management system which satisfies the requirements of ISO 9001 & ISO 17025.

The Wire and Strand laboratory is SANAS (South African National Accreditations Systems), approved and through this association, is part of the mutual recognition agreement of ILAC, (International Laboratory Accreditation Co-operation), which covers twenty-six countries. Regular audits of the testing facility ensure that standards are maintained at the highest level.

In addition to this, Wire and Strand construction products are approved by various certificate authority for reinforcing steels.

The Wire and Strand operation is fully committed to ensuring a safe and healthy working environment for employees. As part of an extensive SHE programme, the factory has achieved ISO18001 & ISO 14001 status as well.





Haggie Wire and Strand has a long history of being at the forefront of PC wire and Strand technoloav.

A well-equipped research laboratory, with a staff of dedicated Metallurgists.

This facility carries out development project work, enabling it to offer state-of-theart specialized products. The demands and requirements of our customers are the ultimate driving force for these research programmes.

The Wire and Strand facility has an on-site ISO 17025 Accredited laboratory able to conduct all tests as specified in all international or customer specific requirements.

ACCREDITATIONS

QUALITY PLAN

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As part of our commitment to quality, we have formulated a comprehensive quality plan in an effort to provide our customers with the assurance that they are receiving a top quality product.



Haggie Wire and Strand has a comprehensive quality management system which satisfies the requirements of ISO 9002. The operation goes through regular audits by both the local and international accrediting bodies.

QUALITY SYSTEMS





QUALITY CHECKS

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All tests are conducted in accordance to the specifications required to conform and is displayed in the diagram below:

Strand# JPG-EA-C786-1A

Typical 7 WireOordinary-12.70mm-1860-Relax 2





(%)
±1.2
±1.2
±1.3
±1.2
±2.3
±0.2
95%
2

All critical measures are reported as follows:

- Modulus of Elasticity (Young's
- Modulus) E 0.1% and 0.2% Proof
- Load Rp0.1 & Rp0.2
- Load at 1% Extension F (1%) •
- Ultimate Tensile Strength Fm
- Maximum Breaking Load or Stress – Rm
- Total Elongation at Fracture At
- Elongation at maximum load • - Aqt
- Ductility reported as Total •
- Elongation at Fracture At



SPECIALISED TESTING

Relaxation Properties

Haggie Wire and Strand is routinely tested in a temperature controlled modern state of the art automated stress relaxation laboratory. Typical relaxation values of our strand products after 1000 hours at an initial load of 70% of minimum breaking load are 1.0 to 1,5%. Both ASTM and BS specify 2,5% maximum for low relaxation strand. Results for an initial load of 80% of minimum breaking load are typically between 2,0 – 2,5%. The maximum permissible is 3,5%.

Bond Strength & Transmission Length

Through the years our PC wire and strand has been tested for bond strength and transmission length by various independent bodies. Regular bond strength tests are conducted internally as well.

Stress Corrosion Resistance

Haggie Wire and Strand is tested in a purpose built laboratory for conformance to the FIP test, now incorporated into the latest draft version of EURONORM 10138. Both products easily pass the minimum requirements of the test.

dependent bodies. ernally as well.

Fatigue Endurance

Haggie Wire and Strand has been tested by two independent laboratories for conformance to the tension – tension fatigue test requirements of BS, EURONORM, and other standard bodies, including the PTI for stay cables. The requirements is for the strand to endure 2 million cycles at specified maximum loads of up to 70% of the actual breaking force, with specified load ranges. The product's tendons pass easily, with results in excess of 5 million cycles being recorded.

Cryogenic Properties

For use in the prestressing of concrete vessels for liquid gas, or other applications where very low temperatures are experienced, Haggie Wire and Strand regularly tests its PC strand cryogenic properties. Typically the tensile strength of strand increases by about 12% at 165oC, while elongation is reduced from approximately 5,5% to 3,7%. Relaxation losses are minimal below – 100oC. Young's Modulus is slightly increased.





PACKAGING

In the dispatch area both wire and strand products are packaged according to destination and to customer requirements. Strand may be palletized or mounted eye-toside. An additional corrosion protecting treatment may be applied if requested.

Normal through-the-eye wrapping With VCI treated polymer strip. Test lengths may be packaged outside the strapping for easy access, or may be cut off and wrapped separately with individual pack identity labels and then shipped inside the eye of the pack. Details of pack dimensions for our range of products is available on request. Users are also advised that PC products should preferably be stored under cover and that handling procedures which minimize mechanical damage should be employed.



When ordering PC products, or when making an enquiry, the following information should be made available to our Sales and Marketing office:

- 1. Diameter of wire or strand
- 2. Required specification (BS, ASTM, AS, CSA, JIS, EN, ISO, etc.)
- 3. Tensile Grade

CYB/10T

- 4. Direction of lay for strand
- 5. Finish (plain, indented, crimped, compact, galvanised)
- 6. Special technical requirements
- 7. Packaging and labelling instructions
- 8. Delivery instructions







