Anti-electromarking construction scheme for spiral wound tubing



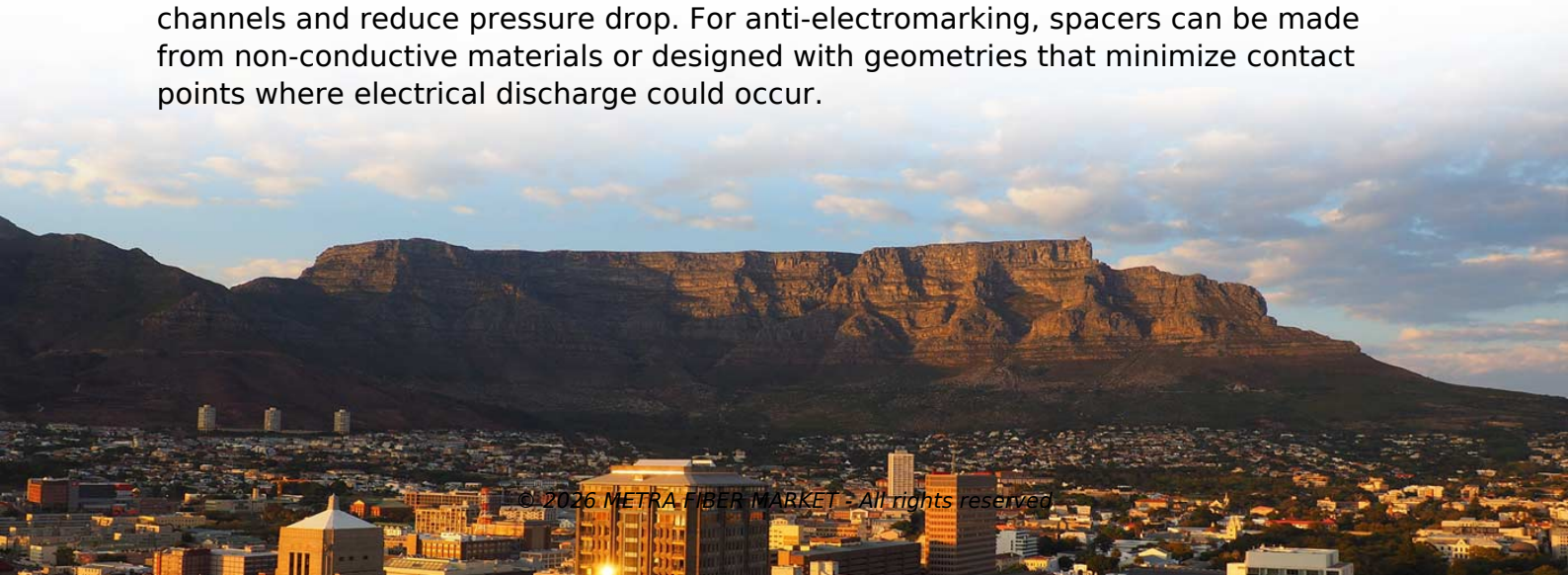
Overview

Performance Advancements in Spiral Element Design _GR286_The spiral wound element design improvements described here will ensure that the elements maintain.

Key Takeaways

Anti-electromarking in spiral-wound tubing can be achieved by integrating conductive or insulating features into the membrane or permeate carrier, combined with optimized feed spacer and ATD design to prevent electrical discharge and mechanical stress. Core Construction PrinciplesSpiral-wound elements are composed of flat sheet membranes, feed spacers, permeate carriers, adhesives, a central perforated permeate tube, and an outer shell. To prevent electromarking, the construction scheme focuses on electrical isolation and uniform current distribution: Membrane and Permeate Carrier Integration: Features can be deposited or embedded on the inactive side of the membrane sheet or within the permeate carrier to reduce localized electrical stress.

This can include conductive coatings, insulating layers, or patterned surfaces that prevent charge accumulation. Feed Spacer Design: Feed spacers maintain flow channels and reduce pressure drop. For anti-electromarking, spacers can be made from non-conductive materials or designed with geometries that minimize contact points where electrical discharge could occur.



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Anti-

Telescoping Devices (ATDs): ATDs at both ends of the element prevent membrane leaves from shifting under pressure.

Proper AT

D design also ensures that the membrane stack remains mechanically stable, reducing the risk of electrical arcing due to uneven compression.

Step-by-

Step Construction Scheme

Membrane Preparation: Lay out the membrane sheet with the active side inward. Apply any anti-electromarking coatings or embedded features on the inactive side. Feed Spacer Placement: Insert feed spacers between folded membrane sheets to form envelopes.

Use spacers with insulating properties or geometries that reduce electrical hotspots. Permeate Carrier Attachment: Sonic-weld or glue permeate carriers to the central perforated tube. Ensure that any conductive paths are controlled and isolated to prevent localized discharge.

Leaf Assembly: Glue multiple membrane envelopes alternately with permeate carriers. Maintain consistent adhesive lines to avoid gaps that could concentrate electrical stress. Rolling and Curing: Roll the assembled leaves around the central tube, then cure and wrap the element.

The wrapping material can include insulating layers to further prevent electromarking.

AT

D Installation: Install ATDs at both ends to stabilize the membrane stack and maintain uniform pressure distribution, reducing mechanical and electrical stress.

Additional Considerations

Material Selection: Use high-dielectric-strength polymers for spacers and outer shells to resist electrical discharge. Quality Control: Inspect for uniform adhesive application, proper alignment of leaves, and absence of conductive bridges that could trigger electromarking. Operational Parameters: Maintain controlled feed water conductivity and avoid high-voltage differentials across the membrane stack to minimize the risk of electrical damage.

By combining integrated membrane/permeate carrier features, insulating feed spacers, and robust ATDs, spiral-wound elements can be effectively protected against electromarking while maintaining high filtration efficiency and mechanical stability.

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Article Content

Performance Advancements in Spiral Element Design _GR286_

The spiral wound element design improvements described here will ensure that the elements maintain good physical integrity over a long period of time and will also reduce the operating cost.

Spiral Protection Tubes

Spiral-wound insulating tubes engineered for easy insertion, secure retention, compact profiles, tight dimensional tolerances, and consistent dielectric performance.

Spiral Wound Modules-UNISOL Membrane Technology

For the different applications of spiral wound modules, UNISOL provides a portfolio of spiral wound modules that stretches from standard modules to products that are designed precisely to the

Spiral Tubing | Shrink and Non-Shrink | Electrolock

Electrolock can provide large continuous length tubing in rolls that are either Layflat or spiral wound constructions. These can be easily incorporated into your automated production equipment to save

Spiral Wound Membranes | Synder Filtration

Spiral-wound elements come in multiple configurations with different spacers, membrane types, lengths, and diameters that allow it to be used in a wide variety of applications.

Polymeric Spiral Membrane Construction & Best Practices

Spiral wound elements aim to maximize durability, efficiency, and versatility in cross flow filtration. Spirals boast a relatively high packing density, easy cleaning, and extreme versatility across different

SPIRAL WOUND

To cover the high variety of applications, UNISOL provides the complete spectrum of MF, UF, NF and RO spiral wound elements, the module design stretches from standard elements to fully customized

Cable Protection Systems

The cable protection products range from high-quality plastic and metal conduits through corrugated tubing, wiring ducts, spiral wraps and protective cable sleeves.

FITCOTUBE® Polyester Spiral-Wound | GREMCO GmbH

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Our MYLAR®/NOMEX® epoxy hoses not only provide the optimum means to waterproof and electrically insulate pipes but also are successful in other applications, such as when securing electromagnets to

WO2023111023A1

The present invention relates to a spiral-wound filter cartridge, called a spiral-wound element, which can be used for fluid separation applications, for example ultrafiltration, micro- and...

Spiral Wound Membranes | Synder Filtration

Construction Spiral-wound elements consist of membranes, feed spacers, permeate spacers, and a permeate tube. First, a membrane is laid out and folded in half

A review of spiral wound membrane modules and

This review provides an insight into the use of pressure-driven membrane processes for groundwater treatment, with focus on the spiral wound

Spiral Wound Gaskets: Construction, Challenges, and Terminology

Background Spiral wound gaskets are common com-modities used in piping systems across several industries, and maintenance and reliability staff are constantly on the look-out for products offering

Comparing Industrial Insulation Solutions: Lay Flat

Compare lay flat tubing and spiral wound tubing industrial insulation solutions. Learn which option best fits your application requirements and processes.

Design and Construction of Commercial Spiral Wound Modules

The spiral-wound membrane module offers users of industrial-scale reverse osmosis an economical combination of low cost, high membrane area density, and favorable mass transfer.

Spiral wound modules and spacers: Review and analysis

The operation of spiral wound modules in industrial plants is affected by many parameters, including the operating conditions, the arrangements of the spiral wound modules in

Spiral Wound Membrane Module | Springer Nature Link

Plate-and-frame as well as spiral wound modules house flat membranes (Mulder 1997). The spiral wound module is an important module type for membrane applications. Initially it was

High Temperature Tubing Materials: Matching Thermal

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Mica-based spiral wound tubing combines the mineral''s thermal stability with flexible construction suitable for motor coils, generator windings, and applications

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