



# Catalogue 2009

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### Geothermal

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# Geothermal

## GEOTHERMAL PROBES AND ACCESSORIES

### GEOTHERMAL PROBES



- ☛ Each probe is pressure tested.
- ☛ Each probe has its unique serial number.
- ☛ Production certificate on request



	<b>25mm double and single probes</b>	<b>32mm double and single probes</b>	<b>40mm double and single probes</b>
<b>Material</b>	25mm x 2,3mm PE100 SDR11 nach DIN 8074	32mm x 2,9mm PE100 SDR11 nach DIN 8074	40mm x 3,7mm PE100 SDR11 nach DIN 8074
<b>U-bend</b>	Probefoot PE100	Probefoot PE100	Probefoot PE100
<b>Connection</b>	Socket welding	Socket welding	Socket welding
<b>Length</b>	20m to 100m other length on request	30m to 150m other length on request	40m to 200m other length on request
<b>Coil core diameter</b>	Ca. 75cm	Ca. 75cm	Ca. 93cm
<b>Coil height</b>	Varies with probe length	Varies with probe length	Varies with probe length

# Geothermal

## GEOTHERMAL PROBES AND ACCESSORIES MANIFOLD DISTRIBUTION BOX



### 6-way distribution box

- OD 900 (6way) made of HDPE with welded bottom plate
- Solid lid with brim and screws
- Hight = ca. 660mm
- Handles on two sides
- Weight = ca. 55kg
- Water tight

### Content:

- 2 manifolds / OD75mm 1" brass coupling nut on top to fit filling and bleeding valves
- Distribution pipe to heat exchanger OD63mm with 100mm welding stub water tight welded to the outside of the distribution box

### Upstream probe ports:

- OD40mm welding stubs water tight welded to the outside of the distribution box
- Fitted with the 1" replaceable ball valve

### Downstream probe ports:

- OD40mm welding stubs water tight welded to the outside of the distribution box
- Fitted with 1" replaceable inline taco setter 8—30l / min

Also available as 7 - 12 way manifold distribution box



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# Geothermal

## GEOTHERMAL PROBES AND ACCESSORIES PRESSURE TEST UNIT



- For pressure testing of geothermal probes
- Build-in datalogger with PC software
- Manual pressure pump independent of electricity
- Ball valve for pressure decrease
- Analog manometer



### Advantages:

- proof of quality towards customer
- Precise measurement
- Compact and robust build can be transported in 'normal cars'
- Continuous documentation with datalogger via included software to your PC / Notebook

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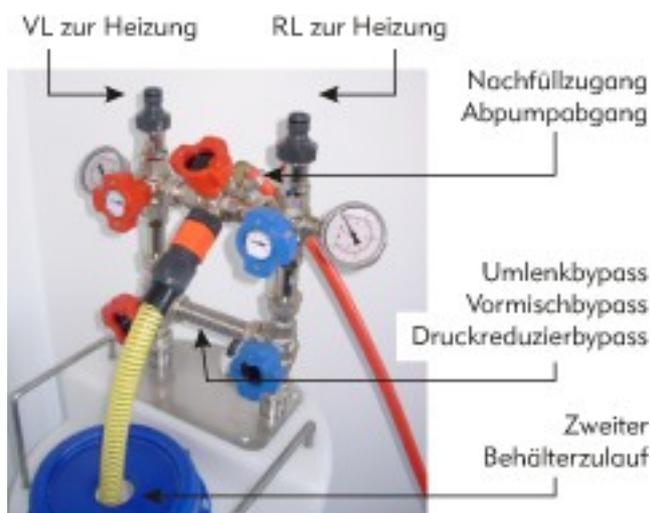
# Geothermal

## GEOTHERMAL PROBES AND ACCESSORIES FILLING MASTER



The perfect tool for filling the system

- Filling
- Cleaning
- Air bubbles removing via shock flushing
- Mixing of Glycol
- Flushing
- Filter bag
- Refilling



### Technical Data

#### **Pump**

- Stainless steel submersible pump, 230V 50Hz
- IP 68, max. head: 60 Metre
- Max. operation temperature: +40°C
- Max. 50g/m<sup>3</sup> sand contain
- Controlled by floating switch

#### **Container**

- Plastic, ca. 55 Litre

#### **Comes with**

- 2x distribution hose with ca. 2,5 Meter with Geka-coupling for filling and evacuation ports 3/4" to 1 1/2"

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# Geothermal

## GEOTHERMAL PROBES AND ACCESSORIES INSTALLATION ACCESSORIES AND WEIGHTS



### Adapter

- Adapter for weights and installation rods
- Makes probe installation easier
- Easy to fit to the probe feet



\* without probe foot



### Weights

- Material: cast iron
- **12kg weights:** D= 85mm, L= 400mm  
Fitted to the probe feet by screw
- **40kg weights:** D= 85mm, L= 1160mm



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# Geothermal

## GEOTHERMAL PROBES AND ACCESSORIES ELECTRO FUSION FITTINGS



### E / F Fittings

- ☛ Material: PE100 SDR11 PN16
- ☛ Barcode based welding
- ☛ Dimensions: 25mm, 32mm, 40mm, 50mm
- ☛ Coupler, reducer, 90° elbows, T-pieces, endcaps



### Trouser piece

#### To unit double probes

- ☛ Material: PE100 SDR11 PN16
- ☛ Dimensions: 32 x 32 x 40mm



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# Geothermal

## GROUTING MATERIAL

### OCMA - BENTONITE



#### Description

**OCMA** bentonites are based on a high purity and high swelling mixed cation montmorillonite clays. All are free flowing powders supplied in bulk, 1000kg IBC or 25kg plastic sacks.

**OCMA** bentonites are specifically processed to develop properties suitable for mainly down-hole drilling applications and civil engineering uses where good fluid loss and cuttings control is needed.



Drilling Properties	
Appæ	
Filter	
YP:F	
Yield	

Physical Properties		
<b><i>Property</i></b>	<b><i>Typical</i></b>	<b><i>Range</i></b>
Moisture Content (%)	11.5	9 -13
Particle Size		
% Passing 75m dry sieve	80	75 - 85
% Retained 75m wet sieve	4.6	3 - 7
Bulk Density (kg/m <sup>3</sup> )	920	800 - 1000
Methylene Blue Absorption (mg/g)	420	400 - 440

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# Geothermal

## GROUTING MATERIAL

### FISCHER GEOCEM 235



**Fischer GC 235 GeoCem** was especially designed for the grouting of borehole heat exchangers and incorporates all favourable characteristics in one product. It can be used for all kind of grouting and soil solidification.

We recommend **Fischer GC 235 GeoCem HS** for grouting in sulphate-bearing water.

235 .

3

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# Geothermal

## GROUTING MATERIAL

### MIKOLIT THERMOSEAL



*Mikolit®-ThermoSeal* is a highly swelling clay product with a strongly enhanced thermal conductivity. Material with high conductivity is added to the raw material. After the spaces between the grains have been filled, a wide degree of swelling capacity remains, which means that, if damage occurs, the clay layer will repair itself.

*Mikolit®-ThermoSeal* has excellent sinking qualities. Due to the fact that the product is free of dust, it has a strongly slowed down start of swelling and it has favourable grain dimensions.

Schrinking of the PE-material of the heat exchanging hose does not cause cracks in the sealing and does not decrease heat conductivity.



Product Name	:	<b>Mikolit®-ThermoSeal</b>
Pellet color	:	black
Pellet size	:	Ø ± 8 mm, length 2 – 12 mm
Package	:	Bags 25 kg
Sinking speed in water	:	21 m/min
Density water saturated	:	1,7 – 1,8 t/m <sup>3</sup>
Bulk density	:	1,1 t/m <sup>3</sup>
Start of swelling	:	15 min
Swelling capacity	:	40 – 60% 1)
Permeability	:	< 10-11 m/s
Swelling pressure	:	9 kN/m <sup>2</sup>
Λ	:	2 W/m <sup>°K</sup>

**Quantity needed(kg/m)**

**Bore hole (mm) >**

ST	Loop configuration	100	120	140	160	200	250
Simplex	2 x 25mm	7,5	11,3	15,7	20,9	33,2	52,6
Dup							
Spe							

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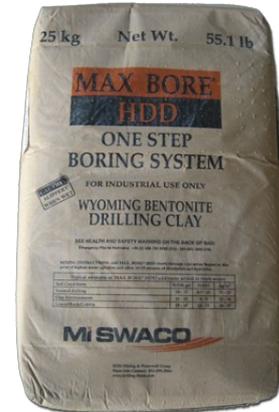
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# Drilling Fluids

## MAX BORE



The **MAX BORE HDD** system is a proprietary, blended, high-yielding Wyoming bentonite supplied as a single-sack product used especially in boring-fluid applications. The **MAX BORE HDD** system provides suspension, borehole stability and filtration control. The system also helps reduce torque and drag in water-base applications and is designed to minimise environmental impact.



### Typical physical properties

Physical appearance.....	Light tan/gray-green powder
Specific gravity.....	2.3 to 2.6
Bulk density.....	48 to 52 lb/ft <sup>3</sup> (769 to 833 kg/m <sup>3</sup> )

The **MAX BORE HDD** system provides suspension, improves wellbore stability, controls filtration, and helps reduce torque and drag in boring-fluid applications. It is a cost- effective product for achieving viscosity for hole cleaning, gel strength for cuttings suspension and transport, wellbore stability, fluid-loss control, and filter cake quality in freshwater and sea water applications. Typical concentrations of the **MAX BORE HDD** system range from 15 to 45 lb/100 gal (18 to 54 kg/m<sup>3</sup>).

### Typical Amounts of MAX BORE HDD Additions Added to Freshwater

E  
N  
C  
C

- One-sack system provides ease of mixing and reduces the number of products required to prepare boring fluid
- Hydrates more than other types of clays and is best for generating viscosity for hole cleaning, developing gels for suspension and controlling filtration
- Unique size, shape and high surface area provide superior filtration characteristics
- Provides lubricity and borehole stability for ease of drilling and stability of water-sensitive clays and shales
- Non-toxic and environmentally safe

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# Drilling Fluids



## CMC HV

**CMC** (technical grade) is a dispersible, sodium carboxymethyl cellulose, fluidloss reducing additive supplied in three grades:

low viscosity, high viscosity, and extra - high viscosity. **CMC** additive can be used in freshwater and seawater mud systems.



### Typical

Physical appearance.....	White to off-white powder
Specific.....	1.59 (Density and)
Solubility.....	Soluble
pH.....	7-10
Temperature.....	Stable °F (120°C) use

### Applications

**CMC** technical-grade additive is used as a fluid-loss reducing additive in freshwater and seawater muds.

It is less effective in brines and saltwater and is not generally recommended to be used if the salinity exceeds 50,000 ppm.

**CMC** Lo Vis tech - grade additive is used in high-viscosity, high solid or heavily weighted fluids and produces only slight increases in viscosity.

**CMC** Hi Vis and Extra Hi Vis tech-grade additives are used in low-viscosity or low-solids fluids and increase viscosity in addition to controlling fluid loss.

### Advantages

- Widely available and an economic source of polymer fluid - loss control
- Concentrated chemical, very effective at small treatment levels  
Can be used in most water - base drilling fluids

### Packaging and Storage

**CMC** Tech Grade additive is packaged in 25- kg (55- lb), Heavy-duty, multi-wall, waterproof sacks.

Store in a dry location away from sources of heat or ignition, and minimise dust.

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# Drilling Fluids



## POLYPAC - R

**POLYPAC R** polyanionic cellulose is a high-quality, water-soluble polymer designed to control fluid loss and increase viscosity in water-based muds.



### Typical physical properties

Physical appearance.....	White, free-flowing powder
Specific gravity.....	1.5 to 1.6
pH (1% solution) .....	6.5 to 8.0

### Applications

**POLYPAC R** additive controls fluid loss in freshwater, seawater, KCl and salt muds.

The polymer forms a thin, resilient, low permeability filter cake that minimises the potential for differential sticking and the invasion of filtrate and mud solids into permeable formations.

**POLYPAC R** fluid-loss-control additive resists bacterial attack, eliminating the need for biocides or preservatives.

It is effective in low concentrations, with the normal fluid-loss treatment ranging from 0.25 to 1 lb/bbl (0.71 to 2.85 kg/m<sup>3</sup>). **POLYPAC R** polymer also develops viscosity to a degree that is dependent on the solids concentration, salinity and make up of water chemistry.

**POLYPAC R** anionic polymer attaches to and encapsulates exposed shales and drill cuttings. This protective polymer “envelope” inhibits the dispersion of shale cuttings and restricts fluid interactions with exposed shales.

### Advantages

- Effective in low concentrations for controlling fluid loss and building viscosity
- Encapsulates shale particles to inhibit swelling and dispersion
- Resists bacterial attack, requiring no biocides or preservatives
- Functions over a wide range of salinity, hardness and pH levels
- Applicable in all water-base muds, ranging from low-solids, non-dispersed polymer systems to high-density, dispersed systems
- Compatible with all common mud-treating additives
- Excellent environmental acceptability

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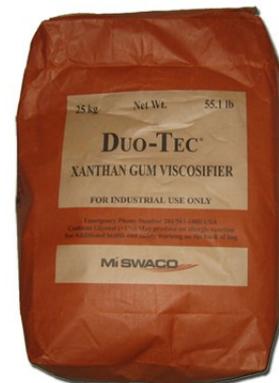
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# Drilling Fluids



## DUO-TEC

**DUO-TEC** additive is a dispersible, non-clarified technical-grade xanthan gum that provides viscosity, including low-shear-rate viscosity, and weight-material suspension for all water-base mud systems. **DUO-TEC** xanthan gum has the unique ability to produce a fluid that is highly shear thinning and thixotropic.



### Typical physical properties

Physical appearance.....	Cream-to-tan powder
Specific gravity.....	1.5
Bulk density.....	50 lb/ft <sup>3</sup> (800 kg/m <sup>3</sup> )

### Applications

The primary function of **DUO-TEC** xanthan gum is to increase viscosity for cuttings transport and suspension. **DUO-TEC** xanthan gum performs effectively in all waterbase fluids, from highly weighted to low-solids systems. This includes freshwater, seawater, salt and 125 heavy-brine systems.

**DUO-TEC** xanthan gum works to provide an optimized rheological profile with elevated low-shear-rate viscosity and highly shear-thinning characteristics with low “n” values.

These characteristics frequently result in fluids with inverted flow properties, i.e., the yield point being greater than the plastic viscosity. Shear-thinning fluids have low effective viscosities at the high shear rates encountered inside the drill string and at the bit.

This low effective viscosity for minimal pressure losses and standpipe pressure allows optimised hydraulics and maximised rates of penetration.

Conversely, at the low shear rates experienced in the annulus, **DUO-TEC** xanthan gum enables the fluid to have a high effective viscosity for adequately cleaning the well and suspending cuttings.

**DUO-TEC** xanthan gum should be added slowly through the hopper to prevent lumping and minimize waste. It should be added at the rate of approximately one 25-lb (11.3-kg) sack every seven minutes.

The time required for the product to yield its ultimate viscosity depends on salinity, temperature and shear.

The amount of **DUO-TEC** xanthan gum required depends upon the desired viscosity.

Normal concentrations range from 0.50 to 2.5 lb/bbl (1.43 to 7.1 kg/m<sup>3</sup>) for most mud systems.

Special fluids and difficult hole cleaning conditions can require higher concentrations up to 4 lb/bbl

(11.4 kg/m<sup>3</sup>). The addition of salt, an antioxidant and thermal stabilisers improves temperature stability in

**DUO-TEC** fluids from 250° to 280°F (121° to 138°C).

Specially formulated systems/pills have been used at temperatures up to 400°F (204°C).

**DUO-TEC** xanthan gum is subject to bacterial degradation, and treatments with a biocide are recommended to prevent fermentation.

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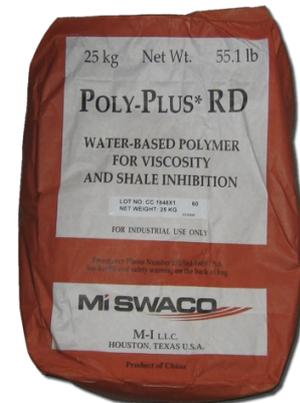
# Drilling Fluids



## POLY-PLUS RD

**POLY-PLUS RD** acrylic co-polymer(PHPA) is a readily dispersible product designed to provide cuttings encapsulation and shale stabilisation. It is formulated for easy mixing with improved dispersion to eliminate "fish eyes." This is beneficial when rapidly mixing either large quantities or high concentrations of polymer where good mixing equipment is unavailable.

**POLY-PLUS RD** acrylic co-polymer acts as a viscosifier, friction reducer and flocculant. It also provides some fluid-loss control. **POLY-PLUS RD** acrylic co-polymer is a specially treated, high-molecular-weight product. It can be used in systems ranging from low solids to weighted muds, using makeupwaters from freshwater to saltwater.



### Typical physical properties

Physical appearance.....	White, granular powder
Odor.....	Slightly hydrocarbon
Specific gravity.....	1.25 to 1.40
pH (1% solution).....	7.7
Bulk density.....	40 to 46 lb/ft <sup>3</sup> (641 to 737 kg/m <sup>3</sup> )
Nature of charge.....	Anionic
Activity.....	>90%

### Applications

**POLY-PLUS RD** acrylic co-polymer mud systems. **POLY-PLUS RD** additive provides excellent cuttings encapsulation and improved wellbore stability. Typical concentrations of **POLY-PLUS RD** acrylic co-polymer are 0.25 to 1 lb/bbl (0.71 to 2.85 kg/m<sup>3</sup>).

It is also effective in salt muds, such as KCl- or NaCl-enhanced fluids, although slightly higher concentrations of **POLY-PLUS RD** acrylic co-polymer can be required.

### Clear-water fluids.

**POLY-PLUS RD** acrylic co-polymer can be used in clear-water, solids-free drilling fluids.

This product enhances solids removal by flocculating the undesired solids and increasing viscosity.

The polymer also provides cuttings encapsulation and improved wellbore stability.

**POLY-PLUS RD** acrylic co-polymer is frequently used in slim-hole, continuous-coring applications.

### Advantages

- Readily dispersible and does not form "fish eyes"
- Excellent cuttings encapsulator limits cuttings dispersion
- Provides improved shale stabilisation
- Powdered material has significantly lower toxicity than invert-emulsion, liquid polymers
- Highly concentrated product (>90% activity) reduces transportation costs and storage space requirements
- Aids in preventing balling on the bit, stabilisers and bottom hole assembly by coating and lubricating solids
- Enhances removal of drill solids
- Can be used to viscosify clearwater and low-solids drilling fluids

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# Drilling Fluids



## SUPER - VIS

**SUPER-VIS** xanthan gum is a high-molecular-weight biopolymer used for increasing carrying capacity in water-base systems.

**SUPER-VIS** biopolymer has the unique ability to produce a fluid that is highly shear-thinning and thixotropic.



### Typical physical properties

Physical appearance.....	Cream-to-tan powder
Specific gravity.....	1.5
Bulk density.....	50 lb/ft <sup>3</sup> (800 kg/m <sup>3</sup> )

### Applications

The primary function of **SUPER-VIS** biopolymer is to increase low-shear viscosity for cuttings transport and suspension. This product performs effectively in all water-base fluids, from highly weighted to low-solids systems, including freshwater, seawater, salt and heavy-brine systems.

**SUPER-VIS** xanthan gum works to provide an optimised rheological profile with elevated low-shear-rate viscosity and highly shear-thinning characteristics with low “n” values.

These characteristics frequently result in fluids with inverted flow properties (i.e., the yield point is greater than the plastic viscosity).

Shear-thinning fluids have low effective viscosities at the high shear rates encountered inside the drillstring and at the bit. This low effective viscosity for minimal pressure losses and standpipe pressures allows optimised hydraulics and maximised rates of penetration.

Conversely, at the low shear rates experienced in the annulus, the **SUPER-VIS** product enables the drilling fluid to have a high effective viscosity for adequately cleaning the well and suspending cuttings.

### Advantages

- Highly effective suspension enhancer; small treatments produce significant results
- Provides a shear-thinning rheological profile for improved hydraulics
- Minimum frictional pressure losses for additional hydraulic horsepower at the bit and low, high-shear-rate viscosity for maximum penetration rates
- Viscous laminar flow in the annulus for improved wellbore stability with maximum hole-cleaning and suspension capacity
- Easy to mix

**SUPER-VIS** product is packaged in 2-gal (7.6-L) buckets (12.5-lb [5.7-kg] per bucket).

The product can also be packaged in 15- to 21-lb (6.8 to 9.5 kg) baggies per 5-gal (18.9-L) bucket. Store in a well-ventilated area away from sources of heat or ignition.

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# Well building material

## PVC - PIPES AND ACCESSORIES

### SCREEN AND CASINGS



- ☛ Open area 5 - 10%
- ☛ Trapezoidal, BSP, Flush thread
- ☛ Standard - slot sizes:0,3; 0,5; 1,0mm
- ☛ Standard - effective length 1m and 2m
- ☛ Standard - colour blue



Nominal diameter	Ø outside	wall thickness	Ø inside	Ø socket	threading
DN 35	41,5 mm	3,5 mm	34,5 mm	46,0 mm	BSP

# Well building material

## PVC - PIPES AND ACCESSORIES

### TECHNICAL DATA



Open area of PVC screens in percent in according to nominal diameter and slot size

DN	0,3 mm	0,5 mm	1,0 mm
35	6,5 %	8,0 %	
40	6,0 %	7,0 %	
50	5,5 %	6,5 %	
80	5,0 %	6,0 %	
100	5,0 %	6,0 %	9,0 %
115	5,0 %	6,0 %	9,0 %
125	4,5 %	5,5 %	8,0 %

Flow through screen based on an entry velocity of 30mm/sec and according to a nominal diameter and slot size.

DN	0,3 mm	0,5 mm	1,0 mm
35	0,80 m <sup>3</sup> /h	1,00 m <sup>3</sup> /h	
40	1,00 m <sup>3</sup> /h	1,25 m <sup>3</sup> /h	
50	1,20 m <sup>3</sup> /h	1,50 m <sup>3</sup> /h	
80	1,40 m <sup>3</sup> /h	1,70 m <sup>3</sup> /h	
100	1,90 m <sup>3</sup> /h	2,30 m <sup>3</sup> /h	3,10 m <sup>3</sup> /h
115	1,85 m <sup>3</sup> /h	2,30 m <sup>3</sup> /h	3,15 m <sup>3</sup> /h
125	1,80 m <sup>3</sup> /h	2,20 m <sup>3</sup> /h	3,15 m <sup>3</sup> /h

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# Well building material

## PVC - PIPES AND ACCESSORIES

### WELL HEADS



Material : PVC glue socket with flange

Central : galvanised steel socket for discharge tubing

Sizes : 3" to 6"

Standard socket sizes : 1" and 1 1/4"



- Other socket sizes on request
- Custom made items on request

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