

# Dielectrics

## Overview



**A tough nut  
for copycats...!**

# Superior fluids for all your applications



**Dr. Manfred Storr**  
Managing Director

When Carl Christian Held started the production of machine oils and greases in 1887, he laid the foundation stone for a medium-sized company that over the past decades has established itself as a specialist in the lubricants sector. oelheld GmbH has existed in its present form since 1989, and has been managed by Dr. Manfred Storr since 1973.

**Innovative fluid management, stringent product development and quality assurance are the key to the success of our products.**

Numerous machine manufacturers therefore develop products together with us that are specially tailored to the demands of their machines. That also naturally applies to our customer.

Our many years of experience with high-tech lubricants also enable us to work intensively to the specific demands of our customers and to adapt existing fluids to a wide range of different production processes.



## Dielectrics

Whether for roughing work or use in ultra-fine finishing – the dielectric has to satisfy the very specific requirements for every application. The high-performance dielectrics from oelheld are made from synthetic base oils and contain discharge-intensifying, wear-reducing additives and ageing inhibitors for use in electric discharge machining (EDM).

By contrast with the conventional mineral oil products, the high-purity synthesis products enriched with the oelheld-patented satellite electrodes from the IonoPlus® series are manufactured in a special blending process.

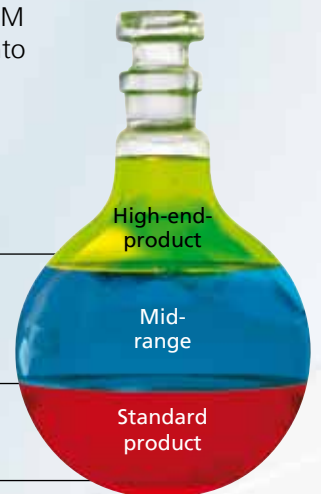
The dielectrics from oelheld have been tested in extensive series of trials and have proved to be effective in practice for decades. Leading manufacturers of erosion discharge machines and filters expressly recommend our fluids. The dielectrics have very high disruptive strength, are as clear as water (except IonoPlus ) and practically odourless. Furthermore, they achieve the degree of purity of pharmaceutical white oils and are more or less free of aromatics.

Our dielectrics for EDM can be sub-divided into 3 product categories:

**IonoPlus® range**

**IME range**

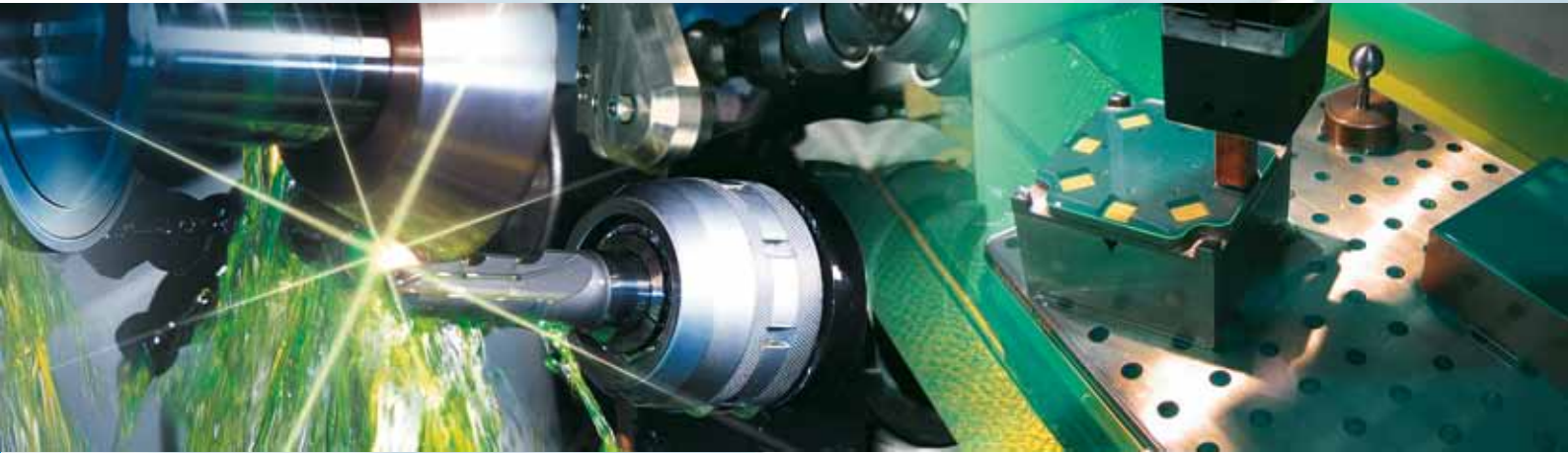
**EcoSpark 105**



EDM wire cutting machines:  
**IonoFil / ControFil 2**

EDM fast hole drilling machine:  
**IonoVit® S**

# Dielectric fluids for EDM Die sinking machines



## EcoSpark 105

- Competitive performance
- Good discharge properties
- Non-irritating to the skin
- Low odour
- Competitive price

## IME Series Dielectric

- No odour
- Transparent colour
- High discharge properties
- No irritation to the skin
- Low electrode wear
- Good surface qualities
- Excellent polishing properties
- Long service life of the dielectrics

## Technical Data – IME Series

Density at 15° C (g/cm <sup>3</sup> )	0,76–0,82	DIN 51757
Viscosity at		
40° C (mm <sup>2</sup> /s)	1,30–3,70	DIN 51562
Flash point ° C	56–120	DIN EN 22719
Aromatics content (% w/w)	< 0,01	DIN 51378

## IonoPlus® Series

- Combination of high-purity synthetic products
- Enriched with satellite electrodes
- Up to 20% higher discharge capacity than the IME dielectrics
- Free from aromatics
- No odour
- Transparent green colour
- Even lower electrode wear than with the IME dielectrics
- Excellent surface qualities
- Even higher polishing properties
- Long service life of the dielectrics
- No toxic or allergic reactions

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The individual dielectrics from the oelheld product series are specially formulated in their different viscosities and additives to the machining processes and materials in question. In each product series you will find a variant specially formulated for polishing, roughing and universal application.

# Dielectric fluid for EDM Fast hole drilling machine



## The advantages of IonoVit® S

- Faster erosion
- Lower electrode wear
- No health hazards when used according to the manufacturers recommendation
- Free of heavy metals and chlorine
- Low odour
- Low foaming
- Corrosion protection

## Machine: MADRA, electrode: copper multichannel, diameter: 1,5 mm

	Tungsten carbide, height 20 mm grade: CF-H40 HIP			Tungsten carbide, height 70 mm Wolframcarbide embedded in cobalt		
	time [min:sec]	wear [mm]	Feed rate [mm/min]	time [min:sec]	wear [mm]	Feed rate [mm/min]
Di-water*	03:52	160	5,17	15:34	537	4,50
IonoVit® S	02:20	105	8,57	09:10	296	7,64
Benefit with IonoVit® S	<b>39,7%</b>	<b>34,4%</b>	<b>65,8%</b>	<b>41,1%</b>	<b>44,9%</b>	<b>69,8%</b>

	Tool-steel, height 100 mm grade: 1.2379			Inconel, height 100 mm nickel-based alloy		
	time [min:sec]	wear [mm]	Feed rate [mm/min]	time [min:sec]	wear [mm]	Feed rate [mm/min]
Di-water*	03:38	152	27,5	03:15	157	30,8
IonoVit® S	01:58	54,7	50,8	01:14	63	81,1
Benefit with IonoVit® S	<b>45,9%</b>	<b>64,0%</b>	<b>84,7%</b>	<b>62,1%</b>	<b>59,9%</b>	<b>163%</b>

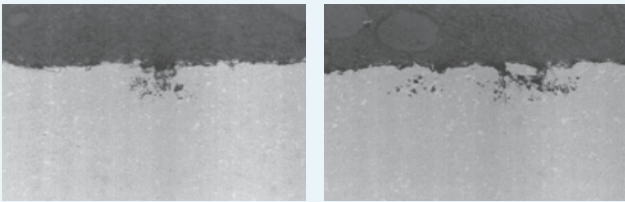
# The new age of wire-cutting EDM



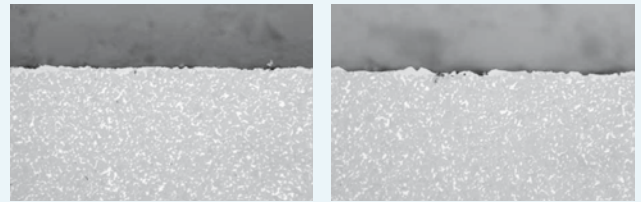
## The advantages of IonoFil

- No cobalt leaching with carbide metal
- Better surface qualities
- No corrosion on workpieces and the machine
- Smaller spark gaps possible
- No microbiological attack
- Reduced thermal shock
- Less heat cracking
- Better precision machining thanks to smaller spark gaps

## Surfaces



Clearly to be seen in the upper figure are the spots where water has significantly damaged the surface and permitted corrosion due to the leaching of cobalt.



Undamaged surface machined with IonoFil

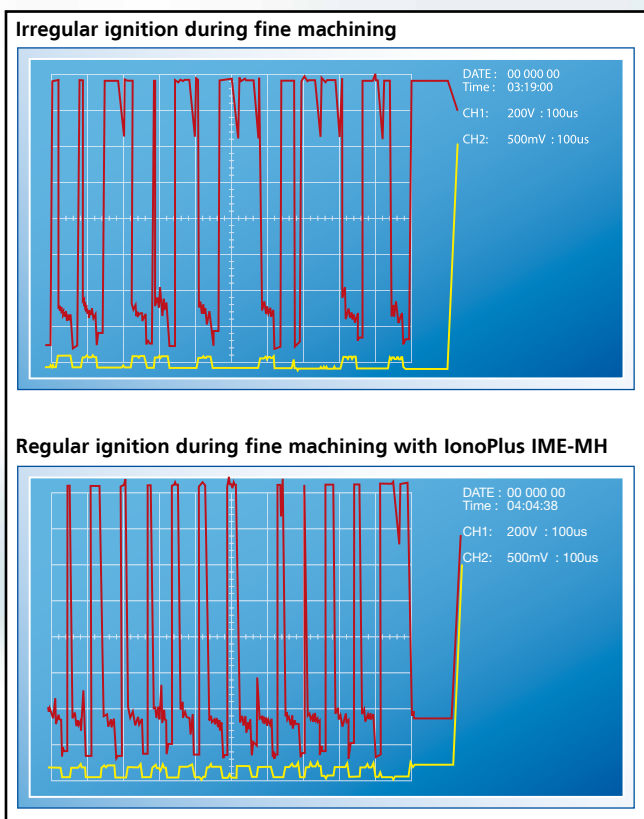
Particularly when machining carbide metal, cobalt leaching and hence also corrosion present a problem that is difficult to overcome. That is why, in collaboration with leading companies in the EDM field and the University of Louvain (Belgium) decided to set up a research project to develop a hydrocarbon-based dielectric that is designed specifically for the wire EDM technology. The result is IonoFil.

The service life of carbide punches, in particular, can be enormously prolonged by preventing cobalt leaching. Laborious and cost-intensive deionisation of the water with

resins, corrosion protection – before, during and after machining – and frequent changing of the medium are now things of the past thanks to this development. IonoFil as dielectric allows smaller spark gaps to be used, thus permitting far better precision machining, e.g. with closer radii. The quality of the surfaces increases to the same extent, with peak-to-valley roughness of down to Ra 0.1  $\mu\text{m}$  being achieved far faster and easier than with water.

A convincing argument, particularly at a time when the industry is making ever higher quality demands on its suppliers and on the manufactured parts.

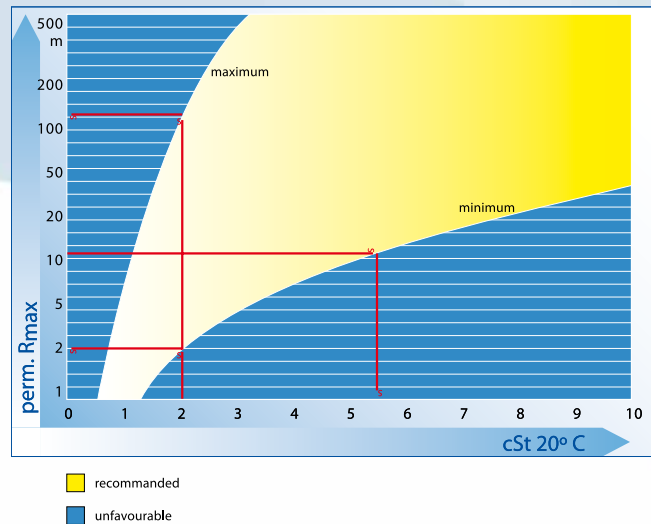
# Research and development



That means more discharges and hence shorter discharge times. The secret are the satellite electrodes distributed in the fluid that create a faster discharge bridge that produces an effective spark channel.

All oilfield dielectrics have been classified by the Research and Materials Institute Baden-Württemberg as representing no health hazard in their operational safety and industrial hygiene.

Table of recommended viscosity as a function of  $R_{max}$



As can be seen from the diagram above, more regular ignitions per unit of time can be achieved by changing the dielectric from IME to IonoPlus®.





The engineers and technicians in our Research department develop tailor products that have proven themselves world-wide for many years using the latest base oil and additive technologies.

Metal processing oils, dielectrics and water-miscible cooling lubricants account for the largest proportion of our broad assortment of basic products. We regard these areas as our spheres of key competence and have proved this through numerous patented and extremely successful products.

Should you need more than just a standard product or wish to increase the productivity of your production, come to us and put our laboratory to the test. We guarantee a long service life for many of our products and also carry out regular analyses of your products currently in use.

New research projects are the catalyst for permanent further development of existing products. Therefore we are in the position to develop new technologies and realize customer specific demands. We guarantee you that we are always acting at the pulse of time. Challenge us !

## The benefits of oelheld

The dielectrics from oelheld are characterised in particular by performance-enhancing and application-friendly properties.

- Less electrode wear
- Better polishing results
- Faster machining
- No filtration problems
- Neutral odour
- No health hazards
- All oelheld dielectrics can be mixed

## Human Technology

- Human technology is not just a trademark at oelheld GmbH – it is a guiding principle. Low risk potential as well as environmental safety of the products and the application are most important for us.
- **Human Technology for Man, Environment and Machines – our contribution toward a better future!**



# High-tech products for machines – worldwide!

oelheld GmbH is not only represented with its own sales offices and production plants in France, Great Britain and the USA, but also has various representatives in most countries.

## **oelheld U.S., Inc.**

1760 Britannia Drive, Unit 1  
Elgin Illinois 60124  
phone: +1-(847)-531-8501  
fax: +1-(847)-531-8511  
E-Mail: [hutec-us@oelheld.com](mailto:hutec-us@oelheld.com)  
web: [www.oelheld-us.com](http://www.oelheld-us.com)

## **oelheld UK Ltd.**

Unit 16, Colomendy Business Park, Erw Las  
Denbigh, LL16 5TA.  
Tel: +44 (0)1745-814-777  
Fax: +44 (0)1745-813-222  
E-Mail: [sales@oelheldgroup.co.uk](mailto:sales@oelheldgroup.co.uk)  
Internet: [www.oelheld.com](http://www.oelheld.com)

## **oelheld technologies SAS**

Technopôle de Forbach-Sud  
140, Avenue Jean-Eric Bousch, 57600 Oeting  
Téléphone : +33 (0)3.87.90.42.14  
Télécopie : +33 (0)3.87.84.66.91  
E-Mail : [hutec@oelheld.fr](mailto:hutec@oelheld.fr)  
Internet : [www.oelheld.fr](http://www.oelheld.fr)

## **Storr oelheld (Shanghai) Trading Co., Ltd.**

Room 1908, Hitime International Building  
No.888, Sichuan Road(N)  
Hongkou District, Shanghai, 200080  
Telephone: +86-13801724397  
E-mail: [john.w@oelheld.com.cn](mailto:john.w@oelheld.com.cn)  
Internet: [www.oelheld.com.cn](http://www.oelheld.com.cn)

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Human Technology  
for man, environment  
and machines

**HUTECH**

**oelheld**<sup>®</sup>  
innovative fluid technology

oelheld GmbH • Ulmer Strasse 135-139 • D-70188 Stuttgart  
Telefon: +49 (0) 7 11 / 1 68 63 - 0 • Fax: +49 (0) 7 11 / 1 68 63 - 40  
E-Mail: [hutec@oelheld.de](mailto:hutec@oelheld.de) • Internet: [www.oelheld.de](http://www.oelheld.de)