



## ADDITIVES AND WAXES FOR WIRE DRAWING



### FORMULATION COMPONENTS FOR WIRE DRAWING

- » Anti-deposition agents
- » Anti-tap / Anti-wear
- » Emulsifiers
- » Wetting agents
- » Waxes
- » Defoamers
- » Rheology modifiers

### IMPORTANT CHARACTERISTICS FOR WIRE DRAWING

#### LUBARIT® in liquid wire drawing



- » Effective die lubrication
- » Good heat transfer
- » High wetting efficiency
- » Low foaming
- » Easy to clean post drawn wire
- » Stable product blends

#### CERETAN® in powder wire processes



- » Good anti-wear
- » Low wire breakage
- » Optimal wire topology
- » Low dusting
- » Easy to clean post drawn wire
- » Easy to recycle



# ADDITIVES FOR WIRE DRAWING PRODUCTS

| Product                          | Chemistry | Percentage of Active, Water & non-aqueous | Tank side defoamer | Surfactant | Dispersant Water Based | Dispersant Oil Based | Wire drawing Water based | Wire drawing Oil based | Wire drawing Dry powder | Anti-tap / Anti-wear |
|----------------------------------|-----------|---|--------------------|------------|------------------------|----------------------|--------------------------|------------------------|-------------------------|----------------------|
| <b>ANTIDEPOSITION AGENTS</b>     |           | <b>LIQUID</b>                             |                    |            |                        |                      |                          |                        |                         |                      |
| EDAPLAN® 395                     | anc       |   |                    |            | ○                      |                      |                          |                        |                         |                      |
| EDAPLAN® 494                     | ac        |   |                    |            | ●                      |                      |                          |                        |                         |                      |
| EDAPLAN® 516                     | ac        |   |                    |            | ●                      |                      |                          |                        |                         |                      |
| EDAPLAN® 916                     | fa        |   |                    |            | ●                      | ○                    |                          |                        |                         |                      |
| EDAPLAN® 930                     | ac        |   |                    |            | ○                      | ●                    |                          |                        |                         |                      |
| <b>ANTIFOAMS &amp; DEFOAMERS</b> |           | <b>LIQUID</b>                             |                    |            |                        |                      |                          |                        |                         |                      |
| FOAM BAN® 155                    | sil,pa    |   |                    |            |                        |                      |                          | ●                      |                         |                      |
| FOAM BAN® 1860                   | 3D, poa   |   |                    |            |                        |                      | ●                        | ○                      |                         |                      |
| FOAM BAN® 2699                   | poa       |   | ●                  |            |                        |                      | ○                        |                        |                         |                      |
| FOAM BAN® 2875                   | oms       |   |                    |            |                        |                      |                          | ○                      |                         |                      |
| FOAM BAN® 3057                   | wx, mo    |   | ○                  |            |                        |                      | ○                        |                        |                         |                      |
| FOAM BAN® HP970                  | 3D        |   |                    |            |                        |                      | ●                        |                        |                         |                      |
| FOAM BAN® TK-360                 | 3D, poa   |   | ●                  |            |                        |                      | ●                        |                        |                         |                      |
| <b>RHEOLOGY MODIFIERS</b>        |           | <b>LIQUID</b>                             |                    |            |                        |                      |                          |                        |                         |                      |
| TAFIGEL® AP 16                   | ac        |   |                    |            |                        |                      | ○                        |                        |                         |                      |
| TAFIGEL® AP 20                   | ac        |   |                    |            |                        |                      | ●                        |                        |                         |                      |
| TAFIGEL® PUR 61                  | pur       |   |                    |            |                        |                      | ○                        |                        |                         |                      |
| <b>SURFACTANTS/EMULSIFIER</b>    |           | <b>LIQUID</b>                             |                    |            |                        |                      |                          |                        |                         |                      |
| EDAPLAN® 916                     | fa        |   |                    |            |                        | ○                    |                          |                        |                         |                      |
| LEUKONÖL LBA-2                   | sco       |   |                    |            |                        |                      |                          | ●                      |                         |                      |
| LUBARIT® EXP 6533/1              | pos       |   |                    |            |                        |                      | ●                        |                        |                         | ●                    |
| METOLAT® 200                     | es        |   |                    | ●          |                        |                      | ○                        | ●                      |                         | ●                    |
| METOLAT® 250                     | svo       |   |                    | ○          |                        |                      | ●                        |                        |                         |                      |
| METOLAT® 388                     | pge       |   |                    | ●          |                        |                      |                          |                        |                         |                      |
| METOLAT® 1299                    | es        |   |                    |            |                        |                      |                          |                        |                         | ●                    |
| METOLAT® 1602                    | es        |   |                    | ○          |                        |                      | ●                        | ○                      |                         | ●                    |
| METOLAT® TH-75                   | sfo       |   |                    |            |                        |                      |                          | ●                      |                         |                      |
| <b>WETTING AGENTS</b>            |           | <b>POWDER</b>                             |                    |            |                        |                      |                          |                        |                         |                      |
| METOLAT® P 530                   | snc       |   |                    | ●          |                        |                      | ●                        |                        | ●                       | ○                    |

○ Recommended ● Highly recommended

3D = 3-Dimensional siloxane  
 ac = Acrylic  
 anc = Anionic copolymer  
 es = Ester wax  
 fa = Fatty acid  
 mo = Mineral oil

oms = Organically modified polysiloxane  
 pa = Paraffin wax  
 pge = Polyglycol ester  
 poa = Polyalkalene technology  
 pos = Phosphate ester  
 pur = Polyurethane

sco = Sulphated castor oil  
 sfo = Sulphated fish oil  
 sil = Silicone  
 snc = Sulphated naphthalene condensate  
 svo = Sulphated vegetable oil  
 wx = Wax



# WAXES FOR WIRE DRAWING PRODUCTS

| Product             | Chemistry | Percentage of Active Water & non-aqueous | Melting Point [°C] | Particle size [Micron D <sub>98</sub> ] | Wire drawing Water based | Wire drawing Oil based | Wire drawing Dry powder | Corrosion Protection | Anti-wear |
|---------------------|-----------|--|--------------------|---|--------------------------|------------------------|-------------------------|----------------------|-----------|
| <b>WAXES POWDER</b> |           |  |                    |   |                          |                        |                         |                      |           |
| CERETAN® MA 7008    | ebs       |  | 143–151            | 8                                       |                          |                        | ●                       |                      |           |
| CERETAN® MA 7250    | ste       |  | 98–108             | 50                                      |                          |                        | ●                       |                      |           |
| CERETAN® MC 6015    | ca        |  | 81–89              | 15                                      |                          |                        | ●                       |                      |           |
| CERETAN® MF 5108    | ptfe      |  | 320–340            | 8                                       |                          |                        | ●                       |                      | ○         |
| <b>WAXES LIQUID</b> |           |  |                    |   |                          |                        |                         |                      |           |
| LUBARIT® 267/B      | ptfe      |  | –                  | 5                                       |                          | ●                      |                         |                      | ●         |
| LUBARIT® 276/E      | ptfe      |  | –                  | 5                                       | ○                        |                        |                         |                      | ●         |
| LUBARIT® 328/G      | am        |  | 147–153            | 30                                      | ●                        |                        |                         |                      |           |
| LUBARIT® 328/R      | am        |  | 143–151            | 18                                      | ●                        |                        |                         |                      |           |
| LUBARIT® 368/W      | pe/ptfe   |  | 104–112            | 18                                      | ●                        |                        |                         |                      |           |
| LUBARIT® 408/W      | cp        |  | –                  | –                                       | ○                        |                        |                         | ●                    |           |
| LUBARIT® 868/F      | ca blend  |  | 87–93              | 10                                      | ○                        |                        |                         |                      |           |
| LUBARIT® 901/A      | am, pe    |  | 150                | 10                                      |                          | ●                      |                         |                      |           |
| LUBARIT® 998        | pe        |  | 125–135            | 9                                       | ○                        |                        |                         |                      |           |
| LUBARIT® 1102/2     | pe        |  | 130–136            | 25                                      | ●                        |                        |                         |                      |           |
| LUBARIT® 7040       | pe        |  | 120–130            | 3                                       | ○                        |                        |                         |                      |           |
| LUBARIT® 7040 ET    | ft,pe     |  | 103 & 114          | 0.3                                     | ●                        |                        |                         |                      |           |
| LUBARIT® CA 300     | ca blend  |  | 72–80              | 3                                       | ●                        |                        |                         |                      |           |
| LUBARIT® T-304/D60  | fb        |  | 102                | –                                       |                          |                        |                         | ●                    |           |
| LUBARIT® WT 18040   | ft        |  | 112–115            | 20                                      | ●                        |                        |                         |                      |           |
| OMBRELUB CD         | cst       |  | 140–150            | –                                       | ●                        |                        |                         |                      | ●         |
| SÜDRANOL® 195       | hdpe      |  | 128–137            | –                                       | ●                        |                        |                         |                      |           |
| SÜDRANOL® 340       | pe        |  | 95                 | –                                       | ●                        |                        |                         |                      | ●         |

○ Recommended ● Highly recommended

am = Amide  
ca = Carnauba wax  
cp = Co-polymer  
cst = Calicum stearate

ebs = Ethylene bis stearamide  
fb = Functional blend  
ft = Fischer-Tropsch wax  
hdpe = High density polyethylene

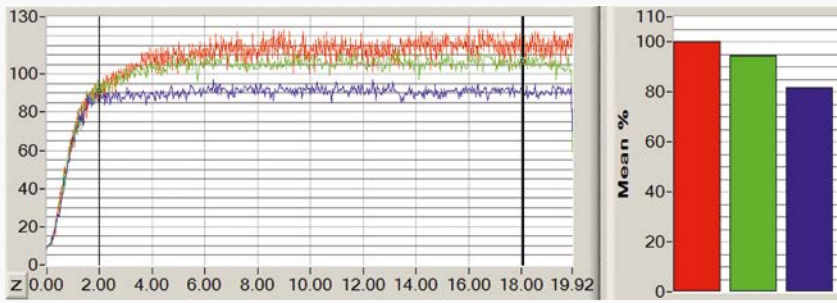
pe = Polyethylene  
ptfe = Polytetrafluoroethylene  
ste = Stearamide

## FURTHER RECOMMENDATIONS

LUBARIT® 328/R is a surfactant rich wax, we encourage reducing the addition level of other surfactants and emulsifiers in the wire drawing formulation  
LUBARIT® 408/W for non-cuprous applications  
SÜDRANOL® 340 for cuprous alloy applications



## MICROTAPPING TORQUE TEST



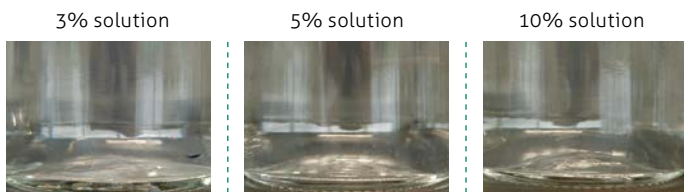
Curves obtained at 2%, 5% and 10% **LUBARIT® EXP 6533/1** in deionized water (DI). Vertical axis shows torque (N/cm) and horizontal axis shows millimeters of depth of the tapping. The mean values of five measurements are taken between 2 and 18 mm of depth.

Results show the required force for tapping markedly decreases on increasing addition levels of **LUBARIT® EXP 6533/1**.

Within the data acquisition range from 2 to 18 mm the mean force value drops relative to the amount of **LUBARIT® EXP 6533/1** in the dilution, as shown.

| Reference                           |                         | Maximum value (N/cm) | Mean value (N/cm) | S.D. (N/cm) |
|-------------------------------------|-------------------------|----------------------|-------------------|-------------|
| <span style="color:red">■</span>    | LUBARIT® EXP 6533/1 2%  | 124.0                | 111.3             | 7.1         |
| <span style="color:green">■</span>  | LUBARIT® EXP 6533/1 5%  | 113.0                | 104.9             | 3.9         |
| <span style="color:purple">■</span> | LUBARIT® EXP 6533/1 10% | 97.0                 | 90.6              | 2.3         |

## SOLUBILITY TEST (12 DAYS, AMBIENT) LUBARIT® EXP 6533/1



**LUBARIT® EXP 6533/1** dissolves completely in DI water and is perfectly stable at all dilution rates.



**COMPETITOR A** Insolubility increases at higher concentrations. Solutions flocculate over time.



**COMPETITOR B** Compatible and stable at low treat rates. High treat rate results in solid flocculation.

## FOAM TEST BY HAND SHAKING

Hand shake data (5% dilution in DI water)

| System              | Initial  |             | 5 Day    |             |
|---------------------|----------|-------------|----------|-------------|
|                     | Time (s) | Height (cm) | Time (s) | Height (cm) |
| LUBARIT® EXP 6533/1 | 15       | b           | 15       | b           |
|                     | 30       | b           | 30       | b           |
|                     | 60       | c           | 60       | c           |
| Competitor A        | 15       | c           | 15       | 1.0         |
|                     | 30       | c           | 30       | 1.0         |
|                     | 60       | c           | 60       | 1.0         |
| Competitor B        | 15       | 2.0         | 15       | 2.2         |
|                     | 30       | 2.0         | 30       | 2.2         |
|                     | 60       | 2.0         | 60       | 2.2         |

c = Collar of foam  
b = Blanket of foam

**LUBARIT® EXP 6533/1** initially shows only a blanket of foam reducing to a collar after 60 seconds. After 5 days aging only a blanket of foam persists. These are very good and consistent results.

The competitive product B develops more foam initially and after five days than **LUBARIT® EXP 6533/1**, competitive product A shows a collar of foam immediately after the hand shake test. However, the stability of competitive product A is very poor, as it shows increased development of foam after reshaking of the five days aged solution.



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