

NF Wire Forum

Aurubis
Metals for Progress

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NF Wire Forum



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Agenda

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1. Drawing lubricants; types and characteristics
2. Requirements on lubricants for ultra fine wire drawing
3. Emulsion monitoring and maintenance
4. Filtration for ultra fine wire drawing

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Drawing lubricants;
types and characteristics

Drawing lubricants; types and characteristics

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Drawing oil

- Used from rod to fine wire drawing
  - for aluminum
  - for copper: special alloys (e.g. trolley wire)
  - shaped wire
- Very good lubricity
- Flexible viscosity
- lower cooling capacity
- Filtration is difficult



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Drawing lubricants; types and characteristics

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Drawing emulsion

- Used from rod to fine wire drawing (to 0.1mm)
  - copper
  - copper alloys
  - aluminum
- Very good cooling capacity
- Adjustable lubricity
- Good filterability
- Viscosity partly adjustable by concentration



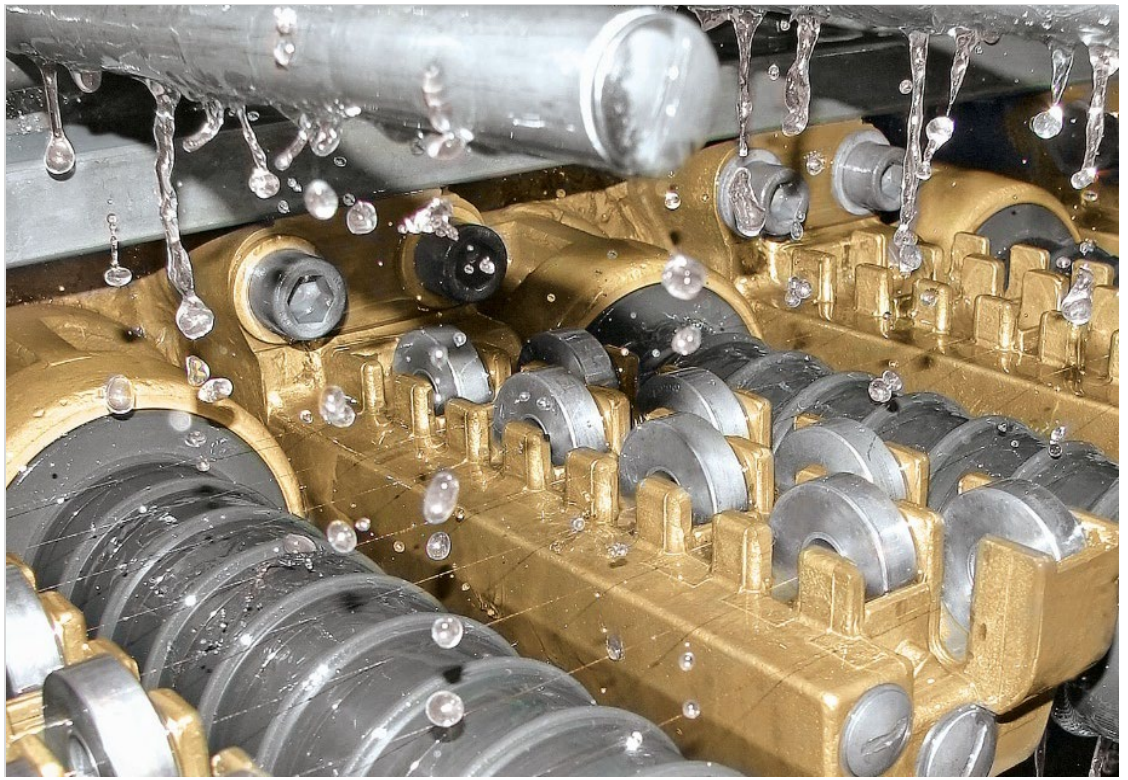
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Drawing lubricants; types and characteristics

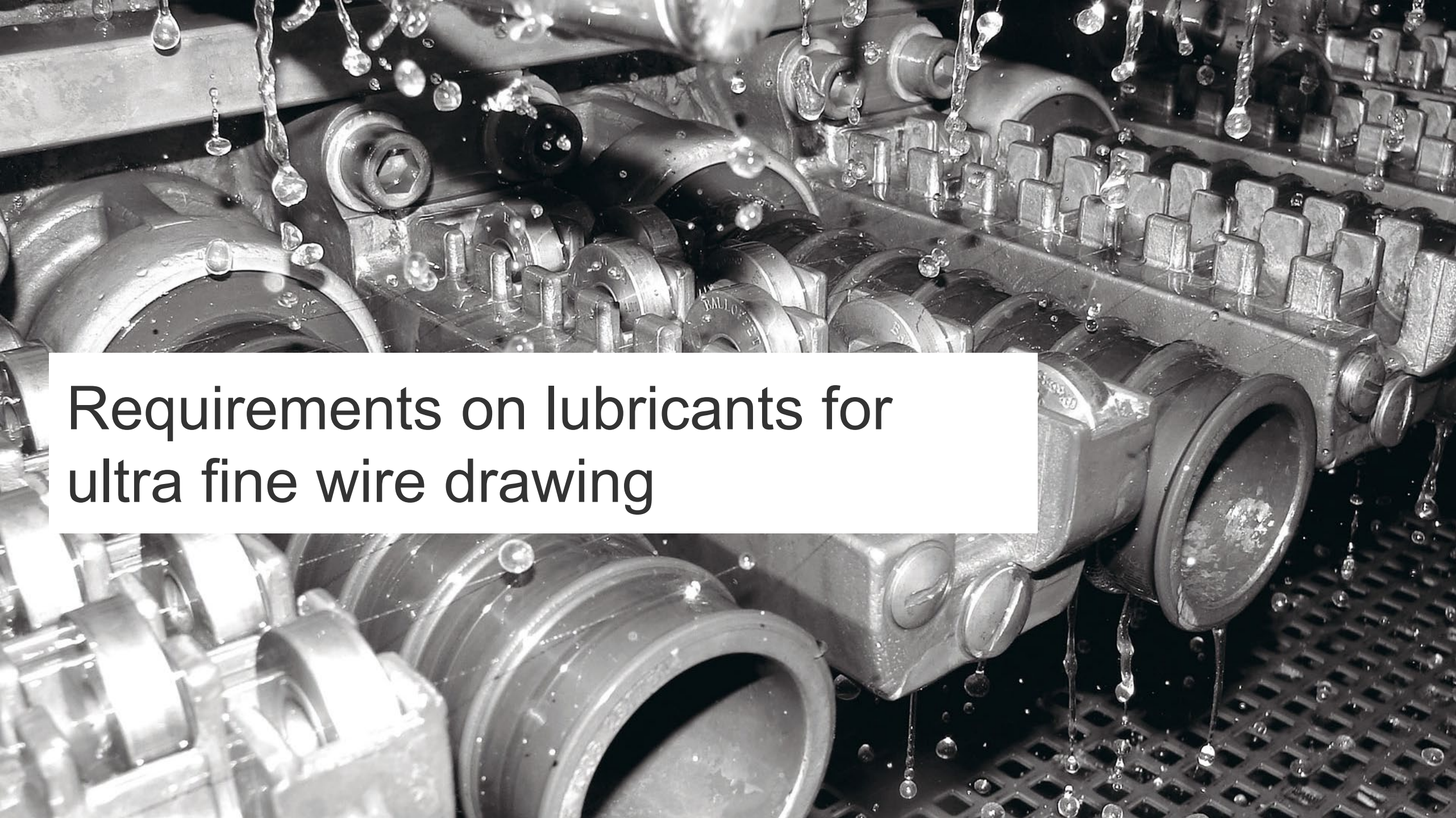
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Drawing solutions (fully synthetics)

- Used from fine to ultra fine wire drawing (<0.15mm)
  - copper
  - copper alloys
- Optimal cooling properties
- Optimal filterability
- Lubricity adjustable
- Free from emulsifiers and mineral oil



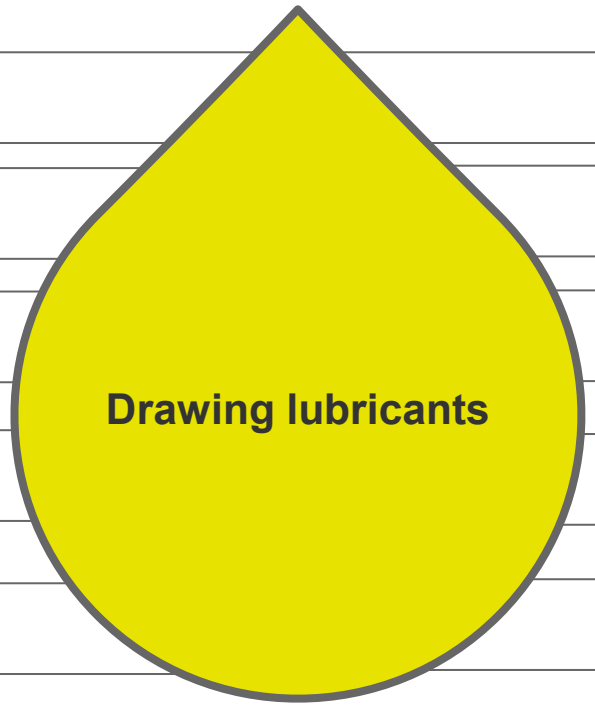
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Requirements on lubricants for ultra fine wire drawing

Requirements on lubricants for ultra fine wire drawing

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- Lubricity
- Cleaning ability (Dust carrying capacity by optimal wetting)
- Iron corrosion protection
- Trouble free subsequent production of the drawn wire
- User and environmental friendly
- Cooling
- Low foam behavior
- Copper corrosion protection
- Long lifetime of drawing lubricants
- Cheap and easy disposal

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Requirements on lubricants for ultra fine wire drawing

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- Selection of the correct lubricant, due to the previous mentioned points, beside that, the following parameters are essential too:
- Material to be drawn (bare copper, tinned copper, aluminum,…)
- Final diameter
- Subsequent processing
  - Is there an annealing or is the wire processed hard drawn ?
  - Is there an enameling process ?
  - Is some leftover lubricity necessary, e.g. for a bunching process ?

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Emulsion monitoring and maintenance

Emulsion monitoring and maintenance

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<u>What belongs to emulsion maintenance?</u>

- The workplace
- The drawing machine
- Periphery

- The emulsion monitoring

- Evaluation of the measured data and caretaking of the necessary action

<u>Which roll takes the machine operator?</u>

- He should/has to observe the following parameters:
  - Appearance of the system
  - Odour
  - Foam behaviour
  - Creation of residues
  - Changes in general cleanliness
  - Unusual filter drag-out

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Emulsion monitoring and maintenance

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What is to avoid?

- Using of the emulsion tank as a dust bin
- Addition of not commited additives or cleaners
- Driving the system beside the nominal temperature for a longer time

What to take care of?

- Adherence of nominal temperature of 35 - 45°C (Ideally 38 – 42°C)
- Adherence of adviced measures
- frequent control and documentation of essential emulsion data (pH-value, concentration)

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Emulsion monitoring and maintenance
necessary Measures

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1	**Concentration**
2	**pH-value**
3	Conductivity, dissolved copper, microbiology (only if needed)
4	Corrosion protection test (iron / copper) [only if the risk of corrosion is suspected]

Point 1 and 2 should be:

- ***measured daily if possible***
- ***documented and observed***

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Emulsion monitoring and maintenance

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A trouble-free wire production only is possible through a targeted emulsion maintenance and proper monitoring

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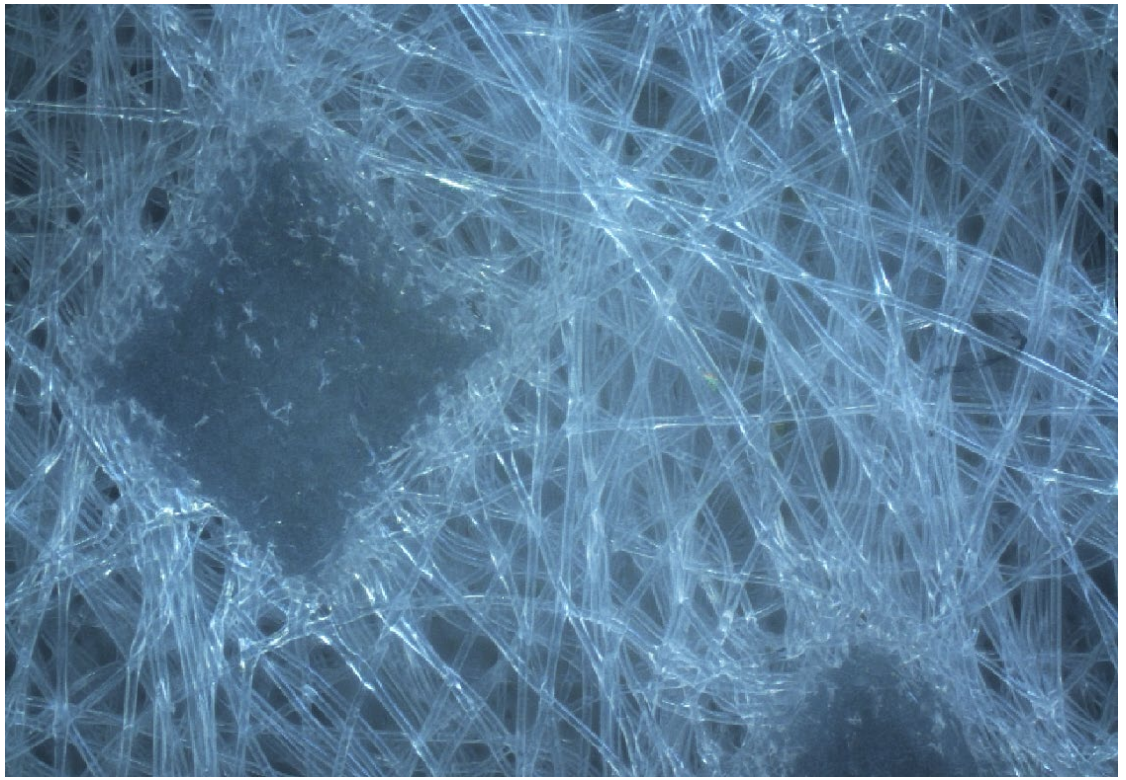


Filtration for ultra fine wire production

Filtration for ultra fine wire drawing

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- Dimensioning of tank and filter
  - Tank size: 10 x flow rate / min (Example: 400 l/min ≙ 4000 l tank volume)
  - Filter size: has to be determined by all parameters
- Choice of the right filter material
  - This applies to: „the finer the merrier“ (min.100g/m²)
- Service and maintenance of the system (tightness,…)
- Sizing of piping and pumps



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Resumee

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For ultra fine wire drawing the following parameters are essential according to the lubricant:

- Lubricant choice
- Dedicated system design
- Optimized filtration
- Usage of a suitable water quality
- A perfect coolant maintenance
- An observing operator

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Join in:
Live Panel on May 11th at 14h CET

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Please send **your questions** until May 10th to nf-wire-forum@aurubis.com

We look forward to seeing you again virtually!

www.nf-wireforum.com



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