

# **Determination of a fixation time of wood preservatives: a paper discussion**

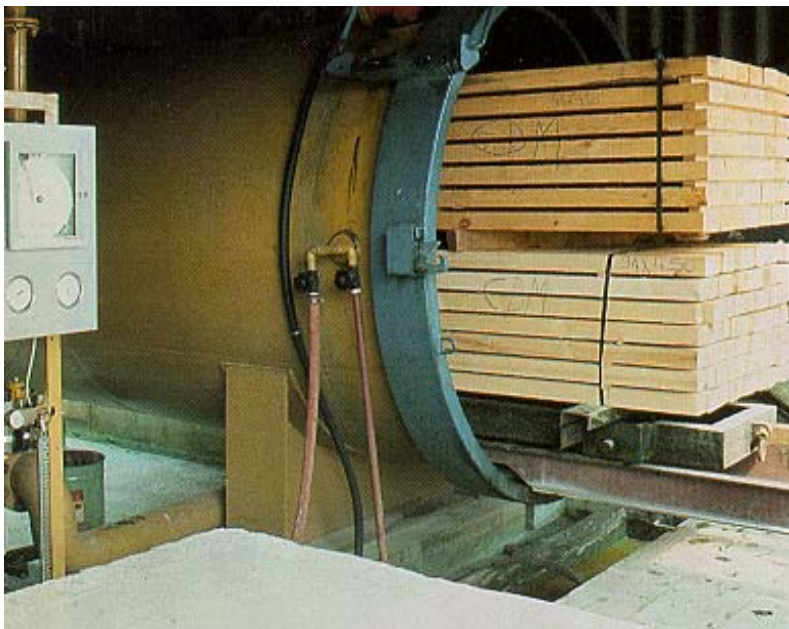
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# Agenda



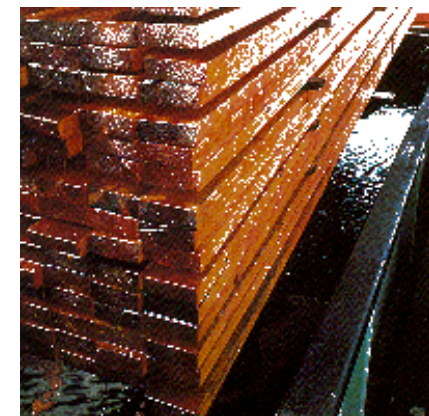
- Context
- Definition
- Determination of a fixation time - French approach
- Determination of a fixation time - German approach
- Summary

# Context: European & national regulations

- **Europe:** For material preservative of products types 6 to 10, instructions on the minimum drying time or time to reach resistance to leaching (fixation) of the product in the material treated. ....  
**Furthermore, when possible, a qualitative or quantitative method should be stated for determining that the proper drying or resistance to leaching has been achieved.**  
(Chapter 5 of the common core data set for biocidal product «Intended uses and efficacy» for a BPD dossier requirements)

- **France:** Arrêté du 17/12/2004 relatif aux prescriptions générales applicables aux installations classées pour la protection de l'environnement soumises à déclaration sous la rubrique n°2415

- **Germany:** Bundesgesundheitsblatt 1/90



## Definition: What is a « fixation time »?

- Act or state of fixing a wood preservative in the timber so that it will not leach (EN 1001-2: 2005, Number 4.29)
- Minimum time to keep treated wood under cover (experimental French standard XP X41-590:2007)
- Any other definitions?



## Determination of a fixation time – French approach

Step	Content
Preparation of test specimen	Choice, Drying (humidity < 20%)
Treatment	Treatment of wood test specimens according to NF EN 113, Weighing of the samples before and after treatment, Calculation of the retention, Selection of specimens in accordance with NF EN 113, End sealing of wood samples.
Drying	Drying of the test specimens following 2 conditions: Summer : 20°C, 65 ± 5 % RH Winter : 5°C, 85 ± 5 % RH
After: 4h, 19h, 24h, 48h, 96h	5 test specimens are removed from the climatic chamber.
Immersion of test specimens	Test specimens are immersed in a water bath. Date and hour were recorded for each immersion period (8 hours). Analytical characterization of each leachate.

# Determination of a fixation time – French approach

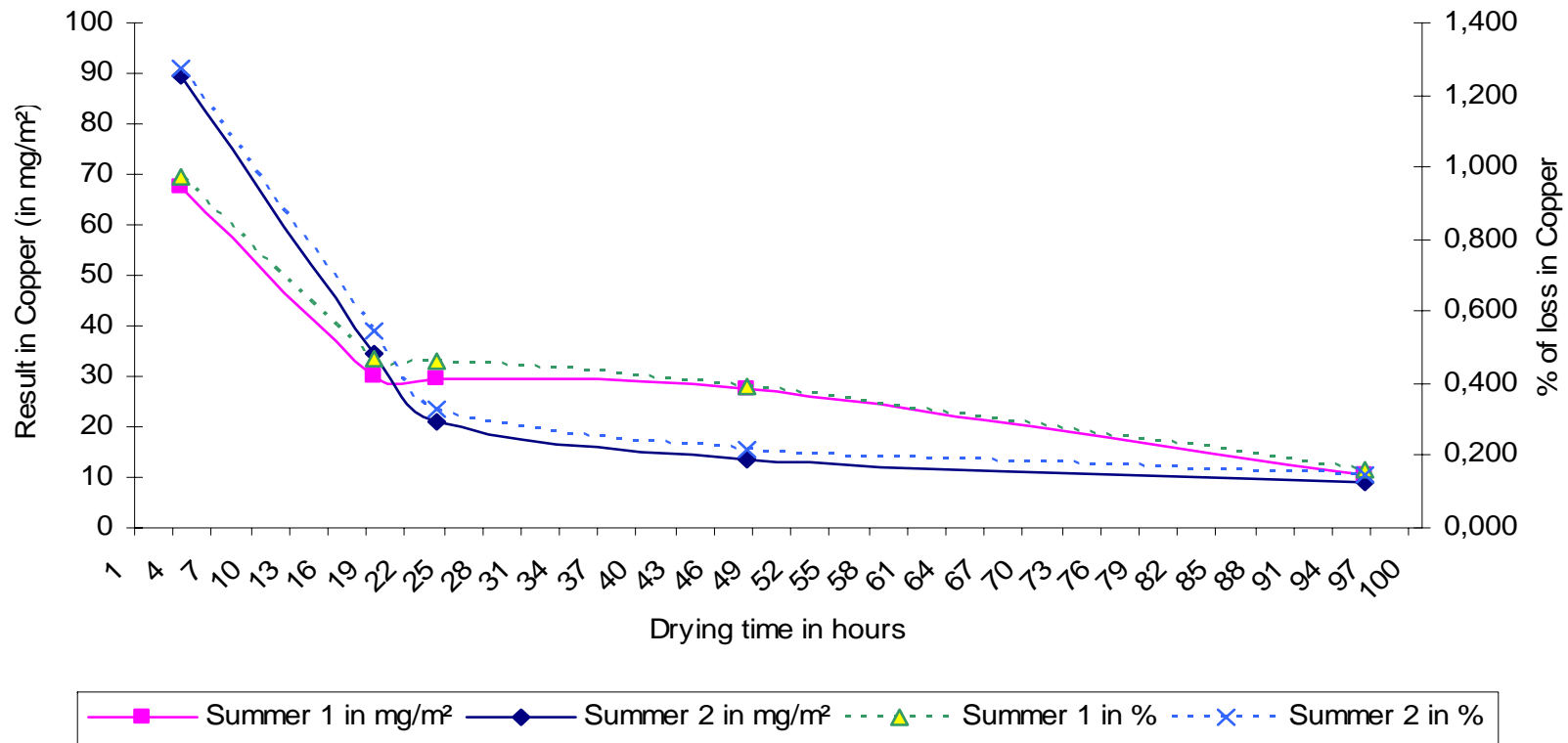
## Results on CCA (oxides) formula

- Analytical data for the baths allow the creation of kinetic curves for copper, arsenic and chromium.
- For every case, the experimental proceeding leads to curves repeatable between both replicates.
- For chromium, the protocol has to be applied at longer times, in order to complete the kinetic curves to reach a plateau.
- Results obtained on copper, arsenic and chromium shown a known behavior of CCA type formulas (oxides), as for example:
  - Sensibility to temperature,
  - Fixing time for  $\text{CrO}_3$  longer than for  $\text{CuO}$  and  $\text{As}_2\text{O}_5$



# Determination of a fixation time – French approach

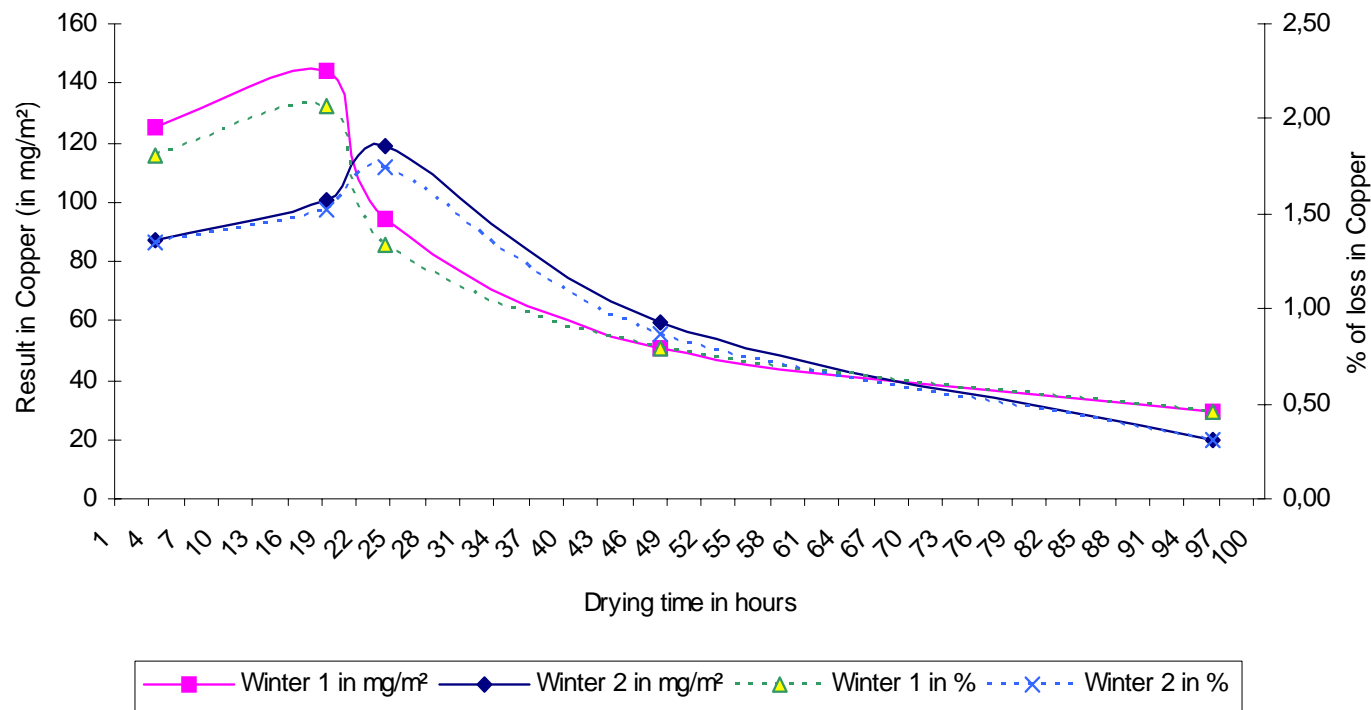
## Results on CCA (oxides) formula



## Total Copper in Summer

# Determination of a fixation time – French approach

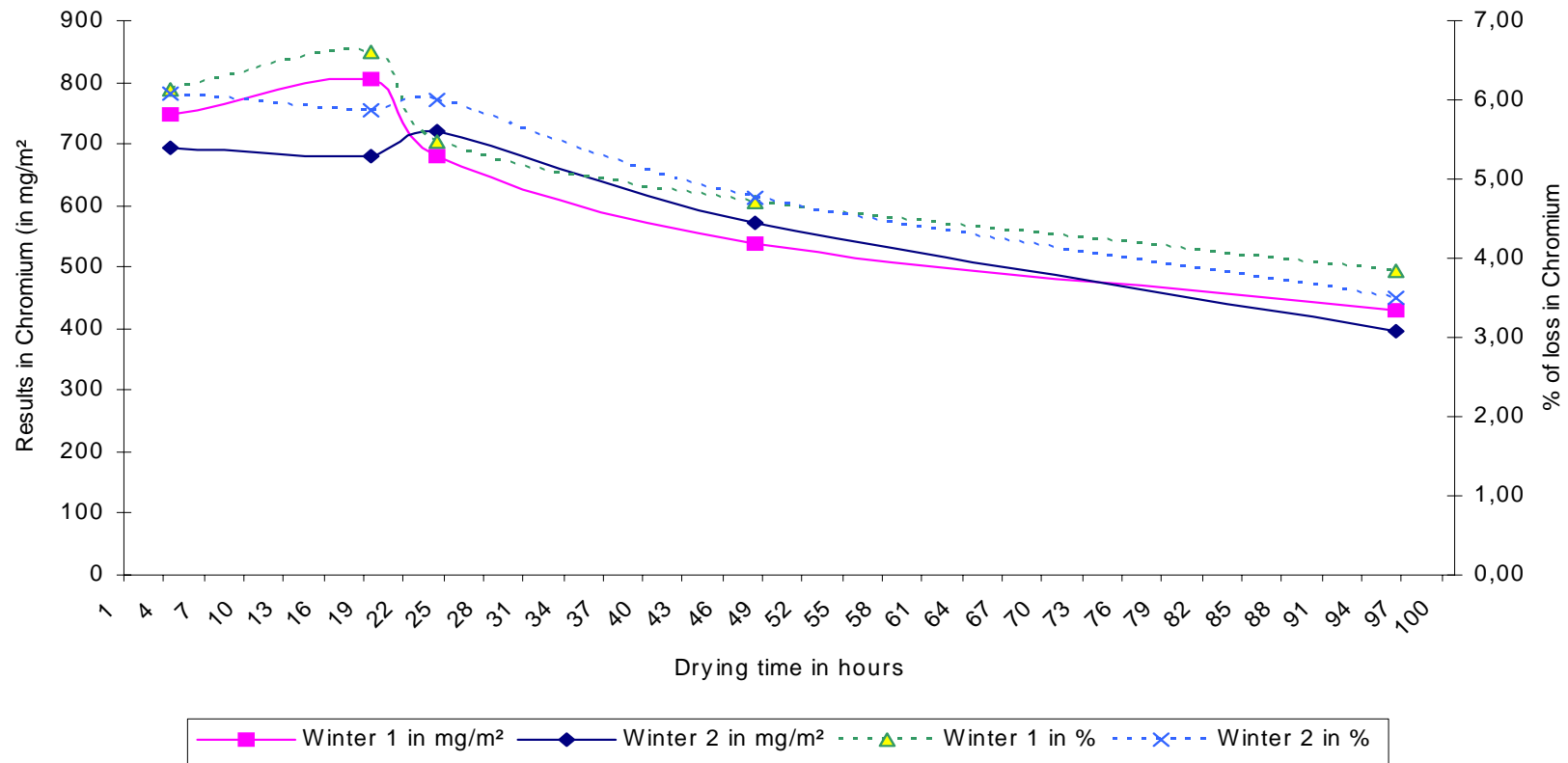
## Results on CCA (oxides) formula



## Total Copper in Winter

# Determination of a fixation time – French approach

## Results on CCA (oxides) formula



## Total Chromium in Winter

## Determination of a fixation time – German approach

The approach that was developed and proposed by SCHOKNECHT et al. (2003) is nearly identical with the French method from the practical point of view. Following a short compilation:

- Dimension of the test specimen according to EN 113 (1996)
- Treatment of the specimens according to the Technical data sheet or to requirement of the supplier
- Storage of the treated specimen at 5°C (winter) and 20°C (summer) for different time periods
- Laboratory test according to ENV 1250-2 (1994) using 5 replicates
- Quantification of relevant substances in the obtained water



## Determination of a fixation time – German approach

Calculation of the “Degree of fixation”:

$$FG = \frac{E - A}{E} * 100\%$$

- E: amount of active ingredient that was brought into the specimen [mg]
- A: amount of active ingredient in the water [mg]

**First requirement:**  $FG_{\max(20^{\circ}\text{C})}$  at least 95%

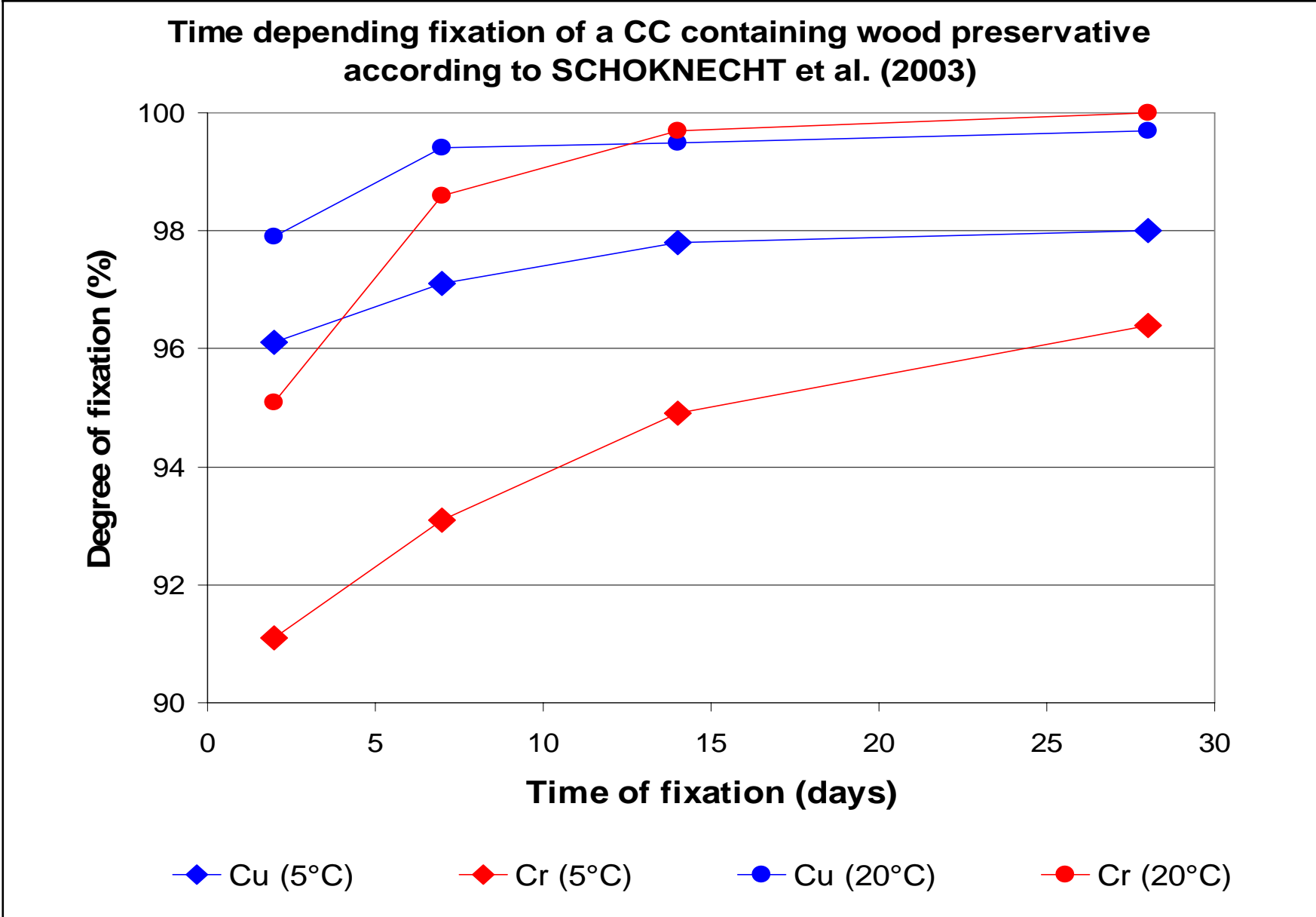
Calculation of the “Fixation index”:

$$FI = \frac{FG_m}{FG_{\max}} * 100$$

$FG_m$ : mean value of the fixation degrees of the specimens tested at a certain time

$FG_{\max}$ : maximum fixation degree (Is the highest value estimated at all times for specimens stored at a temperature of 20°C)

**Second requirement:** FI at least 95%



# Summary

- France and Germany use a very similar methods
- It is possible to determine a fixation time with a laboratory method (wood test specimen can be treated under vacuum or by dipping)
- In order to avoid any use for environmental assessment, we propose to design a testing with:
  - *One time of drying on both climates (winter, summer)*
  - *A criteria at 5% maximum of active ingredients in the baths (in comparison with the initial retention in the wood)*

**Thank you for your attention...**

**And for your input or idea**

**for a possible test design!**

**Time depending fixation of a CC containing wood preservative according to SCHOKNECHT et al. (2003)**

