



Ecological Measures in the Pressroom

09-2010

VEGRA - Gesellschaft für Herstellung und Vertrieb von
Produkten für die graphische Industrie mbH

Otto-Hahn-Strasse 1, D-84544 Aschau am Inn, Germany

Tel.: (+49) 86 38 - 96 78-0, e-mail: info@vegra.de, web page: www.vegra.com



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Carbon-neutral Printing in Practice

- Certification possible
- Limited quantity of accredited certification auditors
- The procedure is the same in most of the cases:
 - Calculation of the CO₂-consumption
 - Purchase of certificates for compensating the CO₂-emissions
 - But no support for reducing CO₂ emissions

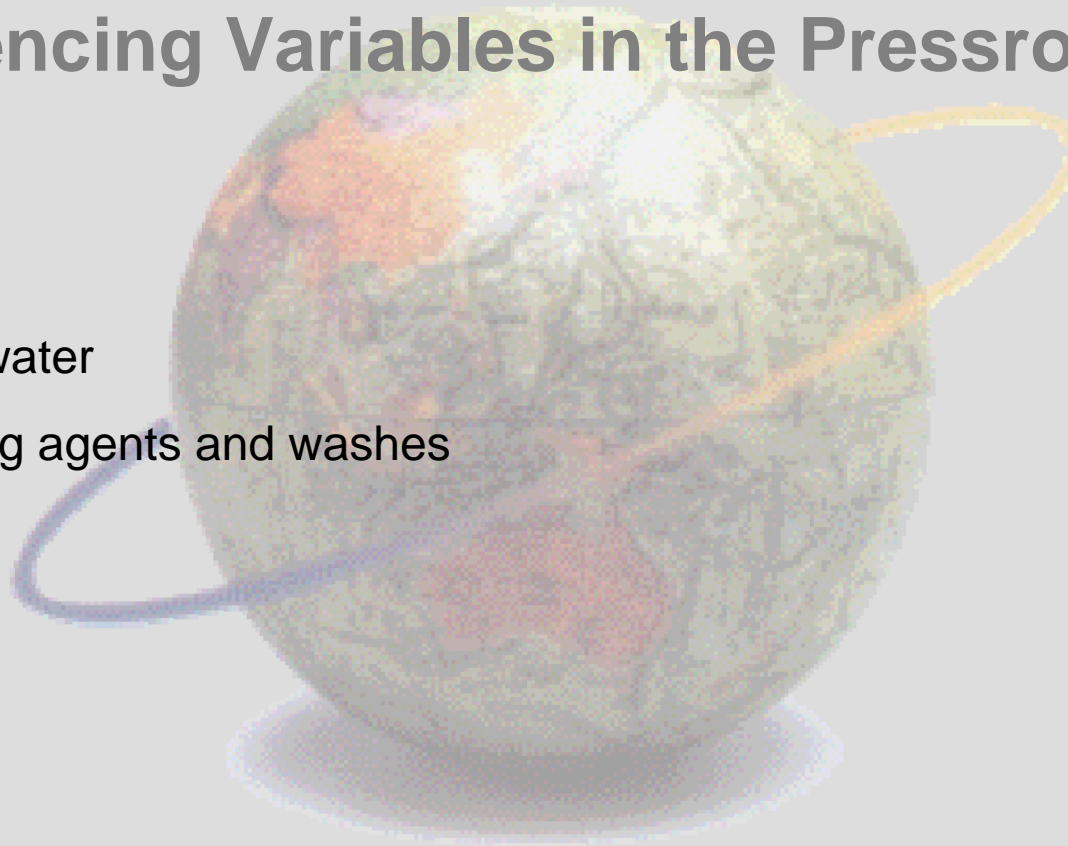
Correct way: CO₂-Reduction - not CO₂-Compensation



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Influencing Variables in the Pressroom

- Energy
- IPA in water
- Cleaning agents and washes
- Paper





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Influencing Variables in the Pressroom

- with every **liter** (0.78 kg) of IPA **1.712 kg CO₂** are set free,
- this means: with a consumption of **5,000 liter of IPA** per year/press approx. **8.5 to** of CO₂ are produced

- with every **liter** (0.8 kg) cleaning agent (e.g. RW 220 063) **2.490 kg CO₂** are set free
- this means: with an average consumption of **9,000 liter** cleaning agent per year/press approx. **22 to CO₂** are produced



Calculation of the releasable hydrocarbon equivalents during the combustion of Isopropanol (IPA)

- 1.) Underlying chemical equation (combustion): $\text{CH}_3\text{-CH-OH-CH}_3 + 4,5 \text{ O}_2 \implies 3 \text{ CO}_2 \text{ (gas)} + 4 \text{ H}_2\text{O}$
corresponding molecular weights in g/mol: 60.1 + 4.5 x 32 \implies 3 x 44 + 4 x 18
- 2.) Result: 1 mol IPA (60.1 g/mol) produces 3 mol CO₂ (132 g/mol)
- 3.) Question: How many liter of CO₂ are set free by combustion of 1 liter IPA ?
Solution: Density of IPA = 780 g/l (20°C), divided by 60.1 g/mol = 12.98 mol/l
In other words: 1 liter IPA = 780 g = 12.98 mol/l.
- 4.) As per mol IPA 3 mol CO₂ are set free (see also item 1), the mol/l are converted into g as follows:
12.98 mol/l IPA x 3 = 38.94 mol CO₂ x 44g/mol (molecular weight CO₂)

During the combustion of 1 liter (= 780 g) IPA 1712.4 g CO₂ are produced

- 5.) Conversion of g CO₂ into liter CO₂ (molar volume of a gas: 22.4 liter)
according to item 4, during the combustion of 12.98 mol/l IPA 38.94 mol CO₂ x 22.4 liter are produced

During the combustion of 1 liter (= 780 g) IPA 873 Liter CO₂ are produced

Information: The natural CO₂ content in the air is 0.03 Vol.-%, 1000 liter air contain 0.3 liter CO₂



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Calculation of the releasable hydrocarbon equivalents during the combustion of

Rapid Wash 220 063

- 1.) Underlying chemical equation (combustion):
corresponding molecular weights in g/mol:
$$\begin{array}{rcl} \text{C}_{15}\text{H}_{32} + 15.5 \text{ O}_2 & \text{====>} & 15 \text{ CO}_2 \text{ (gas)} + 16 \text{ H}_2\text{O} \\ 212 & + 15.5 \times 32 & \text{====>} 15 \times 44 & + 16 \times 18 \end{array}$$
- 2.) Result: 1 mol RW 220 063 (212 g/mol) produces 15 mol CO₂ (660 g/mol)
- 3.) Question: How many liter of CO₂ are set free by combustion of 1 liter RW 220 063?
Solution : Density of RW 220 063 = 800 g/l (20°C), divided by 212 g/mol = 3.77 mol/l.
In other words: 1 liter RW 220 063 = 800 g = 3.77 mol/l.
- 4.) As per mol RW 220 063 15 mol CO₂ are set free (see also item 1), the mol/l are converted into g as follows:
3.77 mol/l RW 220 063 x 15 = 56.6 mol CO₂ x 44g/mol (molecular weight CO₂)
During the combustion of 1 liter (= 800 g) RW 220 063 2490 g CO₂ are produced.
- 5.) Conversion of g CO₂ in liter CO₂ (molar volumen of a gas: 22.4 liter)
according to item 4 during the combustion of 3.77 mol/l RW 220 063 56.6 mol CO₂ x 22,4 Liter are produced
During the combustion of 1 liter (= 800 g) RW 220 063 1267.9 liter CO₂ are produced.

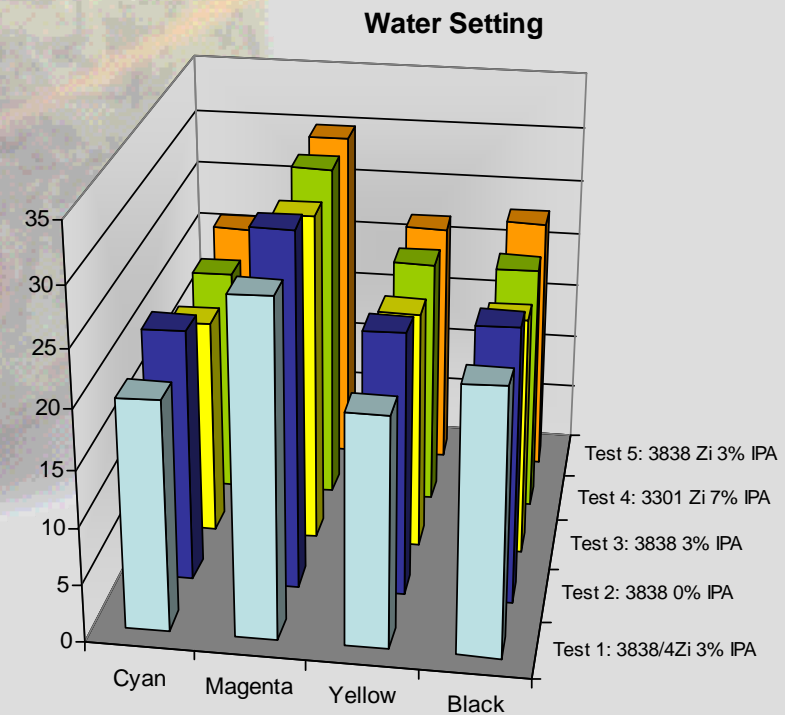
Information: The natural CO₂ content in the air is 0.03 Vol.-%, 1000 liter air contain 0.3 liter CO₂



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CO₂-Savings by IPA Reduction

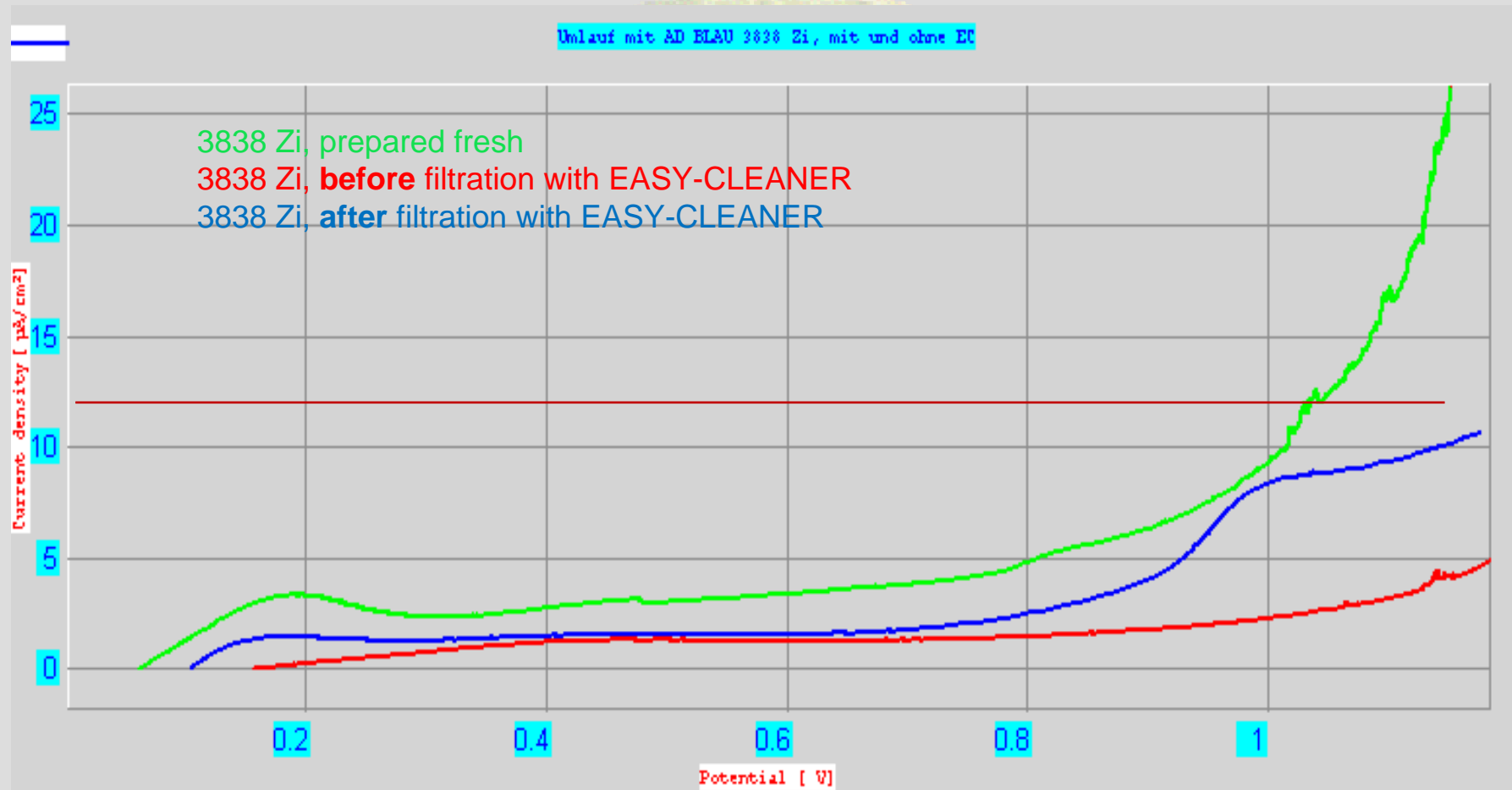
- Technical adjustments on the printing press are not required for IPA-reduction or IPA-free printing
- IPA-free printing will not cause any disadvantages regarding printing technique
- Fountain solutions for IPA-free printing are compatible with other fountain solutions, which means that PSO can be reached without problems.





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Corrosion Test





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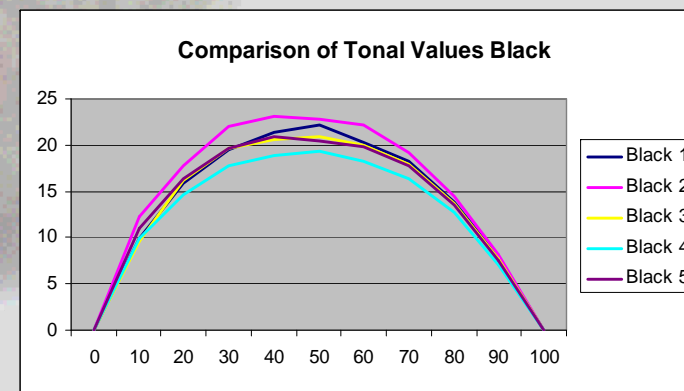
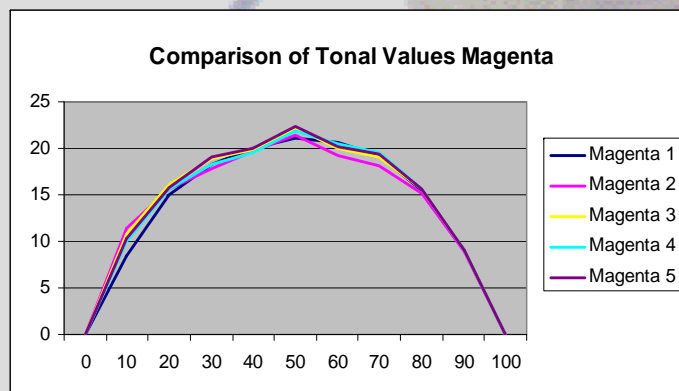
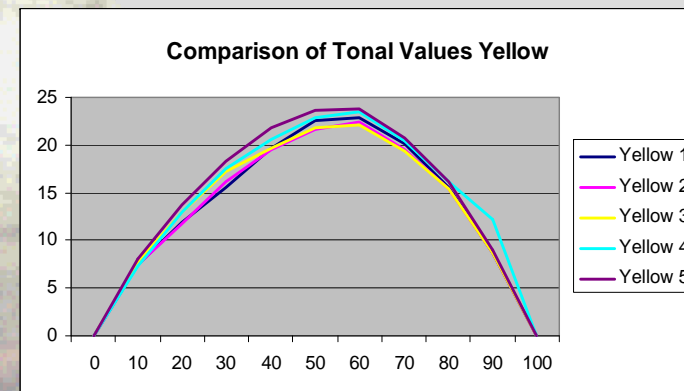
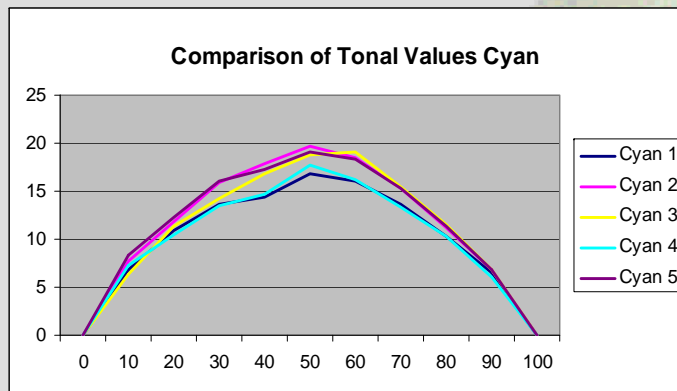
Undesired Interactions Found – Paper





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Test Print of various Founts (with and without IPA)





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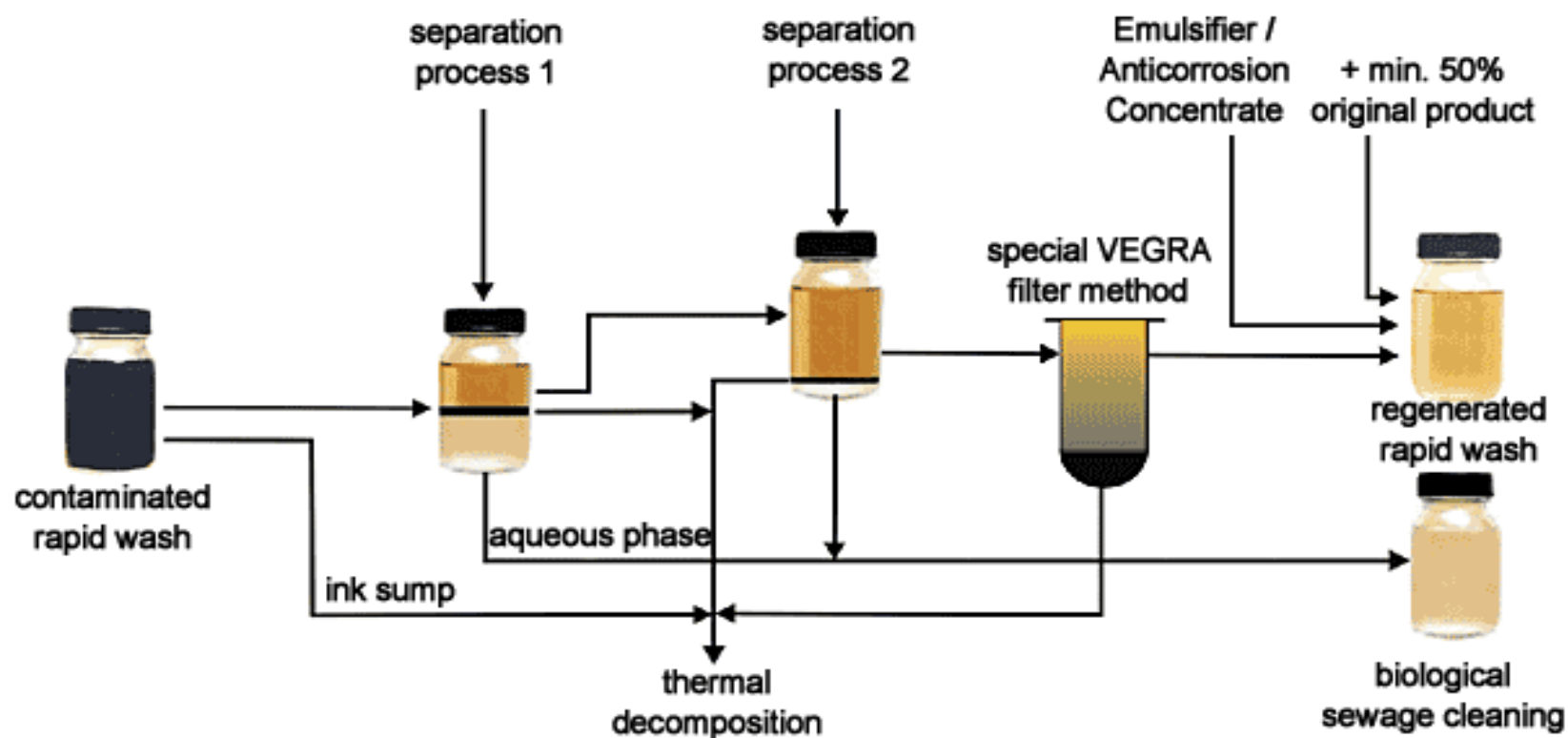
Cleaning Agents

- CO₂ savings due to VEGRA recycling of cleaning agents
- Certified procedure
- No more costly disposal of used cleaning agents by the user
- VEGRA recycling is CO₂ neutral
- Professional disposal by VEGRA of the residues which cannot be re-used
- Protection of resources by recycling of the „mineral oil“
- CO₂-credit note for recycled oil
- This means reduction of the CO₂-emissions



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Rapid Wash Recycling Concept VEGRA GmbH





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VEGRA Recycling Concept





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Water based Cleaning Agent

VOC-Free Pressroom Cleaner Concentrate GREEN 220 400 Zi

- Free of VOCs
- Not subject to labelling
- Very good cleaning properties
- Suitable for cleaning by hand and for automatic blanket washers
- Online-recycling possible on the premises of the user with EASYLAC Cleaning Container
- Water miscible, corrosion inhibited
- Approval by KBA and BALDWIN for Sheet Fed Offset and by WIFAG and Westland Gummiwerke



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Cleaning Test with VOC-Free Pressroom Cleaner Concentrate GREEN 220 400 Zi





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Water Based Cleaning Agent

VOC-Free Pressroom Cleaner Concentrate GREEN 220 400 Zi

Example:

Water based cleaning agents are free of CO₂.

Even if the parts (ink duct, doctor knife etc.) can „only“ be cleaned manually with such cleaning agents, up to **2.5 to CO₂/press** can be saved.



Thank you for your attention!

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