Date:090706

# SCANPOL® PRODUCTS FOR TREATMENT OF WASTE AND WASTEWATER FROM METAL FINISHING, PCB AND PAINTING INDUSTRY.

## Industrial Wastes

Industry production processes create a variety of wastewater pollutants, some that are difficult and/or costly to treat. Wastewater characteristics and levels of pollutants vary significantly by industry. Additionally, fluctuations may occur in the wastewater's daily and hourly flow, temperature, and composition. In some instances, several waste streams from different processes at an industry location may discharge at the same location. Discharges from industrial facilities can be direct or indirect. Direct discharges are made directly to a waterway or water body. Indirect discharges are usually made to Publicly Owned Treatment Plants (POTWs), and the discharge is treated by the POTW. Additionally, some facilities participate in source control that utilizes water reuse, waste minimization or pollution prevention to reduce or eliminate discharges of pollutants.

## Conventional cleaning technology

Metal hydroxide precipitation is the standard method for removing harmful metals from metal finishing wastewater. This is achieved by adjusting the pH of the waste- water with an alkaline reagent to deposit the dissolved metals and settle and remove the resultant metal hydroxide precipitates. This procedure usually needs pre-treatment prior to metals precipitation, such as the oxidation of cyanide ($CN^-$) or reduction of Cr(VI), to deal with substances that interfere with the precipitation. Nucleation agents are also used to enhance the settling of fine precipitates. The use of nucleation enhances the performance of the cleaning procedure so that the metal concentration in effluents after purification is characteristically one order of magnitude lower than after treatment without added nucleation agents. Nucleation agents can be a co-precipitated metals such as iron that is added as the sulphate/chloride salt to provide co-precipitation with ferric hydroxides. An excess of co-precipitation metal also masks, to some degree, complexing agents present in waste waters.

SCANPOL® products are developed in the line of Swedish environmental law that is forcing development of chemicals that have lowest impact on the environment. Therefore our developed SCANPOL® products for wastewater treatment are principally base on inorganic chemistry. Below you may find tables with comparison between standard iron chloride and some of SCANPOL® products.

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# SCANPOL®40

## COMPARISON OF FLOCCULATION AIDS AT TREATMENT OF WASTEWATER, HALF CONCENTRATES AND CONCENTRATES FROM METAL FINISHING AND PCB INDUSTRY

| | SCANPOL®40 | Iron chloride Fe $CL_3$ |
|---|---|---|
| ***Effect on quantitative precipitation of heavy metals from wastewater*** | | |
| - at $PO_4^{---}$ presence | Very high efficiency | Mediocre |
| - at $CO_3^{--}$ presence | Very high efficiency | No effect |
| - at $F^-$ presence | Very high efficiency | No effect |
| - at $NH_4^+$ presence | Very high efficiency | No effect |
| - at presence of week and medium strong complexes | Very high efficiency | No effect |
| ***Sedimentation property for precipitated metal hydroxides at presence of:*** | | |
| - $PO_4^{---}$ | Very good | Negative affected |
| - $CO_3^{--}$ | Very good | Negative affected |
| - $F^-$ | Very good | Negative affected |
| - $NH_4^+$ | Very good | Negative affected |
| - week and medium strong complexes | Very good | Negative affected |
| ***Treatment/Dewatering of sludge*** | | |
| | Very high efficiency. Up to 70% solid content in cakes | Worth pressing property, often wet cakes |
| Treatment of used process bath | | |
| - black chromate | Very good flocculation aid | Does not work |
| - chromate build up on $Cr^{+++}$ chemistry | Very good flocculation aid | Does not work |
| - developing/stripping of dry film/solder mask | Very good flocculation aid | Mediocre |
| ***Economical aspects*** | | |
| - amount of sludge | Half of the sludge in comparison with $FeCL_3$ | Lot of sludge |
| - total price | Purchasing price + ½ tipping costs | Purchasing price + whole tipping costs |

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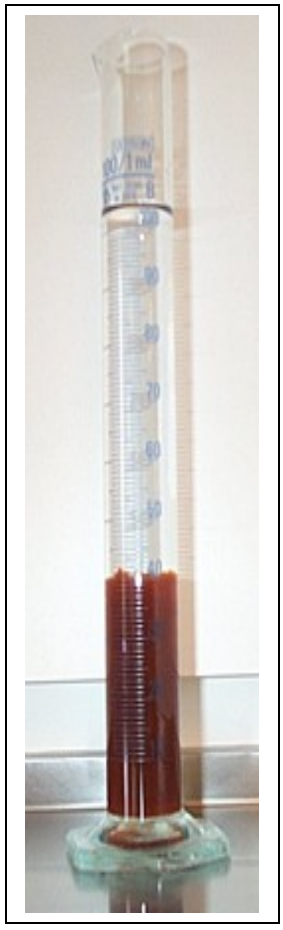
# Comparison of flocculation aids at treatment of wastewater

Comparison of sludge volume at the some dosing ratio 1 ml/L or 1L/m³



**Iron chloride**
15% Fe

**SCANPOL®40**

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## Picture from treatment of wastewater from Metal Finishing Department with SCANPOL®40

## Waste and wastewater installation with capacity of 3m³/h that use SCANPOL®40

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# SCANPOL® 27

## COMPARISON OF FLOCCULATION AIDS AT TREATMENT OF WASTEWATER, HALF CONCENTRATES AND CONCENTRATES FROM METAL FINISHING AND PCB INDUSTRY

| | SCANPOL® 27 | Iron chloride Fe $CL_3$ |
|---|---|---|
| ***Effect on quantitative precipitation of heavy metals from wastewater*** | | |
| - at $PO_4^{---}$ presence | Very high efficiency | Mediocre |
| - at $CO_3^{--}$ presence | Very high efficiency | No effect |
| - at $F^-$ presence | Very high efficiency | No effect |
| - at $NH_4^+$ presence | Very high efficiency | No effect |
| - at presence of week and medium strong complexes | Very high efficiency | No effect |
| ***Sedimentation property for precipitated metal hydroxides at presence of:*** | | |
| - $PO_4^{---}$ | Very good | Negative affected |
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| ***Treatment/Dewatering of sludge*** | | |
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| Treatment of used process bath | | |
| - black chromate | Very good flocculation aid | Does not work |
| - chromate build up on $Cr^{+++}$ chemistry | Very good flocculation aid | Does not work |
| - developing/stripping of dry film/solder mask | **Should not be applied for these wastes** | Mediocre |
| ***Economical aspects*** | | |
| - amount of sludge | Half of the sludge in comparison with $FeCL_3$ | Lot of sludge |
| - total price | Purchasing price + ½ tipping costs | Purchasing price + whole tipping costs |

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Comparison of sludge volume at the some dosing ratio 1 ml/L or 1L/m3

**Iron chloride**
15% Fe

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## SCANPOL® 27


**Picture from treatment of rinse water after copper alkali etch process with SCANPOL® 27**

Presented practises and applications for **SCANPOL®** products show some of choice that may be done. Since **SCANPOL®** products had shown versatility within number of applications, it is possible that **SCANPOL®** products have additional undiscovered potential that may be tested according to customer's wishes and demands.

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