

CONVENTION ON THE PROTECTION OF THE MARINE
ENVIRONMENT OF THE BALTIC SEA AREA

HELSINKI COMMISSION - Baltic Marine HELCOM 16/17
Environment Protection Commission

Annex 10

16th Meeting
Helsinki, 14-17 March 1995

HELCOM RECOMMENDATION 16/6

Adopted 15 March 1995,
having regard to Article 13, paragraph b)
of the Helsinki Convention

RESTRICTION OF DISCHARGES AND EMISSIONS FROM THE METAL SURFACE TREATMENT

THE COMMISSION,

RECALLING that according to Article 6 of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1974 (Helsinki Convention), the Contracting Parties undertake to take all appropriate measures to control and strictly limit pollution of the marine environment of the Baltic Sea Area by noxious substances,

RECALLING ALSO that Annex II of the Helsinki Convention defines heavy metals, halogenated compounds, cyanides and EDTA as noxious substances for the purposes of Article 6 of the Convention,

RECOGNIZING that metal surface treatment *) is a notable source of discharges of these noxious substances into water and into atmosphere,

HAVING REGARD to the Ministerial Declaration of 1988 and to the Baltic Sea Declaration of 1990 calling, inter alia, for a substantive reduction of the load of pollutants most harmful to the ecosystem of the Baltic Sea,

RECOGNIZING the importance of limiting discharges into water and into atmosphere from the metal surface treatment by application of Best Available Technology,

DESIRING more information about the discharges from the metal surface treatment,

- pre-treatment (e.g. degreasing/cleaning and pickling);
- electrolytic or chemical deposition of metals, including intermediate treatment;
- post-plating treatment (e.g. chromating, dyeing);
- stripping;
- phosphating

*) This Recommendation should apply primarily to plants in which surfaces are plated with metals electrolytically or chemically. This involves the following main operations:

RECOMMENDS that the Governments of the Contracting Parties to the Helsinki Convention take the following measures to reduce the volume of waste water discharged from metal surface treatment and its pollutant load:

- a) if technically possible, substitution of hazardous substances (e.g. cyanide, cadmium, mercury, EDTA and similar sequestering agents, nonylphenol-ethoxylates, chlorinated organics) by substances which are readily biodegradable, non-bioaccumulating and non-mutagenic and have a low toxicity;
- b) substitution of EDTA in degreasing baths, stripping baths and chemical nickel plating baths. Possible substitutes include e.g. citric acid, tartaric acid and gluconic acid;
- c) substitution of processes generating noxious substances wherever possible (e.g. cyanide oxidation with hypochlorite);
- d) treatment of process baths using suitable processes in order to have the longest possible service life. Such processes include e.g. membrane filtration, ion exchange, electrolysis, thermal processes and evaporation;
- e) retention of bath ingredients by suitable means, such as transporting the goods in such a way that drag-out is minimized; splash guards or optimized bath composition;
- f) multiple use of counter-current rinse waters (at least three rinsing steps should be applied). Suitable techniques to keep more than 90% of the drag-out in a small volume for recovery/recycling are e.g.:
 - (i) 3-stage cascade rinsing;
 - (ii) 2-stage cascade rinsing plus closed cycle rinsing with ion exchange;
 - (iii) combined dip/spray/mist rinsing techniques.

If possible these rinsing concentrates should be returned into the process baths, if necessary after specific treatment/concentration. By applying these rinsing techniques process baths can often be operated as closed water/low waste systems;

- g) separation of suitable non-ferrous metal waste water streams to carry out internal recycling (e.g. by electrolysis) or external recovery (e.g. by non-ferrous metal industry);
- h) recovery of EDTA from chemical copper plating baths (e.g. by precipitation as H_4EDTA) and their rinse baths (e.g. by precipitation after a concentration step, e.g. by anion exchange),

RECOMMENDS ALSO that, as a first step, the Government of the Contracting Parties take the following measures to control and minimize noxious substances in waste waters from the metal surface treatment:

- a) waste water streams should be separated according to the kind of necessary treatment and to achieve a sludge composition such that the metals can be recovered. The treatment should be carried out in batch reactors;
- b) cadmium and mercury containing water streams should be treated and monitored separately with the following maximum concentrations:

Cadmium - 0.2 mg/l

Mercury - 0.05 mg/l;

- c) before discharging into sewers or surface waters the treatment should be provided so that from 1 January 1996 for new plants and from 1 January 2000 for existing plants the concentrations of the following substances do not exceed the following levels (without any dilution before discharge):

Substance Concentration (mg/l)

Chromium (total) 0.7

Chromium (VI) 0.2

Copper 0.5

Lead 0.5
Nickel 1.0
Silver 0.2
Zinc 2.0
Unbound cyanide 0.2
Volatile organic halogens (VOX) 0.1

Plants discharging small loads of metals (defined as sum of total chromium, copper, lead, nickel and zinc less than 200 g/day prior to end-of-pipe treatment) may be subject to limit values up to maximum four times higher for total chromium, copper, lead and nickel. Maximum concentration of zinc shall not exceed 4 mg/l;

d) in some cases organic substances could be present in the waste water. Thus, if possible and considered suitable, such waste water from the metal surface treatment should undergo biological treatment. This includes treatment in a municipal sewage treatment plant,

RECOMMENDS FURTHER that the Governments of the Contracting Parties take measures to avoid as far as possible the use of chlorinated solvents.

They should be replaced by water-based systems or non-halogenated organic solvents. In specific cases, where it is proven that substitution is technically not possible, the following requirements should be met

a) In operating surface treatment plants, the only volatile chlorinated hydrocarbons which should be used for degreasing are commercial-grade tetrachloroethene, trichloroethene or dichloromethane. The use of other halogenated solvents is not necessary for technical reasons. Substances widely acknowledged as carcinogenic should not be contained as additives in, nor be added to, the halogenated hydrocarbons;

b) Surface treatment plants should be established and operated in such a way that goods to be processed should be treated in an enclosure in the cases where volatile solvents are used. This enclosed plant, except for the openings for venting the waste gases, is sealed on all sides;

c) Vented waste gas should be led to a separator which is used to ensure that the emissions of volatile halogenated hydrocarbons do not exceed a mass concentration of 20 mg/m³. As a variation from this: if the solvent contains more than 50% of dichloromethane in the volatile halogenated hydrocarbons, the emission, may not exceed a mass concentration of 50 mg/m³. These concentrations should not be achieved by diluting the waste gas with air. The separated volatile halogenated hydrocarbons should be recovered;

d) Halogenated solvents or residues containing halogenated solvents should be stored, transported and handled in closed vessels;

e) The waste water from processes in which volatile halogenated hydrocarbons are used (e.g. greasing, degreasing) should be treated separately and should comply with the following limit value:

Sum of trichloroethene, tetrachloroethene and dichloromethane: less than 0.1 mg/l (expressed as chlorine in a representative sample),

RECOMMENDS FURTHER that the Contracting Parties re-evaluate in three years the limit values of this Recommendation and reconsider them as appropriate,

RECOMMENDS FURTHER that the Contracting Parties report to the Commission every three years starting from 1997.

**REPORTING FORMAT FOR HELCOM RECOMMENDATION 16/6
ON RESTRICTION OF DISCHARGES AND EMISSIONS FROM
THE METAL SURFACE TREATMENT**

Country _____ **Year** _____

1. For the whole branch:

- a) General description of the branch especially concerning legal conditions and the efforts to minimize the loads by implementing BAT;
- b) Number of plants discharging to water bodies and number of plants connected to municipal treatment plant;
- c) Figures of waste water volume, pollutant loads and waste characteristics;
- d) VOC emission data.