Detergent for gentle removal of inks and markers

The invention relates to a detergent for the gentle removal of inks as used for marking in a roll mill, as well as to markers as used in the production of temporary marking.

Inks and markers are frequently removed by manual cleaning using rapidly evaporating solvents prior to the actual automated aqueous cleaning of the surface. The disadvantage of this process step is an enhanced risk due to the release of highly flammable substances and the risk of injury to persons during the application thereof. Moreover, the use of these solvents also has a negative impact on the environment due to so-called "VOC" (VOC or VOCs is an acronym for **v**olatile **o**rganic **c**ompound[s]). Further, in the case of the conventionally used detergents, a significant amount of erosion of metallic substrate occurs during the removal of inks and markers.

It is an object of the embodiments disclosed herein to propose a detergent that allows the gentle removal of inks and markers from metallic surfaces. A "gentle removal" in terms of the present disclosure is understood to be an "erosion-free" treatment of the substrate with a metallic surface, wherein an erosion of metallic substrate amounts to less than 0.1 µm/h.

Further, if used as a cleaning bath, the detergent should take on the function of a separate/manual pre-cleaning.

Further, the detergent according to the disclosure should be suitable for cleaning metallic surfaces that may be contaminated with non-polar organic contaminants such as oil(s) and/or other predominantly or entirely organic contaminants such as grease(s), soap(s) and/or further metal processing

agent(s) such as for example drawing additives including anionic organic compounds and particle impurities.

According to the disclsoure, this object is achieved by means of a detergent that allows the gentle removal of inks and markers from metallic surfaces in the form of a concentrate or a cleaning bath solution, which contains at least one water-immiscible solvent in an amount of 4 to 200 g/l, at least one anionic and/or nonionic surfactant in an amount of 8 to 300 g/l, at least one complexing agent in an amount of 1 to 100 g/l, at least one buffer substance in an amount of 1 to 100 g/l and at least one water-miscible solvent in an amount of 4 to 200 g/l in water. The water-insoluble solvent component integrates and stabilizes the aqueous process. The solvent component used has a high boiling point, so that no volatilization takes place at application temperatures. During the application of the detergent, a rate of erosion of metallic substrate of less than 0.1 µm/h has been found.

In an aspect, there is provided a borate-free detergent for the gentle removal of inks and markers from metallic surfaces in the form of a concentrate or a cleaning bath solution, characterized in that it contains at least one water-immiscible solvent in an amount of 4 to 200 g/l, at least one anionic and/or nonionic surfactant in an amount of 8 to 300 g/l, at least one complexing agent in an amount of 1 to 100 g/l, at least one buffer substance in an amount of 1 to 100 g/l and at least one water-miscible solvent in an amount of 4-200 g/l in water.

Preferably, the detergent is one that contains at least one water-immiscible solvent of the class of ester and/or ether compounds. These are selected from the group consisting of

hydroxycarboxylic acid esters and glycol monoethers. Particularly preferred are lactic acid esters esterified with C_2-C_8 alcohol.

The detergent is preferably further one that contains at least one oil-in-water emulsifying surfactant of nonionic surfactants and/or of anionic surfactants. The surfactant preferably has an HLB value in a range of 5 to 16, particularly preferably an HLB value of 6 to 14, especially one with an HLB value < 13. An HLB value (hydrophilic-lipophilic balance) is understood to be the

Patent Claims

1. A borate-free detergent for the gentle removal of inks and markers from metallic surfaces in the form of a concentrate or a cleaning bath solution, characterized in that it contains at least one water-immiscible solvent in an amount of 4 to 200 g/l, at least one anionic and/or nonionic surfactant in an amount of 8 to 300 g/l, at least one complexing agent in an amount of 1 to 100 g/l, at least one buffer substance in an amount of 1 to 100 g/l and at least one water-miscible solvent in an amount of 4-200 g/l in water.

2. The detergent as claimed in claim 1, characterized in that it contains at least one water-immiscible solvent of the class of ester and/or ether compounds.

3. The detergent as claimed in claim 1 or 2, characterized n that it contains at least one water-immiscible solvent selected from the group consisting of hydroxycarboxylic acid esters and glycol monoethers.

4. The detergent as claimed in claims 1 to 3, characterized in that it contains lactic acid ester of the C_2-C_8 alcohols.

5. The detergent as claimed in claims 1 to 4, characterized in that it contains at least one oil-in-water emulsified surfactant of nonionic surfactants and/or of anionic surfactants.

6. The detergent as claimed in claims 1 to 5, characterized in that it contains at least one surfactant with an HLB value in a range of 5 to 16.