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(54) Rinse aid.

(57) The use of a layered clay, e.g. a synthetic hectorite, is a rinse aid composition for use after a dishwashing operation significantly reduces the formation of spots and film on the rinsed articles when dry.

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RINSE AID

The present invention relates to an improvement in the rinse step of machine dishwashing operations.

Usually in machine dishwashing operations, the articles
5 to be cleaned are first cleaned in a main wash step,
and subsequently rinsed several times to rinse away any
adhering main wash product and remaining soil. It is
customary to add to the rinsing water a rinse aid com-
position which causes the articles to dry more evenly
10 and improves the visual appearance of the articles when
dry. Although such rinse aid compositions improve said
visual appearance in comparison with articles which
have not been rinsed with a rinse aid containing rinse
liquor, said visual appearance may still need improve-
15 ment, as, despite the use of a rinse aid, some film-
and spot-formation may still occur.

It has now been found that the use of an effective
level of a layered clay in the rinse step of the ma-
chine dishwashing operation significantly reduces the
20 formation of spots on the rinsed articles when dry.

The present invention therefore relates to an improved
rinse step in a machine dishwashing operation, wherein
25 the improvement comprises the use, in the rinse liquor,
of an effective amount of a layered clay.

Rinsing of the cleaned articles with a rinse liquor
which comprises such an effective amount of a layered
30 clay reduces the formation of spots on the articles
when dry.

The layered clay minerals suitable for use in the
present invention belong to the geological classes of
35 the smectites, the kaolins, the illites, the chlorites,

the attapulgites and the mixed layer clays. Typical examples of specific clays belonging to these classes are:

smectites, e.g. montmorillonite, bentonite, pyrophyllite, hectorite, saponite, sauconite, nontronite, talc, beidellite, volchonskoite, vermiculite; kaolins, e.g. kaolinite, dickite, nacrite, antigorite, anauxite, halloysite, indellite, chrysotile; illites, e.g. bravaisite, muscovite, paragonite, phlogopite, biotite; chlorites, e.g. corrensite, penninite, donbassite, sudoite, pennine, clinochlore; attapulgites, e.g. sepiolite, polygorskyte; mixed layer clays, e.g. alleverdite, vermiculite-biotite.

The layered clay minerals may be either naturally occurring or synthetic. Preferred clay minerals for use in the present invention are natural or synthetic hectorites, montmorillonites and bentonites, and of these the hectorites are especially preferred. Many of the above clays are commercially available, and typical examples of commercial hectorites are the Laponites ex Laporte Industries Ltd, England; Veegum Pro and Veegum F ex R.T. Vanderbilt, U.S.A.; the Barasymms, Macaloids and Propaloids ex Baroid Division, National Read Comp., U.S.A.

Particularly preferred commercial hectorites are Laponite S, Laponite XLS, Laponite RD and Laponite RDS, of which Laponite XLS is especially preferred. This is a synthetic hectorite having the following characteristics: analysis (dry basis) SiO_2 59.8%, MgO 27.2%, Na_2O 4.4%, Li_2O 0.8%, structural H_2O 7.7%, with the addition of tetrasodium pyrophosphate (6%); specific gravity 2.53; bulk density 1.0.

The layered clay may be added to the rinse water as

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such, or it may be added thereto in the form of a liquid dispersion of the clay in water or in the form of a composition in any suitable physical form comprising the clay and other suitable or desirable ingredients. Such other suitable ingredients may be low levels of wetting or detergent surfactants, organic acids, hydrotropes, alcohols, perfumes, germicides, anticorrosion agents, etc. Suitable physical forms are powders, liquids, tablets, blocks, granulates, etc.

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The level of the layered clay in the rinse liquor should be such that the rinse liquor contains from 0.001-1 g of the clay per litre. The rinse liquor with the layered clay is effective at both higher and lower rinsing temperatures.

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The invention will be further illustrated by way of Example.

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Example 1

A standard set of tumblers, soiled with a standard evaluation soil, was cleaned in a commercially available dishwashing machine, sold by Miele AG, Germany, under the name Miele G 550. The normal programme was used, at a temperature of 65°C. The water hardness was 9° German hardness. A commercially available machine dishwashing product was used at a dosage of 3 g/l.

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In one experiment, 0.05 g/l of Laponite XLS was added to the final rinse water, and in another experiment no clay was added to the final rinse water.

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The tumblers when dry were visually assessed as to the spot formation, using the following scale:

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- 1 = no spots
 2 = 1-5 spots
 3 = 6-10 spots
 4 = 11-20 spots
 5 = more than 20 spots.

The following results were obtained:

		Spot formation
	final rinse without Laponite XLS	2.8-3.4
10	final rinse with Laponite XLS	1.2-1.6

Example 2

The procedure of Example 1 was repeated, using another machine dishwashing product in the main wash step, and using in the rinse step either no rinse aid at all, or a commercially available rinse aid, or a rinse aid of the following formulation:

		% by weight
20	Laponite XLS	6.0
	Isopropyl alcohol	2.0
	Low-foaming nonionic surfactant	1.0
	Trisodium citrate 2 aq.	2.5
	Water	88.5

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The dosage of the rinse aid was 2.5 ml in the rinse water (corresponding to 0.015 g/l of Laponite XLS). The spot-formation results were as follows:

		Spot formation
30	without rinse aid	4.4
	with conventional rinse aid	4.2
	with rinse aid of the invention as above	1.4

Example 3

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The following formulations are suitable rinse aid compositions according to the invention:

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		% by weight			
	Laponite XLS	3.6	4.0	4.0	8.0
	Isopropyl alcohol	10.0	20.0	10.0	10.0
	Low-foaming nonionic surfactant	2.0	2.0	2.0	1.0
5	Trisodium citrate 2 aq.	-	-	2.5	2.5
	Water	84.4	74.0	81.5	2.5

Example 4

- 10 In the same manner as in Example 1, the following clays were tested in the final rinse at a concentration of 200 mg/10 l.

The following results were obtained:

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		Spot formation	Film formation
	Clay		
	Halloysite (Kandite)	3.9	1.4
	Attapulgate (Hormite)	4.4	1.3
	Kandite (Speswhite)	2.8	1.3
20	Hormite (Attagel 50)	4.4	1.7
	Smectite (Vegum T)	2.6	1.5
	Smectite (Bentone EW)	3.4	1.2
	Hormite (Bleaching earth ST)	3.8	1.3
	Hectorite (Laponite S)	2.0	1.8
25	Blanc	5.0	1.4

CLAIMS

1. A rinse aid composition, suitable for use in an aqueous rinse liquor, characterised in that the composition comprises a layered clay in an aqueous medium.
- 5 2. A composition according to claim 1, characterised in that the composition comprises an amount of the layered clay such that the rinse liquor contains 0.001-1 g of the clay per litre.
- 10 3. A composition according to claim 2, characterised in that the layered clay is selected from the group consisting of the smectites, kaolins, illites, chlorites, attapulgites and mixed layer clays.
- 15 4. A composition according to claim 3, characterised in that the layered clay is selected from the group consisting of hectorites, montmorillonites and bentonites.
- 20 5. A composition according to claim 4, characterised in that the layered clay is a synthetic hectorite.
- 25 6. A composition according to claims 1-5, characterised in that it is a liquid composition further comprising a wetting agent and a solvent.