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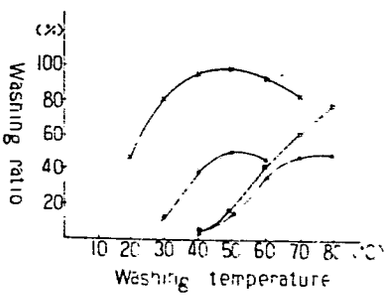
(54) Washing composition.

(57) A washing compound comprises a surface-active agent and a builder as basic components, and at least one specific compound selected from dithionite, a compound having a sulfino group or a salt thereof, a compound having a thiol radical, a hydrazine compound, diketones, dihydroxyphenols and derivatives of sugars in admixture with the basic components, and furthermore, the group of the specific compounds may be in admixture with sugars, gallic acid, trimellitic anhydride or the like; whereby a strong washing effect is attained in a low temperature region (10 to 50°C) in the absence of phosphate builders.

Fig. 1



× Embodiment 5
□ Comparing example 3
△ Comparing example 4
○ Comparing example 5

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DESCRIPTION

"WASHING COMPOSITION"

The present invention relates to a washing composition comprising a surface-active agent and a builder as basic components, and at least one compound selected from specific compounds added to the basic components, which washing composition serves to improve washing performance particularly when acting at lower temperatures and excluding phosphate from the builder for energy-saving and anti-pollution, and is mainly used for industrial purposes.

Conventional washing agents generally comprises surface-active agents from at least one of anionic, non-ionic, cationic or amphoteric agents and a builder (including chelating agents) including inorganic or organic salts with an alkaline property, and enzymes, bleaching agents, fluorescent agents, anti-corrosive agents, solubilization agents, solvents or the like are added thereto if desired.

Such washing agents are selected according to their intended use at a washing concentration of 1 to 100 g/l and a washing temperature of 10 to 80°C. In order to wash off strong contamination caused by adhesion of animal oil, mineral oil, wax or grease, however, high-temperature washing (70 to 80°C) or extension of washing time may be required.

In high-temperature washing as above described, some conditions of the substance to be cleaned may injure the surface of the substance. A kind of contamination may produce strong adhesion of dirt onto the surface of the substance. Accordingly, since the application of the high-temperature washing is restricted and moreover the cost of heating fuel has significantly increased in

recent years, the advent of a cleaning agent which has a strong cleaning performance in low temperature regions (10 to 50°C) has been eagerly awaited.

Customary builders, including sodium tripolyphosphate are used on account of their excellent performance. However, if sodium tripolyphosphate contained in waste water is discharged into a river, lake of sea region, extraordinary breeding of plankton results in contamination by over-nourishment in the river, lake or sea region. Accordingly, the development of a washing agent having a strong washing performance using a builder which does not include sodium tripolyphosphate has been desired, but not yet realized.

A washing agent according to the present invention comprises basic components including a surface-active agent and a builder together with at least one compound selected from dithionites, compounds having a sulfino group or salts thereof, hydrazine compounds, dihydroxy phenols, diketones and derivatives of sugars.

Based on the above mentioned feature, a washing composition according to the present invention can provide a strong washing effect in a low temperature region (10 to 50°C) even if the builder does not contain sodium tripolyphosphate, and thereby it contributes to energy-saving and anti-pollution.

A preferred washing composition according to the present invention is usually composed of the following components : (wherein wt% is inner percentage)

(a) surface-active agent ..... 0.5 to 40 wt%
(b) builder ..... 45 to 98.5 wt%
(c) specific additive compound ..... 0.5 to 30 wt%
(in the case of hydrosulfite (Sodium dithionite) 1 to 20 wt%).

(a) The above mentioned surface-active agent is

selected from one or more surface-active agents generally used such as anionic, non-ionic, cationic and amphoteric agents as hereinafter described. Not only the surface-active agents shown as examples but also other various agents acting similarly may be used.

(1) anionic agent ...

alkyl benzene sulfonate with straight chain or branched chain, alkylsulfate ester salt, alkane-sulfonate, α- olefin sulfonate, alkylethoxysulfate ester salt.

(2) non-ionic agent ...

polyoxyethylated higher fatty alcohol with straight chain or branched chain, polyoxyethylated alkylphenol, block-formed polymer of propylene oxide and ethylene oxide.

(3) cationic agent ...

quaternary trimethyl alkyl ammonium salts, quaternary dimethyl alkyl benzyl ammonium salts, quaternary alkyl imidazolinium salts.

(4) amphoteric agent ...

alkyl betaine, salts of alkyl amino carboxylic acids, alkyl diaminoalkyl glycine, alkyl imidazolinium betaine.

The surface-active agent is incorporated in the composition in the above mentioned amount. If the amount is less than 0.5 wt%, the washing effect cannot be substantially obtained; if it is more than 40 wt%, an excessive amount of surface-active agent in aqueous solution may cause salting out, with resultant decrease in the cleaning effect. Preferably the amount of surface-active agent incorporated is 1 to 35 wt%.

(b) The builder is formed as a combination of agents selected from common inorganic salts, caustic alkalis and salts of organic acids as exemplified herein-

after and adjusted so that the aqueous solution of the builder as a whole becomes alkaline.

(1) inorganic salts ... silicates such as sodium orthosilicate, sodium sesquisilicate, sodium metasilicate or other sodium silicates, borates such as sodium borate or borax, carbonates such as sodium carbonate, sodium sesquicarbonate or sodium bicarbonate, mirabilite, sodium chloride.

(2) caustic alkalis ... sodium hydroxide.

(3) salts of organic acids ... carboxylates such as sodium citrate sodium hydroxyacetate, sodium malate, sodium tartrate, sodium gluconate or sodium polyacrylate, aminocarboxylates such as nitrilotriacetate, ethylenediaminetetraacetate, diethylenetriaminepentaacetate, glycine salts or glutamates.

The builder is incorporated in the above mentioned amount. If the amount is less than 45 wt%, the washing agent cannot be prevented from coagulating; if it is more than 98.5 wt%, the relative amount of the surface-active agent becomes too small for performance of the washing agent. The preferred amount of builder incorporated is 50 to 95 wt%.

(c) The specific additive compound is selected from (1) dithionites, (2) compounds having a sulfino group or salts thereof, (3) hydrazine compounds, (4) dihydroxy phenols, (5) diketones, (6) compounds derived from sugars.

Any specific additive compound serves to improve significantly the effect of the washing agent consisting of surface-active agent and builder, dissolved in water and to extend the peak of the washing effect towards a lower temperature region as hereinafter described by way of examples.

Although the reason for the function of the

specific additive compound is not clear, the washing function of the washing composition according to the present invention seems to be as follows:

Soil adhered to the substance to be washed includes oily soil, solid soil or the like. The soil is adhered on the surface of the substance to be washed by means of physical adsorption or chemical adsorption. Oily soil such as rust preventive oil, rolling oil or cutting oil comprises a distilled component for lubricating oil (hydrocarbons) as a base component together with a rust preventing additive or an extreme- pressure additive having very strong chemical adsorption, that is, polar groups such as a carboxyl group, sulfo group, hydroxyl group, phosphono group, nitrogen atom, sulfur atom or chlorine atom. The above mentioned polar materials seem to form a strong adsorption layer on the metal surface by means of chemical adsorption, or to form a lubricating metallic compound by reacting with the metal surface under high temperature and high pressure.

Generally to obtain a clean surface it is required in a washing action that surface adsorption material is removed from the surface of the substance to be cleaned and replaced by harmless material for subsequent processing. The harmless material means molecules or ions of builder, surface-active agent, and water in the washing liquid.

In the washing process, a specific additive compound according to the present invention co-operates with tbe builder and surface-active agent. At first, it strongly supports the function of emulsification, solubilization dispersion or the like as washing factors, whereby oily contamination is liable to be washed away and the oil layer adhered on the metal surface gradually

becomes thin. When washing reaches near the metal surface in this process, the metal surface has a layer of soil adhered by means of chemical or physical adsorption as hereinbefore described. It often occurred with conventional washing agents that the adsorption layer could not be removed well. However, in a washing composition including a specific additive compound according to the present invention, under a state of decreased surface tension the specific additive compound accompanied by the builder and surface-additive agent can easily approach the oil adsorbed portion and replace the adsorbed soil. This is probably based on a nucleophilic property of the specific additive agent.

The specific additive compound, builder and surface-active agent, which newly cover the surface of the substance to be cleaned in the abovementioned manner, make the substance surface hydrophilic and prevent the soil particles from adhering again. Thus the washing is completed.

The amount of the specific additive incorporated depends on the washing object (the sort of soil) and the washing temperature, and generally has a value ranging from 0.5 to 30 wt% (1 to 20 wt% for hydrosulfite(sodium dithionite)). If the amount is less than the lower limit value, improvement of the required washing effect is not obtained in comparison to non-addition; if it is more than the upper limit value, improvement is scarcely obtained and, on the contrary, reduction of the washing effect may occur on account of problem in solubility or the like.

Examples of specific additive compounds are as follows:

(1) dithionites

1. hydrosulfite

(2) compounds having a sulfino group of salts thereof

2. Rongalite (sodium formaldeyde sulfoxylate)
3. thiourea dioxide

(3) a compound having a thiol radical

4. the monoethanolamine salt of thioglycolic acid

(4) hydrazine compounds

5. hydrazine hydrate

(5) dihydroxy phenols

6. hydroquinone
7. catechol
8. protocatechuic acid

(6) diketones

9. diacetyl

(7) compounds derived from sugars

10. L-ascorbic acid
11. Erythorbic acid or salt thereof

Specific additive compounds as above exemplified may be combined with each other or with the following compounds instead of with other specific compounds. In some combinations, the washing effect may be improved in a multiplicative function. A multiplicative effect is significant particularly in the combination of hydrosulfite and sugars.

(a) sugars (glucose, fructose, lactose, maltose)
(b) gallic acid
(c) P - hydroxybenzaldehyde
(d) trimellitic anhydride
(e) dextrin
(f) triethylenetetriamine

The total amount incorporated of additive compounds consisting of two or more components is 1 to 40 wt%. The reason for the numerical limitation is similar to that for the abovementioned one-component specific additive compound.

The effect of the present invention will now be confirmed by comparing embodiments of the invention with comparing examples.

In this connection reference will be made to the accompanying drawing in which:-

Fig. 1 is a graph illustrating variation of washing performance in embodiment 5 and comparing examples 3 to 5 in dependence on temperature variation.

<Testing Method>

A specimen is prepared by cleaning cold rolled steel sheet (100mm x 50mm x 0.6mm t) with trichloroethylene solvent, applying various sorts of oil to be washed away from the steel sheet surface, and heating the oil at 60°C for 36 hours (at room temperature for 10 days in embodiments 6 to 9 and comparing examples 6 to 7).

Each specimen in the embodiments and comparing examples is immersed in an aqueous solution containing a washing agent of concentration 40g/litre at a prescribed temperature for a prescribed time. After rinsing with water, it is further immersed in an aqueous solution of dilute sulfuric acid of 0.5 wt% and allowed to stand at room temperature for 30 minutes whereby the washed portion is rusted.

In order to estimate the washing effect, the ratio of area of the rusted portion versus the total area of the specimen is visually inspected and designated as the washing ratio in %.

Each value of the washing ratio (%) in the tables is a mean value of the test results of the washing ability measurement performed 5 times.

<Embodiments 1 to 4 and Comparing Examples 1 to 2>

constitution of washing agent ... shown in Table 1

washing condition ... 45°C for 2 minutes

oil to be washed away ... press working oil No.620 for plastic machining (tradename, manufactured by Nihon Kosakuyu Co., Ltd.)

Test results (arithmetic mean value of n = 5 times) are shown in Table 1. It is seen from the table that embodiments 1 to 4 using a surface-active agent and a builder together with a hydrosulfite (sodium dithionite) or a combination of hydrosulfite (sodium dithionite) and a sugar have a sufficiently practicable washing effect in a low temperature region of less than 50°C, and that comparing examples 1 and 2 using conventional composition made up of only surface-active agent and builder do not show a sufficient washing effect in the low temperature region.

<Embodiment 5 and Comparing Examples 3 to 5>

composition of washing agent

Embodiment 5;

sodium hydroxide	20 wt%
sodium metasilicate (anhydride)	30 wt%
sodium carbonate	15 wt%
ethylenediaminetetraacetic acid 4 Na salt	10 wt%
sodium hydroxyacetate	3 wt%
Polyoxyethylated tridecy alcohol 10 mols ethylene oxide added) phosphate ester	4 wt%
Polyoxyethylated nonylphenol 8 mols ethylene oxide added	5 wt%
hydrosulfite anhydride (sodium dithionite anhydride) fructose	5 wt%

Comparing Example 3;

article on the market A (high-temperature type)

Comparing Example 4;
article on the market B (high-temperature type)
Comparing Example 5;
article on the market C (low-temperature type, 40 to 60°C)
washing condition ... at 20, 30, 40, 50, 60, 70 and 80°C for 3 minutes
oil to be washed away ... press working oil for plastic machining, Daphne press Draw Oil 45. (tradename, manufactured by Idemitsu Kosan Co., Ltd.)

Test results are shown in the graph of Fig. 1. It is seen from the figure that the washing effect of comparing example 3 (high-temperature type A) at 80°C can be equally achieved by embodiment 5 at 30°C, and that embodiment 5 is significantly excellent in washing performance in comparison with comparing example 5 (low-temperature type C) and permits practicable washing in a low temperature region.

With regard to saving of heating cost, since the washing temperature can be decreased from 80°C to 30°C by using embodiment 5 in place of comparing example 3, it is estimated that the heating cost is reduced by about 69×10^3 yens per month or 830×10^3 yens per year when a washing vessel of 1,000 liters is used and the cost of a heavy oil is 80 yens/liter.

< Embodiments 6 to 9 and Comparing Examples 6 to 7 >
constitution of washing agent ... shown in Table 2
washing condition ... 30°C for 2 minutes
oil to be washed away ... rust preventing oil, Daphne Oil Coat No. 9 (tradename, manufactured by Idemitsu Kosan Co., Ltd.)

Test results are shown in Table 2. It is seen from the table that embodiments 6 to 9 without sodium tripolyphosphate as the builder in washing composition

of the present invention have a washing effect comparable with comparing example 7 using sodium tripolyphosphate and are therefore significantly excellent in comparison with comparing example 7.

<Embodiments 10 to 66 and Comparing Example 8>

Only one component is used as the specific additive compound in the embodiments.

The washing agent comprises the following basic constitution and the specific additive compound shown in Table 3 is added in a prescribed incorporating amount. Washing conditions and oil to be washed away are also shown in Table 3.

< Basic composition of Embodiments 10 to 66 >

sodium orthosilicate	30 wt%
sodium hydroxide	15 wt%
EDTA . 2 sodium salt	8 wt%
sodium gluconate	4 wt%
Polyoxyethylated nonylphenol 12 mols ethylene oxide added	11 wt%
Polyoxyethylated nonylphenol 6 mols ethylene oxide added	2 wt%
specific additive compound	0.5 to 30 wt%
sodium carbonate (anhydride)	residue

Comparing example 8 is a conventional washing composition (high-temperature type) and constituted as follows:

<Composition of Comparing Example 8>

sodium orthosilicate	74 wt%
sodium tripolyphosphate	5 wt%
sodium carbonate (anhydride)	12 wt%
EDTA:2 sodium salt	0.5 wt%

Polyoxyethylated nonylphenol 11 mols ethylene oxide added 4 wt%
sodium dodecylbenzene sulfonate 4.5 wt%

Test results are shown in Table 3. It is seen from the table that each washing composition according to the present invention is excellent in comparison with conventional washing composition (hign-temperature type) and has a good washing effect particularly in a temperature region less than 50°C.

In addition, using comparing example 8 with a conventional washing agent, a washing temperature ranging from 70 to 80°C is required in order to attain a washing effect similar to embodiments 10 to 66 at 30 to 50°C.

<Embodiments 67 to 86 and Comparing Example 9>

Specific additive compounds in combination with each other are used in the embodiments.

The washing agent is constituted as hereinafter described.

Table 4 shows types of specific additive compounds (1) and (2) or other compounds. Washing conditions and oil to be washed away are also shown in Table 4.

<Composition of Embodiments 67 to 86>

sodium orthosilicate 45 wt%
sodium hydroxide 15 wt%
sodium carbonate (anhydride) 5 wt%
EDTA . 2 sodium salt 8 wt%
sodium gluconate 4 wt%
Polyoxyethylated nonylphenol 12 mols ethylene oxide added
Polyoxyethylated nonylphenol 6 mols ethylene oxide added 2 wt%
specific additive compound (1) 5 wt%
specific additive compound (2) or other compound 5 wt%

< Composition of Comparing Example 9>

sodium orthosilicate	55 wt%
sodium hydroxide	15 wt%
sodium carbonate (anhydride)	14 wt%
EDTA. 2 sodium salt	8 wt%
Polyoxyethylated nonylphenol 12 mols ethylene oxide added	6 wt%
Polyoxyethylated nonylphenol 6 mols ethylene oxide added	2 wt%

Each of the examples for reference as shown in Table 4 is added in an amount of 10 wt% to the same composition as in embodiments 67 to 86 in place of specific compounds (1) and (2) or other compounds, and testing thereof was carried out in a manner similar to that of the embodiments and comparing examples.

Test results are shown in Table 4. It is clearly seen from the table that each of Embodiments 67 to 86 gives a better performance than comparing example 9 and that each embodiment is excellent in its washing effect in comparison with the examples for reference.

Table 1

composition	embodiment 1	embodiment 2	embodiment 3	embodiment 4	comaring example 1	comparing example 2
	wt%	wt%	wt%	wt%	wt%	wt%
sodium orthosilicate	45	45	45	45	45	45
sodium carbonate	19	19	19	19	19	19
nitrilotriacetic acid · 3Na	10	10	10	10	10	10
polyoxyethylated nonylphenal(ethylene oxide 9 mols added)	3	3	3	3	3	3
dobanol (C12 ~ 13) (ethylene oxide 10 mols added)	3	3	3	3	3	3
sodium hydrosalfite anhydrite	20	15	10	5	-	20
maltose	-	5	10	15	20	-
washing ratio	63	82	77	85	44	26

Table 2

composition	embodiment 6	embodiment 7	embodiment 8	embodiment 9	comparing example 6	comparing example 7
	wt%	wt%	wt%	wt%	wt%	wt%
sodium orthosilicate	50	50	50	50	50	50
sodium carbonate	30	27	27	27	25	30
sodium tripolyphospshate	-	-	-	-	10	10
sodium glutamate	8	8	8	8	-	-
sodium dodecylbenzensulfonate in branched chain	4	4	4	4	4	4
laurylalcohal (ethylene oxide 10 mols added)	3	3	3	3	3	3
octyl phenol (ethylene oxide 8 mols added)	3	3	3	3	3	3
sodium hydrosulfite	2	1.5	1.5	1.5	1.5	-
glucose	-	3.5	-	-	-	-
fructose	-	-	3.5	-	-	-
lactose	-	-	-	3.5	3.5	-
washing ratio	67	89	83	86	92	33

Table 3

*A)	*B)	*C) wt%	*F) 30 C *E) *1) rust preventing oil P5901 *D) 2 minutes washing rate %	*F) 30 C *E) *2) press working oil S 300A 5 minutes washing rate %	*F) 50 C *E) *1) rust preventing oil P5901 2 minutes washing rate %	*F) 50 C *E) *2) press working oil S300A 5 minutes washing rate %
10	Rongalite	1	28	86	69	88
11		2.5	32	72	77	86
12		5	32	65	77	83
13		10	37	63	77	81
14		20	39	57	85	80
15	thiourea dioxide	1	44	41	57	60
16		2.5	44	50	59	66
17		5	49	66	62	67
18		10	48	75	65	78
19		20	47	97	66	99
20		30	45	97	71	99
21	protocatechuic acid	0.5	47	30	62	40
22		1	53	32	65	40
23		2.5	54	36	69	48
24		5	57	40	71	48
25		10	57	46	73	51
26		20	57	48	73	53
27	hydrazine hydrate	1	55	35	90	52
28		2.5	57	35	94	65
29		5	62	45	87	68
30		10	66	60	80	69
31		20	89	70	77	77
32	diacetyl	1	45	46	59	49
33		2.5	55	46	64	50
34		5	56	46	65	49
35		10	57	45	72	49
36		20	58	42	73	48

Table 3 (Continued)

		wt%	washing rate %	washing rate %	washing rate %	washing rate %
37	sodium ascorbate	0.5	43	30	74	54
38		1	55	38	75	57
39		2.5	60	43	75	69
40		5	65	43	74	72
41		10	65	51	74	76
42		20	65	53	74	80
43	sodium erythorbate	0.5	41	30	61	54
44		1	56	35	73	61
45		2.5	61	42	74	69
46		5	62	51	75	71
47		10	69	55	78	79
48		20	71	55	77	82
49	hydroquinone	0.5	60	50	52	41
50		1	61	53	74	50
51		2.5	66	55	79	59
52		5	62	57	86	81
53		10	50	72	88	81
54		20	44	60	90	87
55	catechol	0.5	49	50	70	66
56		1	50	53	71	69
57		2.5	54	59	72	81
58		5	51	83	79	88
59		10	49	86	80	91
60		20	48	84	85	90
61	monoethanol amine thioglycolate	0.5	45	30	63	50
62		1	45	42	70	69
63		2.5	47	57	74	76
64		5	50	62	80	81
65		10	51	74	79	85
66		20	44	69	78	71
*C)			8	4	28	21

*1) tradename, manufactured by Nihon Kosakuyu Co., Ltd.

*2) tradename, manufactured by Sugimura Chemical Industrial Co., Ltd.

Table 3 (Continued)

*A) embodiment

*B) specific compound

*C) incorporating amount

*D) washing time

*E) oil to be washed away

*F) washing temperature

*G) comparing example 8

Table 4

*A)	specific compound (1)	compound (2)	washing temperature: 30 C; oil to be washed away: rust preventing oil P5901 *1); washing time: 2 minutes; washing rate %	oil to be washed away: press working oil S300A *2); washing time: 5 minutes; washing rate %
67	thiourea dioxide	protocathechuic acid	83	67
68		trimellitic anhydride	75	73
69		dextrin	73	66
70		triethylenetetramine	80	73
71	hydrozine hydrate	P-hydroxybenzaldehyde	61	51
72		trimellitic anhydride	89	85
73		dextrin	85	86
74		L-sodium ascorbate	58	55
75		gallic acid	89	64
76		glucose	72	58
77		monoethanal amine thioglycolate	51	48
78	protocatechuic acid	hydrosulfite	60	52
79		dextrin	53	51
80		gallic acid	57	59
81	sodium erythorbate	triethylenetramine	74	69
82	hydroquinone	protocathechuic acid	62	54
83		dextrin	68	55
84		P-hydroxybenzaldehyde	69	61

Table 4 (Continued)

85	L-sodium ascorbate	P-hydroxybenzaldehyde	washing rate % 54	washing rate % 55
86	monoethanal amine thioglycolate	glucose	57	52
*B)			25	26
*C)		gallic acid	30	33
		P-hydroxybenzaldehyde	18	21
		trimellitic anhydride	28	15
		glucose	33	23
		dextrin	37	39
		triethylenetetramine	31	20

*1) tradename, manufactured by Nihon Kosakuyu Co., Ltd.

*2) tradename, manufactured by Sugimura Chemical Indutsrial Co., Ltd.

*A) embodiment

*B) Comparing example 9

*C) example for reference

oil to be washed away ... press working oil No.620 for plastic machining (tradename, manufactured by Nihon Kosakuyu Co., Ltd.)

Test results (arithmetic mean value of n = 5 times) are shown in Table 1. It is seen from the table that embodiments 1 to 4 using a surface-active agent and a builder together with a hydrosulfite (sodium dithionite) or a combination of hydrosulfite (sodium dithionite) and a sugar have a sufficiently practicable washing effect in a low temperature region of less than 50°C, and that comparing examples 1 and 2 using conventional composition made up of only surface-active agent and builder do not show a sufficient washing effect in the low temperature region.

<Embodiment 5 and Comparing Examples 3 to 5>

composition of washing agent

Embodiment 5;

sodium hydroxide	20 wt%
sodium metasilicate (anhydride)	30 wt%
sodium carbonate	15 wt%
ethylenediaminetetraacetic acid 4 Na salt	10 wt%
sodium hydroxyacetate	3 wt%
Polyoxyethylated tridecy alcohol 10 mols ethylene oxide added) phosphate ester	4 wt%
Polyoxyethylated nonylphenol 8 mols ethylene oxide added	5 wt%
hydrosulfite anhydride (sodium dithionite anhydride) ~~fructose~~ fructose	8 ~~5~~ 5 wt%

Comparing Example 3;

article on the market A (high-temperature type)

Polyoxyethylated nonylphenol 11 mols ethylene oxide added 4 wt%

sodium dodecylbenzene sulfonate 4.5 wt%

Test results are shown in Table 3. It is seen from the table that each washing composition according to the present invention is excellent in comparison with conventional washing composition (high-temperature type) and has a good washing effect particularly in a temperature region less than 50°C.

In addition, using comparing example 8 with a conventional washing agent, a washing temperature ranging from 70 to 80°C is required in order to attain a washing effect similar to embodiments 10 to 66 at 30 to 50°C.

<Embodiments 67 to 86 and Comparing Example 9>

Specific additive compounds in combination with each other are used in the embodiments.

The washing agent is constituted as hereinafter described.

Table 4 shows types of specific additive compounds (1) and (2) or other compounds. Washing conditions and oil to be washed away are also shown in Table 4.

<Composition of Embodimerts 67 to 86>

sodium orthosilicate	45 wt%
sodium hydroxide	15 wt%
sodium carbonate (anhydride)	5 wt%
EDTA . 2 sodium salt	8 wt%
sodium gluconate	4 wt%
Polyoxyethylated nonylphenol 12 mols ethylene oxide added	11 wt%
Polyoxyethylated nonylphenol 6 mols ethylene oxide added	2 wt%
specific additive compound (1)	5 wt%
specific additive compound (2) or other compound	5 wt%

components and selected from

(a) Rongalite;

(b) thiourea dioxide;

(c) monoethanolamine thioglycolate;

(d) hydrazine or a hydrate thereof;

(e) dihydroxy phenols;

(f) diacetyl;

(g) L-ascorbic acid or a salt thereof; and

(h) Erythorbic acid or a salt thereof.

8. A washing composition as claimed in claim 7, wherein the specific compound is only one component and is present in the composition in an amount ranging from 0.5 to 30 wt% (inner).

9. A washing composition as claimed in claim 7, wherein a mixture of specific compounds is present in the composition in a total amount ranging from 1 to 40 wt% (inner).

10. A washing composition as claimed in any one of claims 7 to 9, wherein the dihydroxyphenols are selected from hydroquinone, catechol or protocatechuic acid.

11. A washing composition as claimed in claim 7, wherein the specific additive compound is in admixture with

(a) hydrosulfite;

(b) gallic acid;

(c) p-hydroxybenzaldehyde;

(d) trimellitic anhydride;

(e) dextrin; or

(f) triethylenetetramine.

CLAIMS

1. A washing composition comprising a surface-active agent and a builder as basic components and at least one specific compound in admixture with the basic components and selected from

(1) dithionites,

(2) compounds having a sulphino group or salts thereof,

(3) a compound having a thiol radical,

(4) hydrazine compounds,

(5) dihydroxy phenols,

(6) diketones and

(7) compounds derived from sugars.

2. A washing composition comprising a surface-active agent and a builder as basic components and a hydrosulfite (sodium dithionite) in admixture with the basic components.

3. A washing composition as claimed in claim 2, wherein the amount of hydrosulfite in the composition is in the range of from 1 to 20 wt% (inner percentage).

4. A washing composition comprising a surface-active agent and a builder as basic components and a hydrosulfite (sodium dithionite) and a sugar in admixture with the basic components.

5. A washing composition as claimed in claim 4, wherein the hydrosulfite (sodium dithionite) and the sugar are each present in the composition in an amount in the range of from 1 to 20 wt% (inner percentage).

6. A washing composition as claimed in claim 4 or 5, wherein the sugar is one or more sugars selected from glucose, fructose, lactose and maltose.

7. A washing composition comprising : a surface-active agent and a builder as basic components; and at least one specific compound in admixture with the basic

components and selected from

(a) Rongalite;

(b) thiourea dioxide;

(c) monoethanolamine thioglycolate;

(d) hydrazine or a hydrate thereof;

(e) dihydric phenols;

(f) diacetyl;

(g) L-ascorbic acid or a salt thereof; and

(h) Erythorbic acid or a salt thereof.

8. A washing composition as claimed in claim 7, wherein the specific compound is only one component and is present in the composition in an amount ranging from 0.5 to 30 wt% (inner).

9. A washing composition as claimed in claim 7, wherein a mixture of specific compounds is present in the composition in a total amount ranging from 1 to 40 wt% (inner).

10. A washing composition as claimed in any one of claims 7 to 9, wherein the dihydroxyphenols are selected from hydroquinone, catechol or protocatechuic acid.

11. A washing composition as claimed in claim 7, wherein the specific additive compound is in admixture with

(a) hydrosulfite;

(b) gallic acid;

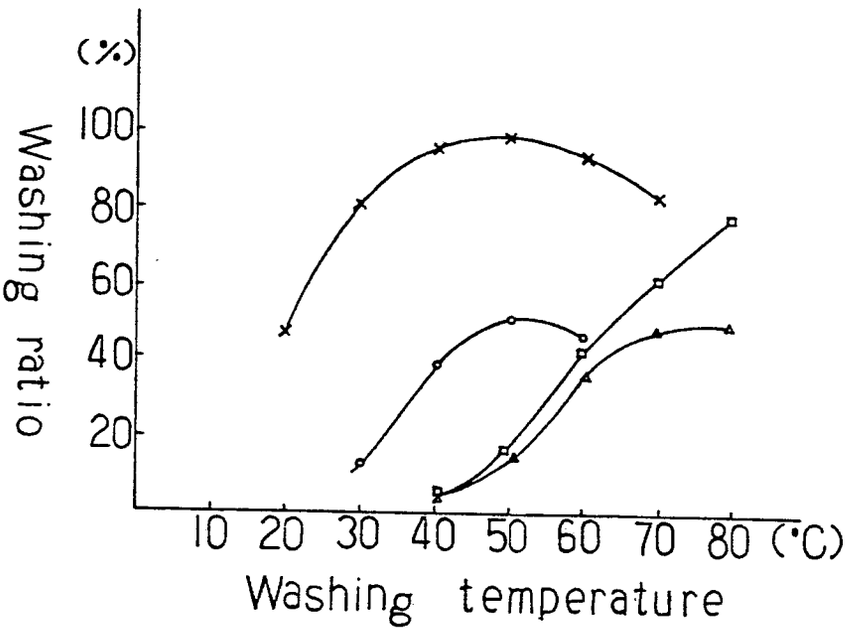
(c) p-hydroxybenzaldehyde;

(d) trimellitic anhydride;

(e) dextrin; or

(f) triethylenetetramine.

Fig 1



× ··· Embodiment 5

□ ··· Comparing example 3

△ ··· Comparing example 4

○ ··· Comparing example 5