



HI&I FORMULARY

CRODA VERSION 5.5

SEABROOK INDUSTRIES INC

INTRODUCTION

Since 1992, Seabrook Industries has partnered with Croda, Inc. in the sales and market development of their line of Incrosoft Quaternaries. Further to this, Seabrook has also participated in promoting Croda's other lines of specialty surfactants*.

This guide is designed to provide the formulator with highly functional – yet economically viable formulations. Croda offers a range of surfactants well suited to these formulation requirements. Each formulation has undergone stability testing and is potentially ready for us in a commercial product.

While Croda products can be used in many applications, they may at times perform best in a secondary role. That's why we don't hesitate to incorporate commodity nonionics and anionics in our formulations. We also attempt to explain why the Croda ingredients are used and the functionality they provide. We understand that economics are always critical and design systems accordingly.

The identities of all Croda ingredients are listed on Page 8. We have also provided a vendor list on Page 8, which should help you in obtaining other necessary raw materials.

The balance of this guide has arranged formulations into meaningful categories to help you to quickly find what you need.

ORDER SAMPLES AND GET STARTED

SEABROOK INDUSTRIES INC
352.621.3777 Fax 621.3321
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The logo for Croda, featuring the word "CRODA" in a bold, serif font, with a horizontal line underneath the text.

**NOTE: The enclosed information has been prepared and is the property of Croda, Inc. Its use is intended solely for the promotion of Croda's line of chemical ingredients. Seabrook can assist in the use and purchase of these materials.*



Functional & Practical Formulations

This guide is designed to provide the formulator with highly functional – yet economically viable formulations. Croda offers a range of surfactants well suited to these formulation requirements. Each formulation has undergone stability testing and is potentially ready for use in a commercial product.

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By Phone (732) 417-0800 x 4201
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Formulations for Homecare and Functional Specialties Version 5.5

CRODA

300-A Columbus Circle
Edison, NJ 08837
(732) 417-0800
(732) 417-0804

GENERAL PURPOSE CLEANERS

Non-Butyl General Purpose Cleaner	HI-1312	Crodafos N-3E	9
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AUTOMOTIVE (continued)

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High Foaming Pressure Wash with Crodaquat DGR	HI-2806	Crodasinic LS-30, Crodaquat DGR	87
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Croda Ingredients Used In This Formulary

Ingredient	Chemical Identity	Ingredient	Chemical Identity
ACYLAN	Acetylated lanolin	INCROCAS 30	PEG (30) castor oil glycerides
COSMOWAX J	Cetearyl alcohol/Ceteareth-20	INCROMECTANT AQ	Acetamidopropyl Trimonium chloride
CRILLET 3	PEG (20) sorbitan monostearate	INCROMIDE CA	Cocamide DEA
CRODACID B	Behenic acid	INCROMIDE LR	Lauramide DEA
CRODACOL C-95	Stearyl alcohol	INCROMINE OXIDE C	Cocamidopropylamine oxide
CRODAFOS N-3E	Oleth-3 phosphate	INCROMINE OXIDE L	Lauramine oxide
CRODAMET O-2	PEG (2) oleamine	INCROMINE OXIDE LF	Short chain amine oxide
CRODAQUAT 1207	PEG15 cocoamine methyl chloride quat	INCRONAM 30	Cocamidopropyl betaine
CRODAQUAT DGR	Proprietary cationic	INCROSOFT 7050	Proprietary polymer
CRODAQUAT LSR	Proprietary cationic	INCROSOFT 8000	Proprietary polymer
CRODAQUAT TES	PEG (16) Tallowammonium ethosulfate	INCROSOFT T-90 HF	Ditallow amidoamine DMS quat
CRODASINIC C	Cocoyl sarcosine	INCROSOFT T-90 LM	Ditallow amidoamine DMS quat
CRODASINIC LS-30	Sodium lauroyl sarcosinate	INCROSOFT ULTRA E	Ditallow amidoamine DMS quat
CRODASINIC O	Oleoyl sarcosine	LANEXOL AWS	PPG (12) laneth-50
CRODASTAT 300	Proprietary	NOVOL	Oleyl alcohol
CRODATERIC CYNA 50	Sodium capryloamphopropionate	POLAWAX	Emulsifying wax NF
CRODATERIC TO	Proprietary amphoteric	PROCETYL AWS	PPG (5) ceteth-20
CRODAZOLINE O	Oleyl hydroxyethyl Imidazoline	SOLAN	PEG (60) lanolin
CROPOL S-4M	Sorbitan monooleate	VOLPO 10	PEG (10) oleyl ether
CROSULTAINE C-50	Cocamidopropyl hydroxysultaine	VOLPO 3	PEG (3) oleyl ether
GLYCEROX HE	PEG (7) glyceryl cocoate		

Non-Croda Ingredients Used In This Formulary

Ingredient	Chemical Identity	Supplier	Phone Number
2-Amino-2-methyl-1-propanol	2-Amino-2-methyl-1-propanol	Angus Chemical	800-648-6689
3-Methoxy-3-methyl-1-butanol	3-Methoxy-3-methyl-1-butanol	CBC Corp.	212-869-4860
Acintol FA-2	Tall oil fatty acid, 2% rosin	Arizona Chemical	800-526-5294
Arcosolv DPM	Dipropylene glycol monomethyl ether	Lyondell Chemical	800-321-7000
Arcosolv DPnP	Dipropylene glycol n-propyl ether	Lyondell Chemical	800-321-7000
Arcosolv PM	Propylene glycol monomethyl ether	Lyondell Chemical	800-321-7000
Arcosolv PnB	Propylene glycol n-butyl ether	Lyondell Chemical	800-321-7000
Arcosolv PnP	Propylene glycol n-propyl ether	Lyondell Chemical	800-321-7000
Arcosolv TPM	Tripropylene glycol monomethyl ether	Lyondell Chemical	800-321-7000
Butyl Carbitol	Diethylene glycol monobutyl ether	Dow Chemical	800-447-4369
Butyl Cellosolve	Ethylene glycol monobutyl ether	Dow Chemical	800-447-4369
Calcium carbonate, 50 micron	Calcium carbonate	Omya	800-749-6692
Calfoam ES-303	Sodium laureth-3 sulfate, 28%	Pilot Chemical	732-576-1900
Calfoam ES-703	Sodium laureth-3 sulfate, 28%	Pilot Chemical	732-576-1900
Calimulse PRS	Monoisopropylamine sulfonate	Pilot Chemical	732-576-1900
Calsoft L-40	Sodium dodecylbenzene sulfonate, 40%	Pilot Chemical	732-576-1900
Calsoft LAS99	Dodecylbenzene sulfonic acid	Pilot Chemical	732-576-1900
Carbopol 676	Polyacrylate polymer	Noveon Inc.	800-349-5389
Citric Acid	Citric acid	ADM	800-555-8411
Diala A	Deodorized Mineral Oil	Equilon Enterprises LLC	888-467-4355
d-Limonene	Orange Terpenes	Interstate Commodities	864-458-8962
Dowanol DB	Diethylene glycol monobutyl ether	Dow Chemical	800-447-4369
Dowanol EB	Ethylene glycol monobutyl ether	Dow Chemical	800-447-4369
Dowanol PM	Propylene glycol monomethyl ether	Dow Chemical	800-447-4369
Emery 871	Isostearic acid	Cognis	800-328-6199
Glycosperse S-20	PEG (20) Sorbitan monosterate	Lonza	201-316-9200
Grade 40 Silicate	Sodium silicate, 3.22:1	Oxy Chem	214-404-3800
Igepal CO-630	NP-9	Rhodia	800-922-2189
Isopar L	Isoparaffinic solvent	ExxonMobil	888-796-3584
Isopar M	Isoparaffinic solvent	ExxonMobil	888-796-3584
Kaopolite 1168	Kaolin clay	Kaopolite, Inc.	888-567-6548
Kaopolite SF	Kaolin clay	Kaopolite, Inc.	888-567-6548
Kathon CG	Isothiazolinone compounds	Rohm & Haas	215-592-3000
Lonzest SMO-20	PEG (20) Sorbitan monosterate	Lonza	201-316-9200
Mackamine C-8	Octyldimethylamine oxide, 40%	McIntyre	800-645-6457
Metezene, 99%	Proprietary compound	Pestco Inc.	412-252-5200
Metso Beads 2048	Sodium metasilicate, anhydrous	PQ Corp.	800-944-7411
Metso Pentabead 20	Sodium metasilicate, pentahydrate	PQ Corp.	800-944-7411
Naxionate 4AX	Ammonium xylene sulfonate, 40%	Rutgers Organics	800-458-3434
Nipacide PX-R	Parachlorometaxyleneol (PCMX)	Nipa	302-478-1522
Nuosept 101	Oxazolidine compound	ISP	800-283-4823
Pilot SXS-40	Sodium xylene sulfonate	Pilot Chemical	732-576-1900
Pine Oil 150	Pine Oil	Millennium Specialty Chemical	800-231-6728
Plurafac SLF-18	Proprietary nonionic surfactant	BASF	800-669-2273

Non-Croda Ingredients Used In This Formulary

Ingredient	Chemical Identity	Supplier	Phone Number
Rhodafac RS-610	Trideceth-6 Phosphate	Rhodia	800-922-2189
Rhodasurf BC-610	Trideceth-6	Rhodia	800-922-2189
Rhodasurf BC-630	Trideceth-7	Rhodia	800-922-2189
Rhodasurf BC-720	Trideceth-10	Rhodia	800-922-2189
Sandopan DTC Acid	Trideceth carboxylic acid	Clariant	704-395-6657
Sequestrene 30A	Tetrasodium EDTA	BASF	800-669-2273
SF 1202	Volatile silicone oil	GE Silicones	800-332-3390
SF 1706	Aminofunctional silicone fluid	GE Silicones	800-332-3390
SF 96, 350 cSt	Dimethicone oil	GE Silicones	800-332-3390
SF 96, 500 cSt	Dimethicone oil	GE Silicones	800-332-3390
SME-1300	Methyl Soyate	Seabrook Industries	352-621-3777
Tergitol NP9	Nonylphenol ethoxylate (9EO)	Dow Chemical	800-447-4369
Tinopol CBS-X	Distyryl biphenyl derivative	Ciba Specialty Chemicals	336-801-2237
Tinopal 5BM-GX	Stilbene type brightener	Ciba Specialty Chemicals	336-801-2237
Trilon A-92R	NTA trisodium salt	BASF	800-669-2273
Versene 100	Tetrasodium EDTA, 40%	Dow Chemical	800-447-4369
Versene Acid	EDTA	Dow Chemical	800-447-4369
Versene Diammonium	Diammonium EDTA, 45%	Dow Chemical	800-447-4369
Versenex 80	DETA pentaacetic acid	Dow Chemical	800-447-4369
Versenol 120	Trisodium HEDTA, 41%	Dow Chemical	800-447-4369
Viscasil, 10,000 cSt	Dimethicone oil	GE Silicones	800-332-3390
Westvaco L5	Tall oil fatty acid, 5% rosin	MeadWestvaco	843-740-2300

NON-BUTYL GENERAL PURPOSE CLEANER

Formulation HI-1312 is a general purpose product suitable for a variety of cleaning tasks. **CRODAFOS N-3E** is a moderate foaming surfactant that works synergistically with nonionics as an emulsifier, detergent and hydrotrope. The alkali stability of **CRODAFOS N-3E** makes it particularly well suited for use in heavy duty cleaning formulations. **CRODAFOS N-3E** also acts as a coupling agent for nonionic surfactants in formulations containing high levels of electrolyte.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	76
Caustic potash, 45%	—	2
Arcosolv DPM	Lyondell Chemical	10
CRODAFOS N-3E	Croda	3
Tergitol NP-9	Dow Chemical	3
Sodium metasilicate anhydrous	—	4
Versene 100	Dow Chemical	2

PROCEDURE

Add ingredients in the order listed, insuring each is fully dispersed before adding the next. Continue mixing until clear and uniform.

NON-BUTYL DEGREASER

Formulation HI-0387 is an alkaline degreaser suitable for unpainted surfaces, ferrous & soft metal and concrete surfaces. HI-0387 uses a combination of **INCROMINE OXIDE C**, and Rhodasurf BC-610 to quickly and easily emulsify oils without the use of hazardous solvents such as petroleum distillates or “butyl” solvents. This formulation can be used undiluted on heavy soils or it can be water diluted up to 40:1 for general purpose cleaning.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	93.0
Sodium Metasilicate, Anhydrous	—	1.0
Versene 100	Dow Chemical	2.0
Rhodasurf BC-630	Rhodia	2.0
INCROMINE OXIDE C	Croda	1.0
Rhodasurf BC-610	Rhodia	1.0

PROCEDURE

Add items in the order listed with agitation. Allow the ingredients to disperse completely before adding the subsequent item. The finished product will be a clear, low viscosity liquid.

NON-BUTYL DEGREASER II

HI-2101 is a moderate foaming, butyl-free all-purpose degreaser. The combination of a trio of surfactants: amine oxide, quaternary amine and ethoxylated nonionic provides a synergy that enables the system to readily emulsify soils without the use of glycol ether solvents. **INCROMINE OXIDE LF** is a low-foaming amine oxide, which provides detergency. **CRODAQUAT TES** is a moderate foaming cationic surfactant, which provides coupling and static reduction.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	87
Metsobeads 2048	PQ Corp.	4
INCROMINE OXIDE LF	Croda	4
Versonol 120	Dow Chemical	2
Rhodasurf BC-610	Rhodia	2
CRODAQUAT TES	Croda	1

Appearance:	Clear, colorless liquid
PH (as is):	13.0
PH(5% v/v):	11.7
Weight per Gallon:	8.6 lbs.
Cloud point (as is):	Clear to 90°C

PROCEDURE

Charge vessel with water and start agitation. Add Metsobeads and mix until dissolved. Add remaining ingredients and continue mixing until system is clear and uniform.

BUTYL CLEANER – NON-PHOSPHATE

Formulation HI-2022 is a glycol ether based, all-purpose hard surface cleaner. The formulation can be readily diluted to various strengths in order to serve a variety of cleaning tasks. **CRODASINIC LS-30** acts as a hydrotrope, a detergent, and mild corrosion inhibition.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	75.5
Metso beads 2048	PQ Corp.	4.0
Dowanol DB	Dow Chemical	10.0
Caustic Potash, 45%	—	2.0
CRODASINIC LS-30	Croda	3.5
Rhodasurf BC-630	Rhodia	3.0
Versene 100	Dow Chemical	2.0
Fragrance, dye	—	q.s.

Appearance:	Clear, colorless liquid
pH (as is):	13.5
pH (5% v/v):	12.5
Weight per Gallon:	8.67 lbs.

PROCEDURE

Charge vessel with ingredients in the order listed while agitating. Insure that each item is fully dissolved prior to adding the next. Continue mixing until clear and uniform.

d-LIMONENE BASED DEGREASER

A high concentration of d-Limonene gives formulation HI-0506 powerful degreasing properties as well as a pleasant citrus odor.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
d-Limonene	Interstate Commodities	20
Westvaco L5	MeadWestvaco	7
Dowanol EB	Dow Chemical	10
KOH, 45%	—	4
INCROMINE OXIDE M	Croda	5
Water	—	53
Versene 100	Dow Chemical	1

PROCEDURE

Add items with agitation to a mixing vessel in the order listed. Allow each ingredient to disperse completely before adding the next item. The finished formulation will be a clear, amber liquid with a pH of approximately 13.

d-LIMONENE BASED DEGREASER II

Formulation HI-1310 is a general purpose degreaser suitable for a variety of cleaning tasks. d-Limonene is an effective solvent especially for asphaltic soils. Odorless mineral spirits enhances the formulation's solvency while maintaining reasonable economics. Use of **INCROMIDE CA** and **CRODAFOS N-3E** allows efficient formation of a microemulsion without the introduction of heat.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
d-Limonene	Interstate Commodities	5
Odorless Mineral Spirits	—	5
2-Butoxyethanol	—	10
INCROMIDE CA	Croda	5
Monoethanolamine	—	2
CRODAFOS N-3E	Croda	3
Water	—	70

Appearance:	Clear, pale amber microemulsion
pH (as is):	10.2
Weight per Gallon:	8.1 lbs.

PROCEDURE

Add ingredients in the order listed, insuring each is fully dispersed before adding the next. Continue mixing until clear and uniform.

ALL PURPOSE CLEANER CONCENTRATE

Formula HI-1030 is a low odor all purpose cleaner concentrate. The combination of **INCROMINE OXIDE C** and **CRODASINIC LS-30** provides significant surface tension reduction allowing improved detergency and wetting.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	73.2
Potassium hydroxide, 45%	—	4.5
Phosphoric acid, 85%	—	1.3
Metso Pentabead 20	PQ Corp.	2.0
Versene 100	Dow Chemical	3.0
Arcosolv DPM	Lyondell Chemical	10.0
INCROMINE OXIDE C	Croda	3.0
CRODASINIC LS-30	Croda	1.0
Rhodasurf BC-610	Rhodia	2.0

PROCEDURE

Add items in the order listed, insuring each ingredient is fully dissolved prior to adding each subsequent item.

SOYATE SOLVENT DEGREASER

Formulation HI-2282 is an eco-friendly degreaser made entirely from vegetable-derived ingredients. This biodegradable cleaner has low VOC's, contains no ozone-depleting compounds and is non-flammable. It may be diluted with up to 100 parts water for light duty cleaning. When used neat, it is suitable for removing heavy soils such as grease, asphalt, inks, glues, etc. This makes it suitable for use in a wide range of cleaners such as engine degreasers, parts washers, adhesives removers, laundry pre-spotters, garage floor cleaners and more. **INCROMIDE CA** provides detergency, wetting, emulsification and foam in conjunction with the strong solvating properties of the methyl soyate.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
SME-1300	Seabrook Industries	92.5
INCROMIDE CA	Croda	7.5

Appearance:	Clear, pale yellow liquid
Odor:	Mild fatty odor
pH (10% v/v):	9.13
Specific Gravity:	7.42 lbs./gal.

PROCEDURE

Combine the two components with agitation. Continue mixing until the system is clear and uniform.

SPRAY & WIPE CLEANER

Formulation HI-1090 is a general purpose cleaner suitable for application on a variety of hard surfaces. This ready-to-use product quickly removes grease and oils from countertops, appliances and ceramic tiles. The synergistic combination of **INCROMINE OXIDE L** and **CRODASINIC LS-30** provides outstanding grease removal, fast wetting and significant surface tension reduction.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	89.5
Metso beads 2048	PQ Corp.	0.5
Isopropyl alcohol, 99%	—	5.0
Arcosolv PnB	Lyondell Chemical	3.0
CRODASINIC LS-30	Croda	0.8
INCROMINE OXIDE L	Croda	1.2
Fragrance, dye	—	q.s.

PROCEDURE

Add items in the order listed, insuring each ingredient is fully dispersed prior to adding each subsequent item.

LIQUID ABRASIVE CLEANSER – WITHOUT BLEACH

Formulation HI-2032 is a liquid abrasive cleanser that is capable of removing difficult residues without causing surface scratching. This non-scratching surface abrasion is accomplished with a fine-grit grade of calcium carbonate. The formulation utilizes **INCROMIDE CA**, as an effective detergent and emulsifier. In combination with the Carbopol 676, the **INCROMIDE CA** helps keep the abrasive particles well suspended in the emulsion.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	67.5
Carbopol 676	BF Goodrich	0.3
Caustic Soda, 50% liquid	—	q.s. to pH 11
INCROMIDE CA	Croda	2.0
Calcium carbonate, 50 micron	Omya	30.0
Fragrance, dye	—	q.s.

Appearance:	Opaque fluid
PH (as is):	11.0
Viscosity @ 25°C (RVT, No. 4, 20 rpm):	9,000 cps.
Weight per Gallon:	9 lbs.

PROCEDURE

Charge vessel with water and begin agitation. Disperse or screen Carbopol into water. Continue mixing until Carbopol is fully dispersed. Add caustic soda to pH target. Add remaining ingredients and mix until homogenous.

ECONOMY DISHWASHER RINSE AID

Formula HI-0406 is a liquid system designed to be used in the rinse aid dispenser of household dishwashers. **CRODASINIC LS-30** serves as a hydrotrope for the Plurafac. This effectively allows the Plurafac to kick out of solution and uniformly coat the dishes with a streak and spot free film.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	78.6
CRODASINIC LS-30	Croda	2.0
Plurafac SLF-18	BASF	19.4
Dye, preservative	—	q.s.

PROCEDURE

Add items to a mixing vessel in the order listed with agitation. Insure that each ingredient is fully dispersed prior to introducing the next item.

VEGETABLE OIL SOAP

Formula HI-0644 is a concentrated floor cleaner made from a vegetable derived soap. This product is ideal for cleaning wood cabinets and wood floors as well as non-wood surfaces. The potassium salt of **CRODASINIC C** lowers the Kraft point of the formulation and allows for high soap concentrations without product gelling. The combination of **INCROMINE OXIDE C** and **CRODASINIC C** works synergistically in providing superior surface tension reduction and improved hard surface cleaning.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	76.3
Caustic potash, 45%	—	7.5
CRODASINIC C	Croda	1.1
Westvaco L5	MeadWestvaco	11.0
Citric Acid	ADM	1.6
Caustic potash, 45%	—	q.s. to pH 10 - 11
INCROMINE OXIDE C	Croda	2.5

PROCEDURE

Add the first five items in the order listed with agitation. Allow each ingredient to disperse completely before adding the next item. Adjust product pH to 10-11 with caustic potash liquid. Add the **INCROMINE OXIDE C** with agitation and mix until uniform.

VEGETABLE OIL SOAP II

Formulation HI-0810 is a concentrated floor cleaner made from a vegetable derived soap. This product is ideal for cleaning wood cabinets and floors as well as non-wood surfaces. **CROSULTAINE C-50** provides lime soap dispersing properties which are helpful when the formulation is used in areas with hard water. **INCROMINE OXIDE C** provides added detergency for oily soils.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	76.3
Caustic potash, 45%	—	7.5
Westvaco COL-5	MeadWestvaco	14.0
Citric Acid	ADM	0.5
Caustic potash, 45% #2	—	q.s.
CROSULTAINE C-50	Croda	0.5
INCROMINE OXIDE C	Croda	1.5

PROCEDURE

Add the first 5 items in the order listed with agitation insuring each is fully dispersed before adding the next. Adjust product pH to 10 – 11 with second caustic potash charge prior to adding the **CROSULTAINE C-50** and **INCROMINE OXIDE C**.

GENERAL PURPOSE ANTISTATIC SPRAY

Formulation HI-1444 is designed to be used for reducing static charges on sensitive surfaces. By targeting only one function – static control, residue and moisture are minimized. This makes the formulation particularly useful for reducing static charge in the proximity of sensitive electronics. **CRODAQUAT TES** provides for effective charge dissipation while the IPA facilitates rapid water evaporation.

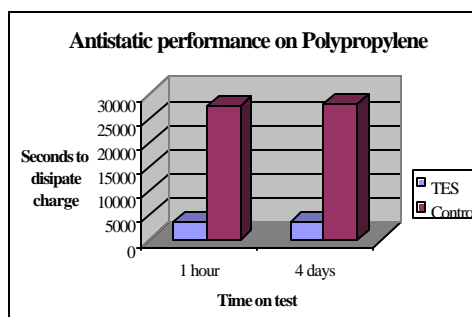
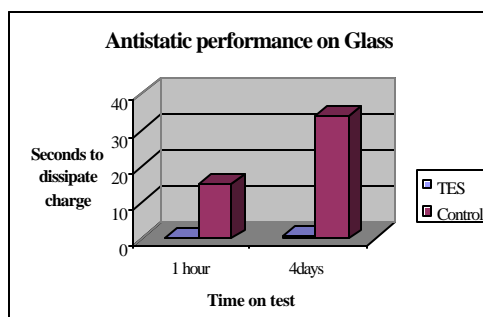
<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
CRODAQUAT TES	Croda	1
IPA	—	20
Water	—	79

PROCEDURE

Add ingredients in the order listed, insuring each is fully dispersed before adding the next.

PERFORMANCE

Formulation HI-1444 was compared with a control in which the **CRODAQUAT TES** was replaced by water. Each was applied to glass and polypropylene test tiles then equilibrated in a humidity controlled environment. A high voltage charge was then applied to the surface and the time necessary to dissipate the charge was recorded. The faster the dissipation, the better the static control. Formulation HI-1444 proved to be 71 times faster on glass and 8 times faster on polypropylene.



METHYL SOYATE MICRO-EMULSION

HI-2200 is a microemulsion based on methyl Soyate. This environmentally friendly, vegetable based methyl ester can be used to replace flammable solvents such as terpenes and petroleum distillates in a variety of cleaning formulations. Resulting formulations have a more pleasant odor profile as well. HI-2200 is suitable for use in applications such as parts, hard surface and hand cleaners. The combination of **INCROMIDE CA** and **INCROMINE OXIDE LF** provides effective detergency, emulsification and wetting of treated surfaces. Upon dilution with water, HI-2200 forms a stable, milky emulsion.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
INCROMIDE CA	Croda	30
SME-1300	Seabrook Ind.	35
Arcosolv PnB	Lyondell Chemical	5
INCROMINE OXIDE LF	Croda	3
Monoethanolamine	—	2
Soft Water	—	25

Appearance: Clear, pale yellow liquid
PH (as is): 10.9
PH(5% v/v): 9.9
Weight per Gallon: 7.9 lbs.
Cloud pt (as is): Clear to 50°C

PROCEDURE

Add items in the order listed while mixing. Continue agitation until clear and uniform.

SOAK TANK CLEANER

This formulation is well suited for use in the removal of grease and food-based soils. It is particularly effective when used in heated soak tanks aimed at removal of tenacious soils. **INCROMINE OXIDE LF** provides detergency without generating a persistent foam. **INCROMINE OXIDE LF** is readily soluble in highly built systems such as this one. This high solubility eliminates the need for use of hydrotropes.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	84
Metsobeads 2048	PQ Corp.	15
INCROMINE OXIDE LF	Croda	1

Appearance:	Clear, colorless liquid
PH (as is):	13.0
PH(5% v/v):	12.7
Weight per Gallon:	9.5 lbs.

PROCEDURE

Charge vessel with water and begin agitation. Add Metsobeads and mix until dissolved. Add **INCROMINE OXIDE LF**. Continue mixing until clear and uniform.

CITRUS DEGREASER WITH CRODAQUAT DGR

HI-2819 is a powerful multi-purpose detergent concentrate that's ideal for the cleaning of hard surfaces such as walls, floors and tile. This concentrate will form clear solutions upon dilution with water. **CRODAQUAT DGR** performs well as the only detergent or emulsifier in the formulation. **CRODAQUAT DGR** emulsifies and effectively removes grease, grime, oil, carbon and other soils from a variety of hard surfaces. The use of d-Limonene provides a refreshing citrus scent.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	51.0
CRODAQUAT DGR	Croda	29.0
Butyl Carbitol	Dow Chemical	6.0
d-Limonene	Interstate Commodities	10.0
Trilon A-92R	BASF	4.0
Dye, fragrance, preservative	—	q.s.

Appearance:	Clear, very pale yellow liquid
pH (as is):	9.5
Viscosity @ 25°C:	5 cps.
% Non-volatiles:	22.5
Wt./Gal.:	8.3 lbs.
Use dilutions:	¼ cup per gallon for general purpose cleaning

PROCEDURE

Charge items in the order listed while mixing. Continue mixing until clear and homogenous.

MULTI- SURFACE CLEANER

HI-2763 is designed as a formulation suitable for trigger-pack use in household and janitorial hard-surface applications. **CRODATERIC TO** is very effective at enabling the system to remove greasy and particulate soils from glass, tile, plastic laminates, enamel, vinyl, and other hard surfaces without leaving streaks or residues. **CRODATERIC TO**, a mild amphoteric surfactant, works well in combination with the solvent system to liberate and remove a variety of soils.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water	—	89.0
Arcosolv PnP	Lyondell Chemical	3.0
Isopropyl alcohol, 99%	—	7.0
Monoethanolamine	—	1.0
Crodateric TO	Croda	0.5
Dye, fragrance, preservative	—	qs

Appearance:	Clear, colorless liquid
pH (as is):	10.25
Viscosity @ 25°C:	Water thin
Wt./Gal.:	8.24 lbs.

PROCEDURE

Charge items in the order listed while mixing. Continue mixing until clear and homogenous.

MILKSTONE REMOVER

HI-2881 is a low-foaming, concentrated acid cleaner suitable for removing mineral deposits from steel surfaces – such as those found in food and dairy processing plants. **INCROMINE OXIDE LF** provides detergency and wetting with only a modest amount of very unstable foam.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	45
Phosphoric Acid, 75%	—	51
INCROMINE OXIDE LF	Croda	4

Appearance:	Clear, colorless liquid
pH (as is):	1.65
Cloud Point (as is):	> 50°C
% Non-volatiles:	40
Wt./Gal.:	10.2 lbs.

PROCEDURE

Charge items in the order listed while mixing. Continue mixing until clear and homogenous.

MILD DISWASHING LIQUID

Formulation HI-1070 is an effective yet mild manual dishwashing concentrate. **INCROMINE OXIDE C** provides thickening, mildness, foam boosting and enhanced detergency – particularly on oily soils.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	63.0-64.0
Calsoft L-40	Pilot Chemical	18.0
Calfoam ES-303	Pilot Chemical	12.0
INCROMIDE OXIDE C	Croda	5.0
Sodium chloride	—	1.0-2.0
Fragrance, dye, preservative	—	q.s.

Viscosity at 25°C: Approximately 520 cps.

PROCEDURE

Add ingredients in the order listed, insuring each is fully dispersed before adding the next.

ECONOMY DISHWASHING LIQUID

HI-1071 is an economical manual dishwash formulation that provides high sudsing and effective detergency. HI-1071 can also be used wherever light duty cleaning is required. **INCROMIDE CA** provides thickening, foam boosting and additional detergency.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	80.75
Caustic Soda, 50% liquid	—	2.75
Calsoft LAS99	Pilot Chemical	12.0
Triethanolamine	—	1.0
INCROMIDE CA	Croda	2.5
Sodium chloride	—	1.0
Fragrance, dye, preservative	—	q.s.

Appearance:	Clear, pale yellow liquid
pH (as is):	Approximately 7.5
Viscosity at 25°C:	Approximately 800 cps.
Active Matter:	16%

PROCEDURE

Add ingredients in the order listed, insuring that each is fully dispersed before adding the next.

PREMIUM DISH DETERGENT

Formulation HI-1319 is a premium dishwashing liquid that is also suitable for a number of other kitchen cleaning tasks. Unlike many high viscosity formulations, HI-1319 will readily disperse when added to water. The formula utilizes mild primary surfactants (ALS and SLES). The formulation mildness and foaming are further promoted by **INCROMIDE LR** and **INCROMIDE LR** and **INCROMIDE LR** thicken the formulation and provide foam boosting. **CRODASINIC LS-30** promotes lather while also retarding the defoaming tendencies of food oils.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	27.5
SDA-40	—	4.0
Ammonium lauryl sulfate, 28%	—	23.0
INCROMIDE LR	Croda	13.0
INCROMIDE LR	Croda	3.0
CRODASINIC LS-30	Croda	6.5
Sodium laureth-2 sulfate, 26%	—	23.0

Appearance: Clear, colorless liquid
 % Actives: 21
 pH (as is): 7.5
 Viscosity @ 20°C: 1600 cps.

PROCEDURE

Add ingredients in the order listed, insuring each is fully dispersed before adding the next.

AUTOMATIC DISH RINSE ADDITIVE

HI-2373 is a concentrated rinse agent for use in automatic dishwashers. The formulation serves to retard deposition of spots and films on ceramics, flatware and glassware. **CRODASINIC LS-30** provides wetting and promotes formulation stability without compromising rinsing performance. Unlike petroleum-based hydrotropes, **CRODASINIC LS-30** will not discolor the formulation nor will it impact it's odor.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	48
CRODASINIC LS-30	Croda	7
Polytergent SLF-18	BASF	45
Fragrance, dye, preservative	—	q.s.

Appearance:	Clear, colorless liquid
pH (as is):	6.5 – 7.0
Weight per Gallon:	8.6 lbs.
Cloud pt. (as is):	136 °F
Cloud pt. (1%w/w):	100°F

PROCEDURE

Charge vessel with water and begin agitation. Add remaining items in the order listed and continue mixing until solution is clear and uniform.

PREMIUM MANUAL DISHWASHING LIQUID

HI-2550 is an ultra concentrated dishwashing liquid designed for the retail market. This system uses **INCROMINE OXIDE C** to provide detergency, foaming and mildness in combination with other primary surfactants.

INCROMINE OXIDE C allows the formulation of this very high active yet affordable system without creating the excessive viscosity that would result if an alkanolamide was used.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	19.0
Calsoft L-40	Pilot Chemical	40.0
Pilot SXS-40	Pilot Chemical	5.0
INCROMINE OXIDE C	Croda	20.0
TEA, 99%	—	3.5
Magnesium sulfate, heptahydrate	—	1.0
Calfoam ES703	Pilot Chemical	12.0
Fragrance, dye, preservative	—	q.s.

Appearance: Clear, pale amber liquid
 pH (as is): 8.5
 Initial Brookfield Viscosity @ 25°C (RVT, No.2, 20 rpm): 390 cps
 % Non-Volatile: 41

PROCEDURE

Charge vessel with water. Add remaining items in the order listed, while mixing. Continue agitation until clear and uniform.

GLASS & HARD SURFACE CLEANER

Formulation HI-0629 provides formulators with a cost effective system for glass and hard surface cleaners. The combination of **CRODASINIC LS-30** and **INCROMINE OXIDE L** at low use levels allows for excellent wetting and soil removal while leaving a streak free surface. This low viscosity formulation can be readily sprayed from a trigger dispenser.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	91.5
IPA, 99.5%	—	4.0
Arcosolv PnB	Lyondell Chemical	2.0
CRODASINIC LS-30	Croda	0.25
INCROMINE OXIDE L	Croda	0.25
Ammonia, 28% soln	—	2.0
Fragrance, dye, preservative	—	q.s.

10X DILUTABLE GLASS CLEANER CONCENTRATE

Formulation HI-1190 is an institutional, liquid glass cleaner dilutable with up to 10 parts water. **CRODASINIC LS-30** enhances the wetting and cleaning performance of the formulation. It does so without leaving behind the smear or bloom, which is common when sodium lauryl ether sulfate or ethoxylated alcohols are used.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	33
Isopropyl alcohol, 99%	—	40
Arcosolv PnB	Lyondell Chemical	20
CRODASINIC LS-30	Croda	5
Aqua Ammonia, 28%	—	2
Fragrance, dye	—	q.s.

PROCEDURE

Add items in the order listed, insuring each ingredient is fully dispersed prior to adding the next.

DILUTABLE GLASS CLEANER WITH ANTISTAT

Formulation HI-1091 is an institutional liquid glass cleaner that is dilutable with up to 10 parts water. Use of **CRODASINIC LS-30** enhances the wetting and cleaning performance of the formulation without leaving behind the smearable deposit that is common when sodium lauryl ether sulfate or ethoxylated alcohols are used.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	33
Isopropyl alcohol, 99%	—	40
Arcosolv PnB	Lyondell Chemical	20
CRODASINIC LS-30	Croda	5
Aqua Ammonia, 28%	—	2
Fragrance, dye	—	q.s.

PROCEDURE

Add ingredients in the order listed, insuring each is fully dispersed before adding the next.

GLASS CLEANER WITH ENHANCED STATIC CONTROL

HI-2195 is an institutional, liquid glass cleaner that is dilutable with up to 10 parts water. This butyl-free formulation utilizes **CRODASINIC LS-30** which enhances the wetting and cleaning performance of the formulation without leaving the smearable deposit that is common when sodium lauryl ether sulfate or ethoxylated alcohols are used. **CRODASTAT 300** is a powerful proprietary cationic anti-static agent. It too, is non-streaking, and is compatible with anionic surfactants.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	31
Isopropyl alcohol, 99%	—	40
Arcosolv PnB	Lyondell Chemical	20
CRODASINIC LS-30	Croda	5
CRODASTAT 300	Croda	2
Aqua Ammonia, 28%	—	2
Fragrance, dye	—	q.s.

PROCEDURE

Add items in the order listed, insuring each ingredient is fully dispersed before adding the next.

GLASS CLEANER WITH VINEGAR

Formulation HI-1245 is a low odor glass cleaner supplemented with vinegar. The mild acidity of the vinegar helps solubilize alkaline soils – especially light mineral deposits from hard water. **INCRONAM 30** a mild high foaming surfactant stable in acidic products, provides wetting and detergency.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	92
SDA40	—	3
Arcosolv PM	Lyondell Chemical	3
Distilled White Vinegar	—	1
INCRONAM 30	Croda	1

The finished formulation is a crystal clear liquid with mild a vinegar odor. Formulation pH will be approximately 3.25.

PROCEDURE

Add items in the order listed while mixing until clear and uniform in appearance.

ANTI-FOG/ANTI-STATIC GLASS CLEANER

A butyl-free glass cleaner, HI-2593 utilizes **CRODASINIC LS-30** to enhance wetting and cleaning performance without leaving a smearable deposit. This non-streaking performance is vastly superior to that of systems which employ sodium lauryl ether sulfate or ethoxylated alcohol surfactant systems. **CRODAQUAT 1207** is a water-soluble cationic anti-static agent which is also non-streaking in use. The combination of **CRODAQUAT 1207** with **CRODASINIC LS-30** has an added benefit - providing an invisible film which resists fogging.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	90.7
Isopropyl alcohol, 99%	—	4.0
Arcosolv PM	Lyondell Chemical	4.0
CRODASINIC LS-30	Croda	1.0
CRODAQUAT 1207	Croda	0.3
Fragrance, dye	—	q.s.

Appearance:	Clear, colorless liquid
Odor:	Mild alcohol odor
PH (as is):	7.0
Specific Gravity:	8.2 lbs./gal.

PROCEDURE

Add items in the order listed with agitation. Insure that each ingredient is fully dispersed prior to adding the next. Continue mixing until clear and uniform.

ECONOMY GLASS CLEANER

HI-2647 demonstrates the ability of **CRODASINIC LS-30** to formulate a low cost glass cleaner while providing excellent cleaning performance and user aesthetics. Low use levels of **CRODASINIC LS-30** provide an appropriate level of foam and allows fast wetting and cleaning of treated glass while leaving a streak free surface.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	91.75
Isopropyl alcohol	—	4.0
Butyl Cellosolve	Dow Chemical	2.0
Aqua ammonia, 28%	—	2.0
CRODASINIC LS-30	Croda	0.25
Dye, fragrance, preservative	—	q.s.

Appearance:	Clear, colorless liquid
pH (as is):	11.0
Initial Brookfield Viscosity @ 25°C (RVT, No.1, 20 rpm):	Water thin
% Non Volatile:	0.1
Weight per Gallon:	8.15 lbs.

PROCEDURE

Charge vessel with water. Add balance of items in the order listed, while mixing.

LIME SCALE REMOVER

Suitable for use in trigger sprayers, formulation HI-1276 is an acidic cleaner designed for the quick removal of lime scale and other bathroom soils. The combination of sulfamic and glycolic acid readily dissolves hard water deposits such as magnesium and calcium carbonates. **INCRONAM 30** affords detergency, coupling and foaming.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	85.5
Sulfamic acid	—	4.0
Glycolic acid, 70%	—	4.0
INCRONAM 30	Croda	2.5
Arcosolv PnB	Lyondell Chemical	3.0
Rhodasurf BC-720	Rhodia	1.0
Fragrance, dye	—	q.s.

Appearance: Clear, colorless liquid

PROCEDURE

Add ingredients in the order listed, insuring that each is fully dispersed before adding the next.

NON-ACID TUB & TILE CLEANER

Formulation HI-0552 provides good tub and tile cleaning properties without the use of strong inorganic acids. **CROSULTAINE C-50** provides the formulation with good lime soap dispersal capabilities as well as foaming and wetting properties.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	73
Versene 100	Dow Chemical	25
Dowanol PM	Dow Chemical	1
CROSULTAINE C-50	Croda	1

PROCEDURE

Add each ingredient in the order listed with agitation. Allow the ingredients to disperse completely before adding the subsequent item.

TILE & GROUT CLEANER

Formulation HI-1354 is a mild acid cleaner formulated to remove mineral deposits and organic soils from grout and ceramic tile. **CRODAQUAT TES** acts as an effective, acid stable hydrotrope providing formulation stability at elevated temperatures.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	82.3
Sulfamic Acid	—	10.0
Citric Acid	—	5.0
Arcosolv PnP	Lyondell Chemical	2.0
Rhodasurf BC-630	Rhodia	0.5
CRODAQUAT TES	Croda	0.2
Fragrance, dye, etc.	—	q.s.

Appearance: Clear, colorless liquid
 Weight Per Gallon: 8.95 lbs.

PROCEDURE

Add ingredients in the order listed, insuring each is fully dispersed before adding the next.

READY TO USE PINE OIL CLEANER II

Formulation HI-0296 is a ready to use micro emulsion of Pine Oil. **INCROCAS 30** is utilized for its excellent emulsification properties.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft Water	—	93.7
Grade 40 Silicate	Oxy Chem	1.0
Isopropyl Alcohol	—	1.0
Pine Oil	—	1.0
INCROCAS 30	Croda	1.0
Acintol FA-2	Arizona Chemical	1.0
Isopropyl Alcohol	—	1.0
Aqua Ammonia, 28%	—	0.3

PROCEDURE

Add the first 3 items with agitation allowing each to disperse before adding the next item. In a separate vessel add the remaining items and mix until uniform. Add the contents of the second vessel to the first and mix until uniform. The finished product will be a clear, low viscosity liquid.

DILUTABLE PINE OIL CLEANER WITH INCROCAS 30

Formulation HI-0297 utilizes **INCROCAS 30** to improve on the pine oil emulsification capabilities of tall oil fatty acid. This micro emulsion provides for superior cold temperatures storage properties.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Pine Oil	Glidco	20
INCROCAS 30	Croda	1
Acintol FA-2	Arizona Chemical	6
Triethanolamine	—	3
Isopropyl Alcohol	—	6
Caustic Potash, 45%	—	3
Soft Water	—	61

PROCEDURE

Add the first 6 ingredients in the order listed allowing each to disperse completely before adding the next. Add the water and continue mixing until a clear and uniform emulsion is formed.

READY TO USE PINE OIL CLEANER

Formula HI-1035 is a non-streaking general purpose cleaner suitable for application from trigger spray systems. The combination of **INCROMINE OXIDE M**, **CRODASINIC LS-30** and TOFA soap readily micro-emulsifies pine oil into a dilute, ready-to-use formula.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	94.0
Westvaco L5	MeadWestvaco	0.5
INCROMINE OXIDE M	Croda	0.75
CRODASINIC LS-30	Croda	0.25
Pine Oil	—	0.5
Isopropyl alcohol, 99%	—	3.5
Aqua Ammonia, 28%	—	0.5

PROCEDURE

Charge water to vessel. In a separate vessel, blend remaining items in the order listed. Charge blend to water with agitation and mix until homogeneous.

BLOOMING PINE OIL EMULSION CONCENTRATE

HI-2592 employs an anionic/cationic emulsifier system to produce a concentrated pine oil microemulsion. Unlike most commercial pine oil cleaners, HI-2592 produces a pleasing bloom when diluted with water. **CRODASINIC LS-30** is a cationic compatible surfactant with excellent detergent and wetting properties. **CRODAQUAT 1207** functions as an auxiliary emulsifier for the terpenes present in pine oil. The system would be a good choice in bucket dilutable applications where the cleaning and scent provided by pine oil is desired.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Pine Oil 150	Millennium Specialty Chemical	15
CRODAQUAT 1207	Croda	7
Arcosolv PM	Lyondell Chemical	5
CRODASINIC LS-30	Croda	25
Soft water	—	47
Versenex 80	Dow Chemical	1

Appearance:	Clear, straw yellow liquid
pH (as is):	11.0
Brookfield Viscosity @ 25°C (RVT, No 1, 20 rpm):	40 cps.
% Non Volatile:	15.0
Suggested Dilution:	2 oz/gal for general purpose cleaning
Weight per Gallon:	8.4 lbs.

PROCEDURE

Add items in the order listed while mixing. Continue agitation until the emulsion is clear and uniform.

PINE OIL CLEANER WITH CRODAQUAT DGR

HI-2810 is a powerful multi-purpose detergent concentrate that's ideal for the cleaning of hard surfaces such as walls, floors and tile. This concentrated cleaner can be diluted at up to 64X with water. **CRODAQUAT DGR** performs well as the only detergent or emulsifier in the formulation. **CRODAQUAT DGR** emulsifies and effectively removes grease, grime, oil, carbon and other soils from a variety of hard surfaces. The use of pine oil provides a refreshing scent

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Glidco Pine Oil 150	Millennium	20.0
CRODAQUAT DGR	Croda	25.0
Isopropyl alcohol	—	5.0
Monoethanolamine	—	1.0
Water	—	49.0
Dye, fragrance, preservative	—	q.s.

Appearance: Clear, very pale yellow liquid
pH (as is): 10.8
Viscosity @ 25°C: 20 cps.
% Non-volatiles: 20.5
Wt./Gal.: 8.0 lbs.
Use dilutions: ¼ cup per gallon for general purpose cleaning

PROCEDURE

Charge items in the order listed while mixing. Continue mixing until clear and homogenous.

PET CAGE CLEANER & DEODORIZER

HI-2258 is a ready-to-use formulation suitable for cleaning and deodorizing pet cages. The formulation quickly counteracts malodors while imparting a pleasant citrus scent. **INCROMINE OXIDE LF** is a mild emulsifier and detergent that readily penetrates animal soils.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
d-Limonene	—	0.5
Isopropyl alcohol, 99%	—	5.0
Metazene, 99%	Pestco	0.1
LONZEST SMO-20	Lonza	1.0
INCROMINE OXIDE LF	Croda	1.0
Soft water	—	92.4
Fragrance, dye	—	q.s.

Appearance:	Clear, colorless liquid
Odor:	Mild citrus odor
PH (as is):	7.0
Specific Gravity:	8.2 lbs./gal.

PROCEDURE

Charge vessel with ingredients in the order listed while agitating. Insure that each ingredient is fully dispersed prior to adding the next. Continue mixing until clear and uniform.

ULTRA CONCENTRATED VEHICLE WASH

HI-2126 is an highly concentrated detergent suitable for use in touch-less cleaning of a variety of vehicle types. The amine oxide (**INCROMINE OXIDE LF**), and quaternary ammonium compound (**CRODAQUAT TES**) work synergistically to readily emulsify soils and eliminate the need for use of glycol ether solvents. **INCROMINE OXIDE LF** is a low-foaming amine oxide providing detergency. **CRODAQUAT TES** is a moderate foaming cationic surfactant that provides coupling and anti-static properties.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	60.5
Metsobeads 2048	PQ Corp.	4.0
Versenol 120	Dow Chemical	24.0
INCROMINE OXIDE LF	Croda	4.0
CRODAQUAT TES	Croda	4.0
Rhodasurf BC-630	Rhodia	2.5

Appearance:	Clear, colorless liquid
PH (as is):	13.2
PH(5% v/v):	12.5
Weight per Gallon:	9.2 lbs.
Cloud point (as is):	Clear to 55°C
Dilution Rate:	Up to 1:128

PROCEDURE

Charge vessel with water and begin agitation. Add Metsobeads and mix until dissolved. Add remaining ingredients in order while mixing. Continue to mix until clear and uniform.

VEHICLE WASH & WAX

Formula HI-1067 is a clear, viscous concentrate designed for use in maintaining vehicle exteriors. **INCROMIDE CA** provides a rich lather while the **CRODAZOLINE O** provides a streak free, water beading film on treated surfaces. HI-1067 is effective at dilutions as high as 300:1.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
CRODAZOLINE O	Croda	6.9
Isopropyl Alcohol	—	1.0
Glacial Acetic Acid	—	2.1
Water	—	65.0
INCROMIDE CA	Croda	25.0
Fragrance, dye, preservative	—	q.s.

PROCEDURE

Charge vessel with the first three items with agitation. Add water and heat mixture to 40°C with agitation until the **CRODAZOLINE O** is solubilized. Add remaining ingredients and mix until clear and uniform. Adjust pH to 7.

PREMIUM TRUCK WASH POWDER

Formulation HI-1691 is a premium cleaner concentrate suitable for use as a traffic film remover on commercial vehicles. **CRODAQUAT TES** is a powerful antistatic agent and hydrotrope that promotes the complete removal of stubborn road film without manual brushing.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Sodium Tripolyphosphate, anhydrous	—	42
Metso Pentabeads 20	PQ Corp.	20
Soda Ash, Light	—	29
CRODAQUAT TES	Croda	6
Rhodasurf BC-630	Rhodia	3

Appearance: White, free-flowing powder

Odor: Bland

pH (2% Solution): 12.2

PROCEDURE

Charge first 3 items into a ribbon blender. Add **CRODAQUAT TES** and Rhodasurf BC-630 while mixing. Continue blending until the powder is uniform and free-flowing.

USE DILUTION

Dissolve 1 – 2 lbs. of powder in 50 gallons water.

TRAFFIC FILM REMOVER

Formula HI-1037 is a clear concentrate for maintaining vehicle exteriors. HI-1037 will remove stubborn road film without requiring manual scrubbing when applied by a pressure washer. **CRODASINIC LS-30** gives the formulation a compact lather and promotes free rinsing. It also acts as a coupling agent for the nonionic surfactants used in concentrated liquid detergents such as this.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	88
Sodium tripolyphosphate, anhydrous	—	5
Metso Beads 2048	PQ Corp.	2
Caustic potash, 45%	—	1
CRODASINIC LS-30	Croda	2
Rhodasurf BC-720	Rhodia	2
Dye	—	q.s.

PROCEDURE

Charge vessel with water. Add the next 2 items and mix until dissolved. Add remaining ingredients and mix until clear and uniform.

WINDSHIELD WASHER FLUID (-25°C)

Formulation HI-1593 is a low cost/low temperature windshield washer fluid. When used at full strength, the formulation will resist freezing to -25°C. It is also suitable for summer use and may be diluted with equal parts water. **CRODASINIC LS-30** provides excellent wetting and detergency to help cut through tough road grime. Unlike many surfactants, it also promotes a streak-free appearance on treated glass.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft Water	—	69.8
CRODASINIC LS-30	Croda	1.0
Methyl Alcohol	—	29.2
Dye	—	q.s.

Appearance: Clear, colorless liquid
Weight per gallon: 7.96 lbs.

PROCEDURE

Add ingredients in the order listed while mixing.

TOUCHLESS VEHICLE WASH

Formulation HI-0763 is a phosphorous free traffic film remover intended for use on commercial vehicles such as buses and trucks. **CRODAQUAT TES** provides detergency and static control. This combined effect on vehicle surfaces promotes the complete removal of stubborn road film without necessitating manual brushing.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	82.75
Metso Pentabead 20	PQ Corp.	2.0
Versene 100	Dow Chemical	12.0
CRODAQUAT TES	Croda	2.0
Rhodasurf BC-630	Rhodia	1.25

PROCEDURE

Add each item in the order listed. Insure that each ingredient is fully dispersed prior to adding the next. Continue agitation until clear and uniform.

TOUCHLESS VEHICLE WASH II

HI-2613 is a high foaming automotive detergent concentrate suitable for use through the spray bars systems in automatic carwash tunnels. Cleaning efficiency is so effective that the use of brushes and chamois are not required – thus allowing “touchless” cleaning. **INCROMINE OXIDE C** provides the copious foam that customers want to see as well as fast wetting for superior detergency. **CRODAQUAT TES** provides the critical capability for removing the residual road film, which poses the most difficult challenge in touchless cleaning. It also significantly increases the cloud point of the formulation.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	72.75
Metsobeads 2048	PQ Corp.	4.0
Versene 100	Dow Chemical	12.0
Caustic potash, 45%	—	3.0
Igepal CO-630	Rhodia	2.0
CRODAQUAT TES	Croda	1.25
INCROMINE OXIDE C	Croda	5.0

Appearance: Clear, colorless liquid
 pH (5%w/w solution): 1 2.0
 Initial Brookfield Viscosity @ 25°C (RVT, No.2, 20 rpm): Water thin
 % Non Volatile: 15.0
 Weight per Gallon: 9.0 lbs.
 Cloud Point (as is): 74°C

PROCEDURE

Charge vessel with water. Add balance of items in the order listed, while mixing. Allow each ingredient to disperse completely before adding the next. Continue mixing until clear and uniform.

WHITEWALL TIRE CLEANER

Formulation HI-1088 displays the outstanding solubility of **CROSULTAINE C-50** high electrolyte solutions. **CROSULTAINE C-50** is a biodegradable sulfobetaine that produces a rich, stable foam over a wide pH range and is unaffected by water hardness. HI-1088 quickly removes brake dust and road grime from automobile tires - returning the whitewalls to their original white appearance.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	86.5
Metso Bead 2048	PQ Corp.	10.0
CROSULTAINE C-50	Croda	3.5

PROCEDURE

Add items in the order listed, insuring each ingredient is fully dispersed prior to adding the next.

NON-ACID ALL WHEEL CLEANER

Formula 2543 is a ready to use alkaline wheel cleaner formulation suitable for use on all wheel types. The combination of **CRODAQUAT 1207** and **INCROMINE OXIDE C** provides good wetting, detergency and emulsification for the soils contained in wheel grime. The antistatic properties afforded by **CRODAQUAT 1207** also assist in the removal of break dust and road film.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	90.5
Metsobeads 2048	PQ Corp.	2.0
Versene 100	Dow Chemical	1.0
2-Butoxyethanol	Various	4.0
CRODAQUAT 1207	Croda	0.5
INCROMINE OXIDE C	Croda	2.0
Fragrance, dye, preservative	—	q.s.

Appearance:	Clear, colorless liquid
pH (as is):	12.5
Initial Brookfield Viscosity @ 25°C (RVT, No.2, 20 rpm):	Water thin
% Non-Volatile:	3.5
Weight per Gallon:	8.4 lbs.
Freeze/thaw stability:	Passes 3 cycles

PROCEDURE

Charge vessel with water. Add balance of items in the order listed, while mixing until clear and uniform.

HIGH FOAMING TRUCK WASH

Formulation HI-1198 is a mildly alkaline vehicle wash suitable for use in automatic wash systems. The Calimulse PRS effectively emulsifies stack soot and diesel fuel soils. The **INCROMIDE CA** and **INCRONAM 30** generate a tight foam structure, which provides lubrication for the automatic brushes.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	84.0
Metso Pentabead 20	PQ Corp.	1.5
Potassium hydroxide, 45% liquid	—	0.5
Dowanol DB	Dow Chemical	4.0
Calimulse PRS	Pilot Chemical	4.0
INCROMIDE CA	Croda	3.0
INCRONAM 30	Croda	3.0

PROCEDURE

Add each item in the order listed. Insure that each ingredient is fully dispersed prior to adding the next. Continue agitation until clear and uniform.

Two-Step Vehicle Wash System

HI-2374 is a two-step, touchless vehicle wash system that utilizes an acidic pre-wash followed by an alkaline final wash. This moderate foaming system is consistent with the needs of a touchless system. Step 1 is an acid-based liquid that effectively removes oxides and brakes dust and mineral deposits. It is especially on chrome and glass. Step 2 is an alkaline detergent that neutralizes the residual acid from Step 1, as it penetrates and removes road film from painted surfaces. **CRODAQUAT 1207** functions in both acidic and alkaline systems to quickly wet surfaces, emulsify petroleum soils, and remove road film.

Step 1 – Acid Prewash

Ingredient	Supplier	<u>Weight Percent</u>
Water	—	19.0
Citric Acid, 50% solution	—	60.0
Phosphoric Acid, 85%	—	11.0
Sandopan DTC-Acid	Clariant	5.0
CRODAQUAT 1207	Croda	5.0
Dye	—	q.s.

Appearance:	Clear, pale yellow liquid
Specific Gravity:	9.9 lbs./gal.
Odor:	Mild odor
Viscosity @25oC:	Water thin
PH (as is):	2.0
Use Dilution:	0.5 – 1.0 fl. oz. / Gallon

PROCEDURE

Add items in the order listed, insuring each ingredient is fully dispersed prior to adding the next item. Continue mixing until clear and uniform.

Two-Step Vehicle Wash System (step 2)

Step 2 – Alkaline Wash

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water		64.5
Caustic Potash, 45%	Various	25.0
Versene Acid	Dow Chemical	4.0
Kasil #1	PQ Corp.	3.0
Crodaquat 1207	Croda	2.5
Sandopan DTC-Acid	Clariant	1.0
Dye		QS

Appearance:	Clear, pale yellow liquid
Specific Gravity:	9.3 lbs./gal.
Odor:	Mild odor
Viscosity @25oC:	Water thin
PH (10% v/v):	13.0
Use Dilution:	1.5 – 3.0 fl. oz. / Gallon

PROCEDURE

Add items in the order listed, insuring each ingredient is fully dispersed prior to adding the next item. Continue mixing until clear and uniform.

LOW ACTIVE AUTOMOTIVE RINSE & DRYING AGENT

Formula HI-2531 is system which allows for extremely high dilution levels at automatic car wash operations. The formula does not require the addition of "butyl" solvents or nonionic emulsifiers which typically interfere with the length of time at which treated vehicles dry. HI-2531 has excellent low temperature stability. Frozen product will reconstitute upon thawing without the need of agitation. Use of **Crodaquat LSR** provides superior emulsification - allowing the formulation to readily "plate out" on the surface giving rise to rapid sheating and decreasing drying time. While already low in solids, this system can be further diluted by the end user at up to 9:1 while continuing to obtain a clear and stable microemulsion.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	92.7
CRODAQUAT LSR *	Croda	4.0
Mineral Seal Oil	—	3.0
Glacial Acetic acid	—	0.3
Fragrance, dye, preservative	—	q.s.

Appearance: Clear, colorless liquid
 pH (as is): 5.0 – 6.5
 Initial Brookfield Viscosity @ 25°C (RVT, No.2, 20 rpm): Water thin
 % Activity: 7.0
 Weight per Gallon: 8.34 lbs.
 Freeze/thaw stability: Passes 3 cycles

PROCEDURE

Charge vessel with water and add the acetic acid. In a separate vessel, combine the **CRODAQUAT LSR** and Mineral Seal Oil. Slowly add the oil phase to the water while mixing. Add the other additives while continuing agitation until the system is clear and uniform.

* **CRODAQUAT LSR** is currently a developmental product.

TRAFFIC FILM REMOVER WITH CRODAQUAT DGR

HI-2847 is a concentrated, non-phosphate detergent designed for commercial vehicle cleaning. **CRODAQUAT DGR** is a multi-purpose surfactant system that rapidly wets treated surfaces and quickly removes paraffin-based soils such as engine oils and diesel fuel. **CRODAQUAT DGR** will also neutralize the static charge that makes traffic film so difficult to remove. This makes the **CRODAQUAT DGR** particularly well suited for the formulation of touchless cleaners.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	72.0
Sequestrene 30A Chelate	BASF	20.0
Metso Beads 2048	PQ Corp.	3.0
CRODAQUAT DGR	Croda	5.0

Appearance:	Clear, pale yellow liquid
pH (as is):	12.7
pH (5% v/v):	11.8
Cloud Point (as is):	> 50 °C
% Non-volatiles:	14
Wt./Gal.:	8.8 lbs.

PROCEDURE

Charge items in the order listed while mixing. Continue mixing until clear and homogenous.

NON-ACID WHEEL CLEANER II

HI-2871 is an acid free wheel cleaner that dissolves brake dust and dirt from wheel rims and tires. This non-chloride formulation contains **INCROMINE OXIDE C** to provide fast wetting and emulsification of oily soils. **CRODAQUAT TES** counteracts the static electrical forces that hold particulate soils in place.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	82.0
Sequestrene 30A Chelate	BASF	10.0
Metso beads 2048	PQ Corp.	0.5
CRODAQUAT TES	Croda	0.5
INCROMINE OXIDE C	Croda	2.0
2-Butoxyethanol	—	5.0

Appearance:	Clear, colorless liquid
pH (as is):	12.2
pH (5%v/v):	11.8
Cloud Point (as is):	> 60°C
% Non-volatiles:	5.6
Wt./Gal.:	8.5 lbs.

PROCEDURE

Charge items in the order listed while mixing. Continue mixing until clear and homogenous.

USE DIRECTIONS

It is important that one cleans a single wheel at a time. Hold a spray bottle about 6 inches from the wheel and spray an even coating on a cool, dry wheel. Allow the product to soak for 30 seconds. For extremely dirty wheels, light rubbing with a soft brush or a sponge may be needed. Thoroughly hose off the wheel. Immediately dry the wheel to avoid water spots.

CARPET CLEANER WITH SOLVENT

Formulation HI-0294 is suitable for use in aerosol or trigger spray systems. **INCROCAS 30** allows the formulation of a stable micro-emulsion of d-Limonene. This type of carpet cleaner is suitable for use on rugs, carpets and upholstery.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	88.25
Isopropyl Alcohol, 99%	—	5.5
Dowanol EB	Dow Chemical	4.0
d-Limonene	Interstate Commodities	0.5
INCROCAS 30	Croda	1.0
Sandopan DTC-Acid	Clariant	0.5
Ammonia, 28%	—	0.25

PROCEDURE

Add the first 3 items in the order listed with agitation. In a separate vessel add the remaining items in the order listed with agitation. Mix the contents of the second vessel into the first. The finished product will be a clear, low viscosity liquid.

HIGH TRAFFIC CARPET CLEANER

HI-1607 is a water-based degreaser, suitable for spot cleaning of heavily soiled carpets and rugs – particularly in high traffic lanes. The formulation uses **CRODATERIC TO**, a mild amphoteric, as the primary surfactant. **CRODATERIC TO** is particularly effective in removing oily soils and outperforms similar systems using other common surfactants. **CRODATERIC TO** works effectively with the solvent Arcosolv PnP to allow HI-1607 to outperform some commercial brands.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water	—	89.0
Arcosolv PnP	Lyondell Chemical	10.0
CRODATERIC TO	CRODA	1.0
Dye, fragrance, preservative	—	qs

Appearance: Clear, colorless liquid
 pH (as is): 7.0
 Wt./Gal.: 8.3 lbs.

PROCEDURE

Charge items in the order listed while mixing. Continue mixing until clear and homogenous.

METAL CLEANER/POLISH WITH ANTI-CORROSIVE

Formulation HI-0203 is an effective Metal Cleaner/Polish which will deposit a thin protective layer of oil on the metal's surface. **CRODAZOLINE O** provides significant anti-corrosive properties as well as emulsification. The protective film can be removed with a mild alkaline detergent.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft Water	—	89.85
Phosphoric Acid, 85%	—	0.15
Propylene Glycol	—	5.0
Nonylphenol Ethoxylate, 9EO	—	1.0
CRODAZOLINE O	Croda	1.5
Diala A	Equilon Enterprises LLC	2.5

PROCEDURE

Premix the last 3 ingredients in vessel 1. In a separate vessel 2, charge with water and add the acid and propylene glycol. Add the contents of vessel 1 to the water phase in vessel 2 with agitation. Mix until clear. The finished product will be a clear micro emulsion which exhibits good freeze/thaw and high temperature storage stability.

METAL POLISH LIQUID

Formula HI-1019 is intended as a general-purpose metal cleaning polish. The formulation displays the considerable emulsification and structure building properties afforded by **CRODACID B**. Metal polish emulsions prepared with **CRODACID B** are stiffer and have better storage stability than formulations prepared with stearic acid. The combination of **CRODACID B** and **CRODAFOS N-3E** provides excellent suspension of abrasives thus avoiding hard packing, which can sometimes occur in formulations of this type.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	81.8
Triethanolamine	—	1.0
CRODAFOS N-3E	Croda	0.2
CRODACID B	Croda	2.0
Isopar L	ExxonMobil	5.0
Kaopolite 1168	Kaopolite, Inc.	10.0
Fragrance, dye, preservative	—	q.s.

Viscosity at 25°C: 250 cps.

PROCEDURE

Add the TEA to water in vessel 1 and heat to 60 - 65°C. In a separate vessel 2, blend the next 3 items and heat with agitation to 60 - 65°C. Add the vessel 2 to vessel 1 with mixing. Continue mixing until the temperature is below 45°C. Add remaining items. Blend until smooth and the Kaopolite is uniformly dispersed.

ACIDIC RUST REMOVER

Formulation HI-1176 is intended for removing light corrosion from metal and demonstrates the outstanding solubility of **CROSULTAINE C-50** in high electrolyte solutions. **CROSULTAINE C-50** is a biodegradable sulfobetaine. **CROSULTAINE C-50** produces a rich, stable foam over a wide pH range and is unaffected by water hardness. This formula can be prepared readily at room temperature.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	55
CROSULTAINE C-50	Croda	15
Phosphoric acid, 85%	—	30

PROCEDURE

Add items in the order listed, insuring each ingredient is fully dispersed prior to adding the next.

EMULSIFIABLE COATING OIL WITH CORROSION INHIBITOR

Formulation HI-1134 demonstrates the versatility of **CRODAZOLINE O** in producing an emulsifiable oil concentrate. This coating oil is intended for use in inhibiting corrosion by forming an oily barrier film on metallic surfaces. **CRODAZOLINE O** allows the combination of an oil soluble base and water soluble acid to obtain the desired balance of solubility and emulsification. This emulsifiable concentrate is added to water at the time of use. Salts of **CRODAZOLINE O** provide corrosion inhibition on ferrous surfaces in addition to their powerful emulsification properties.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
CRODAZOLINE O	Croda	16.4
Mineral Seal Oil	—	75.0
Glacial Acetic Acid	—	1.5
Westvaco L5	MeadWestvaco	7.1

PROCEDURE

Add items in the order listed, insuring each ingredient is fully dispersed prior to adding the next. Agitate until clear.

FLUSHING OIL (MINERAL OIL EMULSION)

Formulation HI-1568 is a concentrated mineral oil emulsion that could be used commercially as a flushing oil. In addition to function in this application, HI-1568 demonstrates the powerful emulsifying properties of **CRODAFOS N-3E**. Typically the preparation of a mineral oil emulsion requires the use of several emulsifiers and heated mixing vessels. In contrast, emulsions prepared with **CRODAFOS N-3E** do not require any additional emulsifiers and can be prepared without the use of external heat.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	67
Triethanolamine	—	2
CRODAFOS N-3E	Croda	6
Mineral Oil, 70 SUS	—	25
Fragrance, dye, preservative	—	q.s.

Appearance: White emulsion
PH: (as is): 7.0
Weight per Gallon: 7.9lbs

PROCEDURE

Charge vessel 1 with water, add triethanolamine then mix thoroughly. In a separate vessel 2, blend the **CRODAFOS N-3E** with the mineral oil. Add the contents of vessel 2 to vessel 1 while mixing. Continue mixing until the emulsion is smooth and uniform. Add fragrance, dye, and preservatives if required.

THICKENED LAUNDRY BLEACH

Formula HI-0801 is a thickened, 5.5% chlorine laundry bleach. The enhanced viscosity minimizes splattering which sometimes occurs as the consumer dispenses laundry bleach. The combination of **INCROMINE OXIDE M** and **CRODASINIC LS-30** with potassium isostearate provides a stable viscosity without affecting chlorine stability.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	61.2
Caustic potash, 45%	—	0.5
Emery 871 (Isostearic acid)	Henkel	0.1
INCROMINE OXIDE M	Croda	1.2
CRODASINIC LS-30	Croda	0.3
Sodium hypochlorite, 15%	—	36.7

PROCEDURE

Add first 4 items in the order listed with agitation until clear and homogenous. Add hypochlorite and mix until uniform.

The viscosity of the finished formulation will be approximately 60 cps.

FINE FABRIC WASH II

Formulation HI-1069 is a high active fine fabric wash that produces good cleaning and a luxurious lather. The combination of **INCROMIDE CA** and **INCROMAM 30** provides mildness, foam boosting, thickening and added detergency to the base surfactant.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	83.8
Triethanolamine	—	3.4
Calsoft LAS99	Pilot Chemical	6.8
INCROMIDE CA	Croda	4.0
INCROMAM 30	Croda	2.0
Fragrance, dye, preservative	—	q.s.

PROCEDURE

Add ingredients in the order listed, insuring that each is fully dispersed before adding the next.

TEXTILE LUBRICANT

Formulation HI-0327 is a concentrated textile lubricant especially effective for use on synthetic fibers. **CRODAMOL SS** is a high melting ester wax with very low smoke properties. Although **CRODAMOL SS** is incorporated into this formula at a high concentration, the emulsion has a very low viscosity and outstanding cold temperature stability..

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
CRODAMOL SS	Croda	20.0
CRILL 6	Croda	2.37
Glycosperse S-20	Lonza	2.63
Stearic Acid	—	1.5
Sandopan DTC-Acid	Clariant	1.5
Soft Water #1	—	15.0
Triethanolamine	—	1.5
Soft Water #2	—	55.4
Nuosept 101	ISP	0.1

PROCEDURE

Add first 6 items and heat while mixing to 75° - 80°C. Add Triethanolamine while mixing. Turn off heat source and add second charge of water. Continue mixing. When emulsion temperature is 35° - 40°C, add Nuosept 101 and mix until uniform.

HOUSEHOLD FABRIC SOFTENERS

Formulations FS109 and FS111 are quick and easy systems for producing low cost fabric softeners. **INCROSOFT T-90 LM** requires little or no heat to make dispersions capable of remaining stable for long periods of time. When dosed at the recommended levels of 0.1% (dry fiber basis), softening and static control will be very good.

<u>Ingredient</u>	<u>FS109 Weight Percent</u>	<u>FS111 Weight Percent</u>
Water	96.7	92.3
INCROSOFT T-90 LM	3.3	7.7

PROCEDURE

Slowly add **INCROSOFT T-90 LM** to water under moderate agitation. Continue to mix for 30 minutes to obtain a consistent dispersion. Add dye, perfume, brightener and preservative then mix until uniform. A suitable preservative is recommended. Croda has found Giv-Gard DXN (Givaudan Corp.), Dowicil 75 (Dow Chemical), Ucarcide 250 (Dow Chemical) and formaldehyde to be acceptable preservatives in **INCROSOFT T-90 LM** dispersions.

WRINKLE REDUCING SPRAY

Formulation HI-1667 is an effective formulation suitable for reducing fabric wrinkles. Unlike other formulations based upon glycerine or fatty quaternaries, HI-1667 contains **INCROMECTANT AQ**, a short chain quaternary that will cause no fabric yellowing or rewet problems. **INCROMECTANT AQ** is a powerful antistatic agent that effectively removes static charges promoting wrinkle resistance. **INCROMECTANT AQ** is also three times more hygroscopic than glycerine thus allowing the fabric to remain hydrated and, therefore, less prone to wrinkling.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	89
ETHANOL, SDA-40	—	10
INCROMECTANT AQ	Croda	1
Fragrance, dye, preservative	—	q.s.

Appearance: Clear, colorless liquid
 pH (as is): 5.0
 Weight/Gallon: 8.1lbs.

PROCEDURE

Add items in the order listed with agitation insuring each ingredient is fully dispersed prior to adding the next.

USE DIRECTIONS

Test fabric for color fastness by first applying the product in an inconspicuous area. Apply undiluted product by a trigger spray to fabric until slightly damp. Smooth out wrinkles on treated area. Let dry at room temperature.

HIGH SOLIDS FABRIC SOFTENER

Formulations FS157 and FS159 give the formulator the means to produce consistent high solids fabric softener dispersions. **INCROSOFT ULTRA E** provides viscosity stabilities which are superior to other softener bases on the market. It also provides excellent softening and static control.

<u>FS157</u> <u>Ingredient</u>	<u>FS159</u>	<u>18% Solids</u>	<u>26% Solids</u>
Water		76.7	67.8
INCROSOFT ULTRA E		20.0	28.9
Calcium Chloride (25% Soln.)		2.4	2.4
HCl		To pH 3.5 - 4.0	To pH 3.5 - 4.0

PROCEDURE

- Harden water to 1250 ppm using calcium chloride and heat to 50°C.
- Heat **INCROSOFT ULTRA E** to 50°C.
- Slowly add about 2/3 of the **INCROSOFT ULTRA E**. Increase agitation to maintain a good vortex and mix for 10 minutes.
- Add 1/3 of the calcium chloride solution; reduce agitation while maintaining vortex and mix for 10 minutes.
- Add the remaining **INCROSOFT ULTRA E** and mix for 10 minutes.
- Add another 1/3 of the calcium chloride solution and mix for 10 minutes.
- Add fragrance and mix for 10 minutes.
- Add final 1/3 of the calcium chloride solution and mix 10 minutes.
- Add preservative.
- Adjust pH to 3.5 - 4.0 using HCl.
- Continue agitation for 30 minutes.

The **INCROSOFT ULTRA E** is maintained at 50°C during processing. Heat is removed from the water once mixing begins.

THICKENED RINSE FABRIC SOFTENER

Some retail fabric softener markets – especially outside of the US, call for dispersions that are quite viscous. This is particularly desirable in relatively low solids systems in order to give the consumer the idea that the product is highly concentrated. The formulation challenge is to make economically viable systems that will maintain a constant viscosity when subjected to high heat or freezing/thawing storage conditions. Formulation HI-1343 accomplishes this using the easy to formulate **INCROSOFT T-90LM** in conjunction with the polymeric thickener **INCROSOFT 7050**. Together, they produce a stable high viscosity system with enhanced opacity and creaminess.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft Water	—	88.8
INCROSOFT T-90LM	Croda	11.0
INCROSOFT 7050	Croda	0.2
Hydrochloric acid, 31%	—	q.s. to pH 4 – 5
Fragrance, preservative, dye	—	q.s.

Appearance: Opaque, white dispersion
 Weight Per Gallon: 8.25 lbs.
 Initial Viscosity @ 25°C (RVT, No.4, 20 rpm): 1100 cps.
 Final Viscosity @ 25°C (RVT, No. 4, 20 rpm): 1200 cps. (4 weeks at 50°C)

PROCEDURE

Charge vessel with water. Heat **INCROSOFT T-90LM** to 35°C. Add **INCROSOFT T-90LM** slowly to water while mixing. Add **INCROSOFT 7050** slowly while mixing. Continue mixing until dispersion is smooth and consistent. Add balance of ingredients and mix until uniform.

SOFTENER/SOUR WITH INCROSOFT ULTRA E

Commercial laundries generally need to apply an acid solution after the wash cycle in order to remove residual alkalinity left on garments by the detergent. This step normally occurs just prior to the softening cycle. For convenience and water conservation, the two steps can be combined to one. HI-2582 is just such a system. It can be challenging to formulate a softener/sour combination that has good long term stability (problem systems will show signs of dispersion splitting over time). **Incrosoft Ultra E** is not only the best softener choice for Ultra concentrated softeners but is also ideal for making stable softener/sours. This formulation uses glycolic acid, a more effective sour than other organic acids such as citric acid. It also rinses more freely than silicofluoride salts.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water, 25°C	—	78
Glycolic acid, 70%	—	15
Isopropyl alcohol	—	1
INCROSOFT ULTRA E	Croda	6
Fragrance, dye, preservative	—	q.s.

Appearance:	Opaque, white liquid
pH (as is):	1.9
Viscosity:	20 cps.
% Non Volatile:	15.9
Weight per Gallon:	8.4 lbs.

PROCEDURE

Charge vessel with water. Add acid and IPA then mix thoroughly. Warm Incrosoft Ultra E to 40° until fluid then add slowly while mixing. Continue agitation until uniform. Add dye, fragrance and preservative and mix until uniform.

DILUTABLE CONCENTRATE RINSE SOFTENER

HI-2709 is concentrated fabric softener formulation that is suitable for refill use. It is designed for an easy 1:1 water dilution by the consumer to prepare a concentrated (6%) softener. **INCROSOFT T90HF** is a non-yellowing, general-purpose softener base that is free of any flammable solvents. This softener base provides a soft handle, good static control, excellent dispersion stability and affordable economics.

Ingredient	Supplier	Weight Percent
Soft water, 45°C	—	85.2
CaCl ₂ , 25%	—	0.2
INCROSOFT T90HF	Croda	13.3
CaCl ₂ , 25%	—	1.3
Citric Acid, 50%	—	QS to pH 4 – 5
Dye, fragrance, preservative	—	QS
Appearance:		Opaque, white
fluid		
pH (as is):		4.1
Initial Brookfield Viscosity @ 25°C (RVT, No.1, 20 rpm):		20
cps.		
Brookfield Viscosity @ 25oC (RVT, No.1, 20 rpm) after 1 Freeze/Thaw:		50
cps.		
Brookfield Viscosity @ 25oC (RVT, No.1, 20 rpm) after 1 mo. @ 50oC:		40
cps.		
% Activity:		12
Weight per Gallon:		8.4
lbs.		

PROCEDURE

Charge vessel with water and heat to 45°C. Dissolve CaCl₂ into the water. Heat the **INCROSOFT T-90HF** to 45°C, then, slowly add it to the water while mixing. Continue agitation for 20 minutes until the softener base is fully dispersed. Adjust pH, add dye, preservative, fragrance and mix until uniform.

ANTI-STATIC LAUNDRY DETERGENT LIQUID

HI-2804 is an economical yet effective heavy duty laundry detergent designed for easy removal of typical soils while minimizing static cling. **CRODATERIC TO** acts synergistically with the Igepal CO-630 to enhance the formulation's cleaning performance on oil, particulate and grass stains. **CRODAQUAT TES**, a water-soluble cationic surfactant, imparts static control while acting as an anti-gelling agent and formulation stabilizer.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water	—	72.75
Triethanolamine	—	1.5
Igepal CO-630	Rhodia	15.0
CRODATERIC TO	Croda	10.0
CRODAQUAT TES	Croda	1.0
Tinopal 5BM-GX	Ciba Specialty Chemicals	0.25
Fragrance, dye, preservative	—	q.s.

Appearance:	Clear, very pale yellow liquid
pH (as is):	8.6
Viscosity @ 25°C:	160 cps.
% Non-volatiles:	20.5
Wt./Gal.:	8.5 lbs.
Use dilutions:	2 fl. oz./load

PROCEDURE

Charge items in the order listed while mixing. Continue mixing until clear and homogenous.

HIGH FOAMING STEAM CLEANER

Formulation HI-1178 displays the outstanding solubility of **CROSULTAINE C-50** in high electrolyte solutions. This formulation would be useful in pressure washing applications where the combinations of steam and foam facilitate removal of greasy substances. **CROSULTAINE C-50** produces a rich, stable foam over a wide pH range and is unaffected by water hardness. In addition to producing luxurious foam, **CROSULTAINE C-50** also acts as a coupler to hold the nonionic in the highly built system

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	52.7
Metso Pentabead 20	PQ Corp.	23.0
Caustic Potash, 45% liquid	—	10.0
CROSULTAINE C-50	Croda	12.5
Rhodasurf BC-720	Rhodia	1.8

PROCEDURE

Add items in the order listed, insuring each ingredient is fully dispersed prior to adding the next.

HEAVY DUTY CAUSTIC CLEANER

Formula HI-0760 is a concentrated caustic cleaner designed for heavy-duty industrial cleaning of ferrous and masonry surfaces. **CRODATERIC CyNa50** is readily soluble and stable even in such aggressive media. HI-0760 has outstanding cold temperature stability - remaining fluid down to 0°F.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	43
Metso Pentabead 20	PQ Corp.	20
Caustic potash, 45%	—	22
CRODATERIC CyNa50	Croda	15

PROCEDURE

Add metasilicate to water and mix until dissolved. Add remaining items in order listed and mix until clear and uniform.

SELF FOAMING CHLORINATED CLEANER

Formulation HI-1115 is a heavy-duty high foam cleaner intended for use in food processing plants. The surfactant combination provides a thick lather with small bubble structure that readily adheres to vertical surfaces when applied via foam generation devices. As the primary surfactant, **INCROMINE OXIDE L** provides thickening and detergency. **CRODASINIC LS-30** promotes a fine lather, imparts corrosion inhibition and provides overall stability to the formulation.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	56.0
Sodium Tripolyphosphate, anhydrous	—	2.5
Sodium lauryl sulfate, 28%	—	2.0
CRODASINIC LS-30	Croda	3.0
INCROMINE OXIDE L	Croda	4.0
Caustic Potash, 45%	—	12.5
Sodium hypochlorite, 15%	—	20.0

PROCEDURE

Add items in the order listed, insuring each ingredient is fully dissolved prior to adding the next.

LOW FOAMING CAUSTIC CLEANER

Formulation HI-0243 is a highly alkaline degreaser suitable for unpainted ferrous metal and concrete surfaces. HI-0243 is suitable for use in automatic floor scrubbers and steam cleaners. It is also effective as a deep fryer or garage floor cleaner. **CRODATERIC CyNa50** provides moderate corrosion inhibition and acts as a coupling agent.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	55.5
Caustic Potash, 45%	—	20.0
Sodium Gluconate	—	2.0
Sodium Silicate	—	20.0
CRODATERIC CyNa50	Croda	2.0
Rhodasurf BC-610	Rhodia	0.5

PROCEDURE

Add items in the order listed with agitation. Allow the ingredients to disperse completely before adding the subsequent item. The finished product will be a clear, low viscosity liquid.

VINYL SIDING CLEANER

Formulation HI-1279 is a pressure washer detergent that is effective in the removal of soot and light soils from vinyl siding. **PROCETYL AWS** is a unique alkoxyated surfactant that provides for the quick emulsification of oils. **CRODAQUAT TES** is a powerful anti-static agent that breaks the electrostatic bonds keeping soils in place on the siding.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	82
Metso Pentabeads 20	PQ Corp.	2
Versene 100	Dow Chemical	10
CRODAQUAT TES	Croda	1
PROCETYL AWS	Croda	2
Arcosolve DPnP	Lyondell Chemical	3
Fragrance, dye	—	q.s.

PROCEDURE

Add ingredients in the order listed, insuring that each is fully dispersed before adding the next.

HD PRESSURE WASHER DETERGENT WITH PHOSPHATE

Formulation HI-1281 is a concentrated pressure washer detergent based on tripotassium phosphate (TKP). By reacting caustic potash and phosphoric acid, in situ, a high phosphate loading can be achieved. **CRODASINIC LS-30** promotes good lather and provides corrosion inhibition. **CRODATERIC CyNa50** provides detergency and enhances formulation stability.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	42.1
Caustic potash, 45%	—	36.1
Phosphoric acid, 85%	—	10.9
Sodium gluconate	—	1.0
CRODATERIC CyNa50	Croda	1.4
CRODASINIC LS-30	Croda	4.25
Rhodafac RS-610	Rhodia	4.25

Appearance: Clear, straw yellow liquid
Viscosity @ 25°C: 100 cps

PROCEDURE

Charge vessel with water and caustic potash. Slowly add phosphoric acid while mixing. Monitor batch temperature to prevent boil over. Add remaining items in order listed while mixing. Continue mixing until clear and uniform.

HIGH FOAMING PRESSURE WASH WITH CRODAQUAT DGR

HI-2806 is a high foaming pressure wash detergent that is particularly well suited for use in automated vehicle wash systems. **CRODAQUAT DGR** is a surfactant system that provides spontaneous emulsification of oily soils and neutralizes static charge thus facilitating road film removal. This performance makes HI-2806 suitable for touchless as well as brush based vehicle washes. **CRODASINIC LS-30** is a high foaming anionic surfactant that provides a rich lather and additional detergency while conferring mild corrosion inhibition on ferrous surfaces.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft Water	—	38.0
Metsobeads 2048	PQ Corp.	2.0
Versenex 80	Dow Chemical	10.0
CRODAQUAT DGR	Croda	15.0
CRODASINIC LS-30	Croda	35.0
Fragrance, dye, preservative	—	q.s.

Appearance:	Clear, very pale yellow liquid
pH (as is):	12.95
Viscosity @ 25°C:	70cps.
% Non-volatiles:	26
Wt./Gal.:	8.8 lbs.

PROCEDURE

Charge items in the order listed while mixing. Continue mixing until clear and homogenous.

HIGH PRESSURE DEGREASER

HI-2772 is a concentrated butyl degreaser, suitable for cleaning of heavy equipment, fifth wheels, mining equipment, drag lines, soak tanks, tank trucks and rail cars. This moderate foaming degreaser works well (hot or cold) in both hard and soft water. The surfactant combination provides for quick penetration and emulsification of petroleum-based soils. **CRODATERIC TO** provides excellent detergency and compatibility with the high builder levels.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Soft water	—	74.0
Metsobeads 2048	PQ Corp.	2.0
Versene 100	Dow Chemical	4.0
Butyl Cellosolve	Dow Chemical	5.0
Butyl Carbitol	Dow Chemical	5.0
CRODATERIC TO	Croda	3.0
RHODASURF BC-610	Rhodia	4.0
PEG-2 cocoammonium methylchloride	—	3.0

Appearance:	Clear, pale yellow liquid
pH (as is):	12.6
pH (10%w/w):	11.8
Viscosity @ 25oC:	Water thin
Wt./Gal.:	8.6 lbs.
Use dilutions:	30:1 for heavy duty pressure washing 100:1 for light duty manual cleaning

PROCEDURE

Charge items in the order listed while mixing. Continue aggitation until clear and homogenous.

CLEAR RINGING GEL HAND CLEANER

Formulation HI-1616 is a hand cleaner in the form of a clear ringing gel. The combination of **VOLPO 3** and **5** with **CRODAFOS N-3E** produces an extremely stable system that won't de-fat skin when used. The product is free rinsing and leaves hands feeling smooth and moist.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Isopar M	ExxonMobil	13.0
VOLPO 3	Croda	4.0
VOLPO 5	Croda	3.0
CRODAFOS N-3E	Croda	7.0
Arcosolv DPM	Lyondell Chemical	3.5
Water	—	68.9
Monoethanolamine	—	0.6
Fragrance, dye, preservative	—	q.s.

Appearance: Clear, straw yellow gel
Viscosity @ 25°C (RVT, T-D, 10 rpm): 126,000 cps.

PROCEDURE

Blend the first 5 items in vessel 1 and heat while mixing to 85°C. In a separate vessel 2, blend the water with the MEA and heat to 85°C. Add the contents of vessel 2 to the contents of vessel 1 while mixing. Add fragrance, dye, and preservatives when emulsion temperature is below 45°C. Continue mixing until the emulsion is smooth and uniform.

ECONOMY HAND CLEANER

Formulation HI-1260 is a clear, high viscosity hand cleaner suitable for use in institutional liquid soap dispensers. The formulation quickly produces a rich lather that rinses easily and leaves hands with a smooth feeling. **INCROAM 30** provides foam boosting, thickening and mildness.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	73
Sodium Laureth-3 Sulfate, 28%	—	15
INCROAM 30	Croda	7
Salt	—	5
Fragrance, dye, preservative	—	q.s.

Viscosity at 20°C: Approximately 1,500 cps.

PROCEDURE

Add ingredients in order listed while mixing. Continue mixing until solution is clear and homogenous.

MEDICATED HAND CLEANER

Formulation HI-1303 is a mild, liquid hand cleaner containing the anti-microbial agent PCMX. **INCRONAM 30** provides lathering, thickening and irritation mitigation. **GLYCEROX HE** is an excellent solubilizer for the PCMX and also acts as a water-soluble emollient with a light, lubricious skin feel.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Water	—	57.5
Calfoam ES-3	Pilot Chemical	30.0
INCRONAM 30	Croda	7.5
Sodium chloride	—	1.0
Sodium hydroxide, 50% liquid	—	q.s. to pH 7
GLYCEROX HE	Croda	3.0
Nipacide PX-R	Nipa	1.0
Fragrance, dye	—	q.s.

Appearance: Clear, colorless liquid
 Viscosity at 25°C: Approximately 6,500 cps

PROCEDURE

Charge main vessel 1 with first five items then mix until clear and uniform. In a separate vessel 2, add the **GLYCEROX HE** and PCMX (Nipacide RX-R) then mix while heating to about 50°C until the PCMX is dissolved. Add the contents of vessel 2 to main vessel 1 while mixing. Continue agitation while adding fragrance and dye. Mix until clear and uniform.

HEAVY DUTY HAND CLEANER CREAM

Formulation HI-1615 produces a very stiff cream that is well suited for removing hydrocarbon-based soils from skin. **POLAWAX** is a highly efficient emulsifying wax, which facilitates the preparation of heavy-duty creams. **PHARMALAN** is added to enhance the skin moisturization and conditioning.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Isopar M	ExxonMobil	30
Lonzest SMS-20	Lonza	3
POLAWAX	Croda	10
PHARMALAN	Croda	5
Water	—	52
Fragrance, dye, preservative	—	q.s.

Appearance: Stiff white cream

PROCEDURE

In vessel 1 blend the first 4 items while mixing and heating to 85°C. In a separate vessel 2, heat water to 85°C. Add the oil phase to the water phase while mixing. Add fragrance, dye, and preservative when the emulsion temperature is below 45°C. Continue mixing until the emulsion is smooth and uniform.

CLEAR SILICONE RINGING GEL

Formulation HI-1267 demonstrates the powerful emulsifying properties of the phosphate ester, **CRODAFOS N-3E** and **VOLPO** oleyl alcohol ethoxylates. Unlike most silicone emulsions, HI-1267 provides the formulator with the means of producing a “ringing” silicone gel.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
CRODAFOS N-3E	Croda	6.5
Triethanolamine	—	0.5
Mineral Oil, 70 SUS	—	10.0
SF 1202	GE Silicones	10.0
VOLPO 3	Croda	7.0
VOLPO 5	Croda	4.0
Water	—	52.0
Propylene Glycol	—	10.0

Viscosity @ 20°C: 1,500 cps

PROCEDURE

Blend the first 6 ingredients and heat to 90°C in vessel 1. Charge the water and propylene glycol to a separate vessel 2 and heat to 90°C. Add oil phase in vessel 1 to water phase in vessel 2 with high shear agitation. Continue mixing until the temperature has dropped to a suitable packaging temperature.

SILICONE BARRIER CREAM

Formulation HI-1234 is a traditional barrier cream based upon dimethicone fluid. The cream provides a barrier to skin, which is occlusive to water and water-soluble compounds. **COSMOWAX J** is a complete emulsification package that provides outstanding formulation stability. **NOVOL** provides emolliency and promotes smooth product application. **SOLAN** is a water-soluble lanolin that acts as an emollient, super-fatting agent and emulsifier.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
COSMOWAX J	Croda	10
NOVOL	Croda	4
SOLAN	Croda	3
Mineral Oil, 70 SUS	—	15
Dimethicone fluid, 500 cSt.	—	5
Water, fragrance, preservative	—	63

Viscosity @ 20°C: 83,000 cps.

PROCEDURE

Charge water into vessel 1 and heat to 60° - 65°C. In a separate vessel 2, add remaining ingredients. Heat to 60° - 65°C while mixing. Add the oil phase in vessel 2 to water phase while mixing. Continue mixing without applying additional heat. Add preservatives. When emulsion temperature is below 40°C add fragrance. Mix until smooth and uniform.

WATERLESS HAND CLEANER

HI-2715 is a ringing gel, waterless hand cleaner suitable for industrial, institutional and retail markets. The formulation is free of odor, pumice, and harsh solvents yet easily removes grease and grime from hands without the use of water. Simply apply the product and wipe it off with a towel. Skin is left clean, soft and non-irritated. The combination of **CRODAFOS N3E** with **VOLPO 3** and **VOLPO 5** forms an effective emulsifier package that produces a consistent gel structure for a product that's stable, cleans well, and leaves skin undamaged.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Isopar L	ExxonMobil	38.00
Arcosolv TPM	Lyondell Chemical	3.50
VOLPO 3	Croda	4.00
VOLPO 5	Croda	3.00
CRODAFOS N3E	Croda	7.00
Water	—	43.85
Monoethanolamine	—	0.65
Dye, fragrance, preservative	—	q,s,

Appearance: Cloudy, colorless, ringing gel
 pH (as is): 4.5 – 6.0
 Brookfield Viscosity @ 25°C (RVT, T-D, 10 rpm): 112,000 cps.

PROCEDURE

Charge Vessel 1 with the first 5 items and heat to 85°C. In a separate Vessel 2, add the water and Monoethanolamine while heating to 85 – 90°C. Slowly add the water phase to oil phase while mixing. Continue agitation until the emulsion is smooth and uniform as the temperature drops to 40 – 45°C. At this point dye, fragrance and preservatives can be added.

ORANGE OIL WATERLESS HAND CLEANER

HI-2746 is a ringing gel type waterless hand cleaner suitable for industrial, institutional and retail markets. This odorless formulation will easily dissolve grease and grime from hands without the use of water. It also avoids the need to incorporate pumice or other harsh chemicals while still providing excellent cleaning. Simply apply to the hands and wipe off with a towel. Hands are left clean and feeling pleasant. The combination off **VOLPO 3**, **VOLPO 5** and **CRODAFOS N3E** acts as a mild, yet effective emulsifier system that produces a very stable gel structure thus providing good shelf life.

<u>Ingredient</u>	<u>Supplier</u>	<u>Weight Percent</u>
Odorless Mineral Spirits	—	10.0
White Mineral Oil, 70 SUS	—	24.0
d-Limonene, technical grade	Interstate Commodities	5.0
VOLPO 3	Croda	4.0
VOLPO 5	Croda	3.0
CRODAFOS N3E	Croda	7.0
Arcosolv TPM	Lyondell Chemical	3.0
Soft Water	—	43.2
Monoethanolamine	—	0.8
Preservatives	—	QS

Appearance: Cloudy, colorless, ringing gel
 pH (as is): 5.0 – 7.0
 Brookfield Viscosity @ 25°C (RVT, T-D, 10 rpm): 112,000 cps.

PROCEDURE

Charge vessel 1 with the first 7 ingredients and heat to 65°C. In a separate vessel, add the water and monoethanolamine then heat to 65-70°C. Slowly add water phase to oil phase with agitation. Mix until smooth and uniform. Allow the emulsion to cool to 40-45°C prior to adding fragrance or preservatives.