



Extran<sup>®</sup>  
cleaning  
applications

Extran®-cleaning applications

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# Extran®

Good clean science can only happen if laboratory and production facilities are cleaned properly. Everything that comes in contact with chemicals or biologicals needs to be free from contaminants before and after you use in order to eliminate interferences and to protect yourself, your colleagues, and the environment.

No matter what it is you need to clean or what contaminants you need to get rid of, Merck KGaA has an Extran® detergent that will work for you.

Extran® laboratory cleansers have some unique advantages:

- Extran® cleans reliably and prevents carry-over of residues to the next analysis.
- Extran® has no inhibitory effect on enzyme tests e.g.  $\alpha$ -Amylase, LDH, HBDH, GOT or acid phosphatase.
- Extran® is chlorine-free – there is neither chlorine odour nor a health hazard.
- Extran® is extremely economical to use.
- Extran® avoids, in practically all cases, having to use chromosulphuric acid that has subsequently to be disposed of.
- Extran® fulfils all requirements with respect to biodegradability and phosphate content. The German ministry of the environment has approved the formulation.

For further information, safety data sheets and our certificates of analysis please see our Internet site at

[www.chemdat.info](http://www.chemdat.info)

# Manual detergents

## Procedure for use

The Extran® MA types for manual cleaning procedures are concentrates for universal use in the preparation of aqueous cleansing baths for the reliable and complete removal of residues.

- Tap water should be used to prepare solutions. Should the water hardener tend to precipitate, additional Extran® should be added. The use of demineralised water enhances the cleaning effect.
- Simply immerse the objects to be cleaned completely in the solution.
- On removal, first rinse with tap water and then with distilled water.
- The baths can be used repeatedly over a period of time without having to be renewed; accumulated dissolved contamination, however, will cause the solution to lose its cleaning power.
- If necessary, fresh Extran® can be added.
- The entire procedure takes less than two hours.
- In problematic cases involving e.g. plaster, blood or heavy oil, simply allow the objects to soak a little longer.
- Warming the solution accelerates the cleaning process.
- Extran® can also be used in conjunction with ultrasonic cleaning.

## Extran® MA 01, liquid, alkaline

### Ingredients

Anionic and non-ionic surfactants, phosphates, low concentrations of excipients

### Applications

This multipurpose liquid concentrate is an excellent cleaning agent for big jobs such as lab benches, tiles and floors and for removing heavy deposits as well as laboratory apparatus cleaning baths. It enhances the cleaning power of ultrasonic baths. Extran® MA 01 is not suitable for alkali-sensitive materials such as aluminium.

### Features

- liquid
- alkaline
- chlorine free

### Recommended concentrations

Optimal concentration is dependent on water hardness and the extent of contamination. The following recommendations are given:

- Normal contamination: 2%
- Heavy contamination: 5%
- Very stubborn contamination: up to 20%

### The pH should be:

- 2% solution: pH = 11.6
- 5% solution: pH = 12.0

### Ordering information

Extran® MA 01, liquid alkaline	Quantity	Packaging	Cat. No.
	2.5 l	PE bottle	1.07555.2500
	10 l	PE canister	1.07555.9010
	25 l	PE canister	1.07555.9025

## Extran® MA 02, liquid, neutral

### Ingredients

Anionic and non-ionic surfactants, phosphates and low concentrations of excipients

### Applications

This neutral liquid concentrate is the detergent of choice for cleaning alkali sensitive materials such as aluminium, zinc or alloys. Extran® MA 02 is also safe to use on precision instruments made of glass and quartz. Burettes, pipettes and even photometric cells can be immersed in a solution of MA 02 for a gentle but thorough cleaning. Or, use MA 02 Detergent in your ultrasonic bath for those heavily soiled but delicate items.

### Features

- liquid
- neutral
- chlorine free

### Recommended concentrations

Optimal concentration is dependent on water hardness and the extent of contamination. The following recommendations are given:

- Normal contamination: 2%
- Heavy contamination: 5%

### The pH should be:

- 5% solution: pH = 7.5

### Ordering information

Extran® MA 02, liquid, neutral	Quantity	Packaging	Cat. No.
	2.5 l	PE bottle	1.07553.2500
	10 l	PE canister	1.07553.9010
	25 l	PE canister	1.07553.9025

## Extran® MA 03, liquid, alkaline, phosphate free

### Ingredients

Anionic and non-ionic surfactants and alkaline additives

### Applications

This alkaline liquid concentrate is a universal cleaning agent for heavily contaminated items including glass, quartz, porcelain, nonferrous metals and rubber. The phosphate-free formula of Extran® MA 03 is perfectly suited for cleaning apparatus specifically used for the micro determination of phosphate based compounds. Extran® MA 03 is not suitable for alkali-sensitive materials such as aluminium.

### Features

- liquid
- alkaline
- phosphate free
- chlorine free

### Recommended concentrations

Optimal concentration is dependent on water hardness and the extent of contamination.

The following recommendations are given:

- Normal contamination: 2 %
- Heavy contamination: 5 %
- Very stubborn contamination: up to 20 %

### The pH should be:

- 2 % solution: pH = 11.6
- 5 % solution: pH = 12.0

### Ordering information

Extran® MA 03 liquid, alkaline, phosphate free	Quantity	Packaging	Cat. No.
	2.5 l	PE bottle	1.07550.2500
	10 l	PE canister	1.07550.9010
	25 l	PE canister	1.07550.9025

## Sodium hydroxide solution

### Ingredient

Sodium hydroxide

### Applications

Basic cleansing agent in various concentrations (10 %, 32 % and 49–51 %) in the well-known Merck quality. These high purity solutions – which are free of surfactants or complexing agents – are especially suited for cleaning applications where residues have to be prevented. Utilizing these ready-to-use solutions the time consuming and potentially dangerous job of dissolving sodium hydroxide pellets can be avoided.

### Features

- liquid
- highly alkaline
- chlorine free

### Ordering information

Sodium hydroxide solution min. 10 % (1,11)	Quantity	Packaging	Cat. No.
	1 l	PE-bottle	1.05588.1000
	10 l	PE-canister	1.05588.9010
Sodium hydroxide solution extra pure approx. 32 % (1,35)	Quantity	Packaging	Cat. No.
	2,5 l	PE-bottle	1.05587.2500
	25 l	PE-canister	1.05587.9025
	200 l	PE-drum	1.05587.9200
Sodium hydroxide solution 50 %	Quantity	Packaging	Cat. No.
	1 l	PE-bottle	1.58793.1000
	25 l	PE-canister	1.58793.9025

## Decalcification solution, Base: citric acid approx. 19 %

### Ingredients

Citric acid, other organic acids in small amounts

### Applications

Instead of aggressive inorganic acids this decalcification solution can be used for sensitive materials. It is especially suited for the gentle decalcification of water taps, boilers, containers or pipe work. This decalcification solution is produced from pharmaceutical-compliant starting materials.

### Recommended concentrations

Optimal concentration is dependent on water hardness and the extent of contamination.

The following recommendations are given:

- Normal contamination: 1 %
- Heavy contamination: 5 %

Please do not use with corrosive materials.

### Ordering information

Decalcification solution base: citric acid approx. 19%	Quantity	Packaging	Cat. No.
	1 l	PE-bottle	1.00240.1000

# Chromosulphuric acid

## General information

When working with really stubborn residues, e.g. carcinogenic residues, chromosulphuric acid can be most useful; the carcinogenic residues can be rendered harmless by reaction with the acid. The reaction is based on chromium (VI) oxide  $\text{CrO}_3$ , a powerful oxidising agent. During the reaction, the red-brown chromium (VI) oxide is reduced to the trivalent chromium. The degree of reduction can hence be assessed by the colour change: fresh chromosulphuric acid is red-brown; upon reaction, it changes to green.

## The following must be observed when using chromosulphuric acid:

Greatest care must be taken when using the acid due to its highly caustic and oxidising nature and the possibility of the formation of toxic chromium (VI) vapour. Due to the strong exothermic reaction involved, water must never be added to the acid (acid splashes can be dangerous). Should the acid have to be diluted; adding the acid carefully to the water whilst stirring should carry this out. If chlorides are present

in the residues processed, the extremely toxic chromium (VI) oxide chloride (chromyl chloride) forms.

Hence, chromosulphuric acid should be used exclusively under a well-functioning fume cupboard. In addition, protective clothing, non-permeable gloves and safety goggles should be worn.

If any part of the body comes in contact with the acid, wipe off with a dry cloth and then wash using copious amounts of water. Contaminated clothing should be discarded immediately and destroyed. Information on the safe use of the product is printed on the package label.

## Ordering information

Chromosulphuric acid	Quantity	Packaging	Cat. No.
	1 l	Glass bottle	1.02499.1000
	2.5 l	Glass bottle	1.02499.2500
	22 l	Glass/EPS	1.02499.9022



# Cleansing of apparatus

The various Extran® types have been specially developed in close cooperation with leading instrument manufacturers as to their suitability for use in laboratory washing machines. They have been extensively tested to demonstrate their cleaning effectiveness and universal applicability. One of the most important criteria was a very low degree of foam formation. In addition, the excellent water solubility of all the components used prevents residues from remaining on the instruments.

In order to neutralise possible alkaline residues and to remove all traces of alkali, an acid rinse should be carried out subsequent to the main cleaning step. We recommend the use of Extran® AP 21, containing phosphoric acid or Extran® AP 22, containing citric acid, for this purpose.

## Extran® AP 12, powder, alkaline

### Ingredients

Phosphates, sodium hydroxide, alkaline salts

### Applications

This alkaline powder detergent is a powerful cleaning agent formulated to remove all types of heavy contamination from laboratory glassware and equipment. AP 12 contains the right ratio of phosphates and alkali to attack stubborn dried on or burnt on residue and easily removes starch and protein based contaminants. Extran® AP 12 can be used in under-the-counter lab dishwashers, as well as large, industrial, automated washers. This detergent will not foam even with violent agitation and is free from organic wetting agents. It does contain complexing agents so that it can be used in conjunction with both hard and soft water.

### Features

- powder
- alkaline
- surfactant free

### Recommended concentrations

Optimal concentration depends on the hardness of the water used and on the degree of contamination of the objects to be cleaned. Under normal use a concentration of 0.2–0.4%, i.e. 20–40 g Extran® AP 12 per 10 l of water.

The pH of a 0.3% solution should be 12.3.

### Ordering information

Extran® AP 12 powder, alkaline	Quantity	Packaging	Cat. No.
	2 kg	PE bottle	1.07563.2000
	10 kg	PE drum	1.07563.9010
	25 kg	PE drum	1.07563.9025

## Extran® AP 15, liquid, alkaline

### Ingredients

Complexing agents, sodium hydroxide solution

### Applications

This phosphate-free liquid detergent is a powerful cleaning agent formulated to remove all types of heavy contamination from laboratory glassware and equipment. Extran® AP 15 can be used in under-the-counter lab dishwashers as well as large, industrial, automated washers with liquid dosing systems. This detergent will not foam, even with violent agitation, and works especially well with protein starch residues.

AP 15 Detergent contains complexing agents in a sodium hydroxide solution that attack stubborn dried on or burnt on residue and easily removes starch and protein based contaminants.

### Features

- liquid
- alkaline
- surfactant free
- chlorine free

### Recommended concentrations

Optimal concentration depends on the hardness of the water used and on the degree of contamination of the objects to be cleaned. Under normal conditions use a concentration of 0.3–0.5%, i.e. 30–50 g Extran® AP 15 per 10 l of water.

The pH of a 0.3% solution should be 12.2.

### Ordering information

Extran® AP 15 liquid, alkaline	Quantity	Packaging	Cat. No.
	2.5 l	PE bottle	1.07575.2500
	10 l	PE canister	1.07575.9010
	25 l	PE canister	1.07575.9025

## Extran® AP 11, powder, mild alkaline

### Ingredients

Phosphates, alkaline salts



### Applications

This mildly alkaline powder detergent is suitable for everyday cleaning of laboratory glassware and equipment. Extran® AP 11 can be used in under-the-counter lab dishwashers, as well as large, industrial, automated washers. It also contains an anti-corrosive agent that protects your porcelain and glassware.

### Features

- powder
- mildly alkaline
- surfactant free
- chlorine free
- contains an anti-corrosion agent

### Recommended concentrations

Optimal concentration depends on the hardness of the water used and on the degree of contamination of the objects to be cleaned. Under normal use a concentration of 0.2–0.4%, i.e. 20–40 g Extran® AP 11 per 10 l of water.

The pH of a 0.3% solution should be 11.3.

### Ordering information

Extran® AP 11 powder, mild alkaline	Quantity	Packaging	Cat. No.
	2 kg	PE bottle	1.07558.2000
	10 kg	PE drum	1.07558.9010
	25 kg	PE drum	1.07558.9025

## Extran® AP 14, liquid, mild alkaline

### Ingredients

Complexing agents, alkaline salts

### Applications

This mildly alkaline phosphate-free detergent is suitable for everyday cleaning of laboratory glassware and equipment. Extran® AP 14 can be used in under-the-counter lab dishwashers, as well as large, industrial automated washers with liquid dosing systems.

### Features

- liquid
- mildly alkaline
- phosphate free
- surfactant free
- chlorine free

### Recommended concentrations

Optimal dosing depends on the hardness of the water used and on the degree of contamination of the objects to be cleaned. Under normal use a concentration of 0.3–0.5%, i.e. 30–50 g Extran® AP 14 per 10 l of water.

The pH of this type of solution should be 11.2.

### Ordering information

Extran® AP 14 liquid, mildly alkaline	Quantity	Packaging	Cat. No.
	2.5 l	PE bottle	1.07573.2500
	10 l	PE canister	1.07573.9010
	25 l	PE canister	1.07573.9025

## Extran® AP 13, powder, alkaline, with detergents

### Ingredients

Non-ionic surfactants, phosphates, sodium hydroxide, alkaline salts

### Applications

This alkaline powder detergent is a powerful cleaning agent formulated to remove all types of heavy contamination from laboratory glassware and equipment. Extran® AP 13 is particularly effective with fat-based deposits; however, can also be used with other organic and inorganic residues. It can be used in under-the-counter lab dishwashers, as well as large, industrial, automated washers.

### Features

- powder
- alkaline
- chlorine free

### Recommended concentrations

Optimal concentration depends on the hardness of the water used and on the degree of contamination of the objects to be cleaned. Under normal use a concentration of 0.2–0.4%, i.e. 20–40 g Extran® AP 13 per 10 l of water.

The pH of this type of solution should be 12.2.

### Ordering information

Extran® AP 13 powder, alkaline with detergents	Quantity	Packaging	Cat. No.
	2 kg	PE bottle	1.07565.2000
	10 kg	PE drum	1.07565.9010
	25 kg	PE drum	1.07565.9025

## Extran® AP 21, liquid, acid with phosphoric acid

### Ingredient

Phosphoric acid

### Applications

This low pH, phosphoric acid solution can be used as a pre-wash to dissolve carbonate and hydroxide deposits. Protein and amine residues are more easily removed when articles are prewashed with Extran® AP 21. AP 21 acid rinse is also effective as a gentle cleaner in the main wash cycle. It contains corrosion inhibitors to protect sensitive equipment and laboratory utensils. Since the strongest detergents are alkaline based, AP 21 Detergent, as a final rinse, neutralizes and removes calcareous deposits from both the articles being cleaned and the dishwasher itself.

### Features

- liquid
- acid
- surfactant free

### Recommended concentrations

Optimal dosing depends on the hardness of the water used and on the degree of contamination of the objects to be cleaned. Under normal use a concentration of 0.1–0.3%, i.e. 10–30 g Extran® AP 21 per 10 l of water.

The pH of this type of solution should be 2.0.

### Ordering information

Extran® AP 21 liquid, acid with phosphoric acid	Quantity	Packaging	Cat. No.
	2.5 l	PE bottle	1.07559.2500
	10 l	PE canister	1.07559.9010
	25 l	PE canister	1.07559.9025



## Extran® AP 22, liquid, acid with citric acid

### Ingredients

Citric acid, non-ionic surfactants, excipients in low concentrations

### Applications

This low pH, citric acid solution can be used as a prewash or final rinse. Since most detergents are alkaline based, Extran® AP 22, as a final rinse, neutralizes and prevents calcium and carbonate deposits in the dishwasher. The product is recommended for those cases where special care has to be taken. It is especially suitable for removing lime stains e.g. from water taps or sensitive metal and glass surfaces.

### Features

- liquid
- acid

### Recommended concentrations

Dosing can be carried out automatically via a dosing device or manually.

Under normal use a concentration of 0.1–0.3%, i.e. 10–30 g Extran® AP 22 per 10 l of water.

The pH of this type of solution should be 3.0.

### Ordering information

Extran® AP 22 liquid, acid with citric acid	Quantity	Packaging	Cat. No.
	2.5 l	PE bottle	1.07561.2500
	10 l	PE canister	1.07561.9010
	25 l	PE canister	1.07561.9025

## Extran® AP 31, liquid, anti-foam

### Ingredients

Inorganic polymers, excipients in low concentrations

### Applications

This anti-foaming solution can be used to prevent the development of foam during the wash and rinse cycles of an automatic dishwasher. Even when low foaming detergents are used, foam can form due to the saponification of fats and the presence of emulsifier and protein contaminants.

### Recommended concentrations

0.5–3 ml per 10 l rinse

### Ordering information

Extran® AP 31, liquid anti-foam	Quantity	Packaging	Cat. No.
	2.5 l	PE bottle	1.07560.2500

## Extran® AP 41 powder, enzymatic

### Ingredients

Enzymes, phosphates, alkaline salts

### Applications

This powder detergent contains enzymes designed to attack dried tissue, mucus and protein residues. Extran® AP 41 can be used in under-the-counter lab, large, industrial, automated washers and as a manual cleaning solution. Due to the thermal instability of the enzymes, AP 41 should be used at temperatures below 70°C. Optimal cleaning is achieved at a temperature between 55–65°C.

### Recommended concentrations

A concentration 0.3% is recommended i.e. 30 g Extran® AP 41 per 10 l of water.

The pH of this type of solution should be 11.4.

### Ordering information

Extran® AP 41, powder enzymatic	Quantity	Packaging	Cat. No.
	2 kg	PE bottle	1.07570.2000
	25 kg	PE drum	1.07570.9025

### Features

- liquid
- alkaline
- enzymatic

Product	Properties	Package-	Concentration	pH	Application notes
<b>Extran® cleansers for manual use</b>					
Extran® MA 01 1.07555	liquid, alkaline	2.5 l 10 l 25 l	2–5–20 %	11.6–12.0	Universal cleanser for heavy deposits. Can be used up to 40° hardness. Can also be used for benches, tiles, floor coverings. Suitable for ultrasonic baths.
Extran® MA 02 1.07553	liquid, neutral	2.5 l 10 l 25 l	2–5%	7.2–7.5	Universal cleanser for precision instruments made of glass and quartz and for sensitive metals. Suitable for ultrasonic baths.
Extran® MA 03 1.07550	liquid, alkaline, phosphate-free	2.5 l 10 l 25 l	2–5–20 %	11.6–12.0	Universal cleanser for heavy deposits. Can be used without restriction in water of extreme hardness. Suitable for ultrasonic baths.
Decalcification solution 1.00240	liquid, acid	1 l	1–10 %	3.0	Decalcification solution for delicate surfaces.
Sodium hydroxide solution 10 % 1.05588	liquid, alkaline	1 l 10 l		14	Universal, highly alkaline cleanser.
Sodium hydroxide solution 32 % 1.05587	liquid, alkaline	2.5 l 25 l 200 l		14	Universal, highly alkaline cleanser.
Sodium hydroxide solution 50 % 1.58793	liquid, alkaline	1 l 25 l		14	Universal, highly alkaline cleanser.
<b>Extran® cleansers for washing machines</b>					
Extran® AP 11 1.07558	powder, mild alkaline	2 kg 10 kg 25 kg	20–40 g / 10 l	11.3	For the gentle cleaning of objects in analytical laboratories. Cleaning effect corresponds to that of Extran® AP 14 liquid.
Extran® AP 12 1.07563	powder, alkaline	2 kg 10 kg 25 kg	20–40 g / 10 l	12.3	Powerful cleansing effect on starch and protein residues. Cleaning effect corresponds to that of Extran® AP 15, liquid.
Extran® AP 13 1.07565	powder, alkaline, with detergents	2 kg 10 kg 25 kg	20–40 g / 10 l	12.2	Powerful cleansing effect on fat residues.
Extran® AP 14 1.07573	liquid, mild alkaline	2.5 l 10 l 25 l	30–50 ml / 10 l	11.2	For the gentle cleansing of machines with liquid dosing, e.g. in the analytical laboratory. Cleaning effect corresponds to that of Extran® AP 11 powder.
Extran® AP 15 1.07575	liquid, alkaline	2.5 l 10 l 25 l	30–50 ml / 10 l	12.2	Powerful phosphate free cleanser for machines with liquid dosing. Cleaning effect corresponds to that of Extran® AP 12 powder.
Extran® AP 21 1.07559	liquid, acid, with phosphoric acid	2.5 l 10 l 25 l	10–30 ml / 10 l	2.0	For pre-rinsing of residues of carbonate, hydroxide, protein, amines etc. Post-rinsing with neutralisation effect. Also suitable for gentle main washing step. Prevents furring.
Extran® AP 22 1.07561	liquid, acid, with citric acid	2.5 l 10 l 25 l	10–30 ml / 10 l	3.0	For gentle pre- and post rinsing with neutralisation effect. Prevents furring. Environmentally compatible as it is phosphate-free.
Extran® AP 31 1.07560	liquid, anti-foam	2.5 l	1–3 ml / 10 l	–	Additive for foaming fats, soaps and all types of emulsifiers
Extran® AP 41 1.07570	powder, enzymatic	2 kg 25 kg	30 g / 10 l	11.4	For medical and dental practices and hospitals. For the removal of mucous, saliva, blood etc.
<b>For particularly stubborn cases</b>					
Chromosulphuric 1.02499	liquid	1 l 2.5 l 22 l			For the cleaning of glass vessels.

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