Data Sheet

Miller 25 ® Disinfectants

Effective - Safe - Ecological

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Miller® Disinfectants
Effective - Safe - Ecological

Introduction

Disinfection is an essential aspect of today's world. We all expect germ-free and absolutely safe manufacturing and packaging of processed foods and drinks, impeccable handling of foods in restaurants, and drinking water of indisputable quality. We expect microbiologically irreproachable surroundings in the ever increasing healthcare sector, in clinics and old age homes, in the cosmetics and pharmaceutical industries, in all public buildings, swimming pools, sanitary installations, air conditioning systems. The list is endless...

In this highly competitive market intensive research has been in progress for decades. New scientific evidence is constantly being gained and new products and methods are being developed to help us all fighting our "smallest" yet most dangerous enemies.

Today's challenge for a disinfectant is to be **effective and safe and ecological!**

Disinfectants on a **chemical basis** are generally one component products, intended for a specific application field, depending on the properties of the component used. However, narrow specificity has resulted in a multitude of similar products; the market has actually been flooded with virtually identical products by numerous manufacturers, all fiercely competing with one another.

The registered chemical disinfectants are divided in several groups. The most common are the Aldehydes, the Alcohols, the Phenols, the Halogens and the Quats. The application fields for every single product are reduced to a limited number of situations. The **Miller**® concept for efficient disinfection envisions **one single** product for all applications. Consequently, just to take one example, a brewery would not have to use up to seven different disinfectants to do a proper disinfection job, but just one **universal Miller**® disinfectant for a perfect job!

Rein Product GmbH has succeeded in developing a multi-component, ecological, i.e. fully degradable disinfectant that is highly effective against bacteria, fungi, algae, viruses and amoebae, without contaminating the environment: a remarkable advantage over traditional disinfectants.

History

The **Miller**® Research Team decided at an early stage that in order to avoid the known disadvantages of the traditional chemical formulae, the product to be developed would have to be positioned in a new group of oxygen decomposing substances. At that time not one single brand was registered in this group, whereas more than 40 product brands were named in the other disinfection groups.

Miller® further aimed at developing an **ecological** product that would not harm humans, animals and the environment in any way.

The Miller® Research Team started intensive tests with the two basic components Hydrogen Peroxide (H_2O_2) and Silver (Ag+). In the correct concentration the two elements complement each other ideally, intensifying each other's bactericidal effect.

Hydrogen Peroxide

Hydrogen Peroxide (H_2O_2) is an oxidizing agent with disinfecting properties. Furthermore, it is a substance which releases oxygen, thereby transforming itself in pure water (H_2O), not leaving any trace elements in the treated water.

Hydrogen Peroxide is used industrially as food additive, bleaching agent and for the purpose of chemical reactions. It is also used to decontaminate and purify industrial sewage and exhaust air. However, in its concentrated form, hydrogen peroxide is fairly unstable and has a tendency to decompose, so that stabilising agents have to be added. This instability is a hindrance in using hydrogen peroxide as a disinfectant. Other disadvantages of hydrogen peroxide are: high sensitiveness to temperature, sunshine and ultra-violet radiation as well as slow, short and limited effectiveness. It is therefore unsuitable for preventing a renewed contamination.

Silver

The term "oligodynamic" was coined by the Swiss botanist Carl von **Nageli** *in 1880, as he observed that highly diluted silver solutions (Ag) have an algicidal effect. He discovered that a silver concentration of 0.01 mg/L had "incredible" effects on vegetation, algae, etc. and he named this the "oligo-dynamic effect". Later, further tests revealed that the same low concentration also has a bactericidal effect. In fact, silver proved to have several advantages over the commonly used disinfectants. For example, "silvered" water is odourless, causes no eye irritation, does not form chloramines or other irritating substances. Silver ions dosed in minimal quantities do not alter the chemical or the physical properties of the treated water. Silver can therefore be applied in a wide pH range, without altering the pH value of the treated water. Moreover, it proved particularly effective at high water temperatures. Silver proved to be supreme in its long-lasting bacteriostatic effect, thus very actively preventing a new contamination.*

The major disadvantage of the oligodynamic method is that silver has no oxidizing effect and thus is not capable of decomposing or of altering or eliminating organic matter by oxidation. Also, silver is only effective in clear water (free from impurities and organic matter), meaning that turbid water has to be purified by filtration, flocculation or oxidation before treatment. Another limitation of silver is its slow bactericidal action. The effectiveness of silver is very marked and above all long-lasting, but a relatively long contact time must be taken into account. The exposure time can be shortened by increasing the dosage. However, since silver is a heavy metal there are threshold limit values to be observed. In fact, there has been a strong resistance to all processes involving the use of silver in the last decades. In many cases the psychological component played an important role and resulted in exaggerated caution. This may explain why the use of silver in drinking water supplies and emergency water supplies has been reduced to a minimum.

The Breakthrough

After many years of intensive research, our team succeeded in developing – for the first times ever – a production method that blended the two basic components hydrogen peroxide and silver. This was already a significant scientific achievement, but the most remarkable discovery was that combining the two elements resulted in an impressive enhancement of the properties of each of the two individual substances.

The new Disinfectant was then named Miller. The synergy obtained made it possible to achieve outstanding disinfection results with far lower concentrations. That was instrumental in overcoming the last barriers against silver. The silver content in Miller is approx. 10 to 20 times lower than the concentration officially authorized for drinking water worldwide.

Moreover, the combination of oxidation and oligodynamy resulted in a two-phased (multi-facetted) product capable of destroying biofilm at normal application concentration (i.e. without dangerously overdosing). This is an extremely important characteristic when fighting higher forms of bacteria and viruses which have developed a biofilm as a protective coat. Hydrogen peroxide oxidizes the biofilm enabling the silver to penetrate unhindered and to eliminate the bacterium or the virus.

The convincing properties of the Miller® Disinfectants, especially as far as toxicity, side-effects and environmental tolerance are concerned, are such that the necessary official permits and authorizations for their use in all fields of application have already been granted in several countries. Authorizations for their use in the treatment of drinking water, which are relatively difficult to obtain, have also been granted in a number of countries. Fantastic results have been obtained with Miller® Disinfectants in this field.

In more than 250 large scale international scientific studies and tests carried out by well-known institutions worldwide, the products' outstanding characteristics have been verified and confirmed, acknowledging that Miller® Disinfectants are an excellent choice for disinfecting both contents and surfaces.

The Future begins to day

The success story of Miller® Disinfectants is based on three key aspects:

® *thorough understanding of the chemistry of disinfection*
- *universally applicable, effective and ecological disinfecting products*

e *application know-how backed by years of experience in the world of disinfection*

Miller offers products and solutions for every field of application! Share our success

TECHNICAL DATA

State of aggregation:	Clear liquid without any characteristic odour. In dilution without taste and odour.
Density:	1.196 Kg/dm^3
Boiling point:	114 C at 1013 mille-bar.
Freezing point:	-51 C
pH:	1.2
Foaming activity:	Not foaming
Forming of coatings:	Does not form coatings
Biological degradation:	The primary substance hydrogen peroxide has no waste water implications. Its only degradation products are water and oxygen $2H_2O_2 \longrightarrow H_2O+O_2$
Combustion:	Is non-combustible. Organic substance like wood, paper, oil, coal, cotton wool, straw etc. must not come in contact with
Corrosion properties:	Corrosion- resisting are aluminum 99.5% (free of iron), Cr –Ni- steal, e.g. 1.4301, 1.4401, 1.4571, plastics as polypropylene, polyethylene, polyvinyl chloride. Varnish coatings and lining materials which are used in swimming pools or storage containers for instance should be tested in pre experiments

Material	Effective loss of weight (g/m^2/24h)	Allowed loss of weight (g/m^2/24h)
Aluminium 99.5%	0.37	10
Anticorodal	0.53	10
Glavanised iron	0.04	30
Cr –Ni- steal (18/8)	0.06	0.5

Advantages and Properties of the Miller Disinfectant

- ✓ universal range of application
- ✓ no gaps
- ✓ long-term effect
- ✓ hinders a renewed contamination
- ✓ no danger of bacterial resistance
- ✓ effective at water temperatures of 0°C – 95°C
- ✓ effectiveness and long-term effect are guaranteed even at high water temperatures
- ✓ no danger in case of overdosing
- ✓ does not create any odour
- ✓ has no toxic effect in its diluted state
- ✓ no carcinogenic or mutagenic effect
- ✓ in its diluted state it does not cause irritation to skin, eyes and mucous membranes
- ✓ does not alter the taste of foodstuffs treated
- ✓ no need to rinse after application
- ✓ neutralization after use not necessary
- ✓ practically not detrimental to waste water and environment
- ✓ does not enter into chemical combination with any other chemical element
- ✓ the pH value is not altered by the application in the recommended concentration
- ✓ storage of up to 5 years possible
- ✓ own measuring and regulating equipment
- ✓ all raw material and equipment suppliers as well as the Miller® manufacturing plants satisfy the norms ISO 9001.
- ✓ VAH/DGHM Certificate

Effectiveness / Antimicrobial Effect

The antimicrobial effect of the Miller® Disinfectants includes the complete range of micro-organisms.
The effectiveness of the Miller® Disinfectants against numerous pathogens has been tested and confirmed in more than 250 assays carried out by well-known international institutions.

Miller® Disinfectants are effective against:

- Gram positive and Gram negative bacteria
- Viruses, including bacterophagus
- Spore-forming organisms
- Yeast
- Fungi
- Mould
- Protozoa

Miller® Disinfectants are proven to be effective against:

Anthracis, Amoebae, Cholera, ECBO, Herpes, Hepatitis, HIV, Influenza, Avian Flu, Legionella (Legionnaires Disease), Listeria, Meningitis, MRSA, Mycoderins, Newcastle Disease, Polio, Pseudorabies, Tuberculosis, Vaccina, VRE, etc.

Miller® Disinfectants are effective against Biofilm:

Miller® Disinfectants are capable of destroying biofilm with the normal application concentration (i.e. without overdosing). This is an extremely important process everywhere where micro-organisms form so called biofilm as a protective coat. The oxygen released by the hydrogen peroxide oxidizes the biofilm thereby enabling the silver ions to eliminate the micro-organism unhindered.

Miller® Disinfectants in further assays:

At this time, further comprehensive and detailed tests are being carried out in various application fields. The list of pathogens involved is published and constantly updated on our Website.

List of Pathogens Tested up to Date

Gram negative bacteria

Acinetobacter Iwoffii
Aeromonas salmonicida
Agrobacterium radiobacter
Burkholderia cepacia
Campylobacter jejuni
CDC gr. IV c-2 (Ralstonia sp.)
Chryseomonas luteola
Comamonas acidovorans
Enterobacter aerogenes
Erwinia carotovora
Eschericia coli
Flavobacter/Cytophaga
Flavobacterium indologenes
Gallionella sp.
Klebsiella oxytoca
Klebsiella pneumonia
Legionella pneumophila
Naumaniella sp.
Neisseria meningitidis
Ochrobactrum anthorpi
Pasteurella sp.
Proteus mirabilis
Proteus vulgaris
Pseudomonas aeruginosa
Pseudomonas alcaligenes
Pseudomonas chlororaphis
Pseudomonas fluorescens
Pseudomonas sp.
Pseudomonas syringae pv. Tomato
Ralstonia pickettii
Salmonella enteritidis
Salmonella paratyphi
Salmonella sp.
Salmonella typhi
Salmonella typhimurium
Salmonella typhosa
Vibrio cholerae (Colera)
Vibrio parahaemolyticus
Xanthomonas campestris
Yersinia pestis (Pestis)

Acid-fast bacteria

Mycobacterium phlei
Mycobacterium smegmatis
Mycobacterium spez.

Algae

Asterionella Formosa
Stephanodiscus hantzschii
Fragilaria sp.
Chroomonas norstedtii
Chlamidomonas sp.
Melosira var.
Nitzschia sp.

Gram positive bacteria

Bacillus anthracis (Anthrax)
Bacillus cereus
Bacillus circulants (vegetative and spores)
Bacillus licheniformis
Bacillus mesenterious
Bacillus sp.
Bacillus subtilis
Bacillus subtilis spore
Clostidrium novyi
Clostidrium perfringens
Clostridium sporogenes
Corynebacterium
Enterococcus faecalis (Streptococcus faecalis)
Enterococcus faecium
Enterococcus hirae
VRE (Vancomycin resistant Enterococcus)
Lactobacillus brevis
Lactobacillus lindneri
Lactobacillus plantarum
Lactobacillus sp.
Lactococcus lactis (Streptococcus lactis)
Leuconostoc mesenteroides
Listeria innocua
Listeria monocytogenes
Micrococcus candidu
Micrococcus pyogenes
Micrococcus roseus
Mycobacterium Tuberculosis (tuberculosis)
Pedicoccus damnosus
Pedicoccus sp
Sarcina Lutea (Micrococcus Luteus)
Staphylococcus agalactiae
Staphylococcus albus
Staphylococcus aureus
MRSA
Staphylococcus Coagulase +ve
Staphylococcus faecium
Staphylococcus marcescens
Streptococcus pyogenes

Yeast

Saccaromyces cerevisiae
Saccharomyces uvarum
Saccharomyces cereivisia var. uvarum
Saccharomyces carlsbergensis

Fungi

Absidia corymbifera
Alternaria alternate
Aspergillus fumigatus
Aspergillus niger
Aspergillus niger spores
Botrytis cinerea
Cladosporium cladosporioides
Flagellata apochromatica
Fusarium spp.
Geotrichum candidum
Microsporum gypseum
Mucor
Penicillium digitatum
Penicillium roqueforti
Penicillium sp.
Penicillium verrucosum
Pichia membranaefaciens
Trichophyton mentagrophytes

Virus

Adenovirus
ECBO virus
Hepatitis B
Hepatitis C surrogate
Herpes simplex type 1
HIV-1
Influenza A (H5, H7 and H9)
Influenza A (H5N1)
Influenza A virus
Newcastle Disease virus
Orthopoxvirus
Papovavirus SV-40
Paramyxo virus
Poliovirus 1
Pseudorabies virus
Vaccina virus

Protozoa

Trophozoite
Amoebae
Ciliata g. sp.
Cryptosporidium parvum
Cryptomonas sp.
Nagleria fowleri

Arthropoda

Dermatophagoides pteronyssinus

Product Types

The Miller® Disinfectants are available in different concentrations, container sizes, etc. depending on the customer application. All product types are delivered from stock in containers of 5, 10, 25, 65 or 200 liters.

Highly Concentrated Products

We offer our highly concentrated products for professional applications:

Product	**- Concentration** **- Main Components**	**- Product Type / Application**
Miller Highly concentrated Disinfectant	100 % solution Concentrated Product 50% H202/0.05% Silver	Standard disinfectant for the universal disinfection of surfaces and of contents
Miller Highly concentrated Disinfectant	100 % solution Concentrated Product 50% H_2O_2/0.1% Silver	Disinfectant for special applications on surfaces and disinfection of contents
Miller 25% **Highly concentrated** **Biocide**	**100 % solution** **Concentrated Product** **25% H_2O_2/0.025% Silver**	**Standard disinfectant for the universal disinfection of surfaces and of contents**
Miller Highly concentrated Preservative	100 % solution Concentrated Product 50% H_2O_2/0.1% Silver	Preservative for the cosmetics and pharmaceutical industries

Lightly Concentrated Products

We offer our lightly concentrated products for professional applications as well as for the private sector:

Product	**- Concentration** **- Main Components**	**- Product Type / Application**
Miller Lightly concentrated Disinfectant	15 % solution Concentrated Product 7.5% H_2O_2 / 0.0075% Silver	Standard disinfectant for the universal disinfection of surfaces and of contents
Miller Lightly concentrated Disinfectant	15 % solution Concentrated Product 7.5% H_2O_2 / 0.015% Silver	Disinfectant for special applications on surfaces and disinfection of contents
Miller Lightly concentrated Disinfectant/Cleanser	15 % solution Concentrated Product 7.5% H_2O_2/0.015% Silver/7% Surfactants	Disinfectant and Cleanser in one for application on surfaces
Miller Lightly concentrated Disinfectant/Cleanser	15 % solution Concentrated Product 7.5% H_2O_2/0.015% Silver/1.4% Surfactants	Disinfectant and Cleanser in one for application in pipes and circuits

Ready-to-use Products

We offer our ready-to-use products for professional applications as well as for the private sector:

Product	- **Concentration** **- Main Components**	**- Product Type / Application**
Miller Ready-to-use Disinfectant	10 % solution Ready-to-use 5% H_2O_2	Mould control application in industry and in the private sector
Miller Ready-to-use Disinfectant	6% solution Ready-to-use 3% H_2O_2	Disinfectant for microbiologically highly contaminated surfaces, e.g. hospitals
Miller Ready-to-use Disinfectant	3% solution Ready-to-use 1,5% H_2O_2	Disinfectant for microbiologically contaminated surfaces
Miller Ready-to-use Disinfectant & Cleanser	3 % solution Ready to use 1.5% H_2O_2 Surfactants	Disinfectant and cleanser in one for application in pipes and circuits

Range of Equipment

We offer a wide range of equipment especially suited to the measurement, control as well as the dosing of **Miller**® Disinfectants:

- Measuring strips
- Measuring Kit
- Measuring and Control Units
- Dosing Pumps
- Proportional Dosing Equipment
- Fogging Units
- Hygiene Control Systems
- Air Hygiene / Air Sampler
- etc.

Field of Application

1. Beverage Industry

Beverage Industry producers and bottlers of mineral water, soft drinks, fruit juices industry, etc.	floors, walls, ceilings, drains	2.5-3.5%
	mould control	2%
	fermentation tanks storage tanks, fittings	500-600 ppm
	pressure tanks, pipelines, pumps, filters	Up to 700 ppm
	equipment, machines, tools	3.5%
	tanks, containers, dosing installations	2.5%
	filling plants	2.5%
	refuse glass showers, hot-water rinsing zones	200 ppm
	CIP Installations (collected rinsing water)	0.2%
	working clothes	1.5-2%

Producers of Mineral Water, Soft Drinks, Fruit Juices and Wine:

Water Treatment

- Treatment of service and well water

Raw Material Storerooms

- floors, walls, ceilings, drains
- transport containers, stacking containers
- filling plants

Production

- floors, walls, ceilings, drains; mould control
- mixing devices, bottle washing installations
- sugar and raw material supplement
- filling plants and conveying equipment
- CIP installations (collected rinse water)
- equipment, machines, tools
- containers, pipelines
- working clothes

Delivery / Storage

- surfaces, containers, pipelines
- transport containers and vehicles
- conveying installations, filters

Cooling Plants / Air Conditioning Systems

- cooling systems, air washing devices, humidifiers, ventilation shafts

Incoming Raw Material

- floors, walls, ceilings, drains
- transport containers, cans
- stacking containers
- filling equipment

2. Dairy Industry

Dairy Industry Milk processing industry, dairies, cheese-making, yoghurt producers, etc.	floors, walls, ceilings, drains	3-3.5%
	mould control	3-3.5%
	conveying and filling equipment	3-3.5%
	equipment, machines, containers	3-3.5%
	instruments and tools	3-3.5%
	working clothes	3-3.5%
	CIP	0.2-0.8%

Delivery

- transport containers and vehicles
- conveying equipment, filters

Cooling Plants / Air-Conditioning Systems

- cooling systems, air washing devices, humidifiers, ventilation shafts

Water Treatment

- Treatment of service and well water

Incoming Raw Materials / Storerooms

- floors, walls, ceilings, drains
- transport containers
- stacking containers

Production

- floors, walls, ceilings, drains; mould control
- mixing devices, bottle washing installations
- sugar and raw material supplement
- filling plants and conveying equipment
- CIP installations (collected rinse water)
- equipment, machines, tools
- containers, pipelines
- working clothes

3. Food Processing Industry

Food Processing Industry Canning factories, butchers, abattoirs, fish processing, bakeries, mills, pasta and farinaceous producers, convenience food producers, chocolate factories, edible oil/margarine/shortening factories, etc.	floors, walls, ceilings, drains	3-3.5%
	mould control	3-3.5%
	sorting plants, mixing devices	3-3.5%
	conveying and filling equipment	3-3.5%
	equipment, machines, tools	3-3.5%
	containers, pipelines	3-3.5%
	working clothes	3-3.5%
	filling plants	0.2- 0.8%

Distribution

- transport containers and vehicles
- conveying equipment, filters

Cooling Plants / Air-Conditioning Systems

- cooling systems, air washing devices, humidifiers, ventilation shafts

Water Treatment

- Treatment of service and well water

Incoming Raw Materials / Storerooms

- floors, walls, ceilings, drains
- transport containers
- stacking containers

Production

- floors, walls, ceilings, drains; mould control
- mixing devices, bottle washing installations
- sugar and raw material supplement
- filling plants and conveying equipment
- CIP installations (collected rinse water)
- equipment, machines, tools
- containers, pipelines
- working clothes

4. Animals Farms / Meat Processing

Disinfection in breeding establishments, such as poultry/cattle /sheep/rabbits, and in meat processing.

Water; **Treatment**	Treatment of drinking water	Up to 100 ppm
	Drinking water pipelines	300-800 ppm
Breeding Establishments	floors, walls, ceilings, drains equipment, machines, tools egg disinfection (poultry), incubators milking installations, cow udder disinfection food and drinking water containers working clothes	Up to 3.5%
Abattoirs / **Storage**	floors, walls, ceilings, drains ramps, waiting areas plucking and skinning installations conveying equipment, sorting plants equipment, machines, tools storage rooms, cold-storage depots working clothes	Up to 3.5%
Transport	transport vehicles, trucks, ramps	Up to 3.5%

Cooling Plants / Air-Conditioning Systems

- cooling systems, air washing devices, humidifiers, ventilation shafts

5. Fish and Shrimp Farms / Processing.

Fish farms, ponds with shrimps, mussels and oysters, terrariums, aquariums.

Breeding	ponds, basins, channels, containers equipment, machines, tools conveyor belts (feed)	30-100 ppm
Processing / Storage	catching devices floors, walls, ceilings, transport basins conveying equipment, sorting plants processing machines, packing material equipment, machines, tools storage devices, cold-storage depots and trucks working clothes	Up to 3.5%
Transport	transport vehicles, trucks, containers	2%

Cooling Plants / Air-Conditioning Systems

- cooling systems, air washing devices, humidifiers, ventilation shaf

6. Vegetables and fruits

Agriculture	(hors-sol), plantations, preservation, pre-harvest and post-harvest disinfection. irrigation, washing, cooling water	50-800 ppm
Plants	Cauliflower- Artichokes	200 ppm
	Beans	200 ppm
	Spinach- Mallow	300-800 ppm
	Okra	200-500 ppm
	Apricot- Strawberry	100-200 ppm
	Fig	300-800 ppm
Preservation / Conservation	post-harvest disease control flowers, fruits, vegetables, etc.	200- 700 ppm
Processing / Storage	floors, walls, ceilings, drains conveying equipment, sorting plants washing plants processing machines, packing material equipment, machines, tools storage installations, cold-storage depots, trucks working clothes	Up to 3.5%
Transport	transport vehicles, trucks, containers	Up to 3.5%
Cooling Plants / Air-Conditioning Systems	cooling systems, air washing devices, humidifiers, ventilation shafts	200 ppm

7. Hotels / Restaurants / Old People's Homes / Schools / Hospitals

Disinfection of surfaces, equipment, laundry, etc.

Water Treatment	hot and cold water (Legionella)	100-200 ppm
	drinking water	Up to 60 ppm
Kitchen	floors, walls, ceilings working areas, equipment, shelves, tools laundry	3.5%
Sanitary Installations	floors, walls and ceilings in wet cells bathrooms, wash-basins, toilets laundry	3.5%
Rooms and Supplies	floors, walls, ceilings beds, blankets, carpets ambient air disinfection equipment, working clothes, transport vehicles laundry	3.5%
Air-Conditioning Systems / Ventilation	cooling systems, air washing devices, humidifiers, ventilation shafts	200 ppm

8. Medical sector

Medical, dental and veterinary surgeries

Water Treatment	hot and cold water (Legionella)	Up to 200 ppm
	drinking water	Up to 60 ppm
Operating Rooms / Treatment Rooms	floors, walls, ceilings working areas, equipment, tools ambient air disinfection disinfection of hands laundry	Up to 3.5%
Transport	ambulances, transport vehicles, wheelchairs laundry	Up to 3.5%
Rooms and Supplies	floors, walls, ceilings beds, blankets, carpets instruments, working clothes, transport vehicles laundry	Up to 3.5%
Air-Conditioning Systems / Ventilation	cooling systems, air washing devices, humidifiers, ventilation shafts	200 ppm

9. Cosmetics and Pharmaceutical Industry (Production, Laboratory, etc.)

Surface and content disinfection, preservation

Water Treatment	Treatment of service water	Up to 200 ppm
Incoming Raw Material / Storerooms	floors, walls, ceilings, drains transport containers	Up to 3.5%
Production	floors, walls, ceilings, drains conveying and filling installations equipment, machines, tools working clothes	Up to 3.5%
Laboratory	floors, walls, ceilings equipment, machines, tools pipelines working clothes	Up to 3.5%
Sterile area	Fogging	Up to 10%
Distribution	transport containers and vehicles conveying installations, filters	Up to 3.5%
Cooling Plants / Air-Conditioning Systems	cooling systems, air washing devices, humidifiers, ventilation shafts	200 ppm

10. Swimming Pools

Private and public swimming pools, hotel, children and thermal pools, spa baths, whirlpools, saunas, fitness centres, solariums.

Swimming Pools:	water disinfection	Up to 100 ppm
Water Treatment:	hot and cold water (Legionella)	Up to 100 ppm
Rooms / Halls:	floors, walls, ceilings changing rooms solariums, saunas, deck chairs	Up to 3.5%
Sanitary Installations:	floors, walls, ceilings in wet cells bathrooms, wash-basins, toilets	Up to 3.5%
Air Conditioning Systems / Ventilation:	air washing devices, humidifiers, ventilation shafts	200 ppm

11. Water Supply

Disinfection of drinking water, pipelines, drinking fountains, etc.;
long-term conservation of emergency water supplies (military, civil defence).

Drinking Water Treatment	raw water disinfection protection of pipeline network long-term disinfection (e.g. emergency water)	100-200 ppm
Surface Disinfection	(standing & flow method) cisterns, reservoirs wells equipment, machines, tools	Up to 3.5%
	Drinking water pipelines	Up to 500 ppm

12. Household

Disinfection of kitchen, bathroom, shower, toilet, etc.

Water Treatment	hot and cold water (Legionella) drinking water	Up to 100 ppm
Kitchen	floors, walls, ceilings working boards, equipment, tools laundry	Up to 3.5%
Sanitary Installations	floors, walls and ceilings in wet cells bathrooms, wash-basins, toilets laundry	Up to 3.5%
Rooms	floors, walls, ceilings beds, blankets, carpets laundry	Up to 3.5%
Air-Conditioning Systems / Ventilation	air washing devices, humidifiers, ventilating shafts	200 ppm
Human care & personal hygiene	Shower	0.2%
	Hand sanitizer	0.1-0.2%

13. Air Conditioning Systems and Cooling Towers

Disinfection of air humidifiers, cooling towers, air conditioning systems, elimination of algae.

Cooling Towers:

Water Treatment

- cooling water
- emergency cooling water

Air-Conditioning Systems:

Water Treatment

- Humidifiers, vaporisers, evaporators
- air washing devices

Air-Conditioning and Ventilation Systems

- filter plants, rotary air filters, disposable filters
- ventilation shafts
- air disinfection (filters)

14. Oil-Rig / Oil Platform

Content and Surface Disinfection

- Disinfection of drilling mud
- Disinfection of lubrication sludge
- General disinfection

15. Air and Water Filters

Disinfection of filter installations

Filter Installations

- standard filtering systems
- micro-, ultra, nano-filtering installations
- reverse osmosis systems

16. Waste Water Treatment

Sewage treatment plants (public or industrial)

Sewage Treatment Plants:

Activation Plants

- biocatalytical effect (process acceleration by supplying oxygen)
- control of filament-forming bacteria
- suppression of sulphurous water formation

Clarifiers

- control of filament-forming bacteria
- reduction of bulking sludge formation

Industry:

Tanneries, Paper Industry, Refineries, etc.

- Oxidation of sulphur and phenolic components **Chemical Industry, Precious Metal Extraction, etc.**
- oxidation of cyanide

17. Tourism

(Disinfectant sprays, drinking water treatment)

Travel, camping, caravans, boats. Disinfection of beaches.

Water Treatment

- drinking water
- hot and cold water (Legionella)
- camping, caravans
- boats, ships

Sanitary Installations

- floors, walls and ceilings in wet cells
- bathrooms, wash-basins, toilets

Rooms

- floors, walls, ceilings
- beds, blankets, carpets

Beaches

- surface disinfection

Miller

Rein Product

VDA 6.2
ESAD II
GMP

DIN EN ISO 14001

DIN EN ISO 9001

SGS

SGS

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Consumer Testing Services
Personal & Homecare

SGS INSTITUT FRESENIUS
Im Maisel 14
65232 Taunusstein

Taunusstein, 06th November 2012

Test Report: 2393091-02

Examination of the disinfection effect

Sample entry:	04.10.2012
Test conditions:	see page 2
Results:	see page 3
Sample description:	Rein Product Miller Prod. 01/2012 Exp. Date 01/2015

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Miller

Rein Product

VDA 6.2
ESAD II
G M P
DIN EN ISO 14001
DIN EN ISO 9001
SGS

SGS

INSTITUT
FRESENIUS

Order-No. : 2393091 06.11.2012
Test Report : 2393091-02
Sample : Rein Product Miller Prod. 01/2012 Exp. Date 01/2015 (120726133)

Test conditions:

Evaluation of bactericidal and fungicidal activity in qualitative suspension test (DGHM-standard methods, 1.9.2001, Method 8)

10 ml of the appropriate dilution of the test product is mixed with 0.1 ml of test suspension and mixed well. After the required action times (see below), the mixture was mixed again.
Each 0.1 ml were removed and placed in 10 ml of CSL-bouillon without neutralizing agents.

Incubation of subcultures

Subcultures with bacterial suspension:	48 h at 36 ± 2 °C
Subcultures with yeast / fungi suspension:	48 h at 30 ± 2 °C

Test micro-organisms:

Escherichia coli ATCC 11229
Staphylococcus aureus ATCC 6538
Proteus mirabilis ATCC 14153
Pseudomonas aeruginosa ATCC 27853
Candida albicans ATCC 10231
Aspergillus brasiliensis ATCC 16404
Salmonella enterica DSM 554

Action time: (5 min / 15 min / 30 min / 60 min)

Product concentration: (0.5% / 1% / 2%/ 3% /4% / 5%)

Testing period: 01.11.2012 – 05.11.2012

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VDA 6.2 ESAD II GMP DIN EN ISO 14001 DIN EN ISO 9001 SGS

SGS INSTITUT FRESENIUS

Order-No. : 2393091 06.11.2012
Test Report : 2393091-02
Sample : Rein Product Miller Prod. 01/2012 Exp. Date 01/2015 (120726133)

Results

Evaluation of *Escherichia coli* ATCC 11229 (1.77 x 10^8 cfu/ml)

End concentration of the test product	growth after			
	5 minutes	15 minutes	30 minutes	60 minutes
5 %	-	-	-	-
4 %	-	-	-	-
3 %	-	-	-	-
2 %	-	-	-	-
1 %	+	-	-	-
0.5 %	+	+	-	-
WSH Control	+	+	+	+

+: growth; -: no growth cfu: colony forming units

Evaluation of *Proteus mirabilis* ATCC 14153 (1.70 x 10^8 cfu/ml)

End concentration of the test product	growth after			
	5 minutes	15 minutes	30 minutes	60 minutes
5 %	-	-	-	-
4 %	-	-	-	-
3 %	-	-	-	-
2 %	-	-	-	-
1 %	+	-	-	-
0.5 %	+	+	-	-
WSH Control	+	+	+	+

+: growth; -: no growth cfu: colony forming units

Evaluation of *Salmonella enterica* DSM 554 (1.57 x 10^8 cfu/ml)

End concentration of the test product	growth after			
	5 minutes	15 minutes	30 minutes	60 minutes
5 %	-	-	-	-
4 %	-	-	-	-
3 %	-	-	-	-
2 %	-	-	-	-
1 %	-	-	-	-
0.5 %	-	-	-	-
WSH Control	+	+	+	+

+: growth; -: no growth cfu: colony forming units

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Rein Product

VDA 6.2 ESAD II GMP DIN EN ISO 14001 DIN EN ISO 9001 SGS

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INSTITUT FRESENIUS

Order-No. : 2393091 06.11.2012
Test Report : 2393091-02
Sample : Rein Product Miller Prod. 01/2012 Exp. Date 01/2015 (120726133)

Evaluation of *Aspergillus brasiliensis* ATCC 16404 (1.54 x 10^8 cfu/ml)

End concentration of the test product	growth after 5 minutes	15 minutes	30 minutes	60 minutes
5 %	-	-	-	-
4 %	-	-	-	-
3 %	+	+	+	-
2 %	+	+	+	+
1 %	+	+	+	+
0.5 %	+	+	+	+
WSH Control	+	+	+	+

+: growth; -: no growth cfu: colony forming units

Evaluation of *Staphylococcus aureus* ATCC 6538 (1.51 x 10^8 cfu/ml)

End concentration of the test product	growth after 5 minutes	15 minutes	30 minutes	60 minutes
5 %	-	-	-	-
4 %	-	-	-	-
3 %	-	-	-	-
2 %	-	-	-	-
1 %	+	+	-	-
0.5 %	+	+	-	-
WSH Control	+	+	+	+

+: growth; -: no growth cfu: colony forming units

Evaluation of *Pseudomonas aeruginosa* ATCC 15442 (1.87 x 10^8 cfu/ml)

End concentration of the test product	growth after 5 minutes	15 minutes	30 minutes	60 minutes
5 %	-	-	-	-
4 %	-	-	-	-
3 %	-	-	-	-
2 %	-	-	-	-
1 %	-	-	-	-
0.5 %	-	-	-	-
WSH Control	+	+	+	+

+: growth; -: no growth cfu: colony forming units

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Rein Product

VDA 6.2 ESAD II GMP DIN EN ISO 14001 DIN EN ISO 9001 SGS

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Order-No. : 2393091 06.11.2012
Test Report : 2393091-02
Sample : Rein Product Miller Prod. 01/2012 Exp. Date 01/2015 (120726133)

Evaluation of *Candida albicans* ATCC 10231 (1.59 x 10^8 cfu/ml)

End concentration of the test product	growth after 5 minutes	15 minutes	30 minutes	60 minutes
5 %	-	-	-	-
4 %	-	-	-	-
3 %	+	+	-	-
2 %	+	+	-	-
1 %	+	+	-	-
0.5 %	+	+	-	-
WSH Control	+	+	+	+

+: growth; -: no growth cfu: colony forming units

SGS INSTITUT FRESENIUS GmbH

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Project Leader

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Teamassistant

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Data Sheet

Miller 25 ® Disinfectants

Effective - Safe - Ecological