

The Role of Waterless Hand Sanitizer as part of an Effective Hand Hygiene Strategy for Passenger Cruise Ships, and Selection of Suitable Products

Abstract

Modern cruise ships represent a complex challenge for infection control comprising of a number of key scenarios ranging from food handling to acute healthcare provision as well as the risks associated with public spaces and herd infections. Key scenarios for hand hygiene aboard modern cruise ships are reviewed and for each, the suitability and important performance requirements for waterless hand sanitizers are considered. Deb InstantFOAM Complete is found to be highly suitable for use in all important scenarios.



Make Hands Matter in the Workplace



Introduction

Modern passenger cruise ships are effectively “mini cities” at sea, with populations of several thousand and hence with all the complexity in hygiene provision of a typical urban infrastructure, with the added complication of isolation for long periods of time (no-one leaving or entering the environment).

This review considers the requirements for hand hygiene and specifically the role of waterless hand sanitizers within the cruise ship eco-system. This is only one part of a holistic hygiene or hand hygiene strategy and this will be considered briefly.

First, we consider the scenarios and responsibilities of individuals for hand hygiene within the cruise ship ecosystem, and the role waterless hand sanitizer plays within this. Then we consider the selection of the most suitable product from those available on the market. We will show that Deb InstantFOAM Complete waterless hand sanitizer is the most suitable product for cruise ship environments.

Key Elements of the Cruise Ship Ecosystem

For the purposes of this review, we will establish key elements of the overall environment, and the roles of key people within those scenarios, as the requirement and responsibility for hand hygiene differs among these.

Key scenarios are:

- Passenger and public washrooms
- Food storage and preparation areas
- Healthcare areas (on board hospital/clinic)
- General public areas (e.g. cinema, ballroom, etc.)

Key people are:

- Passengers
- Staff associated with food handling
- Staff associated with healthcare provision
- General staff not associated with these activities

In addition to waterless hand sanitizer deployment, the role of hand washing and surface cleansing will be commented on, but not reviewed in detail.

Section 1: Review of Hand Hygiene Requirements in Key Scenarios

Washroom Hand Hygiene

Hygiene in washrooms (either public or in passenger/staff quarters) is a vital element of any holistic infection prevention strategy. Washrooms present an infection risk via two main pathways; infection from feces (either an infected individual or an asymptomatic carrier) and infection following contamination of on-board water supply (e.g. Legionella). The role for thorough surface cleansing and disinfection in washrooms, and for effective water quality control, is clear and will not be covered in this review. Regarding hand hygiene and the selection of the most appropriate solution, two factors are important in washrooms:

1. Water for rinsing is commonly (and should be) available
2. Physical cleansing in addition to hand sanitizing is required

Passenger and Public Washrooms

Given the above, the primary hand hygiene solution for passenger and public washroom should be a high quality non-soap hand cleanser designed for frequent use and with mild, skin-friendly properties. The selection of such products will not be covered in detail here; however any choice from the Deb Stoko Range of Foam Hand Cleansers is highly suitable. These products are proven to provide a washroom cleansing experience superior to water alone from one push and typically provide >99% reduction in germs on the skin while being extremely mild and pleasant to use.

Additional considerations for Healthcare and Food Handlers

Staff involved in healthcare and food handling have an additional duty of care and risk profile following any visit to the washroom. For this reason, it is strongly recommended that either a suitable broad-spectrum antimicrobial cleanser is adopted in place or a general washroom cleanser for the specific washrooms used by staff in these departments. When this is not possible, a regime of washing with a non-soap cleanser followed by sanitizing with a suitable waterless hand sanitizer should be adopted.

Opportunities for adoption of the former strategy would include instances where washrooms are used uniquely by such employees (e.g. in kitchen areas). Opportunities for adoption of the latter strategy would include instances where such employees use public washrooms in the course of their duties (e.g. a doctor visiting a passenger room). In this case, both washroom hand cleanser and waterless hand sanitizer should be provided, and instructions for use given to key staff.

Selection of suitable antimicrobial cleanser is not covered in detail in this review. Selection of suitable waterless hand sanitizers will be covered later in this review.

Food Storage and Food Preparation Areas

In these environments, two main pathways for contamination and infection can occur; food contamination from an infected individual and food contamination from other contaminated food. In addressing these risks, the role for robust surface cleansing is clear, as is the role for effective food management (storage, separation and control) and personnel management. None of these aspects will be covered in this review.

Food contamination can take a number of forms; bacterial, fungal or viral. Of key concern are bacterial contaminations such as *Listeria* and *Salmonella*, and viral contaminations such as Norovirus. It is important to note a key distinction in that bacterial colonies can grow and multiply on or inside contaminated food, while viral contaminants typically lay dormant awaiting transport to a human host.

The safest and most effective means to ensure good hygiene is to wash hands thoroughly according to established best practice (see for example WHO guidelines). Washing with an appropriate hand cleanser and water ensures the physical removal of greasy soiling as well as any microbiological contamination. Given the high duty of care for such situations, a high level of sanitizing (>99.99% reduction) is desired. As noted above, this can be achieved either through combination of standard non-soap hand cleanser and waterless hand sanitizer or by using a suitable antimicrobial hand cleanser.

The latter strategy should be strongly encouraged for food handlers as it provides a more convenient solution unless a suitable product is not available. When cleanser + sanitizer are used, it is important that hands are both physically clean and dry before the sanitizer is applied. It is not considered that frequent requirements for hand hygiene away from the provision of running water is likely or desired for food handling environments. Suitable workflow optimization and training should minimize this.

Selection of suitable waterless hand sanitizers will be covered later in this review. Deb InstantFOAM Complete is highly suitable for food handling environments.

Healthcare Areas

Within on-board healthcare areas, we consider that individuals can be healthcare professionals, passengers (as patients or visitors) and other non-associated staff members (also as patients or visitors). In terms of the key duty of care for hand hygiene, we will focus on healthcare professionals, with comments as to suitable provision for the other groups.

Control of infection is vital when discussing healthcare facilities. Typical pathways for contamination leading to infection include transmission of pathogens from one patient directly to another, or via surfaces touched by both or by healthcare workers engaged in the treatment of both. Specific opportunities for infection include feeding of patients and particularly treatment of open wounds or execution of aseptic procedures.

In addition to the requirement for effective surface cleansing which is not covered here, there is a very clear and effective strategy for hand hygiene outlined in the World Health Organization (WHO) 5 moments for Hand Hygiene (see figure 1). It is strongly recommended that this strategy is adopted, trained and compliance among healthcare workers measured.

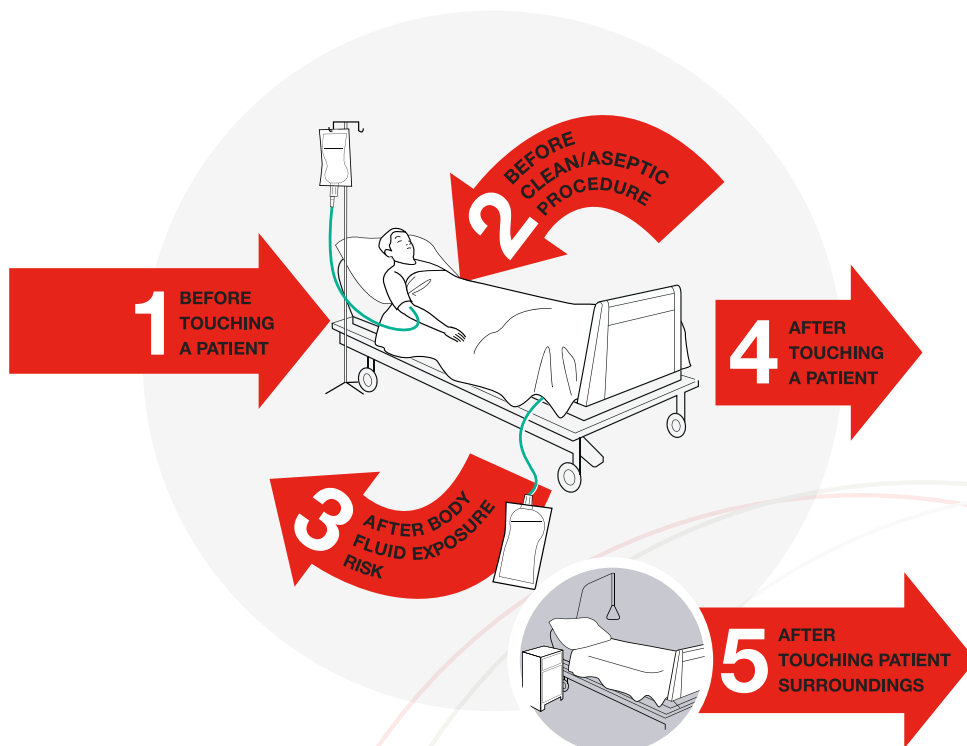


Figure 1: WHO 5 Moments for Hand Hygiene

In terms of the key concerns for healthcare workers, clearly prevention of transmission of all pathogens is important. However, paramount is prevention of transmission of multi-drug-resistance-organisms (MDROs) such as MRSA and VRE which are endemic in healthcare settings due to regular contact with antibiotic drugs. Additional activity against key infection strains such as C. Difficile and Norovirus is also highly desirable.

For healthcare staff, very frequent hand hygiene may be required in order to fully comply with the risk based approach of the 5 Moments. In many cases, hand hygiene at the point of care (away from the provision of running water) is needed. For these reasons it is strongly recommended that a suitable waterless hand sanitizer is adopted as the primary strategy for hand hygiene for healthcare staff, supplemented by either a standard or an antimicrobial hand cleanser when necessary. Only when hands are physically dirty, or following key risk indicators such as Moment 3 (after body fluid exposure risk) should hands be washed with cleanser and water. In most other cases, better sanitizing and skin care is achieved by using a suitable waterless hand sanitizer designed for frequent use.

Non-healthcare workers (either passengers or non-involved staff) should be encouraged to sanitize with a waterless hand sanitizer on entry to and exit from the healthcare area, or following clear risk indicators such as touching a patient.

General Public Areas

Beyond washrooms, main pathways for infection in public areas will be touching contaminated surfaces and airborne pathogens. Robust surface cleansing strategies clearly must play a role. In addition, sensible hand hygiene practices can effectively mitigate spread of non-airborne pathogens and can assist in the control of airborne (aerosol) pathogens.

Provision of waterless hand sanitizer at key locations such as entry/exit to open spaces and along thoroughfares is a very effective means to tackle such infection risks, which will be dominated typically by control of “herd” contagions, including Norovirus, and E. coli. Table 1 summarizes the above review, highlighting key hand hygiene requirements for each scenario. Overall, while waterless hand sanitizer cannot be considered the sole solution for effective hand hygiene in all scenarios aboard the modern cruise ship, it is a key element of a successful strategy.

Scenario	Key People	Key Infection / Contamination Risks	Recommended Hand Hygiene Solution
Washrooms	Passengers and General Staff	Cross-infection from feces-borne pathogens (e.g. E coli, Norovirus)	Wash hands with suitable non-soap cleanser
	Food Handlers and Healthcare Staff	Contamination of food or patient with feces borne pathogens	Wash hands with suitable non-soap cleanser AND use waterless hand sanitizer OR use a suitable antimicrobial hand cleanser
Food Handling and Preparation Areas	Food Handlers	Contamination of food with pathogens (e.g. Listeria, Salmonella)	Use a suitable antimicrobial hand cleanser OR when not available, wash hands with suitable non-soap cleanser AND use waterless hand sanitizer
Healthcare Areas	Healthcare Staff	Cross-infection of MDROs (e.g. MRSA, VRE, C. diff).	Follow WHO 5 Moments AND use waterless hand sanitizer unless hands are physically dirty or after body fluid exposure risk, then wash hands with a suitable non-soap cleanser
	Patients & Visitors	As above	Use waterless hand sanitizer on entry/exit to patient areas
General Public Areas	All	Surface contamination and airborne infections (common cold, Norovirus)	Provide waterless hand sanitizer at key locations such as entry/exit to open spaces and along thoroughfares

Table 1: Summary of Hand Hygiene Solutions for Key Scenarios on Cruise Ships

Section 2: Selection of Suitable Waterless Hand Sanitizer

Elements for Selection

The primary criterion for selection of a waterless hand sanitizer must be antimicrobial efficacy, but this is not the only aspect. Other key selection criteria for a successful outcome include skin compatibility, likely build-up of microbial resistance and user preference. The latter is especially important in driving compliance either when very frequent use is required (e.g. Healthcare) or when professional responsibility cannot be assumed (e.g. public areas).

Antimicrobial Efficacy

In selecting on antimicrobial efficacy, a wide range of data is often presented and this can be confusing. Key elements to bear in mind are:

- In-vivo efficacy data refers to real handwashing & hence is very realistic, but often limited in terms of the types of organisms tested due to safety concerns for the volunteers
- In-vitro efficacy data is therefore useful in providing a sense of breadth of efficacy (many organisms)
- Bactericidal efficacy is paramount for all settings, as bacteria make up the majority of concerning infections including MDROs and food contaminants such as Listeria, E. coli and Salmonella
- Virucidal efficacy is useful in controlling common “herd” infections such as common cold (Rhinovirus) and Norovirus that can outbreak on board
- Finally, also consider where a waterless hand sanitizer should be the solution, versus cleansing with a hand cleanser and water

Table 2 summarizes key antimicrobial efficacy testing methods as indicated by World Health Organization in their Hand Hygiene guidelines 2012 [page 29]. Summary of each test and its relevance to cruise ships is indicated. A good quality, suitable waterless hand sanitizer for use on cruise ships should definitely pass EN1500 tests to demonstrate the foundation efficacy in-vivo against bacteria. In addition, it should have available data to demonstrate in-vitro a wide breadth of activity on both gram-positive (Gr+) and gram-negative (Gr-) types of bacteria, as well as molds and yeasts. Antiviral activity is also highly desirable, demonstrating efficacy on the key pathogens, Poliovirus, Adenovirus and Norovirus.

Test Method	Organisms	Summary	Relevance for Cruise Operators
EN1500	E. coli	European standard in-vivo test method for leave-on products (sanitizers)	Very relevant. Key criterion for product acceptance for most governing authorities across Europe, Canada, Australia & Asia
EN1276/ EN12054/ ASTM E-2315	Bacteria	Standard methods for in-vitro bactericidal efficacy. EN1276 requires 5LR performance on identified strains to pass the norm	Relevant as an in-vitro indicator of efficacy across a wider range of strains than in possible using in-vivo methods. Key strains should include MRSA, Listeria & Salmonella. Also useful for demonstrating performance on spore forming organisms such as C. difficile.
EN14476	Viruses	European standard in-vitro virus efficacy test. Available for all viruses. Specific list to claim norm = Poliovirus, Adenovirus and Norovirus, 4LR required	Relevant as an in-vitro indicator of antiviral activity. Benefit is that this method can be used to test a wide range of strains, including key outbreak concerns related to influenza and common cold type viruses as well as food-borne viruses such as Norovirus.
ASTM E-2011-13	Viruses	Non-standard but recognized entire hand in-vivo method for viruses. Both hand washes & sanitizers	Relevant as an in-vivo indicator of antiviral activity however due to in-vivo approach, available on fewer virus strains than EN14476. Can be used to test strains involved in outbreaks such as Norovirus and Rhinovirus. Benefit is that this in-vivo method allows for real world application of the product i.e. uses the manufacturers recommended dosage and rubbing in time for a more realistic result than EN14476.
EN1275/EN1650	Fungi/Molds	Standard methods for in-vitro yeasticidal and fungicidal efficacy	Somewhat relevant where concerns exist for fungal or yeast food contamination such as Candida albicans or Aspergillus niger/brasiliensis. Hand Hygiene should not be the key preventative measure for such issues: surface cleansing and hygienic storage is much more important and effective.
EN 12791	Resident Skin Flora	European standard in-vivo test method for Surgical pre-operative rub formulations	Not relevant for Cruise operators
ASTM E-1115	Resident Skin Flora	US standard in-vivo test method for Surgical pre-operative rub formulations	Not relevant for Cruise operators

Table 2: Summary of Antimicrobial Test Methods

Skin Compatibility and User Preference

Skin compatibility is vital for a leave-on product (not rinsed) that may be used very frequently. Often, alcohol based waterless hand sanitizers are considered “harsh” and drying to the skin. However, this is not necessarily true and compared to washing with water, dermatologists often recommend the use of a waterless product as a preferred solution. Alcohol based products are strongly recommended for skin compatibility. Between types of alcohol, ethanol is endorsed by FDA as the sole active agent for waterless hand sanitizers that is considered generally safe and effective (GRASE status). Propanol is effective, but does not enjoy this status in the United States.

A good quality product should be selected, preferably an ethanol-alcohol based, which does not contain any additional uncontrolled active agents and that has extensive skin compatibility data available. The latter can include toxicology assessments (look for frequency of use in the scenarios tested), TEWL data for moisturization and patch testing for skin sensitivity.

User preference is a less objective assessment but in very general terms, users have consistency demonstrated preference for products which:

- Are non-sticky
- Spread easily
- Do not spill on the floor or clothes
- Smell pleasantly
- Are non-greasy and leave a pleasant after-feel

Again in general terms:

- Gel products suffer from stickiness and poor spreading/evaporation
- Liquid products are messy to use
- Propanol based products tend to smell and have a “greasy” feel
- Ethanol based foams are preferred

Build-up of Microbial Resistance

Bacteria are known to possess the ability to develop resistance to biocides when populations are in regular contact with sub-lethal doses. The key issue for MDROs is resistance to antibiotics applied post infection, as opposed to biocides used in infection prevention, however it is prudent, particularly in a semi-closed ecosystem such as a cruise ship, to use biocides for which no history of resistance is apparent. For waterless hand sanitizers, the selection is clear; choose an alcohol based product that does not rely for efficacy on other, potentially uncontrolled active agents. Alcohol is widely recognized to pose no concern for resistance build-up due to the highly broad nature of its action.

Selection of Products: Why Choose Deb InstantFOAM Complete?

Deb InstantFOAM Complete hand sanitizer is a highly suitable product for application on cruise ships. This product meets a very wide range of global efficacy standards and has a substantial portfolio of verified data in support (available on request). In addition, this is an ethanol based foam product with an outstanding history of user preference.

Selection on Aesthetic Criteria

While efficacy is clearly the paramount criterion for selection of waterless hand sanitizer, only when a product is well accepted, easy and pleasant to use will it be widely utilized. Only with wide utilization are

potential infections controlled. Table 3 and 4 summarize common aesthetic selection criteria in a simple fashion without having performed a laboratory assessment of all available products.

Selection Criterion	Foam (Deb InstantFOAM Complete)	Liquid	Gel
Spreads easily	Yes	Yes	No
Will not spill on floor or clothes	Yes	No	Yes
Non-sticky	Yes	Yes	No

Table 3: Summary of aesthetic selection criteria based on formulation type

Selection Criterion	Ethyl Alcohol (Deb InstantFOAM Complete)	Isopropanol
Spreads easily	Yes	Yes
Smells pleasantly	Yes	No
Non-greasy	Yes	No

Table 4: Summary of aesthetic selection criteria based on active

Deb invented, patented and owns the worldwide IP for foaming alcohol sanitizer formulations. Deb InstantFOAM Complete is Ethyl Alcohol based, non-greasy, neutral smelling and is presented as a patented foam formula which is non-sticky, spreads easily and does not spill.

Final Selection Conclusions for Waterless Hand Sanitizers on Cruise Ships

Alongside robust water treatment, food handling and management and surface cleansing procedures, and supplemented where appropriate by water rinsed hand cleansers, waterless hand sanitizers can play a vital role within the hand hygiene strategy for infection prevention aboard modern cruise ships. In this review, we have clarified the key scenarios for use, performance and ideal aesthetic requirements for a suitable waterless hand sanitizer for cruise ship application. Of the wide range of products reviewed, only Deb InstantFOAM Complete meets all requirements.

Deb USA Inc.

2815 Coliseum Centre Dr. Suite #600, Charlotte, NC 28217

T: 800 248 7190 F: 800 367 7408

customer.service@debgroup.com www.debgroup.com



Make Hands Matter in the Workplace



Deb InstantFOAM[®] Complete

The Complete Solution for
Hand Sanitizing

For use without water



Make Hands Matter in the Workplace



A World First Innovation

Deb InstantFOAM® Complete is the world's first alcohol-based foam hand sanitizer that is proven to be fully broad spectrum, meeting all sanitizing needs in one unique foam application.

Using patented Deb Foam Technology™ the unique perfume-free & dye-free alcohol-based liquid is dispensed as soft-structured foam and designed to be used without water to provide a complete solution for hand sanitizing, combining safety and preference with highly effective broad spectrum efficacy.



Quickly spreads across the hands

Deb InstantFOAM® Complete can be used at the immediate point of need to provide instant hand hygiene.

Ideal for use in multiple areas

The product is ideal for **critical hand hygiene situations** where closed or semi-closed quarters may increase the likelihood of outbreaks, such as **cruise ships** and **long-term care**.

Also suitable for use in all **food handling** and **food processing environments** where a higher level of hand hygiene is needed to reduce the risk of cross contamination.



Ideal for use in areas prone to outbreaks resulting from the spread of many types of common germs.

EFFICACY

Deb InstantFOAM® Complete has been fully tested and proven to provide broad spectrum activity.

"Kills up to 99.9999% of many types of germs in 15 seconds"¹

Complies with international test standards: ASTM E2315-03, EN1500, EN12791, EN1276, EN13727, EN14476, EN1650 and EN14348

PREFERENCE

Unlike with liquids, foam does not run off the hands and provides the user with complete control of the product without dripping or splashing, ensuring the full dose is applied effectively with every application. Compared with gels, foam does not contain gelling agents that leave the hands feeling sticky, particularly after multiple applications.

"84% of users prefer foam to gel due to being non-sticky and fast drying"²

Deb InstantFOAM® Complete incorporates moisturizers to leave the skin feeling smooth and refreshed after use, helping to avoid skin dryness which can be associated with use of some sanitizers in high frequency usage settings.

SUSTAINABILITY



USDA BioPreferred: Deb InstantFOAM Complete was certified by the United States Department of Agriculture to have 95% biobased content and to comply with the USDA defined thresholds for biobased Personal Care products.



EcoLogo Certification: Deb InstantFOAM Complete was certified to the UL Ecologo Standard UL 2783 for its reduced environmental impact.

SAFETY

Deb InstantFOAM® Complete has been carefully formulated with safety in mind.



Hypoallergenic

Carefully formulated to minimize the likelihood of any adverse allergic reactions occurring during use.



Non-Irritating to Skin

Dermatologically validated to show that the product has good skin compatibility and is non-irritating.



Does not create antimicrobial resistance

The highly effective non-specific, multi-target antimicrobial action of the product ensures there is no risk of antimicrobial resistance.



Non-tainting to food

Independently tested and proven not to have the potential to taint food, making it safe for use in any food handling environment. NSF E3 certified.



Compatible with gloves

Independently tested to prove the product can be applied to hands prior to wearing latex, vinyl and nitrile gloves without effecting material integrity.



¹ Test Report BSL150826-201: An evaluation of the antimicrobial properties when challenged with 58 micro-organism species using in-vitro time kill ASTM E2783-11 method.
² Independent research Commissioned by Deb

Dispenser & Pack Formats

Deb InstantFOAM® Complete is available in a range of dispenser formats and pack sizes for use in different working and public environments, to facilitate compliance through ease of availability and use:



Personal and Tabletop Pump Bottles

Suitable for use around the workplace, at the point of need and for mobile work point.

CODE	CASE QTY	SIZE
1 IFC47ML	12	47ml Pump Bottle
2 IFC400ML	6	400ml Pump Bottle



Manual Dispensers & Cartridges

Lockable, reliable, low maintenance wall-mounted manual dispensers and hygienically-sealed 1 liter cartridge.

CODE	CASE QTY	SIZE
3 IFC1L	6	1 Liter Cartridge
4 IFS1LDS	15	1L Deb InstantFOAM® Dispenser
5 SAN1LDS	15	1 Liter Sanitize Dispenser



Touch-Free Dispenser, Cartridge & Stands

Lockable, reliable, long-life battery touch-free dispenser and hygienically-sealed 1 liter cartridge. Suitable for wall-mounting or use on stands.

Hand sanitizing stations made to hold the touch-free dispenser. Note: dispenser sold separately.

CODE	CASE QTY	SIZE
6 IFC1TF	3	1 Liter Cartridge for TF Ultra
7 AUTOINFCON	8	1 Liter Deb InstantFOAM® TF Ultra Dispenser
8 92752	1	Sanitizer Stand

Support Materials

Available to Deb InstantFOAM® Complete users, Deb provides a range of educational and point of use materials to help increase hand hygiene compliance. Contact your local Deb supplier or representative for more information.



Find out more about InstantFOAM® Complete

See the Deb InstantFOAM® Complete Product Information sheet or Safety Data Sheet.

Available at www.debgroup.com

Deb InstantFOAM® Complete is part of a 4-step Deb Stoko Skin Care System to Protect, Cleanse, Sanitize and Restore the skin to keep it clean and healthy.



PROTECT



CLEANSE



SANITIZE



RESTORE

USA

Deb USA, Inc.

2815 Coliseum Centre Dr., Suite 600, Charlotte, NC 28217-1385

T: (800) 248-7190 F: (800) 367-7408

www.debgroup.com



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The world's leading away from home skin care company

InstantFOAM® Non-Alcohol PURE

Non-Alcohol Foam Hand Sanitizer

PRODUCT DESCRIPTION

Effective, perfume-free, dye-free non-alcohol based foam sanitizer to kill 99.99% of many common germs in 30 seconds when used properly.

WHERE TO USE

Areas where alcohol-based / flammable products are a concern, such as schools, prison, health institutions.

INSTRUCTIONS FOR USE

- Apply directly to dry and clean hands
- Rub across all areas of hands until dry
- No rinsing required



FORMAT: FOAM

FEATURES	BENEFITS
Non-Alcohol Based	Ideal for areas where alcohol-based products are a concern such as schools, prisons and other health institutions.
InstantFOAM™ Formula	Highly effective formula is fully tested and proven to eliminate up to 99.99% of many common germs when used properly.
Does Not Contain Gelling Agents	Unlike gel sanitizers, the product does not contain gelling agents that leave the hands feeling sticky, particularly after multiple uses.
Perfume-Free and Dye-Free	Designed for people who are sensitive to perfumes and dyes and who prefer products which do not have these added.
Pleasant to Use	The rich foam is extremely pleasant for frequent use in-between hand washing, encouraging maximum compliance.
Contains Skin Conditioners	Helps prevent drying and leave the skin feeling smooth after use.

InstantFOAM® Non-Alcohol PURE

Non-Alcohol Foam Hand Sanitizer

STATUTORY REGULATIONS

This product is manufactured and labeled in compliance with the Federal Food, Drug and Cosmetic Act issued by the Food and Drug Administration (FDA).

SAFETY DATA SHEETS

For Safety, Environmental, Handling, First Aid and Disposal information, please refer to the Safety Data Sheet which can be downloaded from www.debgroupp.com/us/sds.

SHELF LIFE

This product has a shelf life of at least 36 months from the date of manufacture when stored unopened at room temperature.

QUALITY ASSURANCE

SC Johnson Professional products are manufactured in facilities which follow Current Good Manufacturing Practice (cGMP) and/or Cosmetic GMP requirements.

All raw material used for production undergo a thorough quality control process before being used for manufacturing in our high quality products.

All finished goods are subject to intensive quality testing before being shipped out to our customers.

PRODUCT SAFETY ASSURANCE

Skin Compatibility Tests

The 48hr Single Patch Test results have been validated by a dermatologist to show the product to be 'non-irritant'.

EFFICACY TESTS

Product exhibits strong activity against a variety of Gram-positive and Gram-negative bacteria, as well as the yeast *Candida albicans*. In most instances, the reduction rates were greater than 99.99% after a 30 second exposure period.

INGREDIENTS

ACTIVE: BENZALKONIUM CHLORIDE 0.13%

INACTIVE: AQUA (WATER), PROPYLENE GLYCOL, ALOE BARBADENSIS LEAF JUICE, COCAMIDOPROPYL BETAINE, LAURAMINE OXIDE, TETRASODIUM EDTA, CITRIC ACID, MAGNESIUM NITRATE, METHYLCHLOROISOTHIAZOLINONE, MAGNESIUM CHLORIDE, METHYLISOTHIAZOLINONE

PACK SIZES

STOCK CODE	SIZE	CASE QUANTITY
55851	47ml Pump Bottle	12
55815	400ml Pump Bottle	12
55857	1 Liter Cartridge	6
AFS120TF	1.2 Liter TF Cartridge	3

SC Johnson Professional
2815 Coliseum Centre Dr. #600
Charlotte, North Carolina, 28217
United States
Telephone: 800 248 7190
www.scjp.com

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