

Below is an overview for two products, including Spray 9 and Dimethyl Benzyl Ammonium Chloride.

**Product:** Spray 9

**Chemistry<sup>4</sup>:** Water-based alkaline cleaner, clear liquid, mild odour, pH 12.7, combination of builders, detergents, emulsifiers, and surfactants.

**Purpose:** Kills bacteria, viruses and fungi as well as removing stains, grime, grease (oils)

**Suitable Surfaces<sup>1,2</sup>:** Concrete, Metal, Stainless Steel, Plastic, Rubber, Vinyl

**DO NOT USE ON<sup>4</sup>:** Glass, Leather, Treated Fabrics, Untreated Wood, Wool

**DO NOT MIX WITH<sup>4</sup>:** Acids, Bleach, Caustics (corrosives)

**Relevant Applications<sup>1</sup>:** Industrial (Commercial), Automotive, Manufacturing/Food Processing

- **Industrial<sup>1</sup>:** Conveyors, Equipment, Floors, Light Fixtures, Machinery, Motors, Tools, Vents, Walls, Work Benches
- **Automotive<sup>1</sup>:** Consoles, Dashboards, Door Panels, Engines, Tires, Trailers, Trucks, Upholstery, Wheels
- **Manufacturing<sup>1</sup>:** Floors, Hoods, Refrigerator (Exterior), Vents, Walls

**Benefits<sup>4</sup>:** Non-abrasive and non-flammable, Contains no bleach or petroleum products

**Health Concerns<sup>3</sup>:** Moderate eye irritation. Avoid contact with clothing, eyes and skin. Flush water to eyes for 15-20 minutes if eye contact is made, and call Poison Control Centre.

**Storage/Disposal<sup>3</sup>:** Keep product non-frozen. May re-fill container with same product, but DO NOT USE to store any other product.

The bacteria, fungi and viruses that Spray 9 can kill are listed below respectively (Table 1-3). Each list is organized alphabetically.

**Table 1:** Bacteria that Spray 9 can effectively kill with exposure (45 seconds)

#	Name of Bacteria
1	ATCC BAA- 1705
2	<i>Bordetella pertussis</i> -ATCC 12743
3	<i>Enterobacter aerogenes</i> -ATCC 15038
4	<i>Escherichia coli</i> (E. coli)-ATCC 35150
5	<i>Escherichia coli</i> -Carbapenem Resistant-CDC 8137
6	<i>Klebsiella pneumoniae</i> -Carbapenem Resistant-

7	<i>Listeria monocytogenes</i> -ATCC 19117
8	<i>Pseudomonas aeruginosa</i> -ATCC15442
9	<i>Salmonella enterica</i> -ATCC 10708
10	<i>Shigella dysenteriae</i> -ATCC 13313
11	<i>Staphylococcus aureus</i> – CA-MRSA-NARSA NRS123
12	<i>Staphylococcus aureus</i> – MRSA-ATCC 33592
13	<i>Staphylococcus aureus</i> -ATCC 6538
14	<i>Streptococcus pyogenes</i> -ATCC 19615

**Table 2:** Fungi that Spray 9 can effectively kill with exposure (9 minutes)

#	Name of Fungi
1	<i>Candida albicans</i> –ATCC 10231
2	<i>Trichophyton interdigitale</i> , formerly <i>Trichophyton metagrophytes</i> -ATCC 9533

**Table 3:** Viruses that Spray 9 can effectively kill with exposure (30 seconds)

#	Name of Virus
1	Adenovirus Type 2-ATCC VR-846
2	ATCC #VR-333(H1N1)
3	Coxsackie B3 Virus-ATCC VR-30
4	Hepatitis B Virus**-DHBV16 Strain
5	Hepatitis C Virus**-ATCC VR-1422
6	Herpes Simplex Virus Type I-ATCC VR-733
7	Herpes Simplex Virus Type II-ATCC VR-734
8	HIV-1**-Strain HTLV-III <sup>B</sup>
9	Influenza A <sup>2</sup> Virus-ATCC VR-544

10	Norovirus- via Surrogate Virus ATCC VR-782
11	Pandemic 2009 H1N1 Influenza A Virus-
12	Poliovirus Type I-ATCC VR-192
13	Respiratory Syncytial Virus-ATCC VR-26
14	Rhinovirus Type 37-ATCC VR-1147
15	Rotavirus-Strain WA

**References (for Spray 9):**

1. **Illinois Tool Works Inc. Year Unknown<sup>1</sup>**. Spray Nine Concrete Cleaner. Available [Online]: [https://www.spraynine.com/product/spray-nine-concrete-cleaner/?cat\\_refer=9](https://www.spraynine.com/product/spray-nine-concrete-cleaner/?cat_refer=9) [18 March 2020].
2. **Illinois Tool Works Inc. Year Unknown<sup>2</sup>**. Spray Nine Heavy Duty Cleaner and Degreaser Disinfectant. Available [Online]: <https://www.spraynine.com/product/spray-nine-cleanerdegreaser-8/> [18 March 2020].
3. **Merritt Supply. Year Unknown**. Marine Spray Nine Multi-Purpose Cleaner and Disinfectant. Available [Online]: <http://www.merrittsupply.com/wp-content/uploads/2016/12/PDS-Spray-Nine-Cleaner-PN-26932.pdf> [18 March 2020].
4. **Permatex 2019**. Technical Data Sheet. Spray Nine Heavy-Duty Cleaner, Degreaser, and Disinfectant. Available [Online]: [https://441py33rout1ptjxn2lupv31-wpengine.netdna-ssl.com/wp-content/uploads/tech\\_docs/tds/26800.pdf](https://441py33rout1ptjxn2lupv31-wpengine.netdna-ssl.com/wp-content/uploads/tech_docs/tds/26800.pdf) [18 March 2020].

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## Warehouse Disinfection

PEI Potato Board

**Product:** Dimethyl Benzyl Ammonium Chloride (Alkyl form synonymous with benzalkonium chloride)

**Chemistry:**  $C_6H_5CH_2N(CH_3)_2RCl$ , Antimicrobial quaternary amines<sup>1</sup>, water-soluble and amber color<sup>2</sup>, light yellow liquid<sup>4</sup>

**Purpose:** To kill bacteria and other microorganisms that cause illness or disease

**DO NOT MIX WITH:** Strong acids or bases, metals or strong oxidizing agents<sup>4</sup>

**Relevant Applications:** Agricultural equipment, industrial water systems<sup>1</sup>

**Health Concerns<sup>1,5</sup>:** Respiratory, skin and eye irritant, acute oral toxicity, toxic to aquatic organisms and birds.<sup>1</sup> Refer to MSDS for how to respond to inhalation, skin, eye or clothing contact.

**Resistance<sup>3,4</sup>:** Some newer studies suggest benzalkonium chloride disinfectant products could be building up resistance over time.

**Storage:** Cool, well ventilated area<sup>5</sup>

### References (for Dimethyl Benzyl Ammonium Chloride):

1. **Beyond Pesticides. Year Unknown.** Gateway on Pesticide Hazards and Safe Pest Management. Available [Online]: <https://www.beyondpesticides.org/resources/pesticide-gateway?pesticideid=89> [18 March 2020].
2. **Dunn C.G. 1937.** Antiseptic and germicidal properties of a mixture of high molecular alkyl-dimethyl-benzyl-ammonium-chlorides. *Am. J. Hyg.* **26** (1): 46.
3. **Kim M., Weigand M., Oh S., Hatt J., Krishnan R., Tezel U. and Pavlostathis S. 2018.** Widely used benzalkonium chloride disinfectants can promote antibiotic resistance. *App. Enviro. Microbio.* **84** (17).
4. **Tandukar M., Oh S., Tezel U., Konstantinidis K., Pavlostathis S. 2013.** Long-term exposure to benzalkonium chloride disinfectants results in change of microbial community structure and increased antimicrobial resistance. *Enviro. Sci. Tech.* **47**(17): 9730.
5. **ThermoFisher Scientific. 2018.** Alkyl-benzyl-dimethylammonium chloride. Safety Data Sheet. Available [Online]: <https://www.fishersci.com/store/msds?partNumber=AC263820010&productDescription=BENZALKONIUMCHLORIDE%2C+50+1LT&vendorId=VN00032119&countryCode=US&language=en> [18 March 2020].