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## Nissan “Self-Cleaning” Car

Recently, Nissan Motor Company announced in a press release that they developed a paint that repels dirt. This paint, in effect, would create a “self-cleaning” car<sup>1</sup>. Current testing is presently ongoing.

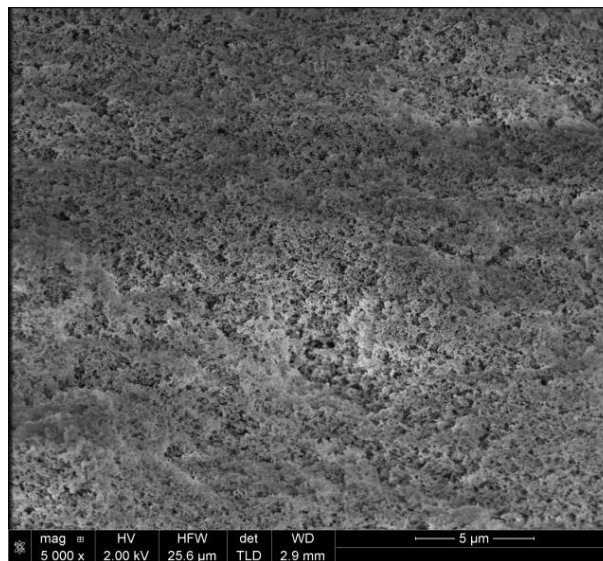
### What Is It?

According to the press release, Nissan applied “Ultra Ever-Dry®” to the body of their automobiles. The technology is not a paint, but is a coating that is applied to the car after it has been painted.

The coating is a two-step process consisting of a base coat (See Attachment A and SDS) and a top coat (See Attachment B and SDS). When applied, the aromatic solvents in the base coat evaporate and leave behind a polyisocyanate film, which has similar characteristics to polyurethane and provides an effective bonding site to the substrate and for the top coat. When the top coat is applied, the solvents evaporate and leave behind silica and a fluorocarbon. This process creates a superhydrophobic (i.e. water-repelling) and oleophobic (i.e. oil-repelling) barrier.

“Superhydrophobic” is further defined as the water droplet having contact angles greater than 150°.

To see the three-dimensional barrier that it creates, Swagelok Center for Surface Analysis of Materials at Case Western University analyzed it under an electron microscope<sup>2</sup>:

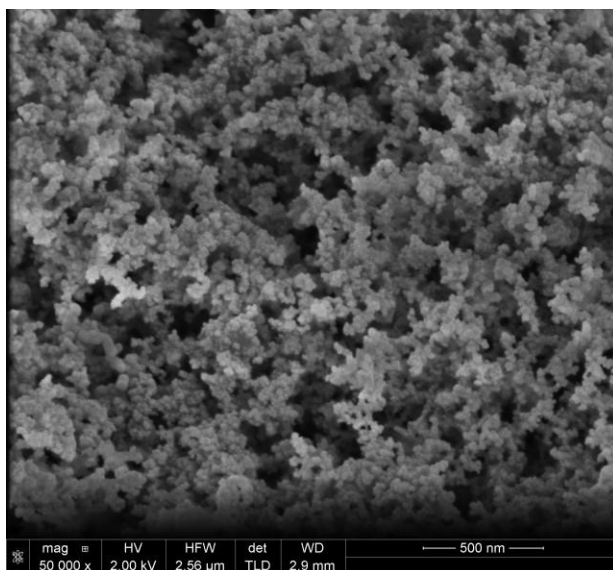


Magnification: 5,000X

Photo Credit: Dr. Amir Avisha Swagelok Center for Surface Analysis of Materials

<sup>1</sup> <http://nissannews.com/en-US/nissan/usa/releases/nissan-develops-first-self-cleaning-car-prototype>

<sup>2</sup> <http://arstechnica.com/gadgets/2013/03/the-internet-demanded-partially-scientific-testing-of-ultraeverdry-in-hd/3/>



Magnification: 50,000X

Photo Credit: Dr. Amir Avisha Swagelok Center for Surface Analysis of Materials

From the electron microscope analysis, you can see the mesh-like consistency of the branched polymers. However, the surface is not smooth but rough and uneven.

### Does It Work?

If the definition of “does it work” is “it repels water and dirt”, then yes, under certain conditions it may work as long as the dirt is sufficiently wet. The chemistry of combining the polyisocyanate film with branched silicon dioxide and fluorocarbon will give you an effective superhydrophobic and oleophobic barrier. Several videos are online demonstrating the abilities of the coating. Nonetheless, oils with particularly low surface tensions are not able to be repelled by this coating.

However, the real question is, “Can it effectively be applied to and work on cars?” Various drawbacks to the coating indicate that currently the answer is “no”. The biggest issue with this coating is that the product is not clear. The product, as applied, is white and hazy which is the reason Nissan used a white vehicle in their testing video. It is not usable on windshields or mirrors as it leaves them white. Also, as noted above, the product applies unevenly so the coat of the car would no longer be smooth. The lifetime of the product is another concern as the chemicals are susceptible to UV rays from the sun. The product’s website maintains that it will last for a maximum of one year<sup>3</sup>, but one could expect the coating to last less than a year in the driving conditions a modern driver faces. The coating will also be removed in the presence of detergents, alcohols, and solvents<sup>3</sup>. With the knowledge that not all oils are repelled by this barrier and that horizontal surfaces will still have trouble staying clean as they don’t have gravity to aid them, a customer would still have to wash their cars at times. The washing process would effectively remove the coating. The coating does not hold up to abrasion so polishing is out of the question as well. .

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<sup>3</sup> <http://www.spillcontainment.com/everdryfaqs>

### **Are there any further considerations?**

The base coat and top coat, as shipped, are both flammable and are skin and eye irritants. The top coat gives off toxic fumes and a certified respirator, along with gloves and eye protection, are required to apply the coating. The process takes about three hours to complete properly.

Environmental concerns surround the solvents used in the products. Volatile organic content (VOC) for the base coat is 83% while the top coat VOC is greater than 96%. Most states will test for the presence of acetone and xylenes and have specified limits that industries may not exceed. Acetone, in particular, is readily consumed by microorganisms. Thus, oxygen depletion in aquatic systems is a major concern when these systems have high levels of acetone. The LC50 is >100 mg/L for Fish (96 hours) for the bottom coat. The solvents are not present in the finished coating, however, there are human health<sup>4</sup> and ozone depletion<sup>5</sup> concerns associated with fluorocarbons.

### **Is it viable in the future?**

As outlined above, it is not a viable “self-cleaning” car product currently. Talks with technology executives at leading paint manufacturers indicate a pessimistic future with these “self-cleaning” paints. Even if the coatings were able to overcome the myriad of issues with the products themselves, it will still always have the problem of horizontal surfaces on cars. They see no reason to believe this technology will be available for a minimum of 10 years, if ever.

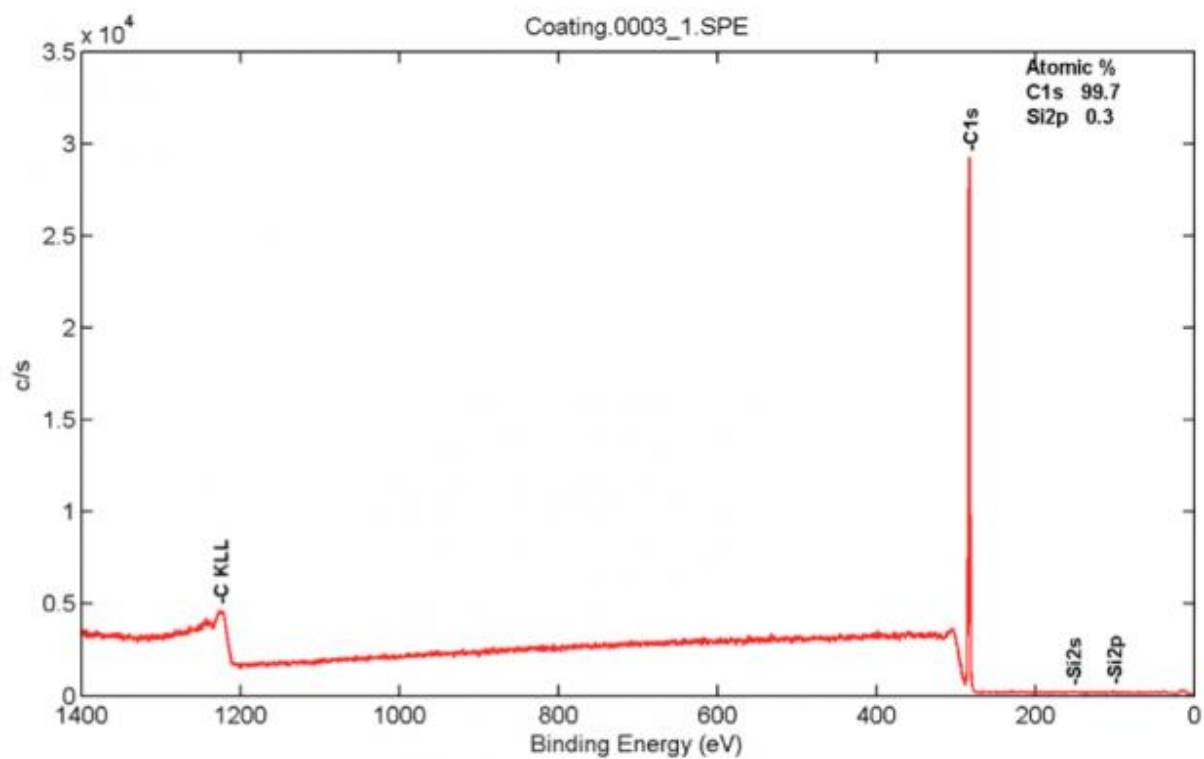
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<sup>4</sup> <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2072821/>

<sup>5</sup> <http://www.vega.org.uk/video/programme/119>

## Attachemnt A

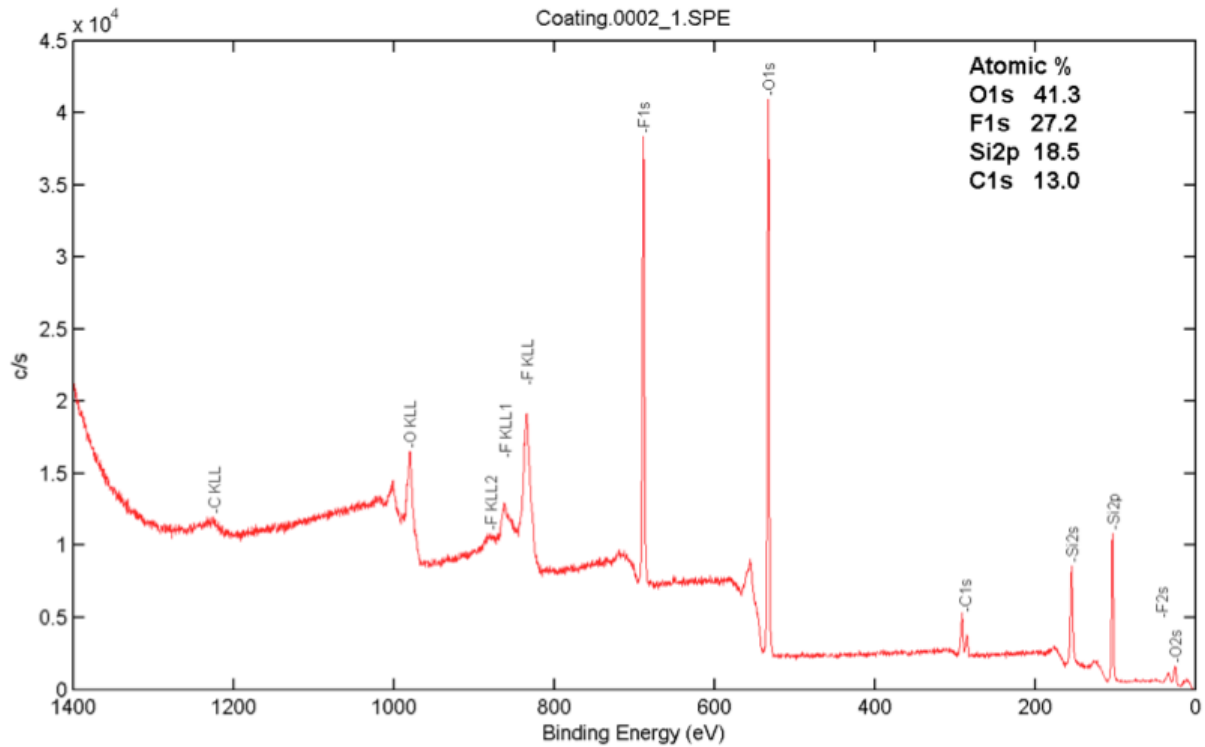
X-ray photoelectron spectroscopy (XPS) of the bottom coat. Note the long-carbon chain and trace amounts of silicone dioxide.



Credit: Dr. Wayen Jennings, Swagelok Center for Surface Analysis of Materials  
<http://arstechnica.com/gadgets/2013/03/the-internet-demanded-partially-scientific-testing-of-ultraeverdry-in-hd/3/>

## Attachment B

X-ray photoelectron spectroscopy (XPS) of the top coat. Note the fluorinated hydrocarbon and increased amount of silicon dioxide.



Credit: Dr. Wayen Jennings, Swagelok Center for Surface Analysis of Materials  
<http://arstechnica.com/gadgets/2013/03/the-internet-demanded-partially-scientific-testing-of-ultraeverdry-in-hd/3/>

*"The Professional's Choice"*

# SAFETY DATA SHEET

According to Regulation (EC) No 1907/2006 (REACH)

Version 2.1 Print date: 28/10/2013

Revision date: 28/10/2013

## Section 1 IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY/UNDERTAKING

### 1.1 Product identifier:

Identification on the label/Trade name: Ultra-Ever Dry SE Base Coat or Bottom Coat

CAS: see section 3 EC: see section 3

Index Number: N/A

REACH Pre-registration No.: N/A

Additional identification: N/A

### 1.2 Relevant identified uses of the substance and uses advised against:

#### 1.2.1 Identified uses:

Coating for various substrates exhibiting superhydrophobic characteristics.

#### 1.2.2 Uses advised against:

Not available.

### 1.3 Details of the supplier of the safety data sheet:

UltraTech International, Inc.

11542 Davis Creek Court, Jacksonville, FL 32256

Tel: 1-800-353-1611

Web Address: [www.spillcontainment.com/everdry](http://www.spillcontainment.com/everdry)

### 1.4 Emergency Telephone Number: 1-800-424-9300

Available 24 hours?

YES

NO

## Section 2 HAZARDS IDENTIFICATION

### 2.1 Classification of the substance or mixture

#### 2.1.1 Classification:

Classification in according to EU CLP 1272/2008	
Hazard classes/Hazard categories	Hazard statement
Flam. Liq. 2	H225
Skin Irrit. 2	H315
Eye Irrit. 2	H319

For full text of H- phrases: see section 2.2.

Classification in according to 1999/45/EC (DPD)	
Hazards characteristics	R-Phrases
F; R11	R11
Xi; R36	R36/38
R67	R67

For full text of R- phrases: see section 16.

#### 2.1.2 The most important adverse effects

##### 2.1.2.1 The most important adverse physicochemical effects:

Not available.

##### 2.1.2.2 The most important adverse human health effects:

May cause drowsiness or dizziness.

##### 2.1.2.3 The most important adverse environmental effects:

Not available.

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## 2.2 Label elements



**Hazard Pictograms:**

**Signal Word(S):**

**Hazard Statement:**

Danger

Highly flammable liquid and vapour.

Causes skin irritation. Causes serious eye irritation.

May cause drowsiness or dizziness.

**Precautionary Statement:**

Keep away from heat/sparks/open flames/hot surfaces.

No smoking.

Keep container tightly closed.

Use explosion-proof electrical/ventilating/lighting/equipment.

Use only non-sparking tools.

Take precautionary measures against static discharge.

Wear protective gloves/eye protection/face protection.

Wash hands thoroughly after handling.

IF ON SKIN (or hair): Take off immediately all contaminated clothing.

Rinse skin with water/shower.

In case of fire: Use foam to extinguish.

If skin irritation occurs: Get medical advice/attention.

Take off contaminated clothing and wash it before reuse.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists: Get medical advice/attention.

Store in a well-ventilated place. Keep cool.

Dispose of contents/container in accordance with local regulation.

## 2.3 Other hazards

In use, may form flammable / explosive vapour-air mixture.

### Section 3 COMPOSITION/INFORMATION ON INGREDIENTS

**Substance/Mixture:** Mixture

**Ingredient(s):**

Substance Name	CAS#	EC#	% by weight	REACH No.	Classification
Xylenes	1330-20-7	215-535-7	36%	N/A	H226, H315
t-Butyl Acetate	540-88-5	208-760-7	36%	N/A	H225
Acetone	67-64-1	200-662-2	11%	N/A	H225, H319, EUH066
Proprietary Polymer	-	-	16%	N/A	N/A
Proprietary Additives	-	-	1%	N/A	N/A

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## Section 4 FIRST AID MEASURES

### 4.1 Description of first aid measures:

#### 4.1.1 In case of inhalation:

If cough, shortness of breath or other breathing problems occur, move to fresh air. Seek medical attention. If necessary, restore normal breathing through standard first aid measures.

#### 4.1.2 In case of skin contact:

Wash thoroughly with soap and water. Seek medical attention if redness, itching, or burning occurs.

#### 4.1.3 In case of eye contact:

Flush eyes immediately with large amounts of water for 15 minutes. Seek medical attention.

#### 4.1.4 In case of ingestion:

Do not induce vomiting. Get medical attention immediately.

### 4.2 Most important symptoms and effects, both acute and delayed

The product is not classified as harmful to human health.

### 4.3 Indication of any immediate medical attention and special treatment needed

Immediately call a POISON CENTER or doctor/physician.

## Section 5 FIRE-FIGHTING MEASURES

### 5.1 Extinguishing media:

Suitable extinguishing media: Carbon Dioxide, Dry Chemical, Foam.

Unsuitable extinguishing media: Water at full jet, as it may not cool product below its flash point.

### 5.2 Special hazards arising from the substance or mixture

Not applicable.

### 5.3 Advice for fire-fighters:

Full protective equipment including self-contained breathing apparatus (MSHA/NIOSH approved or equivalent) should be used.

## Section 6 ACCIDENTAL RELEASE MEASURES

### 6.1 Personal precautions, protective equipment and emergency procedures:

Refer to section 8 of SDS for personal protection details.

### 6.2 Environmental precautions:

Do not allow to enter sewerage system.

### 6.3 Methods for containment and cleaning up:

Spills should be collected using inert absorbent. Remove all sources of ignition. Ventilate area.

### 6.4 Reference to other sections:

Refer to section 8 of the SDS.

### 6.5 Additional information:

Not available.

## Section 7 HANDLING AND STORAGE

### 7.1 Precautions for safe handling:

#### 7.1.1 Protective measures:

Keep away from heat, sparks, or open flame. Ventilate area during use and until all vapors are gone.

#### 7.1.2 Advice on general occupational hygiene:

Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

Remove contaminated clothing and protective equipment before entering eating areas.

### 7.2 Conditions for safe storage, including any incompatibilities:

Keep in closed containers when not in use.

### 7.3 Specific end use(s):

Not available.



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## Section 8 EXPOSURE CONTROL/PERSONAL PROTECTION

### 8.1 Control parameters:

8.1.1 Occupational exposure limits: Not available.

8.1.2 Additional exposure limits under the conditions of use: Not available.

8.1.3 DNEL/DMEL and PNEC-Values: Not available.

### 8.2 Exposure controls

8.2.1 Appropriate engineering controls:

Should be sufficient to reduce exposures below the workplace standards for acetone established by the national regulations to the lowest level achievable.

8.2.2 Individual protection measures, such as personal protective equipment:

Eye/face protection: Chemical type goggles, safety glasses with splash shields, or suitable face shields should be used.

Hand protection: Repeated exposure may cause skin irritation and/or sensitization. Wear impermeable gloves. e.g. PVC, Nitril. Handle in accordance with sensible hygiene and safety practice.

Body protection: Suitable protective clothing and eye protection should be in accordance with national, or regional standards and regulations.

Respiratory protection: Ventilation and respiratory protection must be used. In addition to engineering controls and safe work practices, personal protective equipment may be needed. Personal respiratory protection equipment appropriate for this material can range from (1) a reusable cartridge half face mask with organic solvent cartridge filter and particulate filter (P100); to (2) a supplied air system depending on the scope of work. A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators. Persons should not be assigned to tasks requiring the use of respirators unless it has been determined they are physically able to perform the work and are trained to use the equipment.

8.2.3 Environmental exposure controls:

Avoid discharge into the environment.

## Section 9 PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

Appearance:	Clear liquid with suspended fine particles
Colour:	Not applicable
Odour:	Sweet odor.
Odour threshold:	No data available
pH:	Not determined.
Melting point/range :	Not applicable
Boiling point/range (°C) :	140-180 °F
Flash point (°C) :	10 °F
Evaporation rate:	No data available
Flammability (solid, gas):	No data available
Ignition temperature (°C) :	No data available
Upper/lower flammability/explosive limits:	No data available
Vapour pressure (20°C) :	No data available
Vapour density:	Heavier than air
Relative Density (20°C):	No data available
Water solubility (g/l) at 20°C :	Partly soluble.
n-Octanol/Water (log Po/w) :	No data available
Auto-ignition temperature:	No data available
Decomposition temperature:	No data available
Viscosity, dynamic (20 °C):	No data available

### 9.2 Physical hazards:

Highly flammable liquid and vapour.

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## 9.3 Other information:

Fat solubility (solvent– oil to be specified) etc	Not available
Bulk Density:	Not available
Dissociation constant in water (pKa):	Not available
Oxidation-reduction Potential:	Not available
Specific Gravity:	0.84
Volatile Content:	83%

## Section 10 STABILITY AND RELIABILITY

### 10.1 Reactivity:

Stable under recommended transport or storage conditions.

### 10.2 Chemical stability:

Stable under normal temperatures and pressures.

### 10.3 Possibility of hazardous reactions:

No dangerous reactions known.

### 10.4 Conditions to avoid:

Incompatible materials.

### 10.5 Incompatible materials:

Not available.

### 10.6 Hazardous decomposition products:

Not available.

## Section 11 TOXICOLOGICAL INFORMATION

### 11.1 Toxicokinetics, metabolism and distribution

Not available.

### 11.2 Information on toxicological effects

<u>Acute toxicity:</u>	LD50 (Oral, Rat): No data available. LD50 (Dermal Rabbit): No data available. LC50 (Inhalation, Rat): No data available
<u>Skin corrosion/Irritation:</u>	Causes skin irritation.
<u>Serious eye damage/irritation:</u>	Causes serious eye irritation.
<u>Respiratory or skin sensitization:</u>	No data available.
<u>Germ cell mutagenicity:</u>	No data available.
<u>Carcinogenicity:</u>	No data available.
<u>Reproductive toxicity:</u>	No data available.
<u>STOT- single exposure:</u>	May cause drowsiness or dizziness.
<u>STOT-repeated exposure:</u>	No data available.
<u>Aspiration hazard:</u>	No data available.

## Section 12 ECOLOGICAL INFORMATION

### Toxicity:

<i>Acute toxicity</i>		<i>Time</i>	<i>Species</i>	<i>Method</i>	<i>Evaluation</i>	<i>Remarks</i>
LC50	> 100 mg/l	96h	Fish	OECD 203	N/A	N/A
EC50	N/A	24h	Daphnia	OECD 202	N/A	N/A
EC50	N/A	72h	Algae	OECD 201	N/A	N/A

**Persistence and degradability:** No data available.

**Bioaccumulative potential:** No data available.

**Mobility in soil:** No data available.

**Results of PBT&vPvB assessment:** No data available.

**Other adverse effects:** No data available.

# SAFETY DATA SHEET

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## Section 13 DISPOSAL CONSIDERATIONS

### 13.1 Waste treatment methods

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to an approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## Section 14. TRANSPORT INFORMATION

	<i>Land transport (ADR/RID)</i>	<i>Sea transport (IMDG)</i>	<i>Air transport (ICAO/IATA)</i>
<i>UN-Number:</i>	UN1263	UN1263	UN1263
<i>UN Proper shipping name:</i>	PAINT (Contains: Xylene)	PAINT (Contains: Xylene)	PAINT (Contains: Xylene)
<i>Transport hazard Class:</i>	3	3	3
<i>Packaging group:</i>	II	II	II
<i>Environmental hazards:</i>	No	No	No
<i>Special precautions for user:</i>	See section 2.2	See section 2.2	See section 2.2
<i>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</i>	IBC02	IBC02	IBC02

## Section 15 REGULATORY INFORMATION

### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Relevant regulations: No data available.

*Chemical Safety Assessment Carried Out?* YES  NO

## Section 16 OTHER INFORMATION

### 16.1 Indication of changes

Version 2.1 amended by EU No 453/2010

### 16.2 Relevant R- phrases (number and full text):

R11: Highly flammable

R36/38: Irritating to eyes and skin.

R67: Vapours may cause drowsiness and dizziness

### 16.3 Legal Disclaimer:

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The company shall not be held liable for any damage resulting from handling or from contact with the above product.

- End -

# SAFETY DATA SHEET

According to Regulation (EC) No 1907/2006 (REACH)

Version 2.1 Print date: 28/10/2013

Revision date: 28/10/2013

## Section 1 IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY/UNDERTAKING

### 1.1 Product identifier:

Identification on the label/Trade name: Ultra-Ever Dry SE (Top Coat)

CAS: see section 3 EC: see section 3

Index Number: N/A

REACH Pre-registration No.: N/A

Additional identification: N/A

### 1.2 Relevant identified uses of the substance and uses advised against:

#### 1.2.1 Identified uses:

Coating for various substrates exhibiting superhydrophobic characteristics.

#### 1.2.2 Uses advised against:

Not available.

### 1.3 Details of the supplier of the safety data sheet:

UltraTech International, Inc.

11542 Davis Creek Court, Jacksonville, FL 32256

Tel: 1-800-353-1611

Web Address: [www.spillcontainment.com/everdry](http://www.spillcontainment.com/everdry)

### 1.4 Emergency Telephone Number: 1-800-424-9300

Available 24 hours?

YES

NO

## Section 2 HAZARDS IDENTIFICATION

### 2.1 Classification of the substance or mixture

#### 2.1.1 Classification:

Classification in according to EU CLP 1272/2008	
Hazard classes/Hazard categories	Hazard statement
Flam. Liq. 2	H225
Eye Irrit. 2	H319
STOT SE 3	H336

For full text of H- phrases: see section 2.2.

Classification in according to 1999/45/EC (DPD)	
Hazards characteristics	R-Phrases
F; R11	R11
Xi; R36	R36
R66	R66
R67	R67
R23	R23

For full text of R- phrases: see section 16.

#### 2.1.2 The most important adverse effects

##### 2.1.2.1 The most important adverse physicochemical effects:

Highly flammable liquid and vapour.

##### 2.1.2.2 The most important adverse human health effects:

Causes serious eye irritation. May cause drowsiness or dizziness. May be toxic if inhaled.

##### 2.1.2.3 The most important adverse environmental effects:

Not available.

# SAFETY DATA SHEET

According to Regulation (EC) No 1907/2006 (REACH)

Version 2.1 Print date: 28/10/2013

Revision date: 28/10/2013

## 2.2 Label elements



**Hazard Pictograms:**

**Signal Word(S):** Danger

**Hazard Statement:** Highly flammable liquid and vapour.

Causes serious eye irritation.

May cause drowsiness or dizziness. May be toxic if inhaled.

High gas, vapor, mist or dust concentrations may be toxic if inhaled.

**Precautionary Statement:** Keep away from heat/sparks/open flames/hot surfaces. No smoking.

Ground/Bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting/equipment.

Use only non-sparking tools.

Take precautionary measures against static discharge.

Wear protective gloves/eye protection/face protection.

Wash hands thoroughly after handling.

Avoid breathing dust/fume/gas/mist/vapours/spray.

Use only outdoors or in a well-ventilated area.

IF ON SKIN (or hair): Take off immediately all contaminated clothing.

Rinse skin with water/shower.

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Call a POISON CENTER if you feel unwell.

In case of fire: Use foam to extinguish.

Store in a well-ventilated place. Keep container tightly closed. Keep cool.

Dispose of contents/container in accordance with local regulations.

## 2.3 Other hazards

EUH066 — Repeated exposure may cause skin dryness or cracking.

## Section 3 COMPOSITION/INFORMATION ON INGREDIENTS

**Substance/Mixture:** Mixture

**Ingredient(s):**

Substance Name	CAS#	EC#	% by weight	REACH No.	Classification
Acetone	67-64-1	200-662-2	96 – 98%	-	H225, H319, H336, EUH066
Silica	112945-52-5	-	2 – 4%	-	N/A
Proprietary Additive	-	-	1%	-	N/A

## Section 4 FIRST AID MEASURES

### 4.1 Description of first aid measures:

4.1.1 In case of inhalation:

If cough, shortness of breath or other breathing problems occur, move to fresh air. Seek medical attention. If necessary, restore normal breathing through standard first aid measures.

# SAFETY DATA SHEET

According to Regulation (EC) No 1907/2006 (REACH)

Version 2.1 Print date: 28/10/2013

Revision date: 28/10/2013

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## 4.1.2 In case of skin contact:

Wash thoroughly with soap and water. Seek medical attention if redness, itching, or burning occurs.

## 4.1.3 In case of eyes contact:

Flush eyes immediately with large amounts of water for 15 minutes. Seek medical attention.

## 4.1.4 In case of ingestion:

Do not induce vomiting. Get medical attention immediately.

## 4.2 Most important symptoms and effects, both acute and delayed

The product is not classified as harmful to human health.

## 4.3 Indication of any immediate medical attention and special treatment needed

Immediately call a POISON CENTER or doctor/physician.

## Section 5 FIRE-FIGHTING MEASURES

### 5.1 Extinguishing media:

Suitable extinguishing media: Carbon Dioxide, Dry Chemical, Foam.

Unsuitable extinguishing media: N/A.

### 5.2 Special hazards arising from the substance or mixture

Not applicable.

### 5.3 Advice for fire-fighters:

Full protective equipment including self-contained breathing apparatus (MSHA/NIOSH approved or equivalent) should be used.

## Section 6 ACCIDENTAL RELEASE MEASURES

### 6.1 Personal precautions, protective equipment and emergency procedures:

Refer to section 8 of SDS for personal protection details.

### 6.2 Environmental precautions:

Do not allow to enter sewerage system.

### 6.3 Methods for containment and cleaning up:

Spills should be collected using inert absorbent. Remove all sources of ignition. Ventilate area.

### 6.4 Reference to other sections:

Refer to section 8 of the SDS.

### 6.5 Additional information:

Not available.

## Section 7 HANDLING AND STORAGE

### 7.1 Precautions for safe handling:

#### 7.1.1 Protective measures:

Keep away from heat, sparks, or open flame. Ventilate area during use and until all vapors are gone.

#### 7.1.2 Advice on general occupational hygiene:

Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

Remove contaminated clothing and protective equipment before entering eating areas.

### 7.2 Conditions for safe storage, including any incompatibilities:

Keep in closed containers when not in use.

### 7.3 Specific end use(s):

Not available.

## Section 8 EXPOSURE CONTROL/PERSONAL PROTECTION

### 8.1 Control parameters:

8.1.1 Occupational exposure limits: Not available.

8.1.2 Additional exposure limits under the conditions of use: Not available.

8.1.3 DNEL/DMEL and PNEC-Values: Not available.

# SAFETY DATA SHEET

According to Regulation (EC) No 1907/2006 (REACH)

Version 2.1 Print date: 28/10/2013

Revision date: 28/10/2013

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## 8.2 Exposure controls

### 8.2.1 Appropriate engineering controls:

Should be sufficient to reduce exposures below the workplace standards for acetone established by the national regulations to the lowest level achievable.

### 8.2.2 Individual protection measures, such as personal protective equipment :

Eye/face protection: Chemical type goggles, safety glasses with splash shields, or suitable face shields should be used.

Hand protection: Repeated exposure may cause skin irritation and/or sensitization. Wear impermeable gloves. e.g. PVC, Nitril. Handle in accordance with sensible hygiene and safety practice.

Body protection: Suitable protective clothing and eye protection should be in accordance with national, or regional standards and regulations.

Respiratory protection: Ventilation and respiratory protection must be used. In addition to engineering controls and safe work practices, personal protective equipment may be needed. Personal respiratory protection equipment appropriate for this material can range from (1) a reusable cartridge half face mask with organic solvent cartridge filter and particulate filter (P100); to (2) a supplied air system depending on the scope of work. A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 or applicable federal/provincial requirements must be followed whenever workplace conditions warrant respirator use. NIOSH's "Respirator Decision Logic" may be useful in determining the suitability of various types of respirators. Persons should not be assigned to tasks requiring the use of respirators unless it has been determined they are physically able to perform the work and are trained to use the equipment.

### 8.2.3 Environmental exposure controls:

Avoid discharge into the environment.

## Section 9 PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

Appearance:	Clear liquid with suspended fine particles
Colour:	Not applicable
Odour:	Fragrant mint like odor.
Odour threshold:	No data available
pH:	Not determined.
Melting point/range :	-139 °F
Boiling point/range (°C) :	133 °F
Flash point (°C) :	-4 °F
Evaporation rate:	No data available
Flammability (solid, gas):	No data available
Ignition temperature (°C) :	No data available
Upper/lower flammability/explosive limits:	No data available
Vapour pressure (20°C) :	No data available
Vapour density:	2.0 Heavier than air
Relative Density (20°C):	No data available
Water solubility (g/l) at 20°C :	Mostly soluble.
n-Octanol/Water (log Po/w) :	No data available
Auto-ignition temperature:	No data available
Decomposition temperature:	No data available
Viscosity, dynamic (20 °C):	No data available

### 9.2 Physical hazards:

Highly flammable liquid and vapour.

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## 9.3 Other information:

Fat solubility (solvent– oil to be specified) etc	Not available
Bulk Density:	Not available
Dissociation constant in water (pKa):	Not available
Oxidation-reduction Potential:	Not available
Specific Gravity:	0.79
Volatile Content:	98%

## Section 10 STABILITY AND RELIABILITY

### 10.1 Reactivity:

Stable under recommended transport or storage conditions.

### 10.2 Chemical stability:

Stable under normal temperatures and pressures.

### 10.3 Possibility of hazardous reactions:

No dangerous reactions known.

### 10.4 Conditions to avoid:

Incompatible materials.

### 10.5 Incompatible materials:

Not available.

### 10.6 Hazardous decomposition products:

Not available.

## Section 11 TOXICOLOGICAL INFORMATION

### 11.1 Toxicokinetics, metabolism and distribution

Not available.

### 11.2 Information on toxicological effects

<u>Acute toxicity (Acetone):</u>	LD50 (Oral, Rat): 5800 mg/kg LD50 (Dermal Rabbit): No data available. LC50 (Inhalation, Rat): 50,100mg/m3
<u>Acute toxicity (Mixture):</u>	No data available.
<u>Skin corrosion/Irritation:</u>	No data available.
<u>Serious eye damage/irritation:</u>	Causes serious eye irritation.
<u>Respiratory or skin sensitization:</u>	No data available. May be toxic if inhaled.
<u>Germ cell mutagenicity:</u>	No data available.
<u>Carcinogenicity:</u>	No data available.
<u>Reproductive toxicity:</u>	No data available.
<u>STOT- single exposure:</u>	May cause drowsiness or dizziness.
<u>STOT-repeated exposure:</u>	No data available.
<u>Aspiration hazard:</u>	No data available.

## Section 12 ECOLOGICAL INFORMATION

### Toxicity:

<i>Acute toxicity</i>		<i>Time</i>	<i>Species</i>	<i>Method</i>	<i>Evaluation</i>	<i>Remarks</i>
LC50	N/A	96h	Fish	OECD 203	N/A	N/A
EC50	N/A	24h	Daphnia	OECD 202	N/A	N/A
EC50	N/A	72h	Algae	OECD 201	N/A	N/A

**Persistence and degradability:** No data available.

**Bioaccumulative potential:** No data available.

**Mobility in soil:** No data available.

**Results of PBT&vPvB assessment:** No data available.

**Other adverse effects:** No data available.



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## Section 13 DISPOSAL CONSIDERATIONS

### 13.1 Waste treatment methods

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to an approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

## Section 14. TRANSPORT INFORMATION

	<i>Land transport (ADR/RID)</i>	<i>Sea transport (IMDG)</i>	<i>Air transport (ICAO/IATA)</i>
<i>UN-Number:</i>	UN1263	UN1263	UN1263
<i>UN Proper shipping name:</i>	PAINT (Contains: Acetone)	PAINT (Contains: Acetone)	PAINT (Contains: Acetone)
<i>Transport hazard Class:</i>	3	3	3
<i>Packaging group:</i>	II	II	II
<i>Environmental hazards:</i>	Not applicable	Not applicable	Not applicable
<i>Special precautions for user:</i>	See section 2.2	See section 2.2	See section 2.2
<i>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</i>	IBC02	IBC02	IBC02

## Section 15 REGULATORY INFORMATION

### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Relevant regulations: No data available.

*Chemical Safety Assessment Carried Out?* YES  NO

## Section 16 OTHER INFORMATION

### 16.1 Indication of changes

Version 2.1 amended by EU No 453/2010

### 16.2 Relevant R- phrases (number and full text):

R11: Highly flammable

R23: Toxic by inhalation

R36: Irritating to eyes

R66: Repeated exposure may cause skin dryness or cracking

R67: Vapours may cause drowsiness and dizziness

### 16.3 Legal Disclaimer:

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The company shall not be held liable for any damage resulting from handling or from contact with the above product.

- End -