

# The dirty business of cleaning

WHY HOUSEHOLD  
CLEANING PRODUCTS  
ARE BAD FOR YOUR HEALTH

A WHITE PAPER PRODUCED BY ENJO UK

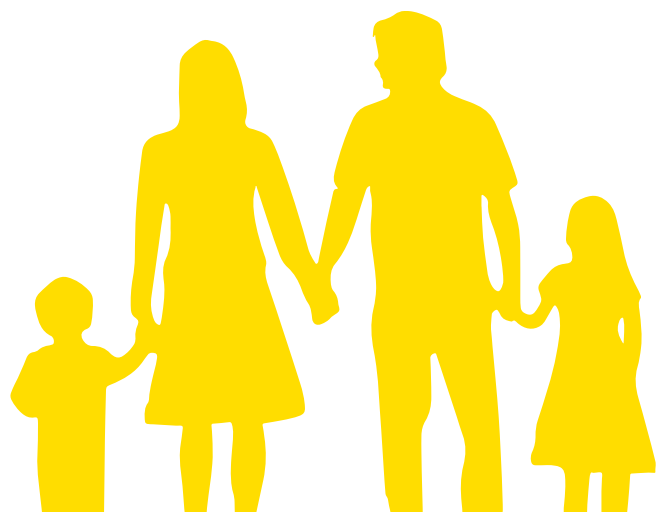




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## Contents

1. Executive summary
2. Introduction
3. Which chemicals are lurking in our homes?
4. What's in our cleaning products?
5. How is our health affected?
  - a. Adults
  - b. Children
  - c. Pets
  - d. Product developments
6. How can we reduce the risk to health?
7. Conclusion
8. References



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that the regular use  
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for health.

## Executive Summary

In recent years there have been an increasing number of concerns raised over the chemicals and toxins found within our homes.

Research into regular house dust has discovered that our homes are host to a huge number of potentially toxic chemicals, which can enter our bodies through direct contact or inhalation. Children and pets are particularly sensitive to this; children's brains and bodies are still developing, and pets have a faster metabolism and smaller lungs than their owners. Also, both groups spend most of their time in the low-level zone of the home where toxins settle.

But cleaning our homes using standard chemical products is problematic in itself - studies have shown that the regular use of cleaning products can be harmful for health, causing respiratory problems and skin conditions, and affecting reproductive function.

Popular products such as sprays and wipes cause additional problems. Sprays leave behind tiny airborne particles that can damage the lungs when inhaled, and wipes have been shown to be ineffective at properly removing harmful bacteria. And even supposedly environmentally friendly 'eco products' can still contain health-harming toxins.

Experts agree that the safest way to clean your home, with minimal risk to health and the environment, is by using a fibre cloth and water.



## Introduction

Concerns over the chemicals and toxins found within our homes have increased over recent years, and the evidence that these can harm your health is now significant.

Toxic Home Syndrome, the potentially dangerous build-up of indoor pollutants from common cleaners and other products, has been widely reported in the media.

According to Peter Howarth, Professor of Allergy and Respiratory medicine at Southampton University:<sup>1</sup>

“Toxic Home Syndrome occurs when individuals and families are exposed to a potent mix of airborne pollutants within the home arising from poor ventilation, causing respiratory and skin diseases to occur more frequently.”

Indeed, a study from the University of Bergen found that regular use of cleaning sprays can be as bad for your lungs as smoking 20 cigarettes a day.<sup>2</sup>

We spend a great deal of time trying to keep our homes clean and fresh; nearly one-third of us clean every day,<sup>3</sup> and throughout their lives, UK residents will spend a total of 1 year, 5 months and 19 days cleaning!<sup>4</sup> This means that the average person is exposed to a significant amount of potentially harmful chemicals. And product developments, particularly sprays and wipes, are compounding this problem.

We have developed this white paper to explain:

- Which chemicals you could expect to find in your household cleaning products
- The impact these could have on your health
- What you can do to protect yourself and your family

## Which chemicals are lurking in our homes?

Our homes should be a safe haven for our families, but a 2016 US study found as many as 45 toxic chemicals in regular house dust.<sup>5</sup> The study has been recognised as relevant in the UK because these chemicals are widely used across the world and have been detected in homes in the UK and other European countries.

The dust was found to contain a variety of consumer product and building material chemicals that have been linked to health risks for adults and children. These include:



### Phthalates

Phthalates are a group of chemicals used to make plastic softer and more flexible, so that it's harder to break. They are found in vinyl flooring, vinyl blinds, and food packaging. They also appear in personal care products and fragranced products.



### Environmental phenols

You'll find these used as preservatives in personal care products; in plastic materials such as reusable water bottles; and in cleaning products like detergents.



### Flame retardants

These chemicals are used to make furniture, baby products, electronics, and building insulation meet flammability standards.



### Fragrances

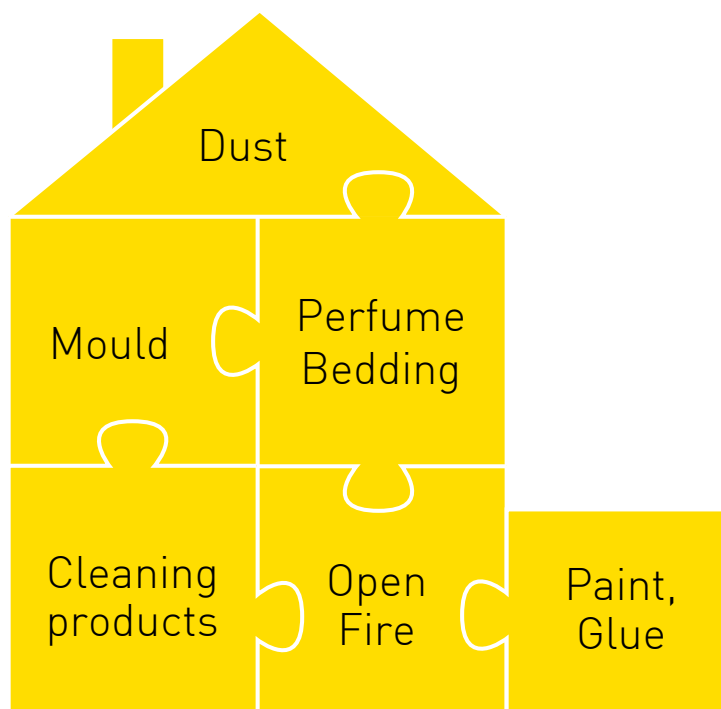
Fragrances are found in a wide variety of household products, including personal care products, cleaning products and candles.



### Fluorinated chemicals

These chemicals are used to make textile items, such as upholstery, carpets, clothes and shoes, resistant to water and stains. You could also find them in non-stick cookware and in greaseproof food containers such as pizza boxes or popcorn bags.





**Each area of the home presents unique challenges.**

This is just a selection of the substances discovered in our homes, yet it demonstrates that we live alongside chemicals from a variety of materials and products. The diagram above shows how each area of your home could be affected.

Experts now believe that there is an urgent need to consider the indoor environment as a crucial source of chemical pollutant exposure. The US study supports the view that it is not just direct skin exposure to chemicals that is the problem; house dust carries these chemicals

into the body when inhaled. And the improved insulation found in modern housing means that the polluted air is effectively sealed inside the building, exacerbating the impact on your health. With the rise in recent years of home working,<sup>6</sup> exposure to these risks will be increased.

So, what can we do to address this? While there is often little you can do to change the building materials that make up the fabric of your home, the products that you use inside the home deserve closer scrutiny.



## What's in my cleaning products?

The first liquid soap for household cleaning - PineSol - was developed at the end of the 19th century. Today, a multi-million pound industry offers us all manner of creams, liquids, sprays and wipes to clean our homes. But what do they contain?

In a study funded by the European Commission's Joint Research Centre, solvent use in the home was identified as one of four sectors that had the highest impact on human health.<sup>7</sup> The process of buying cleaning products is such a common occurrence that many of us never bother to read the labels, having used the same product for years, or simply continued to buy the products our parents used. Yet a quick browse on the supermarket shelf will reveal how toxic many of these products are. Did you know that residues of antibacterial wipes should be disposed to a special waste collection point? Or that a popular window cleaning product warns you not to breathe in the spray?

### Volatile organic compounds

In addition to the previous list of chemicals, some of the products we use to clean our homes, such as detergents and furniture polish, contain chemicals called volatile organic compounds (VOCs).<sup>8</sup> These are chemicals that start off as a solid or liquid but very easily evaporate into vapours or gases. Examples of these are acetone, benzene and formaldehyde. When products containing VOCs are used, or even stored, they evaporate into the air and enter your bloodstream through inhalation. Research suggests VOCs can irritate the lungs, particularly in children.<sup>9</sup>



## How is our health affected?

Chemicals in cleaning products have been shown to have a significant impact on the health of all family members - adults, children and pets.

### ADULTS

Chemical exposure in the home has been mainly linked to respiratory health, skin conditions and reproductive functions.

### Respiratory health

Although most of us use a seemingly small amount of cleaning product each time we clean, research has suggested that the regularity with which we use these products builds up over time to result in significant exposure, which can affect lung function.

"In the long run, cleaning chemicals are very likely to cause rather substantial damage to your lungs."

Oistein Svanes, Department of Clinical Science, University of Bergen

The University of Bergen analysed data from more than 6,200 participants for more than 20 years; participants had an average age of 34 at the beginning of the study.<sup>10</sup> The results showed that cleaners have a 40 per cent higher risk of developing asthma than others. In fact, lung function decline in those working as cleaners or regularly using cleaning products at home was comparable to smoking 20 cigarettes a day over 10 to 20 years. Day after day, year after year, the damage caused by these chemicals was increasing.

### Cleaning sprays

The Bergen study found that cleaning sprays were the main culprit affecting lung function, with small particles remaining in the air for hours after cleaning.

This makes sense - if your cleaning product leaves a lingering scent then clearly you are still ingesting it, however small the amount. And anecdotally, many people complain of wheezing when using sprays to clean their shower. According to Professor Cecilie Svanes, from the University of Bergen's Department of Global Public Health and Primary Care, these small particles can travel deep into the lungs, causing damage and infections.

Aside from professional cleaning, a 2009 European study showed that cleaning at home with sprays has a significant impact on respiratory health.<sup>11</sup> Following analysis of more than 3,500 people across 10 countries, results linked asthma symptoms with those using sprays at least once per week. The study also found that physician-diagnosed asthma was more prevalent in those cleaning with sprays more than 4 days per week. Conversely, products not in spray form were not linked with asthma.

The British Lung Foundation raises similar concerns over sprays and calls for more research into the effects of breathing in these chemicals in our homes.<sup>12</sup>

### Skin conditions

Detergents in our cleaning products designed to remove grease, oil and dirt have been linked to skin conditions such as eczema and dermatitis. The National Eczema Society<sup>13</sup> claims that these products can make existing conditions worse and even cause conditions to occur in otherwise healthy skin, stating that:

"Household cleaners, detergents and sprays, whether in liquid form or as airborne particles, can irritate the skin of people with eczema. In particular they can cause a type of eczema called irritant contact dermatitis (ICD)".

## Case Study

It may not seem obvious but the products that you use to clean the bath can have a significant effect on your skin. Daisy, age 2, struggled for years with painful eczema and was constantly visiting the doctor to try new treatments. After her mother stopped using chemicals to clean the bath and introduced a cleaning routine using fibre cloths and water, Daisy's skin cleared up almost immediately. Her mother said:

"For the first year and a half of her life, my daughter suffered with eczema all over her body. She would cry her eyes out as she clawed at her itchy skin, and needed Piriton and wet wraps every day to help soothe it.

It was stressful and extremely upsetting. We tried every cream, avoided certain foods, ditched the shop-bought products, but nothing worked. One day our health visitor suggested we look at our cleaning products.

I had never thought about my daughter bathing in the chemical residue that I was leaving in the bath after cleaning. Or the residue from the chemical cleaners I was using on my surfaces and floors.

I removed all chemical cleaning products in our home and switched to a fibre cloth and water cleaning system, and finally Daisy's skin started to clear up! We couldn't believe such a simple change would have such a significant effect. I had no idea how bad chemical cleaners were for my family's health, and I would recommend that anyone with skin conditions try switching to a chemical-free method."



## Reproductive functions

Chemical exposure has been associated with problems with both male and female reproductive functions.<sup>14</sup> A study from the University of Melbourne found that a group of chemicals called endocrine disrupting chemicals (EDCs), present in many cleaning

products, can affect the quality of sperm, eggs and embryos.<sup>15</sup> Glycol ethers and phthalates, found in many cleaning products and personal care products, have also been shown to cause low sperm motility.<sup>16</sup>

“Since children spend 80% of their time indoors and with increasing drives to conserve heat with the ‘sealing’ of homes, pollution exposure indoors becomes a major issue for children’s health and development.”

Professor Stephen Holgate, co-chair of the Indoor Air Quality Working Group and special adviser to the Royal College of Physicians on air quality

## CHILDREN

Babies and children are particularly vulnerable to the health effects of chemicals in the home,<sup>17</sup> because:

- > Their brains and bodies are still developing, so they have narrower airways and a higher need for oxygen than adults.<sup>18</sup>
- > They often play or crawl on the floor and frequently touch their mouths, increasing their exposure to chemicals.

Because toxins are heavier than air, toxic particles settle in a low level invisible 'cloud' throughout your home. This zone is exactly where children and pets spend almost all of their time within the home.

Equipment used by children and babies, such as highchairs and plastic toys, also require regular cleaning. Sprays and wipes are commonly used to clean these items, leaving residues in the air and on the surface to be inhaled or absorbed by the child.

In the Bergen University study, almost all of the dust samples were found to contain phthalates, which have been linked to developmental problems in babies.

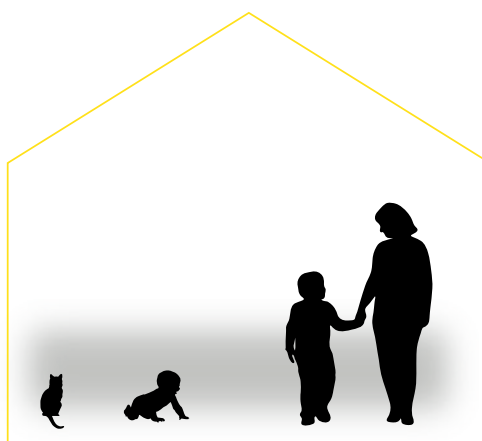
In fact, experts have suggested that many of the chemicals found in everyday products could result in neurodevelopmental disorders, including autism and attention-deficit disorders.<sup>19</sup>

As a result of the mounting evidence, the British Royal College of Physicians and the Royal College of Paediatrics and Children's Health announced in February 2018 that they will carry out a major study on the impacts of indoor air pollution on children's health, with the report due to be published in autumn 2019.<sup>20</sup>

Explaining the reasons for the study, Professor Stephen Holgate, co-chair of the Indoor Air Quality Working Group and special adviser to the Royal College of Physicians on air quality, stated:

"Since children spend 80% of their time indoors and with increasing drives to conserve heat with the 'sealing' of homes, pollution exposure indoors becomes a major issue for children's health and development."

Said to be the world's first comprehensive study of its kind, the research will consider all factors of indoor air pollution, including chemical exposure from household products. The research team aims to raise awareness of the issues affecting the health of children exposed to indoor air pollution and to provide practical recommendations to government.





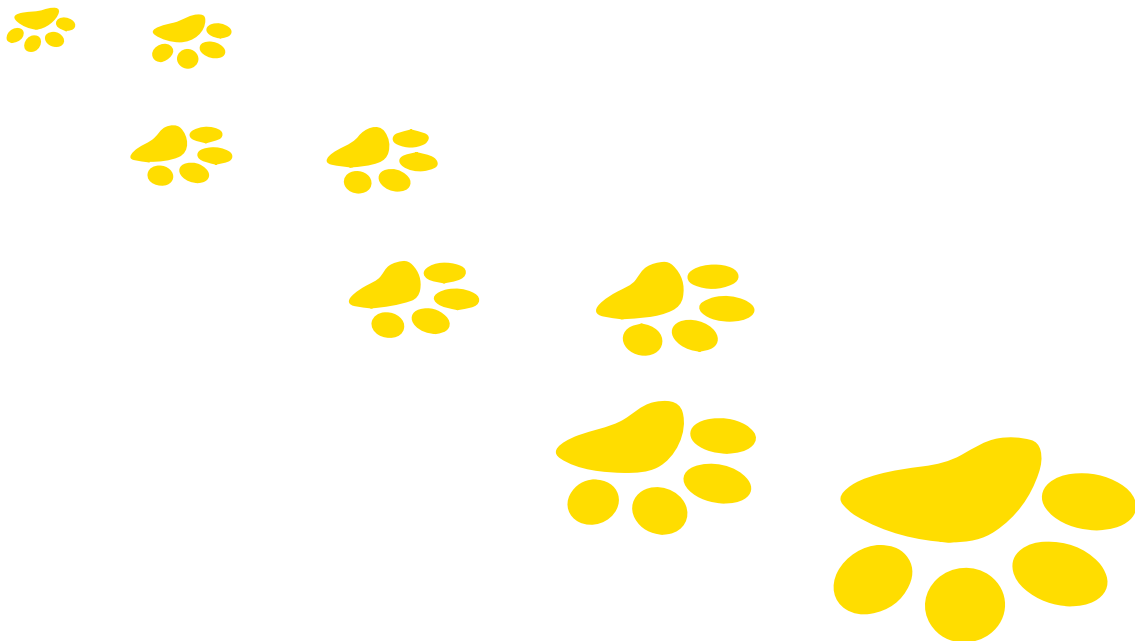


## PETS

By their very nature, your pets are curious and like to explore any new objects in their home. Coupled with a lack of awareness of toxic hazards, this curiosity puts pets at risk from accidentally ingesting harmful cleaning products. Not only can these chemicals cause permanent damage to their skin or stomach; they can also prove fatal to your pet.<sup>21</sup>

Thankfully most cleaning products are not attractive to pets and you can take steps to store them out of reach; however, once these products are applied throughout your home, they can inadvertently cause harm to your beloved four-legged friends.

As with children, pets tend to inhabit the lower levels of your home, where toxins such as chlorine settle. But because pets have a faster metabolism and smaller lungs than their owners, their bodies will ingest and process toxins even faster than children.<sup>22</sup> And although your pet's paws are robust enough for long walks outside, they are surprisingly absorbent, allowing chemicals underfoot to pass into the bloodstream.





## PRODUCT DEVELOPMENTS

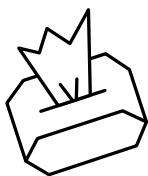
In addition to the formulation of cleaning products, the method of using the product is also a cause for concern. The early days of cleaning products favoured liquids and solid bar formats. As products developed, sprays and wipes have gained in popularity, perhaps due to their speed and ease of use. However, while these may be convenient, they are less impressive in other areas.

### Sprays

Sprays are a common sight on supermarket shelves, but this method of delivery can be much more harmful to humans than their liquid and bar predecessors. Sprays disperse tiny particles in the air, which linger and can enter your airways.

### Wipes

Antibacterial wipes are a popular choice for many households due to their ease of use and impressive claims, however concerns have been raised over how effective they actually are.<sup>23</sup> This could be due to confusion over the difference between cleaning (physically removing dirt) and disinfecting (killing bacteria). Antibacterial wipes will kill bacteria but not remove dirt, so a previously unclean surface will remain so after using a wipe.



Furthermore, the wipes' disinfecting agent must remain on the surface for a significant period of time (between 4 and 10 minutes) to fully act. This requires multiple applications during that time to keep the surface wet; an instruction most users do not follow.

According to a study from Cardiff University, the wipes are often simply spreading bacteria around.<sup>24</sup> And even when most bacteria have been removed, they replicate and return to your surfaces very quickly if just a single cell is left.<sup>25</sup>

In an experiment measuring bacteria on a child's highchair tray, wipes were less successful at removing this than simply wiping with a fibre cloth and water.<sup>26</sup>

Additionally, wet wipes have been reported recently as being the biggest cause of sewer blockages. As part of the government's efforts to reduce single-use plastic, the Department for Environment, Food and Rural Affairs (DEFRA) is working with manufacturers to investigate ways of preventing wet wipes entering our waterways and damaging our marine environment.

### What about eco products?

So-called 'eco-friendly' products have risen in popularity in recent years, which indicates a desire for products that are safer for both our families and the environment. However, these can also contain ingredients that are surprisingly toxic, such as sodium lauryl sulphate (SLS).

According to Professor Richard Guy, from Bath University's Department of Pharmacy and Pharmacology, SLS can cause severe skin irritation and reduce the effectiveness of skin function when left in contact with healthy skin.<sup>27</sup>

Ultimately, if a product uses a biocide (a chemical that destroys or inhibits the growth or activity of living organisms by poisoning) rather than a physical action to be effective, then it still has the potential to cause harm.



## How can we reduce the risk to our health?

There are a number of steps that consumers can take to reduce the risk to health:

### 1. Make careful choices about any cleaning products that you buy

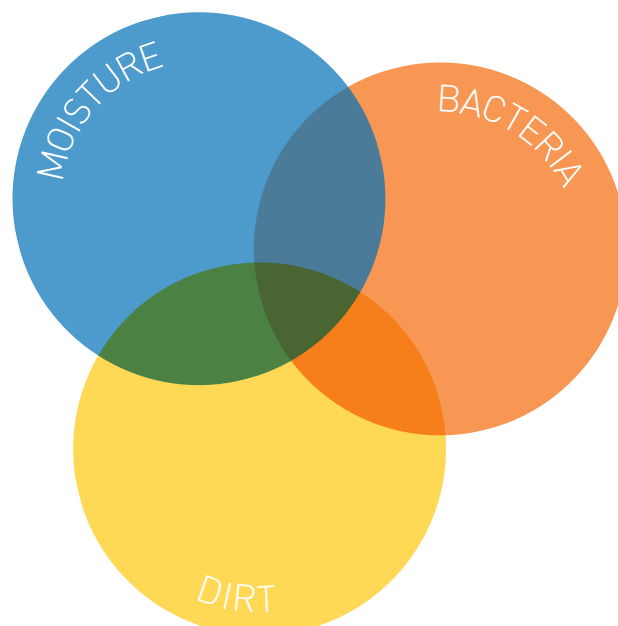
This will help to get the message across to companies and policymakers that people care about the effects of these chemicals on their family's health and wellbeing.

### 2. Consider other ways of cleaning

The British Lung Foundation advises that the best way to avoid coming into contact with chemicals found in cleaning products is not to use them, and especially to avoid sprays.<sup>28</sup> There are many 'homemade' cleaning recipes out there, but be aware that these can cause their own problems. For example, tea tree oil is effective at treating bacterial and fungal conditions but can prove fatal for pets.<sup>29</sup> Professor Svanes from the University of Bergen states that a microfibre cloth and water are more than enough for most cleaning purposes.

This statement is supported by a study undertaken in June 2017 by Siegfried Lerchbaumer, an expert in ambient air hygiene, to measure the impact of different cleaning methods on dust dispersion.<sup>30</sup> The test results showed that levels of dust pollution varied highly depending on the cleaning method used and were highest using a broom or mop. By contrast, the fibre cloth method that he tested dispersed 13 times less dust when compared to conventional cleaning, especially when used regularly.

A structured cleaning regime that includes a fibre cloth and water to remove dirt and bacteria, followed by a drying stage to remove moisture, will provide the most hygienic solution.

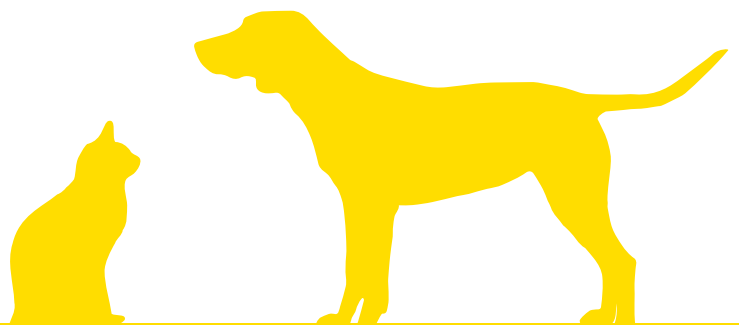


## Conclusion

Toxic chemicals are found throughout our homes and pose a significant risk to health through direct contact and inhalation.

Regular household dust contains a number of potential toxins, while the cleaning products that we use to get rid of dust - particularly sprays, and even those branded as eco-friendly - have been shown to cause harm to adults, children and pets. This is due to their ingredients and also because of their regular use.

The best way to avoid chemicals in your home is to choose an alternative cleaning method, such as a fibre cloth and water, that has been shown to effectively remove dirt with minimal dispersion.



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