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IMPORTANT

ppm
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CLEANERS NEED A HAND

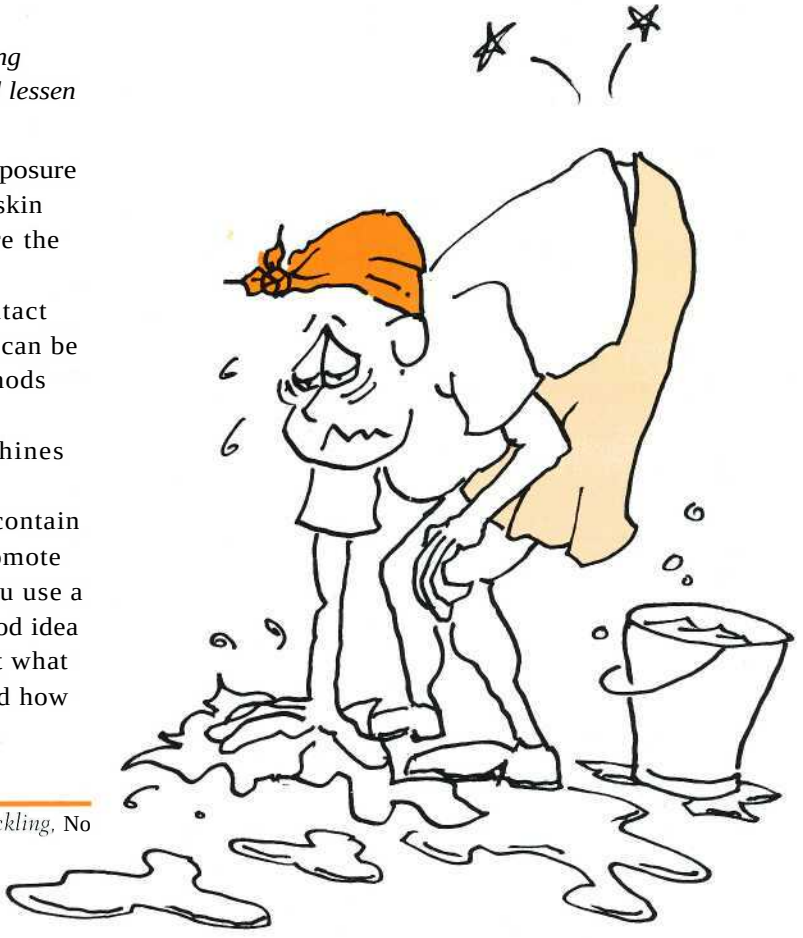
Hand eczema is common among cleaning personnel. A few practical hints could lessen the risk:

Eczema is often caused by repeated exposure to water and cleaning detergents. The skin dries out and becomes rough. These are the first signs of a developing eczema.

The first thing to do is to minimise contact with water and liquid detergents. This can be achieved by applying dry cleaning methods instead of wet.

Large areas could be cleaned with machines that operate with steam, for instance.

Many detergents and cleaning liquids contain preservatives and solvents that may promote the development of skin allergies. If you use a particular detergent regularly, it is a good idea to contact the manufacturer to find out what substances are used in the product, and how best to protect the skin.



Source: Ostcrbo, A. 1996, *Arbetsliv i utveckling,* No 3/96 p12

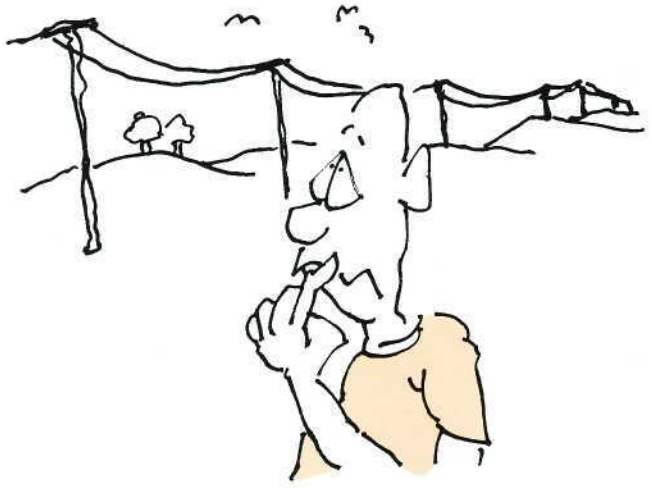
To All our Readers:

Merry Christmas and a Safe 1907!

ELECTRIC FIELDS AND HEALTH RISKS:

AMERICANS FIND NO CONNECTION

The American National Research Council has spent two years sifting through nearly twenty years of research on high-voltage power lines, and have found no link between electromagnetic fields and any human disease.



The project included some 500 studies, spanning from 1979 to today, and included humans, animals, and even experiments on cells in test tubes. No evidence was found of cancer, reproductive disorders, learning problems or behavioural conditions being caused by high voltage fields, even where the experiments involved very high energy fields.

WEAK LEUKAEMIA LINK

The committee was unable to rule out a statistical link between childhood leukaemia and high-voltage power lines. On the other hand, the analysis could not find any conclusive evidence that there was a definite association between electromagnetic fields and blood cancer. So far, available research has been reluctant to blame electromagnetic fields directly for the statistically higher incidence of leukaemia in children living near power lines.

The NRC report, while not finding any conclusive evidence that electromagnetic fields have negative health effects, advised that more research should be devoted to both leukaemia and breast cancer in connection with high-voltage power lines.

Four US government laboratories are currently conducting a US$65 million study on the biological effects of electromagnetic fields. Results are expected in 1997.

...BUT SOME DISAGREE

The latest research from Canada suggests that living near power lines can indeed be a hazard, resulting in leukaemia, depression, Alzheimer's disease and even suicidal tendencies.

According to professor Gilles Theriault, MacGill University, Montreal, the risk of leukaemia rises by up to 84 per cent if you live closer than 100 m from power lines. However, Professor Theriault, who presented his findings at the ICOH safety conference in Stockholm last September, had not found any evidence of a connection between power lines and breast cancer, brain tumours, or reproductive damage.

Source: Alskog, A (ed.), 1996, *Kraftledningarkan oka riskenfor leukemi*, Arbetarskyddsnämndens Nyhetsbrev, No 7

CLEANING METHODS

THAT SUIT YOU RIGHT DOWN TO THE GROUND!

Floor care is the most common type of cleaning by far. But as innovation and improvement goes, cleaning methods seem to he swept under the carpet.

Women are still doing most of the cleaning, both at home and as a profession. And they still often have to use wet, heavy mops, buckets of detergent solution, soaking rags and cloths.

Professional cleaners have a high average of sick days. Solvents, detergents and other solutions are not the only culprit: unergonomic design of cleaning equipment and inappropriate cleaning methods are also to blame.

THE COST OF CLEANING

If you calculate it over the lifetime of a building, cleaning the building costs as much as putting it up in the first place. Add to that worker's sick days due to muscular strain, allergies, eczema and other skin conditions, and cleaning suddenly becomes a major consideration in the running of any business.

Both money and workers' health can be saved by applying improved design and equipment and better cleaning techniques.

Mr Rolf Tenser, a cleaning consultant, estimates that 80 per cent of cleaners are using the incorrect methods, resulting in various types of work injuries. He also claims that constructive improvements could cut cleaning costs by 40 per cent and prevent millions of tons of chemicals from polluting the environment.

BIG ADVANCES UNDERFOOT

The first thing to consider is the floor itself. It may be a good investment even to replace existing floors. Dirt sticks to untreated linoleum and plastic. A better option is a plastic floor with a polyurethane coating. Polyurethane treatment of existing floors could work if the surface is "cleaning-friendly" to start with — but to cover an old grubby floor does not pay off.

Another floor consultant, Mr Thomas Akerblad, advises building designers to think long and hard about the entry points to buildings and premises. A "clever" succession of materials that work to clean people's shoes as they enter the building will save a lot of cleaning inside the premises. Mr Akerblad points out that floor care starts outside the building: he recommends that the area outside the building should be kept clean and free of mud and dust. A cleaning grid or mat at the door is a good idea, followed by an area of rubber slats, and then a few metres of textile carpeting.

GIVE YOUR MOP THE CHOP!

Sweeping floors from side to side with a wet mop is hard on the back and may spell trouble for the arms and legs, too. A good floor will facilitate dry-mopping, which is much easier. If the floor becomes too dirty, a small cleaning machine should be used instead of wet mopping. If the floor has a good, hard plastic surface, the best cleaning schedule is as follows:

Daily:
Dry-mop the floor with a disposable towel mop impregnated with paraffin oil for minimum friction.
Monthly:
Mop with a cleaning machine. Follow up with dry polishing.

According to Mr Tenser, using water is not a good cleaning method. Unless you keep changing the water very frequently, it will only shift the dirt from one spot to another.

Source: Berlin, E., 1996, *WorkingEnvironment* 1996, p 33

HOSPITAL GETS CLEANERBILL OF HEALTH

When Gothenburg Health Care modified its cleaning methods and materials, cleaning costs were cut by a third, and the number of staff on long-term sick leave was halved.

One of the major changes was to appoint an occupational toxicologist who has two unique powers: firstly, to accept or reject every new chemical product purchased by Gothenburg Health Care and, secondly, to stop the use of any product within the organisation.
Every supplier of chemicals to Gothenburg Health Care was required to provide full information on the product, both in terms of health effects and environmental safety:

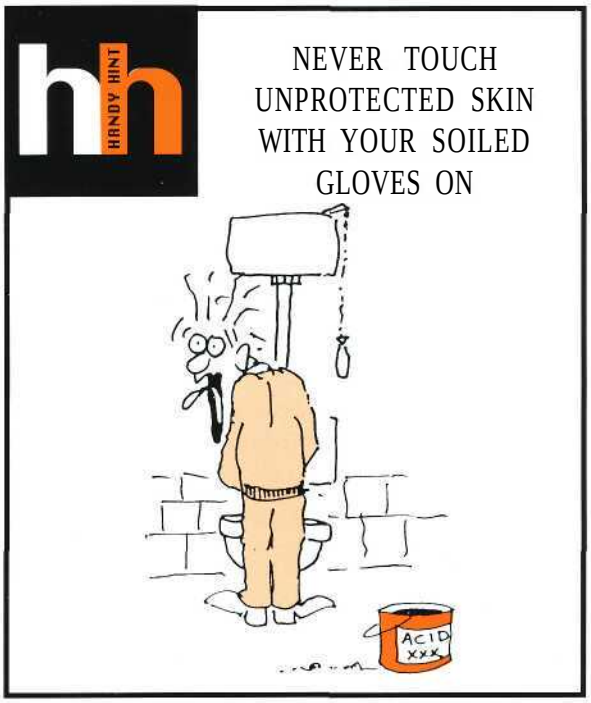
- Ingredients
- Manufacturing processes
- Packing, wrapping, filling
- Type of containers
- Transportation
- Usage instructions
- Information for recycling or re-use
- Disposal methods

Conventional wet and heavy cleaning methods had to make room for lighter, drier methods. Much less water and detergents were used.
An education program for cleaning staff was set up, requiring each employee to attend a six-week course. The curriculum includes not only cleaning techniques, but also ergonomics and environment studies.
As a result, cleaning personnel use the correct methods and know how to handle chemicals and how to protect themselves.

HEALTHIER CLEANERS

95 per cent of the cleaning staff use vinyl gloves with a thin cotton inner glove. This is probably the main reason why there have not been any cases of eczema or skin problems among staff for several years since the new cleaning program started.
Cases of long term sick leave have dropped by 50 per cent, and the new cleaning program has meant that several employees who were ready for early retirement have been able to return to full time occupations.
Cleaning costs at Gothenburg Health Care have been cut by a third as a result of the changes, which means that not only are the employees healthier, but the budget too.

Source: Dahlgren, E. F./ReportageBörsen, 1996, *Arbetsliv i utveckling*, No 3 pp 10-11



PETROLHEAD ACHES

The smell of petrol is as familiar as it is sinister. Every time you fill up your car, you get a big whiff of it. Repeated exposure to benzene is a health hazard in itself, but nowadays petrol often contains fuel additives that might be as bad for your health as they are good for your car.

All types of petrol, leaded and unleaded, are potential health hazards. Petrol has a narcotic effect on the central nervous system, and can cause dizziness, headaches and nausea. It is also an eye irritant, and can cause severe irritation to the mouth, throat and intestines if ingested. In such cases, vomiting may lead to liquid hydrocarbon reaching the lungs, which could result in severe chemical pneumonia. Repeated long-term inhalation of petrol fumes can cause permanent brain damage, starting with fatigue, irritability, insomnia, loss of memory and concentration problems.

It is well known that benzene is a carcinogen. In fact, it is classed as the most cancer-causing aromatic hydrocarbon in petrol, capable of causing leukaemia and bone marrow damage. Although it has yet to be proven conclusively, benzene is suspected of causing kidney cancer.

ADDITIVES

The fuel used in motor transport often contains fuel additives, such as methyl tert-butyl ether, or MTBE. This acts to make the hydrocarbons burn quicker and reduces the carbon monoxide and unburnt hydrocarbons in the exhaust fumes. MTBE is therefore an "environmentally sound" additive which decreases air pollution.

The other side of the coin is that MTBE reportedly causes headaches, dizziness and nausea, as well as irritation to the upper respiratory tract in some cases.

It is hard to get a clear picture of who is exposed to hazardous levels of petrol fumes. Obviously, a self-service petrol station does not present a great risk to staff, perhaps except for mechanics. However, stations where staff perform all the filling may need to look at the exposure levels.

European sampling at petrol stations in Europe have been widely varied, ranging from 7.9 mg/m^3 at some stations to 101 mg/m^3 at others. Benzene levels averaged 0.35 mg/m^3. Full service petrol stations in Mediterranean countries have attracted the attention of the European Union, and funds have been allocated for further research.

Source: Work Health Safety 1996, *Fuelling Panic*, Finnish Institute of Occupational Health, Porvoo, Finland, p 13

A NUCLEAR EXPERT (PARISIAN)
WENT OUT AND AWAY ON A MISSION
WHEN VISITORS WONDERED
WHERETO HE HAD WANDERED
HIS SECRETARY SAID, "HE'S GONE FISSION."

Are you in glove?

Some things to remember when choosing a protective glove

Breakthrough time

Permeation rate

Degradation

Water-based resistance

Oil-based resistance

Physical resistance

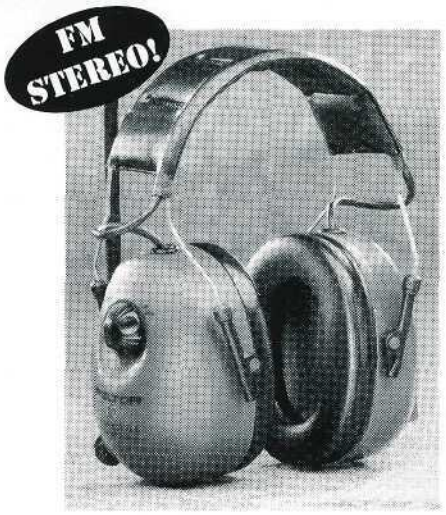
Grip

Sensitivity

Comfort

1 Source: Marigold Industrial, 1994, Industrin i sakra händer, LRC Products Ltd

WIN THIS!



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...but you have to work for it: use your brain during the Christmas break and send in the coupon by the 28th of February 1997 to be in the running for this fabulous prize!

THE PPM BODY WORDS COMPETITION:

Name at least TEN body parts that are spelled with only three letters:

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

Name at least ONE palindromic body part (its name reads the same backwards and forwards, like the word "level")

_____

Enter the body part that best corresponds to the description. The first one is given:

Part of a journey	Leg
Place of worship	_____
Tropical tree	_____
Student	_____
304.8 mm	_____
Storage box	_____
Supply with weapons	_____

Name at least SIX rhyming pairs of body parts (e.g. lip—hip):

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

The Judges' decision is final. No correspondence will be entered into. Correct answers and the winner will be announced in PPM 1/1997

Name: _____

Position: _____

Company: _____

Street: _____

City: _____ State: _____ Postcode: _____

Telephone: _____ Fax: _____

SEND TO: PPM Magazine, Private Bag 1001, Mona Vale NSW 2103 — by 28th February 1997

ARE YOU IN THE LEAD?

Exposure to lead in the industry is decreasing, but all over the world, certain occupational groups are still exposed to large amounts of lead.

Risk groups include:

- Smelting
- Casting
- Scrapping/scrap metal handling
- Battery manufacture
- Spray painting
- Car repairs
- Mechanics
- Welding/flame cutting

A new study from the Finnish Institute of Occupational Health claims that workers with high lead levels in the blood stand a 40 per cent greater of contracting cancer than people not exposed to lead. In regard to lung cancer, the risk is nearly twice as high.

LEAD AND EXHAUST FUMES

The study included 60,000 workers over the ten-year period 1973-1983, and found that the lung cancer risk was even higher among workers exposed to a mixture of lead and exhaust fumes.

Source: Work Health Safety, 1996 p 3, ref. Anttila, A., *Occupational exposure to lead and risk of cancer*, Finnish Institute of Occupational Health

THE INS AND OUTS

OF RESPIRATOR WEAR

These days, respirators are better made, easier to use, and provide better protection than ever before. In many cases, there is no more to personal breathing protection than to put on a clean respirator with the appropriate filter.

But it may be beneficial to know a few facts about what goes on inside the respirator, and what effects respirator wear has on the breathing and on the body in general.

THE BREATHING PROCESS

Our body needs a certain amount of oxygen every minute. This amount varies, depending on what activity we are performing. The harder we work, the more oxygen we need.

Since the air contains only about 21% of oxygen, and since we can absorb only about one fifth of that oxygen, we have to breathe in a lot of air to satisfy our oxygen requirements. In effect, in order to absorb one unit of oxygen, we need to inhale about thirty units of air.

The total volume of air we inhale during one minute is called the *minute volume*, and is measured in litres per minute (l/min).

Different modes of breathing can achieve the same minute volume. For instance, 30 litres/minute can be supplied by:

twenty 1.5 litre breaths

or

ten 3 litre breaths

or

five (very deep) 6 litre breaths.

CONFUSING? IT'S ALL L/MIN TO ME!

As we said before, breathing is all about moving a certain *volume* of air into our lungs at a certain *speed*. The speed at which the air moves is called the *flowrate*. Unfortunately, both the amount of air we breathe and the speed at which it travels are measured in litres/minute. It is important to understand the difference between the two.

Try this a few times: concentrate on your lungs and draw a deep breath through your nose, stopping at the "top" of your lungs.

You will probably notice how the air starts to flow through the nose slowly, then reaches a top speed around the middle of the breath, and

then slows down again at the top of the breath. Breathing through your nose, you can not only feel the air speeding up and slowing down — you can hear it.

The same speed-up/slow-down effect occurs when you exhale.

At the fastest point in the breathing cycle, the air reaches its *peak flow rate.* The peak flow rate is of particular interest to respirator users, since this is the fastest speed at which air flows through the respirator (or filter, or inhalation/exhalation valves).

The peak flow rate can be calculated with reasonable accuracy.

If we were breathing absolutely regularly, that is, taking exactly as long to inhale as to exhale, our breathing cycle would take the form of a *sine curve.* The peak flow rate would then be the minute volume times π (approximately 3.14). For instance, at 30 l/min, the peak flow rate would be approximately 30 x π = 94.2 1/min.

However, our breathing is usually not so regular. During normal breathing, the inhalation is slightly more forceful (more rapid) than the exhalation. This in turn means that the peak flow rate occurs during the inhalation only, and is greater than the formula presented above. As a rule of thumb, the relationship between minute volume and peak flow rate is around 1:4. Generally speaking, in most types of breathing, the relationship lies somewhere between 1:3.5 — 1:5.

When selecting a respirator or filter, it is important to know how it has been tested, that is, which "litres/minute" has been used. If the product has been tested using continuous flow, the test results only reflect the minute flow, not the flow rate during actual breathing.

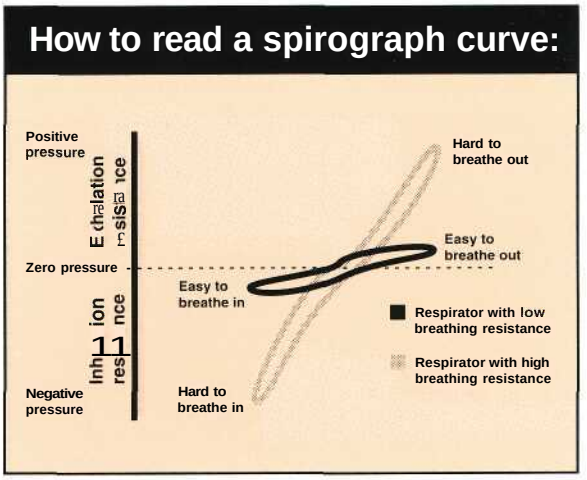
WEARING A RESPIRATOR

Putting on a respirator places extra stress on the respiration, no matter how good the respirator. Every respirator means some degree of constriction or obstruction, whether physical or psychological. It is therefore essential to select a respirator that presents the least possible restriction to the breathing cycle.

BREATHING RESISTANCE

The constriction created by a respirator is called *breathing resistance,* of which there are two types: *inhalation resistance* and *exhalation resistance.* Both types are important to the breathing cycle, and it is a mistake to only place importance on the inhalation resistance. Breathing resistance can be caused by a number of factors. The most obvious factor is the obstruction caused by an air purifying filter. But there are other important factors that are not only limited to filter respirators. Other contributors to breathing resistance include narrow hoses, small inhalation and exhalation valves, membranes and automatic valves that require a certain amount of air pressure in order to open or close.

The most accurate way to measure the breathing resistance of a respirator is a *spirograph plot,* which draws a "picture" of the air pressure inside the respirator during the entire breathing cycle.



The spirograph can be used to test all types of enclosed respirators. The graph features a horizontal centre line which indicates zero air pressure in the respirator. Above the zero line is positive pressure, and below it is negative pressure.

It is relatively easy to read a spirograph plot of a respirator, especially if the results of a second respirator are superimposed on the first. As a general rule, the further the curve strays from the horizontal, the greater the breathing resistance. In other words, the steeper the curve, the higher the resistance. The upper part of the curve concerns exhalation resistance; the lower part shows inhalation resistance.

The plot of a filter respirator is half above the zero line, half below. The reason is that when we draw air into the lungs, there is a slight

"vacuum", or negative pressure, in the respirator. When we push air out, the pressure rises on the positive side.

A positive pressure respirator (such as an SCBA, HPBA or supplied air respirator) will present a spirograph curve of similar shape as a filter respirator (although usually flatter), but will be placed entirely above the zero line.

Depending on the respirator, the curve may be relatively even, or it can have a pronounced "dogleg", where one or the other side is more vertical than the other. This means that the respirator has a high exhalation- and low inhalation resistance, or vice versa.

Other respirator features that can be examined in a spirograph plot include the opening or closing of membranes and valves, which often look like spikes or humps around the zero line. These are caused by membranes and valves which require a certain threshold pressure to operate. Such a spike could mean a pronounced "click" or "plop" at each breath, which could be very irritating to the user.

DEAD SPACE

When we exhale, we cannot empty our respiratory system completely; some air always remains in the nose, mouth, windpipe, and bronchi. When we next inhale, this air is re-breathed into our lungs. The volume of this air is called the dead space of our respiratory system. In short, the dead space is the volume by which we don't exhale completely. In the average human, the dead space is around 150 ml, or about one third of a normal breath.

A respirator adds to the total dead space, which increases by the interior volume of the respirator. Although the dead space of a respirator is small, around 50 ml, it still increases the total dead space to 200 ml, or about 40% of a normal breath.

This has two main effects: firstly, that we have to take deeper breaths (and therefore work harder) in order to get the oxygen we need, and, secondly, that a greater amount of used air (and therefore a greater amount of carbon dioxide) is re-breathed in each breath.

Both of these factors can have significant effects on our work, our breathing, and our well-being.

Source: Nunn, J. F., 1993; *Nunn's applied respiratory physiology,* 4th ed., Butterworth-Heinemann Ltd., Oxford; Malmsten, C. & Rosander, M., 1987; *Rök- och kemdykning,* Svenska Brandförsvarsföreningens Service AB (Swedish Fire fighting society), Stockholm; Sebel, P., Stoddart, D. M., Waldhorn, R. E., Waldmann, C. S., Whitfield, P., 1985, THE *HUMAN BODY: Respiration, the breath of life,* Torstar Books Inc., New York

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An American study has gone through years' worth of research and found no connection between electromagnetic fields and disease.

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Floor cleaning starts outside the building. By designing buildings entrances cleverly and choosing the right floor materials, floor cleaning can be a breeze.

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Gothenburg Health Care has done away with three quarters of all chemical, saved a third in cleaning costs, and staff absence by half.

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Petrol fumes contain not only benzene, but a variety of additives with a variety of health effects.

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A few basic things you need to know about protective gloves

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You could win a fantastic Peltor FM Stereo headset that protects your hearing while letting you listen to music. Worth well over $200 But you'll have to work for it ...

ARE YOU IN THE LEAD? (PAGE 9)

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THE INS AND OUTS O... (PAGE 10)

A few facts about ... respirators.

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