Protecting Your Skin

Presentation by Paul Tierney, Regional Sales Manager, Marigold Industrial Ltd.

Paul introduced his presentation by asking the rhetorical question "What do your hands deserve?" and explained that he would cover crucial Mechanical and Chemical Hazards, together with the importance of correct sizing.

The answer to Paul's question was "Respect" – which we all needed to pay tour own hands and very often did not do, for a multitude of reasons! He explained the importance of this by saying that, in our lifetime, we carried out something like 25 million hand movements! Altogether, there are 27 bones in each hand, with metres of blood vessels and thousands of nerve endings per square inch, all covered by a miraculous protective layer of skin.

Although it is is flexible and tough and does an incredible job, Paul added, it is not indestructible! In addition to its protective role, it also enabled us to detect extremes of hot and cold so that we could avoid harm from our surroundings. He then showed us several photographs of the ravages brought about by cement burns, dermatitis and even amputation!

Cement Burns

These cement burns are horrific and are easily comeby because wet cement is alkaline and does not cause any sensation as it burns into the vivtim's skin. There was a high profile case in the Construction Industry, some years ago, where a groundworker was standing in poured cement for a few hours, did not bother to change his clothing and suffered such serious burns that part of his leg had to be amptutated! Although frequent washing and after work skin care can alleviate this problem, it is so much better, Paul suggested, to prevent the problem altogether, with the use of an appropriate glove!

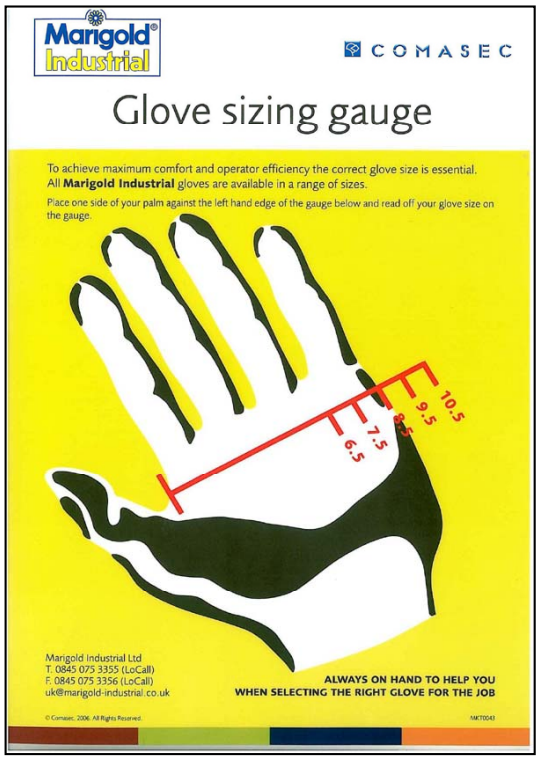
Another common skin injury, Paul went on, is that caused by Chemicals, which trigger off Irritant Dermatitis. This type of injury is very much worse if it develops into the Allergic form of the disease, as a result of exposure to certain types of chemicals. In these cases, following initial exposure, subsequent contact with, often, a much smaller quantity of chemical can cause the same degree of injury. This is very often a career-threatening problem, which can have a devastating effect on work and family!

Dermatitis

Paul continued by showing this photograph of a severe amputation of all the fingers on a worker's unprotected hand. Although machines should have built-in guarding to prevent this sort of injury, there are other work activities where an appropriate glove is an essential protection. Luckily, Paul added, the victim's fingers were all re-attached successfully but such an outcome cannot be guaranteed and the process of rehabilitation is not easy!

Traumatic amputation

In a reversal of the old adage, Paul went on to say the "Size Really Does Matter!" because gloves that were too small caused the hand to cramp up, whereas the opposite extreme resulted in a loss of dexterity. He demonstrated the use of this convenient sizing Chart to emphasise the point, by asking the placing his right hand, palm down, over the image with the one side pressing up against the end of the red line.



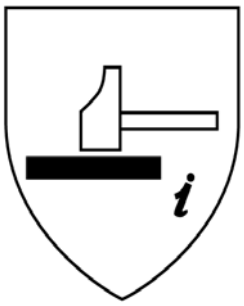
The graduated marks at the other end of the line indicated the glove sizes which gave the most comfortable fit for optimum performance. The following table gives the relevant dimensions for the different sizes from EN420, which lays out the general requirements for most sizes of glove, including: -

- Ergonomy, construction (neutrality of pH, amount of detectable CrVl and no allergenic substances), innocuousness and Comfort (size), dexterity, water vapour transmission and absorption.
- If requested, electrostatic properties must be meadured according to the tests of the prEN 1149-1,-2 or 3. Pictograms shall not be used and spacific information on lab test conditions must be added.
- Indication of the levels of performances: 1 : minimum, 2 : good, 3 : very good, 4 and more : excellent, 0 : does not offer protection. X : performance not measured.

Selection of the glove's size according to the hand length and circumference						
Glove Size	**6**	**7**	**8**	**9**	**10**	**11**
Minimal length (mm)	**220**	**230**	**240**	**250**	**260**	**270**
Hand Circumference (mm)	**152**	**178**	**203**	**229**	**254**	**279**
Hand Length (mm)	**160**	**171**	**182**	**192**	**204**	**215**

Paul then dealt with the matter of Mechanical Protection, which is specified in **EN388**. The symbols on the left appear on Gloves to mark the Mechanical Performance in various categories listed below: -

Mechanical Protection Markings



ABCD

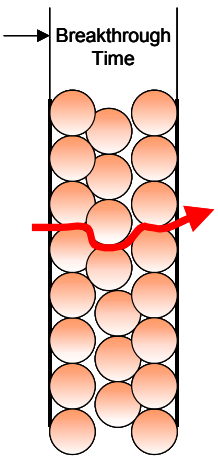
Appropriate Category Performance Levels displayed in this sequence, adjacent to the Symbol

Performance Category		Performance Levels				
		1	2	3	4	5
A	Abrasion Resistance (cycles)	100	500	2000	8000	n/a
B	Blade Cut Resistance (index)	1,2	2,5	5	10,0	20,0
C	Tear Resistance (Newtons)	10	25	50	75	n/a
D	Puncture Resistance (Newtons)	20	60	100	150	n/a

Performance Category		Performance Levels Ranges
A	Abrasion Resistance	0 - 4
B	Blade Cut Resistance	0 - 5
C	Tear Resistance	0 - 4
D	Puncture Resistance	0 - 4

Paul then passed round some samples of gloves for the audience to examine and comment on the relative performances in various Categories. He drew our attention to the superior performance of Kevlar under the Blade Cut Resistance test and mentioned that this was done with a blade mounted in a jig passing through a recorded number of cycles until it penetrated the material.

He then discussed the resistance of gloves to the Permation of various chemicals through the material itself. He said that this attack took place in a subtle manner, when some molecules could pass into the material and diffuse through top the inside, ***even though there are no discernable holes***. Paul likened this effect to a ballon on Boxing Day that started to look wrinkled and soft!Permeation data comprises these two elements: -



1. Breakthrough Time (BTT) – The measure of how long it takes the chemical to pass through the glove material, measured in minutes. This result is recorded in time bands, which are categorised in performance levels, as specified in **EN 374.**

2. Permation Rate (PR) – This is the rate that the chemical transmits through the material after breakthrough has occurred. It is measured in the Marigold Industrial Chemical Resistance chart as

FAST (F); MEDIUM (M); SLOW (S) and ZERO (0)

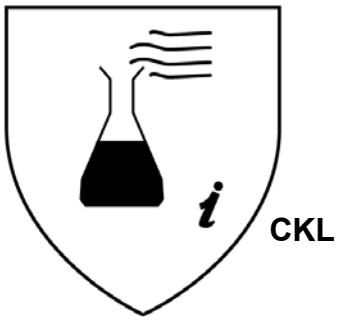
The performance levels specified are: -

Level 1	11 – 30 mins	Level 4	121 – 240 mins
Level 2	31 – 60 mins	Level 5	141 – 480 mins
Level 3	61 – 120 mins	Level 6	> 480 mins

The Level 6 was equivalent to full day's shift and Paul added that a sure sign of permeation was when the inner liner became discoloured!

The tests are done for a specific Chemicals, drawn from this list in EN 374: -

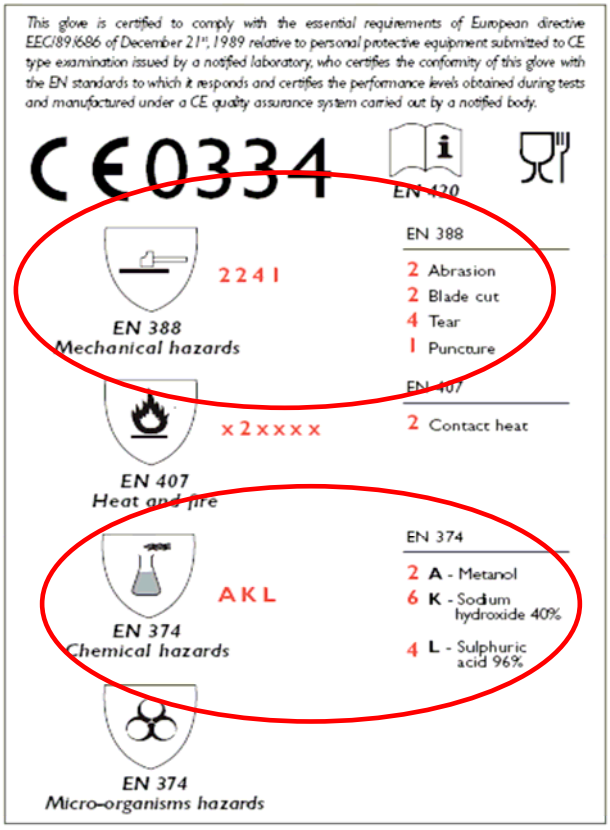
A	Methanol	G	Diethyl Amine
B	Acetone	H	Tetrahydrofuran
C	Acetonitrile	I	Ethyl Acetate
D	Dichloromethane	J	n-Heptane
E	Carbon Disulphide	K	Sodium Hydroxide 40%
F	Toluene	L	Sulphuric Acid 96%

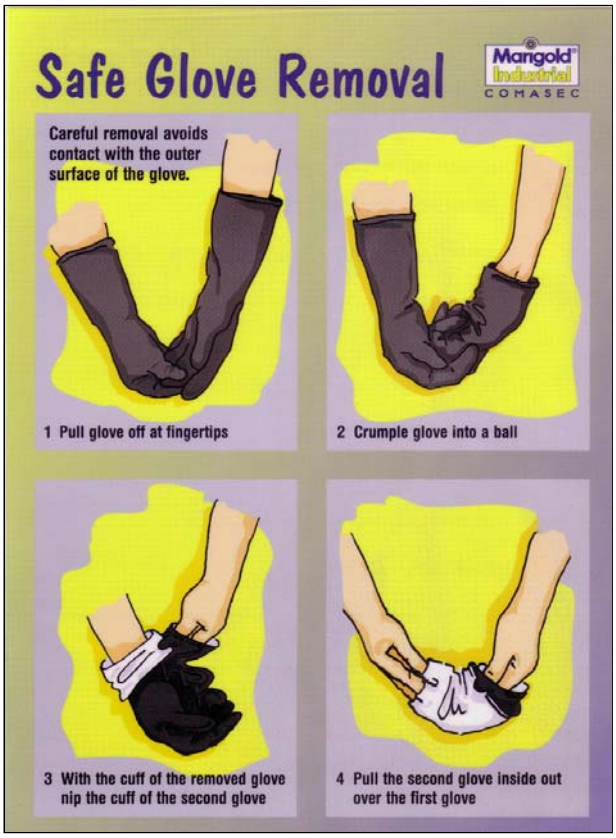


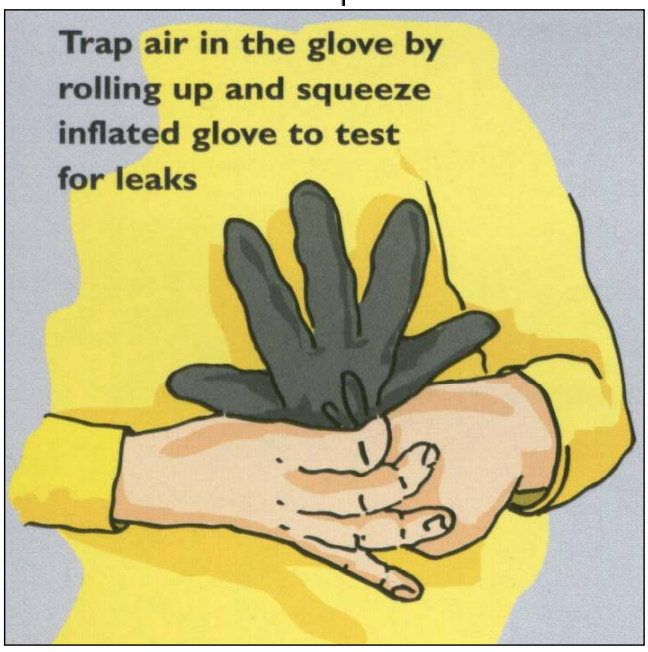
Whatever tests have been done for the material in question, the corresponding Alpha Code will be displayed alongside this symbol. For Acetonitrile, Sodium Hydroxide and Sulphuric Acid, the letters will be "CKL".

Paul summarised this information by showing how it apeared on a typical Product Information Sheet and concluded his talk with some "Does and Do'ts" other hints on how to use gloves: -

DO check the gloves for the job have been selected and issued	***DO*** remove and dispose of gloves safely
DON'T wear gloves beyond their useful lifetime	***DON'T*** SHARE GLOVES!
DO check gloves regularly for any defects or holes	***DO*** wash hands before you put gloves on
DO check permeation and degradation times	***DO*** treat all cuts and abrasions before wearing gloves
DO store all gloves safely	***DON'T*** Ignore any signs of skin rash or irritation







Members' Questions

John Surman of JFW Gas Ltd. asked if Marigold produced electrical insulating gloves and Paul said that they did not.

Bob Cole of Morgan EST enquired if Paul could give any information about the effectiveness of Vibration Gloves. Paul said that Marigold did not supply them and commented that they did not control the effect of vibration directly, although they did alleviate the symptoms because they kept hands warm.

Dalvindar Masaun of Sandwell & West Birmingham Hospitals NHS Trust asked how it was possible to check suitability if there were no markings on the glove. Paul suggested that the user could use the Chemical Abstracts Service Registry (CAS) number to identify the chemical on their website @ www.marigoldindustrial.com .

Bob Cole asked a safety tolerance could be allowed on the quoted performance levels. Paul said that, as they were EU Standards, no tolerance factors could be applied. He added that, as most gloves were worn for splash protection, whereas the tests were done by full immersion, there was a significant, albeit unintentional, in-built margin in the application.

Dave Lilley commented that he had heard of an alternative to Kevlar and asked if Paul could identify it. Paul replied that it was a material called Dinema and that it was thinner and lighter than Kevlar and gave more dexterity. Kevlar, however, exhibited more heat resistance.

As there were no further questions, the Chairman thanked Paul for a most informative presentation and asked the audience to show their appreciation.