20,000 printed plastic bottles returned to the manufacturer demonstrating the same fault. The ink was not adhering properly, not all over, but at one point. The material was white polyethylene. The image was single colour but very small print. It was a medicine container that required a large amount of text detailing dosage etc. It was absolutely crucial that all the information remained on the container. The manufacturer of the container who was also the printer was at his wits end as to how to resolve the problem.

On visiting the facility it was clear that this company knew what they were doing. Excellent equipment well maintained on a well-organised production floor.

The first thought was a pre-treatment problem. Flaming was the process in use. The burner was mounted in line on the printing machine. A proprietary flame control unit controlled the flame condition. Everything was fine.

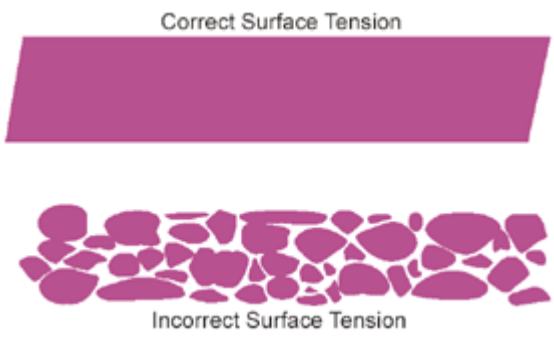
It was not an ink problem as the vast majority of the image passed the specified Scotch tape test. It was just this one oval area about 25 mm by 18 mm. 'Twas time again for some detective work! Starting from final printed product the trail led through transport and storage back to the moulding floor. This was also well run and everyone appeared to be wearing the correct personal protective equipment.

The bottles were blow moulded and ejected from the machine down a ramp where an operator picked up the bottle and removed a small piece of plastic sprue with a sharp knife. He had a glove on his left hand and held the knife in the right hand. The hot bottle was held in his left hand while he cut off the sprue. He then transferred the bottle to the right hand between his thumb and the knife to place it in the transport packaging. The problem was his thumbprint. He was hot and perspiring. The oils from his hand were contaminating the surface. The flaming, which was designed to modify the surface energy of the plastic was not removing this contamination. The only way to have done so was by use of a solvent wipe. The solution was quite simple; he wore a glove on each hand. This covered up the offending "digit". The thumbprint was no more and the problem disappeared.

CORRECT PRE-TREATMENT OF SURFACE

Whichever printing process we are using handling the surface to be printed can cause havoc with the print. Ink will only adhere to a substrate if the surface energy of the surface is higher than the surface tension of the ink. The ink has to wet the surface to be printed. With polypropylene and polyethylene, flaming, or corona discharge, or plasma treatment are all recognised methods of making the surface wettable. They all increase the surface energy of the material to be printed.

SURFACE TENSION



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ADHESION ON PRETREATED CONTAINERS

Contamination by whatever means is a major problem for any surface. One of the most insidious is silicone spray. This is sometimes used for lubrication. The application of these sprays anywhere near surfaces that have to be printed or coated can disable a facility. Once contaminated with silicone inks will not stick.

AS WITH ALL AREAS OF PROFITABLE PRINTING.

KEEP IT CLEAN!