



Case Studies

Worksafe & Environmental Chemistries in Australian Industry



For a Better World

Forgacs - Tomago Shipyard

Acetone Substitution in Steel Fabrication

Situation

Cleaning surfaces with Acetone prior to welding is common. For critical jobs such as those in shipbuilding it is essential to remove all contaminants from the metal surface prior to welding. Failing to do so can mean foreign matter is incorporated within the weld itself resulting in sub-standard strength. A dirty surface can also affect the performance of the welding equipment. Achieving a 'clean weld' is of particular importance when dealing with specific codes for QA.

Whilst Acetone achieves a good cleaning result it does not evaporate entirely from the welding surface and when high temperatures are subsequently applied a toxic vapour is produced. This vapour can cause irreparable liver damage and other health effects if inhaled. Acetone also presents a fire risk in this type of environment.

In addition to the health risks Acetone has a low flashpoint making it a considerable fire risk – particularly around welding operations. The high vapour pressure of acetone also means it evaporates quickly often requiring several applications in order to obtain a satisfactory result.

The Challenge

How do you clean and prepare welding surfaces without fire risk or toxic Acetone vapour?

The Hazards

Whilst Acetone is listed as GRAS (Generally Recognised as Safe) thermal decomposition or burning of Acetone residue can release certain carbon oxides and other hazardous gases. It is these by products of thermal decomposition that present the primary health risk to workers. Some of these gasses can cause irreparable liver damage if inhaled.

Acetone has an extremely low flashpoint (-17 degrees C) and its vapour is heavier than air meaning it settles and concentrates in low areas. There have been numerous cases of fires and explosions caused by the use of acetone near ignition sources such as welders. A tablespoon of Acetone inside a 44 Gal drum is enough to produce a potentially explosive atmosphere.

The Solution

Forgacs removed the Acetone health risk and fire hazard by substituting it with **purasolve Surface Prep** which, despite being safer, produced better results with far less product used. Overall this occurred at a cost saving to Forgacs.

The purasolve range offers low hazard alternatives to common industrial solvents which replace dangerous and toxic products such as MEK, Acetone, Gun Wash, Trichloroethane as well as products containing benzene and its derivatives.

purasolve Surface Prep is non explosive, has less odour than Acetone and evaporates completely leaving no residue. For a powerful solvent **purasolve Surface Prep** has an extremely low vapour pressure meaning that less product is lost through evaporation. This means workers save time and overall less product is used.



The Outcome

Forgacs maintained their welding standards whilst simultaneously removing the risk of fire and serious health issues to their workers. Because they used less product the change came at an overall cost saving to the business.

The effect of **purasolve Surface Prep** on welding standards was independently verified by third party radiographic NDT with all welds complying with appropriate quality standards.

Improving Lives

By using **purasolve Surface Prep** instead of Acetone, Forgacs avoided the risk of Acetone fire and explosion which is sadly too common in such workplaces around the world. For their workers the risk of permanent liver damage from toxic fumes is no longer a worry.

Improving Business

Fires, explosions and serious health issues are all bad for business. Forgacs' switch from Acetone to **purasolve Surface Prep** was a prudent risk management measure that removed some potentially disastrous and costly outcomes for the business. What's more it did this by saving on overall costs.

Improving Innovation

Because **purasolve Surface Prep** is safer and doesn't evaporate quickly, workers at Forgacs were able to improve their surface prep practices getting cleaner welding surfaces with greater efficiency. Because there is no risk of explosive vapours accumulating **purasolve Surface Prep** enables surfaces to be cleaned and welded in confined spaces with less requirement for ventilation.

purasolve
tomorrows compliance today

Fortescue Metals Group

Removing Toxic Butyl Cellosolve from Train Cleaning Operations



Situation

Fortescue Metals Group operates a number of train services transporting ore from its mining operations to various ports for export. As part of the regular maintenance rail equipment workers are required to clean dust and oils from trains and carriages using pressure cleaners and chemical cleaning agents.

The previous regime employed a common chemical agent, which due to the atomising effect of the high-pressure cleaner on hot train surfaces, was being inhaled and ingested by workers. When these workers began experiencing nose bleeds, migraines, dizziness and other illnesses the root cause was quickly determined to be Butyl Cellosolve – the key active ingredient in the cleaning agent.

It was also determined that, aside from the immediate symptoms, exposure to Butyl Cellosolve can have serious long-term health effects.

FMG were also looking to improve oil water separation in the wash down area, in view of reducing huge oily water disposal costs. The chemical reaction of conventional degreasers form strong emulsions with oil which are then difficult to separate with oil water plate separators which work on the principle of phase separation.

The Challenge

How do you efficiently clean hot Pilbara dust and oil off mining trains without serious health risks to workers whilst simultaneously improve the condition of waste water?

The Hazards

Butyl Cellosolve is a toxic agent used in many industrial and domestic cleaners – many of which claim to be non hazardous. It is absorbed through the skin and lungs causing a variety of health issues depending on the level of exposure.

Potential symptoms: Eye, nose, throat and skin irritation; cough; hemolysis, hematuria, anemia; central nervous system depression, dizziness, drowsiness, lightheadedness, unconsciousness; headache, vomiting; pulmonary edema; eye redness, pain, blurred vision; liver and kidney damage; INGES ACUTE: Abdominal pain, diarrhea; nausea; metabolic acidosis; SKIN ABS.

Health Effects: Irritation - Eyes, Nose, Throat, Skin - Mild (HE16); Blood disorders, anemia (HE12); CNS effects - Narcosis (HE8). It may also damage a developing fetus.

Affected organs: Eyes, skin, respiratory system, CNS, hematopoietic system, blood, kidneys, liver, lymphoid system, reproductive system.

The other significant hazard to the business was the ongoing cost of disposal of oily water, which was proving expensive and unsustainable, adding to maintenance, personnel, and compliance costs.



The Solution

triple7 Heavy Duty was substituted in place of the current cleaning agent.

triple7 is a powerful bio-based cleaner and degreaser that is free of any hazardous and toxic ingredients. This product was simply applied via a pressure washer to clean dust and oil from the trains. The workers found that by using **triple7 Heavy Duty** it improved their health while increasing performance and safety. No special PPE equipment was required; they used less product and were not affected by toxic fumes.

Their oil water separator performance was also vastly improved. FMG will never need to pay the huge oily water disposal costs again, and the water quality is of a standard which allows them to use it for dust suppression! **triple7 Heavy Duty** does not form an emulsion with the greases and oils, but lifts and releases at the surface for easy removal and allows for true and complete separation.

The Outcome

With the help of EFS, Fortescue Metals Group identified and mitigated a major health risk associated with its rail operation. In line with emerging national WHS standards it achieved this result at the top of the risk control hierarchy by substituting dangerous products with safe ones thus removing the threat entirely.

Improving Lives

By substituting Butyl Cellosolve with **triple7 Heavy Duty** FMG has improved the short-term health and comfort of their workforce. More importantly FMG has ensured that the potentially long-term health effects of Butyl Cellosolve were averted before they could take hold.

Improving Business

By removing serious toxins from the working environment FMG immediately reduced worker sick days and improved morale resulting in increased output. By averting long-term health issues FMG has also protected itself against potentially damaging and expensive legal issues and industrial action.

Improving Innovation

By substituting the toxic cleaner with a safe alternative FMG has removed health risks without affecting the use of innovative high-pressure cleaners. Without such measures FMG may have been forced to revert to older, less innovative methods of manual cleaning or been forced to employ complicated and clumsy PPE measures.

Just some of the other ways we're helping drive change - For a Better World



Exxon - Bass Straight

Providing high performance, safe, helicopter transportable solvents for critical maintenance jobs.



Sydney Opera House

Chosen for exterior cleaning without risk of toxic run-off into Sydney Harbour.



Maldivian Air Taxis

Trusted to clean sensitive aircraft in world class aquatic environments without ecological risk.



Geelong City Council

Replacing harsh BBQ cleaning agents that were sending workers home sick on a regular basis.

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