Zi-400 HD
AIRCRAFT CLEANER

A FIRST CLASS CLEAN WITH
POWERFUL CORROSION PROTECTION

Solidus Industries Zi-400 HD Aircraft Cleaner is a revolutionary aviation cleaning product.

Scientifically proven to protect aluminium and steel alloys from corrosion, Zi-400 also has the extraordinary ability to shut down the corrosion process after it has commenced.

FULLY APPROVED FOR EXTERIOR AND INTERIOR USE, ZI-400 HAS BEEN THE TRUSTED CLEANING PRODUCT OF THE AUSTRALIAN DEFENCE FORCE SINCE 1993.

Each day, Zi-400 actively protects aircraft from corrosion across the globe in the military, search and rescue, police airwing, air medical services, commercial airlines, flight training schools, charter services, aerial application and general aviation.

APPROVALS AND CERTIFICATIONS AS AN EXTERIOR AND INTERIOR AIRCRAFT CLEANER INCLUDE:

- Boeing BSS7432 *(Exterior)*
- Boeing BSS7434 *(Interior)*
- AMS 1526C, Exterior Cleaner *(Accepted by AIRBUS Industries)*
- AMS 1550B, Interior Cleaner *(Accepted by AIRBUS Industries)*
- MIL-C-87936A TYPE 1 SPECIFICATIONS
- DEF (AUST) 5570A
- Textron Aviation
- Bombardier
- McDonnell Douglas CSD #1
- Lockheed-Georgia Co. STM32-302
- Lockheed Martin *(Vought Systems)*
- British Aerospace Co T.O.R. 241
- United Space Alliance
- Australian Civil Aviation Safety Authority Approval REF.DR 95/176/EI1
- United Kingdom Civil Aviation Approval DAI/9386/92
- NSN 6850-66-127-3606 20 Litre
- NSN 6850-66-133-4198 200 Litre
- MANF CODE Z5393 (CAGE)
- Defence Supplier Code Z14R0

WHY WASH YOUR AIRCRAFT WITH ZI-400 HD AIRCRAFT CLEANER?

It is no secret that one of the greatest challenges to the profitability of the aviation industry is corrosion. Between maintenance costs and loss of productivity due to aircraft downtime, it has been estimated that corrosion costs the aviation industry in the USA alone, over $2 billion each year.

Corrosion is a challenge that all aircraft owners/operators face. Aircraft are often exposed to highly corrosive environments, from salty coastal locations, air pollution from industrialised areas, windborne dust and sand, high humidity, ultraviolet light and volcanic ash. Add to this the risk of corrosion from direct contact with engine exhaust particles, oils and fuels, hydraulic fluid and acidic leaks from galleys and lavs.

While corrosion prevention methods in the design and manufacture of aircraft have advanced considerably in the past 30 years, over time, exposure to these environments inevitably cause protective paint coatings to harden, become brittle and crack. Original metal primers break down leaving the alloys beneath vulnerable to the natural corrosion process.

PREVENT CORROSION WITH REGULAR DETERGENT WASHES WITH ZI-400

Regular detergent washing with Zi-400 HD Aircraft Cleaner is an inexpensive way to protect aircraft from costly and potentially dangerous corrosion damage.

With each clean Zi-400 works its way into cracks in the paint work and around rivets and fasteners, displacing moisture, dirt and salts from hard to reach areas that are highly susceptible to corrosion. In situations where corrosion has already set in, Zi-400 can swiftly reduce the rate of corrosion to almost zero.

Additionally, Zi-400 is a robust airframe cleaner. It successfully removes the most stubborn aircraft fouling from carbon deposits, exhaust stains, oils, grease, tyre rubber, hydraulic fluid and environmental contaminants such as salts, dust, bird excrement and atmospheric pollution.

Zi-400 will not damage or degrade paint surfaces and is highly suited for use on composite panels, titanium and matte finish paints. Zi-400 may be used as often as is necessary as there are no limitations on its frequency of use.

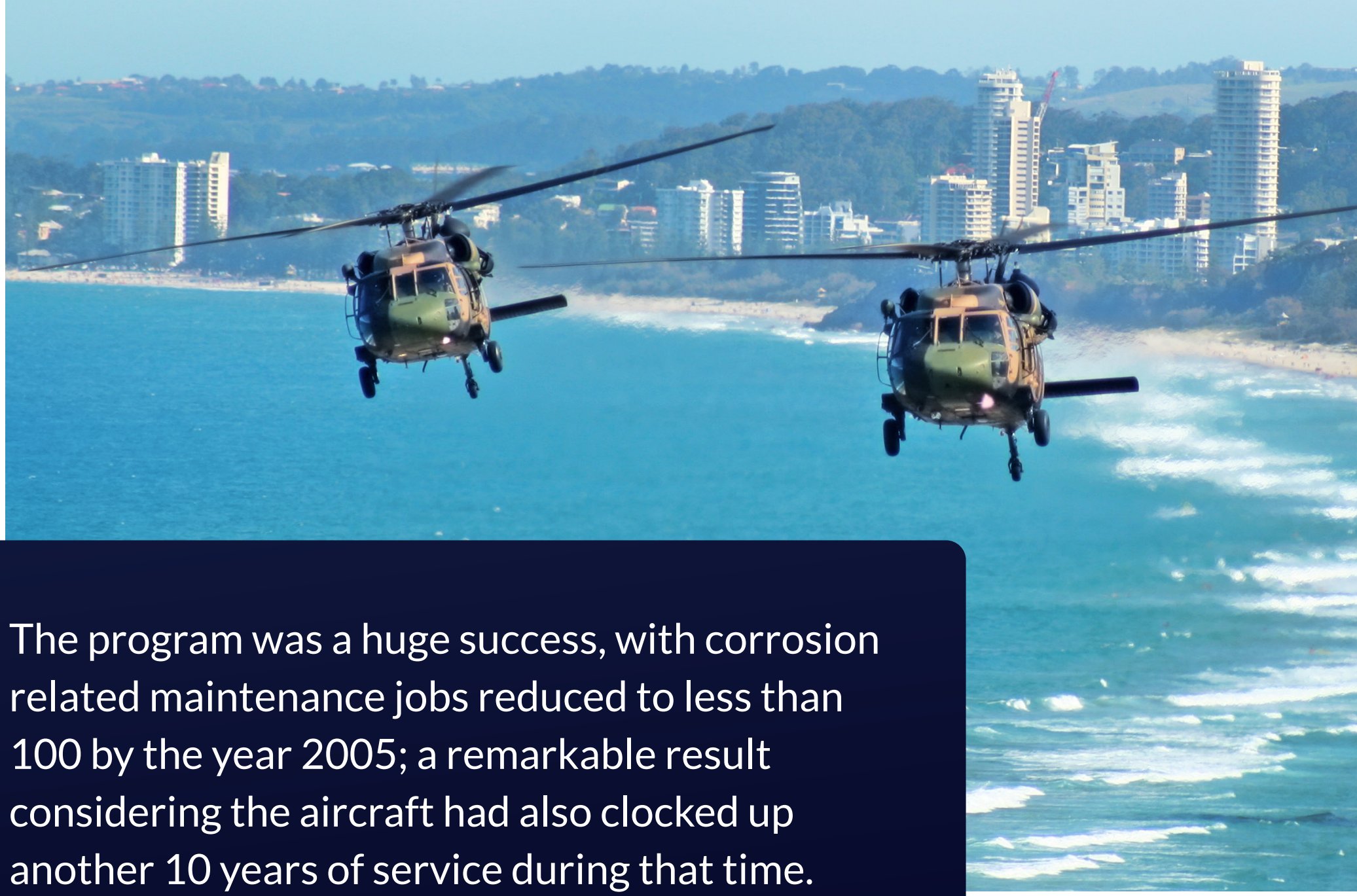
The combined cleaning and corrosion inhibiting abilities of Zi-400 have made it the market leader and industry benchmark throughout the entire aviation sector from ultra-lights and recreational aircraft to the heaviest military and commercial airliners, even the space shuttle.

WHEN SHOULD YOU START THINKING ABOUT CORROSION PREVENTION?

While corrosion is typically associated with ageing aircraft, the reality is that the risk of corrosion begins from day one. A prime example was the experience of the Australian Defence Force's Blackhawks.

Entering service as a brand new fleet of over 30 helicopters in 1988, within four years the number of corrosion-related maintenance jobs on the fleet had escalated to over 200, and by 1994 this figure had increased to over 500 per year. The ADF engaged Defence Science and Technology (DST) to develop a smarter approach to preventing corrosion in aircraft and arresting corrosion rates where it had started to occur.

The Corrosion Prevention and Control Program (CPCP) combined regular aircraft detergent washing with Solidus Industries Zi-400 Aircraft Cleaner, the use of corrosion inhibiting compounds, dehumidification and advanced corrosion detection tools to catch signs of corrosion early.

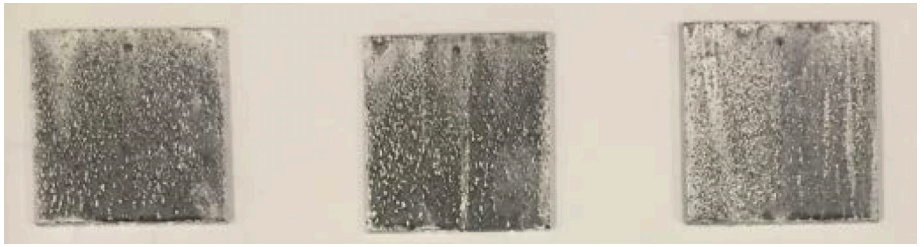


The program was a huge success, with corrosion related maintenance jobs reduced to less than 100 by the year 2005; a remarkable result considering the aircraft had also clocked up another 10 years of service during that time.

ADVANCED CORROSION INHIBITION
THE SCIENCE BEHIND ZI-400

In 1993, as part of their search to discover the best corrosion prevention methods for military aircraft, the Australian Defence Force commissioned Defence Science and Technology to conduct rigorous scientific testing on the impact of 19 aviation cleaning products on the corrosion rates of aluminium alloy used in military airframes.

Although all of the cleaning products conformed to Boeing and AMS specifications, it is important to understand that these specifications only require a product to demonstrate that it will not corrode an airframe at a greater than specified rate. The accepted corrosion rate threshold varies between Boeing, AMS and MIL-SPEC. As a result, these specifications do not guarantee that a cleaning product will not contribute to corrosion. They also don't assess whether a cleaning product is able to inhibit or protect aircraft against corrosion.



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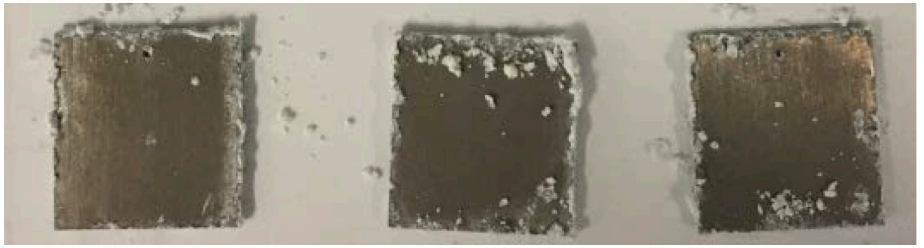
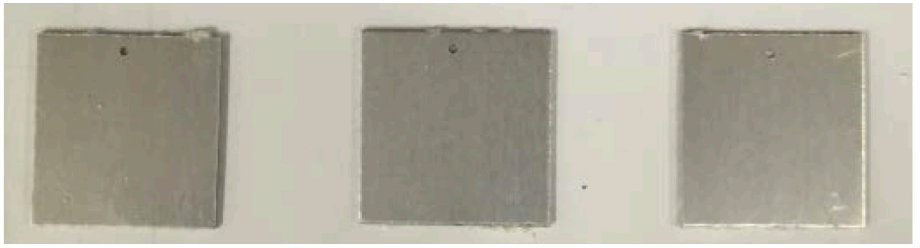
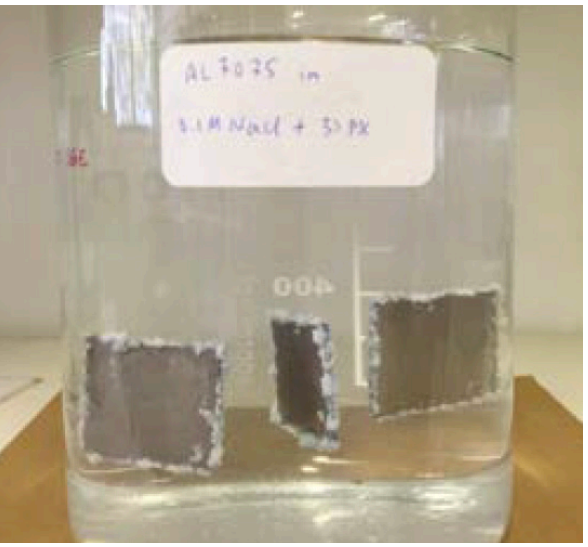
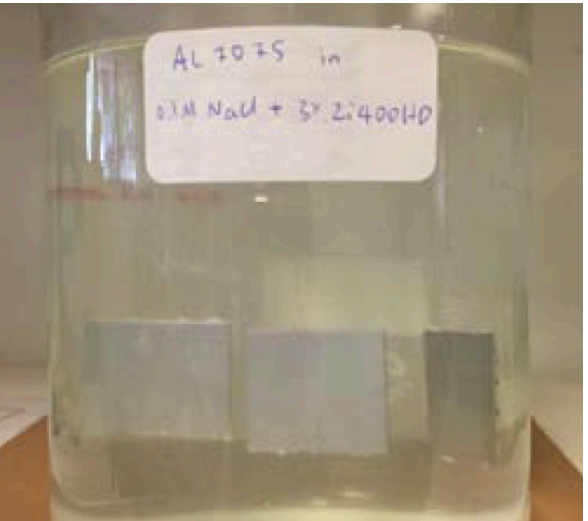


3% Product X



3% ZI-400 HD





THE SCIENCE BEHIND ZI-400 *CONTINUED...*

After 21 days of testing, Solidus Industries Zi-400 Aircraft Cleaner was proven to be a highly effective corrosion inhibitor. Zi-400 also demonstrated an extraordinary ability to arrest existing corrosion after it had commenced, shutting down corrosion rates to almost zero.

The study also proved that Zi-400 was very effective in reducing the rate of under film corrosion emanating from defects in an epoxy primer paint coating on an aluminium alloy, and reducing crevice corrosion on an aluminium alloy.

On the strength of these results Zi-400 was chosen as the preferred cleaning product for Australian military aircraft and Solidus Industries has been the trusted ally of the Australian Defence Force ever since.

In 2016, Solidus Industries commissioned Deakin University's Australian Centre for Infrastructure Durability to undertake a more in depth assessment of Zi-400 HD's capabilities as a corrosion inhibitor.

For comparative purposes tests were also conducted on a well-known brand of cleaner, widely used by the aviation industry and approved for use on aircraft (Product X).

Both aircraft cleaning products were tested for their corrosion inhibiting performance in highly corrosive chloride containing environments. Such environments are similar to those which can develop as thin layers of moisture on the external surfaces of aircraft.

THE CONCLUSIONS FROM THE DEAKIN UNIVERSITY AND DST STUDIES ARE SUMMARISED BELOW:

1) Zi-400 HD Aircraft Cleaner has been shown to be an excellent inhibitor of corrosion of aluminium alloys and steel in a very corrosive chloride containing environment.
2) Its effectiveness as an inhibitor has been demonstrated by its prevention of pitting corrosion under constant and alternate immersion conditions, filiform corrosion, crevice corrosion and galvanic corrosion.
3) Zi-400 has the ability to retard and arrest the growth of a corrosion process under very severe conditions. This is of particular value where the corrosion process is driven by the interaction of dissimilar metals providing a very strong driving force for corrosion.
4) Zi-400 is able to provide excellent corrosion inhibition because it is thought to adsorb strongly at local cathodes on the surface thus reducing significantly the rates of cathodic reactions, and therefore retarding the overall electrochemical corrosion process.
5) When tested under identical conditions to those used for the Zi-400 tests, washing detergent Product X (which conformed to Boeing D6-17487 REVISION P and AMS 1526B aircraft specifications), in some cases actually increased the rate of corrosion on both Aluminium alloys and steel, when compared to the Control solution. It also had no effect on the corrosion rate when added to an existing corrosion process.

If you would like to read an in-depth review of the Deakin University and DST reports, contact Solidus Industries.

INTERIOR AIRCRAFT CLEANING

Zi-400 HD Aircraft Cleaner has also been tested and conforms to Boeing and AMS interior specifications. It can be used for all aspects of interior cleaning, from cockpit, to cabin, to galley, to cargo hold.

An outstanding multi-purpose cleaner, Zi-400 is highly effective on a wide range of surfaces including carpet, upholstery, leather, rubber, plastics, acrylic windows and lavatories.

As an interior cleaner, Zi-400 is easy and safe to use. It is classified as non-hazardous and non-dangerous according to WHS Regulations and the ADG Code.

Zi-400 has been the trusted interior cleaner of choice for major international and domestic airlines for over 20 years.

HEALTH AND ENVIRONMENTAL INFORMATION

Zi-400 HD Aircraft Cleaner is a water-based formula that is safe for people and the environment.
It is biodegradable, non-flammable, non-corrosive, low-foaming and non-fuming.

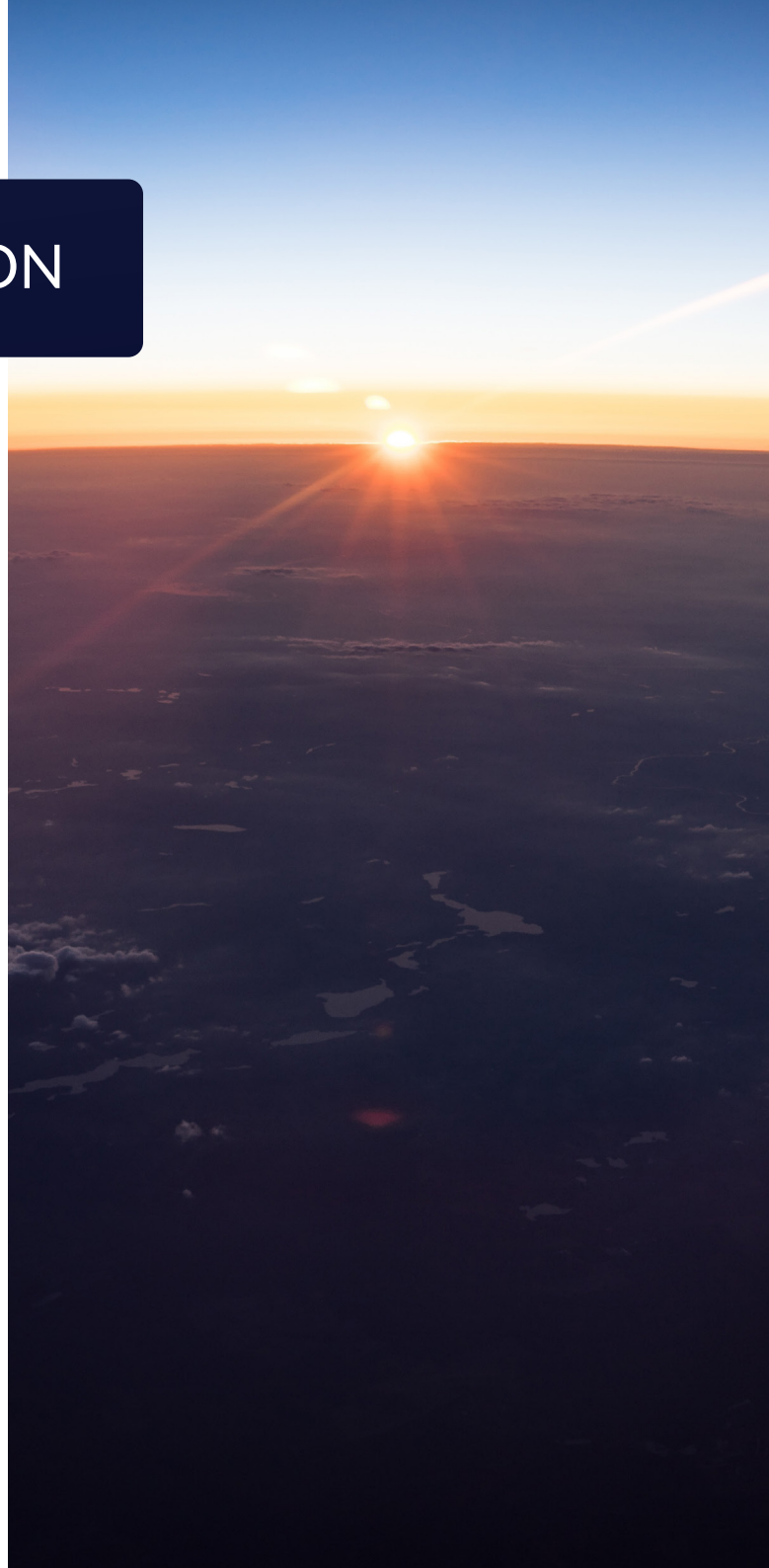
It does not contain any phosphates, Volatile Organic Compounds (VOCs), or ingredients considered to be carcinogens, mutagens, or reproductive toxicants.

Zi-400 is classified as a quick break degreaser, making it perfect for use in oil water separators.

It is likewise compatible with septic tanks, wastewater treatment systems and all water recycling/reuse plants.

Zi-400 is classified as NON Dangerous Goods under the ADG7 and is suitable for uplift by air.

Solidus Industries holds ISO 9001 accreditation and accordingly, Zi-400 is produced, stored and dispatched under this quality assurance system.



ZI-400 HD AIRCRAFT CLEANER
RECOMMENDED DILUTION RATIOS

Zi-400 is supplied in concentrate form, and will need to be diluted with water at different ratios depending on use. In this section, we outline the recommended dilution ratios for some of the most common applications for both exterior and interior aircraft cleaning.

Experienced aircraft operators will immediately notice that the dilution ratios for Zi-400 are considerably lower than the majority of other aircraft cleaning products on the market – making Zi-400 extremely cost effective per drum. Many aircraft cleaners require a 1:8 or 1:12 ratio for general usage, whereas Zi-400 only needs to be mixed at 1:30 to provide its superior clean and corrosion protection.

As shown in the table on the following page, Zi-400 is an extremely versatile aviation cleaning product. It is safe and effective on any surface that tolerates water, such as plastic, metal, wood, glass, ceramic, leather, painted surfaces and fabrics.

It is also completely suitable for any form of application, from the traditional bucket and brush or sponge through to foaming wands and dip tanks.

ZI-400 HD AIRCRAFT CLEANER
RECOMMENDED DILUTION RATIOS

TYPE OF USAGE		DILUTION Zi-400 : Water
Aircraft **exterior** applications	Light soils	1 : 40-50
	Moderate soils	1 : 30
	Heavy soils *(Grease, oil, exhaust trails)*	1 : 5-10
Aircraft **interior** applications	Carpet & upholstery spotting, galley surfaces, plastics, lavatory surfaces *(except mirrors)*	1 : 30
	Carpet cleaning	1 : 80
	Glass, mirrors, acrylic windows	1 : 100

These dilutions should be used as a reference point and guide when cleaning. You may vary these to suit your particular application, equipment and requirement.

Let experience be your guide and don't be afraid to experiment. Remember that any surface that tolerates water should be safe for use with Zi-400. If in doubt, spot test a small area first.

HOW TO WASH AN AIRFRAME
WITH ZI-400 HD AIRCRAFT CLEANER

Please note that this information is presented as a guideline only and is not intended to represent an accepted procedures or maintenance manual. Always follow the aircraft manufacturer's recommendations over any other advice.

1. For optimal results do not wash aircraft in direct sunlight or in wind as this will cause premature drying of Zi-400 on the airframe.
2. Observe environmental regulations that are relevant to where you are operating. Although Zi-400 itself is environmentally safe to use, during cleaning it will remove contaminants such as salts, hydrocarbons and other material from the aircraft that may have a detrimental effect should they find their way into the ecosystem.
3. Prepare the airframe for washing strictly as per the aircraft's operations or maintenance manual. Pay particular attention to covering or sealing those parts of the aircraft that must not have water directed at them under pressure.

These areas include but are not limited to pitot tubes, AOA sensors (Angle Of Attack) and electronics and/or avionics ventilation inlets/outlets.

PRESSURE CLEANERS NOT RECOMMENDED

DO NOT wash your aircraft with a pressure cleaner. Pressure washers have no place in aircraft cleaning! High pressure water will drive dirt and contaminants deep into lap joints and cavities, causing long-term degradation and damage to the airframe, along with the sand-blasting effect that is created with the particles of grime. Water applied under pressure can also damage and penetrate seals, exacerbate paint loss, and damage the adhesive bonds found on aircraft structures.

4. Begin the wash by applying Zi-400 to areas of high fouling at a dilution ratio of 1:5. The areas are predominantly around wheel wells, undercarriage, oil breathers and exhausts. Recommended application methods include brush, sponge, rag or spray bottle. Agitation of Zi-400 on the work area is essential.

5. Immediately commence washing the rest of the airframe at a dilution of 1:30. Our recommended application for this step is foam application. If foaming equipment is not available, a spray or brush will also work. Wash from the top of the airframe down to the bottom. Work quickly and methodically, leaving a dwell time of a few minutes for the product to sit, so as it can lift the grime from the surface before rinsing. We recommend dividing the airframe into sections to be washed and rinsed clean as you go.

6. Tools such as brushes, sponges or pads that are used on the airframe **MUST NEVER BE USED ON TRANSPARENCIES.** Separate equipment, solely dedicated to transparency cleaning must only be used.

7. Product and rinse water should only be directed onto the airframe from front to rear and generally in a downwards manner. Be aware that incorrect application may cause liquid to enter parts of the aircraft that were never intended to be wet. Again consult the manual for the airframe type or seek advice from a Licenced Aircraft Maintenance Engineer.

8. Dry any areas that require special attention and remove any tape or material used for sealing areas of the aircraft. These areas may require hand cleaning.

ZI-400 TECHNICAL DATA SHEET

Appearance	Clear yellow/green alkaline liquid with faint lemon odour; Mixes with water
Physical state	Liquid
PH (in concentrate form)	11.8 ± 0.4
PH as a solution (3%)	8.35
Melting point/freezing point (OC)	Not available
Initial boiling point and boiling range point (OC)	>100 OC
Flash point (OC)	Not applicable
Vapour pressure (kPa)	2.3 @ 20 OC
Solubility in water (g/l)	miscible
Relative density (SG) (water = 1)	1.016
Viscosity (CPS)	40
Vapour density (Air = 1)	As for water

General Safety Precautions:

Read Safety Data Sheet and product label for appropriate application and safety information before use. Contact Solidus Industries for additional documentation or visit our website at www.solidus.industries

FOR MORE INFORMATION CONTACT
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