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(ISSUE 2)

AIRWORTHINESS ADVICE NOTICE

TYPE AFFECTED: All sailplanes.

SUBJECT: DISINFECTING COCKPITS AND ASSOCIATED AVIATION EQUIPMENT

BACKGROUND: With the widespread relaxation of COVID-19 restrictions across the majority of Australian states, a large number of gliding clubs are likely to recommence operations. The state and federal governments continue to emphasize the importance of social distancing and hygiene and it would be a disaster if a COVID cluster were to occur at a gliding club. It is important that the GFA provides advice to protect our members and the local communities. Many clubs have conducted risk studies that recommend disinfecting cockpits after use.

There are a wide range of disinfectants available that are effective against COVID-19. However many of these are unsuitable for use in aircraft cockpits or parachutes because they contain aggressive chemicals. There is very little published data for many of these disinfectants that states their impact on critical safety equipment like seat harnesses or parachute harnesses. The use of disinfectants within the cockpit and on parachute harnesses should be undertaken with an abundance of caution and careful reading of the ingredients of the disinfectant. In most cases there is no clear answer and that there will be a trade-off between the short term benefits of disinfection and the longer term risk of damage to or degradation of components. In some instances regular disinfection may result in earlier replacement of components like aircraft harnesses.

This document aims to provide an overview of what can be used in each location and some of the risks that need to be considered and managed in the future. A summary is provided at Table 1.

RECOMMENDATIONS: Studies have suggested that the COVID-19 virus can stay active for longer periods of time (up to 3 days) on hard surfaces than porous

surfaces. Disinfection efforts should focus on high touch surfaces such as:

- Canopy frames,
- Cockpit sides,
- Controls,
- Seat harness buckles, and
- Release handles and rudder pedal adjustment knobs.

Consideration should also be given to:

- Microphones, given their close proximity to the face and high chance of contamination from fine drops of spittle / saliva when talking.

The best way to prevent COVID-19 from spreading via contact with the aircraft is to disinfect people's hands with sanitizer both before and after. By disinfecting the hands, less disinfecting of the aircraft and cockpit is required hence posing less of a risk to airworthiness.

The use of disinfectants within the cockpit and on parachute harnesses should be undertaken with an abundance of caution and careful reading of the ingredients of the disinfectant. In most cases there is no clear answer and that there will be a trade-off between the short term benefits of disinfection and the longer term risk of damage to or degradation of components. Seat belts or fittings may require earlier replacement as a result of disinfection practices.

The following guidance is recommended:

1. Ensure hand disinfectant is readily available and used both before and after handling or flying the aircraft.

2. Where cockpit disinfection is required, exercise due diligence in the selection of disinfection media by checking ingredients and determining their suitability for use on aircraft. There is a technical guide below to assist with selection. Disinfection media must be pH neutral.

3. Daily Inspections and Annual Inspections will require increased vigilance for corrosion, particularly around metal fittings on seat harnesses when water based solutions are used.

4. If regularly disinfected each day, seat harnesses should be removed every 3 months, disassembled and washed in warm soapy water and then thoroughly rinsed and allowed to dry in order to remove any build up of chemicals in the weave. The metal fittings should be inspected for corrosion before reassembly.

5. If regularly disinfected each day, parachute harnesses should be wiped down every 3 months with soapy water and then wiped with clean water and allowed to dry. The metal fittings should be inspected for corrosion.

DISINFECTION METHODS: Various aircraft and cockpit disinfection methods are:

Time: General advice states that 3 days storage in dry conditions is sufficient to disinfect a hard surface and less time is needed for a porous surface. Good storage of aircraft and parachutes during the week will ensure that these items are COVID-19 free by the next weekend.

Household Cleaners and Disinfectants: As a general rule these should not be used anywhere near an aircraft cockpit, seat harness, parachute or canopy. Because of the wide range available with a range of ingredients, careful assessment is required before deciding what can and can't be used. Many contain either acids, bleaches, hydrogen peroxide or ammonia which can damage aircraft components, harnesses or canopies. 'Medical disinfectants' often contain Benzalkonium Chloride which is referenced in a paragraph below.

Soapy Water: This has been the traditional cleaning and disinfecting medium. Mild, pH neutral soap should be used. If used regularly in the cockpit, using distilled or demineralised water will decrease the risk of corrosion of exposed metal over time.

Soapy water can be used in almost all parts of the cockpit but should not be used on aircraft instruments where water ingress can cause damage to electrical switches and mechanical dials. When used on control columns fitted with push to talk switches and similar, it should be used sparingly and wiped on rather than sprayed or splashed on. Again water ingress can cause damage to electrical switches. Any excess should be wiped off after a short time. Using a cloth damped only with water will help remove excess soap.

Water will wick into the weave of aircraft seat harnesses and parachute harnesses. This moisture may be retained under buckles and other metal fittings even though the rest of the harness is dry. This will increase the risk of corrosion on the contact side of these fittings that will need extra vigilance during annual inspections.

Iso-Propyl Alcohol: Most commonly found as a pump spray pack or as an 'alcohol wipe' this will either be pure or a 70% to 80% solution with distilled water. Similar to soapy water, iso-propyl alcohol can be used in the majority of the cockpit with the exception of the canopy. Whilst there is less water involved in the alcohol solutions, it should be used sparingly around electrical switches and never sprayed directly onto instruments.

CAUTION
Vapours from the evaporating iso-propyl alcohol are highly flammable

Iso-propyl alcohol will slightly reduce the strength of nylon and polyester webbing until it evaporates but should not cause permanent damage. However at the time of writing, there was no definitive information from manufacturers. Iso-propyl alcohol is an effective solvent and may leach dyes from seat harnesses and parachutes harnesses causing local discoloration. Because Iso-propyl alcohol solutions contain water, the water will wick into the weave of aircraft seat harnesses and parachute harnesses. This moisture may be retained under buckles and other metal fittings even though the rest of the harness is dry. This will increase the risk of corrosion on the contact side of these fittings that will need extra vigilance during annual inspections.

Iso-propyl alcohol may loosen gap tape or control seals if used externally on the aircraft.

Diluted Methylated Spirits: This is similar to iso-propyl alcohol but can be prepared at home from methylated spirits (ethanol) and distilled / demineralised water. The following recipe was provided by Dr Rachel Westcott (care of Emilis Prelgauskas) for a homemade hand sanitiser:

75mls methylated spirits
24 mls clean water
1 ml glycerine (available from pharmacies and some supermarkets)

Shaken up into a spray bottle.

The glycerine acts as a skin moisturiser as repeated sanitising will remove natural oils from the skin. This can also be used on the aircraft controls, but the glycerine will remain after the solution has evaporated and will require a wipe with a dry cloth to remove it.

A solution of 75% methylated spirits and 25% distilled / demineralised water is preferred for general aircraft cleaning. Similar to soapy water, ethanol solution can be used in the majority of the cockpit with the exception of the canopy. Whilst there is less water involved in the ethanol solutions, it should be used sparingly around electrical switches and never sprayed directly onto instruments.

CAUTION
Vapours from the evaporating methylated spirits are highly flammable

Ethanol will slightly reduce the strength of nylon and polyester webbing until it evaporates but should not cause permanent damage. However, at the time of writing, there was no definitive information from manufacturers.

Because methylated spirit solutions contain water, the water will wick into the weave of aircraft seat harnesses and parachute harnesses. This moisture may be retained under buckles and other metal fittings even though the rest of the harness is dry. This will increase the risk of corrosion on the contact side of these fittings that will need extra vigilance during annual inspections.

Hand Wipes / Disinfectant Containing Benzalkonium Chloride (BAK): There are a number of 'hospital grade' or 'medical' disinfectants as well as alcohol free hand wipes that contain Benzalkonium Chloride (BAK). Examples of this are:

- Calla 1452 Aircraft Interior Disinfectant
- Viraclean Hospital Grade Disinfectant

BAK is a very potent antiseptic. A review of available technical documents show that these are typically a small concentration of BAK in a water solution, sometimes with or without alcohol. There is often a detergent, dye and a scent mixed in with these as well. Whilst the BAK may not be a direct threat to airworthiness, other components in the solution may be. The scent is likely to be an ester which may have a long term impact on polyester.

Advice from disinfectant manufacturers (Viraclean) state that it is unlikely these products cause short term damage to aircraft cockpits. However, there is no information on long term degradation. Calla 1452 has been tested to meet a number of standards to show that it will not damage aircraft interiors and hard plastics. However, the standards do not require testing on aircraft or parachute harnesses and the Calla 1452 literature specifically omits reference to seat belts, harnesses and similar items. No strength testing has been done.

Some studies suggest a percentage of BAK will also be absorbed into synthetic materials also giving an extra duration of protection. This suggests that wiping with BAK solutions and allowing it to dry needs to be done less frequently than other methods to give the same level of protection.

However, BAK in concentrated form is very alkaline and may cause pitting of some metals. It is unclear as to whether residual BAK will build up in seat harnesses or parachute harnesses over time and then cause damage to metal fittings. BAK is water soluble and will be removed by washing harnesses with soapy water. As a result periodically removing seat harnesses and washing them as per an annual inspection is recommended.

Netbiokem DSAM: This product is being recommended by other sports aviation groups. It contains N-(3-aminopropyl)-N-dodecyl-1,3-propanediamine which is a biocide. It is also a very strong skin and eye irritant and requires the use of personal protective equipment (PPE).

CAUTION
Strong eye and skin irritant.
Wear gloves and eye protection when using this product.

Netbiokem DSAM has been tested to meet a number of standards to show that it will not damage aircraft interiors and hard plastics. However, the standards do not require testing on aircraft seat belts or parachute harnesses and the Netbiokem DSAM literature specifically omits reference to seat belts, harnesses and similar items. No strength testing has been done.

It is unclear as to whether residual chemicals will build up in seat harnesses or parachute harnesses over time and then cause damage to metal fittings. N-(3-aminopropyl)-N-dodecyl-1,3-propanediamine is water soluble and will be removed by washing harnesses with soapy water. As a result periodically removing seat harnesses and washing them as per an annual inspection is recommended.

Zoono Z-71: This is a relatively new product currently used by Qantas. It contains Octadecyldimethyl Trihydroxysilyl Propyl Ammonium Chloride which is a very potent antiseptic similar in effect to Benzalkonium Chloride (see above). The difference is that this water solution is sprayed onto a surface and allowed to dry. This forms a protective surface that will last up to 30 days (if kept clean of dirt etc) according to the manufacturer.

Zoono Z-71 has been tested to meet a number of standards to show that it will not damage aircraft interiors and hard plastics. However, the standards do not require testing on aircraft seat belts or parachute harnesses and the Zoono Z-71 literature specifically omits reference to seat belts, harnesses and similar items. No strength testing has been done.

This product is expensive. However the long duration of the protection means there is likely to be less risk to airworthiness in the long term from build up of residual chemicals on surfaces and in the weave of seat belts etc as Zoono Z-71 needs less regular application. The same applies to water wicking into the weave of aircraft seat harnesses and parachute harnesses from the solution. Less exposure will reduce the risk of corrosion on the fittings than other methods of disinfection.

DISINFECTING COCKPITS

	Soapy Water	Isopropyl Alcohol (Pure or 70%-80% Solution) CAUTION: FLAMABLE VAPOURS	Diluted Methylated Spirits (75% Meth 25% Water) CAUTION: FLAMABLE VAPOURS	Hand Wipes / Disinfectant With Benzalkonium Chloride (BAK)	Netbiokem DSAM CAUTION: SKIN IRRITANT	Zoono Z-71
Controls	! Wipe with damp cloth. After 20 seconds or longer, follow with wipe down with dry cloth. Water ingress may affect switches on control column.	✓ Light spray or use wipes or damp cloth. After 20 seconds or longer, follow with wipe down with dry cloth to remove any residue.	✓ Light spray or wipe with damp cloth. After 20 seconds or longer, follow with wipe down with dry cloth to remove any residue.	✓ Wipe with damp cloth. Not likely to cause short term problems on control hand grips. No clear information on long term impact on controls. BAK may remain on surfaces after wiping. BAK in concentrated form is very alkaline and may cause pitting of some metals.	✓ Light spray or wipe with damp cloth. After 5 minutes or longer, follow with wipe down with dry cloth to remove any residue. Use appropriate PPE.	✓ Disinfect surface. Spray onto surface and allow to dry. Water solution may affect switches on control column.
Instruments	✗ Water ingress may affect switches and instruments	✓ Use wipes or damp cloth. After 20 seconds or longer, follow with wipe down with dry cloth to remove any residue.	✓ Wipe with damp cloth. After 20 seconds or longer, follow with wipe down with dry cloth to remove any residue.	! Wipe with damp cloth. Not likely to cause short term problems. No clear information available on long term impact on instruments. BAK may remain on surfaces after wiping. BAK in concentrated form is very alkaline and may cause pitting of some metals.	! Wipe with damp cloth. After 5 minutes or longer, follow with wipe down with dry cloth to remove any residue. Not likely to cause short term problems. No clear information available on long term impact on instruments.	! Disinfect surface. Spray onto surface and allow to dry. No clear information available on long term impact on instruments.
Harness	✓ Wipe with damp cloth. After 20 seconds or longer, follow with wipe down with cloth dampened with water only. Regular disinfection each day will increase the risk of corrosion of metal buckles and fittings.	! Light spray or wipe with damp cloth. After 20 seconds, follow with wipe down with dry cloth to remove any residue. Low risk but no definitive statement from manufacturers that this is guaranteed to be safe. May leach dye from harness. Regular disinfection will increase the risk of corrosion of metal buckles and fittings.	! Wipe with damp cloth. After 20 seconds or longer, follow with wipe down with dry cloth to remove any residue. Low risk but no definitive statement from manufacturers that this is guaranteed to be safe. Regular disinfection will increase the risk of corrosion of metal buckles and fittings.	! Wipe with damp cloth. Not likely to cause short term issues. No clear information available on long term impact on harness webbing. No available data on strength of nylon or polyester treated with BAK. Some BAK will be absorbed by synthetic fibres after wiping. BAK in concentrated form is very alkaline and may cause pitting of some metals.	! Wipe with damp cloth. After 5 minutes or longer, follow with wipe down with dry cloth to remove any residue. No clear information available on long term impact on harness webbing. No available data on strength of nylon or polyester treated with Netbiokem DSAM.	! Disinfect surface. Spray onto surface and allow to dry. No clear information available on long term impact on harness webbing. No available data on strength of nylon or polyester treated with Zoono Z-71. Water solution will increase the risk of corrosion of metal buckles and fittings.
Parachute	✓ Wipe with damp cloth. After 20 seconds, follow with wipe down with cloth dampened with water only. Regular disinfection each day will increase the risk of corrosion of metal buckles and fittings.	! Light spray or wipe with damp cloth. Follow with wipe down with dry cloth to remove any residue. Low risk but no definitive statement from manufacturers that this is guaranteed to be safe. May leach dye from harness Regular disinfection will increase the risk of corrosion of metal buckles and fittings.	! Wipe with damp cloth. After 20 seconds or longer, follow with wipe down with dry cloth to remove any residue. Low risk but no definitive statement from manufacturers that this is guaranteed to be safe. Regular disinfection will increase the risk of corrosion of metal buckles and fittings.	! Wipe with damp cloth. Not likely to cause short term issues. No clear information available on long term impact on parachute. No available data on strength of nylon or polyester treated with BAK. Some BAK will be absorbed by synthetic fibres after wiping. BAK in concentrated form is very alkaline and may cause pitting of some metals.	! Wipe with damp cloth. After 5 minutes or longer, follow with wipe down with dry cloth to remove any residue. No clear information available on long term impact on harness webbing. No available data on strength of nylon or polyester treated with Netbiokem DSAM.	! Disinfect surface. Spray onto surface and allow to dry. No clear information available on long term impact on harness webbing. No available data on strength of nylon or polyester treated with Zoono Z-71. Water solution will increase the risk of corrosion of metal buckles and fittings.
Canopy	✓ Wash as per normal	✗ Possible damage to acrylic	✗ Possible damage to acrylic	✗ Due to the wide range of products available with a range of ingredients it is unclear what impact these will have on acrylic canopies. No published data on strength or transparency of acrylic with BAK. BAK in concentrated form is very alkaline and may cause pitting of some metals.	! Tested on Lexan 9600 for 10 minutes. No cracking or crazing reported. Not recommended.	! Tested on Lexan 9600 for 10 minutes. No cracking or crazing reported. Not recommended.

Table 1: Summary of Cockpit Disinfection Options