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CoVid-19 Disinfectants Usage in Flight Deck

BACKGROUND/PURPOSE:

Due to the outbreak of COVID-19, customers have asked about the compatibility of various cleaning chemicals with the flight deck materials. The objective of this test is to determine which WHO/CDC/EPA/EASA recommended cleaning solutions will not cause any damage to the hardware via test and/or analysis as applicable.

Honeywell makes no claims to the effectiveness of these products or application methods for disinfecting Honeywell equipment and only addresses whether a disinfectant/chemical composition has a negative impact to the Honeywell product.

Analysis of the bill of material for all flight deck hardware indicated 11 materials that may potentially be negatively affected by a solvent:

1. Polyurethane Gray Paint
2. CCD
3. Buttons
4. Polycarbonate button backing
5. Silicone Switch Seal
6. Cho-Seal Conductive Gasket
7. Polyurethane Black Paint
8. Display Unit Cover Glass with Antireflective coating
9. Mankiewicz Paint
10. Track Ball*
11. TouchScreen*

Note: *Items indicated were evaluated by analysis based on specification requirements.

April 9, 2020

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In total 11 cleaning solutions were analyzed or tested.

1. 70% Ethanol
2. 6% Hydrogen Peroxide
3. 0.1% Sodium Hypochlorite
4. Ozone
5. Zip Chem Calla 1452
6. Sanosil S010
7. 90% Isopropyl Alcohol
8. Klercide 70/30 IPA
9. Netbiokem DSAM
10. Clorox Wipe
11. Aerodis 7127

Assumptions for the analysis consist of the following:

1. Only the front-end electronics will be affected. (The sealing is sufficient to prevent large amounts of solution from entering behind the units)
2. Application will be applied after each flight, maximum of 4 times a day. Applications times are based off manufacturer's or WHO/CDC/EPA/EASA guidelines.

CONCLUSIONS/RECOMMENDATIONS:

It is recommended to perform a wipe on application instead of a spray application. This would best be performed by applying the cleaning solution to a lint free cloth and wiping down the surface, allowing it to dry. This will limit the exposure time as well as ensuring that excess solution does not contact internal electronics.

All solutions are acceptable except for ethanol based products, solutions containing sodium hypochlorite and Clorox Wipes. Ethanol showed bubbling and flaking on the paint as well as the buttons and is not recommended for use in any cleaning application.

To prevent streaking, the Isopropyl Alcohol is recommended for cleaning of the cover glass in accordance with Honeywell Publication No. D199305000008, section 12, paragraph E.

Reference Table 1 for complete recommendations on appropriate cleaning solutions.

Table 1: Cleaning Solution Compatibility

Chemical Name	Ingredients	Qualification	Approved
Ethanol	70% Ethanol	Test	No
Hydrogen Peroxide	6% Hydrogen Peroxide	Test	Yes
Sodium Hypochlorite	0.1% Sodium Hypochlorite	Analysis	No
Ozone	100% Ozone	Analysis	Yes

Zip Chem Calla 1452	0.814% Octyl decyl dimethyl ammonium chloride, 0.407% Dioctyl dimethyl ammonium chloride, 0.407% Didecyl dimethyl ammonium chloride, Alkyl (50% C14, 40% C12, 10% C16) dimethyl, 1.085% benzyl ammonium chloride	Test	Yes
Sansosil S010	hydrogen peroxide solution ... % 5-<8 orthaophosphoric acid 0-<_0.1 Silver 0-<_0.01	Similarity (Hydrogen Peroxide)	Yes
Isopropyl Alcohol	90% Isopropyl Alcohol	Honeywell Publication No. D199305000008, section 12, paragraph E	Yes
Klercide 70/30	60-100% IPA, water	Similarity (Isopropyl Alcohol)	Yes
Netbiokem DSAM	0.1-1% N-(3-aminopropyl)-N-dodecyl-1,3-propanediamine, water	Analysis	Yes
Clorox Wipe	1-5% Ethylene glycol monohexyl ether, n-alkyl (68% C12, 32% C14) dimethyl ethylbenzyl ammonium chloride, n-alkyl (5% C12, 60% C14, 30% C16, 5% C18) dimethyl benzyl ammonium chloride	Analysis	No
Aerodis 7127		Similarity (Calla 1452)	Yes

PROCEDURES:

Analysis:

The bill of material for all flight deck top level assemblies were analyzed for their non-metallic materials. Various resources were consulted to perform an analysis based on historical compatibility data.

In addition, the touchpad and touchscreen were done by analysis based on requirements.

Touchpad Solvent Resistance Requirement:

Solvent resistance. In addition to the solvents and fluids defined by mil-p-77bb
Except lacquer thinner, the isp front surfaces shall be designed to be resistant
To the following fluids:
A. Engine oil in accordance with mil-i-7bob, mil-i-23699, and p & wa specification 521, type i and type 2.
B. Hydraulic fluid in accordance with bms 3-1 i, type 4, class i.
C. Common interior cleaner, such as malco plastic cleaner, burlin ca. Bis mx, Mr. Clean, c & h chemical aec soap, or miller-stephenson ms-260.
D. 1-1-1 trichloroethane, isopropyl alcohol, denatured alcohol, and acetone.
E. Mild acids such as phosphoric acid.
F. Perspiration.
G. Normal cleaning agents such as water solutions of soap, detergents, and ammonia.
H. Insecticide such as dichloros iddypl or pyrethrum based.
I. Ethylene glycol, aea type i and 2.
J. Fire extinguishants, monobromo trifloror, methane, methyl bromide

Touchscreen Solvent Resistance Requirements:

The exposed surfaces shall be designed to be resistant to the following fluids

- Cleaning agents such as water solutions of soap, detergents, Malco plastic cleaner, Burlin CO. 815 MX or Mr. Clean, C&H Chemical AEC Soap.
- Isopropyl or Denatured Alcohol
- Mild acids such as Phosphoric Acid

Test:

Testing was conducted per MIL-STD-810H, Method 504.3, Contamination by Fluids, with a total soak time of 24 hours at room temperature in each of the fluids independently. Each sample was inspected and photographed prior to and after the exposure to determine any changes resulting from the exposure. An inspection was also performed at 1 hour and 8 hours into the exposure.

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ECCN: 7E994.

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