3D PRINTED PARTS (FDM & SLS) RESISTANCE TO SANITIZING METHODS

FOR USE IN CONTEXT COMMANDING THE FREQUENT CLEANING OF PARTS

MADE IN ORDER TO HELP IN THE GLOBAL EFFORT AGAINST COVID-19.
INFORMATIONS AND DATA SHOWN ARE PURELY INDICATIVE, THE AUTHORS CANNOT BE HELD RESPONSIBLE FOR ANY ERRORS.

Matériau	Sanitizing methods tested (data compilation of in-house and third-party testings and studies)											
	By default: **Rubbing** ! **Soaking** ! only in split cells marked [3]										Autoclave, hot air, dry air, steam	Low temp. Hydrogen Peroxide
	Sodium Hypochlorite	Sodium Hydroxide	Ethyl Alcohol	Isopropyl Alcohol	Acetic acid 8%	Triethyl-amine	Phenyl-methane	Dimethyl-cétone	Formal-dehyde 100%	Formal-dehyde 40%		
	NaClO	NaOH 1M	C2H5OH	C3H8O	CH3COOH	C6H15N	C7H8	C3H6O	CH2O	CH2O	Max recom.	H2O2 59%
	Bleach	Caustic soda	Ethanol	Rubbing alc.	Vinegar 8%	Trieth	Toluene	Acetone	Pure Formol	Formol 40%	Temp.[4]	Sterrad®
PLA	3 | 3			3 | 3							50°C	[5]
PLA-Cu[1]	3 | 3			3 | 3							51°C	
ABS											65°C	
PMMA											67°C	N/A
HIPS	N/A			N/A							70°C	N/A
PETG											66°C	
PA 11	3 | 3			3 | 3	3 | 3					3 | 3	57°C	
PA 12	3 | 3			3 | 3	3 | 3					3 | 3	87°C	
PA-CF[2]				3 | 3	3 | 3						135°C	
PA 910				3 | 3	3 | 3	N/A					105°C	N/A
POM								3 | 3			110°C	
PP						3 | 3					81°C	
PE											36°C	
PC						N/A					86°C	
PEEK						N/A					145°C	

Totally non-resistant, quick and complete deterioration of parts.	Limited resistance and partial structural deterioration at first exposure.	Occasional resistance, 1 to 10 exposure to solvent.	From 10 to X exposures to solvent without substantial damage.	N/A = non tested in the use case discussed (rubbing, soaking, other).

MATERIALS MARKED GREEN ARE NOT EQUALS IN RESISTANCE, WHICH MAY BE 10, 20, 50, 100 OR X EXPOSURES.
This chart is meant to help medics, paramedics and individuals resorting to 3D printed parts (made by them or given by third-party) identify the best sanitizing methods in order to face Coronavirus Covid-19 crisis, and can not be considered otherwise than a honest voluntary contribution in the context of the health and sanitary emergency.

[1] : PLA-Cu is a copper-filled PLA filament.
[2] : Nylon-CF encompasses all carbon fiber filled nylon filaments.
[3] : left : by soaking / dipping, right : by rubbing.
[4] : 95% of Heat Deflection Temperature.
[5] : 2 to 5 exposures max (depending PLA resistance, bc of varying compositions).

NOTE : avoid Ethylene Oxide at all costs (alters polymers structure, and creates a toxic film on the surface of 3D printed parts, especially those made in PLA, PETG, PET, PE).

Sharing is caring ! For any suggestions, contact us :

- www.phoenix-equipement.com ;
- www.facebook.com/phoenix.equipement ;
- phoenix.equipement@gmail.com .

Additional sources apart from in-house tests :

https://www.nature.com/articles/s41598-019-56350-w
https://3dprint.com/262930/3d-printed-polymers-solvent-compatibility-charts-must-be-dedicated-rather-than-simple/
https://www.elsevier.com/books/the-effect-of-sterilization-on-plastics-and-elastomers/mckeen/978-0-12-814511-1
https://www.researchgate.net/publication/326697946 / https://www.academia.edu/37171248
https://omnexus.specialchem.com/polymer-properties/properties/glass-transition-temperature
http://www.atomer.fr/1/1a-Temperature-flechissement-sous-charge-TFC-HDT.html
https://opendentistryjournal.com/VOLUME/13/PAGE/410/FULLTEXT/
https://sffsymposium.engr.utexas.edu/Manuscripts/2012/2012-21-Perez.pdf