

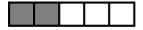
Application Note



Skill level



Time



Cost



Overview

Chemical environments are some of the most demanding workspaces, as the ability of printed prototype models to resist chemical attack depends on numerous chemical and environmental conditions and factors.

Chemical resistance is considered a functional concern rather than an aesthetic one. Rapid prototype (RP) models designed to evaluate functional use within a chemical environment are subjected to various conditions, such as temperature, reagent combinations and concentrations, and exposure time, all of which affect chemical resistance. Due to the wide range of variables that affect the shape of RP models, there is a need to more accurately establish parameters, such as usage, combination of chemicals and their resultant reactions and the geometry of the RP models, including surface finish, wall thickness and resin.

Typically, there is a correlation between the temperature of a chemical reagent and its reactivity. The higher the temperature, the greater the chemical reactivity and the more aggressive the chemical is to RP model. Correspondingly, most chemical resistant coatings lose their chemical resistance as temperature increase. Many chemicals, such as biocides, can affect the color, gloss, texture and performance of a chemical resistant coating as well as the printed RP model itself.

Viewed in this light, the items mentioned above may affect the chemical resistance post process.

Applications

Today, chemical resistance applications of RP models are growing in importance. The choice of suitable applications with adapted material properties, like chemical resistance, ensures that the application requirements are met.

For durable parts and patterns, or test parts for aggressive functional testing, a post process provides an excellent answer. Chemical resistance to corrosive agents, such as oil, gasoline and acids offers a viable solution for functional prototypes that can withstand robust performance demands.

The high chemical resistance provided by the post process also extends the use of aerospace, automotive and medical prototypes. These industries are among the first users expected to exploit this solution. The aerospace industry and the automobile manufacturers are expected to take advantage of its petroleum resistance and its ability to function when in contact with different chemicals. Printed PolyJet™ models, coated with a treated resistant coating, have resistance to harmful environmental exposure and may withstand moisture and chemicals.

The use of chemical resistant coating on RP models as an insulation to withstand the presence of aggressive materials, such as acid, bases, water, salt water and fuel, expands the range of applications for RP models. Such a coating may serve the



Figure 1. Applying chemical resistance spray



Figure 2. Applying chemical resistance spray on assembled parts

automotive, industrial, appliance, customer goods and other related industries that apply abrasion, chemical, corrosion, oil resistant and water repellent coatings to their products.

The Process

The workable solution for chemical resistant coating can be achieved by using the Fine-L-Kote™
It is also available in aerosol forms for prototypes and small runs.

Fine-L-Kote™ SR is a transparent durable coating that offers chemical resistance and is recommended for harsh environments. This type of SR resin coating has excellent moisture and fungus resistant properties and is UL recognized. The coating's flexibility allows for vibration, movement and rapid changes in temperature. The coating process is performed by applying a thin layer of the chemical resistant coating and then waiting 72 hours for final curing before exposure to chemicals. This coating is applied by aerosol achieving a thin layer that has minimal effect on part details. The result is a smooth coating that is easily applied to complex surface shapes.

This transparent coating provides cost-effective chemical resistance with a convenient method of application for prototype, design and touch-up work. It is specially formulated to provide a homogeneous finish.

Chemical resistance:

- ☒ Excellent resistance (no attack) to diluted and concentrated acids, alcohols, bases and esters
- ☒ Good resistance (minor attack) to aldehydes, ketones and oils
- ☒ Limited resistance (moderate attack suitable for short-term use only) to aliphatic and aromatic hydrocarbons, mineral oils, and oxidizing agents



Figure 3. Coating the inner surface of the bottle



Figure 4. 72 hours later, the bottle is chemical resistant

Disclaimer

Objet Geometries Ltd. is not responsible for misuse of our products or their use in conjunction with unsafe or improperly maintained equipment or for uses other than intended as specified in this application note.

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About Us

Here at 3D Printers Canada, we offer you any 3D Printing Solution. We serve any North American location with our primary service being 3D Printing. Through this service, our first priority is maintaining professional customer service. Each of our professionals maintains a high level of expertise to ensure success, a friendly experience and high quality service.

Our team of Mechanical Engineers and Mechanical Engineering Technologists use the newest and industry leading 3D Printing equipment. This allows us to be innovative, strategic and adaptable. Our passion is evident in all our work and we are relentless and talented at what we do. Our competitive prices combined with industry leading and latest technology never fail to deliver success and quality to our clients. By printing 3D objects quickly and affordably, you will not only save great amounts of time and money, but you will be able to alter your design to remove flaws or make improvement.

Mission

"Our Mission is to deliver advanced and robust 3D Printers to Canadian Product Development clients so they can speed up innovation and develop world class products. With our full line of unique 3D Printers which enables 3D CAD models to be built with amazing surface quality, highest accuracy/resolutions and with the world's only multi-material applications, that is second to none."

Vision

Using our creativity, we want to help pioneer ideas and push the industry of 3D printing forward. By being diverse in all aspects of our business, we are committed to enhancing your experience in any way. Our industry leading design, technology and capabilities allow us to best serve you. We want to continue to lead the printing industry while creating new solutions and improving old ones.

Customer

Our ultimate measure of success is customer satisfaction. Our aptitude, dedication and success in this category is unparalleled. Our devotion leads us to go above and beyond customer expectations as we value reliability and confidence in our services. 3D Printers Canada is a member of the Canadian Manufacturers & Exporters and SPE (Society of Plastics Engineers).

Quality

Quality is at the core of our growing reputation. As individuals and as a corporation, we expect excellence. Determination is an essential requirement for our success. We are devoted to continued progress in all aspects of our operation.

Your satisfaction is necessary to our success. Our goal is to provide you with the best level of customer service, and we welcome your comments and suggestions.