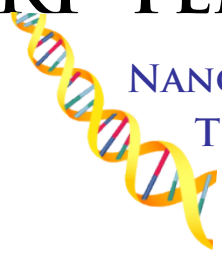


RP TEMPERING™ TECHNOLOGY NEWS



NANO-COMPOSITE
TECHNOLOGY

SOLID FREEFORM ADDITIVE TECHNOLOGY
& PATENTED ENGINEERING TECHNIQUE

VOLUME 6

AUGUST 2006

FDM Parts Dramatically Improve...

RP Tempering™ FDM parts have been very successful to date. Although we have not had the luxury of tempering as many FDM parts as we have in SL & LS materials, all our testing and customer feed back have been very favorable. The pictures below demonstrate FDM living hinges, wire ties, and the torsion strength of a tensile bar. FDM parts, because of the

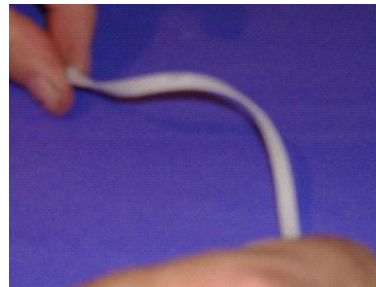
process of extrusion and layering, will still have reduced strength values in two dimensions. However, after tempering an FDM part you will increase the strength in all 3 dimensions making a more durable part. Snap features and living hinges will achieve 100 cycles on average. As an added advantage the Proto-Plasma-Rx™ spray will smooth out the FDM part finish without secondary manual finishing.



Plain FDM Living Hinge Part Fractured on First Cycle



RP Tempered™ FDM Living Hinge Completed 50 Cycles without Breaking



RP Tempered™ FDM Fully Functional .045" Wire Ties with One Way Latching



Plain FDM Tensile Bar Fractured at 1/2 Bend



RP Tempered™ FDM Tensile Bar Bends and Twists Without Fracturing

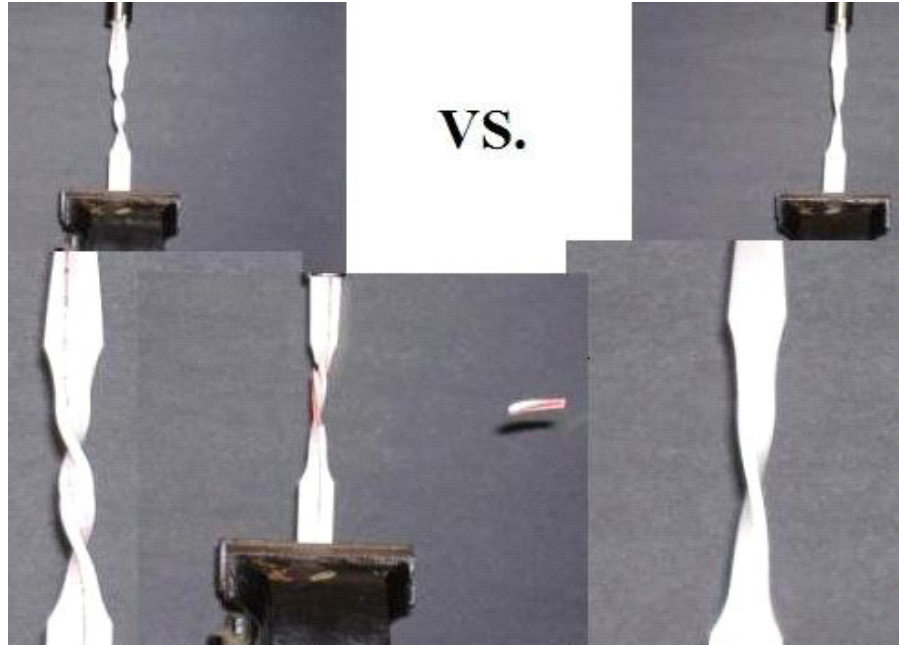
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LS Parts Pass the Test

Hundreds of LS parts have been tempered not only for our R & D testing but for customer applications. Actually, in most cases there is a higher margin of improvement made to a LS part after tempering when compared to SL after tempering. Other important improvements on an LS part after tempering are: Thermal Properties, Heat Resistance and Deflection, Chemical Resistance (fuel, oil, water), Impact Strength, Torsion Strength, Vibration Signature Reduction, Flex Strength and more. In the picture shown it compares a tempered LS part to a plain LS part in torsion strength. The improvement on average is over 250%! There will not be a loss of tensile strength or flexural modulus and there will be a gain in flex strength. LS parts soaked in oil or #2 fuel and then tested after 30 days did not show any decrease in mechanical strength.



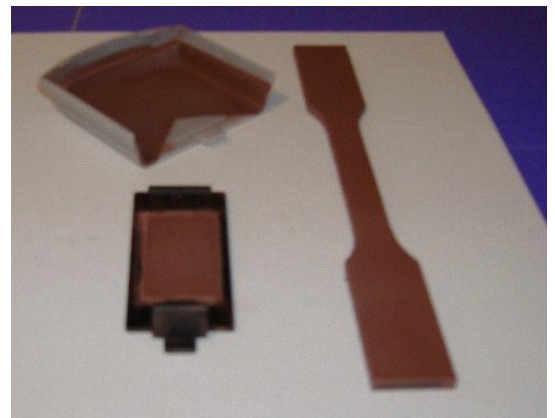
*RP Tempered™ LS Part on left - 3 Revolutions before breaking
Plain LS Part on right - 3/4 Revolution before breaking
Notice small peice in middle picture of material flying off after fracturing - this demonstrates that the stiffness is the same after tempering but it will require more force to break it.*

EMI Shielding - Material Introduction

PAR3 Technology is introducing a new RP Tempering™ compound for EMI shielding. The

electrical properties are improved. This application can be done on location without having to send it out to an EMI shielding service

company. The process takes only minutes and is very cost competitive verses industry EMI shielding services.



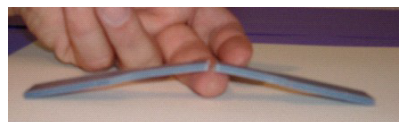
RP Tempering™ Compound with Copper Infiltrates

Bluestone™ Breakthrough

PAR3 Technology has been working with the Bluestone™ resin with the help of American Precision Prototypes (APP & www.approto.com). Now RP Tempering™ has a tempering technique to give you more flex in the ridge Bluestone™ materials without fracture. This material has several potential applications and with our new RP Tempering™ technique for

Bluestone™, the brittleness of this resin is enhanced dramatically. Below are pictures demonstrating standard Bluestone™ tensile bars compared to RP Tempered™ Bluestone™ tensile bars. More data will be published in the coming months on all physical properties.

*Lower Left: Plain Bluestone™ fractured
Below: RP Tempered™ Bluestone™*



RP Tempering™ - The Team Approach

By Marty McGough Total CS Team (www.totalcsteam.com)

The RP Tempering™ technology offers the RP or SFFF user the opportunity to provide much more durable parts that can be used in a wider distribution of applications than the standard parts they have been building in the past. The good news is that users of this process should be seeing several key improvements in their business.

□ First, with more durable parts they should be seeing new applications opening up that require finished part

characteristics that were not obtainable in the past.

□ Second, there should be some cost reduction realized in the areas of less broken parts in the process, less shipping damage and some reduced post processing time.

□ Third, there should be some increased revenue available as a result of increased prices for parts that utilize this technology

To take full advantage of all of these opportunities to increase your bottom and top line numbers, it clearly takes an integrated approach between your operations, engineering, sales and marketing teams. Each of these departments needs to understand what this

technology has to offer and how to effectively communicate and sell it to the customer base. My point here is that each of the users of the RP Tempering™ technology should take some extra time to make sure their teammates understand the benefits of this process and define a plan that meets your internal goals to optimize the value it can provide to you and your customers. From a TCST and a PAR3 standpoint, we would be glad to support you in any way we can to help you internally communicate the value of this technology and help you commercialize it in your specific applications. Please feel free to contact us if you would like our support in this or any other area.

Ceramic RP Tempering™ Compound

Ceramic Microsphere Proto-Plasma-Rx™ technique will be used in extreme temperature cold & hot applications by spraying on a layer of Standard Proto-Plasma-Rx™ and applying the ceramic microspheres

to the surface. Then spray on 4 more coats of Proto-Plasma-Rx™ to finish. We will be publishing data on physical properties in next month's issue. This will be available to all license bureaus September 1, 2006.



Ceramic Microspheres RP Tempered™ Parts

LS Elastomeric Resin

Hi-Temp Protoplass© when applied to LS elastomer parts will withstand over 1000 degrees of heat resistance. The picture to the right shows how well the Hi-Temp Proto-

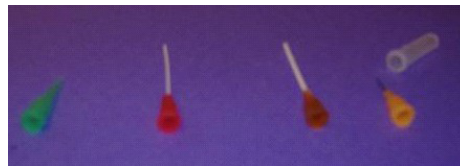
plass© holds up under dramatic temperatures and part manipulations. Other improvements include Tensile Strength, Puncture Strength and Tear Strength.



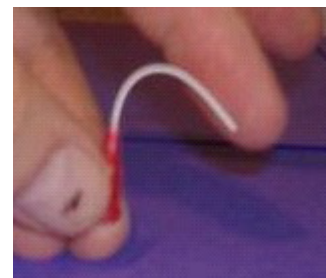
LS Elastomeric Resin Part

Safety Improvement - Injection Applicator

We are pleased to introduce our new line of injection applicators made of plastic, to replace the old steel injection applicator with sharp tips. The tips are not only safer but are also pliable and will comply better to the SFF part. We have a special one time offer of new injector tips for all service bureaus that have the steel tip injection



applicators. Just email or call PAR3 Technology and ask for free replacements.



Web Support

My RP Community, at www.MyRPCommunity.com, is continuing to be an excellent open forum mechanism for not only the RP Tempering™ technology discussion, but for all SFF

related conversation. I would compare it to an updated, more advanced, RPML. We would recommend that everyone visit the website to form your own opinion.

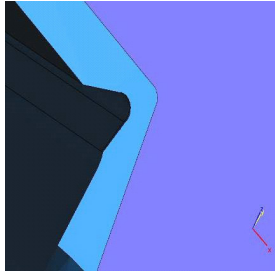
www.MyRPCommunity.com



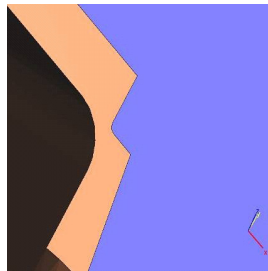
**IT
OUT!**

STL File Conversions

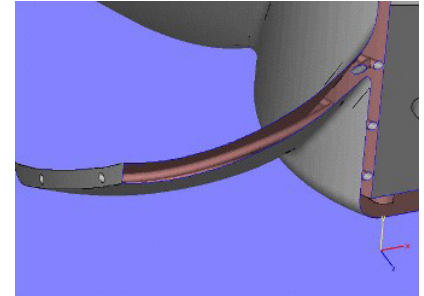
3Matic Software continues to support RP Tempering™ Patented 3D CAD Engineering systems. In past news letters you have seen “Tunneling”, “V”Grooves and “U” Shape pictures. The pictures shown here represent



actual file changes in STL format using the 3Matic software. This subtractive process is used when maximum strength is required in a SFF part. RP Tempering™ was introduced only 9 months ago and as the industry embraces the technology 3Matic software will become a



needed item for most RP Tempering™ providers. We will continue to support file conversation at PAR3 Technology and TCST as always.



Quality Report on RP Tempering™

RP Tempering™ was introduced about 9 months ago into the “REAL WORLD”. We have been faced with part designs never before tried during our development and even through BETA testing. We have been tracking our quality performance record from materials sold to end use application by using a pass/fail system. We continue to learn more from you on a daily basis which improves the whole

RP Tempering™ System & Customer Support.

Applications: We have only had 5 reported applications that did not work. We are still working to engineer a solution to make 2 of these applications successful.

RP Tempering™ Materials: We have had 3 materials shipping issues evolving into 2 rejections. One rejection was because the pigments in colored RP Tempering™ Compounds

and CNT's did not mix/compound well. We pulled the colored materials off the market until we could fix the problem. The other material problem we have recently experienced is the RP Tempering™ compound not completely curing. We should have our testing done addressing this issue by August 19th. We think the problem arises in a low humidity or limited air movement situation.

Comments from Earl Dunlap, PE

Thank you for your requests for articles on different applications besides SL parts. I hope this issue of RP Tempering™ Technology News has covered more of what you are looking for. We plan to continue sharing articles that show how RP Tempering™ can be used in a wide variety of ap-

plications with a wide range of materials.

The use of RP Tempering™ continues to grow and gain industry acceptance. As it does, we will provide you with the latest information.

As always our offer stands to temper parts for free, in any material/process for evaluation. If you have any question or comments

about RP Tempering™ you are welcome to share them with us using the email addresses below. Also, you can see all our past issues of RP Tempering™ Technology News on the website at www.RPTempering.com.

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