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Chemistry 124
Prof. Paul Jackson
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Laboratory Countertops Analysis

Introduction

Worktops are a critical element of laboratory furniture and the most vulnerable to damage. Therefore, the material used for worktops can have an adverse influence on the outcome of experiments and other work in progress. Also, for environments where there are large numbers of users or a high demand for hygiene, the choice of materials becomes even more important. Laboratories used frequently by different individuals or groups need to be strong and resistant to wear. They must look their best at all times, because visible signs of wear can sometimes lead to an excessively casual approach by subsequent users. Because of these reasons, durability, maintainability and reliability, together with aesthetics, are key factors to be considered in selecting laboratory worktop surface material.

We investigated several different countertops to find the best physical surface with the highest environmental standards. Countertops for laboratory use include: hardwood, stainless steel, phenolic resin, and Trespa Toplab Plus. Our research focused on laboratory countertops manufactured in the Midwest with a maximum transportation radius of 500 miles. Our group spoke with representative from manufacturers of different laboratory countertops in order to find

a product with the smallest ecological impact from the raw materials and the production process to the application and recycling.

I. Hardwood – Maple or Oak



photo courtesy <http://www.kewaunee.com>

Historically, hardwood has been a common building substance that is used in a number of different settings. In many tables and countertops, oak and maple are often used with penetrating oil or natural varnish finishes. In our product research, we learned that hardwood, either oak or maple, is also used as a substance for laboratory countertops. While speaking with a representative from the Kewaunee Scientific Corporation, we were told that hardwood laboratory countertops were effective in settings where mechanical or physical work levels were high, yet were a poor candidate for situations involving chemicals. Although the product had a fair chemical resistance, the representative did not recommend it for use in chemical laboratories, such as those in chemistry experiments. We choose to focus out attention to other materials that could be used universally in the facility.

II. Stainless Steel



photo courtesy <http://www.kewaunee.com>

Stainless Steel provides many unique values that make it a powerful candidate in the material selection process. Stainless steel is low carbon steel, which contains chromium at 10% or more by weight. This addition of chromium gives the steel its unique stainless, corrosion resisting properties. Stainless steel also has special high chromium and nickel-alloyed grades and has the ability to retain its strength at high temperatures. After contacting several steel manufacturers, we decided that steel is the most expensive laboratory countertop and because of its conductive properties, it is not ideal for use in a science laboratory. Steel countertops have many beneficial properties that have proven to work well in medical facilities. St. Olaf may want to look into steel countertops within its medical facilities because it is a sanitary surface that holds large amounts of weight.

III. Phenolic Resin



photo courtesy <http://www.kewaunee.com>

One product that we seemed to have success in finding information is Phenolic Resin. Phenolic Resin is constructed of thermoset resins (materials that tend to be rigid, infusible, and insoluble, and cannot be remelted and reformed) and layers of kraft paper. The thermoset resins and the kraft paper are formed into a monolithic slab under high heat and pressure, and then surfaced with melamine, a strong organic base with chemical formula $C_3H_6N_6$, with the IUPAC name 1,3,5-Triazine-2,4,6-triamine. The melamine is primarily used to produce melamine resin, which when combined with formaldehyde produces a very durable thermoset plastic.

Phenolic resin incorporates incredible flatness and is light weight to provide an easy to use product. It also has a resistance to many chemicals, moisture and thermal shock and has an easy to clean surface. Phenolic resin's lighter weight is popular with installers and makes phenolic resin a viable choice for use as shelving material in adjustable shelving applications.

A key characteristic of phenolic resin is the ability to withstand high temperature. Along with this, the product can hold a large mechanical load with minimal deformation. Phenolic resins are specified for demanding applications, such as refractory, friction and foundry products, to meet the challenges of these high temperature environments. This provides the product rigidity necessary to maintain structural integrity. Also, even under extreme high temperatures, dimensional stability can remain. An important parameter in evaluating temperature stability is the glass transition temperature (T_g). As the temperature is raised, crystalline solids like ice or polyethylene melt and become liquids. Amorphous solids like glass and cured phenolic resin pass through a temperature range where the molecules rapidly gain in mobility. This molecular mobility results in flow or creep, and in rapid dimensional change. Phenolic resin remains cross linked, and so retains some stiffness even above the T_g . Ideally, the end used temperature should not exceed the T_g value. The initial glass transition temperature of phenolic resin is approximately the same as the cure temperature. Unlike most polymers, the T_g of phenolic resin can be further elevated to levels in excess of 260° C by a correctly designed post bake protocol.

Phenolic resin is compatible with many organic and inorganic fillers and reinforcements, which makes it an ideal candidate for many different end uses. It quickly penetrates the structure of these substrates. The final properties are attained after a brief thermal exposure to complete the cross-linking process. This process provides the means to engineer the desired mechanical, thermal, and chemically resistant properties. For this reason, phenolic resin is often used in other environments than just laboratory countertops. It is used in pultrusion and filament winding technology for demanding applications, such as oil platforms, missile components and heat shields. Other examples include abrasive wheels, friction products, wood composites, and molding compounds.

Within a laboratory environment, phenolic resin could be used to accommodate the harsh exposure of severe chemical environments. The inherent nature of phenolic resin provides an impervious shield to protect a variety of substrates from the corrosive effects of chemicals. Tests that have been conducted confirmed minimal degradation from many chemicals after prolonged exposure, even at elevated temperatures. Typical exposures include gasoline, alcohol, oil, glycol, brake fluid, various hydrocarbons, and also weak acids and bases.

In the event of an ignition spark or source, phenolic resin can be designed to meet the requirements of specified flammability ratings. These can be altered by the use of inorganic fillers and reinforcements, depending on the various situations it will be exposed to. If there is a fire, phenolic resin typically generates hydrogen, hydrocarbons, water vapor, and carbon dioxide when exposed to temperatures above its decomposition. In a fire situation, phenolic resin produces a relatively low amount of smoke at a relatively low level of toxicity.

During normal oxidative conditions at temperatures above the decomposition point, phenolic resin has a high char yield. In many ways, it behaves similar to ceramic and may actually contribute to structural integrity when exposed to fire situations. This characteristic of phenolic resin is being utilized in structural composite gratings and pipes for offshore oil rigs where fire is a constant threat, and has been useful in designing vitreous carbon articles such as special analytical electrodes, crucibles for melting rare earth metals, rocket nozzles, extremely high temperature bearings and seals, and heat shields for missiles.

When looking at the green qualities on the product, we noted that production and manufacturing took place in Batavia, Illinois, within the 500 mile parameter. No hazardous or carcinogenic substances were present over reportable limits. When lit on fire during disposal, the product generated carbon monoxide, carbon dioxide, formaldehyde and a variety of aromatic

hydrocarbons and partial oxidation products. Yet, this was the extent of the information that could be found. Even while speaking to representatives of numerous companies, we were only able to find a Material Safety Data sheet for the product, which can be found in the appendix.

IV. Trespa Toplab PLUS



photo courtesy <http://www.trespa.com>

Durability, reliability, maintainability, and aesthetics (the qualities of an ideal laboratory worktop mentioned in our introduction) are all optimized with the well-machined Trespa Toplab PLUS worktops. These worktops are self-supporting flat panel worktops with a phenolic resin core reinforced with cellulose fiber. They are processed similarly to hardwood worktops, and thus can be readily machined and adapted to the specific needs of any laboratory in a similar fashion. Sinks (stainless steel, epoxy, or polypropylene), drip cups, drainage holes, grooves, and other additional features can easily be incorporated into the worktop surface. Also, the edges and joints of the worktop are completely water-proof and chemically resistant, having no need for further finishing.

Many of these properties persist following installation. The Toplab Plus worktops can easily be adapted to subsequent changes in the arrangement or needs of the laboratory. It can be re-cut and retro-fitted with new sinks, drip cups, drainage holes, or other equipment, and will still

retain all of its properties of chemical and heat resistance. The adaptability, maintainability, and aesthetics of the Toplab Plus worktops allow a unique and unparalleled degree of dependability and design.

The properties which make Trespa Toplab Plus laboratory worktops so reliable and adaptable also give them a high modulus of elasticity and high levels of both tensile and flexural strength. They are also highly resistant to impact, scratching, general wear, and heat (although some optical properties of the material, such as gloss or color, may change slightly if subjected to a dry heat at beyond 355 °F for extended periods of time. The level of scratching resistance in particular is equal to or above 4 Newtons.

The decorative surface of Trespa Toplab Plus worktops are especially designed for laboratory worktops with high demands and requirements and provide 24 hour chemical resistance to even the most concentrated of acids and dyes. For example, this attractive surface is entirely impervious to all possible materials used in laboratory environments, including radioisotopes, human tissue and blood samples, and bacteria, molds, or microorganisms. It is also resistant to water, dyes, and organic solvents, and is especially easy to clean and disinfect.

This high level of resistance was demonstrated in a chemical resistance test, which was conducted by applying five drops of each reagent to the surface of the laboratory worktop. In this test, acids (such as Hydrochloric acid, Phosphoric acid, Acetic acid, Chromic acid, and others), bases (such as Ammonium Hydroxide), salts (such as Silver Nitrate, Ferric Chloride, Copper Sulphate, Sodium Chloride, and others), organic chemicals (such as Formaldehyde), solvents (such as Acetone, Dichloromethane, Ethylacetate, Ethylalcohol, Methylalcohol, Trichloroethylene, Xylene, and others) and biological stains (such as Basic fuchsin, Carbol fuchsin, Gentian violet, Methylene blue, Wright stain, and most conventional cleaning agents) all

produced no effect upon the Trespa Toplab Plus laboratory worktops, meaning that there was no detectable stain, loss of gloss, or change in work surface material.

When 98% Sulphuric acid and the organic chemical Furfural were applied to the surface, a rating of “No Effect” was not obtained, but the Toplab Plus worktops still achieved an “Excellent” rating, meaning that these substances produced a slight stain or loss of gloss, but that no change to the smoothness, function, or life of the work surface material was detected. 65% Nitric acid also produced an effect upon the Toplab Plus worktops, but the effect was still very minimal. The worktops were given a rating of “Good” with respect to this substance, meaning that there was a clearly discernible stain or loss of gloss, but still that there was no change to the smoothness, function, or life of the work surface material.

With the exception of these three chemicals, all other reagents applied to the surface of the worktops in the chemical resistance test had no effect upon the Trespa Toplab Plus laboratory worktops: clear evidence of their durability and reliability. Detailed results for these and for additional reagents not mentioned are included in the complete Trespa Toplab Plus chemical resistance test information data tables, which are attached.

Perhaps even more incredible and appealing than the durability, reliability, maintainability, and aesthetics of the Toplab Plus laboratory worktops from Trespa are the “Green” sensibilities found within the values of the company itself. Trespa utilizes the resources of the world in order to manufacture their quality products, but they are also aware that these resources are largely finite, and have accordingly made it their mission to act as responsible guardians of the environment, and to respect people, property, and future generations. They strive to not only make certain that their production processes are in accordance with all relevant standards and legislation, but to exceed these requirements wherever and whenever possible.

“Integral Chain Management” is the policy by which Trespa operates, which means that they extensively research, draw conclusions, and take measures appropriate to the placing of as little pressure as possible upon the environment throughout the entire life-cycle of their products. In this policy they not only consider the product itself, but also any and all product-related matters such as maintenance, transport, and demolition. Trespa’s “Green” sensibility is especially evident in the fact that Trespa was one of the first major manufacturers of products utilized in construction to map in its entirety the totality of its products’ effects through a life-cycle analysis.

Trespa looks ahead and designs for the future by producing optimally-sized panels and by implementing their sawing optimization program, both of which produce less overall waste. In addition, their choice of panel thickness means that fewer sub-frames are required, and their choice of cavity depth means that no extra insulation is required.

The ecologically sound manufacturing of Trespa’s products begins with another choice, the initial choice of raw materials. For example, Trespa uses inert binding agents in their products, which are obtained mainly from residual substances. Also, no heavy metals are used in the dyes which are applied to their products during the manufacturing process.

This process itself has also been optimized by Trespa. They have taken elaborate measures to improve the overall production process, with the result being that they are able to recycle many of the residual substances created from both semi-finished and end products. Some of these residual substances are also thermo-recycled, which provides a significant amount of energy recovery for the company and which produces no toxic or corrosive gases. In fact, all emissions and discharges created by the process of manufacturing the materials of the Toplab Plus laboratory worktops are well within statutory limits.

Trespa's "Green" sensibility and commitment to the environment is also evident beyond the manufacturing of the product, and persists long after the Toplab Plus worktops have been delivered. Upon installation, customers can expect to enjoy the comparatively longer life of the worktops, due to their being remarkably resistant to impact, scratching, and general wear. They are also very easy to clean, and even easy to fix, should any adjustment or modification need to be made. And should replacement be necessary, Trespa Toplab Plus laboratory worktops are simple to dismantle when renovating or demolishing, and can be recovered or even entirely recycled by Trespa.

That is how far Trespa's "Green" sensibilities and commitment to the environment extend, from the very beginning of their product's life to its very end, and beyond. For additional information, Trespa's complete stated environmental policy is attached.

Conclusion – Recommendation

While countertops such as phenolic resin, stainless steel, and hardwood have beneficial attributes and physical properties, we did not find them to be the best choice for the new science facility. Steel has excellent chemical resistance but is conductive to electricity and can be very costly. We rejected the idea of having steel laboratory tops because it would be a drain on our natural resources and not the most cost efficient material. The purpose of this project was to determine the greenest materials for laboratory countertops, and ultimately the obvious choice was Trespa's Toplab PLUS. The production uses the highest percent of raw materials in their product, located at the nearest location, and having the greatest physical properties for our

science facility. The product also has a continuous commitment to a green process and focuses itself as one of its selling points.

Trespa is a leader in the provision of surface solutions, whilst minimizing the effects of its products on the environment and on human health. Trespa is composed of mostly raw materials and certified residual wood and is the least harmful on our natural resources. Steel and other hardwoods use more renewable resources as well as time and energy to process and manufacture while Trespa can be locally manufactured and distributed making it the most efficient product. While taking all costs, health considerations, and transportation costs into our analysis, Trespa was the most efficient and ideal product for the St. Olaf Science facility.

Sources and Contacts

Interiors for Business

Batavia, Illinois.

Phone: 630-761-1070

Fax: 630-761-1065

<http://www.interiorsforbusiness.com/>

Direct link to the Kemresin® Lite:

<http://www.interiorsforbusiness.com/catalog/item.php?id=444&cat=EducLaboCase#>

Tegan Marketing – Trespa Toplab PLUS

410 Ferndale Road North

Minneapolis, MN 55447

phone: 763-475-1340

toll-free: 800-510-5836

<http://www.teganmarketing.com/>

Fax: 507-388-3159

www.vironbiocomposites.com

Haldeman-Homme, Inc.

Ronald P. Johnson

430 Industrial Blvd.

Minneapolis, MN 55314

Phone: 612-362-2114

Cell: 612-812-8075

Fax: 612-378-2236

Email: Rjohnson@Haldemanhomme.com

<http://www.haldemanhomme.com>

Environ Biocomposites

Donna Robbins

221 Mohr Drive

Mankato, MN 56001

Phone: 507-388-3434

Toll Free: 800-324-8187

Appendices

- A. Kewaunee Scientific Corporation Environmental Statement**
- B. Trespa Corporation Environmental Policies**
- C. Phenolic Resin Material Safety Data Sheet**
- D. Phenolic Resin Laminate Technical Bulletin**
- E. Phenolic Resin Work surface Price sheet – Interiors for Business**
- F. Trespa Chemical Resistance Brochure**
- G. Trespa Material Safety Data Sheet**

A. Kewaunee Scientific Corporation Environmental Statement

Environmental Statement

Kewaunee Scientific Corporation recognizes that our environment is the responsibility of not only the individual, but the corporate community as well. The success of our customers, our employees, and our company depends on the ability of us all to sustain the resources that underlie the products and services we offer and use.

1. To provide laboratory furniture, fume hoods, and accessories that minimize energy consumption and adverse environmental impact by designing, engineering, and manufacturing products
 - o that use renewable and recyclable resources,
 - o that use less energy and resources to install and operate, and,
 - o that match the building life cycle, withstanding the rigors of decades of use, relocation and reuse.

2. To manufacture these products in an environmentally responsible manner.



taken from: <http://www.kewaunee.com/environment.asp>

B. Trespa Corporation Environmental Policies

MANUFACTURER'S STATED ENVIRONMENTAL POLICIES

Quality, Environment, Safety and Health Policy:

Trespa International defines its core activities as the production, sale and marketing of high quality decorative panels to provide innovative solutions to customers all over the world. A global market leader in High Pressure Laminate (HPL)-compact, Trespa employs two proprietary technologies and produces four distinct product lines or brands: Meteon, Athlon, Toplab and Virtuon.

As a commercial company, we set out to be successful in all of our activities and by doing so, rewarding all stakeholders: customers, employees, shareholders and suppliers. We do, however, want to do this whilst striving to maintain all aspects of fair play and respect for others, their property and the environment.

This policy encompasses three key areas:

Quality:

We set out to comply with – but not limit ourselves by - all relevant industrial standards for quality including ISO 9001, with due observance of the highest possible standards as part of a continuous improvement programme. We want to be regarded as a leading supplier by all the industries we serve.

Environment:

We are aware that all of the world's resources are finite and we want to act as responsible guardians of the environment, with due respect to people, property and future generations. As good citizens, we want to live in accordance with the standards as set out in ISO 14001 as well as all relevant legislation – exceeding requirements where possible and implementing the best practices throughout our organization. In addition, we place a strong focus on continuous improvement and the prevention of negative environmental impact.

Safety and Health:

It is our objective to ensure that every employee, customer or supplier who is present at any one of our locations, deals with our products or works in any other way on our behalf should be safe. First and foremost we place a personal responsibility with each individual to secure his/her own safety. Secondly, every one of us carries the responsibility for overall safety – and will be encouraged to bring to management’s attention any unsafe practices or situations, which need to be resolved without delay. We are living in accordance with safety & health standard OHSAS 18001 and our working practices are subject to continuous improvement. In addition, we strictly adhere to agreed safety standards, in legislation, best practices and common sense, to ensure that people are safeguarded. Where there is a choice, safety will be put before any other considerations.

To ensure overall well-being, we set out to create an innovative and stimulating working climate. Employees are encouraged to take advantage of and be open to new learning experiences as they present themselves – and, where possible, we will assist with the provision of such experiences.

To continuously improve our performance we have defined, in our Management Information System, Critical Success Factors (CSF) as our significant risks and Key Performance Indicators as targets to monitor these risks in relation to our Business Plan.

Additional Environmental Statement about Trespa Products:

Trespa products and the finished goods manufactured using Trespa panels can be evaluated for United States Green Building Council (USGBC) credits under the USGBC LEED Rating System, Version 2.0. The following sections would apply to Trespa panels and finished goods manufactured using Trespa panels: Material & Resources, credits 3.1, 3.2, 4.1 or 4.2, 5.1 and 6.0 and Indoor Environmental Quality, credit 4.4.

The following facts represent Trespa’s material properties in respect to environmental topics such as material composition, recycled content, air quality and Trespa’s commitment to environmental protection.

Raw Material Composition:

- Kraft Paper 70% of product
 - U.S. point of origination
 - Acquired by harvesting
 - Does not contain post-consumer or post-industrial waste
- Phenolic Resin
 - 15% of product
 - Local source or origin
 - Acquired via the chemical manufacturing industry
 - Does not contain post-consumer or post-industrial waste
- Polycarbonate Resin
 - 15% of product
 - Local source of origin
 - Acquired via the chemical manufacturing industry
 - It is post-industrial waste

Recycled Content:

Total % of recycled material in the product is 15%

Total % of post consumer waste is 0%

Total % of post-industrial waste is 15%

- Approximately 70% of materials used to manufacture Trespa products are derived from renewable resources.
 - In-plant waste at the Trespa factory is reused and converted to product or energy.
 - Packaging materials are manufactured using renewable materials.
 - Energy conservation measures at the factory include, but are not limited to, energy generation through burning scrap material, burning off-cuts and after-burning at drying ovens. This represents 21% of the factories energy usage and is derived from renewable energy sources.
- Trespa panels can be easily removed and recycled.

- Trespa products can easily be disassembled or removed from a building and reused in new construction or renovation of an existing building.
- The life expectancy of Trespa products is 41 - 60 years.

Air Quality:

- Trespa products contain phenol-formaldehyde resins. In accordance with ASTM D5116-90, emissions are less than the permissible exposure limit and building occupancy criteria.
- Trespa products do not contain any of the 17 chemicals targeted by the EPA for reduction.
- Production processes are free from emissions of the oxide compounds of carbon, sulfur or nitrogen and ozone depleting products such as CFC's, HCFC's and HFC's.

Commitment to environmental protection:

- All "wet" products that are used for the assembly or installation of Trespa products are available in low VOC or water based products.

C. Phenolic Resin Material Safety Data Sheet

FIBERESiN Industries, Inc.

BOX 88 • OCONOMOWOC, WISCONSIN 53086-0088 • PHONE 262-667-4427 • FAX 262-667-4814

24 HR. EMERGENCY INFORMATION: CHEMTREC 800-424-9300

MATERIAL SAFETY DATA SHEET

SECTION 1: IDENTIFICATION

Product: Solid Phenolic Panel
Synonyms: High Pressure Laminate
Chemical Family: Fully cured phenolic & melamine resin/paper composite
Description: Phenolic laminate; HPL Date Prepared/Revised: 02/03/03

SECTION 2: HAZARDOUS INGREDIENTS

Component: No hazardous or carcinogenic substances present over reportable limits. Nuisance dust may be generated during machining operations.

SECTION 3: PHYSICAL DATA

Melting Point: N/A Boiling Point: N/A
Vapor Pressure: N/A Specific Gravity: 1.30-1.45
Appearance/ & Odor: Solid. No significant odor.

SECTION 4: FIRE & EXPLOSION DATA

Flash Point: N/A Auto-ignition Temp: Not determined
Explosion Hazard: Dust generated by sanding, sawing or machining may be explosive if dust cloud contacts an ignition source. Use of totally enclosed motors is recommended.
Extinguishing Media: Water, foam, dry chemicals, CO2
Special Fire Fighting Procedures: Self-contained breathing apparatus is recommended when there is danger of breathing hazardous products of combustion.
Unusual Fire & Explosion Information: Intense fire may cause sparks and hot gasses to be released from panel.

SECTION 5: HEALTH HAZARD DATA

Recommended Exposure Limits:

<u>Particulates (Not Otherwise Classified or Regulated)</u>	(Total Dust)	OSHA PEL 15 mg/m ³ TWA	ACGIH TLV 10 mg/m ³ TWA
	(Respirable Particulate)	5 mg/m ³ TWA	3 mg/m ³ TWA

SECTION 5: HEALTH HAZARD DATA (Continued)**Routes of Exposure and First Aid Measures:**

Inhalation: Dust from cutting or sanding operations may cause irritation of respiratory tract. If breathing excess dust creates problems, remove to fresh air. Consult physician if necessary.

Eye Contact: Treat dust in eye as foreign object. Flush with water, lifting lids to clear dust.

Effect of Overexposure: Not established. **Threshold Limit Values:** Not established.

SECTION 6: REACTIVITY DATA

Stability: Stable. **Incompatibility:** None.

Hazardous Decomposition Products: Burning generates carbon monoxide, carbon dioxide, formaldehyde and a variety of aromatic hydrocarbons and partial oxidation products.

Hazardous Polymerization: Will not occur.

SECTION 7: SPILL OR LEAK PROCEDURES

In Case of Spill: N/A

Waste Disposal: Incinerate or landfill in accordance with Federal, State & Local regulations.

SECTION 8: SPECIAL PROTECTION INFORMATION

Engineering: Provide local exhaust as necessary to meet OSHA limits for nuisance dust.

Respiratory Protection: Use approved respirator or dust mask when machining.

Ventilation: Recommended when machining.

Protective Gloves: Recommended when handling and machining.


Eye Protection: Safety glasses recommended when handling or machining.

Information contained herein is based on data available and is believed to be accurate. However, no warranty is implied or expressed regarding accuracy of the data or results of use of this material. It is the responsibility of the buyer and/or user of this material to research and understand safe methods of storage, handling and disposal of this product.

D. Phenolic Resin Laminate Technical Bulletin

See electronic copy

E. Phenolic Resin Work surface Price sheet – Interiors for Business

	Interiors for Business, Inc. 106 W. Wilson Street Batavia, IL 60510 (630) 761-1070 TEL (630) 761-1065 FAX www.interiorsforbusiness.com	QUOTE																							
	<table border="1"> <tr> <th colspan="3">PROJECT DESCRIPTION</th> </tr> <tr> <td colspan="3">Phenolic Resin Worksurfaces</td> </tr> </table>	PROJECT DESCRIPTION			Phenolic Resin Worksurfaces			<table border="1"> <tr> <th colspan="3">CUSTOMER</th> </tr> <tr> <td colspan="3">David Mitchel mitcheld@stolas.edu</td> </tr> <tr> <th>REVISION</th> <th>TERMS</th> <th>DATE</th> </tr> <tr> <td>1.0</td> <td>Net 30</td> <td>1/26/2006</td> </tr> <tr> <th colspan="3">SALES REP</th> </tr> <tr> <td colspan="3">Chad Young</td> </tr> </table>	CUSTOMER			David Mitchel mitcheld@stolas.edu			REVISION	TERMS	DATE	1.0	Net 30	1/26/2006	SALES REP			Chad Young	
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		*All surfaces are 3/4" thick *Pricing is for Worksurface only. Backsplashes and legs if required will have additional charges.																							
		To accept this order please sign and fax back: X _____																							
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		Sales Tax	7.0%	N/A																					
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*Thank you for the opportunity to quote these items.
 Initial orders and large orders may require deposit.
 This quote is valid for 30 days.*

F. Trespa Chemical Resistance Brochure
See electronic copy

G. Trespa Material Safety Data Sheet
See electronic copy