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ISO TC42 WG5, Task Group 2 – HBI Participation to Standardize Test Methods and Improve Photo Book Quality

Since fall 2009, HBI/LBI has participated in task group TG2 – Storage and Mechanical Properties, which is a subgroup of WG5 – Physical Properties and Image Permanence of Photographic Materials. This initiative was organized under ISO/TC42, the International Standards Committee, which is responsible for standardization of traditional photography as well as digital imaging. This task group is chaired by Dr. Mark Mizen, Director of Digital Development, Creative Memories.

Executive Director, Debra S. Nolan, and board member, Paul Parisi, ACME Bookbinding, have represented the association during discussions at group meetings and via conference calls. HBI/LBI has been called upon to assist with fulfilling assignments related to hardcover binding. In particular, following a meeting of ISO/TC42 WG5 TG2 in the fall of 2010, HBI/LBI was asked to identify test methods for the following attributes: Cover to Book Block Attachment Strength, Grain Direction, Recycled Content to Ground Wood,

Endpapers, Cover Material Composition, Cover Board Composition/Window, Page Flexibility, Page Attachment Method and Tear Strength.

When tasked with these assignments, a call was issued to members with expertise and experience in these areas. Those who responded and participated in this exercise include Jonathan Jacobsen, Jim Kaeli, Alan McIntire, Dave Robbins, Bill Schnitzler, and Lang Wightman. Werner Rebsamen, HBI/LBI Technical Director, also generously shared his knowledge and experience.

In the summer of 2011, another meeting of ISO/TC42 WG5 TG2 was held and Rebsamen joined the group to offer technical guidance. As a result of this meeting, HBI/LBI was tasked to participate in further identifying test methods specific to photo books on the following subjects: Page Attachment Durability & Physical Binding Integrity; Cover Material (Chemical and Physical Stability), and Book/Cover Warp. These and other proposed test methods were discussed at the meeting of ISO TC42 WG5, TG2, which was held the week of October 10, in Minneapolis, MN, immediately following the 2011 HBI/LBI fall conference.

This edition of *ShelfLife* printed compliments of Library Binding Service.
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According to Mizen, “HBI’s participation in this is highly valued because of the hardcover binding expertise the association and its members bring to the effort to standardize test methods and improve photo book quality.”

The following Standards Update, from the January/February 2011 issue of the *IS&T Reporter*, provides more detailed information on the work of ISO TC42.

Standards Update

David Q. McDowell, Editor

This issue of Standards Update focuses on the recent change in responsibility for ISO/TC42 Photography and the USTAG (Technical Advisory Group) to TC42 from I3A to IS&T. Much of the input was provided by Ken Parulski, Chair of ISO/TC42.

What Changed

On January 1, 2011, IS&T assumed oversight for the standards developed by ISO/TC42 (the ISO Technical Committee responsible for photography) and the USTAG to TC42, the role previously held by I3A. IS&T has partnered with the American National Standards Institute (ANSI), which will serve as the Secretariat for ISO/TC42, and will also administer the US Technical Advisory Group (USTAG) to ISO/TC42. This will ensure support of the ongoing development of international imaging standards within TC42 and the active US involvement in these activities. (see <http://www.imaging.org/ist/resources/standards>).

Importance of TC42 to Imaging

Although the name of ISO/TC42 is simply “photography”, its role within and its importance to the imaging community is critical. TC42 standards impact not only traditional photography, but digital imaging and a wide range of metrological issues that extend beyond “photography”.

“HBI’s participation in this is highly valued because of the hardcover binding expertise the association and its members bring to the effort to standardize test methods and improve photo book quality.” Dr. Mark Mizen, Creative Memories

For example one of the earliest ISO standards still in use today, and recently updated by TC42, is ISO 5, *Photography and graphic technology — Density measurements*. In addition to defining the widely used density response functions, ISO 5 defines the geometry used for both densitometric and colorimetric measurements across much of the imaging industry. Other pivotal existing standards include:

- ISO 5800, the ISO speed of color negative films,
- ISO 18921, the life expectancy of optical discs, and
- ISO 15740, the PTP protocol used to communicate with digital cameras.

Current new projects include:

- work to define an XMP based metadata standard for digital photography (ISO 12234-3),
- standardization of “shooting time lag” measurements for digital cameras and camera phones (ISO 15781),
- an improved version of the TIFF/EP image format for storing “raw” images (ISO 12234-2),
- the stability of photographic prints to effects of thermal (ISO 18936), light (ISO 18937), ozone gas (ISO 18941), and humidity (ISO 18946),
- the care and handling practices for magnetic hard drives used for image storage (ISO 18943).

Background to the Transition

Since its creation in 1947, the Secretariat for TC42 had been assigned to ANSI (ISO Secretariats are officially assigned to National

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Bodies). ANSI assigned administrative responsibility for TC42 to the photographic manufacturer's trade association known for many years as NAPM, and more recently as I3A. ANSI also appointed the association to serve as the Secretariat of the USTAG to ISO/TC42.

Over the last decade, the photographic industry has gone through a major evolution. Digital imaging has largely displaced film-based photography, while digital photography has found applications in a wide range of products and services. These industry changes were mirrored in I3A's areas of focus, membership and priorities, leading to a mismatch between I3A and TC42's interests. The USTAG to ISO/TC42 recognized that this situation was unsustainable, and agreed to take action.

The USTAG to TC42 considered a number of options including:

- creating an independently funded and managed organization to act as the ISO/TC42 Secretariat and USTAG administrator;
- asking ANSI to move the support of ISO/TC42 and the TAG to another US organization; and
- relinquishing the ISO/TC42 Secretariat role to another National Body member.

Because of the strong synergy between ISO/TC42 and IS&T, the group agreed that the best option was to propose that the sponsorship of accredited standards for photography be transferred from I3A to IS&T. Through its members, IS&T represents the multiple areas of imaging science that support photography standards, including electronic imaging, color science, image preservation, photofinishing, and silver halide research.

Many ISO/TC42 standards participants are long-time, active members of IS&T. Much of the fundamental research that underlies the standards developed by ISO/TC42 has been reported in IS&T sponsored conferences and publications. Moreover, members of IS&T benefit from the standards developed by ISO/TC42.

To initiate the transfer from I3A to IS&T, a detailed proposal was drafted by the chair of ISO/TC42 and the chair of the USTAG to TC42, and reviewed by the TAG members and the leadership of both IS&T and I3A. The final proposal was then approved by the Board of Directors of both I3A and IS&T, and by the USTAG to TC42.

The proposal included retaining the existing standards management board (SMB), which is now responsible for the IS&T standards budget, and for providing the oversight and funding of (i) the IT committees, (ii) the administration of the USTAG to TC42, and (iii) the administration of the ISO/TC42 Secretariat. The SMB operates according to the SMB Standard Operating Procedures, which it has developed and approved. Direct administration of the USTAG and the ISO/TC42 Secretariat is now provided by Jason Knopes of ANSI staff, as part of an enhanced services agreement between ANSI and IS&T.

What is ISO/TC42 Photography

TC42 is the International Standards Committee responsible for standardization primarily, but not exclusively in the field of still picture imaging—chemical and electronic—including, but not limited to:

- definitions for still imaging systems;
- methods for measuring, testing, rating, packaging, labeling, specifying and classifying the dimensions, physical properties and perfor-

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mance characteristics of media, materials and devices used in chemical and electronic still imaging;

- specifications and recommendations of logical and physical characteristics, practices, interfaces and formats for still imaging capture, processing, and output systems; and
- methods, measurements, specifications, and recommended practices for storage, permanence, integrity and security of imaging media and materials, and imaging materials disposition.

TC42 is currently responsible for 173 published International Standards and has 11 Participating countries and 20 Observer countries.

TC42 is organized by Working Groups (WGs). The current WGs are:

- WG 3 Sensitometry, image measurement and viewing
- WG 4 Mechanical elements of photographic equipment
- WG 5 Physical properties and image permanence of photographic materials
- WG 6 Photographic chemicals and processing
- WG 18 Electronic still picture imaging

In addition the following WGs, although administered by TC42, are joint activities with other TCs.

- WG 8 Photographic film and paper dimensions (TC6)
- WG 17 Dental films (TC106)
- WG 20 Digital camera color characterization (IEC)
- WG 21 Density measurement (TC130)
- WG 22 Color management (TC130)
- WG 23 Extended color encoding (TC130 & CIE))
- WG 24 Viewing conditions for photography and graphic technology (TC130)

- WG 25 Use of XMP for digital photography (TC130)

ISO/TC42 also participates in several Joint Working Groups administered by other ISO and IEC technical committees.

The Role of the USTAG to TC42

Every National Body in ISO has some form of shadow committee to provide input to the International Standards activities. In the US, our official representative to ISO is ANSI. To facilitate the work of providing input to the various TCs, ANSI has created a US Technical Advisory Group (USTAG) for each ISO TC in which the US (ANSI) participates. The user community is responsible for the support (and often administration) of these USTAGs.

It is the USTAG to each TC that is responsible for providing US technical experts and determining the US position on standards of that TC.

The USTAG to TC42 is organized by areas of interest into Imaging Technology (IT) committees, which are:

- IT2 - Image Evaluation
- IT9 - Image Permanence
- IT10 - Digital Photography

IS&T members based in the United States can participate in the development of accredited international photography standards by joining the appropriate IT committee.

The IT Committees

The members of the responsible IT committee can participate in and vote on the US comments and/or approval of ISO/TC42 standards in the technology area of that IT committee.

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A more detailed look at the three IT committees follows:

IT2 – Image Evaluation

IT2 develops standards pertaining to the quantitative evaluation of conventional and digital photographic prints, such as density and resolution measurements. It also develops standards for measuring the response of imaging materials and devices, such as the sensitivity of photographic film to light, the spectral power distribution of exposure lamps, and the conditions for viewing images.

IT2 has five sub-groups focused on the following subject areas:

1. IT2-28 Densitometry
2. IT2-31 X-ray Film Image Evaluation
3. IT2-36 Image Structure
4. IT2-39 Light Sources and Lenses
5. IT2-45 Sensitometry of Photographic Films and Papers

IT2 holds a committee meeting once per calendar year. IT2 members develop the USA opinion on ISO standards developed by ISO/TC42/WG3: Sensitometry, Image Measurement and Viewing, and many are also USA experts on ISO/TC42/WG3.

IT2 members represent users, governmental agencies, other standards organizations, and companies that manufacture photographic film, paper and plates, as well as other imaging media.

IT9 – Image Permanence

The scope of the IT9 Committee is the development of standards and recommended practices for physical properties, permanence behavior and the effect of environmental factors on imaging materials. Imaging materials include photographic film and paper, digital print media, image transfer

materials, magnetic recording materials, electro-optical materials, and other materials. IT9's scope includes a variety of digital output materials, such as inkjet prints on paper and other substrates.

The primary focus of IT9 is the development of the USA opinion on ISO standards developed by ISO/TC42/WG5: Physical Properties and Image Permanence of Photographic Materials, and many members of IT9 also serve as US experts on ISO/TC42/WG5.

WG5 is responsible for the ISO 18900 series of standards on physical properties and permanence of imaging materials. There are currently over 40 standards either published or in development.

IT10 – Digital Photography IT10 members develop the US position on ISO standards developed by TC42/WG18, which are largely related to digital photography, and most also serve as US experts on TC42/WG18. The scope of IT10 includes specifying image formats, device interfaces, and storage media. IT10 also works on standardized measurement methods for digital cameras and other digital capture devices and systems. IT10 has supported the development of more than twenty ISO standards, by serving as US experts to ISO/TC42/WG18 and several joint working groups administered by ISO/TC42.

These ISO standards include:

- Digital image formats and image transfer protocols
- Digital camera ISO speed, resolution, OECF, and noise measurements
- Print and film scanner resolution and dynamic range measurements
- Extended color encodings

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- Psychophysical methods for estimating image quality
- Terminology

IT10 meetings are normally held twice per year. ISO/TC42/WG18 also typically meets twice per year, between IT10 meetings. To speed the development and publication of standards of critical interest in the USA, IT10 has also developed ANSI Standards using a fast-track process. These efforts included the creation of PTP (Picture Transfer Protocol), which was later adopted as ISO 15740, the international standard for communicating with digital cameras and other digital photography devices.

Participation in the Image Technology (IT) Committees


The IS&T SMB plans no changes in the structure, participation fees, leadership, or membership of the current Image Technology (IT) committees. These committees are responsible for digital photography, conventional photography, and image permanence standards.

Participation in an Image Technology (IT) Committee is open to experts representing organizations, companies, and government agencies, as well as to individuals, affected by the work undertaken by the committee. Qualified organizations, companies, and individuals willing to

actively participate in standards development are encouraged to join the one or more IT committee in their area of interest. Annual dues, billed on a calendar year, are required from all participants for each IT on which they serve.

IT Committee fees depend on participant classification, which are

- Individual Expert: \$150/year/per IT committee
- NFP Association, Professional Society or University: \$500/year/per IT
- Professional Consultant:
 - \$750/year/per IT
 - Small Company (<\$100M annual revenue): \$1,750/year/per IT
 - Medium Company (\$100-\$500M annual revenue): \$4,000/year/per IT
 - Large Company (>\$500M annual revenue): \$8,500/year/per IT

For more information about TC42 related standards or for IT Standards Committee Application Forms please go to www.imaging.org/ist/resources/standards. For more information about standards in general please contact the editor at mcdowell@npes.org. 

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Books Bound With PUR – Are They Safe?

By Werner Rebsamen



Recently a large university in the United States contacted the Library of Congress and requested information about the long-term characteristics and safety of the relatively new PUR adhesives now being used extensively in bookbinding. A lab science manager replied, stating that the Library has not yet tested PUR adhesives used for binding books, catalogs and magazines, noting that this particular adhesive is on the prohibited materials list of the National Archives & Records Administration. That same science manager also stated “that PUR’s may not be suitable for library bookbinding because they degrade by hydrolysis and that there are issues with off-gassing of organic vapors.” With this response, the university that raised this question contacted this writer with “do you have any relevant information to add on this issue?” All I could say to that was “thank you for the invitation to comment!”

It was a very justified request made to this writer. In 1990 and 1991, I conducted extensive research on aging characteristics of PVA adhesives, a project sponsored by LBI. Libraries had concerns about the long-term aging characteristics of adhesive bound library books. The conclusion of this research was that if the right kinds of PVA adhesives are being used, they most likely last 500 years or more. In an effort to ensure that these findings were correct, LBI followed this research up with two well-known conservators, (Ogden & Strauss) who, after additional and extensive research, came-up with the same conclusions. (These research reports are available from LBI).

We were also introduced to PUR adhesives in 1990. At that time, safety of PUR adhesives was a serious issue. Not in its final form on bindings, but in its liquid phase during application. In June

1990, I published an extensive article in *American Printer* on the “Pros and Cons of PUR Adhesives.” The issue was safety with methylene bisphenyl isocyanate vapors and other like products. Before we go any further, let’s highlight the pros and cons of PUR adhesives in a language everyone is able to follow.

PUR Adhesives

PUR is a short abbreviation of “Poly Urethane Reactive.” These new adhesives differ from conventional hotmelts as they cure by cross-linking via a chemical reaction with the moisture contained in the paper and the surrounding air. This is much different than conventional hotmelts which are like a candle made from wax. If you light the candle, the wax will turn into a liquid. If you take away the heat, that liquid will coalesce and return back, rather quickly, into its solid state. In technical language, we refer to these as thermoplastic hotmelts. These days, most books, catalogs, magazines and other bound materials are, at least in North America, bound with hotmelts. This includes the *National Geographic* magazine. While earlier hotmelt formulations in the 1960s were problematic with regard to longevity, today’s formulas will last virtually forever. I’m sure the folks at *National Geographic* magazine have done their homework. That magazine used to be bound together with wire-staples through the sides. During a visit at *National Geographic*, I was told the reason for stapling is “that the binding will last forever!” Another factor was recycling. The covers were glued onto the book with a protein glue.

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Reactive hotmelts (PUR's) behave similarly in that they are melted and applied hot, then allowed to solidify. They differ, however, in that they immediately begin to cure or cross-link by a chemical reaction with moisture. Moisture is available from the book's paper and the surrounding air. A normal moisture content of paper is approximately seven percent. Cross-linking increases the molecular weight and thus the toughness of the polymer in the adhesive. Once fully cross-linked, this material no longer melts, but, because of its toughness and an application of a film applied to the spine that is half of that of hotmelt, it remains extremely pliable. As an added feature, because of its initial low molecular weight, reactive hotmelts can more efficiently wet out difficult to bind papers, non-porous surfaces like super calendered, coated papers filled with inks and toners. The cross-linking then provides the "lock" to allow the adhesive to tenaciously hold onto the substrate. As a result, these very adhesives are being used to structurally bond metal and dense chip-boards in the panel bonding markets. The car industry is using PUR adhesives to glue-in carpets and other material. This was long before bookbinders even considered this adhesive to successfully bond difficult to bind sheets together.

Earlier Concerns of Safety

When PUR adhesives were introduced in the early 1990's, machinery suppliers and bookbinders struggled with application technologies. As stated above, PUR adhesives must be heated. When heated to its application temperatures, they may give off MDI fumes, or isocyanates, which are considered a health hazard because people can become sensitized to them. The results are often eye, respiratory or skin irritations. At the beginning, bookbinders lacked the necessary equipment and there were many unfortunate surprises. One German bookbinder tried this new "miracle"



The Muller Martini Amigo Binder, designed for digital printing, adjusts automatically to any format. Contemporary papers, inks and toners are difficult to bond and are therefore bound with a PUR adhesive.

glue in a conventional hotmelt glue pot. Then they went out to have lunch. It started to rain. PUR's cure by moisture. When they returned, the entire PUR glue in the pot already solidified. They tried hammer and chisels in vain. The \$50,000+ glue pot was a total loss! In earlier times, for safety and control of the MDI fumes, bindery operators had to wear masks to clean the glue pots. Unlike conventional hotmelts, PUR adhesives must be emptied out of the glue pots after every use or at the end of the shift as they cannot be reheated. Needless to say, when PUR adhesives are used, good ventilation is essential to minimize exposure. Once PUR adhesives have cooled down to room temperature, the vapor pressure of the MDI is low enough, that virtually none is emitted. When the products are bound with PUR, and after they have cured, absolutely no MDI is available to be released to cause a problem.

Of course, these were earlier problems. We used to carry around complex and expensive measuring tools to record even the smallest amounts of MDI vapors. Operator safety was always our first priority. Some binder operators wore badges which contained an active

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chemical that reacted only with MDI. After a fixed period of time, the badge was sent to a laboratory for an analysis. This established the total exposure for a given period of time worn. Luckily, when using PUR's these days, safety is no longer a concern. Adhesive suppliers now furnish formulations where MDI vapors are almost nil.



During an open house at R & R Bindery Service, Inc. in Girard, IL, members of HBI/LBI could watch paperback bindings being converted into durable, PUR bound hardcover bindings. PUR takes longer to cure.

Compare that to earlier PUR formulations which were near the maximum threshold limit value of allowable MDI and IPDI emissions of 5 parts per billion (ppb) for an 8 hour shift. Today's PUR formulas emit only 1/10th of that. Even better are the newer PUR application systems used on binding machines. Some have entirely closed systems, using pre-melters and extrusion heads. Some new, small PUR binding machines are equipped with a pressurized melting tank for their 2 kg PUR melting cartridges. In other words, a binder operator is no longer exposed to any vapors, no matter how small the emission may be. When the question of whether safety MDI monitors are being implemented was posed to a bookbinding adhesive chemist

who tours binderies on a regular basis, he said yes, they are available, but nobody is using them anymore. Thanks to all of these efforts in regard to safety, PUR adhesives are now being used in most binderies. With these miracle PUR adhesives, binders are now able to bind the most difficult papers without any problems. Customers request and specify their fancy, printed masterpieces to be bound with PUR.

Applications and Performance

The recommended application temperatures for PUR adhesives are approximately 100° F less than when working with conventional hotmelt adhesives. In a bookbinding environment, we use two different application systems—extrusion or rollers. The amount of adhesive applied to the spine is roughly half of that of hotmelt. PUR adhesives do cost more, but considering the amount of adhesive applied to the spine, the price/cost differences are minimal. These days, most binders charge the same regardless of whether hotmelts or PUR adhesives are being used. While hotmelt adhesives set almost immediately, PUR adhesives require more time. But that also has changed with newer PUR formulas. The higher the humidity, the quicker they will cure. The thin film applied to the spine results in a flexible binding and usually shows excellent opening qualities. The adhesive is very pliable. The adhesion and strength is many times that of a hotmelt adhesive, especially on difficult to bind papers such a coated paper stocks. PUR adhesive bound books can endure heat up to 212°F and perform well in temperatures as low as 40°F. The durability and longevity has been reported to be 500 or more years; the same as with PVA adhesives. Books destined for a long life or a heavy use will retain their integrity. Once cross-linked, neither ultra-violet light, temperature extremes nor humidity will cause deterioration of a PUR adhesive.

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Best of all, PUR adhesives do not contaminate paper waste in the re-pulping process as the cured adhesive particles wash out like metal staples.

When should you use PUR adhesives? As stated earlier, PURs successfully bind the most difficult papers, some which may be UV coated, laminated etc or otherwise coated. These adhesives are non-migratory, which means they are not affected by ink-solvent migration like a hotmelt adhesive. With the rise of digital printing, the photo book industry could no longer be without PUR for binding their books. Some toners and silicon oils make any attempts of binding a true challenge. Sure, we could side-sew these books and jeopardize openability. Side-sewing is also very limited with regard to the thickness. In my bookbinding lab, I have several hardcover bound photo books (weddings) which are over one inch thick. All of those have been bound most successfully with PUR.

Are books bound with PUR safe in a library environment?

Let us go back to the beginning of this article when University librarians contacted the Library of Congress with regard to the safety of books bound with PUR. Remember the expert's opinion "that PUR's may not be suitable for library bookbinding because they degrade by hydrolysis and that there are issues with the off-gassing of organic vapors?" They even went so far as to state "that people have become sensitized to isocyanates off-gassing from not fully cured polyurethanes."

Well, my expertise is bookbinding, not chemistry. But in my long career, I have gotten to know the top experts, bookbinding adhesive chemists, researchers and most of all, enjoyed with them, in-depth technical dialogs. To get expert opin-



Books bound with PUR show exceptional strength. When tested for tensile page-pull, the paper is weaker than the strength of the binding.

ions on this particular topic, I contacted three of them, one being a former researcher at the FOGRA institute in Germany, the others working with our bookbinding industry in the United States. Here are their comments:

Peter Stadler is a retired FOGRA researcher located in Munich, Germany. In my career, I had the pleasure to be with Peter on a lecture tour. Like me, in retirement he teamed-up with other colleagues to investigate on-going prob-

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lems in the Graphic Arts industry. On this topic, I received the following answer: (abbreviated and translated from German) “Werner, sorry, but I could not hide a chuckle about such a question in regards to aging characteristics and possible hydrolysis of PUR adhesives. To make such a statement on a normal reactive PUR, it is to say that after the reaction of the isocyanates within the system and with the moisture, we then create a three-dimensional cross-linkage, a so-called Biuret structure. This reaction creates a stable, solid material that will remain in its solid form for centuries and will not be affected by any chemicals. Only very high temperatures (fire) could destroy it.” Stadler then went on and stated that they investigated PUR adhesives for the use in bookbinding as early as 1984. Their major interest in this new adhesive was to find a cure for insidious ink-solvent migrations, which occurs with offset printing and the use of hotmelt. As for aging characteristics of PUR and the release of gasses, he stated that this is, after cross-linking, no longer possible. The automobile and furniture industries are using PUR adhesives extensively since the 1980’s or earlier. Once the PUR adhesives have cured, they release no gases or chemicals. If that would be the case, those who are concerned with safety, would long have stopped the automobile and furniture industries from using PUR adhesives. Peter was also kind enough to share his present research with PUR and micro-emission, new developments, which will result into a new generation of PUR adhesives which will have a MDI of only <0.1%! Contact: ps@druckgutachten.de or www.print-expertise.eu. Peter speaks excellent English. The website also has pages in English.



The all new GP2 Technology PraeziPur is using a patented, closed PUR application system with a nozzle and is equipped with a pressurized melting tank for 2 kg PUR melting cartridges.

Tom Rolando is an adhesive chemist at Wisdom adhesives. He stressed safe handling of PUR’s in its liquid form. PURs arrive at the bindery in a solid state and must be heated in a special pre-melter. Tom went on to say that liquid isocyanates pose a safety threat if not handled properly. Once reacted, PURs form polyurethane polymers, which like most polymers, are non-toxic and are readily and abundantly usable. Polyurethanes do NOT pose a safety threat for handling. Equating the safe use and handling isocyanates to polyurethanes is like equating the safe use and handling of ethylene and polyethylene plastic. One is very volatile (the monomer) and the other (polymer) is used safely for many items – including food contact. He concluded that we should not forget to include into any argument for the use of PURs in bookbinding, that polyurethanes (generally one or two-component polyisocyanate based products) are extensively and nearly exclusively used for all of flexible packaging (of which 75% - at least – is food and medical packaging). The

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chemistries are identical to that of the PURs being used in bookbinding.

So for bookbinders, Tom recommends using proper methods for handling PURs. As for bookreaders, no special requirements are needed for handling. Contact: www.wisdomadhesives.com or tomrolando@wisdomadhesives.com.

Chuck Cline is a bookbinding adhesive chemist and is considered to be the most knowledgeable expert in North America on the use and applications of PURs and other adhesives. On a regular basis, Chuck is training crews, providing book testing services and solving all kinds of industry problems related to adhesive binding. Chuck has been active with the development of PUR at National Starch (now Henkel) from the beginning. At their extensive testing laboratories, they conducted many tests, among them accelerated aging and exposures to atmospheric conditions. Chuck stated as far as “out gassing” is concerned, once the polyurethane has cured that possibility is below any standard measurement thresholds today. There is some CO₂ generated with the curing of PUR, especially liquid PUR, as can be seen when you use “Gorilla glue.” However it is important to remember that CO₂ is what human beings breathe out with every breath that we take. If there were a problem, we would have to keep every human being away from library books, whether or not they are bound with PUR.


Contact: www.bookbindingadhesive.com or bookbinding1@hotmail.com.

Conclusion

Over a relatively short time period, this writer visited six different library binding establishments and several other trade binderies. They all are binding some of their books with PUR. Brian J. Baird, Vice President of a major New

England library binding establishment and active with ALA, recently published a most interesting, nine-page article for The Serials Librarian, volume 61:2 (Spring 2011). The title of the article is “Pioneering the Use of Polyurethane

Adhesive in Library Binding.” Kudos to Brian as this document is a must read for everyone concerned about library binding and PUR adhesives. Best of all, the article covers and describes extensive testing done to make sure that PUR bindings conform to the ANSI/NISO/LBIZ39-78-2000 Standard for Library Binding.

It is our hope that, with this article, the research done and especially with the comments of three leading experts, all issues in regard to the safety of books bound with PURs will finally be laid to rest. Our industry adapted this new technology with open arms. PUR adhesives solved many contemporary binding problems with papers, inks, toners, coatings and more and is here to stay. 

Werner Rebsamen is Professor Emeritus of the Rochester Institute of Technology and the technical consultant to HBI and the Library Binding Institute. He can be reached at wtrebs@metrocast.net.

Double fan adhesive binding is an outstanding process for library binding, with over 80 years of successful experience for all types of books. Adhesive binding with PUR is also a great process but it is not for all books that a library might bind. - Paul Parisi, ACME Bookbinding



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