Ecological testing for textiles – Helping to achieve sustainability

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In recent years, the demand for eco-friendly materials and textiles has increased significantly among consumers and there is an increasing emphasis on sustainability from various pressure groups. This has resulted in significantly increased pressure on brands and retailers to meet the various eco standards. Retailers and brands are nowadays responding to sustainability in a more proactive manner and striving to take care of the environmental impact of textile manufacturing and the input of chemicals in textile during the manufacturing stages. Due to stricter environmental legislations, retailers and brands are raising the bar for all the restricted chemicals and substances which need to be avoided in the end product. As a result, textile and clothing manufacturers are under great pressure to meet the requirements of eco parameters set by brands in order to be environmentally compliant and to avoid any ecology issues arising during manufacturing and the consumption of the product.

This has resulted in increasing demand from the textile industry for ecological testing against the eco parameters set by various legislative bodies, certification bodies and global brands at every stage of manufacturing.

There is a continuously rising demand for the testing associations and companies who can provide fast and reliable eco testing facilities to their supply chain partners in textile industry.

DyStar has always taken the environmental impacts of its products very seriously and understands the requirements of testing the restricted substances in its raw materials and manufactured products. With the acquisition of Texanlab in India, DyStar has gone further in showing its commitment towards environmental compliance through testing for eco parameters in textiles.

Texanlab has built an immense expertise in the areas of routine and eco testing for textiles over the past few years.

They have talented expertise and necessary processes in place to identify the ecology issues, test the parameters and give expert advice in solving the problem by analyzing the root causes.

According to Texanlab, many substances are restricted for use in industry and consumer products including textiles and garments. Their use is limited for a number of reasons including consumer safety, worker safety and environmental issues (water toxicity, or bioaccumulation for example).

Certain chemicals are now restricted by legislation and so must not be present in consumer products. Others are restricted by brands and eco labels. For major suppliers of textiles and clothing to Europe and the USA, conformance to these and other emerging standards concerning consumer safety, is imperative.

In countries with economies in transition, until now the industry has been reactive rather than proactive. Their specifications for textile products often do not contain such norms. This is likely to change very quickly over the next few years.

An awareness of restricted substances is critical for all involved in the textile supply chain. Although the textile industry is becoming more aware of the substances that are restricted, it is of interest to consider the background to their listing and some of the reasons behind their restriction.

The testing for restricted substances in textiles is a highly specialized area, it is equivalent to seeking the proverbial 'needle in the haystacks'. However in the case of restricted substances in textiles, not only are the sought after needles different, each of the haystacks are also different. Thus it tends to imply that each specific problem of testing brought to the analytical laboratory, a specific procedure must be developed or employed.

1. RSL (Restricted Substance List) testing

RSL testing is probably one of the most complex fields of analytical chemistry because of the need for isolation and determination of substances at the milligram, microgram and sometimes pictogram levels.

RSL testing essentially consists of the following steps:

1. Sampling – how a representative sample is obtained from the test specimen.
2. Extraction of digestion, Concentration, Cleanup, Derivatization if required.
3. Determination by Chromatography (for organic) or Atomic absorption or emission (for metals) or Spectrophotometry (both for metals and certain organic substances) methods.
4. Evaluation of obtained data.

All of the above need to be in line with standard processes and reliable so as to ensure final report accuracy and repeatability.

Instruments used in testing

A range of analytical techniques are used in the RSL testing for textiles including:

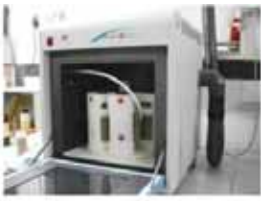
- Gas Chromatography with Mass Spectrophotometer (GC/MS).
- Gas Chromatography with Electron Capture Detector for chlorinated compounds (GC/ECD).
- High Performance Liquid Chromatography with Diode Array Detector (HPLC/DAD).
- High Performance Liquid Chromatography with Mass Spectral Detector (LC/MSD) for non-volatile compounds.
- Atomic Absorption Spectrophotometer with Graphite tube Atomization (AAS / graphite) for metals.
- Inductively Coupled Plasma with Mass Spectrometer (ICP/MS) for metals.
- UV-Visible Spectrophotometer for metals and certain organics.
- Absorbable Organic Halogen (AOX) Analyzer for organochlorines.

Restricted substance

The number of substances that can be restricted is vast and not all of the compounds listed are appropriate for textile products. The most common substances that may be considered when carrying out restricted substance testing are:

1. Formaldehyde.
2. Chlorinated phenols (PCP, TeCP) and Orthophenylphenol (OPP).
3. Banned Amines from Azo dyes.
4. Allergenic Disperse Dyes.
5. Carcinogenic Dyes.
6. Heavy Metals.
7. Organotin compounds.
8. Alkylphenol Ethoxylates (APEOs).
9. Chlorinated Organic carriers.
10. Phthalates.


GC / MS


Microwave Digestion


HPLC / DAD


ICP / MS


HPLC / MSD


AAS / Graphite


UV vis Spectrophotometer

11. Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS).
12. Pesticide residue.
13. Flame retardants.
14. Short chain chlorinated paraffins (SCCP).
15. Polychlorinated biphenyl (PCBs).
16. Polyaromatic hydrocarbons.
17. pH of the aqueous extract.
18. REACH / SVHC.

Texanlab has a complete set up and the necessary expertise to carry out the complete testing requirements for restricted substances list by various retailers and brands as per their recommended limit values for restricted substances.

2. REACH

REACH is a European Community Regulation on chemicals and their safe use (EC 1907/2006). It deals with the Registration Evaluation, Authorization and Restriction of Chemical substances. The Regulation applies not only to chemical substances as such but also to mixtures (preparations) and to substances in final consumer articles such as clothing e.g.

- Restrictions on the manufacture, placing on the market and use of dangerous substances, preparations and articles (Annex, XVII).
- Articles and packaging materials containing over 0.1% (by weight) SVHC substances (Substances of Very High Concern).
- Articles(products) containing substances which are intentionally released during their normal lifetime use e.g. perfumery finishes on textiles.

Hence REACH provisions are also applicable to consumer articles and so far, the ECHA has released a list of 15 chemicals classified as SVHCs or substances of very high concern, reproduced below which triggers obligations for manufacturers and retailers under REACH.

As a global manufacturer and supplier of dyestuffs and auxiliaries DyStar has completed the pre-registration under the REACH legislation of all the chemicals which are used for the manufacturing of its products globally. Our fully equipped Texanlab testing laboratory understands the testing requirements arising from the manufacturers and exporters to fulfill the REACH requirements as per EU legislations and offers testing facilities for most of the SVHC's considered banned as per REACH legislations. Texanlab is continuously working on increasing their capability and facility to test most of SVHC'S mentioned in REACH.

3. CPSIA (Consumer Product Safety Improvement act)

As per the CPSIA (Consumer Product Safety Improvement Act), all components of garments / made-ups meant for Children (kids below 12 years of age) will be required to independently adhere to the norm. Testing reports are made mandatory for Lead content on coated and painted products for all shipments. Currently CPSIA requirements exist for Lead and flammability. Requirements for phthalates have also been notified and will come into effect very soon.

The requirement for mandatory testing on substrates has been granted a moratorium of one year. As per CPSIA all components of the end product must satisfy the requirements of CPSIA, individually. All shipments need to be tested for the presence of Lead from accredited laboratories. Tests have to be done individually on components. No composite samples are permissible in testing. Prints or surface coatings which can be scraped off from the substrates have to be tested as separate samples. At this time, the CPSC has declared a 1 year moratorium on substrate testing, but tests on coatings / prints stay. Requirements / Limit values will undergo change. For example the reduction in limits on Lead has already been notified. Exemptions may be granted by the CPSC at some stage, but until then, every product has to comply.

With such stringent testing procedures, many laboratories have equipped and applied for the accreditation from CPSIA for the CPSIA testing as per their norms on textiles. Texanlab is now one of the few approved and accredited laboratories by CPSIA for lead testing.

The Consumer Product Safety Commission (CPSC), USA has approved Texanlab, Thane to test for the presence of Lead as per 16 CFR 1303 in Children's Products. Thus helping the textile industry to comply with US legislations by providing complete testing solutions.

4. GOTS

GOTS is an Organic textile standard set by four groups promoting the interests of the organic textile industry. OTA (Organic Trade Association) in the USA SA (Soil Association) in the UK JOCA (Japanese Organic Cotton Association) IVN (Internationaler Verband der Naturtextilwirtschaft e.V. – International Association Natural Textile Industry) in Germany GOTS sets specific requirements for the complete production cycle of organic textiles, including the cultivation of cotton. This standard sets clear requirements and, where necessary, limits for:

- Organic fiber production.
- Product labeling.
- Textile auxiliaries, dyes and pigments.
- Stages in the production process, e.g. spinning, weaving, knitting, pre-treatment, dyeing, printing, finishing, etc.
- Accessories.
- Environmental management.
- Waste water treatment.
- Storage, packaging and transport.
- Quality assurance systems.
- End products.
- Residues in accessories.
- Social compliance.

Texanlab is one of few institutes in Asia that has the expertise to perform analysis in compliance with GOTS. Testing for GOTS conformance includes AOX, Formaldehyde, Chlorinated Phenols, Biodegradability, Toxicity tests, APEOs, heavy metal content and banned amines.

For more information on GOTS testing by Texanlab, please visit: www.texanlab.com

5. EU Flower

This European Eco-label encourages businesses to market products and services that are kinder to the environment. The European Eco-label is symbolized by the Flower.

The European eco-label, which is the only sign of environmental quality both certified by an independent organization and valid throughout Europe, presents a unique opportunity to satisfy the customer's expectation.

EU flower is applicable to all textile products including textile clothing and accessories fibers, yarns and fabrics and interior textiles except wall and floor coverings. EU Flower has detailed criteria for all the textile products to be tested at various stages of the textile manufacturing. Texanlab is one of those few laboratories which have been accredited to conduct the testing of textile and related materials as per EU flower requirements.

More information on EU flower can be gained from http://europa.eu.int/ecolabel, www.eco-label.com.

Conclusion

Global Trade is a reality. And so is the era of restricted chemicals. The days of using new chemicals without a full idea about the possible harmful effects on use are now over. The issue of sustainability and relevance of environment protection will be taken up ever more strongly and the textile industry cannot wish it away.

The implications of such restrictions have to be understood by all, across the supply chain. Products will need to be manufactured in compliance with the requirements.

Whilst a fragmented supply chain is often felt as a hindrance, it nevertheless needs to be aware of the requirements and individual steps to be taken so as to ensure a clean final product.

Requirements are not static. They change. In the areas of restricted chemicals, changes are expected to be rapid and at times disturbing. But these challenges will have to be faced and overcome by the industry if sustainability is our ultimate goal.

For more information on the eco testing for sustainable textiles, please visit www.texanlab.com, www.dystar.com.◆

Substance name	CAS number	Possible uses
Anthracene	120-12-7	Found in creosote and is a source of dyestuff
4,4'- Diaminodiphenylmethane	101-77-9	Used to produce polyurethane, as a curing agent in epoxy resin and may be found in some Azo dyes
Dibutyl phthalate (DBP)	84-74-2	Plasticizer for PVC, also used in adhesives, printing inks, cosmetics, paints and film/paper coatings
Cobalt dichloride	7546-79-9	Moisture indicator in silica gel
Diarsenic pentaoxide	1303-28-2	Used in some wood preservatives, agrochemicals, dyes and glass
Diarsenic trioxide	1327-53-3	Weed killer and wood preservative
Sodium dichromate, dihydrate	7789-12-0	Used as a mordant for acid dyes, leather tanning, preparation of ceramic glazes, and as corrosion inhibitors in paint
5-tert-butyl-2,4,6-trinitro-m-xylene (musk xylene)	81-15-2	Fragrance used in household and beauty products
Bis (2-ethyl(hexyl)phthalate) (DEHP)	117-81-7	Plasticizer for PVC and printing films
Hexabromocyclododecane (HBCDD)	25637-99-4 3194-55-6	Used as a flame retardant for expanded polystyrene (EPS) and high impact polystyrene (HIPS), and also in textiles (particularly upholstery)
Alkanes, C10-13, Chloro (Short Chain Chlorinated Paraffins)	85535-84-8	Used as a flame retardant and plasticizer in some rubbers, plastics (particularly PVC), textiles and adhesives/sealants.
Bis(tributyltin)oxide	56-35-9	Used as an algaecide in marine paints
Lead hydrogen arsenate	7784-40-9	Used in pesticides and insecticides
Triethyl arsenate	15606-95-8	Used as an intermediate in semi-conductor manufacturing
Benzyl butyl phthalate (BBP)	85-68-7	Plasticizer for PVC and printing films.
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This list of SVHCs will continue to increase by inclusion of more chemicals.
An updated list of SVHCs should be available at this website URL:
http://echa.europa.eu/consultations/authorisation/svhc/svhc_cons_en.asp.

Italian Textile machinery: Signs of recovery on the way for 2010 - Production at 1,931 Million Euros (-21%) in 2009

Salmoiraghi, President of ACIMIT: "2009 was a very difficult year for our sector. 2010 can still provide a turnaround"

Salmoiraghi, President of ACIMIT said that 2009 was a very difficult year for our sector. 2010 can still provide a turnaround. There's no doubt that we've seen some signs of a recovery during the early part of 2010, as confirmed by increased orders for the second half of 2009, and renewed investments in key markets such as China, India and Brazil. However, we need to wait for consumer spending to pick up again in order to see textile manufacturers return to investing with some continuity," emphasizes Sandro Salmoiraghi, president of ACIMIT, adding that "macroeconomic figures do not as yet provide a one-way indication of this trend."

ACIMIT President Salmoiraghi then commented on the definitive 2009 figures for Italy's textile machinery industry, which indicate a 21% drop in production compared to the previous year (amounting to 1,931 million euros). Exports have also diminished by 21%, totalling some 1,506 million euros. In Italy, demand for textile machinery has fallen 27% compared to 2008. The weak internal market is also evident in a drop of imports (-32%), amounting to 359 million euros.

China, India and Turkey are the primary export markets for Italian machinery builders, albeit sales to these countries remain well lower than 2008 levels. Global demand on the whole for textile machinery has been affected by the economic crisis, as well as by a halt in investments. "Our primary competitors have suffered even greater losses than our own," states Sandro Salmoiraghi. "These figures confirm a general crisis situation: our manufacturers have certainly not been immune, but they have reacted better."◆

Sandro Salmoiraghi, President of ACIMIT.