

ESPRIT

WATER BASED POLYURETHANE (PU)
SUBSTITUTION OF PU SOLUTIONS SUPPLIED IN THE ORGANIC SOLVENT
DIMETHYLFORMAMIDE (DMF)

22/05/2018
sustainability@esprit.com
Esprit Europe Services GmbH

This document is the result of the work done by Esprit, Esprit-Allee, 40882 Ratingen, Germany. Esprit claims all the copyrights hereto. Any utilization, duplication, insertion in databases, reproduction and other usage in any form whatsoever is not allowed without the prior written approval of Esprit. The contents may not be used for any purpose other than that approved by us in writing. All data is non-binding and subject to change without notice. Errors, mistakes and changes reserved.

ESPRIT.COM

ESPRIT

TABLE OF CONTENT

1	INTRODUCTION	3
2	BACKGROUND INFORMATION	3
2.1	Water based PU technology	3
3	TECHNICAL RESEARCH	4
3.1	Esprit partnered up with chemical suppliers.....	4
3.2	Audit and trails with chemical supplier's partner mills	4
4	CURRENT STATUS	4
4.1	Product group shoes	4
4.2	Product group bags and wallets	5
5	FURTHER STEPS.....	5

1 INTRODUCTION

Polyurethane (PU) is made of a multi-layer coating on fabric backing (e.g.: woven, non-woven, microfiber) in order to create an imitation of genuine leather. Conventionally PU solutions are supplied in the organic solvent dimethylformamide (DMF). Production process wise the PU solution may be applied on the fabric backer via direct coating, transfer coating or a combination of both: the two step process.

There are possible substitute solvents for DMF in the market, but they are similar in chemical make-up and in hazards (e.g. Methyl ethyl ketones (MEK) or Methyl isobutyl ketone (MIBK)).

Based on current knowledge water based PU dispersions and technologies, that do not use DMF as a solvent, seem to be the only sustainable alternative to replace DMF in the production process. The PU is stabilized in water instead of DMF or any other solvent.

2 BACKGROUND INFORMATION

The organic solvent Dimethylformamide, CAS no.: 68-12-2, (DMF, sometimes known as DMF(A)) is a substance of very high concern (SVHC) and is included in the candidate list for authorization under REACH. DMF's chemical structure is harmful and alternative chemicals are the solution to avoid negative impacts on the environment and human health. DMF is associated with pollution risks and occupational health risk in factory working environment.

Consequently DMF gets more and more in the focus of different NGOs. For example joining efforts of leading apparel and footwear brands- ZDHC (Zero Discharge of Hazardous Chemicals) - is driving and encouraging research into safer alternatives for DMF with the goal of transitioning this chemical from the Research List to the ZDHC MRSL¹ as soon as possible.

Thus ZDHC is hosting technical workshops for brands, vendors, PU and chemical suppliers on a pilot project base in order to support and encourage exchange for the DMF phase out of the textile industry. Esprit is joining these technical workshops in order to share our experiences and challenges during our trial phase and to contribute to how to improve performance and scalability of water based PU. As a sustainable company- both under the aspects of product safety and environmental sustainability - Esprit wants to take leadership in the DMF phase out project. Our target is to shift to 100% water based synthetic leather by 2025.

This decision was driven by the Esprit Minimum Requirement Steering Committee. The Committee has as one of its targets to update and review the company's chemical requirements (RSL&MRSL throughout our hazardous screening methodology) and to establish a strategy to implement these. The committee consists of quality assurance, social and environmental sustainability, product safety, buying and sourcing- as key players to implement the MRSL in our supply chain.

2.1 Water based PU technology

Water based PU is not using DMF or any other solvent to stabilize the PU droplet in the PU paste. The PU is stabilized with eco-friendly water based raw materials and DMF is completely eliminated from the production

¹ MRSL= manufacturing restricted substances list (a list which includes process chemicals, which may be used in manufacturing)

process. This consequently eliminates workplace exposure and environmental risks as contamination of waste water and air emissions.

3 TECHNICAL RESEARCH

3.1 Esprit partnered up with chemical suppliers

With the help of the chemical suppliers Covestro AG (insqin® technology) and TFL Ledertechnik GmbH (Hydro PU) we started our technical research. Since the technology is comparatively new in the market, we started our research and trail phase already in November 2016. We visited the pilot mill of Covestro nearby our German headquarter and increased our knowledge regarding the new technology of water based PU.

We installed trainings for our product and buying teams within Esprit regarding the new technology on the market and possible material challenges. Additionally we briefed our suppliers regarding the importance of putting effort on more sustainable PU solutions.

For the kick-off of the water base PU project we focus on bags, wallet and shoes, since these are the main style groups being made out of artificial leather

3.2 Audit and trails with chemical supplier's partner mills

For bags and wallets we concentrated on Covestro partner mills, already successfully using the Covestro insqin® technology. Besides our regular tier 2 audit, based on sustainability (among others: environmental management, waste water, air emission and general waste reduction), chemical management and production process control, we audited these partner mills (located in China) regarding the water base PU production capabilities in terms of a set up evaluation in September 2017. For example we assessed the capability of separated production lines, storage areas, and chemical separation in order to minimize the risk of cross contamination. The results have been rated and based on this score the water base PU mills were selected for our trails and first bulk production order.

We installed a trail phase in which we developed styles to be produced in water base PU in order to overcome difficulties based on material characteristics. For example we overcame wrinkle recovery issues during production by choosing the right water based PU materials for selected styles. We also overcame embossing failures triggered by different melting points of the water based PU compared to conventional PU-heat and embossing time had to be adjusted. During the trail phase we enhanced communication between all stakeholders involved: chemical supplier, PU producer as well as point of fabrication of the final product, in order to achieve a successful outcome. We had the chance to discuss potential solutions on technical issues with the support of Covestro as chemical supplier, in order to achieve an end product outcome which is fulfilling Esprit's expectations.

4 CURRENT STATUS

4.1 Product group shoes

With the help of the chemical supplier TFL and their technology Hydro PU we are in an ongoing project for developing water based PU shoes. TFL as chemical supplier, PU supplier as well as shoe the point of fabrication are involved in order to achieve the goal of water based PU shoes in our collection. The project is still ongoing bur already showing positive progress results

4.2 Product group bags and wallets

For the season August and September 2018 we launch our first water based PU style group IRMA. The style group consists of five bag styles and one wallet which are all made of 100% water based PU. The styles will be offered in the colors black, navy and burgundy.



1 Irma Group, season 08/09 2018

5 FURTHER STEPS

Esprit's target is to shift to 100% water based PU by the year 2025. Thus we are supporting and encouraging our suppliers to help us achieving our aim and to shift more and more production towards the sustainable and environmentally friendly alternative: water based PU.

We are very thankful for the support of the chemical suppliers Covestro AG and TFL Ledertechnik GmbH during the research as well as production phase, who made it possible to successfully implement water base PU styles in our collection.