Case Study

Leading the change towards better PU:
Phase out of DMFa based PU material by 2020

Introduction

Many of H&M Group's products are made of a material with a similar look to leather, known as polyurethane (PU). H&M Group has a long-term strategy that by 2030 all PU used should be defined as sustainable, for example bio based. However, already in 2020, we have moved away from conventional PU with the hazardous solvent DMFa and instead use DMFa free options that are better for human health and the environment. We call it "Better PU".

Dimethylformamide (DMFa)[1] is a commonly used solvent in the production of PU coated materials (synthetic leather) and is widely used by the industry. It is also used as a solvent in the production of synthetic fibres. However, there are health implications for factory workers using conventional PU with DMFa and environmental disadvantages in terms of air pollution due to a lot of water and energy consumption in production. DMFa is easily absorbed through the skin and can cause liver damage and other adverse health effects. DMFa is classified under REACH[2] Regulation as a Substance of Very High Concern (SVHC) and it is classified as toxic to reproduction (Reproductive toxic Cat 1B per Regulation (EC) No 1272/2008).

H&M Group is a signatory member of the Zero Discharge of Hazardous Substances Program (ZDHC). To highlight the need and to encourage innovations in the industry, DMFa has been included as a "candidate" to ZDHC Manufacturing Restricted Substance List (ZDHC MRSL 2:0). By already restricting the use of DMFa, H&M Group is leading the change towards a toxic free fashion future.

Timeline Phase out DMFa

As part of H&M Group's Commitment to Lead the Change towards safe products and toxic-free fashion and consequently reduce negative environmental impact and improve human health, H&M Group has phased out DMFa from PU production in 2020.

The following steps has been taken with collaboration with our suppliers in order to reach our goal DMFa free PU:

1. In 2007, DMFa was restricted in the H&M Group's RSL.
2. In 2010, DMFa was added to the H&M Group's MRSL. The same year, H&M Group took the initiative to investigate alternative technologies to apply to PU coated materials (synthetic leather).
3. In 2011, H&M Group engaged with the supply chain and chemical suppliers on product development. H&M Group also reach out to other brands at an AFIRM meeting.
4. In 2013, H&M Group developed a certification routine to secure DMFa free material products.
5. In 2015, two DMFa free orders were placed for footwear and accessories products. By 2017, more alternatives had been explored and was now expanded to all products types.
6. In 2020, DMFa is phased out throughout the whole supply chain.

[1] CAS: 68-12-2; formula (CH3)2NC(O)H

[2] Registration, Evaluation, Authorisation and Restriction of Chemicals

H&M Group Chemical Management: chemical restrictions background information

H&M Group is working to ensure that all the products from all brands within H&M Group are safe to produce and wear. H&M Group requirements usually go further than existing regulations and we often promote progressive chemical management. The overall strategy is that hazardous chemicals should not be used in production or be found in any of our products. H&M Group was one of the first in the industry to establish a Chemical Restrictions List in 1995, that has been continuously updated since. Our suppliers are contractually bound to comply with the list. Our Restricted Substance List (RSL) is based upon the precautionary principle meaning that we restrict substances even when there is scientific uncertainty regarding their hazardous properties. H&M Group is also a member of Apparel and Footwear RSL Management. The mission and vision of AFIRM are to reduce the use of hazardous chemicals in the Apparel and Footwear Supply Chain.

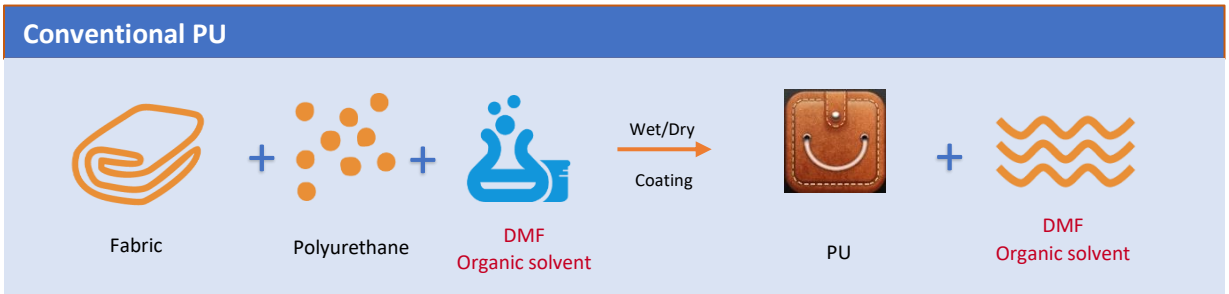
H&M Group Chemical Restrictions (MRSL & RSL) 2020 Textile products, Accessories, Footwear and Bags and Belts

Chemical name	CAS no	REACH Regulation	AFIRM RSL
Dimethylformamide (DMFa)	68-12-2	<1000ppm	<500ppm

Alternatives of DMFa-FREE PU

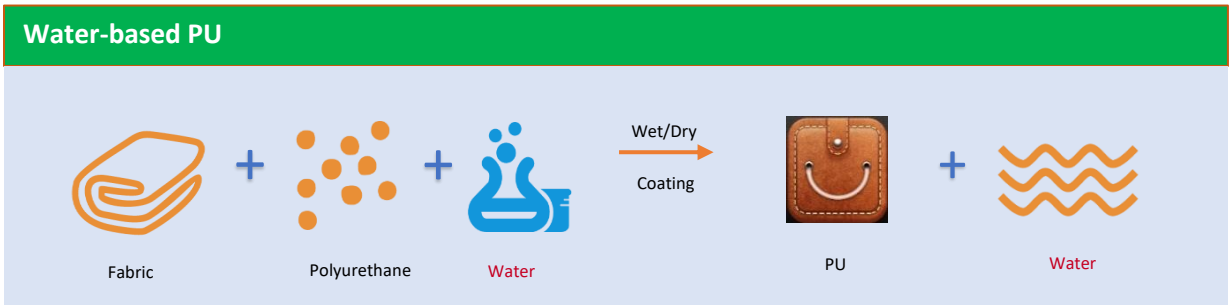
In general, to reach our goal that by 2030 all PU material should be defined as sustainable we must implement a hazard-based method that makes sure that the chemical input is safe. This work is in progress, and we apply a stepwise approach to work toward our goal 100% safe input and output chemistry. We're working towards using Screened Chemistry when looking for alternatives. This means a third-party hazard-based assessment for toxicological properties of a chemical product, taking account information for every ingredient.

Conventional PU is using DMFa as the main solvent to disperse PU. It must use the coagulation process to generate foam structure and achieve body touch. There is tone of water used for coagulation, and workers and consumers cannot avoid risk from DMFa contacts.

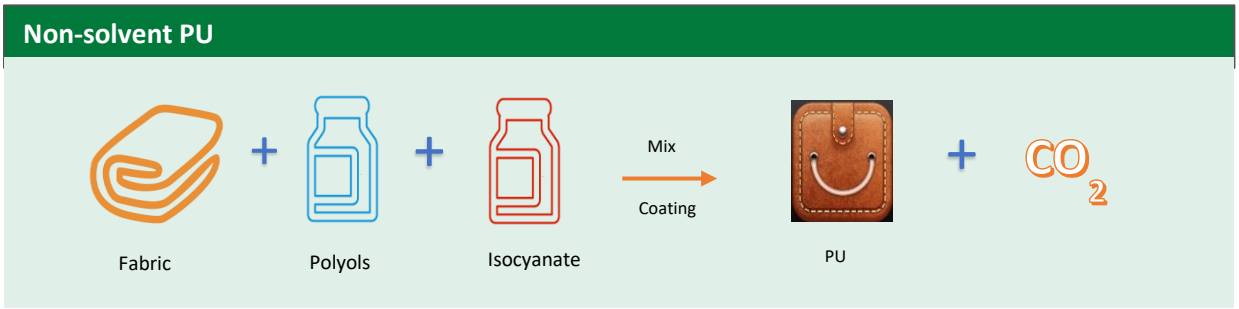


In 2014, H&M Group approached the chemical industry for possible alternatives of DMFa. The first solution water-based PU technology was introduced. Water-based PU technology is replacing DMFa with

water; disperse PU in water instead of DMFa and other toxic solvents. It creates a foam structure with mechanical foaming machine to achieve body touch, without water waste in production.



In 2017, non-solvent technology is applied in PU leather industry. The main difference between water-based/conventional PU and non-solvent is the removal of PU dispensation from the material making process. The foam structure generates from Polyols + isocyanate in-line reaction, there is no water, solvent evaporation, and DMFa from manufacture process. From 2018, H&M Group uses with this technology in large quantities.



Achievements and Challenges

In September 2020, 79% of our PU materials are DMFa free. In fact, already in June 2020 large quantities of our PU materials were DMFa free. Although we are on track towards 100%, some technical challenges remaining to be solved. For example, poor abrasion and flexing when using better alternatives for PU materials in glitter, metallic and all over prints. These challengers concern kids' division due to a lot of products with animal prints, glitter, metallic and all over prints. For the remaining challenges we seek support from the industry.

H&M Group Sustainability work

More information on H&M Group's Sustainability work can be found here.
More specifically about our Chemical work can be found here.