

**CORRELATION STUDY OF CHEMICAL  
INPUT VS OUTPUT IN WET PROCESSES**

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**BURBERRY**

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# CORRELATION STUDY OF CHEMICAL INPUT VS OUTPUT IN WET PROCESSES

## EXECUTIVE SUMMARY

There is potential that the use of the Manufacturing Restricted Substances List (MRSL) in our supply chain will reduce and eliminate chemicals of concern. However, despite all of the efforts made to date (detailed below), the improvement in formulations conformity reflects only marginally on wastewater quality. As discussed later in this document other sources of contamination (such as incoming raw materials) limit the impact that the MRSL can have on wastewater in a short period of time because the MRSL needs to be cascaded. Burberry's Chemical Management Team contend that continued monitoring of formulations, incoming water and wastewater are required. The team have a series of next steps planned to continue working towards complete phase out of undesirable substances from Chemical Input (formulations) in wet processes.

## INTRODUCTION

As part of its commitment to eliminate the use of chemicals of concern from the supply chain, Burberry developed and shared the MRSL, which details restriction limits on chemicals used in processes.

Through the implementation of the MRSL, Burberry aims to eliminate chemicals of concern from use during production and subsequently the residues not only on the finished products, but also on wastewater, air emissions and sludge.

This study aims to establish whether the implementation of the MRSL is effectively helping in the elimination of chemicals of concern and how this is reflected in the wastewater from wet manufacturing processes.

The study involved twelve of our most important wet processing partners, selected for their level of transparency and chemical management capabilities:

- 6 Dye houses
- 2 Tanneries
- 2 Finishing houses
- 1 Laundry
- 1 Printing house

The entire chemical inventory of each facility was documented, analytically screened and wastewater tested through four different phases:

- Phase 1 – initial assessment of formulations and water prior to the implementation of the MRSL

- Phase 2 – water assessment after an initial 20% elimination of MRSL non-conformant formulations
- Phase 3 – water assessment after 70% elimination of MRSL non-conformant formulations
- Phase 4 – water assessment after the complete elimination of MRSL non-conformant formulations

This report covers the results of phases one and two while phases three and four are currently in progress.

## RESULTS

### PHASE 1 FORMULATION SCREENING

The Chemical Inputs were analysed using a semi-quantitative screening methodology, to assess the presence of chemicals of concern. This methodology identifies the presence of 430 substances within a chemical formulation (including 150 that are restricted through the MRSL). The screening was conducted on the entire chemical inventory of the twelve partners in order to gather a complete picture of the Chemical Inputs used in their processes, covering a total of 847 different formulations.

### FORMULATIONS SCREENING RESULTS

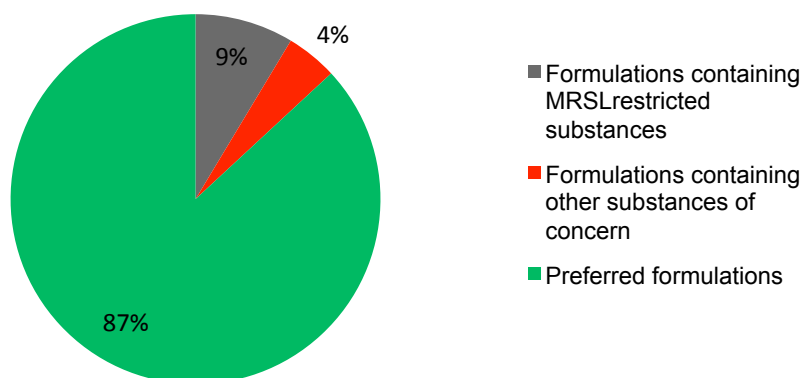


Figure 1

As illustrated in Figure 1, the analytical screening enabled the identification of 73 formulations containing some level of MRSL restricted substances (accounting for the 9%) and other 38 formulations containing some level of other undesirable substances (accounting for 4%). Undesirable substances are potentially harmful above regulatory limits, all of the substances found through our screening were at trace levels and therefore substantially lower than regulatory requirements.

## PHASE 2 INCOMING AND WASTE WATER SCREENING

The incoming water and wastewater of each facility were tested for various groups of chemicals in order to monitor if any of the chemicals of concern could be found as a contaminant (in incoming waters) or as a residue after the wet manufacturing process took place. Samples of incoming water were taken at each facility. In the instances where a homogenization tank was not available, wastewater samples were made of multiple samples collected over a period of three hours.

In Phase 1, the wastewater was analysed for four chemical groups: Phthalates, PFCs, APEOs/APs and Chlorinated Solvents. The wastewater testing in tanneries also included SCCPs and Chlorophenols.

In Phase 2, based on the findings of the chemical inventory screening, wastewater testing included additional groups of substances; Chlorobenzenes, Azo-dyes, Glycols, PAH and Volatile Organic Compounds.

It is important to note that between Phases 1 and 2, the facilities were invited to research and substitute the formulations that contained chemicals of concern.

The results of the incoming and wastewater testing are summarised in Table 1.

- Conclusions 12 times out of 20 (60%), chemical groups found in formulations were also detected in the untreated wastewater (see red outline in Table 1).
- At single substance level, the correlation between input and output is reduced to approximately 25%.
- In 16 times out of 17 (94%), the chemical groups identified in the incoming water were also detected in the untreated effluent water (see blue outline in Table 1).
- The improvement of waste water quality after the initial cleansing of the chemical input is marginal, reflecting the marginal reduction of pollutant achieved between Phase 1 and Phase 2 (WW1-WW2 below).



## LIMITATIONS

The correlation between chemical and water test results cannot be identified with absolute precision, for the following reasons:

- The chemicals of concern that Burberry tested for might not always have been used 1-24 hours before the sampling took place
- Chemical formulations or incoming water may not be the only cause of wastewater contamination, there is a risk that incoming raw material may contain and release chemicals of concern during processing.
- The effects of processing conditions can lead to unpredictable reactions in wastewater.
- The lack of standardisation and experience in the testing of chemical formulations and incoming and wastewater, can result in incorrect test results.

## NEXT STEPS

- Burberry is due to start Phase 3 of this project. The fourth phase will be added to re-assess the correlation once 100% of the MRSL non-conformant formulations have been substituted.
- At the time of writing, the 71% of non-conformant chemical formulations have been substituted. In order to have a more complete and clear overview of the correlation between input-output's, the third phase will include a request for Partners to take note of the chemical formulations used and raw materials processed within the 24h before the water sampling.
- The fourth phase of wastewater testing will include the implementation of the new Zero Discharge of Hazardous Chemicals 'waste water quality guidelines'. This phase will involve the testing of all the eleven restricted chemical groups for each facility.
- The cleansing of the Chemical Input is in progress and it proves to be a complex exercise requiring the following steps:

