

Top-Print

One of the most demanding operations of all productive processes is the creation of new colors and the reproduction of colors that already exist either in nature or on various types of support. In textile printing this operation is highly demanding in terms of qualified human resources and in terms of the number of operations and the quantity of work to be carried out in order to obtain good color quality.

A printed textile distinguishes itself from all other colored textile products because it requires the application of numerous different colors contemporaneously in order to complete the design. In textile printing the number of new colors or reproductions of already known colors is higher than in any other sector. In some companies the number per day may run into three figures and may engage several people in responding to the production demands. Today, two of the most important factors for printing houses are the response time and the color quality.

Optimizing formulation costs is another important element, together with a whole series of necessary tests of the metamerism, in addition to quality control and certification both inside the company and in relation to the outside world. The use of **Top-Print**, provides an immediate response to all these requirements.

Top-Print: the system of mathematical-scientific calculation for excellent quality and perfectly reliable results.



FORMULATION AND CORRECTION FOR SAMPLING NEW COLORS. QUALITY CONTROL

Top-Print is a specialized color matching system for textile printing houses and is the result of over 20 years experience of practical applications in textile dye-houses and PRINTING HOUSES.

Top-Print is a system that has the capacity to formulate and correct colors automatically both in the laboratory and during production.

Better overall results are assured by the mathematical and scientific elements, which were specifically designed for printing houses.

Top-Print's ease of use means that it may be operated by all color-matchers, without the need for specialized computer knowledge.

Essential elements of Top-Print Hardware

The system is composed of:

- a computer which carries out the mathematical and database functions;
- a spectrophotometer that measures the colors;
- a printer in order to print out the results of the processings. The system may be linked up to and supported by other devices in order to carry out other integrated functions.

Top-Print software

The mathematical-scientific software represents the heart of the system and provides its overall validity.

Color file creation

The color file gathers together all

the information on one or more classes of dyes (mother paste for printing). The preparation requires a series of cuts, carried out in an appropriate manner for each individual dye. The cut is part dye and part thickener. The number of cuts required by Top-print in order to create a dye varies from a minimum of 4 to a maximum of 10; normally 5 or 6 are created. The measurement units that are most widely used to express the dye cuts and subsequently the formula are:

- Percentage parts
- Parts to 1,000th
- Absolute parts
- Grams per kilo

The spectrophotometer reading within the visible range (400-700nm) of each individual cut will be used for color file cataloguing of the reflectance curves of each mother paste.

Calculating the formulas

The first step in calculating the formulas is a reading of the color reference to be reproduced.

The role of the color-matcher is of vital importance in the choice that must be transmitted to the system concerning which color file to use for the new formulation. The search for the best formula may be carried out over all the dyes in the color file or specifically over a selected number of most suited files. The selection may be made either by a color-matching expert or by a Top-print research process.

Top-print may be guided by the color-matching expert through a broad series of options and conditions in order to direct the calculation system

towards a specific result based on the qualitative requirements of the color. Some of the options available are:

- Setting usage limits for a dye;
- Ratio between one or more dyes;
- Modifications to the Delta L, C, H settings, to produce a final formula that is modified with respect to the color standard read;
- Selection of the formulation light source;
- Other options.

The information-gathering process required to obtain a formulation is completed by the spectrophotometrical measurement of the SUBSTRATUM - where the reproduction of the formulated color will be printed. The color differences in the substratum will be evaluated and taken into consideration in the calculation of the new formula.

New formulas and corrections

The various formulas that the system provides for color reproduction supply the color-matcher with a range of alternatives from which to choose the best suited. The formulas may be classified and displayed on the computer according to:

- DE color differences, metamerism, price and solidity. Two specific functions that were created for printing purposes are:

a) A simplification in the reading of the numerous colors to be reproduced, with an assigning and storage in memory through the use of a DESIGN/VARIANT/PICTURE code, in order to allow rapid differentiated BATCH processing.

b) The Top-print formulation also calculates the formulas through the appropriate use of the thickener.

After a trial printing of the formula has been carried out in the laboratory, the spectrophotometer measurement must be repeated in order to check the result obtained.

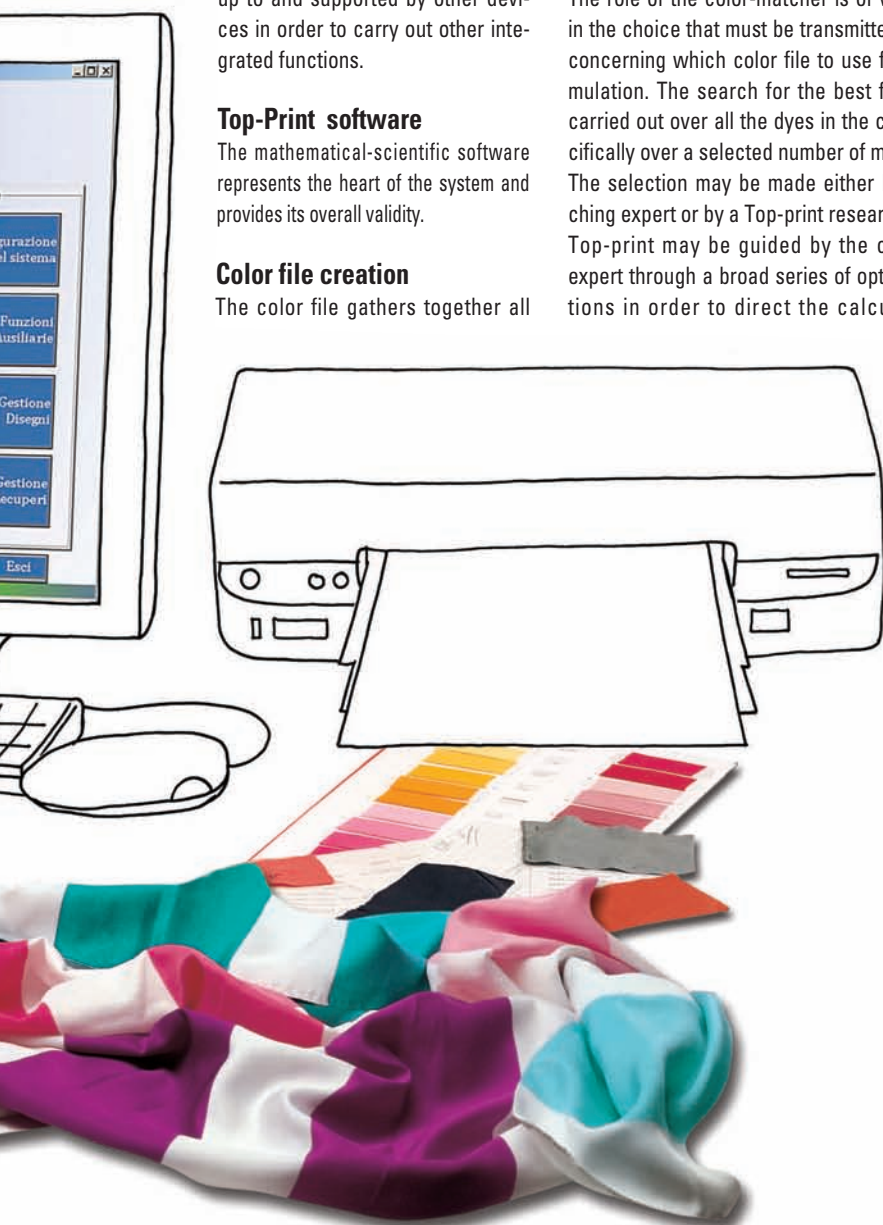
The Quality Control will give its evaluation, as an adviser, in the event that the result is not sufficiently valid (not acceptable in terms of the programmed parameters); this evaluation will be the new correction formula.

The quality and quantity of the first sampled results of the first formulation are very high, approximately 50% of the trials. This high rate is due to an advanced colorimetric calculation logic; however, certain factors that are external to the system, such as variations in absorption and the behaviour of the textile support and the mother pastes, mean that in some cases the result of the first test run is not acceptable.

The calculation of the new correction formula has been designed and created with exceptional success and has yielded results that were far superior to any expectation.

The new correction normally proceeds directly through sampling to its application.

The Top-print calculation system automatically chooses the optimum correction strategy in relation



Top-Print

to the results obtained from the first test run. The correction allows the quantity of paste that has already been prepared to be corrected and recovered or permits the new quantity to be prepared. The production correction is able to guarantee the same excellent results, thereby allowing advantages directly on the printing lines.

Quality Control

The quality control operation is of fundamental importance in order to avoid ongoing doubts about the precision of a color being reproduced from an original color.

Through the use of appropriate calculation formulas and suitable tolerance settings, the system assures the quality of the reproduction from the point of view of color. The most used formulas present in the system are CIELab and CMC in the 1:1 and 2:1 version. The graphics display completes the evaluation from the visual point of view and in so doing permits a certificate of quality according to international standards to be printed.

Colorimetric file of the color cards

The most widely spread custom in the printing sector is the well organized gathering and conservation of all the colors produced over time.

This color file, containing the component formulas, allows the printing house to partly avoid new sampling because often, instead of reinventing a color file formula, an old one may be re-used.

Search

Top-Print allows this historical file to be handled through the use of a code and cataloguing according to various storage keys. The catalogued elements are the color curves and its formula components.

Its usage allows:

1) The relocation of a catalogued color by means of a spectrophotometrical reading of the color to be reproduced. The response will be equal in terms of color and closer in terms of DE.

2) The operator may request a color correction from Top-print in order to pass from the color relocated to the color requested.

Optimizing this historical cataloguing function (search) provides the printing house with a further aid to production that will prove to be extremely useful. The software is equipped with options that update the file, even in relation to changes over time to the mother pastes and to other elements that directly influence the filed formula in terms of keeping it up to date.

Special applications

In order to respond to various individual requirements, Intex System has at its disposition a vast range of programs that have the capacity to provide solutions to numerous specific problems that arise in the printing sector.

Some of the most important of these software

packages are:

Paste quality control before use of the pastes. This software package allows the user to measure any qualitative differences that may be noted in the new product lot with respect to the standards stored in memory. This quality control process is indispensable for any company that uses a dye-house with automatic dosing. It is pointless carrying out precision dosing if one has not first ascertained that the product in question is actually standardized.

The test of the base pastes may be carried out by using two different measuring techniques:

- 1) In Reflection
- 2) In Liquid Transmission

In the first case, some of the product is applied to the substratum and is then read by the spectrophotometer.

In the second case, using liquid transmission, the product is immersed in a liquid state into an ultra-thin microcell and thus may be introduced and measured without any need for application operations.

Degree of whiteness test in order to evaluate with the spectrophotometer the difference between one substratum and another.

- various other options are available in our Intex System software library.

Advantages of Top-Print

The use of Top-Print in a PRINTING HOUSE means enormous advantages in organizational and economical terms. The result is not only an improvement in the quality of the product, but provides a complete return on investment within a very brief period of time. The major advantages for all printing houses are as follows:

- Reduction in the time required for sampling new colors.
- Reduction to one test run and one correction for the standardizing of a new color.
- Optimized metamerism and choice of the non-metameric formula.
- Reduction in research costs of at least 10%.
- Continuous quality control in color reproduction and during production.
- Certification of quality control according to international standards.
- Reduction in the number of mother pastes.
- Selection of the best dyes and easy replacement of a dye and of its correct usage.



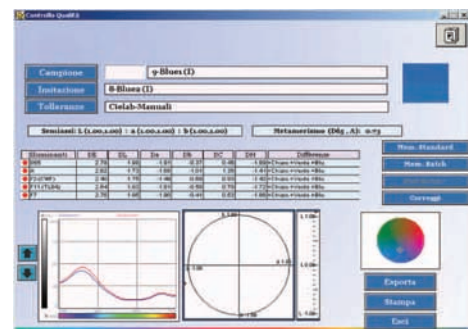
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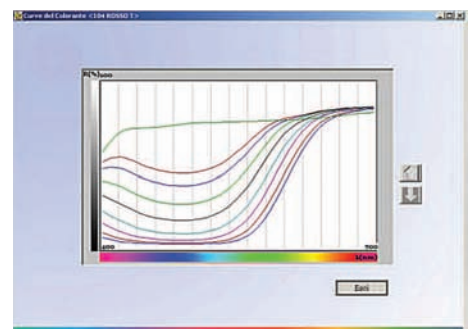
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QUALITY CONTROL



QUALITY CONTROL



COLOR FILE



Top-Eco

The Top-Eco colorimetric software has been specifically designed and produced in order to respond to the vitally important and highly numerous requirements of all those firms and processing plants where a part of the dye that is introduced into the production cycle is not used up and causes production leftovers and returns.

When such products may be re-used in the production cycle, companies generally make efforts to do so. The advantages and problems areas involved in the recovery process are as follows:

1. Economic advantage from product retrieval

- The retrieval of the product means consistent economic benefits for companies within a brief time period.

- Only a few months are required before the investment involved in purchasing Top-Eco is fully returned.



- The total recovery of leftover product reduces the quantity of new product to be purchased with a significant overall advantage.

2. Problem areas in handling the leftover product

- The leftovers are very often abundant and not very consistent in terms of individual lots.

- The numerous containers needed take up a lot of space and involve a very laborious managing of the warehouse.

- Automatic container management systems do not completely resolve the problem.

3. Traditional systems are not easily adapted to the re-usage of leftovers in quantity

The main problems areas are:

- The printing paste decays within just a few days of its being placed in the warehouse.

- It is very rare that an order comes in for the same identical color within those few days.

- Considerable personal experience and skill is



required of the color-matchers in order to decide when and where to use color leftovers.

- Several correction stages are needed to obtain an acceptable result for the requested color. For this reason the recovery in some cases is no longer advantageous.

- The classic recovery involves using the leftovers to "make BLACK". Here again problems arise because not all the leftovers are suitable for producing black.

In addition, the need for black covers only a small part of the quantity of leftovers.

- The disposal of leftovers is a problem that is not only economical but also ecological.

The product to be disposed of always involves complex procedures that increase expenses and have ecological consequences for our environment.

The use of Top-Eco is the solution :

The colorimetric recovery of production leftovers may be carried out using either of two measuring methods, in **reflection** or in **transmission**.

For both methods the principal advantages are:

1. The possibility of making a mixture of all the leftover products within the range of the same class of product.

2. A sampling of the color by means a spectrophotometrical reading with subsequent cataloging and filing in the Color File of all the colors available for the recovery.

3. The re-utilization in the color formulas of consistent quantities of the leftover product and the standardization of the color, calculated instrumentally; in addition, a completion of the process within extremely brief time periods and an excellent final quality of color.

4. The formulation using one or more recovered colors possesses all the optimizing characteristics such as metamerism, color reproduction, optimum cost effectiveness and other elements.

Measurement Techniques

Printing pastes are used at the liquid state and, for this reason, the leftover products from production are liquid too.

Transmittance

Is successfully used for all those classes of products giving a complete solution.

Besides, the color at the liquid state must be the same used after the applied phase.

Not all the dye classes used in printing houses are valid for a spectrophotometrical measurement in transmission.

Reflection

In the event that transmission is not usable, or for any other reason the operator may deem necessary, the measurement in reflection becomes the measuring method.

Using the reflection involves the application or tracing of the product onto a textile support and subsequent steaming and drying operations.

Application Diagram

Gathering the leftover product

The products within the one category range are gathered, with a normal grouping of 4 or 5 color groups (yellows, orange-reds, blue-skyblues, etc.). Once the quantity of the container has been gathered it is shaken, a specimen is taken and an injection is made into the special "microcell".

Spectrophotometrical measurement

The instrument measures the color in transmittance.

Formulating the recovered product

The calculation system has been designed to re-use the maximum quantity of recovered product in the processing of the new color formula. In the new formula, the quantity of recovered product may account for up to 90% of the components. The new formula using the recovered product has all the same characteristics, in terms of evaluation and quality, as the formulas processed entirely with primary mother pastes. The standardization of the color is carried out by means of a test run and its verification. In the event that the result needs correcting, the system provides such correction.



RECOVERING AND REFORMULATION OF THE LEFTOVER PRODUCTS

Recovered product in reflection is differentiated by the sampling technique of the product to be recovered and by the sampling of the new formulas. In these stages the product should be applied on the bottom so that it may be read and measured with the technique in reflection.

This procedure is necessary and advisable when product must be recovered which is difficult or impossible to read in transmission.

Quality control of the mother pastes

Top-Eco both in transmission and reflection is desi-

gned to carry out a quality control on the color and yield of the new mother paste before such paste is put into use. In the event that the paste is not standardized, Top-Eco proposes the correction to be made in order to bring the paste to the perfectly standardized color.

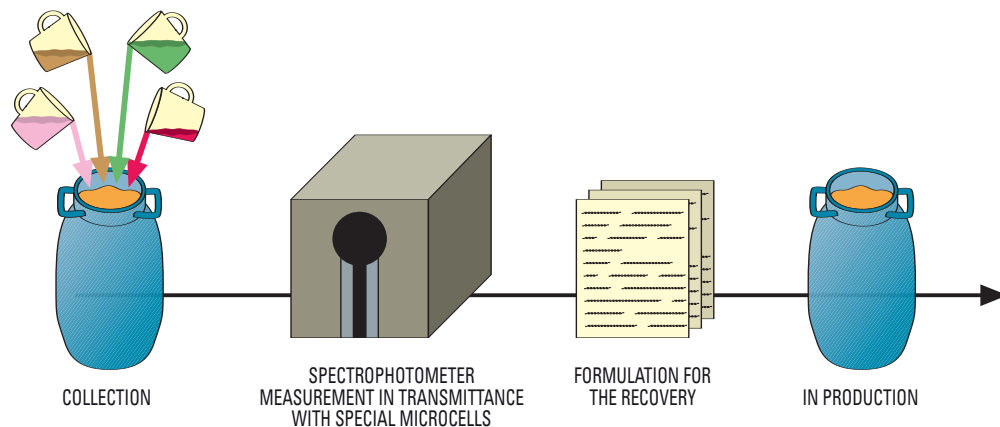
The colorimetric integration of Top-eco and Top-Print with their integration with the dosing installations guarantee high quality printing results.

The recovery of leftover products in a colorimetric manner is the most innovative system to date,

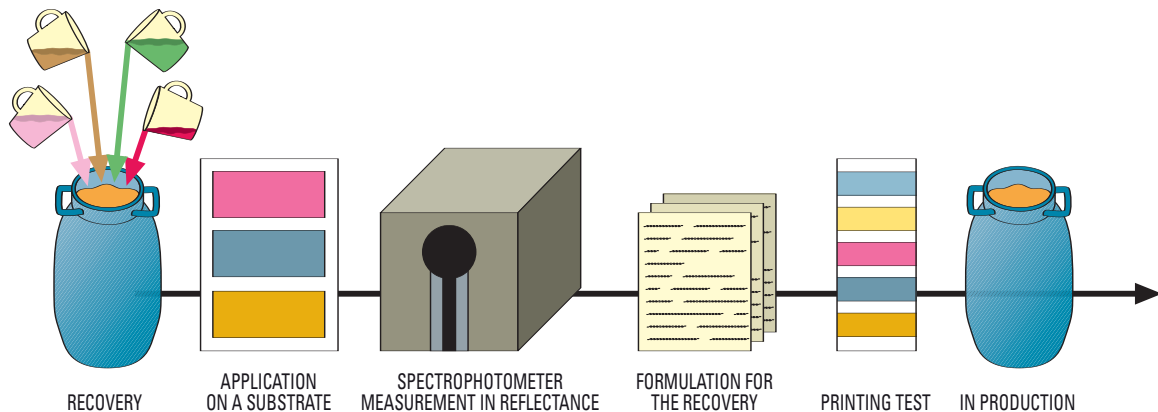
providing enormous advantages to the textile printing sector.

The ease of use of the system allows any company who so desires to introduce the new technology into their production process in a very simple manner and in a brief period of time. A short training session of the company technicians will allow one or two people from the company to independently operate the Top-Eco system.

RECOVERY WITH THE TRANSMITTANCE APPLICATION



RECOVERY WITH THE REFLECTANCE APPLICATION



PAYBACK CALCULATION



TOP-ECO ECONOMY & ECOLOGY



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**Formulation and correction
of new colors for textile printings**

