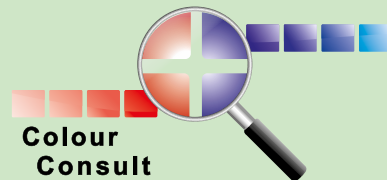# THE
MACH 5+
Get the best experience!

Multi Area Colour-measurement Hardware for fast, automatic spectral measurements of multiple samples in one go and measurements of large inhomogenous surfaces. With the Mach 5+ also: glossy objects.

INTRODUCTION

Image Analysis tools and software are much more common nowadays in our industry and the use hereof is already accepted in most standards like AISE, IKW, Ecolabel etc. The MACH 5+ (Multi Area Colour-measurement Hardware) is the fast and accurate solution for measuring detergent performance, because the MACH 5+ allows you to perform multiple measurements simultaneously. The MACH 5+ combines an industrial camera with LED lightsource technology to create a spectral image of all selected areas, by analyzing all the images taken in different light spectra. The fact that the MACH 5+ is able to quantify large inhomogeneous surfaces makes the MACH 5+ even more versatile.

The MACH 5+ streamlines the performance analysis of multiple samples with its one-step measurement cycle. This will significantly boost the productivity and measurement capacity of your lab, while maintaining the accuracy of a spectral approach. The MACH 5+ was developed jointly by CFT BV and Colour Consult BV. Sales and delivery are coordinated by CFT BV. Colour Consult BV handles the technical support.

Colour Consult

BENEFITS

A major benefit of the MACH 5+ over traditional spectrophotometers is the fully flexible area shape and size selection. These selection areas can be saved and reused if necessary to ensure that you can accurately measure the same areas again. This also offers opportunities for instance for CFT dishwash monitors or even actual plates and cups. Uneven distribution is no problem for the MACH 5+. By measuring the entire area, average readings can be taken for these samples. The MACH 5+ even allows you to quantify testmaterials that are cleaned using the Sheen Washability Tester. In addition, measuring with the MACH 5+ is on average 70% faster than with the traditional spectrophotometer.

TECHNICAL DETAILS

The MACH 5+ is equipped with multiple lightsources which together cover the spectrum from 400-700 nm, corresponding with colours visible to the human eye.
The combination of the spectral sensitivity of the camera and the selected light sources give results that are similar to of a fully equipped spectrophotometer with D65 lightsource with a UV-filter in place (UV excluded). Output is given in L*a*b* -values, XYZ-values and % reflection from 400 to 700nm.
Extensive testing has shown that 97.65% of the L*-values measured with the MACH 5+ deviates less than 2 units from a conventional spectrophotometer. The L*-value (or else the Y-value) is the most commonly used to quantify soil removal. The a*-value and b*- value scored 96,3% and 94,4% respectively in these tests. A detailed report is available on request.

A calibration daily check plate with 24 different coloured tiles is included with the MACH 5+. With this plate you can check the accuracy of the measurements of your device on a daily basis. This daily check is not a calibration, pure a check.
As with every measurement device the MACH 5+ needs to be fully calibrated periodically. The advice is to have this done at least once a year.

HOW DOES IT WORK

When the testmaterial is entered into the soft closing drawer, the user can see the testmaterial on a live image in the MACH 5+ software. When the areas to measure are designated, you are able to obtain L*a*b*-values, XYZ -values and % reflection from 400 to 700nm per 10 nm of all areas with one click. For each area, the software automatically measures multiple smaller subareas to calculate the standard deviation within the area.

The names of the swatches or dishwash plates can be retrieved from a stain database and linked to the corresponding areas. All this data output can be easily copy/pasted to your software of choice or exported in .csv or .txt files.

The Software
The bespoke software of the MACH 5+ offers unique possibilities. Either a flexible manual selection of areas, or an automated time-saving selection of areas, can be used. In both cases, the variation within the selected areas can be restricted or recorded as a seperate value.

All data output is automatically stored in a database together with the recorded image, which not only offers you unique visual opportunities, but also the possibility to discard the physical monitors.

The data can also be stored to a network drive or in your own analytic software. The user can even add his own complex formulas in Phyton script which can be run automatically from the MACH 5+ as a custom option.

The MACH 5+ software is installed on a 'frozen' PC delivered with the device. This means the PC is automatically wiped clean after every restart. This is to ensure the device is always working correctly. Obviously, the database with measurements is stored in a part of the drive that is not wiped clean.

Multi-Swatch Monitors
The use of multi-swatch monitors fully unlocks the potential of the MACH 5+ to increase the output of measurements. The MACH 5+ is fully equipped to measure multi-swatch monitors like the CFT SM-04, a monitor with 20 swatches covering the full range of

performance contributing components in detergents. Custom configuration of monitors is also possible and becoming more popular. In addition to the multi-swatch monitors, multi-stain monitors, or even a combination of both are also measurable with the Mach 5+. Now custom multi-swatch monitors can hold up to 24 swatches and circular stains.

WORK FASTER
by measuring multiple areas in one scan
guaranteed high and constant colour quality

FACTS & FIGURES

- One measurement takes 23 seconds.
- Based on the variation in the sub-areas the standard deviation is calculated for each area.
- With help of gridlines you can have the software position areas within 1 second.
- Area masks/lay-outs, gridlines, stain names can al be saved/stored for later retrieval.

- Each measurement is automatically saved: jpeg, sub-area data, CSV file, LAB values, xyz values and % reflection.
- Ensures fewer human errors
- Enables quantification of inhomogenous areas
- Especially developed for the detergent industry
- Easy to operate
- Saves up to 85% of time spend on measuring.

FREQUENTLY ASKED QUESTIONS

Q How many measurements are done per area?

A One measures every pixel. So per area of 30 x 25 mm 4380 measurements are done. The software gives the average. Also per rectangular area 9 or 16 or 36 sub-areas are measured. This is stored with every measurement in a seperate file.

Q Is the MACH 5+ suitable for measuring fluorescor effect?

A No, because the MACH 5+ does not have an UV-light-source. We have chosen not to work with UV-LEDs, because we believe that these are currently not stable enough.

Q How do you export the data?

A Easiest is just to copy-paste from MACH 5+ to Excel or Jump Excel is installed on the dedicated PC. Exporting to csv or txt files is also possible.

Q Is the MACH 5+ also suitable for measuring whiteness?

A The MACH 5+ gives Y-value wich is a parameter that is sometimes used for scoring whiteness. The MACH 5+ is not suitable to measure Ganz Griesser or CIE whiteness (nor are most conventional spectro's). For that you need to have a calibratable UV lightsource. The MACH 5+ does not have an UV-lightsource, so you can also not calibrate it.

Q Do you also have the option to scan each individual area?

A Yes

Q How fast is the MACH 5+?

A In combination with CFT's multi-swatch monitors one could easily measure 10.000 swatches per day up to even 2.000 swatches per hour.

SERVICE & DELIVERY

Continuing support is provided by Colour Consult BV. Our advice is to immediately purchase a two-year service contract. Service is then free for the first year. This will offer you technical service, software updates and the possiblity to purchase custom built add-ons (hardware of software) such as a remote-access point for online tech support. This allows Colour Consult BV to modify or update the MACH 5+ software remotely if necessary.

The new Mach 5+ is delivered as a plug and play solution wich includes:

- MACH 5+
- PC
- Monitor
- Keyboard
- Mouse

- Connection cables
- Calibration Chart
- Daily Check Calibration Tile
- Protective sleeve for Calibration Tile
- Frames for placing testmaterials

ACCESSOIRES

Measurement background		With larger surface and perfect height for measuring plates, for example
MACH 5 34°Holder		Special 34° holder for reducing gloss on shiny surfaces measuring with MACH 5 - per piece
MACH 5 Tile Bag		Knitted cotton bag to preserve MACH 5+ daily calibration check tile.