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1 - INTRODUCTION

Did you ever do a washing test? If not, you should. It is an excellent tool to evaluate the quality of a print and - if you operate a direct to garment printer - adjust all the settings in the print process to ensure a print that can live up to the highest standards.

In this Ebook, we are going to have a look at wash fastness and show you a simple procedure to do a wash test with the equipment you already have at home.

Washing tests can be an overwhelming subject and many printers try to avoid that topic. If you look at the official washing test standards, there is an enormous amount of rules and regulations. But, washing tests do not have to be complicated. The good news is that it's quite easy to perform a simple washing test at home with the equipment you already own. If you know what to do, all you need is some time.

This simple procedure can already give you lots of insights and can help fine-tune your printing process to find the best settings to maximize the washability of your garments.

Please note that this is our version of a washing test and does not resemble any official washing standard. Usually, there are regulations starting from the correct washing machine up to which detergent to use. Our washing test procedure can be performed with the equipment you already have at home. And it can give you a lot of insights.

We want to show you how to do this and how to interpret the results. So, get ready!

NOTE:

For the simplicity of reading, we talk about washing T-Shirts only. But usually, you can use the same process on all kinds of garments and fabrics. So whenever we talk about T-Shirts, it is synonymous for all the other types of garments.

DISCLAIMER:

There are numerous manufacturers of DTG equipment which differ greatly in their processes and curing requirements. Therefore, there is no „one size fits all“, but the underlying processes are more or less the same. Please make sure to get a thorough process explanation from the manufacturer of your DTG printer! Our aim with this Ebook is to give you an idea of a simple washing test you can carry out at home and how to use the results to improve your processes. It does not resemble any official wash test standard.

2 - WHY SHOULD YOU DO A WASHING TEST?

There are three reasons to carry out a washing test:

- You want to get the best print possible. Nobody is happy when the print disintegrates after a few washes.
- You want to test the quality of a garment and a print you received.
- You want to find out the correct settings for all the machines involved in all the processes (e.g. pretreatment, printing, curing).



3 - WHAT INFLUENCES WASH FASTNESS?

There are many factors that influence the wash fastness of your garments and affect the final outcome. It is your job, as a printer, to adjust and stabilize all those processes for every type of fabric.

Always remember: Process control is essential in DTG printing!

Some factors that can influence wash fastness:

THE GARMENT

Wash fastness can vary between different types of garments. Depending on their fabric type, the T-Shirts may have a different composition of materials which can influence the washability. A good example is a polyester or a tri-blend T-Shirt.

PRETREATMENT

The pretreatment is needed to make white ink stick to your garments. Whether you spray too much or too less pretreatment and the details of your pretreatment process (inside the machine or outside, heat press and/or the dryer, etc) can have a huge effect on the printed colors as well as on the washability. If you use a pretreatment you need to mix, make sure to always use the correct pretreatment to water ratio. Additionally, make sure to store the pretreatment correctly so it doesn't change its chemical properties (talk to your supplier for details on the correct storage and handling).

INK

There are huge differences between inks from different manufacturers and they all need to be cured accordingly to ensure a lasting result. As with the pretreatment, make sure to store and handle the ink correctly.

CURING

Curing is the part of the process where you "bake" the inks into the garment. That's when cross-links between the garment and the ink are formed and this is what makes the print last. Usually, this is done in a tunnel dryer, a heat press or a combination of both. Both temperature and the correct time are essential for curing the print, otherwise, cross-linking is affected. If the settings are off or the machine is not set to the correct temperature or speed, it can cause troubles.

WASHING

Another factor that can influence your washability is how you wash them. Make sure to use the correct settings! We will talk about this in the upcoming chapters.



4 - WHAT DO YOU NEED TO DO A WASH TEST?

WHICH MACHINERY DO YOU NEED?

You do not need too much equipment, and most likely you already have it at home. All you need is a washing machine and a dryer. If you do not own a dryer, you can also hang dry your garment. But in this case, it would be advisable that you wash the garments more often before evaluating the results. In a dryer, your clothes are exposed to more wear and tear and it is quite likely that your customers are using dryers as well.

WHICH IMAGE CAN I USE?

Theoretically, you can use any image you like. To make things comparable, we always include boxes of solid colors in all four colors (CMYK) and white in our designs.

We also like to evaluate the ability of the printer on that specific garment at the same time, and that's why we also include some photographic images with some tricky designs and patterns like grayscale or low-contrast images. Additionally, we also add in some gradients, text in small font size and some lines with different stroke weights.

DON'T FORGET THE REFERENCE!

Always try to have a minimum of two examples of the same product with the same settings. The first one you wash, the second one you keep as a reference to monitor and control the results.



5 - HOW DO YOU DO A WASH TEST?

STEP 1: PREPARATION

IF YOU PRINT THE T-SHIRTS, DOCUMENT ALL THE SETTINGS

When performing a wash test, it is important to know and document all the settings used during the entire process. Create a control sheet with all the parameters used in all the processes involved.

Some of the settings that you should record include:

- Whether a pretreatment was used (and if so, how much fluid was applied (mixing ratio), at what time and the temperature it was cured, did you use press paper, etc.)
- The print settings used in the RIP software and on the printer (color profile, number of color and white passes, etc.)
- The settings used for curing the ink on to the garment. (heat press: temperature, time and pressure; tunnel dryer: temperature, speed per minute, etc.)

How can you figure out the correct curing settings? Talk to your ink manufacturer to get the first guideline and then refine your settings from there. Remember that every dryer and heat press are different, so the chances are high that you can not use the instructions as they are. If you want to fine-tune the printing process, print several T-Shirts with different settings and make sure to take note of all the details in your control sheet so you can compare the results afterwards. Don't forget to mark the T-Shirts so you can distinguish between them. We usually write numbers on the T-Shirts with white textile marker, but you can also print them on the garments.

Tip: You can print the settings on the T-Shirts!

Important: Don't forget to make a reference T-Shirt and keep it safe!

SEPARATE GARMENTS BY COLORS/TYPES

Just like your mother always preached: Sort your garments by color and temperature and wash them separately. For example, Polyester T-Shirts may need a different temperature than cotton. And putting a red T-Shirt with your whites may cause noticeable color differences.

STEP 2: WASHING AND DRYING

LAUNDRY DETERGENT

In a standardized washing test, you would be required to use special laundry detergent.

For our test, we will not go that far, but you should put a little caution into which type of detergent you pick.

Detergents for whites usually includes bleach and optical brighteners, which will increase the amount of blue light reflected from your garment. This will make whites look more white and less yellow, but it can influence your washing test results, especially if you decide to measure the color values (more on that later).

Usually, a detergent for colors or delicates is the better choice, because it "supposedly" contains less of the chemicals we do not want.

MACHINE SETTINGS

If you did not receive any instructions on how to wash this specific garment, you need to come up with your own settings. You should pick something that regular customers would use when washing your product. Unfortunately, hot temperatures are very harsh on your clothes, no matter if they are printed or not.

For our wash tests, we try to stick to the settings we would use when doing our regular laundry.

Depending on what the label says, we usually stick to a medium-low temperature (on our washing machine: between 20-40°C) and a spin cycle of 800 RPM. We always wash our T-Shirts inside out.

Do not run the washing machine with a single T-Shirt alone. It is recommended to fill up the washing machines with at least ten more pieces to simulate the conditions at a customer's place.

It is also important that once you decide on settings for your washing machine and dryer, you must stick to them and use them repeatedly for the duration of that specific wash test.

STEP 3: BETWEEN WASHES

After the first wash, have a closer look at the print. We will give you a few tips on what to look for in the next chapter.

If you want to document the process, take pictures of all the samples (next to the corresponding reference) between each laundry cycle. The pictures allow for a comparison to show how well the washed garment held up during each wash test. Also, take notes on your control sheet (e.g. after how many washes the sample started to fail).

If you are interested, you can already compare it to the reference T-Shirt you put aside to see first changes.

STEP 4: COLLECT DATA (OPTIONAL)

We always like to measure the solid color blocks on our T-Shirts after every wash to have easily comparable data once we're done with the test. We measure and record the L*a*b* values and do some calculations with them at the end.

If you already have a spectrophotometer (for example by X-Rite or Barbieri) in your shop, you can use this device.

If you do not own them, another super-simple, cheaper solution is to "misuse" a device like the ColorReader by Datacolor. It is originally designed to color match Pantone and RAL palette for paint colors. But it also shows you the L*a*b* values of the measurements. It also works with an app on your phone or tablet, which makes the process extremely quick and easy. So even though the ColorReader is technically not intended to be used for measuring washing tests, we have been very impressed with it, the measurements are constant and we feel that it gives us all the information we need to collect our data.

STEP 5: REPEAT

The more times you repeat this process, the better.

We recommend a minimum of ten washes.

Also, if you hang-dry your clothes, you should wash them more often to make up for the missing wear and tear from the dryer cycle.

6 - HOW TO INTERPRET THE RESULTS - VISUAL

VISUAL INTERPRETATION

COLOR CHANGES

Put the reference T-Shirt and the washed T-Shirt next to each other and compare the colors of the solid blocks. Can you see any difference? Did the colors fade? Is the color change caused by white "fluff" from the fibers coming up (especially on white garments)?



Color change on white T-Shirt (after 10 washes)



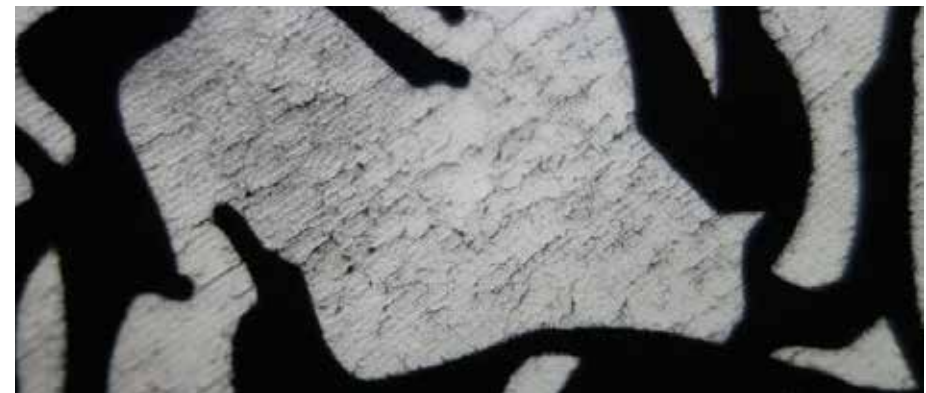
Color change on black T-Shirt (after 10 washes)

IMPERFECTIONS

Can you see any imperfections like flaking and cracking of the ink?



Flaking of the white underbase



Cracking of the white underbase

6 - HOW TO INTERPRET THE RESULTS - MEASURING

MEASURING COLOR DIFFERENCES

As we explained in the last chapter, you can collect data during the washing test to get some more information about the color change.

In our case, after 10 washes, we took our L*a*b* values and calculated the ΔE , which illustrates in our example the color difference between the first and the last wash. If math is not your thing, there are many easy to use ΔE calculators online.

Companies use different standards on how high of a ΔE they allow for a washing test to pass. Many accept a $\Delta E < 2$ because then the color change is most likely not visible to the customer. $\Delta E > 4$ is an easily noticeable color change.

The results we get matches the visual evaluation we did earlier:
 We saw the highest numbers on white T-Shirts, especially on yellow ($\Delta E=5,88$) and magenta ($\Delta E=4,38$), which means that there is a visible color change.
 On black T-Shirts, the ΔE ranges between 1,9 and 0,75 - the color changes are much more subtle and may not be seen by an untrained eye.

The images on the right illustrate the colors of the design, after the print and after 10 washes.

WHITE T-SHIRT



BLACK T-SHIRT



7 - WHAT TO DO AFTER THE WASH TEST?

If everything went well and you have no visible or measured color differences or imperfections, congratulations! Make sure to establish clear washing instructions and deliver them with the final product.

Make an info sheet of the wash test settings and procedures that YOU use to get the best results. Send this info sheet with every T-Shirt shipped to a customer. When these settings and procedures are met, there should be fewer returns (and fewer headaches!).

Also - establish clear process instructions and make sure your team understands and follows them at all times (e.g. pretreatment laydown, curing times, temperatures, etc).

If you want to know more about washing instructions, have a look at our [blog post about washing labels](#).

8 - WHAT IF IT FAILED?

As a printer:

Redo the test with different settings during the printing process (pretreatment, printing, and curing).

If - during this washing test - you already printed several T-Shirts with different settings, pick those that worked the best and go from there.

As a customer:

Start a dialogue with the print provider. Show them the results of your printing test.

If they think that this was a one-time thing, ask them to supply you with new T-Shirts and redo the test.

9 - WHAT CAN YOU DO TO ENSURE GOOD RESULTS?

- Redo your wash test procedures regularly to make sure that none of the process settings have unknowingly changed.
- Check the performance of the tunnel dryer and heat press regularly.
- Pay close attention to potential changes to the amount of pretreatment as well as the method of applying it.
- Make sure the inks and consumables are stored correctly and the printer operates in a suitable environment.



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KEY POINTS TO REMEMBER!

10 - CONCLUSION

Although this may sound like a lot of steps to go through, the last thing any DTG printer wants is a customer to return an order of T-Shirts that washed out. The cost and time to reprint an average size job will far exceed what you would put into doing the wash test. If you are a production printer, use wash tests as an ongoing process for quality control.

We believe that, no matter if you are a printer or a buyer, the wash test process is an important part of protecting the reputation of your company.

PS: Subscribe to our newsletter and get all upcoming Ebooks and news delivered directly into your mailbox.

ABOUT US

We help others to be successful with the two things we are passionate about: DTG (Direct to Garment) Printing and T-Shirt Design. We have had the experience that the many individual steps in the entire process as well as optimizing it all is difficult to understand at the beginning.

That's why we offer training as well as many resources on our website (many of them are free to download).

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