KN 050.055
Printing Guidelines

Alfred Kärcher SE & Co.KG Alfred-Kärcher-Straße 28-40 71364 Winnenden Germany

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Technical responsibility: Packaging & POS Graphic Design Department: TRS-M / ksr / 5133

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1 Other applicable standards, specifications and references

- Packaging Manual KN 050.018
- Prohibition and declaration of substances KN 050.032

2 Brand and POS

“Kärcher” stands for efficient solutions to all kinds of cleaning problems, innovative and high-quality products with excellent design and German development. This solid brand promise must be proven every day anew through our services and devices.

Our corporate design describes the appearance and quality of the online and offline communication. The point of sale offers the opportunity for the customer to convince himself of the Kärcher-brand by experiencing the products before buying.

For this conviction the packaging plays a special role in direct customer communication. It transports the machine's benefits and serves as a silent salesperson. A uniform appearance and the exact reproduction of product illustrations, marketing photos and the yellow brand color are decisive.

How this is ensured can be read below.

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3 Introduction of Color Management

All Kärcher own brands have been designed to be printed in high quality.
The Kärcher brand is created by using a distinctive combination of colors. These primary corporate design colors are present in every pack and communication. Our brand colors do not contain Pantone references.

This document describes reference values and methods to be able to produce and check color and modulation of printed products in a controlled and consistent manner.

The quality of print on packaging must be of excellent commercial standard, avoiding mis-registration and free from defects. The layout and form of all printed text, graphics and barcodes must correspond with the approved artwork, the supplied proof.

To ensure colors are both bright and protected against ink rub, all print must be actively protected with water based matt varnish. All printing inks MUST use light fast pigments and not fade under normal usage conditions. Inks should be free from heavy metals, such as cadmium, chromium, mercury and lead. Alternative pigments should be used when heavy metals are known to be present, but care should be taken to ensure that any organic pigments or dyes used to replace heavy metals are not persistent and / or bio accumulative.

All vendors and their printers must follow the Kärcher Color Management process, failure to do so could cause potential delays, which you may be liable for.

3.1 Minimum specifications for a printer supplying packaging's for Kärcher:

- Must be able to accept a high-res PDF X4 for printing, exception for flex-printing – therefore we will supply open data and pdf. A printed proof for quality and color control will be sent out to the Vendor anyway.
- printing adjustments in the PDF should be done with a PDF editor.
  The PDF should not be opened in other graphics programs.
- Have an internal process and control for color management
- Capability to measure print using a calibrated spectrophotometer in L*a*b* values,
  finally stored in ChromaQA.
- Be able to print within the tolerances described in this document (see page 5 + 6)
- Have a calibrated lightbox to visually match samples to the color standards supplied (proof)
- Use ISO 2846 CYMK inks for printing or acceptable equivalents
- Printed in accordance with the primary colors and tone value curves of ISO 12647-2:2004 and
  density control, the Kärcher targets are achieved.
- Provide relevant certification / chain of custody information for all materials upon request

3.2 Severability clause

If your chosen printer is unable to meet our expectations of print, then Kärcher may nominate a printer from our approved packaging supplier list.

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4 Background

Packaging printing often show:

- X Unacceptable color deviations (tolerances) of the Kärcher brand color.
- X Insufficient and inconsistent color reproduction of images or colored areas.

At the point of sale, this becomes a problem. Especially when print results of strikingly different qualities are placed next to each other. This unsatisfactory situation prompted us to investigate the causes of the printing problems, with the result to introduce this guideline.

5 Purpose of this standard

With these printing guidelines we are introducing a new quality management system for packaging printing.

An initial analysis highlighted the logical deviations in print results due to different substrate colorations and qualities. Many different product-typical substrates were compared in terms of their colorfulness and the color space printable on them with standard CMYK inks.

Using typical ISOcoated V2-separated print data, it was investigated how this data would appear on packaging substrates.

As a result of the investigations, a color space could be defined that describes how an average print of ISOcoated-V2 data looks like on a typical packaging board.

As a result we created our own Color-Standard for packaging print:

OffsetCoated_Kaercher-V3

5.1 Kärcher Color-Standard "OffsetCoated_Kaercher-V3"

This standard is based on coated paper.

Our Color-Standard is characterization data, basically a table from which the chromaticity of any CMYK value can be read.

For quality control, the color values of substrate, primary colors, secondary colors and gray balance, from this table are used.

This standard can be used in the form of an ICC profile in a wide variety of applications, e.g. for soft proofing or process control.

All Kärcher proofs show the simulation of the supplied CMYK data in the targeted Kärcher standard.

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5.2 L*a*b Target values for packaging prints

Measurement conditions

✔ Standard Colorimetric Observer	2°
✔ CIE Illuminant	D50
✔ Measurement Geometry	45/0
✔ Measurement Condition	M0
✔ Specimen Backing	whiteback

Substrate	L* 89,5 a* 1,0 b* -1,6			
Primary colours	CYAN L* 51,11 a* -33,17 b* -48,14	MAGENTA L* 45,46 a* 71,05 b* -1,46	YELLOW L* 85,2 a* -4,0 b* 88,9	BLACK L* 15,09 a* 0,22 b* 0,18
Grey balance	10% K L* 83,72 a* 1,0 b* -1,52	30% K L* 71,64 a* 0,98 b* -1,37	50% K L* 57,97 a* 0,95 b* -1,16	70% K L* 42,37 a* 0,88 b* -0,86

5.3 Accepted tolerances in packaging printing

Substrate	L*± 3.0, a*± 2.0, b*± 4.0			
Primary colours	CYAN ΔEoo **3.5**	MAGENTA ΔEoo **3.5**	YELLOW ΔEoo **1.5**	BLACK ΔEoo **5.0**
Grey balance	10% K ΔEoo **4.0**	30% K ΔEoo **4.0**	50% K ΔEoo **4.0**	70% K ΔEoo **4.0**

Detailed information can be found in this document: LINK

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5.4 TVI in packaging printing (According to 12647-2: 2004)

Measurement of tone value increase and tone value spread: **informative** in Digital and Flexo printing as a reference point for the vendor and printer:

- TVI 0% ΔTVI ± 2
- TVI 30% ΔTVI ± 3
- TVI 50% ΔTVI ± 4, Midtone spread = 5
- TVI 70% ΔTVI ± 3

Tone Value Increase according to ISO 12647-2 :2004 Paper type 1,2 (curve A for CMY, curve B for K).

TVI	A	B
10%	4,0	5,6
30%	10,7	13,7
50%	14,3	17,0
70%	13,4	14,9

Recording of the secondary colors: only with a **purely informative** character.

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5.5 Control strip

Kärcher has developed two color control stripes for checking color tolerances in printing. These wedges are installed directly in the packaging design according to packaging size and space.

The control strips are optimized for metrological and also for visual assessment. The visual assessment could be done via the gray balance fields.

In the future, Kärcher will deliver all PDFs released for printing with our output intent **OffsetCoated_Kaercher-V3**.

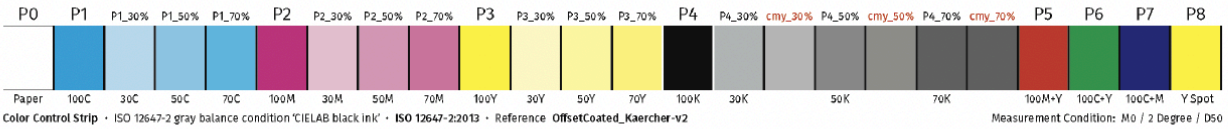
The difference between ISO Coated V2 and OffsetCoated_Kaercher-V3 is only in the color representation, with the same data.

For data that still contains the output intent ISO Coated V2 and is adjusted via a ColorServer before printing, the output intent should be exchanged into OffsetCoated_Kaercher-V3 beforehand.

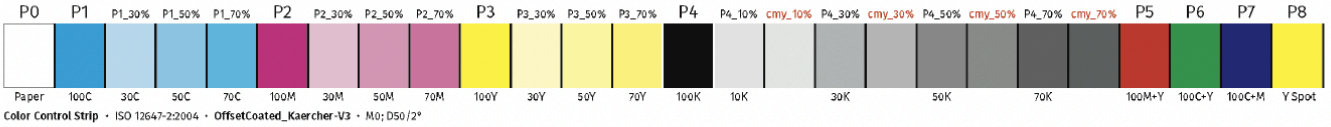
-> Simply assign the OffsetCoated_Kaercher-V3 profile without transformation/conversion of the data!
The color assignment then corresponds to the proof which will be sent to the printer beforehand.

Overview colour wedges:

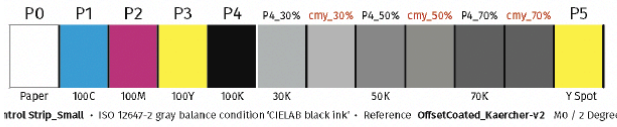
Wedge_V2+TVI



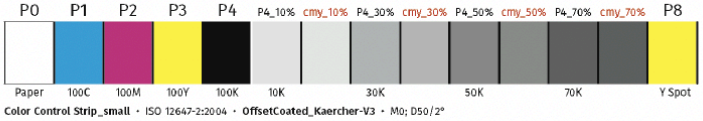
Wedge_V3+TVI



Wedge_V2_small



Wedge_V3_small



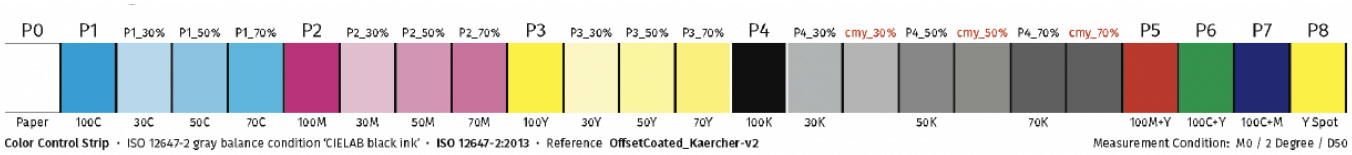
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Explanations on the use of the control strips

The strip is not intended to represent the printing process as such, but the color result of the print.
What we see or measure on the strip should correspond to the characteristics of the printed product.

If Kärcher print data are newly separated for printing, then the test strip must be treated like motif images.
For example, with an achromatic buildup of the gray balance in flexo printing.
This is the only way to ensure that the metrological evaluation corresponds to the optical impression.

Field	Description
P0	Substrat color
P1/P2/P3/P4	Primary colors (C,M,Y,K)
P5, P6, P7	Secondary colors (only informative in the evaluation)
P8	Repeat of yellow (Y) - As this an important value for Kärcher, for this it has a greater importance and weighting.
cmy 10% cmy 30% cmy 50% cmy 70%	Colored gray patches for metrological and visual assessment of the gray balance. These patches should correspond in color to he respective black fields (10K, 30K, 50K, 70K)



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6 Quality Assurance

The print suppliers commit themselves to check the Kärcher packaging prints that they produce for the target values described above and to comply with them.

The measurement logs must be uploaded to the ChromaQA application, described below, and/or must be provided via the FSR (First Sample Report). Only prints that reach the specified target values are approved.

6.1 Measurement Technology and Evaluation

Kärcher has tested different measuring devices and software solutions for the color evaluation of the print results. We decided on the system from TECHKON. The decisive factors were the good quality, excellent support, intuitive handling and the clear, informative software. In addition, the excellent price-performance ratio was convincing. Kärcher recommends the SpectroDens from TECHKON, as no incorrect settings are possible here. The SpectroDens also has a scan function so that measurements can be done quickly.





With TECHKON's cloud-based application software ChromaQA, measurement data from the TECHKON SpectroDens can be conveniently recorded and evaluated.

The Xrite Exact 1 can be used via an import function. However, Xrite Exact 1 does not have a scan function and cannot be controlled and set to the correct measurement conditions by the software.

Kärcher has created the OffsetCoated_Kaercher-V3 in ChromaQA and can now also conveniently evaluate the measurements of the connected printers.

6.2 Quantities of Measurements

The evaluations have shown that with more measurements a meaningful average value is achieved

Lot-Size	Quantities of Measurements
1 - 2.000	2
2.000 – 5.000	3
> 5.000	3 plus 1 every 5.000

All the measurements have to be saved into ChromaQA!

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6.3 ChromaQA

The following procedure is binding for all suppliers and printers who supply packaging to Kärcher.

Submit an application for paid cloud access (license) to Techkon and receive a license key. After receiving the license, Kärcher creates the print supplier in the system and sends the supplier the user name, password and database ID.

For the license please contact:

TECHKON GmbH

Albin Baranauskas

Managing Director

Tel. +49 (0)6174 9244 65

albin.baranauskas@techkon.com

Kärcher contact:

Joerg Krista

Prepress Specialist

Phone: +49 (0)7195 14 4117

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Installation of the ChromaQA software after successful activation.

Measurement of the Kärcher color wedge in the Chroma Press software module. All parameters relevant for the measuring process are already stored in this module (color wedge and measuring device parameters for the measuring process).

The measurement reports are generated in the Chroma Reports module. This optional module can also be activated on request, but is not mandatory.

This module offers a detailed evaluation of the measured wedges and their tolerances to the Kärcher standard.

Export of the evaluation as PDF for communication or archiving.

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6.4 Explanations on the Kärcher standard and evaluation

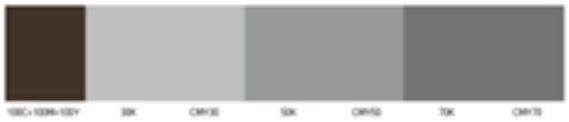
Kärcher bases its color and tolerance specifications on reproducible results in packaging printing, so that common fluctuations in the printing process are included.

With the smallest possible test wedge, an attempt is made to cover as many quality-related criteria as possible.

6.4.1 Gray balance

For example, a good gray balance in printing is an important indicator of good image representation and a simple, visual indication of correct settings in repro and print.

Pefect result



Visual gray scale chart

Insufficient result



Visual gray scale chart

6.4.2 Explanations on the Kärcher standard and evaluation

The scoring value developed by Kärcher for print evaluation weights the most relevant criteria for Kärcher print products. For example, with a high weighting on yellow reproduction.

The minimum scoring value of 75 points represents the absolute minimum requirement for the color reproduction of packaging prints.

A green scoring value indicates that the minimum requirements have been met.

Score Card

Patch Type	Metric	Measured Average	Scoring Average	Score	Weight	Weighted Score
Solids - Process	ΔE	2,87	2,87	100,0	10%	10,0
Solids - Spots	ΔE	1,09	1,09	100,0	40%	40,0
Substrate	ΔE	1,86	1,92	100,0	5%	5,0
Gray Balance	ΔE 50% CMY	3,30	3,30	70,0	15%	10,5
Gray Balance	ΔE 25% CMY	1,12	1,12	100,0	15%	15,0
Gray Balance	ΔE 75% CMY	8,51	8,52	0,0	15%	0,0

Minimum passing score: 75

Production Score

passed

80,5

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A red scoring value, on the other hand, indicates that the Kärcher quality requirements have not been met.

Score Card

Patch Type	Metric	Measured Average	Scoring Average	Score	Weight	Weighted Score
Solids - Process	ΔE	2,76	2,80	100,0	10%	10,0
Solids - Spots	ΔE	1,44	1,44	100,0	40%	40,0
Substrate	ΔE	2,46	2,46	100,0	5%	5,0
Gray Balance	ΔE 50% CMY	6,07	6,08	0,0	15%	0,0
Gray Balance	ΔE 25% CMY	3,68	3,70	30,0	15%	4,5
Gray Balance	ΔE 75% CMY	10,69	10,65	0,0	15%	0,0

Minimum passing score: 75

failed

Production Score
59,5

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6.5 **Initial sample process**

This process should align the vendor / printer into our colormanagent.

This has to be done for each different printing technologies the printer and vendor is going to use for Kärcher packaging for the first time.

Performing the initial sample process you will get a test sheet including the instructions, target values and proof, which MUST be printed on the production press, using the exact substrate that will be used in the final production process.

The test sheet will be evaluated and measured using ISO standards. A report will be generated and sent with our approval or rejection to the vendor / printer.

Once the test sheet has been approved, the vendor / printer is authorized by Kärcher as a certified supplier.

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7 Print-Process

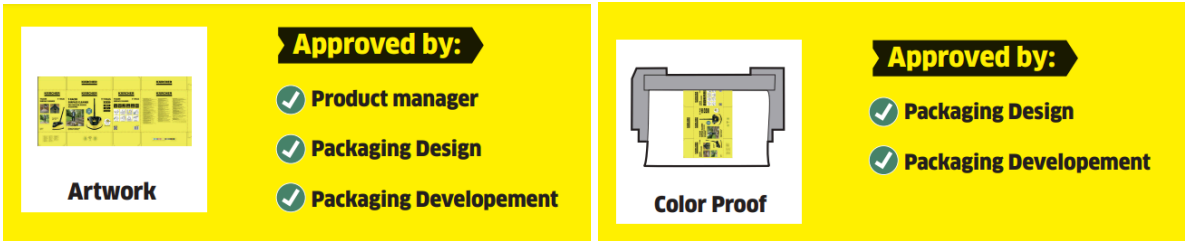
Please pay attention to the following prepress specifications for data transfer and handling, proofing and production.

7.1 Print data

- The file download request is performed by a WebCenter task. Please download the file using the "download button" in the task and finish it after completion by pressing the „complete task“ button.
- Your workflow must be able to work with PDF X4 high resolution files with embedded fonts.
- Fonts are embedded.
- The files are proofed and released by Kärcher.
- The PDF data must be processed as a closed PDF file and must not be opened in programs such as Adobe Illustrator or Corel Draw.

7.2 Proof and release

- Please use the PDF X4 for printing and do modify only for adjustment to your type of printing e.g. trapping, overfilling etc. with a professional PDF editor.
- Make sure that you can handle PDF X4 files.
- The files are approved by internal processes with a final released proof at the end.



-> For this Kärcher will not accept and release any over-worked PDF files.

- A true-color proof of the PDF X4 print file is sent to the supplier for each layout. This proof is binding to specify the expected printing result.
- Please synchronize the print with this proof in original size and void to send another release PDF to Kärcher.
- Please apply this proof for comparison to achieve maximum quality of printing.

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8 Additional Print and Material Specifications

The following mentioned printed grids and grammar of the papers are obligatory.

8.1 Print resolution/screen ruling

Please check our packaging specification which has been provided beforehand, if the grid might be specified differently to this general statement. The values mentioned in the specification always have priority over the default values shown here:

Printing Technology	Target Print Resolution*
Digital Print	Determining the target value is based on the printing release process for the respective machine.
Postprint (HQPP)	35 lpcm (90 dpi)
Offset	60 lpcm (152 dpi)
Prepring	54 lpcm (137 dpi)

*A lower dpi / lpcm could be also sufficient, but this fact should be checked within initial sample process

Only water-based inks are permitted. The use of UV varnishes is not permitted.

8.2 Paper grammar

Printing Technology	Paper	Minimal grammage*
Digital Print	Kraftliner or Testliner white top coated	160 g/m²
Postprint (HQPP)	Kraftliner or Testliner white top coated	180 g/m²
Offset	Chromoduplex / GD2	230 g/m²
Prepring	Kraftliner or Testliner white top coated	185 g/m²

*A lower grammage could be also sufficient, but this fact should be checked within the initial sample process and needs a special release by the R&D Packaging Department.

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9 Print quality

The print quality of bar codes is described in KN 050.018 Section 8.4.

The quality of the printed boxes must be inspected prior to the delivery to Kärcher.

The first part of the inspection is determining whether or not the print as a whole matches the print template. Then the actual quality of the print is inspected against reference specimens. These include:

- Squeezed edges
- Register
- Moiré-effect
- Smearing or blurry areas
- Incomplete areas
- Color variations

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