

PROVISION LABELS GUIDE

The psychology of colour in product labels.

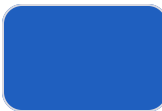
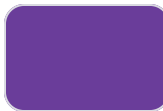
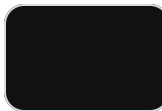
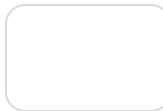
What the evidence supports, what the rules require, how every colour reads to every eye, and how to print colour you can stand behind.

In this eBook

A practical guide for anyone who designs or prints product labels. Select a chapter or a hue to jump straight to it.

01	What colour can and cannot promise Colour is one of the first things a shopper sees on a label. That is exactly why it attracts claims that do not survive a check.	03
02	A working palette, hue by hue Eight hues, and only what a regulation or a published study actually says about each one.	06
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JUMP TO A HUE

							
Red	Orange	Yellow	Green	Blue	Purple	Black	White
08	09	10	11	12	13	14	15



01

CHAPTER 1 OF 6

What colour can and cannot promise

Colour is one of the first things a shopper sees on a label. That is exactly why it attracts claims that do not survive a check.

Start from what can be shown

Books and blogs on colour psychology repeat confident numbers, such as how far colour changes the way food tastes. When this guide was revised, several of those figures could not be traced to any study, so they are not in it.

What can be shown is narrower and more useful. Some colours are set by regulation. Some preferences have been measured in large surveys. Much of the rest depends on context and culture.

SAME RED, TWO MEANINGS

Meaning depends on context

The same red marks fire equipment and danger under OSHA rules in the United States, and a sale price on a grocery shelf. In a 2015 YouGov survey, blue was the favourite colour even in China, where red, yellow and green are considered lucky.



Danger and fire equipment
OSHA 29 CFR 1910.144



Sale price
On a grocery shelf

HOW TO USE THIS GUIDE

Treat colour meanings as hypotheses to test with your own buyers, and treat regulated colours as fixed. The chapters that follow keep the two apart.

Colour meanings

Hypotheses. Test them with your own buyers.

Regulated colours

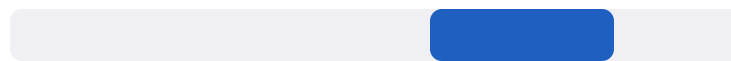
Fixed. Start the design from the rule.

Blue tops a 10 country survey

YouGov asked people in 10 countries on four continents to choose a favourite colour from a list in 2015. The result is consistent, and it is also a reminder of what a survey can and cannot tell you.

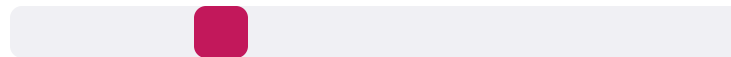


Share choosing blue, from Indonesia to Great Britain



23% to 33%

Share of women choosing pink, usually no higher than red, purple or green



10% to 13%

0% 10% 20% 30% 40%

Figure 1. Lowest to highest country share; only the published endpoints are shown. YouGov, May 2015.

A favourite colour is not a buying decision. The survey says nothing about which label sells more, or about any one category, so use it as a starting point, never as proof.

It does retire one old rule of thumb. Colour by gender, such as pink for products aimed at women, has little support in this data.



02



CHAPTER 2 OF 6

A working palette, hue by hue

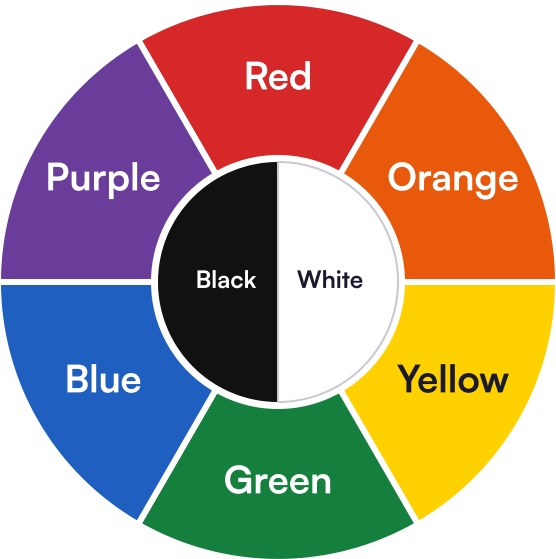
Eight hues, and for each one only what a regulation or a published study actually says. Every page also shows how the colour reads to people with colour blindness, in a greyscale copy, and under white or dark text.

Red	Orange	Yellow	Green	Blue	Purple	Black	White

01	p. 08	02	p. 09	03	p. 10	04	p. 11	05	p. 12	06	p. 13	07	p. 14	08	p. 15
----	-------	----	-------	----	-------	----	-------	----	-------	----	-------	----	-------	----	-------

Eight hues, three kinds of evidence

Each hue page shows the colour as a field, then only what is on record for it, tagged by where it comes from, then how it behaves on a label.



- REGULATION

Set by a rule. Treat it as fixed.
- SURVEY

A measured preference. A starting point, never proof.
- STUDY

A published finding, often about something other than labels. Test it before you rely on it.

Select a hue on the wheel or in the index to go straight to its page.

	Red	Regulation	08
	Orange	Regulation · Study	09
	Yellow	Regulation	10
	Green	Regulation · Survey	11
	Blue	Survey · Study	12
	Purple	Survey · Study	13
	Black	Regulation	14
	White	Regulation	15

ANATOMY OF A HUE PAGE

- 1 The field: the hue at its representative value
- 2 On record: what a rule or study says, with its source
- 3 Evidence tags: regulation, survey or study
- 4 How it reads: colour blindness, greyscale and text contrast
- 5 Colour harmonies: complementary, analogous and triadic partners, computed on a perceptual colour wheel
- 6 Design note: our practical advice, clearly marked

Red

ON RECORD

OSHA's basic colour for danger, fire equipment and emergency stops. It also frames every GHS pictogram.



RED ON A FOOD POUCH LABEL.

REGULATION

SURVEY

STUDY

OSHA 29 CFR 1910.144; 1910.1200 Appendix C

HOW RED READS

COMPUTED, NOT SURVEYED



As printed

#D62828



Deuteranopia

Red-green, no M cones



Protanopia

Red-green, no L cones



Greyscale

Same lightness

TEXT ON RED



5.01:1

White text: passes AA



3.41:1

Ink text: large text only

TINTS FOR PANELS AND BACKGROUNDS



COLOUR HARMONIES

OKLCH WHEEL, SAME LIGHTNESS



Complement

180°

#058693



Analogous

minus 30°

#CD2778



Analogous

plus 30°

#B15E03



Triadic

plus 120°

#008F33

Design note. Spend red on the one thing that must stop the eye, such as a hazard, an allergen or a recall. Pair it with a word and a symbol: about 1 in 12 men see red differently.

Orange



ILLUSTRATION: A FICTIONAL WARNING TAG.

ON RECORD

OSHA's recommended colour for warning tags. Read as stimulating in studies of tablet colour.

REGULATION

SURVEY

STUDY

OSHA 29 CFR 1910.145; de Craen and others, BMJ 1996

Design note. A strong second signal after red. Orange stays vivid only at a lightness where white text works at display sizes, so small text on it goes to ink.

HOW ORANGE READS



As printed
#E8590C



Deuteranopia
Red-green, no M cones



Protanopia
Red-green, no L cones



Greyscale
Same lightness

COMPUTED, NOT SURVEYED

TEXT ON ORANGE

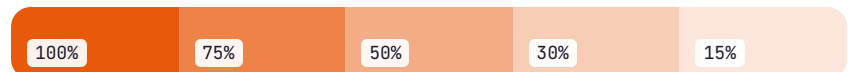


3.58:1
White text: large text only



4.76:1
Ink text: passes AA

TINTS FOR PANELS AND BACKGROUNDS



COLOUR HARMONIES



Complement
180°
#089DC0



Analogous
minus 30°
#E94D6F



Analogous
plus 30°
#C07D03



Triadic
plus 120°
#02A772

OKLCH WHEEL, SAME LIGHTNESS

Yellow

ON RECORD

OSHA's basic colour for caution and physical hazards, paired with black on caution signs.

REGULATION

SURVEY

STUDY

OSHA 29 CFR 1910.144, 1910.145



ILLUSTRATION: A FICTIONAL CAUTION LABEL ON A DRUM.

HOW YELLOW READS

COMPUTED, NOT SURVEYED



As printed

#FFD100



Deuteranopia

Red-green, no M cones



Protanopia

Red-green, no L cones



Greyscale

Same lightness

TEXT ON YELLOW



1.46:1

White text: fails



11.67:1

Ink text: passes AA

TINTS FOR PANELS AND BACKGROUNDS



COLOUR HARMONIES

OKLCH WHEEL, SAME LIGHTNESS



Complement

180°
#C8D4FE



Analogous

minus 30°
#FFCA9C



Analogous

plus 30°
#C1E852



Triadic

plus 120°
#7BE8FF

Design note. Yellow gives the highest contrast with ink of any hue here, and the lowest with white. Never set white text on it.

2nd

favourite colour in the US and in China, in a 2015 YouGov survey.

Green



GREEN ON FRESH JUICE LABELS.

ON RECORD

The panel colour of OSHA safety instruction signs.
Second favourite colour in the US and China in 2015.

REGULATION

SURVEY

STUDY

OSHA 29 CFR 1910.145; YouGov, May 2015

Design note. Green and red are the pair most often confused. Never let green mean go and red mean stop without a word beside each.

HOW GREEN READS



As printed
#15803D



Deuteranopia
Red-green, no M cones



Protanopia
Red-green, no L cones



Greyscale
Same lightness

COMPUTED, NOT SURVEYED

TEXT ON GREEN



5.02:1

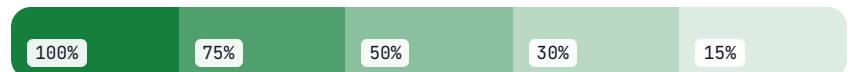
White text: passes AA



3.40:1

Ink text: large text only

TINTS FOR PANELS AND BACKGROUNDS



COLOUR HARMONIES



Complement
180°
#964990



Analogous
minus 30°
#627500



Analogous
plus 30°
#027D6D



Triadic
plus 120°
#4D64B9

OKLCH WHEEL, SAME LIGHTNESS

10 of 10

countries named blue their favourite colour in a 2015 YouGov survey.



ILLUSTRATION: A FICTIONAL TEA POUCH.

Blue

ON RECORD

The favourite colour in all 10 countries YouGov surveyed in 2015. Read as calming in studies of tablet colour.

REGULATION

YouGov, May 2015; de Craen and others, BMJ 1996

SURVEY

STUDY

Read with care. A favourite colour is not a buying decision. The survey says nothing about which label sells more.

Design note. A dependable ground for brand fields and body panels. Deep blues hold white text well; check lighter blues against ink instead.

HOW BLUE READS



As printed
#1F5FBF



Deuteranopia
Red-green, no M cones



Protanopia
Red-green, no L cones



Greyscale
Same lightness

COMPUTED, NOT SURVEYED

TEXT ON BLUE



6.09:1

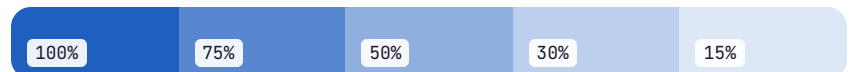
White text: passes AA



2.80:1

Ink text: fails

TINTS FOR PANELS AND BACKGROUNDS



COLOUR HARMONIES



Complement
180°
#835B00



Analogous
minus 30°
#036D90



Analogous
plus 30°
#644DB9



Triadic
plus 120°
#AD2D3D

OKLCH WHEEL, SAME LIGHTNESS

Purple

ON RECORD

Second favourite colour in Hong Kong in 2015. More often on sedatives than on antidepressants in one review of tablet colour.



ILLUSTRATION: A FICTIONAL NIGHT CREAM.

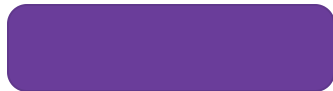
REGULATION

SURVEY

STUDY

YouGov, May 2015; de Craen and others, BMJ 1996

HOW PURPLE READS



As printed

#6A3D9A



Deuteranopia

Red-green, no M cones



Protanopia

Red-green, no L cones



Greyscale

Same lightness

COMPUTED, NOT SURVEYED

TEXT ON PURPLE



7.64:1

White text: passes AA



2.23:1

Ink text: fails

TINTS FOR PANELS AND BACKGROUNDS



COLOUR HARMONIES

OKLCH WHEEL, SAME LIGHTNESS



Complement

180°

#4C6204



Analogous

minus 30°

#404CA9



Analogous

plus 30°

#86307A



Triadic

plus 120°

#7F4902

Design note. Deep purples hold white text at body sizes. Light lavenders behave like pastels: switch to ink.

Black



ON RECORD

A GHS hazard symbol is black on white. OSHA danger signs use red, black and white.

REGULATION

SURVEY

STUDY

OSHA 29 CFR 1910.1200 Appendix C, 1910.145

BLACK BARS ON A WHITE LABEL.

HOW BLACK READS



As printed

#111111



Deuteranopia

Red-green, no M cones



Protanopia

Red-green, no L cones



Greyscale

Same lightness

COMPUTED, NOT SURVEYED

TEXT ON BLACK



18.88:1

White text: passes AA



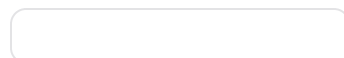
1.11:1

Ink text: fails

TINTS FOR PANELS AND BACKGROUNDS



HIGHEST CONTRAST PARTNERS



White

18.9:1



Yellow

12.9:1



Orange

5.3:1



Red

3.8:1

Design note. Black text is the backbone of every label: barcodes, ingredients and hazard statements. Keep it on white or a pale tint.

White

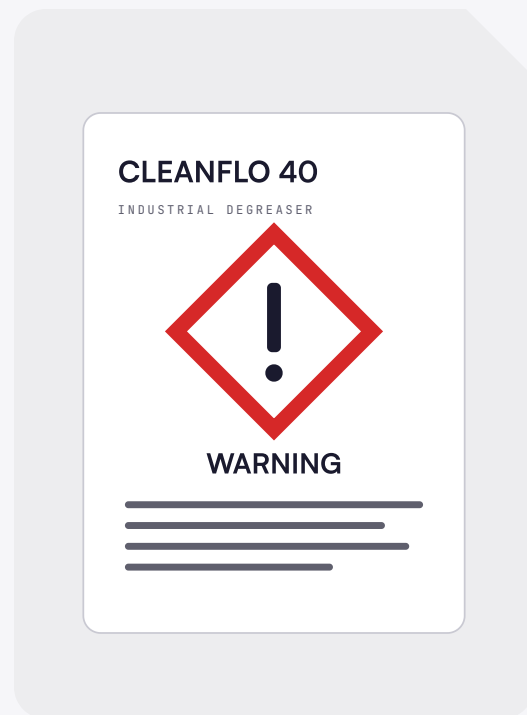


ILLUSTRATION: A FICTIONAL HAZARD LABEL.

ON RECORD

The ground of GHS pictograms and OSHA safety instruction signs, behind the text.

REGULATION

SURVEY

STUDY

OSHA 29 CFR 1910.1200 Appendix C, 1910.145

Design note. White is a colour you print around. On clear or coloured stock it may need its own ink or a white base.

HOW WHITE READS

COMPUTED, NOT SURVEYED



As printed
#FFFFFF



Deuteranopia
Red-green, no
M cones



Protanopia
Red-green, no
L cones



Greyscale
Same lightness

TEXT ON WHITE

1.00:1

White text: fails

Aa**17.06:1**

Ink text: passes AA

TINTS FOR PANELS AND BACKGROUNDS

100%

75%

50%

30%

15%

HIGHEST CONTRAST PARTNERS



Black
18.9:1



Purple
7.6:1



Blue
6.1:1



Green
5.0:1



03

CHAPTER 3 OF 6

How every eye reads colour

Colour is made in the eye and the brain, and not every eye works the same way. These pages show what that means on a label.

Three cones, one spectrum

The eye detects light from about 380 to 700 nanometres. Three kinds of cone cell divide that range, each most sensitive to a different band, and the brain compares their signals to make colour.

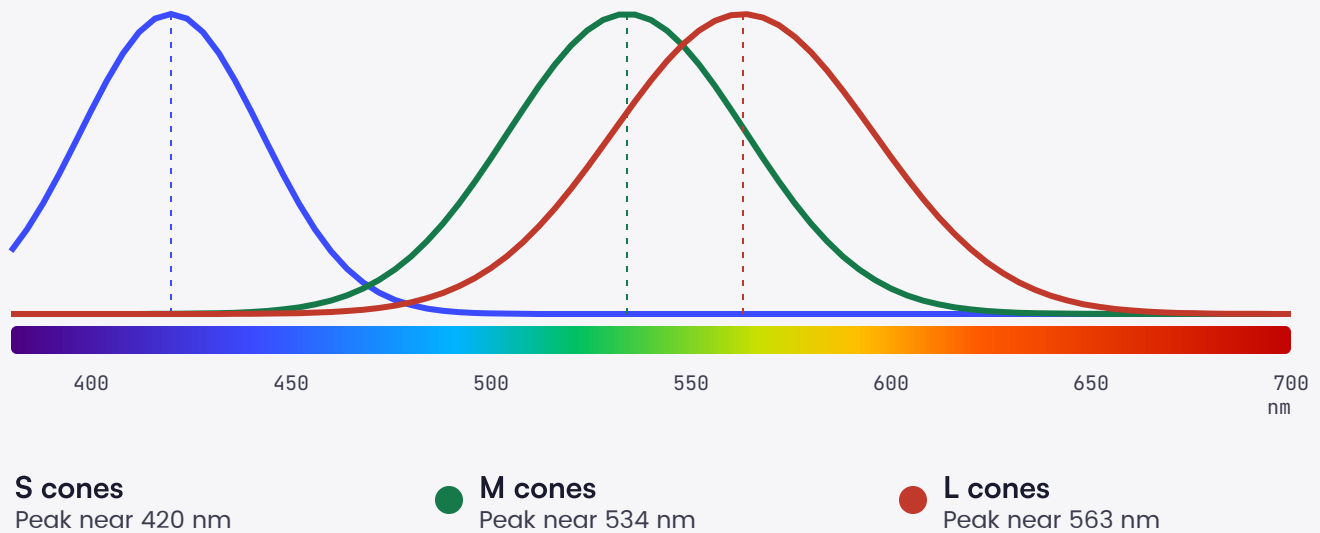


Figure 2. Curve shapes are illustrative; peak positions are the measured averages. Sources: Bowmaker and Dartnall, *Journal of Physiology*, 1980; NASA Science, Visible light.

Why it matters on a label

Red and green differ mainly in how they excite the M and L cones, whose peaks sit only about 30 nm apart. When one of those two cone types is missing or shifted, red and green can look alike. That is the most common kind of colour blindness, and the subject of the next page.

About 1 in 12 men have a colour vision deficiency

The most common type is red-green. On a shelf or a warehouse floor, a label that relies on red against green alone can look like two similar olive marks.



1 in 12

men, in the US National Eye Institute's figure



1 in 200

women of Northern European ancestry, per MedlinePlus Genetics

1.46:1

contrast between a signal red and green as printed. Simulated for deuteranopia it falls to 1.15:1, close to identical.

COLOUR ALONE

AS PRINTED

LOT 4417 · BEST BEFORE 2027 03



DEUTERANOPIA

LOT 4417 · BEST BEFORE 2027 03



PROTANOPIA

LOT 4417 · BEST BEFORE 2027 03



COLOUR PLUS SHAPE AND WORD

AS PRINTED

LOT 4417 · BEST BEFORE 2027 03



HOLD



RELEASE



DEUTERANOPIA

LOT 4417 · BEST BEFORE 2027 03



HOLD



RELEASE



PROTANOPIA

LOT 4417 · BEST BEFORE 2027 03



HOLD



RELEASE



The rule that fixes it. WCAG 1.4.1: colour is never the only means of conveying information. WHMIS labels already work this way, grouping the pictogram, signal word and hazard statement together.

Sources: National Eye Institute, Color blindness; MedlinePlus Genetics, Color vision deficiency; W3C WCAG 2.2 SC 1.4.1; CCOHS, WHMIS labels. Simulations use the Machado, Oliveira and Fernandes 2009 model at full severity, in linear RGB. The label is fictional.

Text on colour, measured

Contrast is maths, not taste. We ran the palette in this guide through the WCAG 2.2 contrast formula. It is a screen standard, but it is the best published check for whether small text on a coloured label will read.

● 4.5:1 and up: body text ● 3:1 to 4.5:1: large or bold text only ● Under 3:1: do not set text



Light hues want ink.
White on yellow scores 1.46:1.
White on orange suits headlines, not small print.

Red on green fails for everyone,
at 1.00:1, before colour blindness.

Large means 18 pt,
or 14 pt bold, in WCAG terms.

Formula and thresholds: W3C, WCAG 2.2, SC 1.4.3 and the relative luminance definition. Hex values are this guide's representative palette; check your own brand colours the same way.



04

CHAPTER 4 OF 6

Where the rules set the colour

On hazard, food and drug labels, colour is part of compliance, so the design starts from the regulation.

Which rule sets which colour

WHAT THE RULES LOOK LIKE



WHMIS and GHS pictogram
Black symbol, white ground, red frame



Danger sign
Red, black and white



Caution sign
Yellow and black



Warning tag
Orange recommended

TABLE 1. COLOUR REQUIREMENTS IN CANADIAN AND US WORKPLACE HAZARD RULES

WHERE AND RULE	WHAT IT SAYS ABOUT COLOUR	 RED	 ORANGE	 YELLOW	 BLACK	 WHITE
CANADA WHMIS, under the Hazardous Products Regulations	Hazard symbol inside a red square set on one of its points; supplier labels in English and French		.	.		
UNITED STATES OSHA HazCom, 29 CFR 1910.1200, Appendix C	Black hazard symbol on a white background with a red frame		.	.		
UNITED STATES OSHA 29 CFR 1910.144	Safety colour code for physical hazards: red for danger and fire equipment, yellow for caution		.		.	.
UNITED STATES OSHA 29 CFR 1910.145	Danger signs in red, black and white; caution signs in yellow and black; orange recommended for warning tags					

1910.144 marks equipment and hazards in the workplace; it is not the rule for chemical labels. Workplace labels in Canada also follow provincial and territorial rules. Sources: ccohs.ca, WHMIS labels and pictograms; ecfr.gov, 29 CFR 1910.144, 1910.145 and 1910.1200 Appendix C. General information, not legal advice.

Colour helps, but never alone

Colour coding can speed up checking, but the evidence is narrower than the claims made for it.

SHARE OF ERRORS CAUGHT BY TRAY TYPE, 2024 SYRINGE TRAY SIMULATION

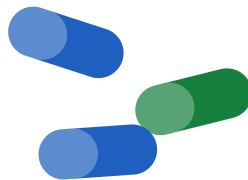


Figure 3. A 2024 simulation with 53 participants, not clinical practice. Source: British Journal of Anaesthesia, 2024 (PMID 38336517).

What the 1996 BMJ review found



LINKED WITH A
STIMULANT EFFECT



LINKED WITH A CALMING
EFFECT

A 1996 BMJ review of 12 studies found that people link red, yellow and orange tablets with a stimulant effect, and blue and green with a calming one. It looked at the colour of the drug itself, not of its label.



COLOUR CUES ON A PHARMACY LABEL, ALWAYS PAIRED WITH TEXT.

Whether colour coded drug labels reduce errors in practice is still debated, so pair every colour cue with clear text.

Ink on food labels

Bright colour on a food label still has to meet packaging rules. Ink suitability depends on the label construction, the package and the food, not on the printer alone.

Epson, for example, says its ColorWorks inks are not intended for direct food contact, and recommends a functional barrier such as aluminum, glass or plastic between the label and the food.

OUTSIDE

INSIDE

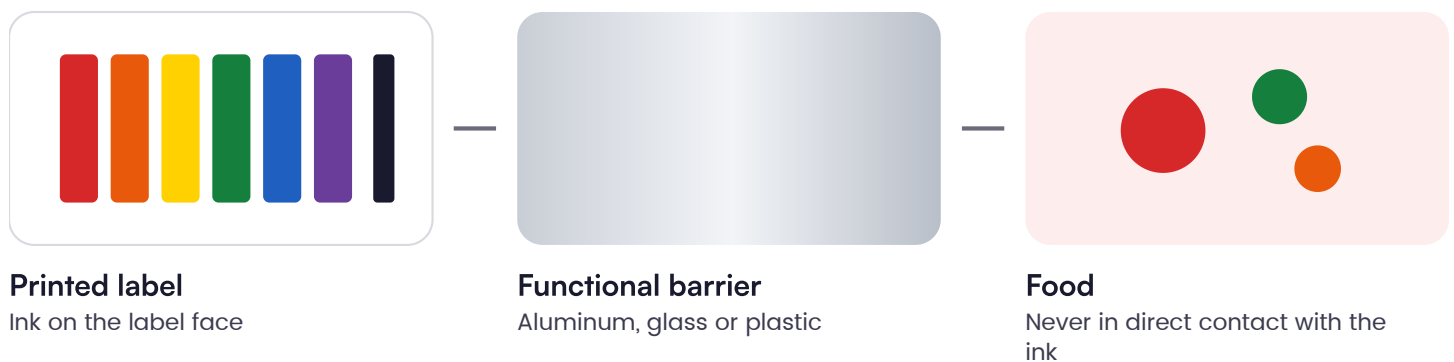


Figure 4. Where Epson says the functional barrier sits. Illustration. Source: Epson news release, 9 April 2019, on ColorWorks inks and food contact materials.



BEFORE YOU PRINT

Confirm with the ink and media supplier that the inks suit your application, and keep their written statement on file.



05

CHAPTER 5 OF 6

Printing colour on demand

Printing colour in house means the palette you chose is the palette that reaches the shelf, run after run.

One blank roll, many designs

On demand colour label printers print the full design and the variable data in one pass onto blank stock, so a new colour or a new product does not mean a new run of pre-printed labels.



Epson states that its ColorWorks printers use water and chemical resistant pigment inks, and that labels are BS 5609 certified on select media. Durability depends on the media, so test yours.

EPSON COLORWORKS CW-C8000, ONE OF THE COLORWORKS MODELS LISTED ON EPSON.CA. SOURCES: EPSON.COM, CHEMICAL LABEL PRINTING; EPSON, 29 MAY 2024.

Four things to settle before you print colour

01

Media

Gloss, matte and synthetic stocks render the same colour differently and last differently. Choose the stock for where the label lives, then judge colour on it.

02

Ink

Pigment and dye inks differ in water, chemical and light resistance. Ask for test data on your media, not a general claim.

03

Colour management

Fix each brand colour as a numeric value, print with the profile for your printer and media, and keep a signed off reference print.

04

Compliance

Check hazard, food and drug requirements first. Regulated colours and text take priority over brand colour.

ONE COLOUR VALUE, THREE STOCKS



Gloss



Matte



Synthetic

Illustration, not a measurement. Judge colour on your own media.



06

CHAPTER 6 OF 6

From palette to print

Each step settles one question before the next, so the colour that reaches the shelf is the colour you chose.

- 01 Give each colour a job**
Identify a variant, warn, or carry the brand
- 02 Check the rules first**
Lock in what a hazard, food or drug rule sets
- 03 Check every eye**
Pair colour with words and shapes, and test text contrast
- 04 Fix the values**
A numeric value per colour, with its printer and media profile
- 05 Proof where it is seen, then test**
On the real media, under the shelf or plant light, then with your own buyers

THEN RUN A SAMPLE FIRST

Ask for a sample run on your own line before you commit to a construction or a print volume.

Figure 5. The five steps set out in this guide. General guidance from Ahearn & Soper, not a regulatory checklist.



NEXT STEP

Tell us what your labels need to do.

With 50 years in barcode and identification, our label engineers will come back with a construction, a sample plan and pricing.

[Request a label quote](#)

CALL

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WEB

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ahearn.com/provision-labels

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