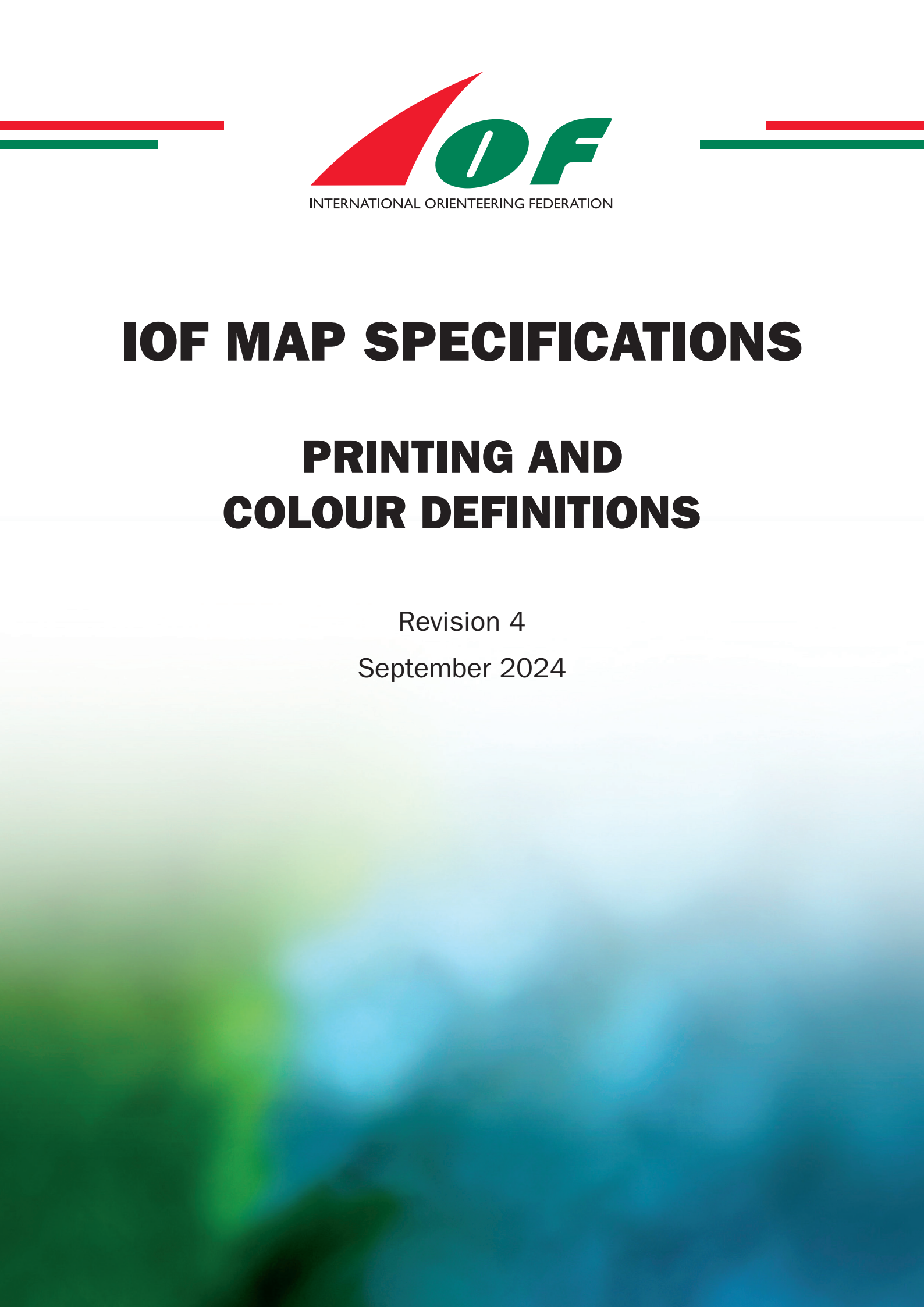
INTERNATIONAL ORIENTEERING FEDERATION

IOF MAP SPECIFICATIONS

PRINTING AND COLOUR DEFINITIONS

Revision 4

September 2024



Errata (changes to the document):

Date	Page	Description
24.05.2021	6	Change from ISMTBOM 2020 to ISMTBOM 202X
27.01.2022	5	New CMYK Colour
27.01.2022	6	New Colour Dark green
27.01.2022	6	New Colour White stripes for area passable at two levles
27.01.2022	6	Change from ISMTBOM 202X to ISMTBOM 2022
16.09.2022	6	Deletion of *White for course overprint* at ISOM2017-2
14.09.2024	1	Deletion of (Previously named ISOM 2017 Appendix 1) in the title
14.09.2024	3	Deletion of PMS (Spot colour printing)
14.09.2024	4	Adding in text: Explanation of LPI and DPI with graphics
14.09.2024	5	Deletion of chapter 4 CMYK Colour Definition
14.09.2024	6	New Colour Orange for Ski-O
14.09.2024	6	Change of colour name Dark green line symbols (ISOM 2017-2) to Dark green for forest edges
14.09.2024	6	Change of colour name Orange for open land permitted to ride to Orange for MTBO
14.09.2024	6	Change of CMYK values of colour Brown: 0 56 100 18 -> 25 75 100 0
14.09.2024	6	Change of CMYK values of colour Brown 50%: 0 28 50 9 -> 10 35 50 0
14.09.2024	6	Change of CMYK values of colour Brown 30%: 0 17 30 5 -> 6 23 33 0
14.09.2024	7	Change of the name PrintTech test sheet -> IOF Print Test Sheet
14.09.2024	8 - 15	Change from CMYK Colour Tables -> Colour Calibration Tables
14.09.2024		Several changes of text in the chapters

This IOF Map Specifications (Printing and Colour Definitions) has been compiled and edited by the IOF Map Commission (November 2020).

Valid from 1st Dezember 2024

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IOF MAP SPECIFICATIONS
Printing and Colour Definitions

1. BACKGROUND

Today, the offset printing industry almost exclusively uses the CMYK technique, so for each year it is harder to find a print shop that has the knowledge and colours to print using spot colours as in the past.

Therefore, the IOF recommends CMYK printing technology.

2. DESCRIPTIONS OF PRINTING TECHNOLOGIES

CMYK

CMYK means that all colour shades are defined by mixing the four colours in the CMYK definition C=cyan, M=magenta, Y=yellow, K=black (or 100% of C+M+Y). For example, the yellow colour used in orienteering maps is defined in CMYK as 27% magenta and 79% yellow.

The main advantages with CMYK are:

- The same technique can be used both for offset and laser printing.
- Logos and advertising can be printed together with the actual map.
- Cheaper and faster offset printing.
- Easier to find a printer that can print without problems.

The disadvantage is that the mixing of CMYK colours used to produce one given orienteering map colour can make thin lines less sharp. This problem affects mainly brown line objects.

CMYK+B

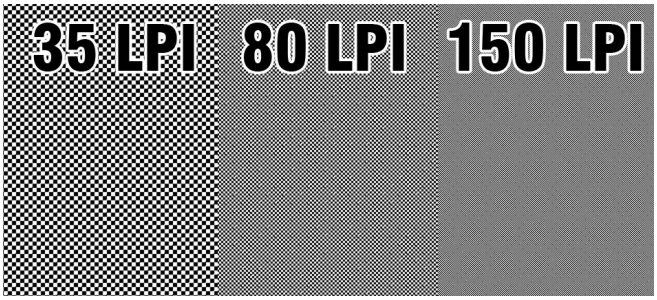
CMYK+B is a hybrid of CMYK and spot colour, developed specially for printing orienteering maps with CMYK technique. It means that all 100% brown objects are taken out of the CMYK separation. The brown objects are instead printed with brown spot colour, whilst the rest of the map is printed with normal CMYK. This means that the only disadvantage of CMYK is eliminated (this method is only possible in offset printing).

3. RECOMMENDED PRINTING TECHNIQUE FOR VARIOUS DISCIPLINES AND FORMATS

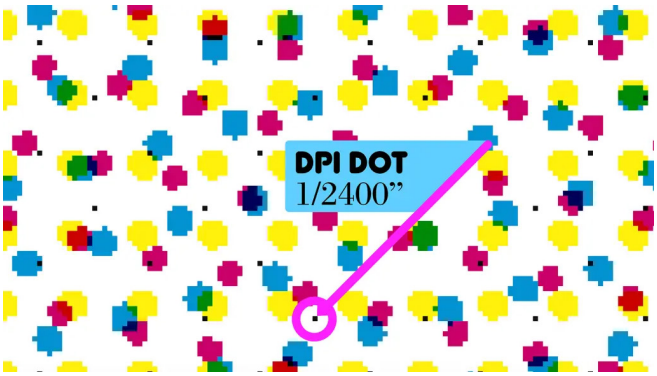
The main concern in CMYK printing (both laser and offset) is to achieve sufficient resolution. To achieve acceptable sharpness of line objects in a normal map, a resolution of at least 230 LPI at the Raster Image Processor (RIP) stage[1] is necessary. If CMYK+B is used, 200 LPI is enough. If the RIP resolution is lower, the lines will look pixelated and they will be more difficult to read and understand. For Sprint maps, SkiO maps and MTBO maps, a RIP resolution of 150 LPI is enough.

1 LPI is something different than DPI

LPI denotes the density of the halftone raster:



DPI denotes the density of dots in the printed image:



Foot-O

Long distance

For main IOF events offset printing (CMYK+B) is demanded for 1:15 000 and strongly recommended for 1:10 000.

Middle distance

For main IOF events offset printing is strongly recommended, but laser printing can be acceptable if the map is not too complicated. Minimum resolution shall be 200 LPI.

Sprint

Sprint maps shall always be laser printed. Minimum resolution shall be 150 LPI.

MTBO

MTBO maps shall always be laser printed. Minimum resolution shall be 150 LPI.

SkiO

SkiO maps shall always be laser printed. Minimum resolution shall be 150 LPI.

Quality of printing shall be compared using the actual IOF Print Test Sheets.

4. THE COURSE PLANNING SYMBOLS

In traditional offset printing, the courses and other additional information is overprinted by an extra print after the actual map is printed. Here the spot colour “Pantone Purple” is used. In this case, an overprint effect will appear making important symbols visible through the course symbols.

In laser printing this effect must be simulated. The strongly recomended way to do this is to place the lower purple track colour in the colour order below black, brown and blue 100% colours (see chapter 6). The IOF does not recommend more advanced methods to achieve overprint because this can impede the effort to print a map with high resolution.

5. PAPERS

For offset printing, a premium coated paper 100-120 g per square meter is recommended. For laser printing, it is important to use a paper suitable for colour laser printing 100-110 g per square meter.

Maps printed on normal paper must be put in a plastic bag, this bag must be sealed. It is very important the the plastic bag is of good quality, It must be made of soft plastic and have a thickness of minimum 0.07mm.

A number of plastic papers can be found on the market, but only “real” plastic papers should be used. Papers that are a combination of plastic and other materials, such as Pretex, should not be used in forest Foot-O competitions, as they are not fully waterproof and often do not have a sufficiently smooth surface. The paper that is suitable for printing of forest Foot-O maps shall be made by 100% solid plastic and must be easy to fold. Brands that are tested with excellent result is for example Teslin and Antius. Be aware of issues that can occur while laser printing plastic paper, for example humidity, high temperatures, printing speed, static build-up and use of non-original toners.

If plastic paper shall be used for offset printing, be aware that some papers slightly change size (will be stretched) in the printing machine, this can complicate the second print of courses. Sometimes drying time can also be a problem.

6. COLOUR ORDER

It is very important to follow the colour order, otherwise it is impossible to show the course planning symbols correctly.

Colour Name	C	M	Y	K	ISOM 2017-2	ISSprOM 2019-2	ISSkiOM 2019	ISMTBOM 2022
Upper purple for course overprint	35	85	0	0	✓	✓	✓	✓
White for course overprint	0	0	0	0		✓	✓	✓
Purple 50% area symbol	18	43	0	0		✓		✓
Green for Ski-O	91	0	83	0			✓	
Orange for Ski-O	0	60	100	0			✓	
White for railroad	0	0	0	0	✓	✓		✓
Black 100%	0	0	0	100	✓	✓	✓	✓
Blue 100% point symbols	100	0	0	0	✓			
Brown 100% point symbols	25	75	100	0	✓			
Green 100% point symbols	80	0	100	0	✓	✓		✓
Blue 100% line symbols	100	0	0	0	✓		✓	✓
Dark green for forest edges	100	0	80	30	✓			
Brown 100% line symbols	25	75	100	0	✓			
Lower purple for course overprint	35	85	0	0	✓	✓	✓	✓
Dark green line symbols	100	0	80	30		✓		
Blue 100% point and line symbols	100	0	0	0		✓		✓
Brown 100%	25	75	100	0		✓	✓	✓
White stripes for area passable at two levles	0	0	0	0		✓		
Brown 50% for road infill	10	35	50	0	✓	✓	✓	✓
Brown 30% for road infill	6	23	33	0		✓		
Black 100% for road outline	0	0	0	100	✓	✓	✓	✓
Black 60% for buildings	0	0	0	60				✓
Black 50% for large buildings	0	0	0	50	✓	✓		
Black 20% for canopy	0	0	0	20	✓	✓		✓
Blue 100% area symbols	100	0	0	0	✓	✓	✓	✓
Blue 70% area symbols	70	0	0	0	✓	✓		✓
Blue 50% area symbols	50	0	0	0	✓	✓	✓	
Blue 30% area symbols	30	0	0	0		✓		
White over green and brown	0	0	0	0	✓	✓		
Brown 50% for paved area	10	35	50	0	✓	✓	✓	✓
Brown 30% for paved area	6	23	33	0		✓		
Olive green	38	27	100	0	✓	✓	✓	✓
Dark green area symbols	100	0	80	30		✓		
Green 100% area symbols	80	0	100	0	✓	✓		
Green 60% area symbols	48	0	60	0	✓	✓		
Green 30% area symbols	24	0	30	0	✓	✓	✓	✓
Black 35% area symbols	0	0	0	35	✓	✓		
White over Yellow	0	0	0	0	✓	✓	✓	✓
Black for cultivated land and sandy ground	0	0	0	100	✓	✓		✓
Orange for MTBO	0	60	100	0				✓
Yellow 100% area symbols	0	27	79	0	✓	✓		✓
Yellow 75% area symbols	0	20	59	0	✓		✓	
Yellow 50% area symbols	0	14	40	0	✓	✓	✓	✓

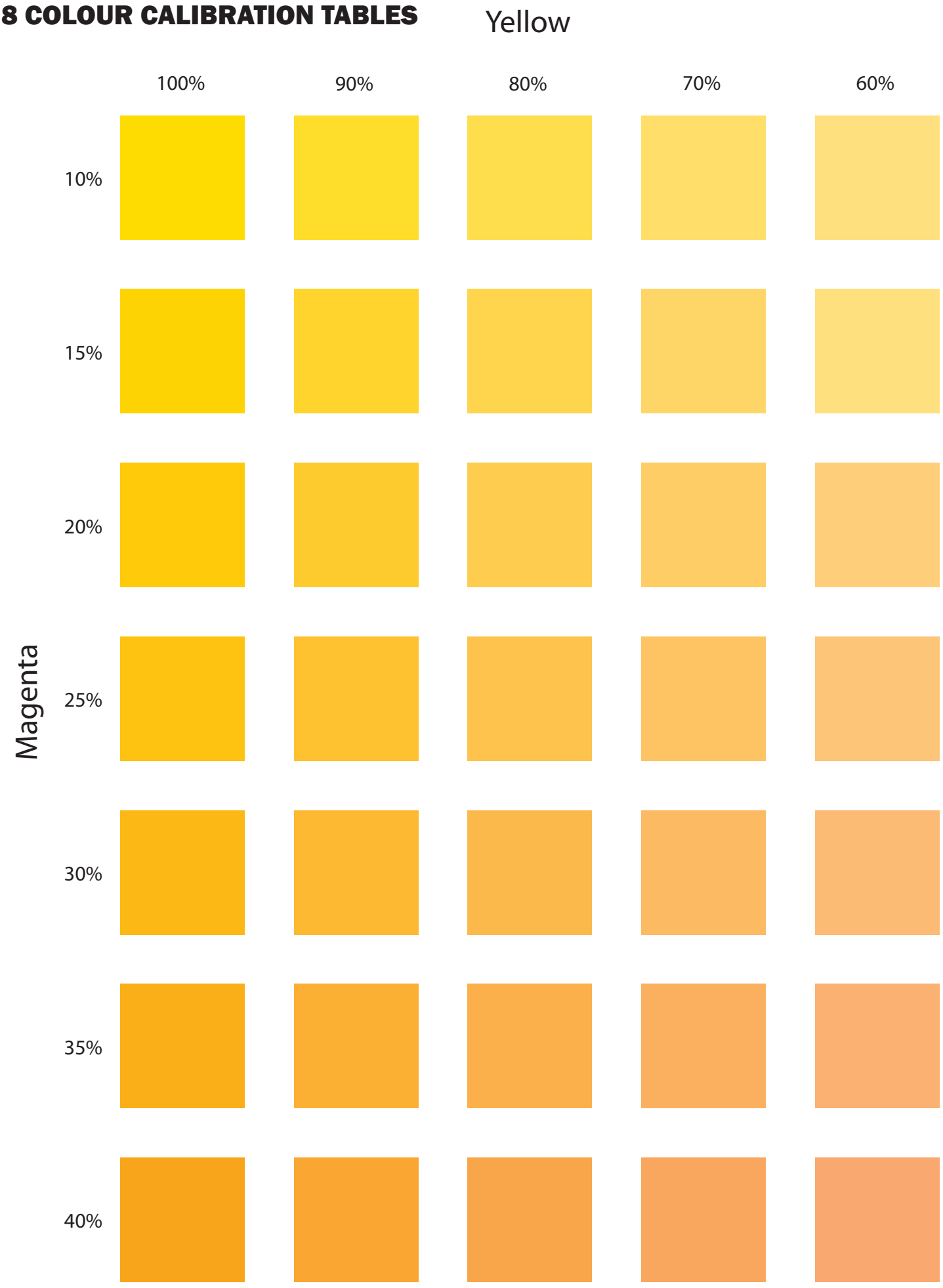
7. COLOUR CALIBRATION

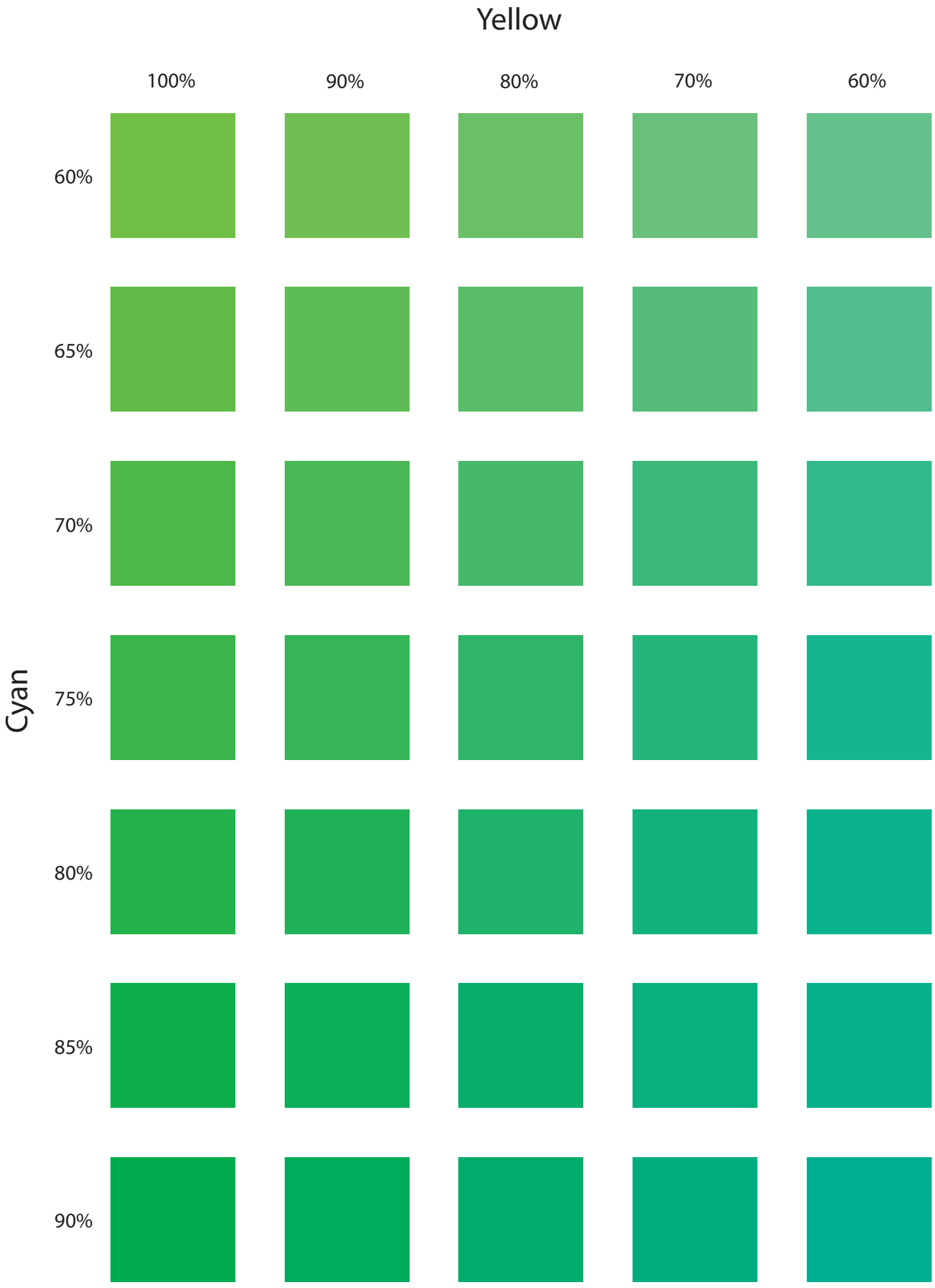
For calibrating the colours of a printer, it is necessary to print the IOF Print Test Sheet on that printer. After that, the results must be compared with the colours of the original IOF Print Test Sheet. If there are differences, the colours have to be adjusted in the mapping program. To facilitate the process of adjustment, the colour tables therefore can be used.

Print the colour calibration tables on the printer to find the equivalent CMYK values compared to the colours of the original IOF Print Test Sheet. If the graduations of the colours are not adequate, the values of the colours have to be interpolated.

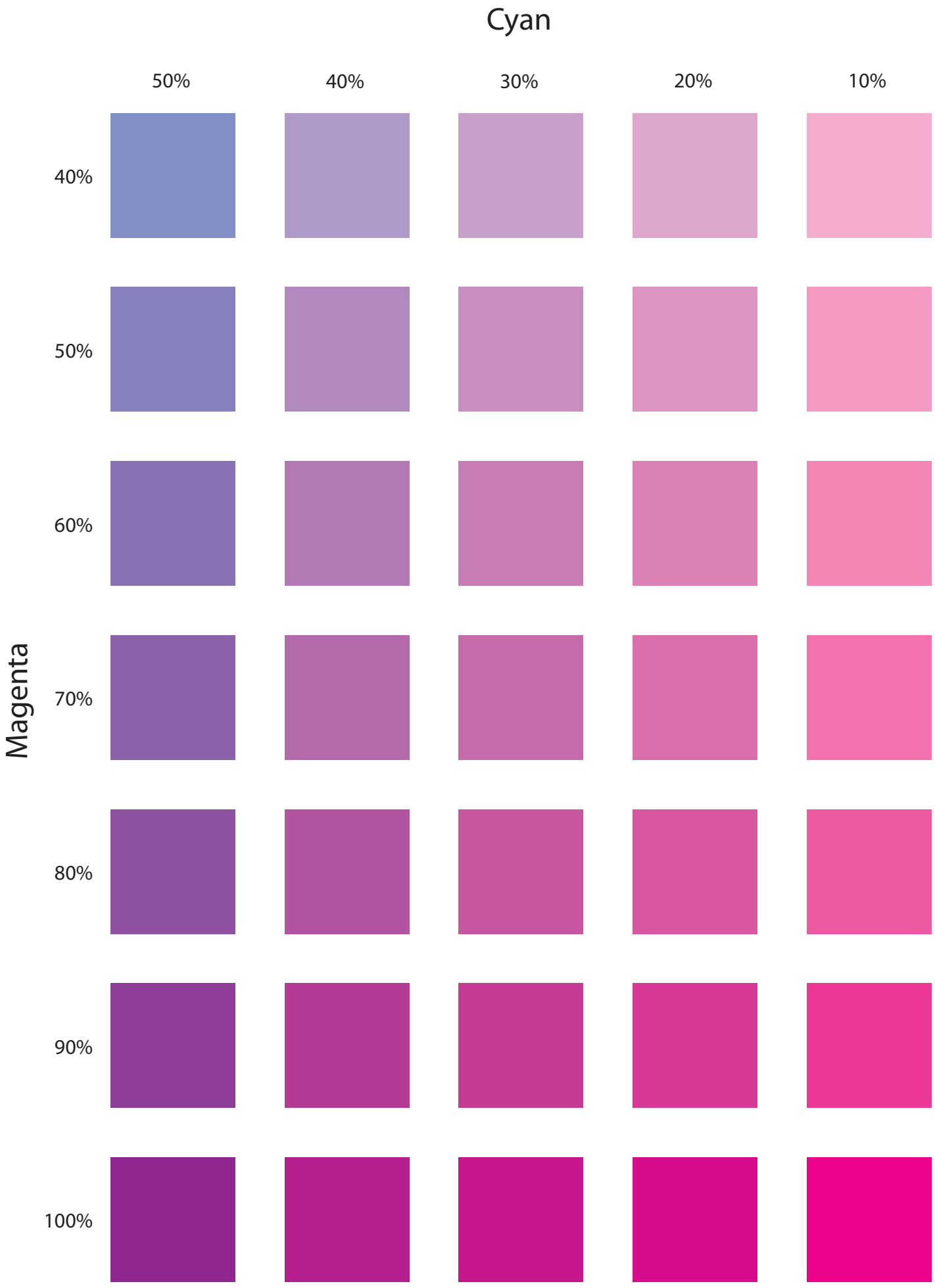
As this is an iterative process, the changed IOF Print Test Sheet must be printed, and the results must be reviewed again. If the results are not satisfying, the process has to be repeated until all colours are matching.

8 COLOUR CALIBRATION TABLES

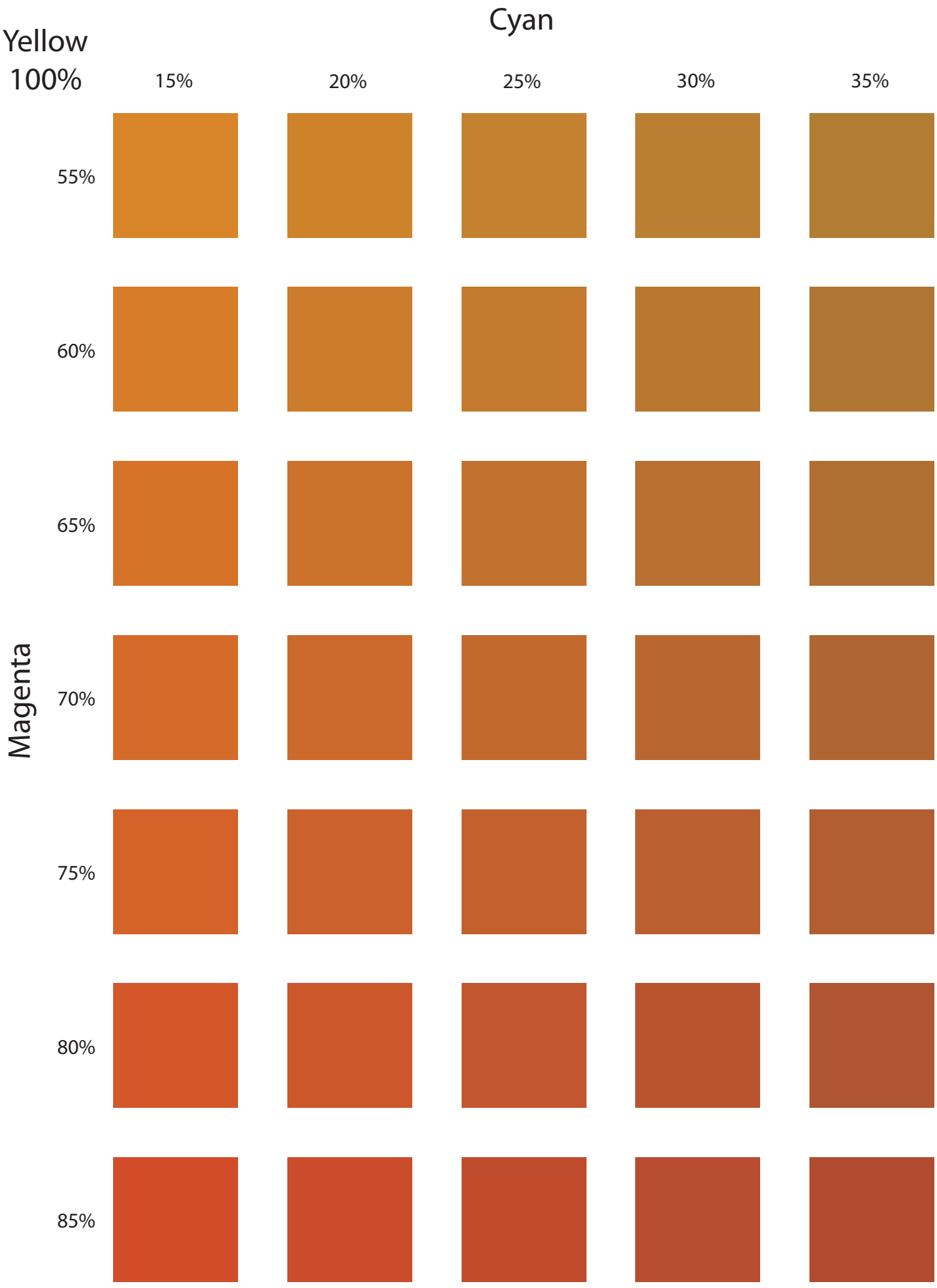




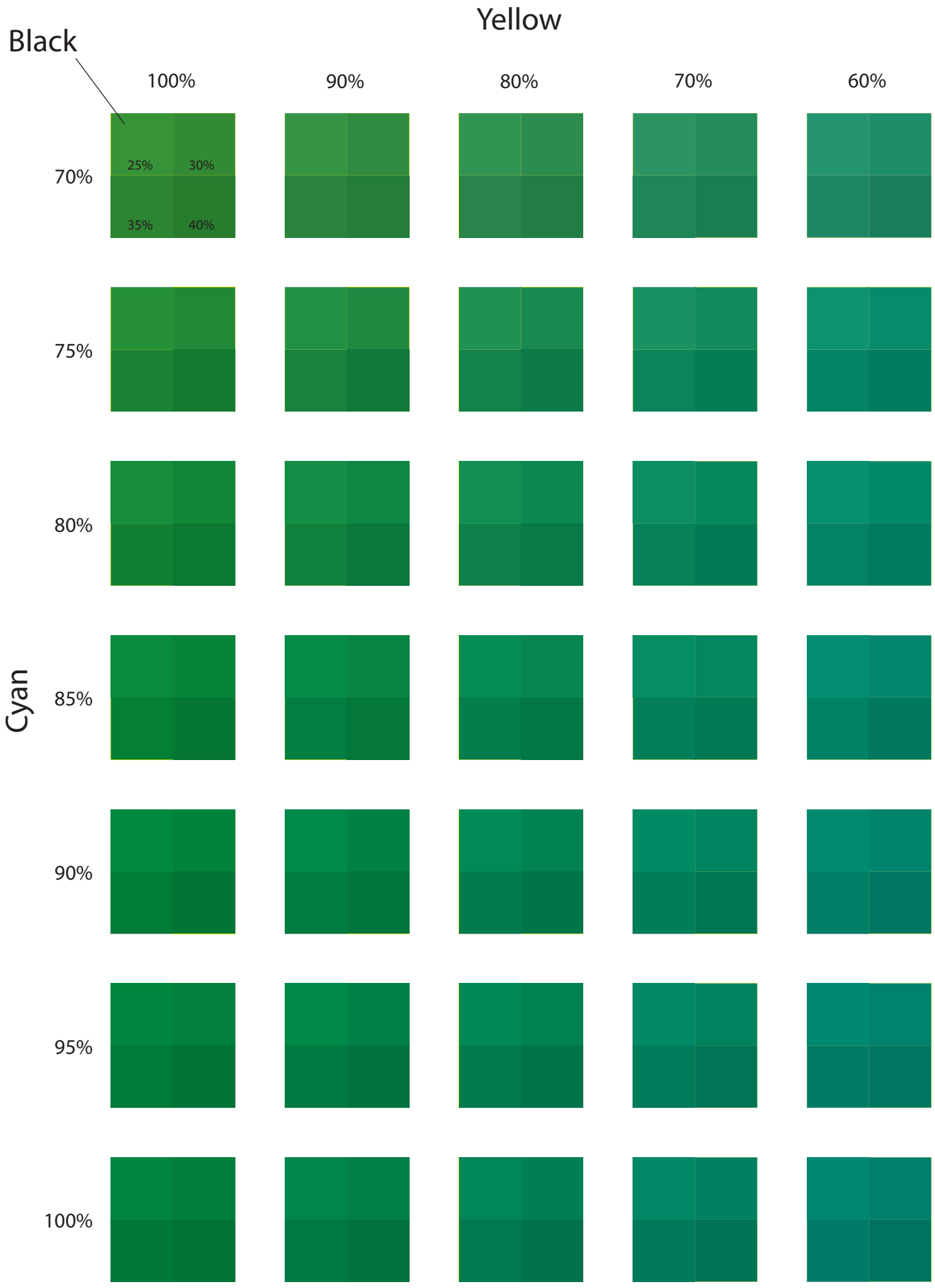
Target: Green



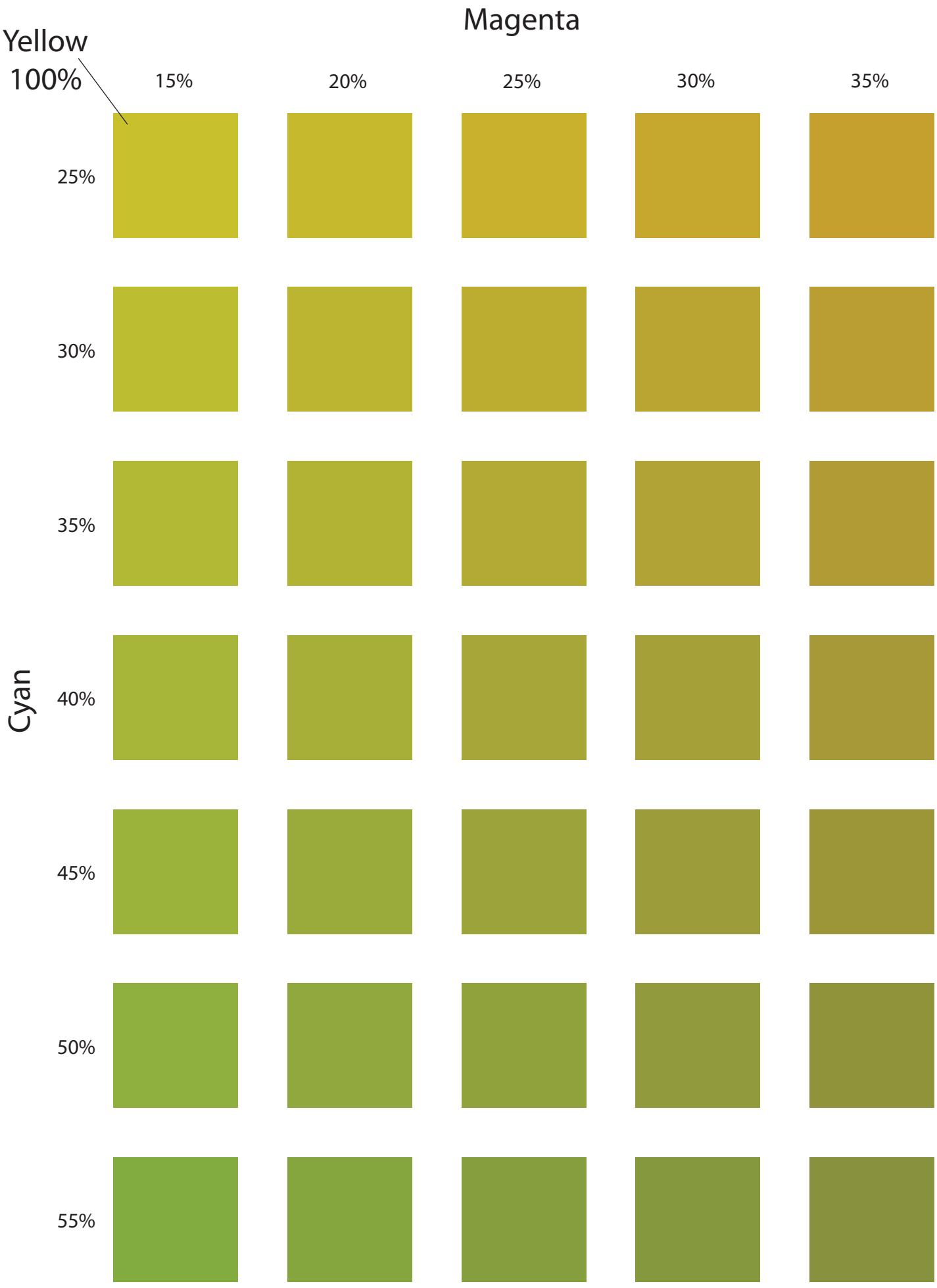
Target: Purple



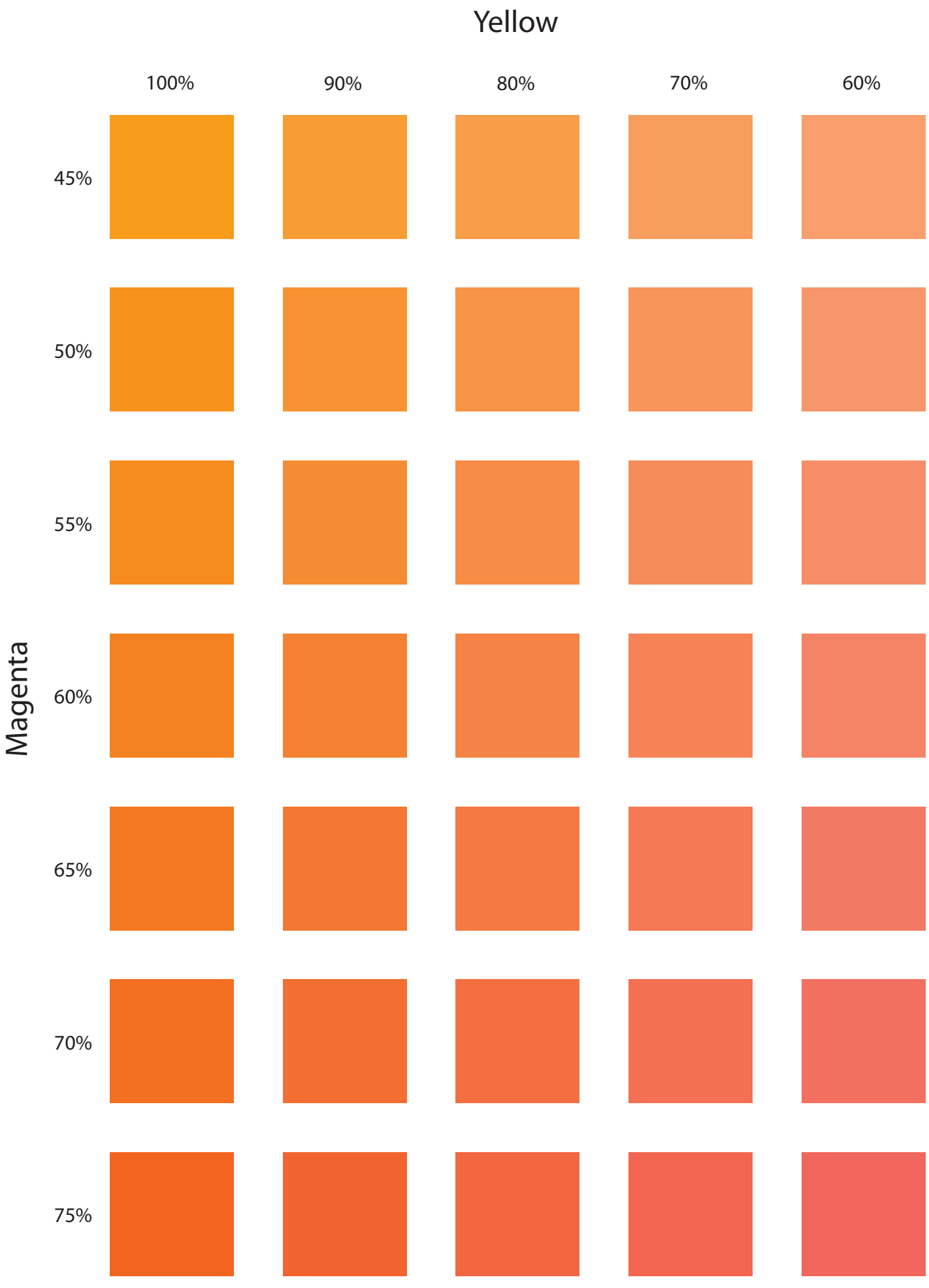
Target: Brown



Target: Dark Green

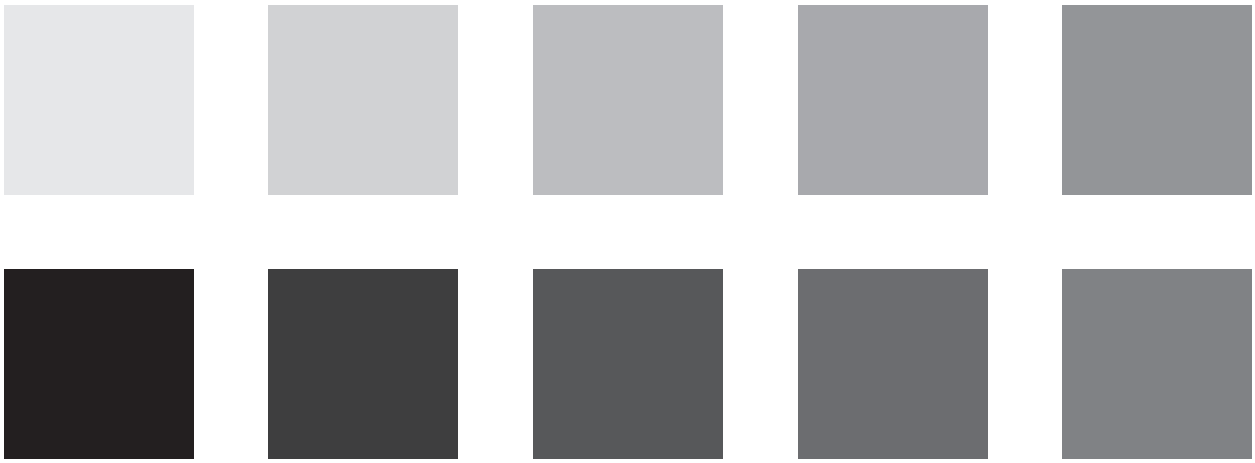


Target: Olive Green



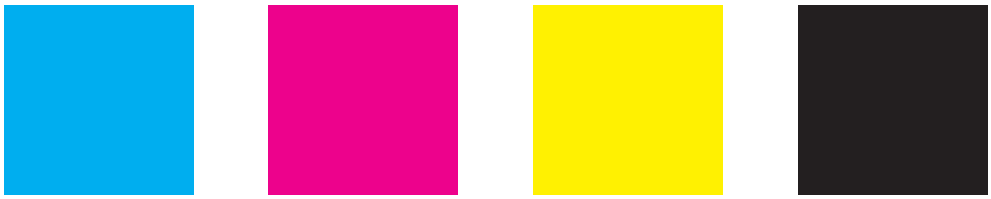
Target: Orange

10% 20% 30% 40% 50%



100% 90% 80% 70% 60%

Black



CMYK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