

RIT Orange (2019)

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Dating to the Rochester Athenaeum and early years of RIT, the school colors were blue and gray. In the 1950s, RIT's mascot became the Tigers and the school colors were changed to orange, brown, and white. In 1968, the colors were refined to burnt umber and orange to more closely coordinate with the brickwork of RIT's new campus. These were initially described by Pantone PMS 165 and 1675, which were later refined to PMS 165 and 476 in the early 2000s.

In 2018, RIT developed a new brand identity and the school colors were changed to orange and white (with black used as a secondary color, particularly for athletics). Brown was controversially dropped. White was loosely specified as a perfect paper white (no PMS designation, CMYK = 0, and RGB = 255) while orange was initially specified as PMS 716 C. RIT President Munson felt that the specified orange was too "brownish" and selected a new RIT orange, based on unspecified PMS swatches under unknown viewing conditions, which became the official new RIT Orange in early 2019. It is represented by Pantone 1505 C. Further, the RIT brand identity recommendations suggest CMYK of (0 68 100 0) and RGB of (247 105 2). The specific CMYK and RGB systems are not specified and it is further noted that "RIT orange is PMS 1505c. The other values for orange shown here, such as RGB and CMYK, have been interpreted for RIT use. Do not use the Pantone-recommended values for 1505c." [<https://www.rit.edu/marketing/brandportal/brand-elements/colors>] The Pantone-recommended values for CMYK and RGB are (0 56 90 0) and (255 105 0) respectively. Neither the RIT- nor the Pantone-recommended CMYK or RGB values are intended to be color matches to the RIT Orange specification for various reasons of reproducibility and legibility. The additional fact that the color systems are specified by neither RIT, nor Pantone, renders them essentially meaningless as color specifications.

The selection of RIT Orange based on a Pantone specification leaves it ill-defined for future use. Pantone specifications are not stable or publicly defined colorimetrically. They are therefore impossible to reproduce outside the proprietary Pantone system and often poorly reproduced within the system. Since Pantone will not (perhaps can not) provide the colorimetric specification of RIT Orange (Pantone 1505 C), they recommend instead:

"Pantone does not publish $L^*a^*b^*$ data for its colors. If you are attempting to use this data as a standard for color matching, we would recommend that you

perform your own measurements on a fresh printing of the PANTONE formula guide to determine your data. This data would be most meaningful to you as it represents your instrumentation, production environment and viewing environment.” [https://www.pantone.com/customer-service/help/?t=L*a*b-values-for-PANTONE-Coated-colors]

In other words, Pantone is not a system for unambiguously specifying color.

To help provide a meaningful definition of RIT Orange so that it might be reproduced accurately outside the proprietary Pantone system, Pantone’s recommendations were followed and a freshly printed Pantone 1505 C Super Swatch was obtained in April, 2019 (near the time of President Munson’s color decision). It was measured and analyzed in the RIT Munsell Color Science Laboratory as described below.

To account for non-uniformity of the 8”x7” Pantone Super Swatch, it was measured in five locations (center and near the four corners). Since the paper was translucent, it was measured with both white and black backing. The color difference between the two backings was about 3.0 CIELAB units, which is significant. The data reported below are for a white backing, more closely simulating printing on opaque paper. The Super Swatch was printed on non-fluorescent paper, while typical Pantone swatch books are printed on fluorescent paper, further introducing inconsistency in the system. The color difference between the Super Swatch and a typical Pantone swatch book was also about 3.0 CIELAB units. The difference was fairly easily perceived. Data reported below are for the average of the five measurements made using a NIST-traceable KonicaMinolta CM2500c reflection spectrophotometer. The instrument utilizes a 45:0 geometry for diffuse reflectance measurement and measurements were completed using a 9mm aperture (measurement area). Reported colorimetric values were computed using standard techniques recommended by the CIE and other standards organizations.

Data for the average of the five measurements are reported in the attached spreadsheet. Included are spectral reflectance (%) along with a plot of the spectral reflectance curve, CIE XYZ and L*a*b*C*h (CIELAB values) for average daylight (CIE Illuminant D65) and both the 1931 (2°) and 1964 (10°) standard colorimetric observers. Tolerances on the CIELAB values are given that represent the ranges of the five measurements. As a practical tolerance, specification of RIT Orange with a Pantone swatch is accurate within about 3.0 CIELAB ΔE^*_{ab} units. Such a tolerance should be used for any attempt at accurate reproduction of RIT Orange.

CIELAB:

RIT Orange is accurately defined as CIELAB L*a*b* values of (65.1 55.6 91.4) (D65, 1931) or (63.3 57.3 88.8) (D65, 1964). These are two different systems in which to specify the same color stimulus.

sRGB:

Standard 8-bit (0-255) RGB values, known as sRGB, can be computed from the D65, 1931 colorimetry. They are (267 108 -44). Values exceeding 255 or less than 0 are outside the sRGB color gamut and cannot be reproduced on an sRGB monitor (typical computer display). Instead, the color can be approximated reasonably by sRGB of (255 109 0) (not too different from either the RIT or Pantone suggestions). All, however, significantly differ from the accurate definition of RIT Orange. RIT Orange cannot be produced in sRGB.

Other RGB Systems:

RIT range remains outside the gamut of Adobe RGB (235 108 -42), a wide-gamut system used in photography, but does fall within the digital cinema wide-gamut P3 system (243 118 20) so it can be reproduced on modern HDR wide-gamut displays (such as those found in some televisions, high-quality computer monitors, and some smart phones).

SWOP Coated CMYK:

SWOP Coated CMYK values for RIT Orange are (0 71 199 0) and again well outside the gamut of any process printing system since the Y value exceeds the maximum of 100. An approximation can be made using (0 71 100 0) which again is not too different from the RIT or Pantone recommendations, but remains very significantly difference from accurate RIT Orange. RIT Orange cannot be reproduced in SWOP Coated CMYK.

Munsell

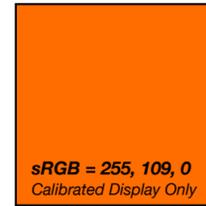
The Munsell specification of RIT Orange is 2.5YR 6.5/18 (Hue Value/Chroma). It is outside the range of the normally-produced Munsell Book of Color. The specification, however, remains fully valid.

Details can be found in the attached spreadsheet. The (!) indicates situations in which RIT Orange is out of gamut and cannot be reproduced accurately.

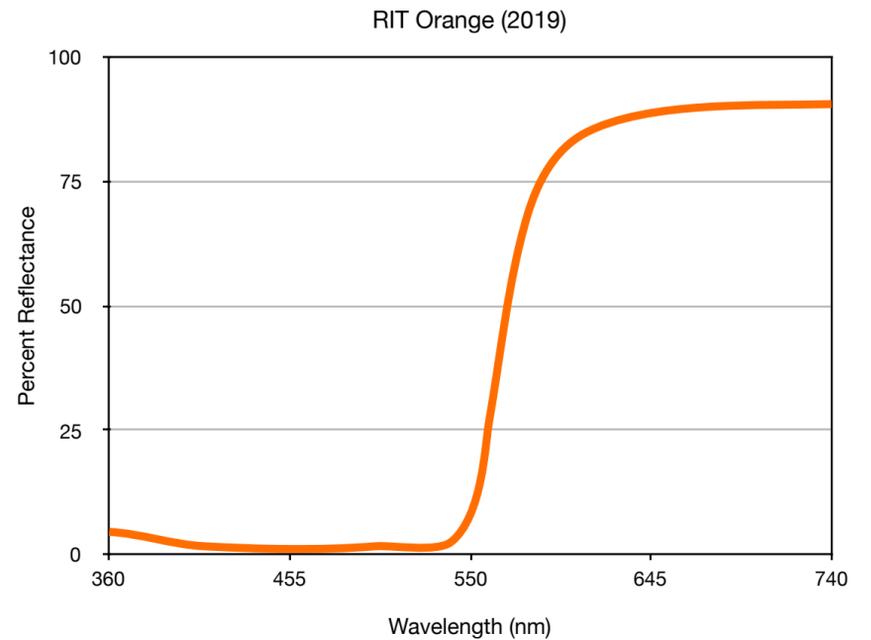
(5/1/2019) MDF

RIT Orange (Pantone 1505 C, White Backing, April 2019)

| | X | Y | Z | L* | a* | b* | C* | h | ! |
|--|---------|-------|-----|-------------------------|-------------------------|------|-------|------|---|
| CIE Colorimetry | | | | | | | | | |
| D65, 1931 2° | 50.6 | 34.2 | 1.5 | 65.1 | 55.6 | 91.4 | 107.0 | 58.7 | |
| D65, 1964 10° | 48.2 | 31.9 | 1.5 | 63.3 | 57.3 | 88.8 | 105.7 | 57.2 | |
| Tolerance (+/-) | | | | 0.2 | 0.3 | 0.7 | 0.6 | 0.1 | |
| Practical Tolerance = 3 ΔE* _{ab} | | | | | | | | | |
| Out of Gamut of Most Reproduction Systems | | | | | | | | | |
| | H | V | C | | | | | | |
| MUNSELL | 2.5YR | 6.5 | 18 | | | | | | |
| | R | G | B | Photoshop Approximation | | | | | |
| sRGB | 267 | 108 | -44 | 255 | 109 | 0 | | | ! |
| Hex | * | 6C | * | FF | 6D | 00 | | | ! |
| Adobe RGB | 235 | 108 | -42 | 230 | 108 | 0 | | | ! |
| P3 RGB | 243 | 118 | 20 | | | | | | |
| | C | M | Y | K | Photoshop Approximation | | | | |
| CMYK (SWOP Coated) | 0 | 71 | 199 | 0 | 0 | 71 | 100 | 0 | ! |
| Reflectance (45/0) | WL (nm) | R (%) | | | | | | | |
| | 360 | 4.5 | | | | | | | |
| | 370 | 4.3 | | | | | | | |
| | 380 | 3.5 | | | | | | | |
| | 390 | 2.6 | | | | | | | |
| | 400 | 1.9 | | | | | | | |
| | 410 | 1.6 | | | | | | | |
| | 420 | 1.5 | | | | | | | |
| | 430 | 1.4 | | | | | | | |
| | 440 | 1.3 | | | | | | | |
| | 450 | 1.3 | | | | | | | |
| | 460 | 1.3 | | | | | | | |
| | 470 | 1.3 | | | | | | | |
| | 480 | 1.4 | | | | | | | |
| | 490 | 1.4 | | | | | | | |
| | 500 | 1.6 | | | | | | | |
| | 510 | 2.0 | | | | | | | |
| | 520 | 1.9 | | | | | | | |
| | 530 | 1.8 | | | | | | | |
| | 540 | 2.5 | | | | | | | |
| | 550 | 8.0 | | | | | | | |
| | 560 | 27.1 | | | | | | | |
| | 570 | 51.2 | | | | | | | |
| | 580 | 68.2 | | | | | | | |
| | 590 | 77.0 | | | | | | | |
| | 600 | 82.1 | | | | | | | |
| | 610 | 84.7 | | | | | | | |
| | 620 | 86.2 | | | | | | | |
| | 630 | 87.1 | | | | | | | |
| | 640 | 87.8 | | | | | | | |
| | 650 | 88.6 | | | | | | | |
| | 660 | 89.0 | | | | | | | |
| | 670 | 89.3 | | | | | | | |
| | 680 | 89.4 | | | | | | | |
| | 690 | 89.7 | | | | | | | |
| | 700 | 90.2 | | | | | | | |
| | 710 | 90.2 | | | | | | | |
| | 720 | 90.3 | | | | | | | |
| | 730 | 90.5 | | | | | | | |
| | 740 | 90.6 | | | | | | | |



Note: ΔE*_{ab}, White v. Black Backing ≈ 3.0
 (darker, lower chroma on black)
 Note: ΔE*_{ab}, SuperSwatch v. Book ≈ 3.0
 (lighter, lower chroma in book)



Instrument: KonicaMinolta CM2500c
 45:0 Geometry, 9mm Aperture
 NIST Traceable, D. Wyble