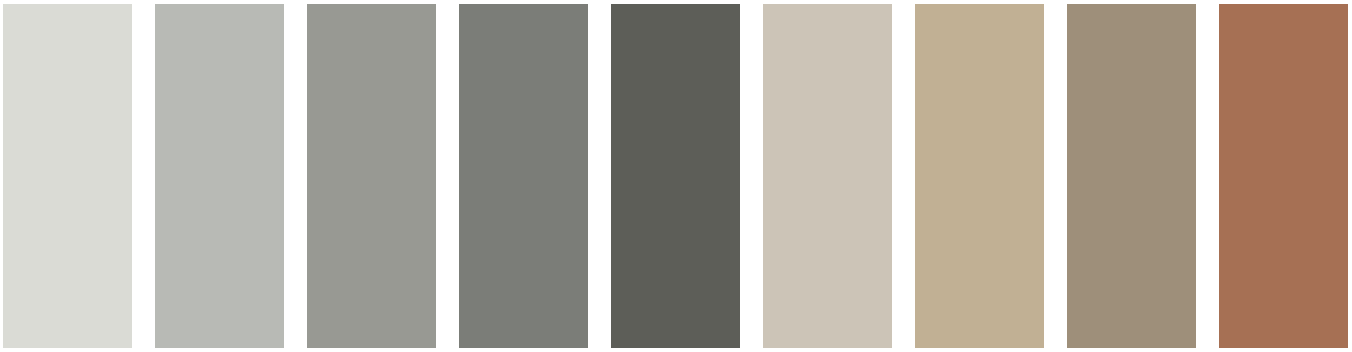
TAKTL is a natural, mineral-based product that generally exhibits color variation. The potential for color variation should be considered early in the design and specification processes. The Color Questionnaire (Page 10) provides specification guidelines based upon design intent and building function.

Note: All images in this document are for general reference only. Projects will require submittal documentation specific to the application. Please contact our Technical Support Team for more information.

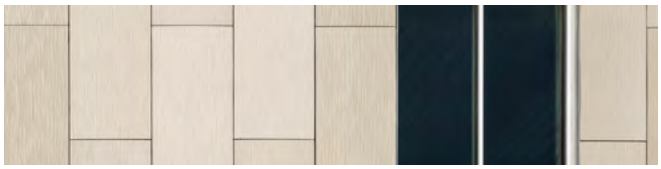
CONTENTS

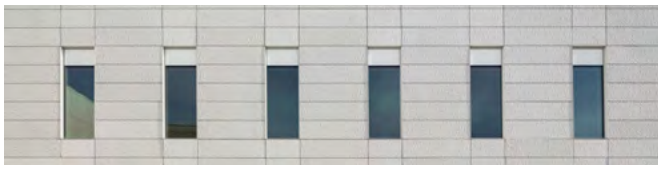


White 87 | Platinum 75 | Titanium 63 | Grey 52 | Graphite 40 | Bone 78 | Sand 72 | Dune 60 | Terracotta 52

STANDARD COLORS One of TAKTL's defining qualities is its ability to be formulated in an expansive range of colors. We have developed nine standard colors for the building industry, with the ability to formulate custom colors as part of our standard program for quantities in excess of 7,000 square feet.

All standard and custom colors contain pigments that are UV-stable and specifically engineered for use in concrete. Pigments are added during the mixing process, and are therefore integral and consistent throughout the material matrix.





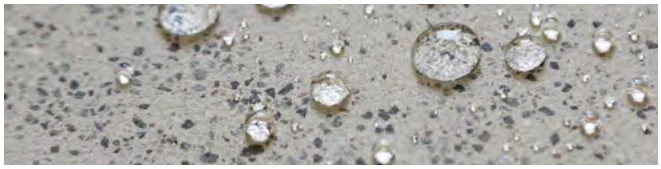
COLOR VARIATION + WEATHERING TAKTL is a natural, mineral-based product that generally exhibits subtle color variation between panels. Darker standard colors (Terracotta, Dune, Graphite, and Grey) and certain textures have greater potential for color variance.

TAKTL gains most of its strength during the first month after it is cast, but it will continue to cure for several years. This curing reaction is hydration in the material – water molecules creating bonds with cement – and the panel will therefore interact with water in the environment and lighten slightly over time.

COLOR QUALITY MANAGEMENT We have a series of interrelated strategies for minimizing color variation within and between production lots, including:

- Tight specification and control of highest quality white cement, pigments, and micro-aggregates
- Stringent quality management procedures for incoming raw materials, including color monitoring and particle size distribution analyses
- Precise, automated material dosing and mixing sequences to achieve exact mix design and homogeneity
- Climate and humidity controlled curing chambers

The acceptance criteria for color variation are outlined in our Quality Management | Tolerances + Acceptance Criteria document (Doc. Q2.1).



MICROSEAL/T™ In order to regulate the flow of moisture between the material surface and the environment, MicroSeal/T, a hydrophobic, breathable finish, is applied to all panels before shipment. MicroSeal is invisible and does not affect the rich, natural appearance of the panel.

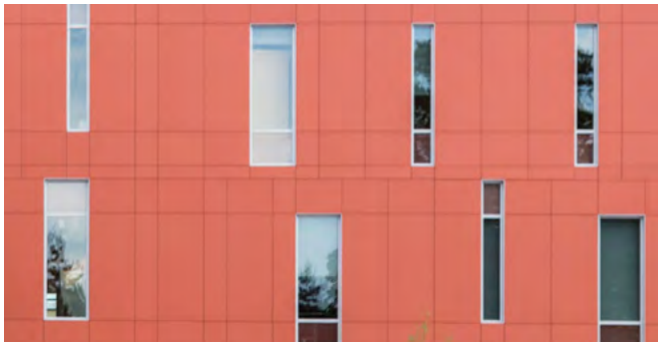
COLORSEAL/T™ For projects in which color variation is not desired, we offer an alternative factory applied finish, ColorSeal/T. The ColorSeal process affords tighter control of the surface color characteristics, mitigating the subtle batch-to-batch color variation that results from using mineral raw materials.

CUSTOM COLOR Custom colors are formulated utilizing small-scale equipment, molds, and curing chambers in our Materials Lab. Unlike mixing paint colors, the process of formulating TAKTL colors requires considerable expertise, time, and internal resources, often involving multiple rounds of mixing, casting, and curing to achieve the final result. One round of custom color formulation is provided free of charge for projects in excess of 7,000 square feet of TAKTL material. Each round produces two 6"x 6" samples and requires approximately eight weeks of lead time. Certain formulations will require additional time for weather testing. To specify color for sampling, please provide physical samples, Uncoated Pantone® numbers, or Sherwin Williams® and Benjamin Moore® paint sample references. Custom samples are not expected to perfectly match paint samples, given the degree of color variation inherent in the raw materials and process.

SAMPLING TAKTL sample kits contain 2"x 6" (52x152mm) and 6"x 6" (152x152mm) samples in a variety of standard textures and colors. Each kit is assembled and packaged individually to target the specific needs of the project. Standard sample kits typically ship within 1-2 business days of the request via FedEx Ground from our Pittsburgh offices. We do not stock every combination of standard colors and textures. Unstocked standard samples ship within 4-6 weeks. Please contact Technical Support for more information.

CUSTOM COLORS

Adelphi University, Nexus
Smooth, Custom Red, ColorSeal/T

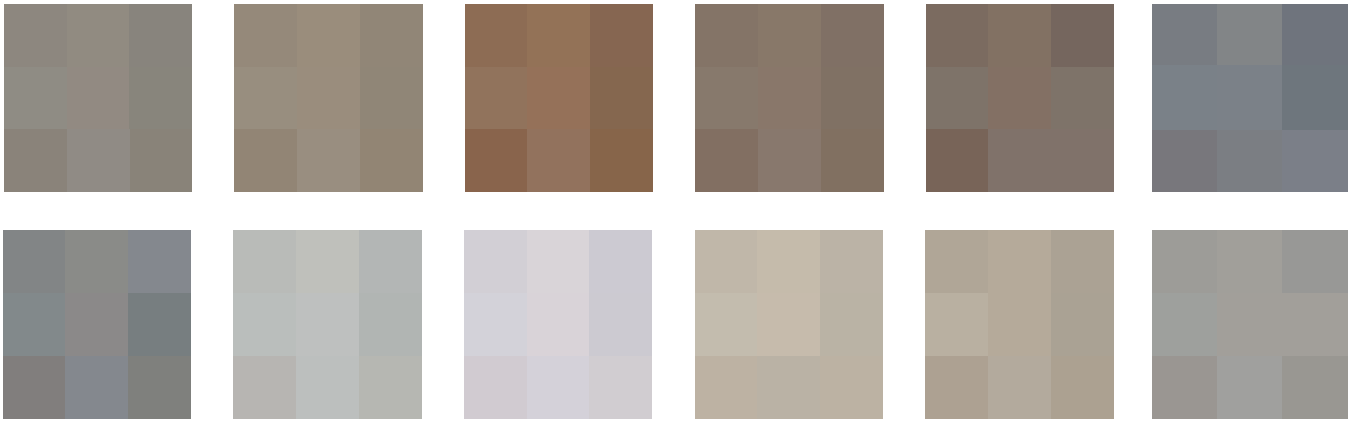


Saturated colors can display extreme variation in different lighting conditions. ColorSeal should be specified if color variation is not desired.

Riverdale Country School, Upper Learning Building
Classic Smooth, Rough 1, Rough 2 MB, Custom Blue, MicroSeal/T

Saturated colors cast in multiple colors can display great tonal shifts.

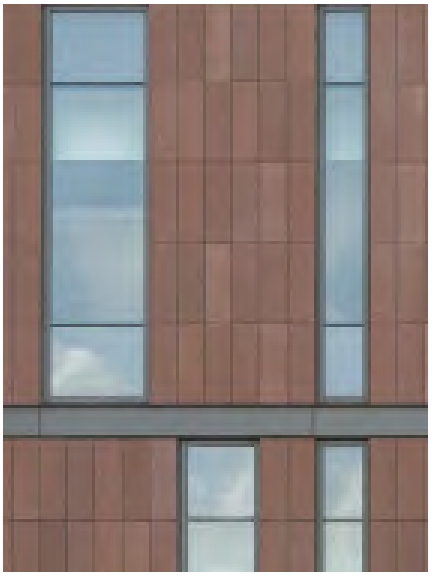
POTENTIAL NATURAL COLOR VARIATION



COLOR VARIATION SUBMITTAL REQUIREMENTS TAKTL requires a signed Natural Color Variation worksheet in the Technical Documents Submittal for any product specified with MicroSeal/T sealer. The worksheet includes a grid, as shown, to illustrate potential color variations that are within tolerances. The grid is a relative representation only; therefore, the printed colors are not to be interpreted as exact matches to physical samples.

POTENTIAL NATURAL COLOR VARIATION EXAMPLES The following photos demonstrate levels of variation on installed projects. Examples include several colors, textures, and finishes, but all material is sealed with Standard MicroSeal. As shown, variation is not explicitly predictable. Shipments will not be sequenced to optimize for panel-to-panel color variation. Designers with hesitation regarding color variation or consistency should employ strategies early in the process to accommodate color variation or specify ColorSeal/T to minimize variation. the MicroSeal finish option. Pages 7 and 8 provide examples of designing for the unpredictable nature of color variation. The questionnaire on Page 10 provides additional support for the specifier in determining the optimal color and finish options.

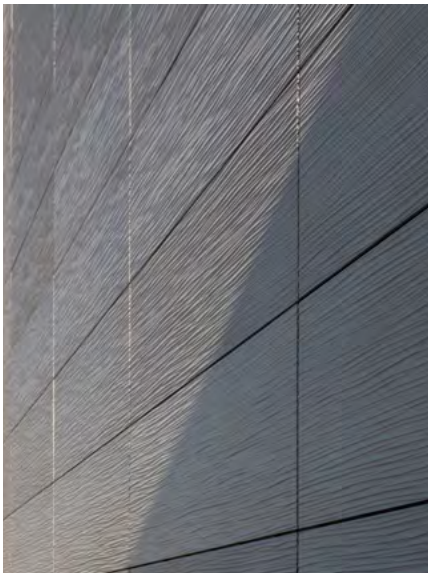
Rutgers University (Camden) Nursing and Science Building | Rough 1 + 2, Terracotta, MicroSeal/T



Natural color variation stems from variances in natural raw materials. Small differences in sand and cement coloration still can result in panel to panel or lot to lot color variation.

POTENTIAL NATURAL COLOR VARIATION

Brownells HQ | Arbos 1, Natural, MicroSeal/T



Minimizing unique part types and designing for panel interchangeability will allow contractors to more easily adjust install location based on panel to panel color variation. Darker colors have greater potential for color variation, including Standards: Natural, Flax, Terracotta, Weathered Brown, Root, Graphite, and Grey.

Crafton Hills College | Smooth MB, Classic White, MicroSeal/T

All colors, including Standard White, and other light colors are subject to color variation from variances in natural raw materials.

POTENTIAL NATURAL COLOR VARIATION

Colgate University, Class of '65 Arena | Classic Smooth, Smooth MB, Rough 1, Bone, Terracotta, Custom, MicroSeal/T

Shipments will not be sequenced to optimize for panel to panel color variation distribution. Our Project Managers can provide guidance on releases for particular elevations or specific part sizes, if concerns are brought to attention early in the submittal process and the requested sequencing doesn't negatively impact sheet utilization or increase handling.

Project Oscar | Arbos 1, Dune, MicroSeal/T

Lighting conditions impact perceived color variation, particularly on highly textured panels across an elevation.

DESIGNED COLOR VARIATION

Wake Tech Community College | Rough 1 + Rough 2, MicroSeal/T

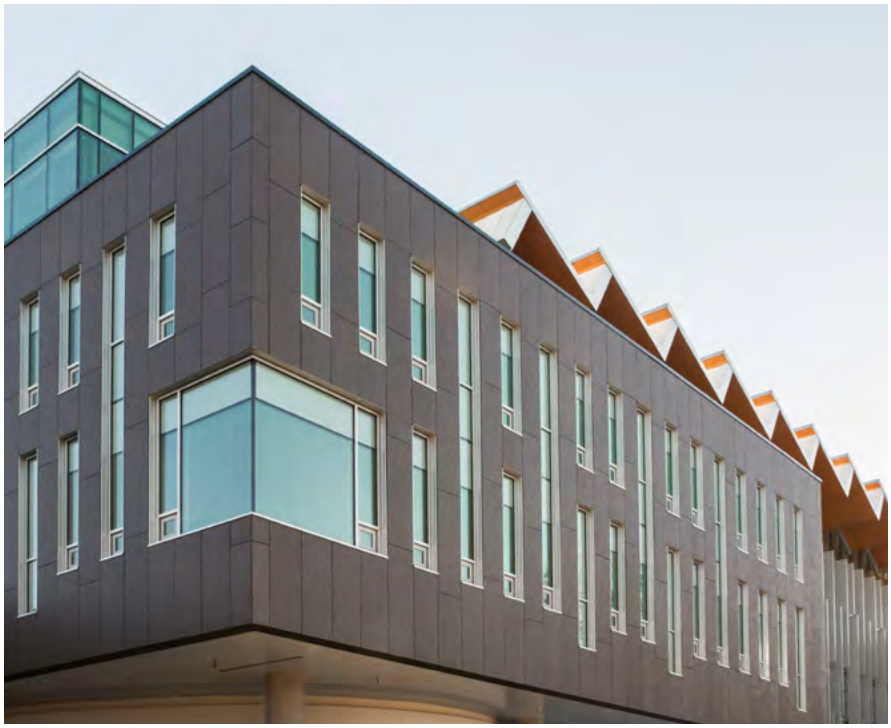
Designers have successfully incorporated two standard textures, cast in one custom color, to create random variation across the elevations.

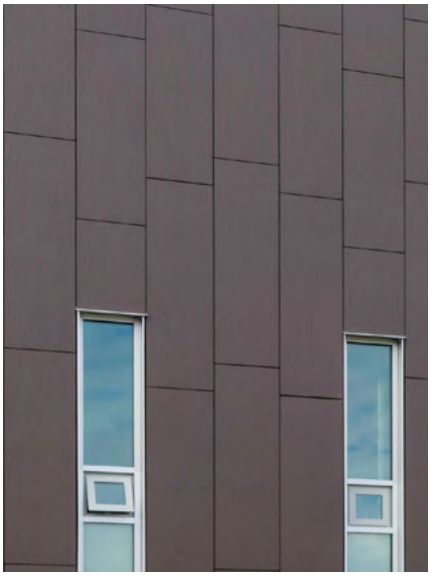
133 Greenwich Marriott | Custom Dual: Smooth + Rough 2, Graphite, ColorSeal/T

Designers collaborated with TAKTL to fabricate dual-textured molds, cast in one standard color, and ColorSealed to accentuate the textural variation and minimize color differences panel to panel.

DESIGNED COLOR CONSISTENCY

University of British Columbia , Student Union Building | Reeds, Root, ColorSeal/T





Building owners who do not desire color variation and/or buildings that will require regular, heavy cleaning should specify ColorSeal because it can be more easily cleaned and re-applied than MicroSeal.

Harvey Mudd Drinkward Residence Hall | Custom: 3-D Face, Custom Tan, ColorSeal/T

Custom-fabricated molds are conditioned to minimize surface issues and correct for some color variation. This conditioning adds to production lead time. Panels produced in young molds, particularly for large orders, may be subject to greater panel to panel variation than Standard Project panels. ColorSeal should be specified if color variation is not desired.

EFFLORESCENCE Efflorescence is defined in the American Concrete Institute (ACI) Manual of Concrete Practice as "*a deposit of salts, usually white, formed on a surface, the substance having emerged in solution from within concrete or masonry and deposited by evaporation.*" Efflorescence staining is a natural occurrence common to concrete, masonry, and cement-based materials.

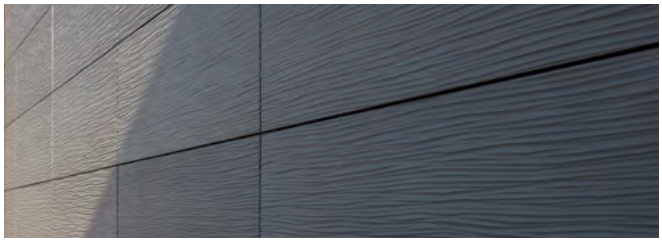
Efflorescence is aesthetic, not a product defect, and does not affect panel performance. Because it is white, efflorescence is more apparent on dark colors. Mediablast finish panels display more efflorescence than panels with cast finish. Efflorescence most often occurs during or shortly after the completion of construction. Weather plays a key role in both the creation and removal of staining. Efflorescence reduces in severity over the course of 12-24 months as rainwater interacts with panel surfaces. The drier and warmer the climate the longer this process takes, but in areas that see a substantial amount of rain the reaction can happen more rapidly. The first impulse is to immediately try to remediate the issue, but in nearly all literature this is ill-advised. Instead, it is recommended to wait for the aforementioned period, because in most cases efflorescing salts will be removed by normal weathering. For more information, please reference our Memorandum on Efflorescence on Cement-Based Products (Doc. Q10-1).

TAKTL VS. TRADITIONAL PRECAST The extremely small particle size of TAKTL raw materials, low water/cement ratio, precise dosing, mixing sequence, compaction and high humidity curing are all aimed at producing a closely packed, exceptionally strong material with disconnected and extremely small (nm dimensions) gel pore structure when fully cured. By comparison, most concrete contains capillary pores (nm dimensions) that provide a means for dissolved salts to work their way to the surface. Since there is very little water in the TAKTL formulation, it would be expected that there would not be much water available to support this migration of salt to the surface. Theoretically, the combination of limited capillary pores to provide egress, low water transport, the addition of pozzolans that consume calcium hydroxide, all lead to a very low incidence of efflorescence in TAKTL products. And, in fact, this is true. However, since full curing to final pore structure is not practical from the standpoint of leadtime and not necessary from the standpoint of strength and performance, the panels are processed when design strength, color development, and surface stability are attained. MicroSeal/T is applied to the surface of the panels as an invisible, breathable sealer to help protect the panel during shipment and installation.

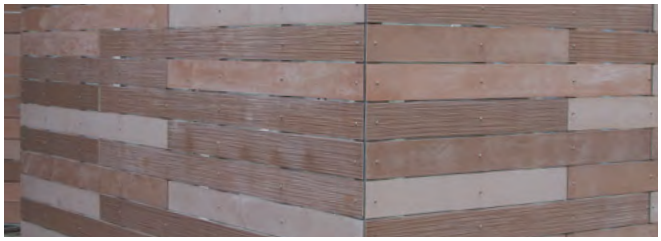
IMPROPER STORAGE EFFLORESCENCE Any TAKTL panel may exhibit natural efflorescence. When this occurs, it can normally be remedied by the installer or designated cleaning contractor. However, panels are more susceptible to efflorescence caused by improper storage or mishandling, which can permanently stain the surface of the panel. There are chemical and visual differences between these types of efflorescence. TAKTL will not be held responsible for efflorescence caused by improper storage or mishandling, including during shipment.

Material with evidence of efflorescence caused by improper storage or mishandling must NOT be installed. Installation will compromise potential for remediation processes. TAKTL can recommend options for efflorescence removal on a case-by-case basis or provide referrals to cleaning contractors as required. For more information about efflorescence, please contact our Technical Support Team.

NATURAL EFFLORESCENCE



IMPROPER STORAGE + MISHANDLING EFFLORESCENCE



Here are the steps we take to inform your decisions about and deliver on your expectations for color:

- We learn about the project design intent.
    1. If color variation **is desired**, we may recommend multiple finishes or textures to accentuate variation.
    2. If color variation **is not desired**, we will recommend ColorSeal. ColorSeal is a factory-applied opaque stain that provides a more uniform color finish, than our standard MicroSeal sealer.
- We provide a Color Variation Chart to demonstrate potential color range, photos of project examples, and a brief questionnaire on which we require sign-off on your understanding of color variation.
- We support your specification writing and provide terms and conditions language that defines acceptance criteria and protocol.
- We monitor panel color during the curing period. If the lot average color starts to shift decisively in one direction, we will adjust the pigment formulation to move the color back towards the original lot. If the initial lot color is unacceptable, we inform you and provide the option to move to ColorSeal finish to meet project requirements.

For more information about color variation and acceptance, please contact our Technical Support Team.

COLOR QUESTIONNAIRE

Use the following questions to determine if MicroSeal/T or ColorSeal/T should be specified and to highlight factors to be discussed with building owners.

Q1. Our design will be successful if:

A. Color is varied or consistent from panel to panel and across elevations.
B. Color variation is displayed from panel to panel.
C. Color is consistent across all panels and elevations.

If you answered A, MicroSeal on any texture, color, and finish will meet design expectations. Please review the Color Variation Chart for specified project color(s) to better understand potential color variation.

If you answered B, MicroSeal on any texture, color, and finish may meet design expectations. For more purposeful panel to panel color variation, we recommend MicroSeal on one or more textures or finishes in one color.

If you answered C, ColorSeal on any texture, color, and cast finish will meet design expectations.

Q2. Color of panels and surfaces will be matched to other project materials:

A. No
B. Yes

If you answered B, ColorSeal on any texture, color, and cast surface will meet requirements. Submittal samples will be final reference for color.

Q3. Panels and surfaces will be or are adjacent to surfaces cleaned regularly with power washers and/or chemicals, detergents, and/or de-icing agents:

A. No
B. Yes

If you answered B, ColorSeal on any texture, color, and cast surface will be most appropriate for demanding cleaning conditions because it can be cleaned and re-applied as required.

Q4. Panels and surfaces are at risk of graffiti and responsive cleaning:

A. No
B. Yes

If you answered B, ColorSeal on any texture, color, and cast surface will be most appropriate for demanding cleaning conditions because it can be cleaned and re-applied as required.

Q5. The project owner will provide decision-making authority to the panel purchasing party regarding final material acceptance:

A. No
B. Yes

If you answered B, ColorSeal on any texture, color, and cast surface will meet requirements. Our automated production facility does not allow for start and stop processing. Per our Terms and Conditions, if we find that color is out of range during the production process, we will notify you and move to ColorSeal finish if required. The purchasing party will have three days to respond to the notification, so it is best if they have decision-making authority.