

SECTION 074229.00 - TERRACOTTA PANEL RAINSCREEN WALL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes, but is not limited to, the following:
1. Extruded hollow-core terracotta panels.
 2. Stainless steel or aluminum horizontal support framing.
 3. Aluminum vertical support framing members
 4. Stainless steel installation clips.
 5. Mechanical anchors and fasteners utilized for the installation of the system
 6. Miscellaneous anchors, fasteners, insulation, air and moisture barrier, vertical sheathing, metal trim, and accessories provided under other Sections
- B. Related Sections include the following:
1. Division 05 Section "Cold-formed Metal Framing".
 2. Division 06 Section "Sheathing"
 3. Division 07 Section "Thermal Insulation"
 4. Division 07 Section "Water-Resistive Barriers/Weather Barriers" and/or "Fluid-Applied Waterproofing".
 5. Division 07 Section "Sheet Metal Flashing and Trim"
 6. Division 08 Section "Entrances and Storefronts"
 7. Division 08 Section "Steel Windows"

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
1. Meet with Owner, Architect, Owner's insurer if applicable, terracotta panel rainscreen wall system Installer, structural-support Installer, and installers whose work interfaces with or affects terracotta wall panel rainscreen wall system.
 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

Architect's Name

 TERRACOTTA PANEL RAINSCREEN WALL SYSTEM
 074223.00 - 1

HVG Facades Pty Ltd | ACN: 634 557 270 | hvgfacades.com.au | 1300 881 712

 SYDNEY
 29 Henderson Street
 Turrella NSW 2205

 MELBOURNE
 25 West Park Drive
 Derrimut VIC 3026

 BRISBANE
 128 Mica Street
 Carole Park QLD 4300

 PERTH
 72 Bushland Ridge
 Bibra Lake WA 6163

 ADELAIDE
 57 Barnes Avenue
 Marleston SA 5033

Project Name	Project #
Project Information	

3. Review methods and procedures related to terracotta panel rainscreen wall system installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special details, penetrations, openings, and condition of other construction that affect the terracotta panel rainscreen wall system.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for the terracotta panel rainscreen wall system, during and after installation.
8. Review procedures for replacement of terracotta panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
 1. Include fabrication and installation layouts of terracotta panel rainscreen wall system components; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, accessories, and special details.
 2. Accessories: Include details of the flashing, trim and anchorage, at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
 1. Terracotta Panels: 6 inches long by actual panel width. Include fasteners, closures, and other metal accessories for the terracotta panel rainscreen wall system.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, tests performed by a qualified testing agency.
- C. Field quality-control reports.

Architect's Name

 TERRACOTTA PANEL RAINSCREEN WALL SYSTEM
 074223.00 - 2

HVG Facades Pty Ltd | ACN: 634 557 270 | hvgfacades.com.au | 1300 881 712

 SYDNEY
 29 Henderson Street
 Turrella NSW 2205

 MELBOURNE
 25 West Park Drive
 Derrimut VIC 3026

 BRISBANE
 128 Mica Street
 Carole Park QLD 4300

 PERTH
 72 Bushland Ridge
 Bibra Lake WA 6163

 ADELAIDE
 57 Barnes Avenue
 Marleston SA 5033

D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For terracotta panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Manufacturer Qualifications: A terracotta wall panel rainscreen wall system manufacturer capable of manufacturing extruded, hollow-core terracotta panels, and its support components, that meet or exceed the performance requirements indicated and of documenting this performance by test reports and calculations.

C. Source Limitations: All primary products specified in this section will be supplied by a single manufacturer, experienced in designing and manufacturing terracotta panel rainscreen wall systems

D. Mockups: Build mockups as detailed and shown in the Contract Documents to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical terracotta panel rainscreen wall system, including, supports, attachments, and accessories.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, terracotta panels, and other manufactured items so as not to be damaged or deformed. Package metal terracotta panels for protection during transportation and handling.

B. Unload, store, and erect terracotta panel rainscreen wall system in a manner to prevent breakage, chipping, and surface damage.

C. Store products in manufacturer's unopened packaging, covered with suitable weathertight and ventilated covering, until ready for installation. Do not store terracotta panel rainscreen wall system components in contact with other materials that might cause staining, chipping, breakage, or other surface damage.

Architect's Name

TERRACOTTA PANEL RAINSCREEN WALL SYSTEM
074223.00 - 3

HVG Facades Pty Ltd | ACN: 634 557 270 | hvgfacades.com.au | 1300 881 712

SYDNEY
29 Henderson Street
Turrella NSW 2205

MELBOURNE
25 West Park Drive
Derrimut VIC 3026

BRISBANE
128 Mica Street
Carole Park QLD 4300

PERTH
72 Bushland Ridge
Bibra Lake WA 6163

ADELAIDE
57 Barnes Avenue
Marleston SA 5033

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of terracotta panel rainscreen wall system to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

- A. Coordinate terracotta panel rainscreen wall system installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a ventilated, secure, and noncorrosive installation while maintaining the leakproof weather barrier.

1.11 WARRANTY

- A. Special Material Warranty: Manufacturer's standard form in which manufacturer agrees to furnish components of the terracotta panel rainscreen wall system that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Structural failures including aspects of terracotta performance defined in ASTM C67.
- b. Deterioration of terracotta and other materials beyond normal weathering.

2. Warranty Period: Ten years from date of Substantial Completion.

- B. Special Installation Warranty: Installation Contractor's standard form in which installer agrees to repair or replace components of the terracotta panel rainscreen wall system that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Structural failures including aspects of terracotta performance defined in ASTM C67.
- b. Installation failures including movement of terracotta panels caused by the movement within the terracotta panel rainscreen wall system installation.
- c. Deterioration of terracotta and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

Architect's Name

TERRACOTTA PANEL RAINSCREEN WALL SYSTEM
074223.00 - 4

HVG Facades Pty Ltd | ACN: 634 557 270 | hvgfacades.com.au | 1300 881 712

SYDNEY
29 Henderson Street
Turrella NSW 2205

MELBOURNE
25 West Park Drive
Derrimut VIC 3026

BRISBANE
128 Mica Street
Carole Park QLD 4300

PERTH
72 Bushland Ridge
Bibra Lake WA 6163

ADELAIDE
57 Barnes Avenue
Marleston SA 5033

1.12 EXTRA MATERIALS

- A. Furnish extra materials that match the products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Terracotta panel rainscreen wall system installation clips: For each type, the lesser quantity of 40 or 1% of the installed quantity.
 2. Terracotta panels: For each surface texture, the lesser quantity of 30 or 1% of the installed quantity. The panels shall be provided in the longest length dimension installed on the project.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide terracotta panel rainscreen wall system capable of withstanding the effects of the following loads, based on testing according to ASTM E 330:
1. Wind Loads: As indicated on Drawings.
 2. Other Design Loads: As indicated on Drawings.
 3. Loads stipulated by the Authorities and Building Codes having Jurisdiction.
 4. Deflection Limits: For wind loads, no greater than 1/200 of the span.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 100 deg F, ambient; 180 deg F, material surfaces.

2.2 TERRACOTTA PANEL RAINSCREEN WALL SYSTEM PANELS

- A. Terracotta Panel System: Provide factory-extruded double wall/hollow core terracotta panels formed into profile for installation method indicated. Include attachment assembly components and accessories required.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include the following:
 - a. Terreal

Architect's Name

TERRACOTTA PANEL RAINSCREEN WALL SYSTEM
074223.00 - 5

HVG Facades Pty Ltd | ACN: 634 557 270 | hvgfacades.com.au | 1300 881 712

SYDNEY
29 Henderson Street
Turrella NSW 2205

MELBOURNE
25 West Park Drive
Derrimut VIC 3026

BRISBANE
128 Mica Street
Carole Park QLD 4300

PERTH
72 Bushland Ridge
Bibra Lake WA 6163

ADELAIDE
57 Barnes Avenue
Marleston SA 5033

- B. Basis-of Design Terracotta Wall Panels: Terreal Piterak Slim 30 terracotta.
1. Panel Thickness: 1.181 inch. (30mm)
 2. Panel Vertical Module Dimension: From 6" to 24".
 3. Panel Horizontal Module Dimension: as indicated on Drawings.
 4. Panel Weight: 10.5 pounds per square foot.
 5. Vertical Joint Type: Open joint without metal trims or gaskets.
 6. Horizontal Joint Type: Overlapping, ship-lap type.
 7. Panel Configuration: Double wall with hollow cores per manufacturer's standard extruding process.
 8. Finish Panel Production Tolerances:
 - a. Squareness: +/- 3mm.
 - b. Straightness of Panel's Top Edge: Color: +/- 3mm.
 - c. Flatness of Panel Height: +/- 2mm.
 - d. Flatness of Panel Length: +/- 3mm.
 9. Color: Through-body (01 Red) (02 Red Orange) (03 Champagne) (04 Salmon) (06 Sand) (07 Sienna) (09 Coffee Brown) (10 chalk white) (11 Sahara Beige) (12 Light Grey) (13 Storm Grey) (15 Slate Grey) (Custom).
 10. Exterior Finish/Texture: (Smooth) (Ridged) (Grooved) (Custom).
- C. Attachment Assembly: Rainscreen principle system that does not require gaskets and/or metal trims to hold the terracotta panels in proper alignment.

2.3 TERRACOTTA WALL PANEL ATTACHMENT COMPONENTS

- A. General: All metal supporting members shall be fabricated from 304 Stainless Steel or 6063 T6 Aluminum for resistance to corrosion.
- B. Horizontal Support Profile:
1. Material: 304 Stainless Steel or 6063 T6 Aluminum
 2. Thickness: As required for structural performance of the terracotta panel rainscreen wall system, 0.050 minimum.
 3. Finish: Manufacturer's standard.
 4. Configuration: Zee or Hat Channel shape
 5. Member Depth: As indicated on Drawings
 6. Member Vertical Spacing: As required for structural performance of the terracotta panel rainscreen wall system.
- C. Vertical Aluminum Support Profile:
1. Material: 6063 T6 Aluminum.

Project Name	Project #
Project Information	

2. Thickness: 0.125 inch minimum.
3. Finish: Painted flat black with manufacturer's standard paint finish.
4. Configuration: Hat Channel shape with registration extensions on open face.
5. Member Depth: As indicated on Drawings
6. Member Horizontal Spacing: At every vertical open terracotta panel joint and at manufacturer's standard distance from openings in the terracotta panel rainscreen wall system.

D. Terracotta Panel Installation Clips:

1. Material: 304, 1/8 Hard ($F_b = 100,000$ psi; $F_y = 55,000$ psi; $E_o = 27,000,000$ psi) ASTM 666 Stainless Steel.
2. Thickness: 0.057 inch.
3. Finish: Manufacturer's standard, unless clip is exposed to view.
4. Configuration: Manufacturer's standard with preinstalled holes for clip attachment to supporting member..
5. Depth: Manufacturer's standard.
6. Spacing: Manufacturer's standard required for structural performance of the terracotta panel rainscreen wall system.
7. Terracotta Panel Attachment Design: Clips shall be manufactured for "friction fit" to terracotta panel to prevent terracotta panels from freely moving after clip installation.

E. Fasteners:

1. Material: 304 Stainless Steel.
2. Type: Hex head, self-drilling.
3. Size: Manufacturer's standard required for structural performance of the terracotta panel rainscreen wall system.

2.4 MISCELLANEOUS MATERIALS

- A. Flashing and Trim: Shall be aluminum material complying with the performance criteria specified and designed to allow adjustments of the system prior to being permanently installed. These items shall be shop fabricated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. It is the responsibility of the Installation Contractor to examine the structure scheduled to receive the terracotta panel rainscreen wall system and verify that it is capable of supporting the loads from the Work

Architect's Name

TERRACOTTA PANEL RAINSCREEN WALL SYSTEM
074223.00 - 7

HVG Facades Pty Ltd | ACN: 634 557 270 | hvgfacades.com.au | 1300 881 712

SYDNEY
29 Henderson Street
Turrilla NSW 2205

MELBOURNE
25 West Park Drive
Derrimut VIC 3026

BRISBANE
128 Mica Street
Carole Park QLD 4300

PERTH
72 Bushland Ridge
Bibra Lake WA 6163

ADELAIDE
57 Barnes Avenue
Marleston SA 5033

Project Name	Project #
Project Information	

specified in this section. Note deficiencies immediately and do not proceed with erection of terracotta panel rainscreen wall system until such deficiencies have been corrected or addressed by the Architect.

- B. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances for the terracotta material panel supports, and other conditions affecting performance of the Work.
1. Examine wall framing to verify that girts, angles, channels, and other structural panel support members and anchorage have been installed within alignment tolerances required by terracotta wall panel manufacturer's written installation instructions.
 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by terracotta wall panel manufacturer's written installation instructions.
 - a. Verify that air- and/or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration prior to the commencement of work.
 - b. Verify that thermal insulation has been installed over air/water-resistive barriers and sheathing or backing substrate to retard thermal transmissions prior to the commencement of work
- C. Examine roughing-in for components and assemblies penetrating terracotta panels to verify actual locations of penetrations relative to terracotta panel rainscreen wall system support framing and joints before commencement of work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate terracotta panel rainscreen wall system with rain drainage work; flashing; trim; and construction of soffits, roofing, parapets, walls, and other adjoining work to provide a secure and noncorrosive installation.
- B. Miscellaneous Supports: Install subframing, furring, and other secondary structural system support members and anchorage according to the Light Gage Structural Institute's "Guide Specifications" and the terracotta panel rainscreen wall system manufacturer's written recommendations.

3.3 TERRACOTTA PANEL INSTALLATION

- A. General: Comply with the system manufacturer's written instruction and recommendations for installation as they apply to project conditions and supporting substrates in the orientation, sizes, and locations

Architect's Name

TERRACOTTA PANEL RAINSCREEN WALL SYSTEM
074223.00 - 8

HVG Facades Pty Ltd | ACN: 634 557 270 | hvgfacades.com.au | 1300 881 712

SYDNEY
29 Henderson Street
Turrella NSW 2205

MELBOURNE
25 West Park Drive
Derrimut VIC 3026

BRISBANE
128 Mica Street
Carole Park QLD 4300

PERTH
72 Bushland Ridge
Bibra Lake WA 6163

ADELAIDE
57 Barnes Avenue
Marleston SA 5033

indicated on Drawings. Anchor system and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving terracotta panels.
2. Field cutting of terracotta panels is not permitted except to accommodate components and assemblies penetrating terracotta panels
3. Do not begin installation until air- and/or water-resistive barriers and flashings that will be concealed by the terracotta panel rainscreen wall system are installed.
4. Install flashing and trim as terracotta panel rainscreen wall system work proceeds.
5. Install installation clip screw fasteners in predrilled holes.
6. Align edges of terracotta panels with adjacent terracotta panels.

B. Fasteners:

1. Use stainless-steel fasteners for surfaces exposed to the exterior; use stainless steel, aluminum, or galvanized-steel fasteners for surfaces exposed to the interior per the terracotta manufacturer's written recommendations.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by manufacturer of dissimilar metals.

D. Attachment Assembly, General: Install attachment assembly required to support terracotta wall panels and to provide a complete rainscreen wall system, including subgirts, rails, and panel clips.

1. Install stainless steel and aluminum support framing plumb and level in locations indicated on approved shop drawings and per the terracotta panel rainscreen wall system manufacturer's written recommendations.
2. Install support framing to allow for installation of flashings, trims, and accessories per the terracotta panel rainscreen wall system manufacturer's written recommendations.
3. Support framing members may be shimmed from face of the face of the air/water-resistive barriers and/or sheathing per the terracotta panel rainscreen wall system manufacturer's written recommendations.

E. Installation: Attach terracotta wall panels to supports at locations, spacings, and with installation clips recommended by manufacturer to achieve performance requirements specified and per the terracotta panel rainscreen wall system manufacturer's written instructions and recommendations.

1. Do not install broken, chipped, cracked, or otherwise damaged terracotta wall panels.
2. Install terracotta panels to maintain the horizontal and vertical reveal spacing defined on the approved shop drawings and per the terracotta panel rainscreen wall system manufacturer's written instructions and recommendations.
3. Do not apply sealants to joints unless otherwise indicated.

F. Clip Installation: Attach stainless steel terracotta installation clips to supports at locations, spacings, and with fasteners recommended by manufacturer.

- G. Rainscreen-Principle Installation: Install using manufacturer's standard assembly with vertical channel that provides support and unobstructed drainage assembly, draining at base of wall. Install vertical channels supported by channel brackets or adjuster angles and at locations, spacings, and with fasteners recommended by manufacturer. Leave horizontal and vertical joints with open reveal.
1. Install terracotta wall panels with open vertical joints, with no gaskets or trims, to allow air flow and drainage.
 2. Allow minimum 0.75 inch airspace behind the terracotta wall panels to allow air circulation.
 3. Do not apply sealants to joints unless otherwise indicated.
- H. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 ERECTION TOLERANCES

- A. Shim and align metal support framing to allow the final terracotta wall panel assembly to be plumb, true, untwisted, and in assembly plane.
- B. Installation Tolerances: Measurements are taken on the final installed exposed surface to view. Installation tolerances shall be defined as:
1. Plumb: 1/8" in 10 feet, 1/4" in 40 feet, non-cumulative
 2. Level: 1/8" in 20 feet, 1/4" in 40 feet, non-cumulative
 3. Alignment & Offsets: limit to 1/8"

3.5 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed terracotta panel rainscreen wall system installation, including accessories.

Architect's Name

 TERRACOTTA PANEL RAINSCREEN WALL SYSTEM
 074223.00 - 10

HVG Facades Pty Ltd | ACN: 634 557 270 | hvgfacades.com.au | 1300 881 712

 SYDNEY
 29 Henderson Street
 Turrella NSW 2205

 MELBOURNE
 25 West Park Drive
 Derrimut VIC 3026

 BRISBANE
 128 Mica Street
 Carole Park QLD 4300

 PERTH
 72 Bushland Ridge
 Bibra Lake WA 6163

 ADELAIDE
 57 Barnes Avenue
 Marleston SA 5033

Project Name	Project #
Project Information	

- B. Terracotta panels will be considered defective if they do not pass test and inspections as defined in the manufacturer's written warrantee.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as terracotta panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of terracotta panel rainscreen wall system installation, clean finished surfaces as recommended by terracotta manufacturer. Maintain in a clean condition during construction.
- B. Cleaning: No cleaning treatment or chemicals should be applied to the terracotta panels without the manufacturer's written authorization. Clean soiled areas with materials that will not damage or harm the terracotta tiles or adjacent materials. Mild detergents approved by the terracotta manufacturer in writing with a soft natural bristle brush may be used
- C. After terracotta panel rainscreen wall system installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- D. Replace terracotta panels that have been damaged or have deteriorated beyond successful repair.
- E. Protect installed products from contact with contaminating substances resulting from construction operations. In addition, monitor terracotta surfaces that are adjacent to exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact the terracotta surface, remove contaminants immediately per the terracotta manufacturer's written instructions and recommendations.

END OF SECTION 074223.00

Architect's Name

TERRACOTTA PANEL RAINSCREEN WALL SYSTEM
074223.00 - 11

HVG Facades Pty Ltd | ACN: 634 557 270 | hvgfacades.com.au | 1300 881 712

SYDNEY
29 Henderson Street
Turrella NSW 2205

MELBOURNE
25 West Park Drive
Derrimut VIC 3026

BRISBANE
128 Mica Street
Carole Park QLD 4300

PERTH
72 Bushland Ridge
Bibra Lake WA 6163

ADELAIDE
57 Barnes Avenue
Marleston SA 5033