

**MANUFACTURER’S GUIDE SPECIFICATION**

SECTION 33 41 00 Prefabricated Drainage Composite

\*\* NOTE TO SPECIFIER \*\*

**Specifier's Notes** are in red font. Delete from final document.

Revise this Section by deleting and inserting text to meet Project’s specific requirements.

Prefabricated drainage composites can be used on both vertical and horizontal structural foundation walls and decks and under slab. Applicable for below-grade foundation walls, slab on grade, tunnels, balconies, split slabs, plaza decks, parking decks and bridges. Do not use when prefabricated drainage composite exposed to continuous sunlight. Good for positive backfill applications and blindside applications.

PART 1 – GENERAL

1. RELATED DOCUMENTS
   1. All Contract Documents, including General and Supplementary Conditions, and Division 1 General requirements, apply to this section.
2. SUMMARY
   1. Section includes complete prefabricated drainage composite system to drain liquid water away from building structure. Compatible with waterproofing systems and common construction materials such as concrete, concrete masonry units (CMUs), metal, wood (pressure-treated and fire-treated), rigid insulation and insulated concrete forms (ICFs).
3. SYSTEM DESCRIPTION
   1. Prefabricated drainage composite system includes:

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Verification of waterproofing system installation.
    2. Substrate preparation.
    3. Drainage composite consist of a polypropylene geotextile filter fabric bonded to the dimples of a three-dimensional polypropylene core.
    4. Accessory components contact adhesives, fittings, sealants, and termination bar.
    5. Drainage composite base drain
    6. Testing and Inspection

1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* 1. Section 01 82 00 - Facility Substructure Performance Requirements
  2. Section 02 30 00 - Subsurface Investigation
  3. Section 02 32 00 - Geotechnical Investigations
  4. Section 03 15 00 – Concrete Accessories
  5. Section 03 30 00 – Cast-In-Place Concrete
  6. Section 04 20 00 – Unit Masonry
  7. Section 07 06 00 - Schedules for Thermal and Moisture Protection
  8. Section 07 11 00 – Dampproofing
  9. Section 07 13 00 - Sheet Waterproofing
  10. Section 07 21 13 - Board Insulation
  11. Section 07 26 16 - Below-Grade Vapor Retarders
  12. Section 07 60 00 – Flashing and Sheet Metal
  13. Section 07 92 00 – Joint Sealants
  14. Section 07 95 00 – Expansion Control
  15. Section 22 13 00 - Facility Sanitary Sewerage (Penetrations)
  16. Section 22 14 00 - Facility Storm Drainage (Penetrations)
  17. Section 26 05 33.13 - Conduit for Electrical Systems (Penetrations)
  18. Section 26 05 43 - Underground Ducts and Raceways for Electrical Systems (Penetrations)
  19. Section 31 23 00 - Excavation and Fill
  20. Section 31 41 00 – Shoring
  21. Section 33 46 00 - Subdrainage
      1. Section 33 46 13 - Foundation Drainage
      2. Section 33 46 16 - Subdrainage Piping
      3. Section 33 46 19 - Underslab Drainage
      4. Section 33 46 23 - Drainage Layers
      5. Section 33 46 26 - Geotextile Subsurface Drainage Filtration

1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* 1. American Society for Testing and Materials International (ASTM)
  2. ASTM D1777 Standard Test Method for Thickness of Textile Materials
  3. ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics
  4. ASTM D4716 Standard Test Methods for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head
  5. ASTM D4751 Standard Test Method for Determining Apparent Opening Size of a Geotextile
  6. ASTM D4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
  7. ASTM D6241 Standard Test Method for Static Puncture Strength of Geotextiles
  8. ASTM D4491 Standard Test Method for Water Permeability of Geotextiles by Permittivity

1. ACTION SUBMITTALS
   1. Product Data: Manufacturer’s product data, installation instructions and details.
   2. Samples: Representative samples of the following:

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Drainage Composite Sheet: 4” x 4” (10 x 10 cm)
    2. Drainage Composite Base Drain: 6” (15,2 cm)

1. INFORMATION SUBMITTALS

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* 1. Prefabricated Drainage Composite Manufacturer’s Sample Warranty
  2. Sustainability Submittals:
     1. Provide VOC content of all components.
     2. LEED Submittal: Documentation of materials, recycled content and location of manufacturer.
  3. Material Certificates: Certification that prefabricated drainage composite system and component materials comply with specified performance characteristics and physical requirements and are supplied by single-source manufacturer.
  4. Contractor Certificate: Approved Applicator status with prefabricated drainage composite material Manufacturer.
  5. Site Condition Reports: Indicate ambient and substrate surface temperatures, relative humidity and dew point, wind velocity and precipitation during application.

1. QUALITY ASSURANCE
   1. Installer Qualifications to:
      1. Have minimum three (3) years of experience in type of work required by this section.
      2. Comply with manufacturer's warranty requirements.
      3. Be approved applicator as determined by waterproofing/drainage system manufacturer.
      4. Attend necessary job meetings. Provide competent and full time supervision, experienced mechanics, all materials, tools, and equipment necessary to complete, in acceptable manner, the drainage composite installation.
   2. Manufacturer Qualifications:
      1. Capable to supply all components of complete prefabricated drainage composite system.
      2. Minimum of five (5) years of experience in manufacturing of prefabricated drainage composite systems.
      3. Capable of providing product and technical support representation during construction, approving an acceptable applicator and suggesting appropriate installation methods.
      4. ISO 9001-2000 Certified Organization
      5. ISO 14001-2004 Certified Environmental Management Organization.
   3. Pre-Installation Conference:
      1. Establish procedures to maintain required working conditions.
      2. Coordinate this work with related and adjacent work and trades.
      3. Review special project details.
      4. Verify with Architect and Contractor that pre-fabricated drainage composite details comply with pre-fabricated drainage composite manufacturer's current installation requirements and recommendations.
      5. Attendees should include representatives for Owner, Architect, Quality Assurance, General Contractor, Pre-Fabricated Drainage Composite Contractor, Pre-Fabricated Drainage Composite Manufacturer, Concrete Contractor, Excavating/backfill Contractor and MEP (Mechanical, Electrical and Plumbing) Contractors, if MEP work penetrates the drainage composite.
      6. Give minimum five (5) day notice to Owner, General Contractor and Manufacturer prior to commencing work. Immediately notify parties of changes in work schedule.
   4. Independent Inspection: Owner provided independent inspection service to monitor pre-fabricated drainage composite material installation. Inspection to include:
      1. Compliance with project contract documents.
      2. Compliance with manufacturer’s published literature and site specific details.
      3. Produce reports and digital photographs documenting each inspection. Make reports available in timely manner to Contractor, Pre-Fabricated Drainage Composite Installer, Pre-Fabricated Drainage Composite Material Manufacturer and Architect.
      4. Substrate examination at beginning of pre-fabricated drainage composite installation, at periodic intervals during installation and at final inspection.
      5. Authorization to proceed prior to concrete or backfill placement against the drainage composite.
   5. Mock-up:

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Area designated by Architect will be considered Mock-up.
    2. Prepare and clean a minimum of a 4’ x 4’ (1,2 x 1,2 m) area of each substrate material type and project condition.
    3. Demonstrate methods, products and tools to prepare acceptable substrate meeting drainage composite manufacturer’s installation instructions
    4. Install drainage composite and accessories.

1. PRODUCT DELIVERY, STORAGE AND HANDLING
   1. Delivery: Deliver materials in factory sealed and labeled packaging. Sequence material deliveries to avoid work delays and minimize on-site storage. Follow manufacturer's instructions, recommendations and safety data sheets for material handling and storage.
   2. Storage: Do not double-stack pallets during shipping or storage. Protect pre-fabricated drainage composite materials from moisture, excessive temperatures and sources of ignition. Cover material top and all sides while stored on-site, allowing for adequate ventilation. Protect material from construction operation, weather, excessive temperatures and prolonged sunlight.
   3. Store and manage hazardous materials in accordance with Section 01 35 29.06 - Health and Safety Requirements and Section 01 35 43 - Environmental Procedures. Remove damaged material from site and dispose of in accordance with applicable regulations.
2. PROJECT CONDITIONS
   1. Substrate Condition: Proceed with work only when substrate construction and preparation work is complete and is acceptable for drainage composite application. All structural, plumbing, electrical, and mechanical work to be under or penetrating through the drainage composite is to be completely secured and in the proper position prior to drainage composite system installation. Substrate preparation to comply with drainage composite manufacturer’s guidelines.
   2. Submit a written report to the General Contractor regarding substrate surface defects and work prepared by other Trades which adversely affect quality or dimensions of drainage composite work.
   3. Weather Conditions: Perform work only when existing and forecasted weather conditions are within Manufacturer’s guidelines including but not limited to:
      1. Do not apply drainage composite materials in areas of standing or active water; or over snow, ice or frost.
      2. Timely remove standing water caused by precipitation or ground water seepage to maintain acceptable site conditions.
   4. Schedule work so the drainage composite will not be exposed for longer than recommended by Manufacturer.
3. WARRANTY
   1. Pre-Fabricated Drainage Composite System Warranty: Pre-Fabricated Drainage Composite Manufacturer to provide sample of five (5) year warranty, including pre-fabricated drainage composite system requirements. Issuance of Manufacturer's Pre-Fabricated Drainage Composite Warranty requires the following:
      1. Pre-fabricated drainage composite products provided by a single manufacturer.
      2. Installation of prefabricated drainage composite and all appropriate system accessories are installed by a Manufacturer Approved Applicator in full accordance with manufacturer’s recommendations, installation instructions, specifications and details.

PART 2 – PRODUCTS

1. MANUFACTURER
   1. Materials: Obtain pre-fabricated drainage composite system including all components and accessories from single manufacturer to assure material compatibility.
   2. MAPEI Corporation, 1144 E Newport Center Drive, Deerfield Beach, FL 33442, USA. Phone: Toll Free (800) 426-2734 or (954) 246-8888; Website: www.mapei.us
2. PRE-FABRICATED DRAINAGE COMPOSITE SHEET
   1. General: MAPEI Mapedrain Prefabricated Drainage Composite Sheet to promote positive drainage. High-Strength, High-Flow, Prefabricated Drainage Composite with Filter Fabric. Three-dimensional polypropylene drainage core with geotextile adhered to one side to allow water passage while restricting soil particles.

\*\* NOTE TO SPECIFIER \*\* Select appropriate drain for the application

* 1. MAPEI Mapedrain 30 for horizontal applications with high compressive strength and flow rates.
     1. Woven filter fabric allows concrete to be poured directly on top of the drainage composite
     2. Compressive Strength per ASTM D1621: 21,000 psf (1005 kN/m2)
     3. Flow Rate per ASTM D4491: 60 gal/min/ft2 (2460 L/min/m2)
     4. Flow (hydraulic gradient = 1) per ASTM D4716: 23 g/min/ft (286 L/min/m)
     5. Core Thickness 0.40" (10,16 mm)
  2. MAPEI Mapedrain 50 for horizontal applications with ultimate compressive strength and flow rates.
     1. Woven filter fabric allows concrete to be poured directly on top of the drainage composite
     2. Compressive Strength: ASTM D1621 33,000 psf (1580 kN/m2)
     3. Flow Rate per ASTM D4491: 60 gal/min/ft2 (2460 L/min/m2)
     4. Flow (hydraulic gradient = 1) per ASTM D4716: 24 g/min/ft (298 L/min/m)
     5. Core Thickness 0.40" (10,16 mm)
  3. MAPEI Mapedrain™ 10 for vertical applications with moderate compressive strength and flow rates. For depths no exceeding 10 ft. (3,05 m).
     1. Geotextile fabric non-woven
     2. Compressive strength 11,000 psf (527 kN/m2)
     3. Flow Rate per ASTM D4491: 140 gal/min/ft2 (5704 L/min/m2)
     4. Flow (hydraulic gradient = 1) per ASTM D4716: 18 g/min/ft (223 L/min/m)
     5. Core Thickness 0.40" (10,16 mm)
  4. MAPEI Mapedrain™ 20 for vertical applications with high compressive strength and flow rates.
     1. Geotextile fabric non-woven
     2. Compressive strength 15,000 psf (718 kN/m2)
     3. Flow Rate per ASTM D4491: 140 gal/min/ft2 (5704 L/min/m2)
     4. Flow (hydraulic gradient = 1) per ASTM D4716: 21 g/min/ft (260 L/min/m)
     5. Core Thickness 0.40" (10,16 mm)
  5. MAPEI Mapedrain™ 25 for vertical applications with high compressive strength and flow rates. Has backer film to prevent potential “die cutting” of a waterproofing membrane installed behind the drainage composite.
     1. Geotextile fabric non-woven
     2. Compressive strength 15,000 psf (718 kN/m2)
     3. Flow Rate per ASTM D4491: 140 gal/min/ft2 (5704 L/min/m2)
     4. Flow (hydraulic gradient = 1) per ASTM D4716: 21 g/min/ft (260 L/min/m)
     5. Core Thickness 0.40" (10,16 mm)
  6. MAPEI Mapedrain™ 40 for vertical and horizontal applications with high compressive strength and flow rates.
     1. Geotextile fabric non-woven
     2. Compressive strength 21,000 psf (1005 kN/m2)
     3. Flow Rate per ASTM D4491: 95 gal/min/ft2 (3870 L/min/m2)
     4. Flow (hydraulic gradient = 1) per ASTM D4716: 23 g/min/ft (286 L/min/m)
     5. Core Thickness 0.40" (10,16 mm)

1. DRAINAGE COMPOSITE BASE DRAIN - PREFABRICATED
   1. MAPEI Mapedrain TD drainage composite to promote positive drainage.
   2. Mapedrain TD: 1” (2,5 cm) thick x 12” (30 cm) by 165’-0” (50,3 m) roll base drain composite designed to collect water from sheet composite drainage and then discharge the water to proper sump system or gravity to daylight.
   3. Compressive Strength: 9,500 psf (455 kN/m2)
   4. Water Flow Rate, 47 gpm/ft width (639 Lpm/m)
   5. Thickness, 1” (2,5 cm)
   6. MAPEI base drain accessory connectors and outlets as required.
2. ACCESSORIES
   1. Mapedrain TM TD Fittings: Mapedrain TD Fittings aid in controlling the water discharged from a Mapedrain system, which includes Mapedrain TD Drainage Composite as the “footing drain.” MAPEI offers four fittings designed to direct and release the cumulative water being discharged from the system.

\*\* NOTE TO SPECIFIER \*\* Delete fitting not required.

* + 1. Mapedrain TD Splice Fitting
    2. Mapedrain TD Corner Fitting
    3. Mapedrain TD Side Outlet Fitting
    4. Mapedrain TD End Outlet Fitting
  1. Contact Adhesive: Used to bond Mapedrain to self-adhered sheet waterproofing membranes
     1. Mapebond 740 is a spray-applied, aerosol contact adhesive
  2. Accessory Products by Others: All accessory materials listed below shall meet the following requirements or shall have manufacturer’s written approval for substitution.
     1. Fasteners & Washers: Fasteners shall be compatible with the substrate and shall have 1” washers

\*\* NOTE TO SPECIFIER \*\* EXECUTION contains work sections pertaining to multiple installations for vertical and horizontal construction. Therefore, PART 3 should be edited to only include work sections specific to the job site conditions required on the project.

PART 3 – EXECUTION

1. SUBSTRATE INSPECTION AND CONDITIONS
   1. Examine the condition of substrates and other conditions affecting work of this section with Pre-Fabricated Drainage Composite Installer, General Contractor and Owner’s Independent Inspector present. Notify General Contractor, in writing, of defects in substrate preventing installation of pre-fabricated drainage composite. Do not proceed with work until defects in substrate are corrected and acceptable for drainage composite installation and comply with manufacturer's recommendations.
   2. Substrates to receive pre-fabricated drainage composite must be clean, dry and free of voids, protrusions and surface irregularities.
   3. Prepare substrate surfaces to accept pre-fabricated drainage composite system per requirements of the drainage composite Manufacturer and as directed by the Architect.
   4. Install pre-fabricated drainage composite only in dry weather.
2. PREPARATION
   1. Remove contaminants such as dirt, debris, oil, grease, wax, cement laitance, or other foreign matter from concrete or shotcrete walls which will impair or negatively affect performance of drainage system installation.
   2. Grade (soil or gravel) shall be uniformly compacted and flat.
   3. Protect adjacent work areas and finish surfaces not receiving drainage composite from damage or contamination from drainage composite products spillage and overspray during installation operations.
   4. Protect pre-fabricated drainage composite from permanent direct sunlight after installation.
3. GENERAL INSTALLATION GUIDELINES
   1. Comply with contract documents and manufacturer's product data, including product application and installation instructions.
   2. Maintain adequate ventilation during preparation and application of materials.
   3. Seal open edges with filter fabric.
   4. Inspect drainage composite and repair or replace as necessary.
   5. Warn personnel against breathing of vapors and contact with skin and eyes; wear appropriate protective clothing and respiratory equipment.
   6. If the contractor elects to use solvent based adhesives, keep flammable products away from spark and flame. Post “No Smoking” signs. Do not allow spark producing equipment to be used during application and until vapors have dissipated.
   7. Apply drainage composite to prepared surfaces starting at the low point and working to high point in overlapping shingling technique.
4. UNDER SLAB INSTALLATION – GENERAL:
   1. Install collection pipes or site water drainage system in trenches as indicated for positive drainage from drainage composite system to collection system and drain to daylight or sump per construction documents.
   2. Roll out drainage composite system material with the geotextile filter fabric side down, directly on the subgrade or concrete working slab, covering entire area as directed by construction documents.
   3. Butt adjacent panels and lap geotextile fabric. Use a butyl tape or duct tape to seal the plastic panel joints (sealing the laps is not required if waterproofing is installed on top of the Mapedrain).
5. BACKFILL FOUNDATION WALL INSTALLATION – GENERAL:
   1. At the base of the wall, place Mapedrain TD foundation drain horizontally oriented standing up tight to wall with the dimple side facing out over the previously installed MAPEI waterproofing system.
      1. To install Mapedrain over Mapeproof™ bentonite geotextile composite waterproofing, use fasteners compatible with the substrate and 1” washers approximately 24” (60 cm) on center to secure Mapedrain TD.
      2. To install Mapedrain over Mapethene self-adhered sheet waterproofing, use Mapebond 740 Aerosol Spray Adhesive to secure Mapedrain TD.
      3. Use Mapedrain TD accessory fittings, as required, to form a continuous installation. Install Mapedrain TD discharge outlet fittings to connect to discharge pipes as required for the project.
   2. Install the bottom course of Mapedrain drainage composite (flat plastic core side against the wall/waterproofing) with the Mapedrain bottom core edge in contact with top core edge of Mapedrain TD. Secure extra fabric flap of Mapedrain extending down the top front edge of Mapedrain TD to prevent the passage of soil into the core at the connection.
      1. To install Mapedrain over Mapeproof bentonite geotextile composite waterproofing, use fasteners compatible with the substrate and 1” washers approximately 24” (60 cm) on center to secure Mapedrain.
      2. To install Mapedrain over Mapethene self-adhered sheet waterproofing, use Mapebond 740 Aerosol Spray Adhesive to secure Mapedrain.
   3. Install subsequent courses of Mapedrain drainage composite to the top termination edge of waterproofing or grade. Tightly abut adjoining drainage composite core edges together and secure the extra fabric flaps over the front of adjacent roll edges, to prevent soil from entering the drainage composite. Where drainage composite panels are installed overlapped, the bottom edge of higher course shall be installed to the outside of the lower course; shingle style to shed water.
      1. To Install Mapedrain over Mapeproof bentonite geotextile composite waterproofing, use fasteners compatible with the substrate and 1” washers approximately 24” (60 cm) on center to secure Mapedrain.
      2. To install Mapedrain over Mapethene self-adhered sheet waterproofing, use Mapebond 740 Aerosol Spray Adhesive to secure Mapedrain.
   4. Around penetrations and tie-back heads, cut Mapedrain drainage composite to fit and wrap extra filter fabric around open core edge to prevent soil from entering the core.
   5. At the top of the Mapedrain drainage composite installation, wrap the filter fabric flap behind the exposed top core edge to prevent soil from entering the core.
6. BLINDSIDE WALL INSTALLATION - GENERAL:
   1. At the base of the lagging wall, install Mapedrain TD foundation drain horizontally oriented with the dimple side facing the lagging wall. Secure Mapedrain to the lagging wall with fasteners compatible with the substrate and 1” washers approximately every 2’. Use corner fittings and splice connectors as required forming a continuous installation. Install Mapedrain TD Side or End Outlet Fittings to connect with discharge pipes as required for the project.
   2. Install the bottom course of Mapedrain drainage composite (geotextile side against the lagging wall) with the bottom edge fabric flap tucked behind the top edge of the Mapedrain TD and against the lagging to prevent the passage of soil into the core at the connection. The bottom edge of the Mapedrain core should be in contact with top edge of Mapedrain TD.
   3. Install subsequent courses of Mapedrain to within 4” to 6” of finished grade or as shown on the construction documents. Tightly abut adjoining sheet drain core edges and tuck the extra fabric flaps behind the adjacent roll edge to prevent soil from entering the core. Secure sheet drain to lagging wall with fasteners compatible with the substrate and 1” washers. Where drainage sheet panels are installed overlapped, bottom edge of higher course shall be installed to the outside of the lower course, to shed water like a roof shingle.
   4. Prior to installing drainage composite near grade, install ½” (12 mm) thick cementitious wall board centered over metal soldier pile from finished grade elevation to specified depth of soldier pile removal. Cementitious wall board will protect the Mapedrain drainage composite when the top of the soldier piles are excavated and removed. Remove cementitious board with removal of soldier pile top and lagging boards.
   5. Around penetrations and tie-back heads, cut Mapedrain drainage composite to fit and wrap extra filter fabric around open core edge to prevent soil from entering core.
   6. At the top of the sheet drain installation, wrap the filter fabric flap behind the exposed top core edge to prevent intrusion of soil into the core and secure sheet drain to wall with termination bar fastened 12" (30 cm) on center with the fabric wrapped.
7. BACKFILL/OVERBURDEN
   1. Install backfill or overburden as soon as possible according to project requirements. Use care during backfill operation to avoid damage to pre-fabricated drainage composite system. Follow generally accepted industry practices for backfilling and compaction. Backfill should be added and compacted in lifts from 6" to 24" (15,2 to 61 cm).
8. CLEAN UP:
   1. In areas where adjacent finished surfaces or work are contaminated by drainage composite material, immediately notify General Contractor and trade responsible for area. Consult manufacturer of surfaces for cleaning advice and conform to their recommendations and instructions. Remove all tools, equipment and remaining product on-site. Dispose of debris and damaged product in accordance with applicable regulations.
   2. Maintain work area in a neat and workmanlike condition. Remove empty cartons and rubbish from site daily.
   3. Repair or replace defaced or disfigured finishes caused by work of this section.

END OF SECTION 33 41 00