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This MANU-SPEC® utilizes the Construction Specifications Institute (CSI) *Project Resource Manual* (PRM), including *MasterFormat*®, *SectionFormat*™ and *PageFormat*™. A MANU-SPEC is a manufacturer-specific proprietary product specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text indicated by brackets []; delete optional text in final copy of specification. Specifier Notes typically precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text. Metric conversion, where used, is soft metric conversion.

This MANU-SPEC specifies precast trench drains systems marketed under the ACO Drain® trade name, either presloped or neutral channel systems, including channels, catch basins, grates, frames and accessories, fabricated from polymer concrete and from fiberglass. These products are manufactured by ACO Polymer Products, Inc. Revise MANU-SPEC section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles, including 33 40 00 Storm Drainage Utilities (Catch Basins, Grates, and Frames; Combination Storm Drain and Underdrain; Inlets; Storm Drainage Manholes, Frames and Covers; Storm Drainage Pipe and Fittings; and Water Detention Chambers).

SECTION 33 44 00
STORM UTILITY WATER DRAINS
(PRECAST TRENCH DRAIN SYSTEMS)

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Surface drainage, including precast trench drain systems.

Specifier Note: Revise paragraph below to suit project requirements. If a reader of this section could reasonably expect to find a product or component specified in this section, but it is actually specified elsewhere, then the related section number(s) should be listed in the paragraph below. Add section numbers and titles per CSI *MasterFormat* and specifier's practice. In the absence of related sections, delete paragraph below.

- B. Related Sections: Section(s) related to this section include:
1. Division 03 Section: Precast Concrete Specialties.
 2. Division 05 Section: Metal Gratings.
 3. Division 22 Section: Facility Storm Drainage.
 4. Division 31 Section: Earthwork.
 5. Division 33 Section: Utility Services.
 6. Division 33 Section: Drainage and Containment.

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain Reference Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Division 01 References Section may establish the edition date of standards. This article does not require compliance with standard, but is merely a listing of references used. Article below should list only those industry standards referenced in this section.

1.02 REFERENCES

- A. Deutsches Institut für Normung e.V. (German Standards Institute) (DIN):
 - 1. DIN 19580 Dec 1988; Surface Water Drainage Channels for Traffic Areas; Classification, Design, Marking, Classes A15 to F900.
- B. American Society of Mechanical Engineers (ASME):
 - 1. ASME A112.21.1M Floor Drains.

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide trench drain system which has been manufactured and installed to withstand loads [Specify loads] and to maintain performance criteria stated by manufacturer without defects, damage or failure.

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 01 Submittal Procedures Section.

1.04 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 01 Submittal Procedures Section.
- B. Product Data: Submit product data and installation instructions including manufacturer's SPEC-DATA product sheet, for specified products.
- C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures.
- D. Samples: Submit selection and verification samples for finishes, colors and textures.
- E. Quality Assurance Submittals: Submit the following:
 - 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
 - 2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

Specifier Note: Coordinate paragraph below with Part 3 Field Quality Requirements Article herein. Retain or delete as applicable.

- 3. Manufacturer's Field Reports: Manufacturer's field reports specified herein.
- F. Closeout Submittals: Submit the following:
 - 1. Warranty: Warranty documents specified herein.

Specifier Note: Article below should include prerequisites, standards, limitations and criteria that establish an overall level of quality for products and workmanship for this section.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.

Specifier Note: If a preinstallation meeting is desired, retain paragraph below.

- B. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 01 Project Management and Coordination (Project Meetings) Section.

Specifier Note: Article below should include special and unique requirements. Coordinate article below with Division 01 Product Requirements Section.

1.06 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 01 Product Requirements Sections.

- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

Specifier Note: Coordinate article below with Conditions of the Contract and with Division 01 Closeout Submittals (Warranty) Section.

1.08 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

Specifier Note: Coordinate paragraph below with manufacturer's warranty requirements.

1. Warranty Period: 12 months commencing on Date of Substantial Completion or 24 months from date of purchase, whichever is sooner.

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards, and descriptions as applicable. Use of such phrases as "or equal" or "or approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

2.01 PRECAST TRENCH DRAIN SYSTEMS

- A. Manufacturer: ACO Polymer Products, Inc.

Specifier Note: Paragraph below is an addition to CSI *SectionFormat* and a supplement to MANU-SPEC. Retain or delete paragraph below per project requirements and specifier's practice.

1. Contact: PO Box 245, 12080 Ravenna Road, Chardon, OH 44024; Telephone: (800) 543-4764, (440) 285-7000; Fax: (440) 285-7005; E-mail: info@acousa.com; website: www.acousa.com.

Specifier Note: Paragraphs below describe ACO Drain systems. Edit to suit project requirements and specifier practice.

- B. Proprietary Products/Systems. Precast Trench Drain Systems, including the following:
 1. ACO Drain K100S Polymer Concrete System:
 - a. Material: Polymer concrete.
 - b. Channels: 4 inches (100 mm) internal width.
 - c. Length: [39.37 inches (1 m) neutral/sloped] [19.69 inches (0.5 m) neutral].
 - d. Slope: [0.6% sloped] [Neutral].
 - e. Metal Edge Rail: [Galvanized steel] [Stainless steel].
 - f. Grates: [410/411 galvanized steel, perforated - ADA compliant] [451/465 stainless steel, perforated - ADA compliant] [445 stainless steel, longitudinal - ADA compliant] [494/495 plastic, longitudinal - ADA compliant] [440 fiberglass, slotted] [420/425/435 galvanized steel, slotted] [450/455/490 stainless steel, slotted] [492 resin composite, slotted] [405 galvanized steel, mesh] [430 stainless steel, mesh] [485 brass, perforated - ADA compliant] [479 ductile iron, mosaic] [477 ductile iron, longitudinal slotted] [478 ductile iron, slotted - ADA compliant] [461 ductile iron, slotted].
 - g. Grate Locking System: QuickLok.

- h. Grate Load Class: [Class A15 - 3372 lb/70 psi (1531 kg/482 kPa)] [Class C250 - 56,200 lb/1162 psi (25,515 kg/8006 kPa)] [Class D400 - 89,920 lb/1859 psi (40,824 kg/12,809 kPa)] [Class E600 - 134,800 lb/2788 psi (61,199 kg/19,209 kPa)] in compliance with DIN 19580.
- i. Catch Basins: [Type 900] [Series 600].
- j. Outlets: Channel bottom drill-out for [4 inches (100 mm)] [6 inches (150 mm)] schedule 40 pipe.

Specifier Note: 6 inches (150 mm) drill-out requires oval-to-round adapter.

- k. Accessories: [Inlet/Outlet/Closing end cap with 4 inches (100 mm) schedule 40 outlet] [Inlet/Outlet end caps with 6 inches (150 mm) schedule 40 outlet].

2. ACO Drain S100K Polymer Concrete System:

- a. Material: Polymer concrete.
- b. Channels: 4 inches (100 mm) internal width.
- c. Length: [39.37 inches (1 m) neutral/sloped] [19.69 inches (0.5 m) neutral].
- d. Slope: [0.6% sloped] [Neutral].
- e. Metal Edge Rail: Ductile iron.
- f. Grates: [Ductile iron, ADA compliant, longitudinal slotted] [Ductile iron, slotted].
- g. Grate Locking System: PowerLok.
- h. Grate Load Class: Class F900 - 202,320 lb/4182 psi (91,853 kg/28,814 kPa) in compliance with DIN 19580.
- i. Catch Basins: [Type 900] [Series 600].
- j. Outlets: Channel bottom drill-out for [4 inches (100 mm)] [6 inches (150 mm)] schedule 40 pipe.

Specifier Note: 6 inches (150 mm) drill-out requires oval-to-round adapter.

- k. Accessories: [Inlet/Outlet/Closing end cap with 4 inches (100 mm) schedule 40 outlet] [Inlet/Outlet end caps with 6 inches (150 mm) schedule 40 outlet].

3. ACO Drain S300K Polymer Concrete System:

- a. Material: Polymer concrete.
- b. Channels: 12 inches (300 mm) internal width.
- c. Length: [39.37 inches (1 m) neutral/sloped] [19.69 inches (0.5 m) neutral].
- d. Slope: [0.6% sloped] [Neutral].
- e. Metal Edge Rail: Ductile iron.
- f. Grates: [Ductile iron, ADA compliant, longitudinal slotted] [Ductile iron, slotted].
- g. Grate Locking System: PowerLok.
- h. Grate Load Class: [Class E600 - 134,800 lb/2323 psi (61,199 kg/16,005 kPa)] [Class F900 - 202,320 lb/3485 psi (91,853 kg/24,012 kPa)] in compliance with DIN 19580.

Specifier Note: A special top section and the Series 600 in-line catch basin base provide an in-line catch basin.

- i. Catch Basins: Series 600.
- j. Outlets: Channel bottom drill-outs for PVC outlets [6 inches (150 mm)] [8 inches (200 mm)] schedule 40 pipe.
- k. Accessories: Inlet/Outlet/Closing end cap with [6 inches (150 mm) schedule 40] [8 inches (200 mm) schedule 40] [10 inches (250 mm) schedule 40 outlet].

4. ACO Drain FG100 Fiberglass System:

- a. Material: Polyester fiberglass.
- b. Channels: 3.75 inches (95 mm) internal width.
- c. Length: [9'10" (3 m) neutral/sloped] [39.37 inches (1 m) neutral].

- d. Slope: [1.0% sloped] [Neutral].
 - e. Frames - Channel and Ends: [Black coated steel] [Galvanized steel] [Stainless steel].
 - f. Grates: [410/411 galvanized steel, perforated - ADA compliant] [451/465 stainless steel, perforated - ADA compliant] [445 stainless steel, longitudinal - ADA compliant] [494/495 plastic, longitudinal - ADA compliant] [440 fiberglass, slotted] [420/425/435 galvanized steel, slotted] [450/455/490 stainless steel, slotted] [492 resin composite, slotted] [405 galvanized steel, mesh] [430 stainless steel, mesh] [485 brass, perforated - ADA compliant] [479 ductile iron, mosaic] [477 ductile iron, longitudinal slotted] [478 ductile iron, slotted - ADA compliant] [461 ductile iron, slotted].
 - g. Grate Locking System: QuickLok.
 - h. Grate Load Class: [Class A15 - 3372 lb/70 psi (1531 kg/482 kPa)] [Class C250 - 56,200 lb/1162 psi (25,515 kg/8006 kPa)] [Class D400 - 89,920 lb/1859 psi (40,824 kg/12,809 kPa)] [Class E600 - 134,800 lb/2788 psi (61,199 kg/19,209 kPa)] in compliance with DIN 19580.
 - i. Catch Basins: [Type 900] [Type F660] [Type F880].
 - j. Outlets: Channel bottom outlet adapter [4 inches (100 mm) schedule 40] [6 inches (150 mm) schedule 40 outlet].
 - k. Accessories: [Closing end cap, female] [Closing/Outlet end cap, male with {4 inches (100 mm) schedule 40} {6 inches (150 mm) schedule 40 outlet}].
5. ACO Drain FG200 Fiberglass System:
- a. Material: Polyester fiberglass.
 - b. Channels: 8 inches (200 mm) internal width.
 - c. Length: [9 feet (2.75 m) neutral/sloped] [3 feet (0.915 m) neutral].
 - d. Slope: [1.0% sloped] [Neutral].
 - e. Frames - Channel and Ends: [Black coated steel] [Galvanized steel] [Stainless steel].
 - f. Grates: [Galvanized steel, bar] [Stainless steel, bar] [Ductile iron, slotted] [Ductile iron, ADA compliant, longitudinal slotted].
 - g. Grate Locking System: Bolts - 2 per 18 inches (457 mm) grate.
 - h. Grate Load Class: [Class C250 - 56,000 lb/968 psi (25,424 kg/6670 kPa)] [Class E600 - 134,800 lb/2323 psi (61,199 kg/16,005 kPa)] in compliance with DIN 19580.
 - i. Catch Basins: [Type F660] [Type F880].
 - j. Outlets: Channel bottom outlet adapter [4 inches (100 mm) schedule 40] [6 inches (150 mm) schedule 40] [8 inches (200 mm) schedule 40 outlet].
 - k. Accessories: [Closing end cap, female] [Closing end cap, male] [Outlet end cap with {4 inches (100 mm) schedule 40} {6 inches (150 mm) schedule 40} {8 inches (200 mm) schedule 40 outlet}].

Specifier Note: Edit article below to suit project requirements. If substitutions are permitted, edit text below. Add text to refer to Division 01 Project Requirements (Product Substitutions Procedures) Section.

2.02 PRODUCT SUBSTITUTIONS

- A. Substitutions: No substitutions permitted.

Specifier Note: Add articles below for allowances and unit prices, if required for project. If added, state work covered. Coordinate with Part 1 General Summary Article, Division 01 Sections and other Bid and Contract Documents.

PART 3 EXECUTION

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Comply with manufacturer's product data, including product technical bulletins, product catalog, installation instructions and installation section drawings.

3.02 EXAMINATION

- A. Site Verification of Conditions: Verify that conditions of substrates previously installed under other sections are acceptable for product installation in accordance with manufacturer's instructions.

3.03 PREPARATION

- A. Surface Preparation: Ensure ground conditions are suitable. Poor site conditions require engineering advice.

Specifier Note: Coordinate article below with manufacturer's recommended installation details and requirements.

3.04 INSTALLATION

- A. Precast Trench Drain System Installation: Ensure channels are surrounded on all 3 sides by concrete of minimum 3000 psi (20,670 kPa) compressive strength. Check relevant installation section drawings for dimensions required.

Specifier Note: Expansion joints may be required and engineering advice should be sought.

- B. Interface with Other Work: [Specify applicable requirements for interface with other work.].
- C. Site Tolerances: [Specify applicable site tolerances for specified product(s) installation.].
- D. Related Products Installation: Refer to other sections in Related Sections paragraph herein for related products installation.

3.05 FIELD QUALITY CONTROL

- A. Site Tests [Installation and Post-Installation Testing]: [Specify applicable test requirements to be performed during and/or after product installation.].
- B. Inspection:
 - 1. Ensure grates are in correct position and captive.
 - 2. Ensure pipe and outlet connections are cleared and checked.

Specifier Note: Edit paragraph below. Establish number and duration of periodic site visits with Owner and manufacturer and specify below. Consult manufacturer for services required. Coordinate paragraph below with Division 01 Quality Assurance Section and Part 1 Quality Assurance Submittals herein. Delete if manufacturer's field service not required.

- C. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.
 - 1. Site Visits: [Specify number and duration of periodic site visits.].

3.06 CLEANING

- A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

3.07 PROTECTION

- A. Protection: Protect installed product and finish surfaces from damage during subsequent construction.

END OF SECTION