



**ITEM 203 - ROADWAY MISC.: EPS GEOFOAM FILL**

THIS WORK CONSISTS OF FURNISHING, TRIMMING AND PLACING BLOCK-MOLDED EXPANDED POLYSTYRENE (EPS) FOR USE AS A GEOFOAM GEOSYNTHETIC PRODUCT IN APPLICATIONS REQUIRING LIGHTWEIGHT FILL MATERIAL.

FURNISH EPS GEOFOAM BLOCKS PRODUCED BY A MANUFACTURER WITH A QUALITY CONTROL PROGRAM WHICH IS MONITORED AND CERTIFIED BY AN ACCREDITED, THIRD-PARTY TESTING ORGANIZATION. AT LEAST 20 DAYS BEFORE THE WORK IS TO BEGIN, SUBMIT TO THE ENGINEER THE FOLLOWING DOCUMENTS:

1. CERTIFIED TEST DATA SHOWING THE EPS GEOFOAM MEETS THE SPECIFIED REQUIREMENTS.
2. MANUFACTURER'S QUALITY CONTROL PLAN AND EVIDENCE OF THIRD-PARTY QUALITY CONTROL MONITORING.
3. SHOP DRAWINGS SHOWING BLOCK THICKNESS, WIDTH, LENGTH, AND LAYING PATTERN OR SCHEDULE.

FURNISH EPS GEOFOAM BLOCKS CONFORMING TO ASTM D 6817, RIGID CELLULAR POLYSTYRENE GEOFOAM, ACCORDING TO THE GEOFOAM TYPE INDICATED IN THE PLANS AND THE TABLE BELOW.

ASTM TYPE	EPS22	EPS29	EPS39	EPS46
MINIMUM DENSITY, LB/CU.FT.	1.35	1.8	2.4	2.85
COMPRESSIVE RESISTANCE				
AT 1% STRAIN, PSI	7.3	10.9	15.0	18.6
AT 5% STRAIN, PSI	16.7	24.7	35.0	43.5
AT 10% STRAIN, PSI	19.6	29.0	40.0	50.0
FLEXURAL STRENGTH, PSI	35.0	50.0	60.0	75.0

FURNISH BLOCKS TREATED BY THE MANUFACTURER WITH A TESTED AND PROVEN TERMITE TREATMENT FOR BELOW GRADE APPLICATIONS. THE TREATMENT SHALL BE EPA REGISTERED, MEET REQUIREMENTS OF ICC ES AC239, AND BE RECOGNIZED IN AN ICC ES REPORT. FURNISH BLOCKS THAT MEET THE PRODUCT FLAMMABILITY REQUIREMENTS SPECIFIED IN ASTM C578.

FURNISH BLOCKS THAT ARE SMOOTH AND FLAT ON ALL SURFACES AND HAVE A DIMENSIONAL TOLERANCE OF ±0.5 PERCENT. THE CORNER OR EDGE FORMED BY ANY TWO FACES OF A BLOCK SHALL BE PERPENDICULAR. THE DEVIATION OF ANY FACE OF THE BLOCK FROM A THEORETICAL PERPENDICULAR PLANE SHALL NOT EXCEED 1/8 INCH OVER A DISTANCE OF 20 INCHES. ANY ONE FACE OF A BLOCK SHALL NOT DEVIATE FROM A THEORETICAL PLANE BY MORE THAN 1/4 INCH WHEN MEASURED USING A STRAIGHTEDGE WITH A LENGTH OF 10 FEET.

BEFORE SHIPPING TO THE SITE, ENSURE BLOCKS ARE SEASONED BY STORING THEM AT THE MANUFACTURER'S FACILITY FOR AT LEAST 72 HOURS AT NORMAL AMBIENT ROOM TEMPERATURE AFTER BEING RELEASED FROM THE MOLD. DURING SEASONING, ALLOW ADEQUATE SPACE BETWEEN THE BLOCKS TO ALLOW AIR CIRCULATION SO AS TO FOSTER THE OUTGASSING OF BLOWING AGENT AND TRAPPED CONDENSATE FROM WITHIN THE BLOCKS.

LABEL EACH BLOCK WITH THE MANUFACTURER'S NAME, ASTM EPS TYPE, THE DATE THE BLOCK WAS MOLDED, THE WEIGHT AND THE DENSITY OF THE BLOCK AS MEASURED AFTER SEASONING.

PROTECT THE BLOCKS FROM EXPOSURE TO THE FOLLOWING:

1. ORGANIC SOLVENTS SUCH AS ACETONE, BENZENE, AND PAINT THINNER
2. PETROLEUM BASED SOLVENTS SUCH AS GASOLINE AND DIESEL FUEL
3. HEAT SOURCES OR ACTIVITY THAT PRODUCES HEAT OR FLAME, INCLUDING TOBACCO SMOKING
4. MORE THAN 30 DAYS EXPOSURE TO SUNLIGHT

PROVIDE TIE DOWN STRAPS, SANDBAGS OR OTHER FLEXIBLE WEIGHTS TO PREVENT BLOCKS FROM BEING DISLODGED BY WIND. DO NOT STORE BLOCKS WHERE THERE IS A POTENTIAL FOR FLOODING.

PROTECT BLOCKS FROM DAMAGE. BLOCKS WITH SLIGHT DAMAGE WHICH AFFECTS A VOLUME OF 0.12 CUBIC FEET OR LESS MAY BE USED AS IS. BLOCKS WITH MODERATE DAMAGE WHICH AFFECTS A VOLUME OF 0.35 CUBIC FEET OR LESS MAY BE USED AND THE DAMAGED AREA FILLED WITH SAND. DO NOT USE BLOCKS WITH DAMAGE THAT AFFECTS A VOLUME GREATER THAN 0.35 CUBIC FEET. THE CONTRACTOR MAY CUT AND REMOVE THE DAMAGED PORTION OF A BLOCK AND THEN USE THE REMAINING UNDAMAGED PORTION OF THE BLOCK IF IT MEETS ALL OTHER REQUIREMENTS.

PREPARE THE SURFACE ON WHICH THE FIRST LAYER OF BLOCKS WILL BE PLACED BY STRIPPING ALL VEGETATION AND GRADING SO THAT IT IS LEVEL WITHIN A TOLERANCE OF 0.5 INCH OVER A 10 FT DISTANCE. PLACE GRANULAR MATERIAL CONFORMING TO SIZE NO. 9 IN TABLE 703.01 IN THE CM&S ON THE SURFACE TO FILL ANY LOW SPOTS IN THE SURFACE. ALSO USE NO. 9 SIZE GRANULAR MATERIAL TO FILL VOIDS BETWEEN THE SOIL AND SIDES OF THE BLOCKS.

PLACE BLOCKS AS INDICATED ON THE PLANS AND SHOP DRAWINGS. PLACE BLOCKS SO THAT ALL VERTICAL AND HORIZONTAL JOINTS BETWEEN BLOCKS ARE TIGHT. GAPS SHALL NOT EXCEED 1 INCH. AVOID CONTINUOUS VERTICAL JOINTS BY OFFSETTING AND ROTATING SUCCESSIVE LAYERS OF BLOCKS. OFFSET BLOCKS AT LEAST 2 FEET BETWEEN LAYERS. THE SURFACE OF EACH LAYER OF BLOCKS ON WHICH ANOTHER LAYER WILL BE PLACED MUST BE LEVEL TO WITHIN 0.5 INCH OVER A 10 FT DISTANCE. CONSTRUCT THE SURFACE OF THE UPPERMOST LAYER OF BLOCKS TO THE GRADE SHOWN ON THE PLANS TO A TOLERANCE OF ZERO TO MINUS 2.5 INCHES.

TRIM THE BLOCKS AS REQUIRED USING A SAW OR HOT WIRE.

PLACE CONNECTOR PLATES BETWEEN HORIZONTAL LAYERS OF BLOCKS. PLACE AT LEAST TWO CONNECTOR PLATES PER BLOCK. FURNISH CONNECTOR PLATES MANUFACTURED FROM GALVANIZED STEEL OR STAINLESS STEEL AND THAT ARE BARBED ON BOTH SIDES. EACH CONNECTOR PLATE SHALL HAVE A LATERAL HOLDING STRENGTH OF AT LEAST 60 LBS.

PORTIONS OF THE GEOFOAM FILL THAT ARE NOT BENEATH A CONCRETE DISTRIBUTION SLAB OR CONCRETE APPROACH SLAB MUST BE PROTECTED FROM HYDROCARBON SPILLS (E.G. DIESEL OR GASOLINE) BY COVERING THE GEOFOAM BLOCKS ON THE TOP AND SIDES FURNISH A GEOMEMBRANE MANUFACTURED FROM A TRI-POLYMER MATERIAL CONSISTING OF POLYVINYL CHLORIDE, ETHYLENE INTERPOLYMER ALLOY, AND A POLYURETHANE OR A COMPARABLE POLYMER COMBINATION. THE MATERIAL SHALL MEET THE FOLLOWING PHYSICAL AND CHEMICAL REQUIREMENTS.

- THICKNESS: MINIMUM 30 MILS (ASTM D751)
- UNLEADED GASOLINE VAPOR MAXIMUM TRANSMISSION RATE 0.40 OZ. PER SQUARE FOOT PER 24 HOURS (ASTM D814)
- GRAB TENSILE STRENGTH: MINIMUM 550 LBS BOTH MACHINE AND CROSS DIRECTION (ASTM D751)
- ELONGATION AT BREAK: 20% MINIMUM (ASTM D751)
- TOUGHNESS: MINIMUM 11,000 POUNDS (GRAB TENSILE STRENGTH MULTIPLIED BY PERCENT ELONGATION)
- PUNCTURE RESISTANCE: MINIMUM 750 LB (ASTM D751 BALL TIP)
- COLD CRACK: PASS AT -30° FAHRENHEIT (ASTM D2136 1-INCH MANDREL, 4 HOURS)
- FACTORY SEAMS: 2-INCH MINIMUM BONDED WIDTH
- SHEAR: MINIMUM 320 LB (ASTM D751)

PROVIDE CERTIFIED TEST DATA FROM THE MANUFACTURER THAT DEMONSTRATES THE GEOMEMBRANE MEETS THE ABOVE REQUIREMENTS. OVERLAP THE GEOMEMBRANE A MINIMUM OF 18 INCHES AT THE ENDS AND SIDES. PLACE THE BEGINNING OF EACH NEW ROLL BENEATH THE END OF THE PREVIOUS ROLL TO PREVENT THE ADVANCING FILL FROM LIFTING THE GEOMEMBRANE. STAGGER END OVERLAPS AT LEAST 5 FEET FROM THE OTHER END OVERLAPS IN ADJACENT ROLLS.

DO NOT DRIVE, OPERATE CONSTRUCTION EQUIPMENT, OR PLACE CONCENTRATED LOADS DIRECTLY ON THE BLOCKS. REMOVE AND REPLACE BLOCKS DAMAGED DUE TO THE CONTRACTOR'S OPERATIONS AT NO EXPENSE TO THE DEPARTMENT. PLACE AT LEAST 12 INCHES OF FILL OVER THE TOP OF THE BLOCKS BEFORE BEGINNING COMPACTION.

THE DEPARTMENT WILL MEASURE THE QUANTITY OF EPS GEOFOAM FILL BY THE NUMBER OF CUBIC YARDS COMPLETED AND ACCEPTED IN PLACE. INCLUDE IN THE CONTRACT UNIT PRICE FOR EPS GEOFOAM FILL THE COST OF SITE PREPARATION, GRANULAR MATERIAL, CONNECTOR PLATES, GEOMEMBRANE WRAP, AND OTHER ITEMS WHICH DO NOT HAVE A SEPARATE PAY ITEM BUT ARE NECESSARY TO INSTALL THE EPS GEOFOAM FILL. THE DEPARTMENT WILL PAY FOR ACCEPTED QUANTITIES AT THE CONTRACT PRICES AS FOLLOWS:

ITEM	UNIT	DESCRIPTION
203	CY	ROADWAY MISC.: EPS GEOFOAM FILL

**ITEM 511 - CLASS QC2 CONCRETE WITH QC/QA. BRIDGE DECK. AS PER PLAN**

THIS ITEM SHALL BE PERFORMED ACCORDING TO C&MS 511, EXCEPT DECK FORMWORK HANGERS SHALL BE GALVANIZED PER C&MS 711.02.

**ABBREVIATIONS:**

- ABUT. - ABUTMENT
- ADT - AVERAGE DAILY TRAFFIC
- ADTT - AVERAGE DAILY TRUCK TRAFFIC
- APPR. - APPROACH
- B - BOTTOM
- BL - BASELINE
- B.F. - BACK FACE
- BM - BENCHMARK
- BOT. OR BTM. - BOTTOM
- BRG. - BEARING
- BTA - BRIDGE TERMINAL ASSEMBLY
- CL - CENTERLINE
- C/C - CENTER TO CENTER
- C.I.P. - CAST-IN-PLACE
- C.J. - CONSTRUCTION JOINT
- CLR. - CLEAR
- CMS - CONSTRUCTION AND MATERIAL SPECIFICATIONS
- CONC. - CONCRETE
- CONSTR. - CONSTRUCTION
- CVN - CHARPY V-NOTCH
- DIA. - DIAMETER
- DIM. - DIMENSION
- DWG. - DRAWING
- E - EAST
- EB - EASTBOUND
- E.F. - EACH FACE
- EL. OR ELEV. - ELEVATION
- EOP - EDGE OF PAVEMENT
- EQ. - EQUAL
- EST. - ESTIMATED
- EX. - EXISTING
- EXP. - EXPANSION
- F.A. - FORWARD ABUTMENT
- F/F - FACE TO FACE
- F.F. - FRONT FACE
- FT. - FOOT OR FEET
- FTG. - FOOTING
- FWD. - FORWARD
- FWS - FUTURE WEARING SURFACE
- HMWM - HIGH MOLECULAR WEIGHT METHACRYLATE
- HORIZON - HORIZONTAL
- HW - HIGH WATER
- IN. - INCH
- JT. - JOINT
- L.F. - LEFT FORWARD
- LT. - LEFT
- MAX. OR MAX - MAXIMUM
- MIN. - MINIMUM
- MISC. - MISCELLANEOUS
- MSE - MECHANICALLY STABILIZED EARTH
- N - NORTH
- NB - NORTHBOUND
- NO. - NUMBER
- N.P.C.P.P. - NON-PERFORATED CORRUGATED PLASTIC PIPE
- OHWM - ORDINARY HIGH WATER MARK
- O/O - OUT TO OUT
- P.C.P.P. - PERFORATED CORRUGATED PLASTIC PIPE
- P.E.J.F. - PREFORMED EXPANSION JOINT FILLER
- PROP. - PROPOSED
- PSF - POUNDS PER SQUARE FOOT
- P.V.I. - POINT OF VERTICAL INTERSECTION
- Q - FLOW RATE
- R - RADIUS
- R.A. - REAR ABUTMENT
- RCP - ROCK CHANNEL PROTECTION
- REQD. - REQUIRED
- R.F. - RIGHT FORWARD
- R.R. - RAILROAD
- RT. - RIGHT
- R/W - RIGHT OF WAY
- S - SOUTH
- SB - SOUTHBOUND
- SER. - SERIES
- SHLDR - SHOULDER
- SPA. - SPACE OR SPACES
- STA. - STATION
- STD. - STANDARD
- STR - STRAIGHT
- T - TOP
- T&B - TOP & BOTTOM
- TBD - TO BE DETERMINED
- TBR - TO BE RELOCATED
- TEMP. - TEMPORARY
- T.O.S. OR T/S - TOP OF SLOPE
- TR - TO REMAIN
- T/T - TOE TO TOE
- TYP. - TYPICAL
- UNK - UNKNOWN
- U.N.O. - UNLESS NOTED OTHERWISE
- VAR. - VARIES
- V - VELOCITY
- V.C. - VERTICAL CURVE
- VPF - VANDAL PROTECTION FENCE
- W - WEST
- WB - WESTBOUND
- WWR - WELDED WIRE REINFORCEMENT

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DESIGNED: MRV CHECKED: DFT  
DRAWN: MRV REVISED:  
REVIEWED: C/JW STRUCTURE FILE NUMBER: 1500369  
DATE: 4/17/2019

**GENERAL NOTES**  
BRIDGE NO. COL-7-2634  
S.R. 7 OVER NORFOLK SOUTHERN RAILROAD

COL-7-26.30  
PID No. 99646  
4/53  
42  
91

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DATE: 4/1/2019  
 REVIEWED: C-JW  
 STRUCTURE FILE NUMBER: 1500369

DRAWN: MRV  
 CHECKED: DFT

ESTIMATED QUANTITIES  
 BRIDGE NO. COL-7-2634  
 S.R. 7 OVER NORFOLK SOUTHERN RAILROAD

COL-7-26.30  
 PID No. 99646

5 / 53  
 43  
 91

MADE BY: MRV		DATE: 3/29/2019		ESTIMATED QUANTITIES				STRUCTURAL FILE NUMBER: 1500369	
CHECKED BY: DFT		DATE: 7/31/2019							
ITEM	TOTAL	UNIT	DESCRIPTION	SUPERSTRUCTURE	ABUTMENTS	GENERAL	REFERENCE SHEET NO.		
202	LUMP		PORTIONS OF STRUCTURE REMOVED, OVER 20 FOOT SPAN, AS PER PLAN			LUMP	3, 7, 9 OF 53		
202	98	SY	APPROACH SLAB REMOVED			98			
202	98	SY	WEARING COURSE REMOVED			98			
203	825	CY	ROADWAY, MISC.: EPS GEOFOAM FILL		825		4 OF 53		
503	LUMP		COFFERDAMS AND EXCAVATION BRACING			LUMP			
503	766	CY	UNCLASSIFIED EXCAVATION			766			
505	LUMP		PILE DRIVING EQUIPMENT MOBILIZATION			LUMP			
507	1,380	FT	STEEL PILES HP14X89, FURNISHED		1,380				
507	1,260	FT	STEEL PILES HP14X89, DRIVEN		1,260				
507	935	FT	16" CAST-IN-PLACE REINFORCED CONCRETE PILES, DRIVEN		935				
507	1,030	FT	16" CAST-IN-PLACE REINFORCED CONCRETE PILES, FURNISHED		1,030				
507	217	FT	PREBORED HOLES, AS PER PLAN		217		3 OF 53		
507	24	EACH	STEEL POINTS OR SHOES		24				
509	146,394	LB	EPOXY COATED REINFORCING STEEL	50,524	95,870				
511	2	EACH	SEMI-INTEGRAL DIAPHRAGM GUIDE, AS PER PLAN		2		33,48, 50 OF 53		
511	191	CY	CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK, AS PER PLAN	191			4 OF 53		
511	51	CY	CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK (PARAPET)	51					
511	613	CY	CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT INCLUDING FOOTING		613				
512	890	SY	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)	311	473	106			
512	47	SY	SEALING CONCRETE BRIDGE DECKS WITH HMWM RESIN	47					
512	44	SY	TYPE 2 WATERPROOFING	6	38				
513	136,000	LB	STRUCTURAL STEEL MEMBERS, LEVEL 4	136,000					
513	2,574	EACH	WELDED STUD SHEAR CONNECTORS	2,574					
516	17	SF	1" PREFORMED EXPANSION JOINT FILLER	17					
516	238	SF	2" PREFORMED EXPANSION JOINT FILLER		238				
516	117	FT	SEMI-INTEGRAL ABUTMENT EXPANSION JOINT SEAL			117			
516	101	FT	2" DEEP JOINT SEALER			101			
516	12	EACH	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE), AS PER PLAN (13"x19"x2.037" PAD W/ STEEL LOAD PLATES AND HP12x53 PEDESTAL)	12			34 OF 53		
518	210	CY	POROUS BACKFILL WITH GEOTEXTILE FABRIC		210				
518	405	FT	6" PERFORATED CORRUGATED PLASTIC PIPE			405			
518	120	FT	6" NON-PERFORATED CORRUGATED PLASTIC PIPE, INCLUDING SPECIALS, AS PER PLAN			120	19 OF 53		
518	2,532	SF	STRUCTURE DRAINAGE, MISC.: PREFABRICATED GEOCOMPOSITE DRAIN		2,532		3 OF 53		
523	1	EACH	DYNAMIC LOAD TESTING		1				
526	316	SY	REINFORCED CONCRETE APPROACH SLABS (T=17"), AS PER PLAN			316	46 OF 53		
526	101	FT	TYPE A INSTALLATION			101			
607	200	FT	VANDAL PROTECTION FENCE, 6' STRAIGHT, COATED FABRIC	200					
601	153	SY	RIPRAP, WITH GROUT			153			
625	862	FT	CONDUIT, 4", 725.04, AS PER PLAN			862	7 OF 53		
846	42	CF	POLYMER MODIFIED ASPHALT EXPANSION JOINT SYSTEM			42			
867	LUMP		TEMPORARY WIRE FACED MECHANICALLY STABILIZED EARTH WALL			LUMP			