

GABION CHECK DAM GENERAL NOTES
1. GABIONS SHALL BE APPLIED AS CHECK DAMS WHERE ALLOWABLE MAXIMUM SHEAR FORCES AND VELOCITIES FOR LOOSE RIP RAP ARE EXCEEDED.
2. CHECK DAMS SHALL NOT BE USED IN LIVE-ACTIVE PERENNIAL STREAMS.
3. CHECK DAMS ARE TO BE USED AS, PRIMARILY, AN EROSION CONTROL MEASURE DUE TO VELOCITY REDUCTION.
4. CHECK DAMS MAY REMAIN IN PLACE AS PERMANENT CHECK DAMS, IF SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.
5. THE CENTER OF THE CHECK DAM MUST BE AT LEAST 0.3 METERS LOWER THAN THE OUTER EDGES. THIS WILL ELIMINATE THE BASKET-SOIL FAILURE POINT WHERE THE GABION CHECK DAM AND NATURAL GROUND MERGE.
6. WIRE MESH GABION ALTERNATES: A. WOVEN MESH - NON-RAVELING TRIPLE TWISTED HEXAGONAL WIRE MESH, CONSISTING OF TWO WIRES TWISTED TOGETHER IN THREE 180 DEGREE TURNS. AREA OF MESH OPENINGS SHALL NOT EXCEED 6,452 SQUARE MILLIMETERS. THE MINIMUM LINEAR DIMENSION OF A WOVEN MESH OPENING SHALL NOT EXCEED 114 MILLIMETERS. B. WELDED MESH - WELDED WIRE MESH WITH A UNIFORM SQUARE OR RECTANGULAR PATTERN AND RESISTANCE WELD AT EACH INTERSECTION. THE WELDED WIRE CONNECTIONS SHALL CONFORM WITH THE REQUIREMENTS OF ASTM A185, INCLUDING WIRE SMALLER THAN W1.2 (3.1 mm.), EXCEPT THAT THE WELDED CONNECTIONS SHALL HAVE A MINIMUM AVERAGE SHEAR STRENGTH OF 70% AND A MINIMUM SHEAR STRENGTH OF 60% OF THE MINIMUM ULTIMATE TENSILE STRENGTH OF THE WIRE. WIRE SHALL BE GALVANIZED AFTER THE FORMING OF THE WELDED MESH.
7. WIRE FOR FABRICATION AND ASSEMBLY SHALL BE HOT-DIPPED GALVANIZED. THE WIRE SHALL HAVE A MINIMUM TENSILE STRENGTH OF 413 MPa. GALVANIZED STEEL WIRE SHALL CONFORM TO ASTM A641, CLASS 3, SOFT TEMPER.
8. TYPE 1, TYPE 2 AND TYPE 3 FASTENERS MUST PROVIDE A MINIMUM STRENGTH OF 635 kg PER METER FOR GABION BASKETS. ALL FASTENERS SHALL MEET ALL OF THE COATING REQUIREMENTS OF THE GABION MANUFACTURER IN ADDITION TO ANY REQUIREMENTS SPECIFIED IN THESE GENERAL NOTES.
9. TYPE 4 SPIRAL BINDERS ARE FOR WELDED-MESH GABION BASKETS ONLY AND SHALL BE FORMED FROM WIRE MEETING THE SAME QUALITY AND COATING THICKNESS REQUIREMENTS AS SPECIFIED FOR THE GABION BASKETS. ALTERNATE FASTENERS FOR USE WITH WIRE MESH GABIONS, SUCH AS RING FASTENERS, SHALL BE FORMED FROM WIRE MEETING THE SAME QUALITY AND COATING THICKNESS REQUIREMENTS AS SPECIFIED FOR THE GABIONS.
10. FOUNDATION PREPARATION - SURFACE IRREGULARITIES, LOOSE MATERIAL, VEGETATION, AND ALL FOREIGN MATTER SHALL BE REMOVED FROM FOUNDATIONS.
11. ASSEMBLY - ROTATE THE GABION PANELS INTO POSITION AND JOIN THE VERTICAL EDGES WITH FASTENERS FOR GABION ASSEMBLY. WHERE LACING WIRE IS USED, WRAP THE WIRE WITH ALTERNATING SINGLE AND DOUBLE HALF-HITCHES AT INTERVALS BETWEEN 102 TO 127 MILLIMETERS. WHERE SPIRAL FASTENERS ARE USED FOR WELDED-WIRE MESH, CRIMP THE ENDS TO SECURE THE SPIRALS IN PLACE. WHERE RING TYPE ALTERNATE FASTENERS ARE USED FOR BASKET ASSEMBLY, INSTALL THE FASTENERS AT A MAXIMUM SPACING OF 152 MILLIMETERS. USE THE SAME FASTENING PROCEDURES TO INSTALL INTERIOR DIAPHRAGMS WHERE THEY ARE REQUIRED. INTERIOR DIAPHRAGMS WILL BE REQUIRED WHEN ANY INSIDE DIMENSION OF A GABION BASKET EXCEEDS 0.915 METERS.
12. PLACEMENT - PLACE THE EMPTY GABIONS ON THE FOUNDATION AND INTERCONNECT THE ADJACENT GABIONS ALONG THE TOP, BOTTOM, AND VERTICAL EDGES USING LACING WIRE. WRAP THE WIRE WITH ALTERNATING SINGLE AND DOUBLE HALF-HITCHES AT INTERVALS BETWEEN 102 TO 152 MILLIMETERS. UNLESS OTHERWISE SPECIFIED, LACING WIRE WILL BE THE ONLY FASTENER ALLOWED FOR INTERCONNECTING WOVEN MESH GABIONS. SPIRAL FASTENERS ARE COMMONLY USED FOR THE ASSEMBLY AND INTERCONNECTION OF WELDED MESH GABIONS. SPIRALS ARE SCREWED DOWN AT THE CONNECTING EDGES, THEN EACH END OF THE SPIRAL IS SECURELY TIED DOWN TO PREVENT UNRAVELING. LACING MAY BE USED AS NEEDED TO SUPPLEMENT THE INTERCONNECTION OF WELDED MESH GABIONS, AND THE CLOSING OF LIDS. FOR GABION LACING DETAILS, SEE ECM-STR-57.

GABION CHECK DAM GENERAL NOTES (CONT.)
13. UNLESS OTHERWISE SPECIFIED ON THE PLANS, THE VERTICAL JOINTS BETWEEN GABION BASKET UNITS OF ADJACENT LAYERS OR TIERS, ALONG THE LENGTH OF THE CHECK DAM, SHALL BE STAGGERED BY A MINIMUM OF ONE CELL.
14. FILLING OPERATION A. FOR REINFORCEMENT, INTERNAL CONNECTING WIRES SHALL BE PLACED IN EACH UNRESTRAINED GABION CELL 450 MILLIMETERS OR GREATER IN HEIGHT, INCLUDING GABION CELLS LEFT TEMPORARILY UNRESTRAINED. TWO INTERNAL CONNECTING WIRES SHALL BE PLACED (TWO ACROSS THE WIDTH AND TWO ACROSS THE LENGTH) CONCURRENTLY WITH ROCK PLACEMENT, AT THE SPECIFIED DEPTH INTERVAL SHOWN ON STANDARD DRAWING ECM-STR-58. IN WOVEN MESH GABIONS THESE REINFORCING WIRES SHALL BE EVENLY SPACED ALONG THE FRONT FACE AND CONNECTING TO THE BACK FACE. ALL CONNECTING WIRES SHALL BE LOOPED AROUND TWO MESH OPENINGS AND EACH WIRE END SHALL BE SECURED BY A MINIMUM OF FIVE 180 DEGREE TWISTS AROUND ITSELF AFTER LOOPING. B. IN WELDED MESH GABIONS, OPTIONAL CORNER STIFFENERS MAY BE USED IN LIEU OF INTERNAL CONNECTING WIRE REINFORCEMENT. WHEN USED, DIAGONAL STIFFENERS SHALL BE PLACED ACROSS THE CORNERS OF THE GABIONS AT 305 mm FROM CORNERS AS DETAILED ON STANDARD DRAWING ECM-STR-58. LACING WIRE OR PREFORMED HOOKING WIRE STIFFENERS MAY BE USED. C. THE GABIONS SHALL BE CAREFULLY FILLED WITH ROCK, EITHER BY MACHINE OR HAND METHODS, ENSURING ALIGNMENT, AVOIDING BULGES, AND PROVIDING A COMPACT MASS THAT MINIMIZES VOIDS. MACHINE PLACEMENT WILL REQUIRE SUPPLEMENTING WITH HAND WORK TO ENSURE THE DESIRED RESULTS. THE CELLS IN ANY ROW SHALL BE FILLED IN STAGES SO THAT THE DEPTH OF ROCK PLACED IN ANY ONE CELL DOES NOT EXCEED THE DEPTH OF ROCK IN ANY ADJOINING CELL BY MORE THAN 76 MILLIMETERS. ALONG THE EXPOSED FACES, THE OUTER LAYER OF STONE SHALL BE CAREFULLY PLACED AND ARRANGED BY HAND TO ENSURE A NEAT, COMPACT PLACEMENT WITH A UNIFORM APPEARANCE. D. THE LAST LAYER OF ROCK SHALL BE UNIFORMLY LEVELED TO THE TOP EDGES OF THE GABIONS. LIDS SHALL BE STRETCHED TIGHT OVER THE ROCK FILLING USING ONLY APPROVED LID CLOSING TOOLS AS NECESSARY. THE USE OF CROWBARS OR OTHER SINGLE POINT LEVERAGE BARS FOR LID CLOSING IS PROHIBITED, AS THEY MAY DAMAGE THE BASKETS. THE LID SHALL BE STRETCHED UNTIL IT MEETS THE PERIMETER EDGES OF THE FRONT AND END PANELS. THE GABION LID SHALL THEN BE SECURED TO THE SIDES, ENDS, AND DIAPHRAGMS WITH SPIRAL BINDERS, INTERLOCKING WIRE, OVERLAPPING RING FASTENERS, OR LACING WIRE WRAPPED WITH ALTERNATING SINGLE AND DOUBLE HALF-HITCHES IN THE MESH OPENINGS.
15. CARE SHOULD BE TAKEN WHEN PLACING ROCK IN GABIONS TO INSURE THAT THE GABION BASKETS WILL NOT BE DAMAGED OR BROKEN.
16. ROCK OR STONE SIZE FOR USE IN GABION BASKETS SHALL BE BETWEEN 102 AND 205 MILLIMETERS WITH A D ₅₀ OF 152 MILLIMETERS (MINIMUM) AND SHALL CONSIST OF FIELD STONE OR ROUGH UNHEWN QUARRY STONE. THE SPECIFIC GRAVITY OF INDIVIDUAL STONES SHALL BE A MINIMUM OF 2.6. STONES SHALL BE OF A QUALITY THAT WILL NOT DISINTEGRATE WITH EXPOSURE TO WATER OR WEATHERING.
17. SEPARATION GEOTEXTILE FABRIC SHALL MEET OR EXCEED THE REQUIREMENTS PROVIDED IN THE TABLE ON THIS SHEET.
18. GABION CHECK DAMS SHALL BE BID FOR UNDER ITEM NO. 209M09.25, GABION CHECK DAMS PER CUBIC METER. PAYMENT SHALL INCLUDE ALL MATERIALS, EQUIPMENT, EXCAVATION, GEOTEXTILE AND LABOR NECESSARY FOR CONSTRUCTION AND MAINTENANCE OF THE GABION CHECK DAMS.
19. SEDIMENT SHALL BE REMOVED FROM BEHIND THE GABION CHECK DAMS WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE DAM AND PAID FOR UNDER ITEM NO. 209M05, SEDIMENT REMOVAL PER CUBIC METER.

GABION CHECK DAM COMPONENT PROPERTIES *				
TYPE OF WIRE	MESH SIZE (mm)	U.S WIRE (GAGE) (mm)	GALVANIZED ZINC COATING (kg/m ²)	TOTAL DIAMETER CORE WIRE (mm)
WOVEN (TWISTED) WIRE MESH	83 X 114	12 (2.69 mm)	0.24	2.67
WELDED WIRE MESH	76 X 76	12 (2.69 mm)	0.24	2.67
SELVEDGE	—	10 (3.43 mm)	0.24	3.30
LACING WIRE	—	13.5 (2.19 mm)	0.24	2.21
INTERNAL REINFORCING WIRE	—	13.5 (2.19 mm)	0.24	2.21
SPIRAL BINDER	—	12 (2.69 mm)	0.24	2.67

* ALL COMPONENTS SHALL BE HOT-DIPPED GALVANIZED STEEL (SEE NOTE 6B REGARDING WELDED MESH GABIONS).

SEPARATION GEOTEXTILE SPECIFICATIONS		
FABRIC TYPE : NON-WOVEN, NEEDLE-PUNCHED GEOTEXTILE		
FABRIC PROPERTY	ASTM TEST METHOD	MINIMUM AVERAGE ROLL VALUES (MARV'S)
WEIGHT	ASTM D3776	MINIMUM 2.14 kg/m ²
GRAB TENSILE STRENGTH	ASTM D4632	>912 Newtons
GRAB ELONGATION	ASTM D4632	≥50%
MULLEN BURST	ASTM D3786	≥1758 kPa
PUNCTURE STRENGTH	ASTM D4833	≥356 Newtons
TRAPEZOIDAL TEAR	ASTM D4533	≥356 Newtons
APPARENT OPENING SIZE (AOS)	ASTM D4751	FINER THAN OR EQUAL TO 0.212 mm (NO.70) STANDARD SIEVE
PERMITTIVITY	ASTM D4491	≥1.2 SEC ⁻¹
WATER FLUX	ASTM D4491	≥3260 L/MIN/m ²
UV RESISTANCE	ASTM D4355	≥70% AT 500 HOURS



ALL UNITS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

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GENERAL NOTES
AND COMPONENT
PROPERTIES

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