

**IFB CQ9027/KPN;  
Amendment # A003  
SWITCH POINTS AND STOCK RAILS TECHNICAL SPECIFICATION**

**PART 1 - GENERAL**

**1.01 DESCRIPTION:**

- A. The work specified in this Section consists of manufacturing, testing, shop assembly, inspecting, packaging , and shipping of special trackwork materials.

**1.02 QUALITY ASSURANCE/CONTROL:**

- A. Quality Assurance Program must be submitted to the Authority and must be consistent with ISO 9001.

- B. Tolerances: Conform to the AREMA "Portfolio of Trackwork Plans" - Plan No. 1010-89, Permissible Variations in Completed Frogs; Plan No. 1011-84, Permissible Variations in Completed Switches; the AREMA "Specifications for Special Trackwork", Permissible Variations in Dimensions, Fits and Other Physical Attributes , page 100-92, Section 7. ; and the AREMA "Specifications for Steel Rails, Section 5, in all aspects unless modified by the Contract Documents and this Specification.

1. Switch tuck mating against the stock rail shall be such that the assembled switch, with minimal bar pressure acting on the switch rail at rod number 1, 25 % or more of the switch point contact length, starting from the tip of the point, shall make positive, firm contact with the ball of the stock rail.
2. Switch spring back shall be such that the assembled switch, with no pressure acting on the switch rail, the maximum allowable spring back between the switch point and the ball of the stock rail shall be 3/16 inch, measured six inches back from the tip of the point.

- C. Reference Specifications:

1. Except as modified in the Contract Documents, design, manufacture, test, assemble, inspect, ship special trackwork in accordance with the American Railway Engineering and Maintenance-of-Way Association (AREMA), "Portfolio of Trackwork Plans", and the AREMA "Manual for Railway Engineering".
2. Except as modified in the Contract Drawings, use rail in the special trackwork conforming to the requirements of the AREMA "Manual for Railway Engineering", Chapter 4, Part 2, Specifications for Steel Rails,

High Strength Rail, and as specified.

**1.03 Not Used**

**1.04 Not Used**

**1.05 SUBMITTALS:**

- A. Shop Drawings for special trackwork components, including the following:
  - 1. Split Switches, including stock rails and assembly.
- B. Shop drawings shall be submitted to WMATA for approval within 30 days after award .
- C. Testing Laboratory, testing equipment, test program plan, test procedures and test reports for the direct fixation rail fasteners including the following Testing Laboratory information for review by the Authority prior to testing:
  - 1. Name and address of the laboratory.
  - 2. A description of the facilities and testing equipment that will be assigned for this testing.
  - 1. Names, experience, and qualifications of the personnel that will be performing this testing.
- D. A certified copy of reports on the analyses and tests required by referenced ASTM specifications.

**1.06 PREASSEMBLY:**

- A. The Contractor shall provide a mock up switch panel complete with switch ties plates in order to completely assemble, the switch points and stock rails for inspection by the Authority and the Quality Control (QC) Staff prior to shipment as follows:
  - 1. Layout:

Manufactured Switch Points will be floor assembled to mating Stock Rails in a predetermined fixture for inspection. The fixture should include, but is not limited to, a minimum of 4 to 6 fixed plates (appropriate for a switch panel using the switch point/stock rail assembly to be inspected), a single clamp or stop at the heel to approximate the action of a heel block (in the event of a floating heel block design) and a single clamp to be located at

the designed first switch rod location.

2. Inspection Criteria:

The specific inspection criteria for a Switch Point/Stock Rail set should, at a minimum, include the following:

- \* Stock Rail Length
- \* Point Rail Assembly Length
- \* Line Of Straight Run (Stock Rail or Switch Point whichever is straight): (+/- 1/32")
- \* Point Tip to Point End of Stock Rail (+/- 1/2")
- \* Point Fit to Stock Rail (1/32" Max Gap for 75% of head contact area with one clamp at First Rod location & Heel if needed)
- \* Spreads at Stops (+/- 1/32")
- \* Spread at Heel Block (+/- 1/32")
- \* Stops (contact - 0.030" max. gap)
- \* Switch Heel Block (contact - 0.030" max. gap)
- \* Flangeway (if assembly is guarded): +/- 1/16" with point thrown to designed point throw.
- \* Proper Tags Applied

- B. Bracing, wedging, or support blocking will be permitted at the heel of the switch and the rails can be clamped at rod No. 1 to hold components to proper gauge and alignment.
- C. Variations from the Authority reviewed Shop Drawings or the General Documents will constitute noncompliance and will not be accepted for shipment unless or until proper modification is made and reviewed by the Authority.
- D. Make available to the Authority, without charge, the facilities and assistance to examine the work during its progress, and when the product is finished, to satisfy the Authority that the finished product will comply with the Contract Documents. Provide templates and one yard straight edge or longer, as necessary, to check flangeway, rail end drilling, switch rail planing, and other features of the Work usually checked by templates.
- E. Present material for inspection in a safe area away from excessive noise and manufacturing activities. Provide labor to facilitate inspection of the top, side and bottom of switches.
- F. Provide record of the Contractors completed switch point inspection checklist.

## **PART 2 - PRODUCTS**

### **2.01 GENERAL REQUIREMENTS:**

- A. Special trackwork materials, including oval-neck track bolts of one-inch

- nominal diameter, nuts and spring washers, and special trackwork assemblies: In accordance with AREMA as modified and as shown.
- B. Rail, switches, and other track material: In accordance with AREMA dimensional requirements for 115 RE rail section or as shown.
  - C. Heel ends of switch rails, and ends of stock, closure and connecting rails beveled in accordance with AREMA requirements.
  - D. Cut at rail ends in accordance with AREMA requirements except that tolerance to be taken up in the rail base.
  - E. Drill holes in accordance with joint manufacturer's instructions, plus or minus 1/32-inch.
  - F. All rail shall be in accordance with as specified and as shown.
    - 1. Guard rails: 132 RE section.
  - G. Drill and ream holes with edges beveled.

## **2.02 STOCK RAILS, CLOSURE RAILS AND CONNECTING RAILS:**

- A. Length: As shown plus or minus 1/8 inch.
- B. All rail ends drilled as shown except ends to be connected to CWR.
- C. Connecting rail drilled to match frog guard rail drilling.
- D. Standard Rail
  - 1. Rail Section and Weight shall be new 115 RE rail section, and shall be in conformance with AREMA Recommended Rail Sections, 115 RE Rail Section and Specifications for Steel Rails, 1994 except as specified.
  - 2. Rail shall be suitable for joining into continuous welded strings using both electric flashbutt and exothermic welding methods.
  - 3. Length as shown.
  - 4. The standard length of rails shall be either 39, 78 or 80 feet.
- E. High Strength (Head Hardened) Rail.
  - 1. High strength rail shall meet all of the requirements of Standard Rail.

2. High strength rail shall be head hardened.
3. High strength rail shall conform to all requirements for high strength rail specified in the AREMA Manual for Railway Engineering, Chapter 4.
4. Rails shall have a Brinell Hardness in the range of 341 to 388. A maximum hardness of 388 BHN may be exceeded provided a fully fine pearlitic structure is maintained.
5. Minimum tensile strength: 140,000 psi.
6. Minimum yield strength: 95,000 psi.

**2.03 - 2.04 Not used.**

**2.05 SWITCHES:**

1. Minimum yield strength: 95,000 psi.
2. Switch rails and stock rails: In accordance with as shown and as specified, and AREMA Plan 221-03, Detail 5100.
  - a. Switch rails may be thick web or constructed with reinforcing bars.
  - b. Switch rail lengths: as shown or as required for switch panel.
  - c. Bolts, rivets, fittings and spring washers in accordance with Appendix A of the AREMA, "Portfolio of Trackwork Plans".
  - d. Fabricate five bolt heel joint assembly in accordance with AREMA Plan 221-03 and AREMA Specifications for Special Trackwork.
  - e. Fabricate forged steel rail stops in accordance with AREMA requirements.
  - f. Switch inserts with bolts: As specified for frog inserts.
  - g. Drill stock rails for ballasted special trackwork as shown. Switch heaters will be furnished and installed by others.

- h. Floating heel blocks for No. 10 and No. 15 switch as shown.
  - i. Floating heel block for No. 8 guarded switch as manufactured by Rail Products and Fabricators or equal, modified as shown.
- 3. Guarded switches shall have a modified five bolt heel joint assembly to accommodate the stock rail, switch rail and guard rail in accordance with AREMA Plan 221-03 and AREMA Specifications.

## **2.06 thru 2.14 Not Used**

### **2.15 SEPARATOR BLOCKS:**

- A. Separator blocks shall be five inches long made of steel or cast iron configured for a 1-7/8 inch flangeway between 115 RE running rail and 132 RE guard rail.
- B. Connect separator blocks with a 1-3/8 inch high strength, square head bolt, spring washer and heavy hex nut with one beveled or flat headlock washer and one flat or beveled washer to provide square bearing and to permit tightening of nuts by wrench.

### **2.16 GUARD RAIL JOINTS:** As shown and where applicable.

Except for the insulated joint shown in the rail layout diagram, joints in the guard rail shall not be nearer than four feet to a joint in the 115 RE running rail.

## **PART 3 -EXECUTION**

### **3.01 PACKAGING:**

- A. The switch points shall be packaged as follows:
  - 1. For No. 6 guarded turnout and no. 6 guarded equilateral turnout switch points and stock rails shall be shipped with heel blocks and assembled.
  - 2. No. 6 std. , no. 8 std , no. 8 guarded , no. 10 and no.15 turnout switch points and stock rails shipped in pieces..
- B. Identification Numbers:
  - 1. As shown, each turnout has an identification number. This number shall be stamped on a metal tag and the tag affixed to each panel

and separate component bundle.

2. Tags shall be made of corrosive-resistant metal such as anodized aluminum or brass. Fastening nails shall be of the same material as the tags. Numbers shall be stamped in characters  $\frac{1}{2}$  inch minimum in height. Tags shall be a minimum of .050 inches thick, 1-1/4 inches wide and two inches long.
- C. Package and label parts and replacement materials in moisture-proof containers suitable for shipment and storage.
- D. Attach copies of shipping list in the package and so that the list is readable from the exterior of the package.

#### **PART 4 - MEASUREMENT AND PAYMENT**

**4.01 MEASUREMENT:** Measurement of work specified in this Section will be made in the following manner:

A. *Switch points and stock rails complete with heel blocks:*

1. *16'- 6" Straight switch point and 44'-2" curved stock rail for LH No. 6 guarded turnout Each*
2. *16'- 6" Curved switch point and 44'-4" straight stock rail for LH No. 6 guarded turnout Each*
3. *16'- 6" Straight switch point and 44'-2" curved stock rail for RH No. 6 guarded turnout Each*
4. *16'- 6" Curved switch point and 44'-4" straight stock rail for RH No. 6 guarded turnout Each*
5. *16'- 6" Straight switch point and 48'-3" curved stock rail for RH side No. 6 guarded Equilateral Each*
6. *16'- 6" Straight switch point and 48'-3" curved stock rail for LH side No. 6 guarded Equilateral Each*

B. *Switch points:*

1. *16'- 6" Straight switch point for LH No. 8 turnout Each*
2. *16'- 6" Straight switch point for RH No. 8 turnout Each*
3. *26'-0" Straight switch point for LH No. 8 guarded turnout Each*

4. 26'-0" Straight switch point for RH No. 8 guarded turnout Each
5. 26'-0" Curved switch point for LH No. 8 guarded turnout Each
6. 26'-0" Curved switch point for RH No. 8 guarded turnout Each
7. 19'-6" Straight switch point for LH No. 10 turnout Each
8. 19'-6" Straight switch point for RH No. 10 turnout Each
9. 19'-6" Curved switch point for LH No. 10 turnout Each
10. 19'-6" Curved switch point for RH No. 10 turnout Each
11. 35' 0" Straight switch point for LH No. 10 turnout Each
12. 35'-0" Straight switch point for RH No. 10 turnout Each
13. 35'-0" Curved switch point for LH No. 10 turnout Each
14. 35'-0" Curved switch point for RH No. 10 turnout Each
15. 35' 0" Straight switch point for LH No. 15 turnout Each
16. 35'-0" Straight switch point for RH No. 15 turnout Each
17. 35'-0" Curved switch point for LH No. 15 turnout Each
18. 35'-0" Curved switch point for RH No. 15 turnout Each

C. Stock Rails:

1. 38 ' 0" Curved stock rail for LH No. 6 turnout Each
2. 38 ' 0" Curved stock rail for RH No. 6 turnout Each
3. 39 ' 0" Straight stock rail for LH No. 6 turnout Each
4. 39 ' 0" Straight stock rail for RH No. 6 Turnout Each
5. 31`6" Curved t stock rail for LH No. 8 turnout Each
6. 31`6" Curved stock rail for RH No. 8 turnout Each
7. 33'-6" Straight stock rail for LH No. 8 turnout Each
8. 33'-6" Straight stock rail for RH No. 8 turnout Each

9. 52'-10 " *Straight stock rail for LH No. 8 turnout Each*
10. 52'-10" *Straight stock rail for RH No. 8 turnout Each*
11. 56'-7 1/2" *Curved stock rail for LH No. 8 turnout Each*
12. 56'-7 1/2" *Curved stock rail for RH No. 8 turnout Each*
13. 32'-6" *Curved stock rail for LH No. 10 turnout Each*
14. 32'-6" *Curved stock rail for RH No. 10 turnout Each*
15. 54'10" *Curved stock rail for LH No. 10 Turnout Each*
16. 52' 10 " *Curved stock rail for RH No. 10 Turnout Each*
17. 34'-8" *Straight stock rail for LH No. 10 Turnout Each*
18. 34'-8" *Straight stock rail for RH No. 10 Turnout Each*
19. 37'-10" *Straight stock rail for LH No. 15 Turnout Each*
20. 37'-10" *Straight stock rail for RH No. 15 Turnout Each*
21. 37'-6" *Curved stock rail for LH No. 15 Turnout Each*
22. 37'-6" *Curved stock rail for RH No. 15 Turnout Each*

**END OF SECTION**