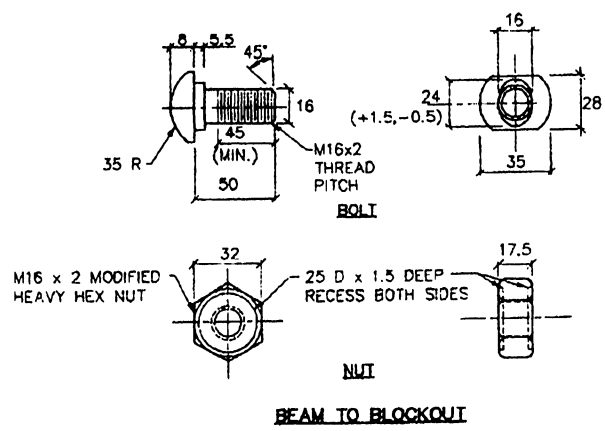
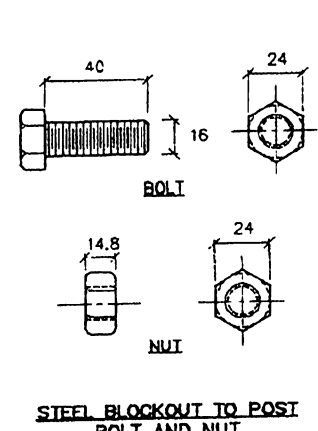


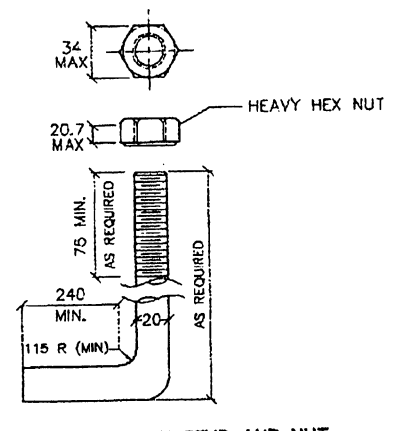
SPLICE BOLT AND NUT



BEAM TO BLOCKOUT BOLT AND NUT



STEEL BLOCKOUT TO POST BOLT AND NUT



J-HOOK STUD AND NUT

I. SPECIFICATIONS

- A. THE GEOMETRY AND MATERIAL SPECIFICATIONS FOR THIS BOLT AND NUT ARE FOUND IN AASHTO M180. THE BOLT SHALL HAVE M16x2 THREADS AS DEFINED IN ANSI B1.13M FOR CLASS 6g TOLERANCES. BOLT MATERIAL SHALL CONFORM TO ASTM F568 FOR CLASS 4.6 (400 MPa TENSILE STRENGTH AND 240 MPa YIELD STRENGTH). ZINC-COATED BOLT HEADS SHALL BE MARKED WITH THE SYMBOL "4.6" AS DEFINED IN ASTM F568 SECTION 9.
- B. NUTS SHALL HAVE ANSI B1.13M M16x2 CLASS 6H THREADS. THE GEOMETRY OF THE NUTS, WITH THE EXCEPTION OF THE RECESS SHOWN IN THE DRAWING, SHALL CONFORM TO ANSI B18.2.4.1M STYLE 1 FOR ZINC-COATED HEX NUTS (SHOWN ON DRAWING). MATERIAL FOR ZINC-COATED NUTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A563M FOR CLASS 5.
- C. THE ZINC COATING SHALL CONFORM TO EITHER AASHTO M232 (ASTM A153) FOR CLASS C OR AASHTO M298 (ASTM B695) FOR CLASS 50. ZINC-COATED NUTS SHALL BE TAPPED OVER-SIZE AS SPECIFIED IN AASHTO M291M (ASTM A563M) EXCEPT THAT A DIAMETRICAL ALLOWANCE OF 510 MM SHALL BE USED INSTEAD OF 420 MM.

STRESS AREA OF THREADED BOLT SHANK (mm <sup>2</sup> )	MINIMUM BOLT BOLT STRENGTH (kN)
157.0	62.8

- D. DIMENSIONAL TOLERANCES NOT SHOWN OR IMPLIED ARE INTENDED TO BE THOSE CONSISTENT WITH THE PROPER FUNCTIONING OF THE PART, INCLUDING ITS APPEARANCE AND ACCEPTED MANUFACTURING PRACTICES.

II. INTENDED USE

- A. THESE BOLTS AND NUTS ARE USED IN GUARD RAIL AND MEDIAN BARRIER DESIGNS. THEY ARE ALSO USED IN GUARD RAIL TERMINAL DESIGNS AND THE GUARD RAIL TRANSITION.

I. SPECIFICATIONS

- A. BOLTS SHALL BE MANUFACTURED ACCORDING TO THE GEOMETRIC SPECIFICATIONS INCLUDED IN ANSI B18.2.3.5M. THREADS SHALL CONFORM TO ANSI B1.13M FOR CLASS 6g THREADS. MATERIAL FOR ZINC-COATED BOLTS SHALL CONFORM TO ASTM F568 FOR CLASS 4.6 (400 MPa TENSILE STRENGTH AND 240 MPa YIELD STRENGTH). BOLT HEADS SHALL BE MARKED AS SPECIFIED IN ASTM F568 SECTION 9 WITH THE SYMBOL "4.6".
- B. ZINC-COATED NUTS SHALL BE MANUFACTURED ACCORDING TO THE DIMENSIONS AND TOLERANCES IN ANSI B18.2.4.1M FOR METRIC STYLE 1 HEX NUTS (SHOWN IN DRAWING). ZINC-COATED NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291M (ASTM A563M) FOR CLASS 5 NUTS.
- C. ZINC-COATED BOLTS AND NUTS SHALL BE TREATED ACCORDING TO EITHER AASHTO M232 (ASTM A153) OR AASHTO M298 (ASTM B695) FOR CLASS 50.

STRESS AREA OF THREADED BOLT SHANK (mm <sup>2</sup> )	MINIMUM BOLT BOLT STRENGTH (kN)
157.0	62.8

- D. DIMENSIONAL TOLERANCES NOT SHOWN OR IMPLIED ARE INTENDED TO BE THOSE CONSISTENT WITH THE PROPER FUNCTIONING OF THE PART, INCLUDING ITS APPEARANCE AND ACCEPTED MANUFACTURING PRACTICES.

II. INTENDED USE

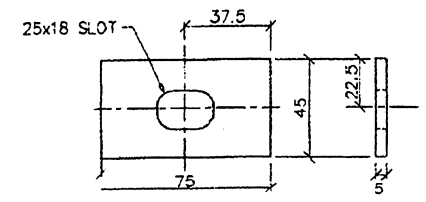
- A. THESE BOLTS AND NUTS ARE USED IN THE CONNECTION OF STEEL BLOCKOUT TO STEEL POST FOR STANDARD CORRUGATED STEEL BEAM GUARD RAIL AND MEDIAN BARRIERS.

I. SPECIFICATIONS

- A. HOOKED ANCHOR STUDS SHALL CONFORM TO AASHTO M314 EXCEPT THAT THREADS AND NOMINAL DIAMETERS SHALL CONFORM TO ANSI B1.13M FOR CLASS 6g THREADS. ANCHOR STUDS SHALL CONFORM TO THE FOLLOWING AASHTO M314 GRADE:  
  
AASHTO M314 GRADE 55 (517 MPa MINIMUM TENSILE STRENGTH)
- B. HEX NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291M (ASTM A563M) FOR CLASS 10S NUTS AND SHALL CONFORM TO GEOMETRY DEFINED IN ANSI B18.2.4.6M. NUTS SHALL HAVE ANSI B1.13M CLASS 6H THREADS.
- C. ZINC-COATED ANCHOR STUDS SHALL BE FINISHED ACCORDING TO EITHER AASHTO M232 (ASTM A153) CLASS C OR AASHTO M298 (ASTM B695) FOR CLASS 50. NUTS SHALL BE ZINC-COATED ACCORDING TO EITHER AASHTO M232 (ASTM A153) CLASS C OR AASHTO M298 (ASTM B695) FOR CLASS 50.
- D. DIMENSIONAL TOLERANCES NOT SHOWN OR IMPLIED ARE INTENDED TO BE THOSE CONSISTENT WITH THE PROPER FUNCTIONING OF THE PART, INCLUDING ITS APPEARANCE AND ACCEPTED MANUFACTURING PRACTICES.

II. INTENDED USE

- A. ANCHOR STUDS ARE USED TO CONNECT GUARD RAIL BEAMS TO THE TERMINAL ANCHOR.



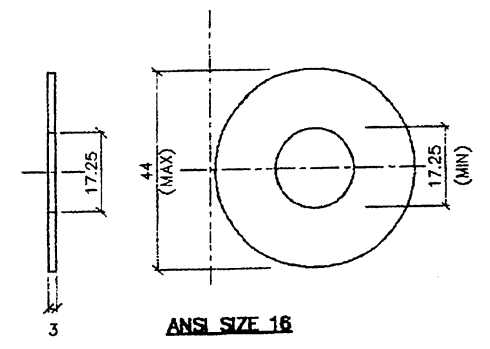
RECTANGULAR GUARD RAIL PLATE WASHER

I. SPECIFICATIONS

- A. RECTANGULAR GUARD RAIL WASHERS SHALL BE MANUFACTURED FROM AASHTO M270M (ASTM A709M) GRADE 250 STEEL PLATE. AFTER STAMPING OR PUNCHING, ZINC-COATED PLATES SHALL BE FINISHED ACCORDING TO AASHTO M111 (ASTM A123).
- B. DIMENSIONAL TOLERANCES NOT SHOWN OR IMPLIED ARE INTENDED TO BE THOSE CONSISTENT WITH THE PROPER FUNCTIONING OF THE PART, INCLUDING ITS APPEARANCE AND ACCEPTED MANUFACTURING PRACTICES.

II. INTENDED USE

- A. THIS WASHER IS USED WITH CORRUGATED STEEL BEAM AND TRANSITION DESIGNS, ON STANDARD CORRUGATED STEEL BEAM GUARD RAILS AND MEDIAN BARRIERS.



ANSI SIZE 16  
PLAIN ROUND WASHER

I. SPECIFICATIONS

- A. PLAIN ROUND STEEL WASHERS SHALL BE MANUFACTURED ACCORDING TO THE DIMENSIONS AND TOLERANCES IN ANSI B18.22M FOR REGULAR SERIES WASHERS. WASHERS SHALL BE ZINC-COATED ACCORDING TO AASHTO M232 (ASTM A153) FOR CLASS C OR AASHTO M298 (ASTM B695) FOR CLASS 50.
- B. DIMENSIONAL TOLERANCES NOT SHOWN OR IMPLIED ARE INTENDED TO BE THOSE CONSISTENT WITH THE PROPER FUNCTIONING OF THE PART, INCLUDING ITS APPEARANCE AND ACCEPTED MANUFACTURING PRACTICES.

II. INTENDED USE

- A. PLAIN ROUND STEEL WASHERS ARE USED IN A VARIETY OF BARRIER APPLICATIONS. THESE WASHERS ARE USUALLY USED WITH THE BLOCKOUT TO POST BOLT & NUT.

EFFECTIVE DATE: FEBRUARY 1997

COMMONWEALTH OF PUERTO RICO DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY AND TRANSPORTATION AUTHORITY		
METAL BARRIER  W-BEAM STRONG-POST  HARDWARE	RECOMMENDED BY: <i>[Signature]</i>	DATE: 1/14/97
	DESIGN AREA DIRECTOR	DATE:
	APPROVED BY: <i>[Signature]</i>	EXECUTIVE DIRECTOR
	DATE: 4-10-97	DIV. ADM. ENVA-PR DIVISION
DATE	REVISION	BY
STD. DWG.	MB	5A OF 28