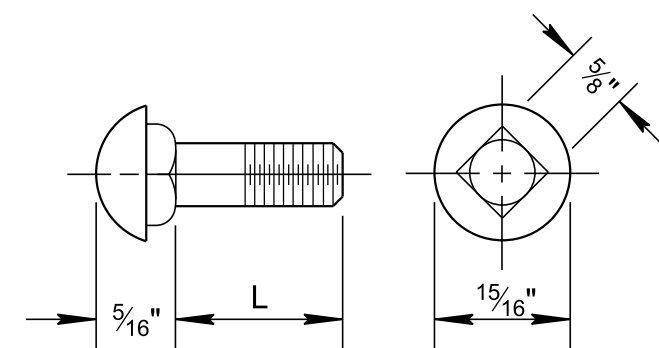
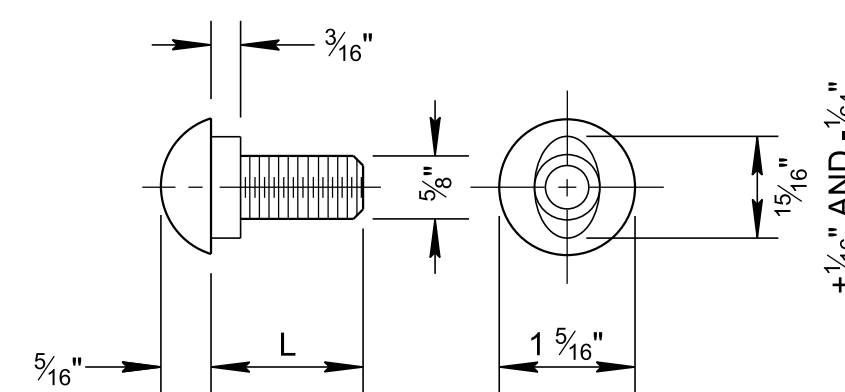


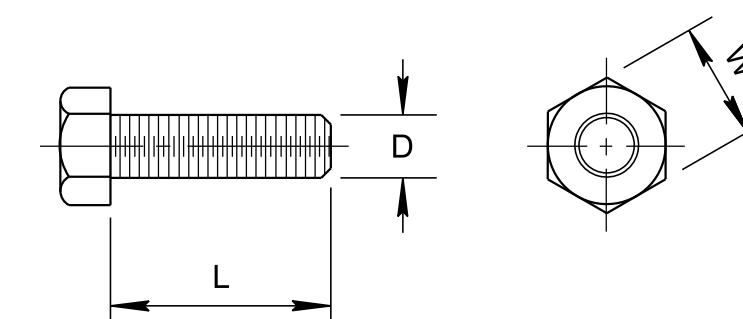
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**5/8" DIAMETER CARRIAGE BOLT**



**5/8" DIAMETER  
BUTTON HEAD BOLT**

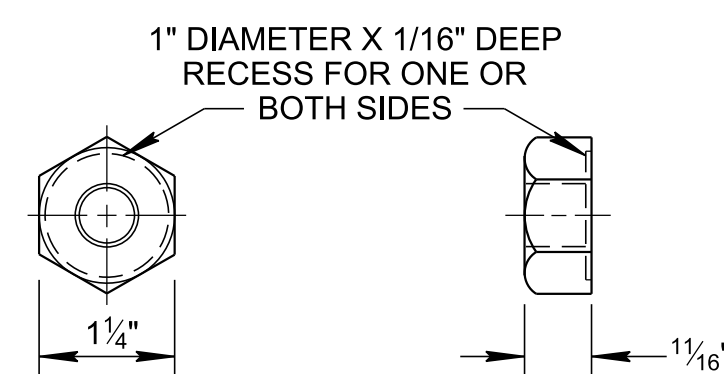


**HEX HEAD BOLT**

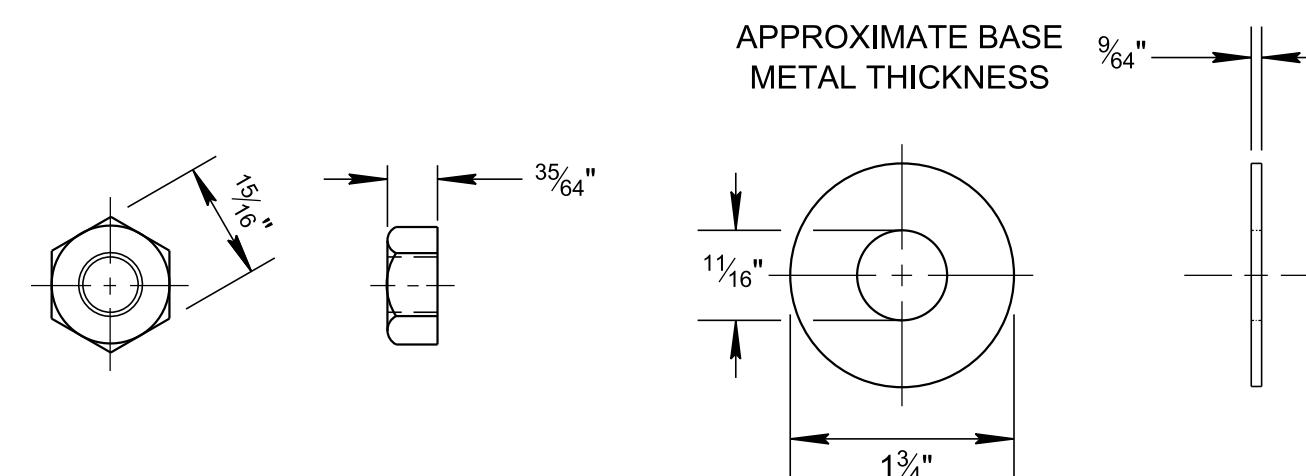
CARRIAGE BOLTS		
L (LENGTH)	MINIMUM THREAD LENGTH	INTENDED USE
1 1/2"	FULL LENGTH	THIS BOLT IS A SPLICE BOLT FOR THE CHANNEL RUB RAIL ELEMENTS.
3"	2"	THIS BOLT IS FOR FASTENING CHANNEL RUB RAIL ELEMENTS TO STEEL POST.

BUTTON HEAD BOLTS		
L (LENGTH)	MINIMUM THREAD LENGTH	INTENDED USE
1 1/4"	FULL LENGTH	THIS BOLT IS FOR GUARDRAIL AT SPLICE JOINTS.
9 1/2"	4"	THIS BOLT IS FOR FASTENING GUARDRAIL ELEMENTS TO STEEL POST WITH BLOCK-OUTS.
18"	4"	THIS BOLT IS FOR FASTENING GUARDRAIL ELEMENTS TO WOOD POST WITH WOOD BLOCK-OUTS.

HEX HEAD BOLTS				
D (DIAMETER)	L (LENGTH)	W (WIDTH)	MINIMUM THREAD LENGTH	INTENDED USE
5/8"	1 1/2"	1 1/16"	FULL LENGTH	IS FOR TYPE 13 ANCHOR. S-GR28-4
5/8"	2"	1 1/16"	FULL LENGTH	IS FOR TYPE 12 ANCHOR STEEL PLATE. S-GRA-1A
5/8"	8"	1 1/16"	4"	IS FOR TYPE 13 ANCHOR. S-GR28-4
5/8"	10"	1 1/16"	4"	IS FOR TYPE 13 ANCHOR. S-GR28-4
3/4"	2" + SLAB THICKNESS	1 1/4"	4"	IS FOR ATTACHING GUARDRAIL TO CONCRETE DECK. S-GR28-6
3/4"	4"	1 1/4"	FULL LENGTH	IS FOR ATTACHING GUARDRAIL TO CONCRETE DECK USING INSERT ASSEMBLY. S-GR28-6
7/8"	2"	1 7/16"	FULL LENGTH	IS FOR INSERT ASSEMBLY S-GRA-1, S-GRC-4 & S-GRC-5



**5/8" DIAMETER RECESS NUT**

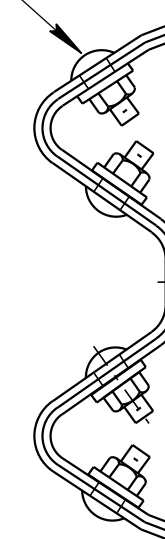


**5/8" DIAMETER HEX NUT AND STEEL WASHER**

(ALTERNATE TO RECESS NUT)

THIS WASHER IS TO BE USED UNDER ALL BOLT HEADS AND NUTS SUBJECT TO TURNING WHEN TORQUED. ROUND WASHERS SHALL BE STEEL, GALVANIZED IN ACCORDANCE WITH AASHTO M232 SPECIFICATION.

5/8" DIA. x 1 1/4" LENGTH, BUTTON HEAD BOLT WITH 5/8" RECESS NUT OR HEX NUT AND 1 ROUND WASHER PER BOLT (TYPICAL).



**GR W-BEAM SPLICE  
(CROSS-SECTION)**

**GENERAL NOTES**

- (A) BOLTS FOR CONNECTING RAIL TO POST THROUGH BLOCKOUT SHALL BE 5/8" DIAMETER X 9 1/2" (STEEL POST) OR 5/8" DIAMETER BY 18" (WOOD POST) BUTTON HEAD WITH ROUND STEEL WASHER. A 5/8" DIAMETER RECESSED BOLT (WITHOUT WASHER) MAY BE SUBSTITUTED FOR THE 5/8" DIAMETER BOLT (FOR BOTH WOOD AND STEEL POSTS) PER AASHTO SPECIFICATION M-180.
- (B) BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND NO MORE THAN 3/4" BEYOND IT.
- (C) BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS TO THE REQUIREMENTS OF ASTM A563M, GRADE "A" OR BETTER, AND BE GALVANIZED IN ACCORDANCE WITH ASTM A153.
- (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.