Foundation Wall Vertical Reinforcing Guide

CITY OF HUTCHINSON BUILDING DEPARTMENT
111 Hassan Street SE, Hutchinson, MN 55350
Phone: (320) 234-4216 Web Site www.ci.hutchinson.mn.us/building.htm

(Interpolation between whole feet of wall height is not permitted)

8" Concrete Foundation Wall Reinforcing per IRC Table R404.1.1(5) and Equivalent Area Sizes/ Spacings – Based on: Grade 60 Steel (Grade 40 Steel)

| Max. Wall Height	Max. Unbalanced Backfill	Rebar required for poured concrete/ Clay soils
7'	6'	#5@48" (32"), #4@31" (21")
	7'	#6@48" (32"), #5@34" (23"), #4@22" (15")
8'	6'	#5@43" (29"), #4@28" (19")
	7'	#6@43" (28"), #5@30" (20"), #4@20" (13")
	8'	#6@32" (21"), #5@22" (15"), #4@15" (10")
9'	6'	#5@39" (26"), #4@25" (17")
	7'	#6@38" (25"), #5@27" (18"), #4@17" (11")
	8'	#7@39" (26"), #6@29" (19"), #5@20" (13"), #4@13"
	9'	#7@31" (21"), #6@23" (15"), #5@16" (11"), #4@10" (7")

12" Masonry Foundation Wall Reinforcing per IRC Table R404.1.1(4) and Equivalent Area Sizes/Spacings – Minimum Grade 60 Steel Required

Max. Wall Height	Max. Unbalanced Backfill	Rebar required for 12" masonry wall/ Clay soils
6'-8"	4'-0"	#4@72"
	5'-0"	#4@72"
	6'-8"	#5@72", #4@47"
7'-4"	4'-0"	#4@72"
	5'-0"	#4@72"
	6'-0"	#5@72", #4@47"
	7'-4"	#6@72", #5@51", #4@33"
8'-0"	4'-0"	#4@72"
	5'-0"	#4@72"
	6'-0"	#5@72", #4@47"
	7'-0"	#6@72", #5@51", #4@33"
	8'-0"	#6@64", #5@45", #4@29"

8'-8"	4'-0"	#4@72"
	5'-0"	#4@72"
	6'-0"	#5@72", #4@47"
	7'-0"	#6@72", #5@51", #4@33"
	8'-8"	#6@48", #5@34", #4@22"
9'-4"	4'-0"	#4@72"
	5'-0"	#4@72"
	6'-0"	#5@72", #4@47"
	7'-0"	#6@72", #5@51", #4@33"
	8'-0"	#6@56", #5@39", #4@25"
	9'-4"	#6@40", #5@28", #4@18"

Example: #5@48" on center reinforcing is required. What is the equivalent spacing using #4 reinforcing steel? Looking at the chart below, the cross sectional area of a #5 bar is 0.31". Divide the cross sectional area of the reinforcing bar by the required spacing, in this case 0.31/48 = 0.0065. To find the equivalent spacing using a #4 bar, of the same Grade strength steel, we use the equation #4@X= 0.0065. Now we use the cross sectional area of the #4 bar, which is 0.2, as in the above equation. 0.2/X=.0065, then 0.2=0.0065X, then 0.2/0.0065=X, and finally X=0.31. Through this example we have found the equivalent to #5@48" on center is #4@31" on center.

Reinforcing Steel Identification
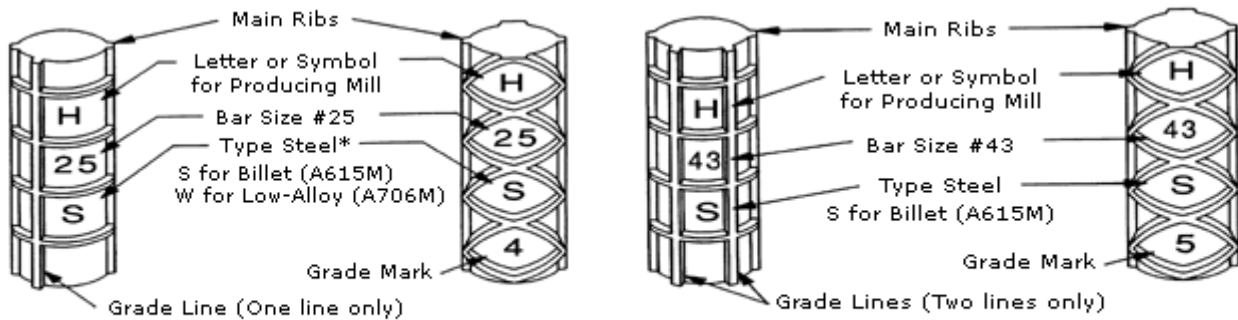
Grade 420

Grade 520

ASTM STANDARD INCH-POUND REINFORCING BARS

BAR SIZE DESIGNATION	NOMINAL DIMENSIONS		
	AREA (in²)	WEIGHT (lb/ft)	DIAMETER (in.)
#3	0.11	0.376	0.375
#4	0.20	0.668	0.500
#5	0.31	1.043	0.625
#6	0.44	1.502	0.750
#7	0.60	2.044	0.875
#8	0.79	2.670	1.000
#9	1.00	3.400	1.128
#10	1.27	4.303	1.270
#11	1.56	5.313	1.410
#14	2.25	7.65	1.693
#18	4.00	13.60	2.257

The current A615 specification covers bar sizes #14 and #18 in Grade 60, and bar sizes #11, #14 and #18 in Grade 75. The current A706 specification also covers bar sizes #14 and #18. Bar sizes #3 through #18 are not included in the A996 specification.

ASTM STANDARD METRIC REINFORCING BARS

BAR SIZE DESIGNATION	NOMINAL DIMENSIONS		
	AREA (mm²)	WEIGHT (kg/m)	DIAMETER (mm)
#10	71	0.560	9.5
#13	129	0.994	12.7
#16	199	1.552	15.9
#19	284	2.235	19.1
#22	387	3.042	22.2
#25	510	3.973	25.4
#29	645	5.060	28.7
#32	819	6.404	32.3
#36	1006	7.907	35.8
#43	1452	11.38	43.0
#57	2581	20.24	57.3

The current A615M specification covers bar sizes #43 and #57 in Grade #20, and bar sizes #36, #43, and #57 in Grade 520. The current A706M specification also covers bar sizes #43 and #57. Bar sizes #29 through #57 are not included in the A996M specification.

3 Grades of Rebar Defined

Inch-Pound Grade	Metric Grade	Min. Yield Strength in psi and (megapascals)
Grade 40	Grade 280	40,000 psi (280)
Grade 60	Grade 420	60,000 psi (420)
Grade 75	Grade 520	75,000 psi (520)