



**Nickel Technical Data
Rod and Bar
Tolerance on Diameter or Distance between Parallel Faces**

Hot Finished Bar and Rod			
Ordered diameter or distance between parallel faces (inches)	Size	Tolerances (inches) (1)(4)	
		Plus	Minus
Rod and Bar, Hot Finished	1.000 and Under	0.016	0.016
	1.001 - 2.000	0.031	0.016
	2.001 - 4.000	0.047	0.031
	Over 4.000	0.125	0.063
Round Rod, Hot Finished and Rough Turned or Round Ground	1.000 and Over	0.031	0.010
Round Rod, Hot Finished, Semi-Smooth, Machined	3.501 and Over	0.031	0.000
Round Rod, Hot Finished, Smooth Finish, Machined	3.501 and Over	0.000	0.005 (2)
Forging Stock (rounds)	.999 and Under	0.005	0.010 (3)
	1.000 and Over	0.031	0.010 (3)
Forging Quality Bolt Stock (rounds only)	1/4, 5/16	0.000	0.0062
	3/8, 7/16, 1/2	0.000	0.0066
	9/16, 5/8, 11/16, 3/4, 13/16, 7/8	0.000	0.0082
	15/16, 1.0	0.000	0.0098
	1-1/16 to 1-1/2 in 1/16 inch increments	0.000	0.0112

(1) Tolerances apply to diameter of rounds, to distance between parallel surfaces for hexagons and squares, and separately to width and thickness of rectangles.

(3) Spot grinding may be permitted to remove minor surface defects. The depth of grinding shall not exceed 3 percent of the diameter.

(2) Permissible variations available as plus 0.005 inch, minus 0; or plus 0.0025 inch, minus 0.0025 inch.

(4) Areas on the ends of the bar and rod (for approximately 1 inch) that are under the permissible variations in diameter are permitted provided the desired finished surface can be obtained within the machining allowance.

Cold Drawn Rod and Bar			
Ordered diameter or distance between parallel faces (inches)	Size	Tolerances (inches)	
		Plus	Minus
Rounds	.4999 and Under	0	0.003
	.5000 - .9375	0	0.002 (1)
	.9376 - 1.9375	0	0.003 (1)
	1.9376 - 2.500	0	0.004 (1)
	2.501 - 3.000	0	0.005 (1)
	3.001 - 3.500	0	0.006 (1)
	3.501 - 4.000	0	0.007 (1)
Hexagons	2.000 and Under	0	0.009

(1) For cold drawn, age hardened, bright finish shafting, an additional minus tolerance of 0.002 inch will be permitted.



Nickel Technical Data
Rod and Bar
Tolerance on Length and Straightness

Permissible Variations in Length of Bar and Rod, All Conditions.				
Specified Length (feet)		Shortest acceptable lengths (feet)	Maximum acceptable length	Maximum permissible percentage by weight of short length
Random mill lengths (1)		6	24 ft	25% under 9 ft
Nominal (stock) length (2)	16 to 18	16	18 ft, 1/2 in.	100% 16 ft or longer
	14 to 16	14	16 ft, 1/2 in.	100% 14 ft or longer
	12 to 14	12	14 ft, 1/2 in.	100% 12 ft or longer
	10 to 12 (3)	10	12 ft, 1/2 in.	100% 10 ft or longer
	8 to 10 (3)	8	10 ft, 1/2 in.	100% 8 ft or longer
	6 to 8 (3)	6	8 ft, 1/2 in.	100% 6 ft or longer
4 to 6	4	6 ft, 1/2 in.	100% 4 ft or longer	100% 4 ft or longer
Cut to length (4)		Specified length	Specified length to plus 1/8 in.	100% Specified plus 1/8 in.

(1) For hot finished sections weighing over 25 pounds per lineal foot and for smooth forged products, all sections, short lengths down to 2 feet may be furnished.

(2) Other nominal lengths with a specified range of not less than 2 feet, with no shorts allowed, may also be furnished.

(3) For cold drawn rod and bar under 1/2 inch in diameter or distance across flats ordered to nominal or stock lengths with a 2 foot range, at least 93 percent of such material shall be within the range specified; the balance may be shorter lengths but in no case shall

(4) For diameters over 8 inches, the tolerance shall be plus 1/4 inch, minus 0.

Permissible Variations in Straightness of Rod and Bar (1)	
Ordered Condition, Finish, and Size	Permissible Deviations in Straightness (inches)
Hot Finished: (2) Bar and Rod (hot finished surface)	Depth of chord (3) 0.050 per foot of length
Rounds: Rough turned or rough ground Semismooth machined Smooth finished machined	Throw in one revolution (4) 0.0500 per foot of length 0.0031 per foot of length 0.0015 per foot of length
Cold Drawn: Rounds (diameter) Up to 4 inches, incl.	Depth of chord (3) 0.030 per foot of length
Hexagons and Squares: All sizes	Depth of chord (3) 0.030 per foot of length

(1) Not applicable to forging quality rod.

(2) Except forging quality stock.

(3) The maximum curvature shall not exceed the value indicated multiplied by length in feet.

(4) The throw is one revolution in any 20 feet maximum length shall not exceed the values indicated multiplied by length in feet.

Permissible Variations in Straightness of Precision Straightened Cold Drawn Shafting		
Ordered Diameter of Shafting (inches)	Standard Distance Between Supports (inches)	Permissible Variations Throw in one Revolution from Straightness (inches)
1/2 to 15/16, incl.	42	0.005
Over 15/16 to 1-15/16, incl.	42	0.006
Over 1-15/16 to 2-1/2, incl.	42	0.007
Over 2-1/2 to 4, incl.	42	0.008
3/4 to 15/16, incl.	Specified lengths of 3 to 10 feet	0.004 plus 0.0025 for each foot, or fraction thereof, in excess of 3 feet.
Over 15/16 to 4 incl.	Specified lengths of 20 feet or less	0.005 plus 0.0015 for each foot, or fraction thereof, in excess of 3 feet.



Nickel Technical Data
Rod and Bar
Machining Allowances for Hot Finished
 (allow the following oversizes)

Condition (1)	Machining allowances (inch) (2)				
	Dimensions (inches)	Diameter	Across Flats (Hexagons and	Thickness (Rectangles)	Width (Rectangles)
Hot Finished	Up to 0.875	0.125	0.125	0.125	0.187
	0.876 - 1.875	0.125	0.187	0.125	0.187
	1.876 - 2.875	0.187	0.25	...	0.187
	2.876 - 3.812	0.25	...	...	0.187
	Over 3.812	0.025	...	...	0.375
Rough Turned or Rough Ground (2) (3)	0.500 - 0.875	0.005	...	...	...
	0.876 - 4.000	0.062	...	...	...
	4.001 - 12.000	0.0125	...	...	...
	12.001 - 20.000	0.125	...	...	...
Semi Smooth Machined (3)	Up to 2.500 (Up to 10' length)	0.062	...	...	...
	2.501 - 4.000 (Over 10-20' lengths)	0.0125	...	...	...
	4.001 - 10.000 (Up to 30' length)	0.125	...	...	...

- (1) Dimensions apply to diameter of rods, distance between parallel surfaces of squares and hexagons, and separately to width or thickness of
- (2) The allowances are recommended for rounds to be machined in lengths 36" or less and for squares, hexagons, and rectangles to be machined
- (3) The allowance for hot finished rod, rough turned or semismooth machined, provide for sufficient excess metal to insure straightness in



Nickel Technical Data
Plate
Tolerance on Weight, Thickness and Diameter

Permissible Variations in Weight and Thickness of Hot Rolled Rectangular Plate										
Specified Thickness (inches)	Permissible Variations in Weight and Thickness of Hot Rolled Rectangular Plate									
	Under 48	48-60 excl.	60-72 excl.	72-84 excl.	84-96 excl.	96-108 excl.	108-120 excl.	120-132 excl.	132-144 excl.	144-160 excl.
3/16 - 5/16, excl.	9.0	10.5	12.0	13.5	15.0	16.5	18.0	...	...	...
5/16 - 3/8, excl.	7.5	9.0	10.5	12.0	13.5	15.0	16.5	18.0	...	...
3/8 - 7/16, excl.	7.0	7.5	9.0	10.5	12.0	13.5	15.0	16.5	18.0	...
7/16 - 1/2, excl.	6.0	7.0	7.5	9.0	10.5	12.0	13.5	15.0	16.5	18.0
1/2 - 5/8, excl.	5.0	6.0	7.0	7.5	9.0	10.5	12.0	13.5	15.0	16.5
5/8 - 3/4, excl.	4.5	5.5	6.0	7.0	7.5	9.0	10.5	12.0	13.5	15.0
3/4 - 1, excl.	4.0	4.5	5.5	6.0	7.0	7.5	9.0	10.5	12.0	13.5
1 - 1-1/4, excl.	4.0	4.0	4.5	5.5	6.0	7.0	7.5	9.0	10.5	12.0
1-1/4 - 1-1/2, excl.	4.0	4.0	4.5	5.5	6.0	7.0	7.5	9.0	10.5	...
1-1/2 - 1-3/4, excl.	4.0	4.0	4.5	5.5	6.0	7.0	7.5	9.0	...	...
1-3/4 - 2, incl.	4.0	4.0	4.5	5.5	6.0	7.0	7.5	...	...	...

Permissible Variation in Diameter for Circular Plate								
Specified Diameter (inches)		Thickness (inches, maximum)	Permissible Variations over Specified Diameter for Thickness given (inches)					
			Thickness to 3/8, incl.		3/16 to 2, excl.		2 to Max Thickness	
			Plus	Minus	Plus	Minus	Plus	Minus
Sheared Plate	20 - 32, excl.	3/8	1/4	0	...	...	...	...
	32 - 84, excl.	3/8	5/16	0	...	...	...	...
	84 - 108, excl.	3/8	3/8	0	...	...	...	...
	108 - 140, excl.	3/8	7/16	0	...	...	...	...
Plasma Torch Cut Plate	19 - 20, excl.	3	...	...	1/2	0	5/8	0
	20 - 22, excl.	2-3/4	...	...	1/2	0	5/8	0
	22 - 24, excl.	2-1/2	...	...	1/2	0	5/8	0
	24 - 28, excl.	2-1/4	...	...	1/2	0	5/8	0
	28 - 32, excl.	2	...	...	1/2	0	5/8	0
	32 - 34, excl.	1-3/4	...	...	1/2	0	...	...
	34 - 38, excl.	1-1/2	...	...	1/2	0	...	...
	38 - 40, excl.	1-1/4	...	...	1/2	0	...	...
40 - 140, excl.	3	...	...	1/2	0	5/8	0	



**Nickel Technical Data
Plate
Tolerance on Width and Length**

Permissible Variations in Width of Sheared, Machined, Abrasive or Plasma Torch Cut Rectangular Plate											
Specified Thickness (inches)		Permissible Variation in Width for Widths Given (inches)									
		Up to 30, incl.		Over 30 - 72, incl.		Over 72 - 108, incl.		Over 108 - 144, incl.		Over 144 - 160, incl.	
		Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus
Sheared (1)	3/16 - 5/16, excl.	3/16	1/8	1/4	1/8	3/8	1/8	1/2	1/8	...	...
	5/16 - 1/2, excl.	1/4	1/8	3/8	1/8	3/8	1/8	1/2	1/8	5/8	1/8
	1/2 - 3/4, excl.	3/8	1/8	3/8	1/8	1/2	1/8	5/8	1/8	3/4	1/8
	3/4 - 1, excl.	1/2	1/8	1/2	1/8	5/8	1/8	3/4	1/8	7/8	1/8
	1 - 1-1/4, incl.	5/8	1/8	5/8	1/8	3/4	1/8	7/8	1/8	1	1/8
Machine or Abrasive Cut (2) (3)	3/16 - 1-1/4, incl.	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
	Over 1-1/4 - 4, incl.	3/16	1/8	3/16	1/8	3/16	1/8	3/16	1/8	3/16	1/8
Plasma Torch Cut	3/16 - 2, excl.	1/2	0	1/2	0	1/2	0	1/2	0	1/2	0
	2 - 3, incl.	5/8	0	5/8	0	5/8	0	5/8	0	5/8	0

(1) The minimum sheared width is 10 inches for material 3/4 inch and under in thickness and 20 inches for material over 3/4 inch in thickness.

(2) The minimum abrasive cut width is 2 inches.

(3) Tolerances shown are applicable for lengths up to 240 inches. For lengths over 240 inches an additional 1/16 inch is permitted, both plus and minus.

Permissible Variations in Length of Sheared, Machined, Abrasive or Plasma Torch Cut Rectangular Plate.															
Specified Thickness (inches)		Permissible Variation in Length for Lengths Given (inches)													
		60 and Under		Over 60 - 96, incl.		Over 96 - 120, incl.		Over 120 - 240, incl.		Over 240 - 360, incl.		Over 360 - 450, incl.		Over 450 - 540, incl.	
		Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus
Sheared (1)	3/16 - 5/16, excl.	3/16	1/8	1/4	1/8	3/8	1/8	1/2	1/8	5/8	1/8	3/4	1/8	...	...
	5/16 - 1/2, excl.	3/8	1/8	1/2	1/8	1/2	1/8	1/2	1/8	5/8	1/8	3/4	1/8	7/8	1/8
	1/2 - 3/4, excl.	1/2	1/8	1/2	1/8	5/8	1/8	5/8	1/8	3/4	1/8	7/8	1/8	1-1/8	1/8
	3/4 - 1, excl.	5/8	1/8	5/8	1/8	5/8	1/8	3/4	1/8	7/8	1/8	1-1/8	1/8	1-3/8	1/8
	1 - 1-1/4, incl.	3/4	1/8	3/4	1/8	3/4	1/8	7/8	1/8	1-1/8	1/8	1-3/8	1/8	1-5/8	1/8
Machine or Abrasive Cut (2) (3)	3/16 - 1-1/4, incl.	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
	1-1/4 - 4, incl.	3/16	1/8	3/16	1/8	3/16	1/8	3/16	1/8	3/16	1/8	3/16	1/8	3/16	1/8
Plasma Torch Cut	3/16 - 2, incl.	1/2	0	1/2	0	1/2	0	1/2	0	1/2	0	1/2	0	1/2	0
	2 - 2-1/4	5/8	0	5/8	0	5/8	0	5/8	0	5/8	0	5/8	0	5/8	0

(1) The minimum sheared length is 10 inches.

(2) Abrasive cut applicable to a maximum length of 144 to 400 inches depending on the thickness and width ordered.



Nickel Technical Data

Tolerance on Thickness of Cold Rolled Sheet and Strip, All Conditions

Ordered Thickness (inches)		Tolerance on Thickness for Widths Given (1) (inches, plus or minus)		
		Less than 12 inches wide (1)	48 inches or less wide	Over 48 to 60 inches wide, inclusive
Sheet	0.018 - 0.025	...	0.002	0.003
	0.026 - 0.034	...	0.003	0.004
	0.035 - 0.043	...	0.004	0.005
	0.044 - 0.056	...	0.004	0.005
	0.057 - 0.070	...	0.005	0.006
	0.071 - 0.078	...	0.006	0.007
	0.079 - 0.093	...	0.007	0.008
	0.094 - 0.109	...	0.007	0.009
	0.110 - 0.125	...	0.008	0.01
	0.126 - 0.140	...	0.008	0.01
	0.141 - 0.171	...	0.009	0.012
	0.172 - 0.187	...	0.01	0.013
	0.188 - 0.218	...	0.011	0.015
	0.219 - 0.234	...	0.012	0.016
	0.235 - 0.250	...	0.013	0.018
Strip	0.010 - 0.050	0.0015	...	...
	0.051 - 0.093	0.0025	...	...
	0.094 - 0.125	0.004	...	...
	0.126 - 0.156	0.0045 (2)	...	...
	0.157 - 0.250	0.0055 (2)	...	...

(1) Measured 3/8 inch or more from any edge except from strip under 1 inch in width, which is measured at any place.

(2) For widths over 8 inches, the permissible variations for cold rolled sheet are applicable.



**Nickel Technical Data
Sheet and Strip
Tolerance on Width, Length and Edges**

Tolerances on Width of Cold Rolled Sheet and Strip, All Conditions				
Ordered Thickness (inches)		Ordered Width (inches)	Tolerances on Widths (inches)	
			Plus	Minus
Sheet	All Thickness	All Widths	0.125	0
Strip, Split Edge:	0.010 - 0.024	12 and Under	0.007	0.007
	0.025 - 0.075	12 and Under	0.007	0.007
	0.076 - 0.100	12 and Under	0.009	0.009
	0.101 - 0.125	12 and Under	0.012	0.012
	0.126 - 0.250	8 and Under	0.015	0.015
	0.126 - 0.250	Over 8 - 12, incl.	0.125	0

Permissible Variations in Stock Lengths of Strip, Up to 12 Inches Wide						
Ordered Nominal or Stock Length (feet)	Required Percentage by Weight of Stock Length	Maximum Permissible Percentages, by Weight, of Short Lengths (feet)				
		Over 8 - 10, incl.	Over 6 - 8, incl.	Over 4 - 6, incl.	Over 2 - 4, incl.	Under 2
10	60	40	30	20	10	0
8	70	...	30	20	10	0
6	80	...	...	20	10	0

Type of Edge of Strip			
Thickness (inches)	Width (inches)	Type of Edge	
0.125 and Less	12 and Less	Slit (1)	
Over 0.125	8 and Less	Slit (2)	
Over 0.125	Over 8	Slit or Sheared (2)	

(1) In coil or straight (random or cut) lengths.

(2) In random or cut straight lengths only.



Nickel Technical Data
Wire
Tolerance on Diameter and Weight, All Conditions

Tolerances in Diameter of Cold Drawn Wire, All Conditions			
Specified Diameter (inches)	Tolerances (inches)		
	Plus		Minus
0.0001 - 0.0044	0.0002		0.0002
0.0045 - 0.0079	0.00025		0.00025
0.0080 - 0.0149	0.0003		0.0003
0.0150 - 0.0199	0.0004		0.0004
0.0200 - 0.031	0.0005		0.0005
0.032 - 0.045	0.0006		0.0006
0.046 - 0.079	0.0007		0.0007
0.080 - 0.1875	0.001		0.001
0.1876 - 0.406	0.001		0.002
Over 0.406	0.002		0.002

Permissible Variation in Weight of Cold Drawn Wire in Coils and on Spools (except Air Force use)			
Condition	Wire Diameter (inches)	Standard Spool Weight (pounds)	Maximum Weight Wire on each Spool (pounds)
Spools (all conditions)	Under 0.010	2	2.5
	0.010 - 0.018	5	6
	0.019 - 0.040	10	15
Condition	Wire Diameter (inches)	Approximate Mean Coil Diameter (inches)	Maximum Weight Per Coil (pounds)
Coils (all conditions)	Under 0.010	8	15
	0.010 - 0.018	8	25
	0.019 - 0.040	8-12	40
	0.041 - 0.081	16 - 20	100
	0.082 - 0.312	18 - 22	200
	0.313 - 0.563	22 - 30	200

Permissible Variation in Weight of Cold Drawn Wire in Coils and on Spools (Air Force use only)			
Condition	Wire Diameter (inches)	Core Diameter (inches)	Maximum Weight Wire on each Spool (pounds)
All Conditions	Under 0.035	1	1
	0.035 - 0.063	4-5	1
	0.064 - 0.0915	...	5
	0.0916 - 0.162	...	25 (coil)