Measurement of roundness by Dial gauge deflections of 6-mm Diameter Copper (Cu) Round Bar Before Straightening

Mean values of Dial Gauge Deflection Readings before straightening of 6 mm Copper round bar x 0.01 mm

	Angles in Degrees																							
Length in cm	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°	180°	195°	210°	225°	240°	255°	270°	285°	300°	315°	330°	345°	STD DEV (mm)
16.0	301.5	297.0	288.0	275.5	262.5	251.0	239.5	225.0	213.5	202.0	195.5	187.0	187.0	197.0	210.0	225.0	241.5	256.0	269.0	284.0	296.0	302.5	308.5	310.5	0.4221
18.0	311.0	306.0	296.0	285.0	268.0	253.5	241.5	230.0	217.0	203.5	195.5	187.0	187.0	198.0	211.5	228.0	244.5	259.5	272.0	285.5	297.0	302.0	307.0	312.0	0.4339
20.0	274.0	269.0	264.5	256.5	248.0	241.0	234.0	227.0	219.0	210.0	207.0	205.0	203.0	208.0	217.5	226.0	237.0	245.5	259.0	265.5	270.0	276.5	279.5	282.0	0.2664
22.0	281.0	276.0	270.0	260.0	251.0	243.5	238.0	228.0	221.5	213.5	207.5	204.5	203.0	208.5	218.5	228.5	240.0	252.0	260.0	268.0	274.5	279.5	282.5	283.5	0.2791
25.0	239.0	238.0	238.5	237.5	238.0	237.0	236.0	236.0	232.5	232.5	235.5	239.0	241.0	241.5	244.5	245.0	245.0	242.5	241.0	240.5	239.0	247.5	237.0	245.5	0.0398
30.0	227.5	225.0	225.5	229.0	235.5	239.0	243.5	247.0	249.5	250.5	252.0	253.5	252.0	251.0	248.0	243.5	237.0	230.0	224.5	218.0	212.0	210.0	209.5	209.0	0.1515
35.0	199.0	208.0	217.5	227.0	231.0	238.5	245.5	250.5	254.5	256.5	256.0	254.5	256.0	254.0	247.0	240.5	230.5	221.0	211.5	203.5	197.0	194.5	193.0	194.5	0.2342
40.0	181.5	195.5	211.0	227.0	239.0	250.0	260.0	268.5	273.0	276.0	274.5	273.5	267.5	262.0	252.5	243.5	231.0	217.0	205.0	194.0	185.0	181.0	178.0	178.5	0.3588
45.0	175.5	196.0	212.0	228.5	246.0	259.0	271.0	284.5	292.0	297.0	296.5	293.0	289.5	280.0	265.5	252.5	237.5	222.0	207.5	191.5	179.0	172.0	168.5	169.5	0.4620
50.0	158.0	176.0	193.0	214.0	234.0	252.0	271.5	288.5	303.0	314.0	318.5	319.5	317.0	310.0	302.0	285.5	269.0	252.0	234.0	215.5	201.0	183.5	174.0	171.0	0.5507
55.0	165.0	177.5	192.0	210.0	233.5	254.0	270.5	284.5	301.0	315.5	329.0	335.0	339.5	329.5	322.0	309.5	292.0	272.0	254.5	232.0	208.0	190.5	176.0	168.5	0.5959
60.0	189.0	185.0	184.5	185.0	191.0	202.5	213.0	234.0	248.0	258.0	267.0	275.0	283.0	289.5	291.5	289.0	283.0	275.0	267.0	256.0	242.5	230.0	218.0	205.0	0.3837
62.0	193.0	182.5	178.0	183.0	188.5	201.0	214.5	229.0	240.0	251.5	260.0	268.0	273.0	278.5	281.0	277.5	274.0	270.0	263.0	252.0	240.0	225.5	214.5	202.0	0.3548
65.0	164.5	158.5	155.5	156.0	169.0	188.5	205.0	225.0	241.0	253.5	270.0	287.5	302.0	304.5	310.5	305.0	311.0	290.0	275.0	255.0	239.5	210.0	201.0	181.0	0.5544
68.0	170.0	154.5	155.0	158.0	173.5	190.5	209.0	229.0	246.5	261.5	278.0	291.0	291.5	298.0	300.0	298.0	296.5	281.0	267.5	250.5	221.0	214.0	194.5	178.5	0.5246
70.0	146.0	138.5	138.5	145.0	162.0	183.0	203.0	224.5	242.5	261.5	277.5	292.0	314.5	321.5	323.5	318.0	300.5	286.0	268.0	246.0	226.5	204.0	185.5	164.5	0.6410
75.0	146.5	145.5	148.5	164.0	181.5	200.0	219.0	238.5	256.0	273.0	289.5	303.5	311.0	312.5	305.0	295.0	280.5	264.5	246.5	224.0	205.0	187.5	168.0	155.0	0.5868
80.0	155.0	167.0	178.0	191.5	205.0	214.5	241.5	255.5	270.5	285.0	296.5	301.0	301.5	295.5	285.0	270.0	262.5	243.0	224.5	206.0	190.0	175.5	163.5	156.5	0.5099
86.0	165.5	181.5	196.5	213.5	230.0	246.5	259.5	275.0	286.5	293.0	296.5	299.0	295.0	285.0	275.0	263.0	247.5	228.0	213.0	196.0	182.5	168.0	160.0	159.0	0.4899

Measurement of roundness by Dial gauge deflections of 8-mm Diameter Copper (Cu) Round Bar Before Straightening

Mean values of Dial Gauge Deflection Readings before straightening of 8 mm Copper round bar x 0.01 mm

	Angles in Degrees																							
Length in cm	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°	180°	195°	210°	225°	240°	255°	270°	285°	300°	315°	330°	345°	STD DEV (mm)
11.5	174	174	174	174	173	171	171	172	174	174	172	169	164	161	157	156	156	155	157	159	163	165	168	173	0.0715195
13	173	171	173	173	172	172	172	173	175	174	171	168	162	159	156	154	153	154	157	159	163	165	167	172	0.0751011
15	173	174	174	174	173	172	171	172	172	171	167	163	158	155	152	151	152	155	158	162	164	165	167	170	0.0793996
17	179	178	178	177	176	175	174	175	174	169	166	163	158	155	154	158	163	167	170	172	174	174	175	177	0.076413
19	179	178	177	177	175	173	173	172	169	165	162	157	153	152	155	161	168	171	175	177	176	176	177	180	0.0875861
22	181	180	179	179	175	172	172	170	166	163	158	155	151	152	156	164	170	176	179	180	179	178	179	180	0.0994951

25	181	181	179	176	173	169	168	166	161	156	153	147	147	152	156	165	170	175	178	178	177	177	179	183	0.1144598
28	177	178	175	175	172	171	170	166	162	158	153	149	148	153	156	161	168	173	174	175	176	177	179	181	0.102854
31	175	175	174	172	172	174	172	168	165	162	156	153	153	152	155	158	160	165	168	171	173	175	176	177	0.0847492
34	173	173	174	174	174	176	175	171	169	163	160	157	156	155	154	156	157	161	165	167	172	175	175	175	0.0794817
37	172	172	173	174	175	176	175	173	170	167	164	161	160	159	157	155	156	158	160	163	167	171	172	172	0.0697508
40	166	166	166	167	170	173	173	171	171	167	165	164	163	164	162	159	157	156	154	156	159	161	163	165	0.0546066
43	159	159	159	162	165	165	166	164	163	161	160	159	159	158	157	156	154	152	151	152	155	156	157	158	0.0423575
46	155	155	155	158	162	162	162	162	161	159	158	158	160	159	157	155	154	152	151	152	154	155	154	156	0.0337161
49	153	154	154	157	160	161	161	161	160	159	158	160	160	160	159	157	156	154	152	152	154	155	155	154	0.031172
52	150	150	151	155	157	158	159	158	157	157	156	158	161	159	158	156	154	152	151	151	153	152	152	151	0.0336536
55	148	149	151	154	156	158	159	160	158	157	158	159	160	160	159	157	154	151	150	150	150	149	149	149	0.0443226
57.5	178	178	180	179	177	176	174	167	165	163	162	158	156	157	158	157	160	164	169	172	174	175	176	177	0.0845534
61.2	174	174	175	175	175	174	171	164	163	161	160	158	156	156	158	158	161	165	168	169	171	173	175	176	0.0716308
64.3	168	169	171	173	171	170	169	163	159	157	157	156	155	155	155	155	157	159	163	164	165	167	168	169	0.0625833
67.5	169	169	169	171	170	169	168	163	159	158	160	158	159	158	158	156	157	158	162	164	166	168	170	168	0.0521803
70.5	162	162	162	163	163	162	162	158	155	154	154	154	157	157	159	158	158	158	158	161	164	164	166	164	0.0350129
73.5	163	161	161	161	161	160	160	156	155	154	156	158	160	160	162	161	160	159	161	161	164	165	166	165	0.0313003
77	161	160	159	157	158	157	158	157	155	156	156	159	162	164	164	165	161	161	162	163	164	165	166	165	0.0340689
80.2	159	158	157	156	156	158	160	159	160	158	160	162	163	163	164	164	162	163	166	166	166	164	166	164	0.0332256
83.2	160	156	155	157	158	161	164	167	169	169	172	173	174	174	174	172	171	168	169	169	170	169	167	164	0.059673
86.2	151	149	149	147	149	152	156	159	161	162	164	167	167	168	169	167	165	164	165	162	163	162	160	157	0.0690148
90.2	151	149	148	146	150	154	160	164	165	166	170	173	174	173	172	170	168	168	166	166	165	162	161	156	0.0868282

Measurement of roundness by Dial gauge deflections of 10-mm Diameter Copper (Cu) Round Bar Before Straightening

Mean values of Dial Gauge Deflection Readings before straightening of 10 mm Copper round bar x 0.01 mm

	Angles in Degrees																								
Length in cm	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°	180°	195°	210°	225°	240°	255°	270°	285°	300°	315°	330°	345°	STD DEV (mm)
12.3	79	71	67	64	61	64	64	65	71	77	84	88	95	100	104	107	110	108	105	103	98	93	88	85	0.16352
16	68	66	67	67	66	68	73	77	81	86	92	96	100	102	105	105	104	102	97	92	87	81	76	71	0.14430
20.5	73	70	65	63	60	60	62	63	67	70	74	78	83	86	91	94	96	97	97	93	90	85	81	76	0.12708
25	91	84	76	67	59	50	49	52	53	50	51	54	62	68	77	86	95	101	108	110	111	109	104	98	0.22512
28	101	88	88	65	51	49	52	55	57	59	61	58	55	60	73	85	98	99	117	122	124	123	119	103	0.26424
31	116	97	82	61	50	49	49	49	49	49	49	49	49	59	75	91	108	121	131	138	140	138	131	121	0.35596
35	128	103	82	59	49	52	53	55	56	57	58	52	53	55	71	89	110	126	141	149	155	155	150	138	0.40341
40	120	96	71	49	53	52	54	56	58	59	62	65	66	66	85	105	123	140	154	164	168	167	157	143	0.43190
45	113	94	66	49	50	54	56	58	62	64	65	69	56	72	87	104	124	142	159	169	175	174	167	149	0.45507
48	59	59	56	53	49	52	56	50	53	52	51	50	53	55	56	62	64	52	53	52	51	49	51	54	0.03918
51	68	66	64	57	50	49	52	56	58	59	62	64	63	66	60	57	53	50	50	49	50	60	64	67	0.06620

54	71	69	66	60	49	54	56	52	51	50	54	56	58	62	61	60	54	52	49	55	61	65	71	72	0.07536
57	70	66	62	53	59	50	49	52	53	50	51	54	62	68	69	72	74	65	62	49	60	66	69	72	0.08510
60	79	76	72	64	52	50	51	50	52	53	54	56	58	63	64	66	68	63	49	53	64	68	73	76	0.09571
63	81	78	74	65	52	55	52	51	49	52	53	52	56	58	62	62	58	51	49	60	68	72	78	80	0.11159
66	82	82	79	67	50	49	55	57	59	60	55	51	58	52	59	63	61	65	66	66	72	76	81	84	0.11453
69	82	79	74	64	49	52	56	58	62	74	72	65	56	49	56	67	65	49	57	66	72	78	82	84	0.11558
72	75	73	65	50	49	52	54	56	58	62	65	67	68	72	65	55	55	53	62	69	74	79	81	81	0.10207
75	72	67	58	49	54	57	59	62	65	67	69	62	56	52	56	52	50	54	55	61	66	71	73	74	0.07856
78	63	58	49	53	58	59	63	66	67	72	66	62	58	55	52	56	59	55	63	66	72	73	74	72	0.07141
81	64	61	50	49	53	64	69	56	62	65	59	53	50	49	56	59	62	49	53	58	64	67	68	69	0.06704
85.5	87	84	75	60	49	54	56	59	63	66	69	72	75	69	59	57	65	72	80	86	89	89	91	91	0.13228

Measurement of roundness by Dial gauge deflections of 12-mm Diameter Copper (Cu) Round Bar Before Straightening

Mean values of Dial Gauge Deflection Readings before straightening of 12 mm Copper (Cu) round bar x 0.01 mm

	Angles in Degrees																								
Length in cm	0°	15°	30°	45°	60°	75°	90°	105°	120°	135°	150°	165°	180°	195°	210°	225°	240°	255°	270°	285°	300°	315°	330°	345°	STD DEV (mm)
12	102	91	81	70	61	52	49	49	49	49	52	59	66	74	82	91	101	110	116	121	124	122	117	112	0.27505
15	95	88	80	70	64	51	51	49	49	50	53	59	66	72	82	88	96	102	108	110	112	111	110	104	0.23366
19	92	89	85	83	79	75	71	67	65	64	65	67	70	72	76	79	83	86	89	91	94	94	94	93	0.10598
24	67	66	67	66	67	69	72	75	77	80	82	85	88	88	88	88	88	86	83	81	79	74	71	69	0.08401
29	75	75	75	74	73	73	72	71	70	70	69	69	69	68	69	70	70	71	73	73	74	74	73	74	0.02334
34	102	101	98	95	88	80	72	66	58	50	49	49	49	49	49	52	59	65	72	78	85	91	96	100	0.19895
39	97	96	97	95	89	85	78	72	65	60	56	55	56	56	58	60	64	69	74	78	83	86	88	92	0.15044
43.5	79	78	79	78	77	76	74	72	71	69	68	67	67	66	67	67	69	70	71	73	74	75	75	76	0.04334
49	62	62	64	66	67	69	70	72	74	75	76	77	77	74	73	72	71	69	67	65	62	61	60	60	0.05682
56	77	76	76	76	75	73	72	70	67	65	63	61	60	58	59	58	59	62	63	65	67	69	71	74	0.0652
59	63	63	62	61	59	58	56	55	55	52	51	50	49	49	49	50	52	52	55	56	57	58	60	61	0.04636
62	50	50	50	51	53	53	55	57	58	60	60	61	61	60	59	59	59	57	56	54	52	50	49	49	0.0429
67	49	49	49	49	50	53	58	62	66	69	71	71	72	70	68	65	62	58	52	49	49	49	49	49	0.08975
72	49	49	49	51	55	57	61	64	67	69	70	71	70	68	66	64	60	57	55	51	49	49	49	49	0.08312
77	53	54	56	59	62	65	67	70	73	74	75	76	75	73	70	68	65	61	57	54	50	50	49	50	0.09309
82	61	61	62	65	67	69	72	75	77	78	80	82	82	80	79	78	77	74	71	70	65	61	61	61	0.07554
87	70	69	70	70	71	72	73	74	75	75	79	79	77	76	76	76	75	73	72	71	70	69	68	69	0.03303