United States National CAD Standard®- V5

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Plotting Guidelines

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0.0 INTRODUCTION

The purpose of the NCS Plotting Guidelines is to allow consistent black-and-white and color plotting from various configurations within CAD programs. These guidelines allow consistent color mapping and data translation between MicroStation™ and AutoCAD®. They also allow other CAD vendors and users to develop color mapping to either or both of the above CAD platforms.

In today's environment the prevalence of plot inconsistency is compounded by multiple types of plotting hardware, differing defaults in the various CAD software packages being utilized, and multiple independent development paths among users.

The previous version of the NCS plotting guidelines only provided an initial solution for mapping screen elements to plot elements. It was based on material developed by the DOD CADD/GIS Technology Center and the United States Coast Guard. The CADD/GIS Technology Center has since declared the material, in the previous NCS version of Plotting Guidelines, obsolete and has requested that it be removed from the NCS.

The previous NCS version of Plotting Guidelines was developed for use with R14 and earlier versions of AutoCAD® that required line widths to be mapped to color numbers. The current versions of MicroStation™ and AutoCAD® allow independent specification of color and line width.

The tables in this NCS version of Plotting Guidelines have removed the dependency of color for plotted line weights.

Plotting Guidelines

1.0 BLACK/WHITE/GRAY PLOTTING

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This section addresses prints/plots that can be printed using a black and white plotter. Since various screen colors can be assigned to color numbers, only color numbers will be addressed. The following table assumes the CAD software utilizes color numbers and allows the user to select from 255 colors.

Color Number			Plotted Color	Plotted RGB Values			Screening	
NCS	Micro-Station	AutoCAD		Red	Green	Blue	%	Output
1-6	1-6	1-6	Black	0	0	0	100	
7	255	7	Background (White)	NA	NA	NA	0	
8-249	7-249	8-249	Black	0	0	0	100	
250	250	250	Gray	102	102	102	60	
251	251	251	Gray	128	128	128	50	
252	252	252	Gray	153	153	153	40	
253	253	253	Gray	179	179	179	30	
254	254	254	Gray	204	204	204	20	

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2.0 LINE WIDTH PLOTTING

Most commercial CAD software products provide an extensive number of line widths. For the majority of drawings, the line widths defined in the table below are considered sufficient. However, it is assumed listed line widths would decrease proportionally if the plotted drawing were reduced to half size. Use of extra fine line widths should be avoided if the drawing will be plotted half size. See *Drafting Conventions, UDS section 4.2* for recommended line types.

	Plotted Line Width	
Line Thickness	mm	in
Extra Fine*	0.13	0.005
Fine	0.18	0.007
Thin	0.25	0.010
Medium	0.35	0.014
Wide	0.50	0.020
Extra Wide	0.70	0.028
XX Wide	1.00	0.039
XXX Wide	1.40	0.055
XXXX Wide	2.00	0.079

*Incorporated to reflect ISO 128-20, 1996 Edition addition

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3.0 COLOR PLOTTING

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This section addresses color printing of non-raster CAD drawings. The following color table assumes the CAD software utilizes color numbers and allows the user to select from 255 colors. The following table establishes consistent print settings for use in creation of color plot/print files. Actual printed colors may vary between printers/plotters. Red, Green, Blue (RGB) values given are based on default AutoCAD® screen color numbers.

	RGB Values			
NCS Color #	Red	Green	Blue	Color
1	255	0	0	
2	255	255	0	
3	0	255	0	
4	0	255	255	
5	0	0	255	
6	255	0	255	
7	255	255	255	
8	128	128	128	
9	192	192	192	
10	255	0	0	
11	255	127	127	
12	204	0	0	
13	204	102	102	
14	153	0	0	
15	153	76	76	
16	127	0	0	
17	127	63	63	
18	76	0	0	
19	76	38	38	
20	255	63	0	
21	255	159	127	
22	204	51	0	
23	204	127	102	
24	153	38	0	
25	153	95	76	
26	127	31	0	
27	127	79	63	
28	76	19	0	
29	76	47	38	
30	255	127	0	
31	255	191	127	
32	204	102	0	
33	204	153	102	

34	153	76	0	
35	153	114	76	
36	127	63	0	
37	127	95	63	
38	76	38	0	
39	76	57	38	
40	255	191	0	
41	255	223	127	
42	204	153	0	
43	204	178	102	
44	153	114	0	
45	153	133	76	
46	127	95	0	
47	127	111	63	
48	76	57	0	
49	76	66	38	
50	255	255	0	
51	255	255	1270	
52	204	204	0	
53	204	204	102	
54	153	153	0	
55	153	153	76	
56	127	127	0	
57	127	127	63	
58	76	76	0	
59	76	76	38	
60	191	255	0	
61	223	255	127	
62	153	204	0	
63	178	204	102	
64	114	153	0	
65	133	153	76	
66	95	127	0	
67	111	127	63	
68	57	76	0	
69	66	76	38	
70	127	255	0	
71	191	255	127	
72	102	204	0	

73	153	204	102	
74	76	153	0	
75	114	153	76	
76	63	127	0	
77	95	127	63	
78	38	76	0	
79	57	76	38	
80	63	255	0	
81	159	255	127	
82	51	204	0	
83	127	204	102	
84	38	153	0	
85	95	153	76	
86	31	127	0	
87	79	127	63	
88	19	76	0	
89	47	76	38	
90	0	255	0	
91	127	255	127	
92	0	204	0	
93	102	204	102	
94	0	153	0	
95	76	153	76	
96	0	127	0	
97	63	127	63	
98	0	76	0	
99	38	76	38	
100	0	255	63	
101	127	255	159	
102	0	204	51	
103	102	204	127	
104	0	153	38	
105	76	153	95	
106	0	127	31	
107	63	127	79	
108	0	76	19	
109	38	76	47	
110	0	255	127	
111	127	255	191	

112	0	204	102	
113	102	204	153	
114	0	153	76	
115	76	153	114	
116	0	127	63	
117	63	127	95	
118	0	76	38	
119	38	76	57	
120	0	255	191	
121	127	255	223	
122	0	204	153	
123	102	204	178	
124	0	153	114	
125	76	153	133	
126	0	127	95	
127	63	127	111	
128	0	76	57	
129	38	76	66	
130	0	255	255	
131	127	255	255	
132	0	204	204	
133	102	204	204	
134	0	153	153	
135	76	153	153	
136	0	127	127	
137	63	127	127	
138	0	76	76	
139	38	76	76	
140	0	191	255	
141	127	223	255	
142	0	153	204	
143	102	178	204	
144	0	114	153	
145	76	133	153	
146	0	95	127	
147	63	111	127	
148	0	57	76	
149	38	66	76	
150	0	127	255	

151	127	191	255	
152	0	102	204	
153	102	153	204	
154	0	76	153	
155	76	114	153	
156	0	63	127	
157	63	95	127	
158	0	38	76	
159	38	57	76	
160	0	63	255	
161	127	159	255	
162	0	51	204	
163	102	127	204	
164	0	38	153	
165	76	95	153	
166	0	31	127	
167	63	79	127	
168	0	19	76	
169	38	47	76	
170	0	0	255	
171	127	127	255	
172	0	0	204	
173	102	102	204	
174	0	0	153	
175	76	76	153	
176	0	0	127	
177	63	63	127	
178	0	0	76	
179	38	38	76	
180	63	0	255	
181	159	127	255	
182	51	0	204	
183	127	102	204	
184	38	0	153	
185	95	76	153	
186	31	0	127	
187	79	63	127	
188	19	0	76	
189	47	38	76	

190	127	0	255	
191	191	127	255	
192	102	0	204	
193	153	102	204	
194	76	0	153	
195	114	76	153	
196	63	0	127	
197	95	63	127	
198	38	0	76	
199	57	38	76	
200	191	0	255	
201	223	127	255	
202	153	0	204	
203	178	102	204	
204	114	0	153	
205	133	76	153	
206	95	0	127	
207	111	63	127	
208	57	0	76	
209	66	38	76	
210	255	0	255	
211	255	127	255	
212	204	0	204	
213	204	102	204	
214	153	0	153	
215	153	76	153	
216	127	0	127	
217	127	63	127	
218	76	0	76	
219	76	38	76	
220	255	0	191	
221	255	127	223	
222	204	0	153	
223	204	102	178	
224	153	0	114	
225	153	76	133	
226	127	0	95	
227	127	63	111	
228	76	0	57	

229	76	38	66	
230	255	0	127	
231	255	127	191	
232	204	0	102	
233	204	102	153	
234	153	0	76	
235	153	76	114	
236	127	0	63	
237	127	63	95	
238	76	0	38	
239	76	38	57	
240	255	0	63	
241	255	127	159	
242	204	0	51	
243	204	102	127	
244	153	0	38	
245	153	76	95	
246	127	0	31	
247	127	63	79	
248	76	0	19	
249	76	38	47	
250	51	51	51	
251	91	91	91	
252	132	132	132	
253	173	173	173	
254	214	214	214	
255	255	255	255	Background

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