

VDI 3400 | Charmilles Surface Texture Chart – True Position Plastics

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The Agie Charmilles (CH) scale originates from the Electrical Discharge Machining (EDM) process, where surface roughness is defined by the energy and duration of each spark. Higher discharge energy produces a coarser texture (higher CH number), while fine finishing passes create smoother surfaces (lower CH numbers). The scale provides a practical EDM-based reference for correlating process parameters to surface finish.

The Charmilles scale is not linear. A rough rule of thumb being that doubling the Ra value increases the CH number by 6. For example, 1 μm Ra = CH20, and 2 μm Ra = CH26

The Ra (micrometers and micro-inches) column provides the direct metric and imperial measurement equivalents for each Charmilles number

VDI 3400 Agie Charmilles	Ra (μm)	Ra (μin)
0	0.10	4.0
1	0.11	4.4
2	0.12	4.8
3	0.14	5.0
4	0.16	6.4
5	0.18	7.2
7	0.22	8.8
8	0.25	10.0
9	0.28	11.2
10	0.32	12.8
11	0.35	14.0
12	0.40	16.0
13	0.45	18.0
14	0.50	20.0
15	0.56	22.4
16	0.63	25.2
17	0.70	28.0
18	0.80	32.0
19	0.90	36.0
20	1.00	40.0
21	1.12	44.8
22	1.26	50.4
23	1.40	56.0
24	1.62	63.0
25	1.80	72.0
26	2.00	80.0
27	2.20	88.0
28	2.50	100.0
29	2.80	112.0
30	3.20	125.0
31	3.50	140.0
32	4.00	160.0
33	4.50	180.0
34	5.00	200.0
35	5.60	224.0
36	6.30	250.0
37	7.00	280.0
38	8.00	320.0
39	9.00	360.0
40	10.00	400.0
41	11.20	448.0
42	12.60	500.0
43	14.00	560.0
44	16.00	640.0
45	17.00	710.0



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Standards Note – ISO 21920 (2021):
ISO 21920 defines the current international method for specifying and verifying surface texture. It provides unified parameters such as Ra, Rz, and Rq, along with standardized filtering methods to ensure consistency across measurement systems.

For molded surface finishes, VDI 3400 and Charmilles texture scales remain valid process-based references and can be correlated to ISO 21920 roughness values where required.