

1951 USAF Resolution Target Data

Group	Element	Frequency	Line Width (um)	Group	Element	Frequency	Line Width (um)
-2	1	0.2500	2000	4	1	16.00	31.3
	2	0.2806	1782		2	17.96	27.8
	3	0.3150	1587		3	20.16	24.8
	4	0.3536	1414		4	22.63	22.1
	5	0.3969	1260		5	25.40	19.7
	6	0.4454	1122		6	28.51	17.5
-1	1	0.5000	1000	5	1	32.00	15.6
	2	0.5612	891		2	35.92	13.9
	3	0.6300	794		3	40.32	12.4
	4	0.7071	707		4	45.25	11.0
	5	0.7937	630		5	50.80	9.84
	6	0.8909	561		6	57.02	8.77
0	1	1.000	500	6	1	64.00	7.81
	2	1.122	445		2	71.84	6.96
	3	1.260	397		3	80.63	6.20
	4	1.414	354		4	90.51	5.52
	5	1.587	315		5	101.6	4.92
	6	1.782	281		6	114.0	4.38
1	1	2.000	250	7	1	128.0	3.91
	2	2.245	223		2	143.7	3.48
	3	2.520	198		3	161.3	3.10
	4	2.828	177		4	181.0	2.76
	5	3.174	157		5	203.2	2.46
	6	3.564	140		6	228.1	2.19
2	1	4.000	125	8	1	256.0	1.95
	2	4.490	111		2	287.4	1.74
	3	5.040	99.2		3	322.5	1.55
	4	5.657	88.4		4	362.0	1.38
	5	6.350	78.7		5	406.4	1.23
	6	7.127	70.2		6	456.1	1.10
3	1	8.000	62.5	9	1	512.0	0.977
	2	8.980	55.7		2	574.7	0.870
	3	10.08	49.6		3	645.1	0.775
	4	11.31	44.2		4	724.1	0.691
	5	12.70	39.4		5	812.7	0.615
	6	14.25	35.1		6	912.3	0.548

The USAF 1951 resolution target was created due to the need to assign numerical tolerances to optical systems and photographic processes. The resolution range depends on the quality and function of the system or process being tested. In the standard Air Force 1951 target, the change in pattern size is in a geometric progression based on the sixth root of 2. To simplify, the number of lines per millimeter doubles with every sixth target element. These six elements are known as a group, and the group heading, such as -2, is the power of 2 to which the first element is raised to express the number of lines per millimeter in that element. In other words, 2 to the -2 power (2^{-2}) is 0.25 line per millimeter, 2 to the 0 power (2^0) is one line per millimeter, and so forth.

The following table depicts the MIL-STD-150A standard, representing the scaling factors.

Element of Group	Factor (mathematical)	Factor (numerical)
1	2^0	1.00000
2	$2^{-1/6}$	0.89090
3	$2^{-2/6} = \frac{1}{\sqrt[3]{2}}$	0.79370
4	$2^{-3/6} = \frac{1}{\sqrt{2}}$	0.70711
5	$2^{-4/6}$	0.62996
6	$2^{-5/6}$	0.56123

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