

Caution:

Don't mark on the phantom with pen or leave printed materials contacted on its surface.
Ink marks on the phantom will be irremovable.

PH-56

Tomosynthesis Phantom NS

Instruction
manual



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Before use

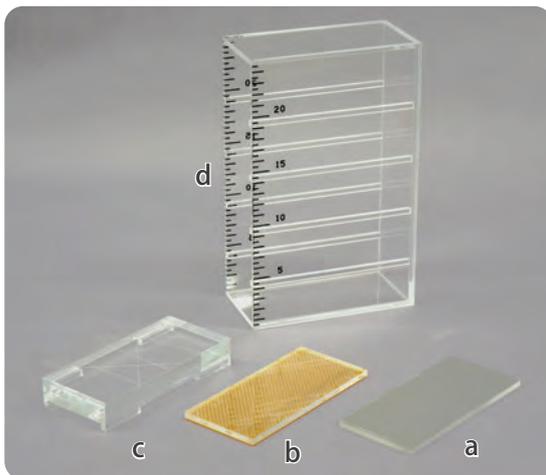
Features

This phantom allows evaluation of reconstruction slices and uniformity in the measurement of slice thickness through showing the images numerically and graphically.

- Evaluation items
 - Slice thickness measurement
 - Uniformity measurement
 - Reconstruction interval measurement

Set includes

Before use, be sure that following parts are included



- Parts
 - a Slice thickness unit Qty: 1
 - b Uniformity unit Qty: 1
 - c Reconstruction interval unit Qty: 1
 - d Height setting rack Qty: 1

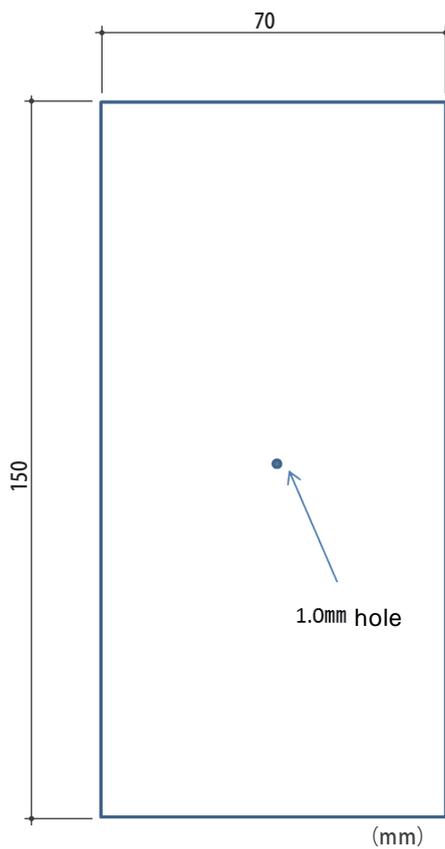
⚠ Cautions

- | | |
|--|---|
| <ul style="list-style-type: none">● Handle with care
As acrylic resin are used, fall or strong shock may damage the phantom. | <ul style="list-style-type: none">● This may be cleaned with wet cloth. If necessary, use diluted detergent. Never use organic solvent like thinner. |
| <ul style="list-style-type: none">● Store phantom at room temperature, away from shock, heat, moisture, and direct sunlight. | <ul style="list-style-type: none">● Don't mark on the models with pen or leave any printed materials in contact with their surface. Ink marks on the phantom are not removable. |

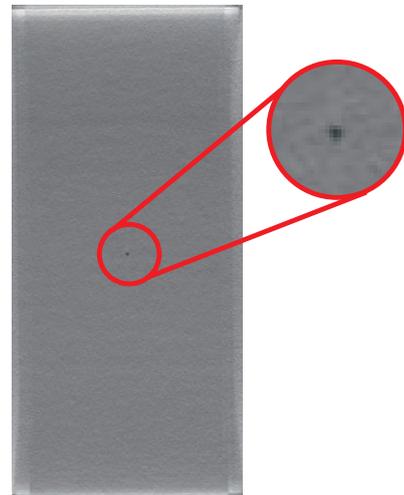
Phantom parts

a. Slice thickness

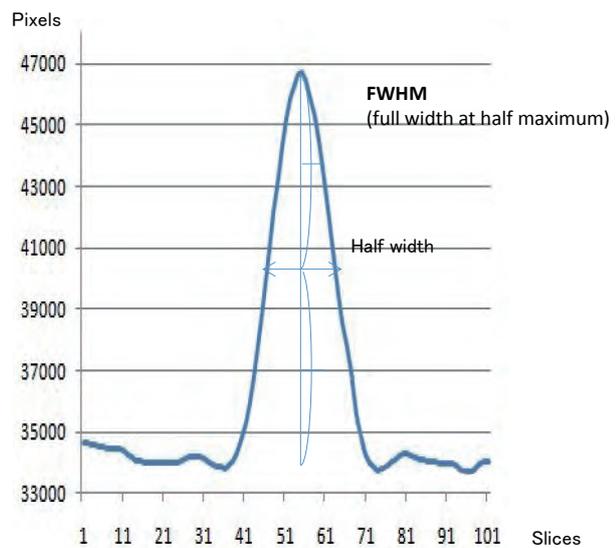
Material : Aluminium, Acrylic resin



Aluminium 0.5mm,
Acrylic resin 5mm



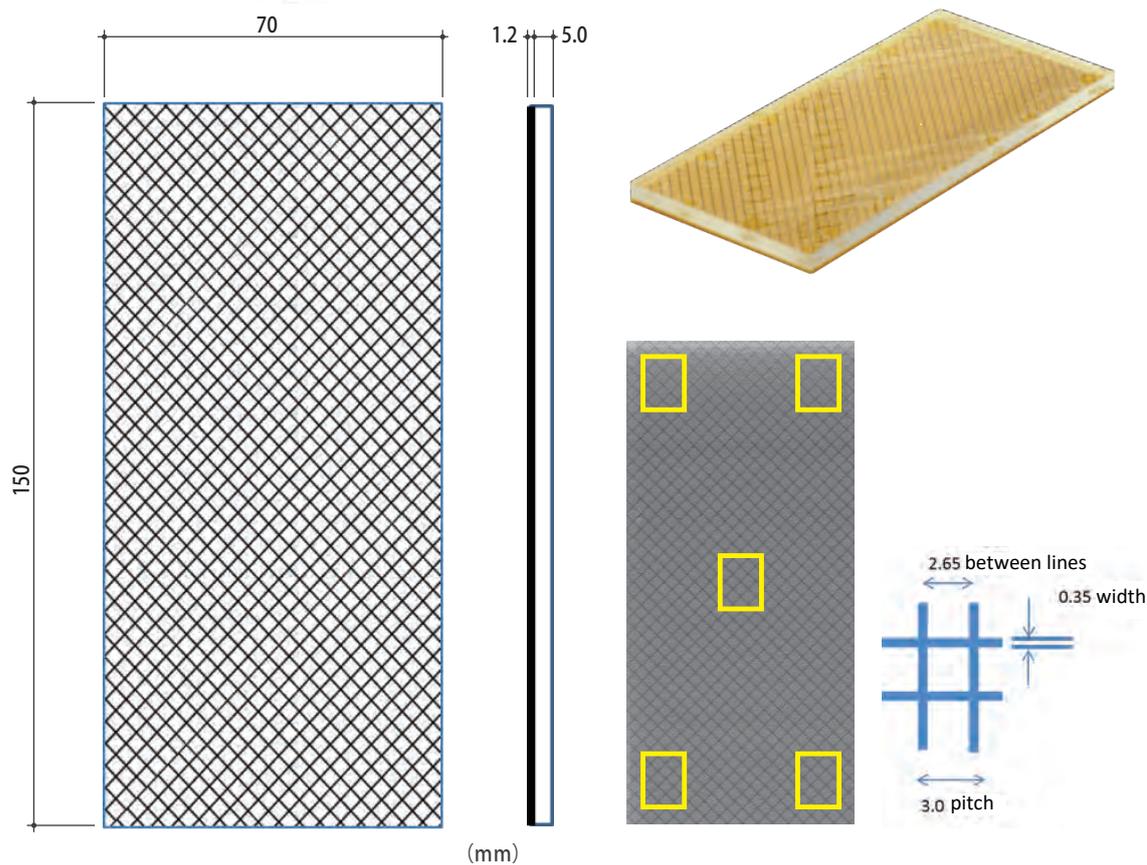
Slice thickness can be obtained by FWHM at the hole.



Phantom parts

b. Uniformity unit

Material : Copper, bakelite, and acrylic resin

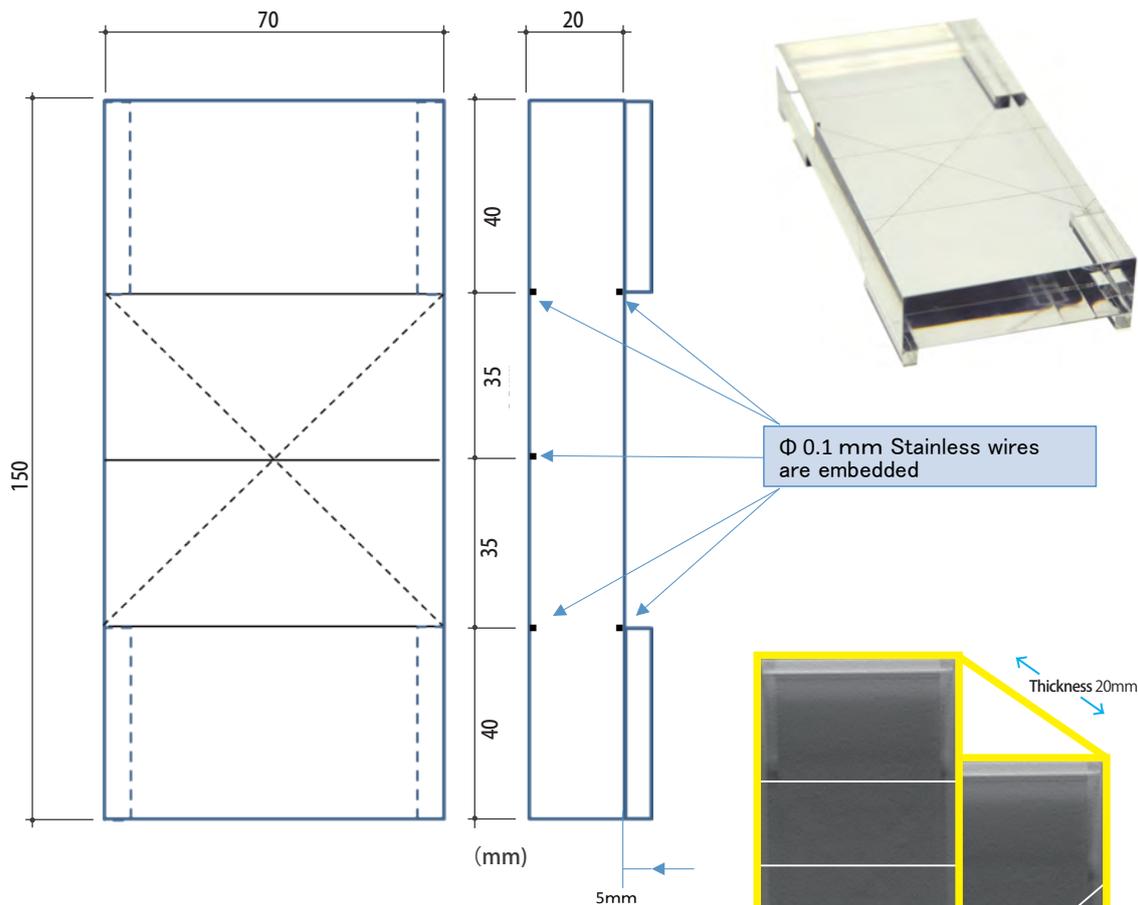


Set ROI to 5 measurement points. The surface whose difference of pixels between maximum and minimum are larger are defined as "in focus". Then check the uniformity and tilt of X-ray fluoroscopic table.

Phantom parts

c . Reconstruction interval unit

Material : 0.1 mm Stainless line、Acrylic resin

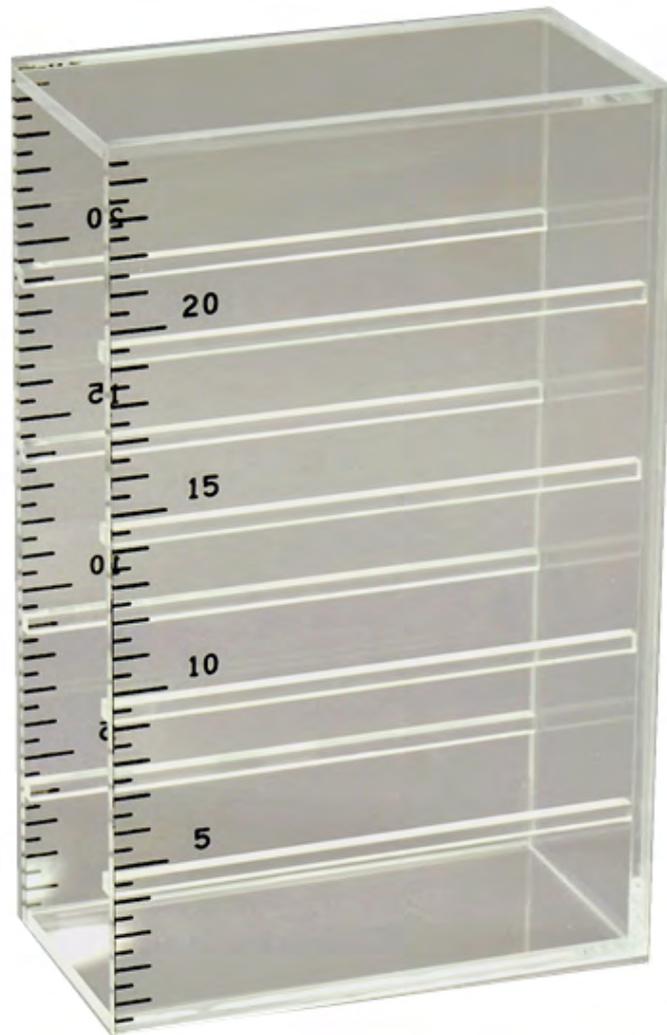


The surface whose differences of maximum and minimum lengths between three metal lines on the upper side and cross lines on the bottom side are defined as "in focus". Then check the reconstruction interval from the height.

Phantom parts

d. Height setting rack

Material: acrylic resin



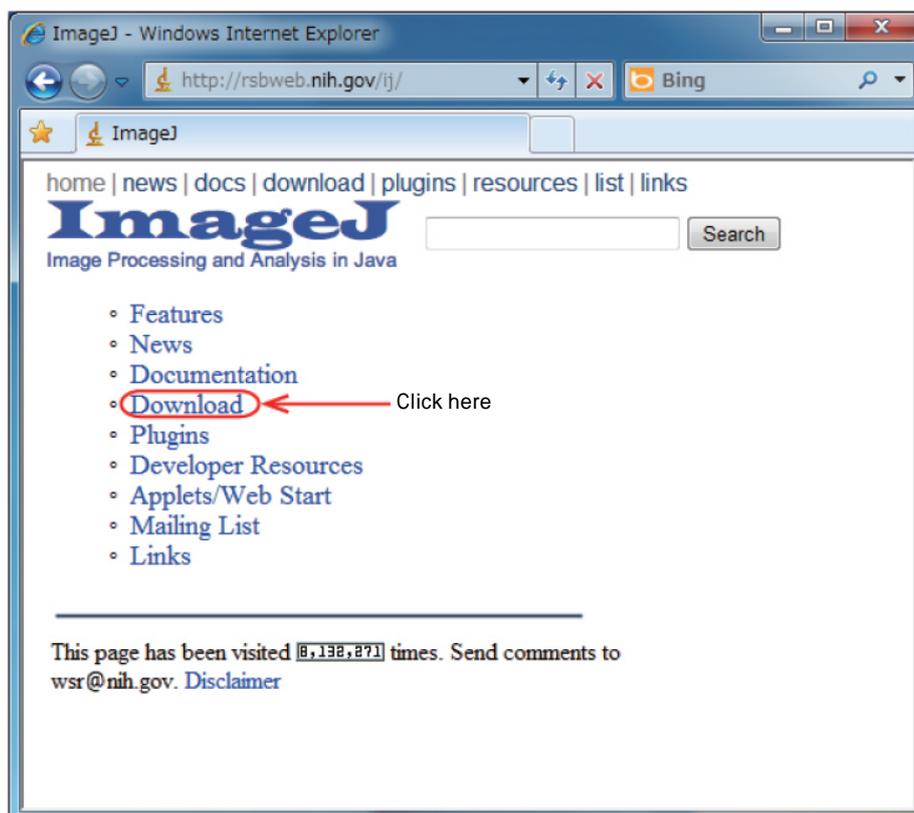
Test units can be set in the aluminum supporting box at 50, 100, 150, 200 (normally 100mm). Scales are shown so that the height from the floor can be shown.

1 Download of free software

Download of free software "ImageJ"

Download the software "ImageJ" from the website below. Import DICOM data to your PC and analyze.

<http://itshiatsu.blogspot.jp/2012/02/01-imagej.html>



2 Slice thickness

Insert slice thickness unit to height setting rack and put is vertically long.

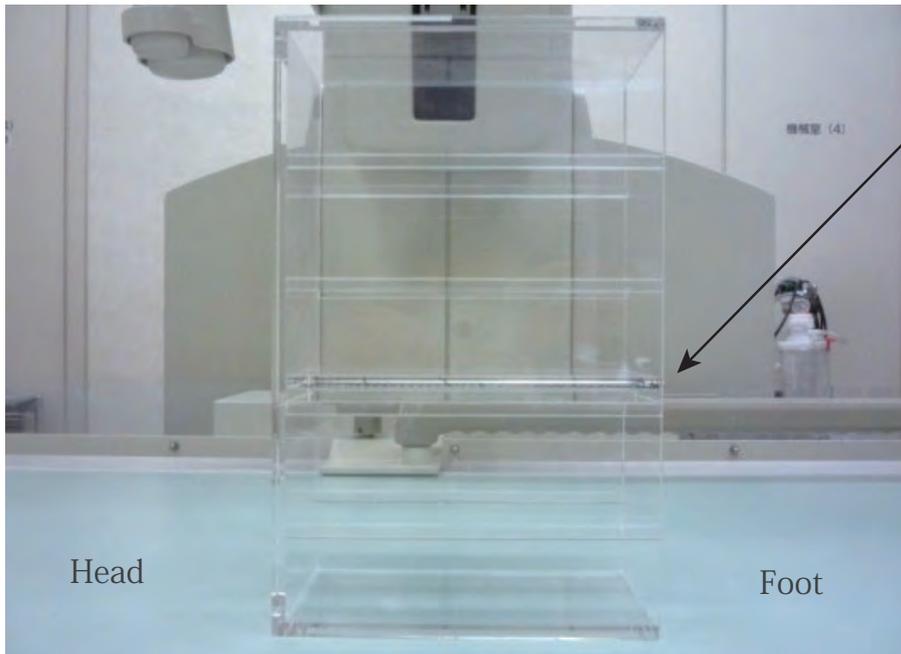


Image acquisition condition : Angle 40° , Slow , HAND F

Set with low condition first

Aluminum plate with hole(ϕ 1 mm)

Image acquisition data Thickness (+-)
0.5mm interval

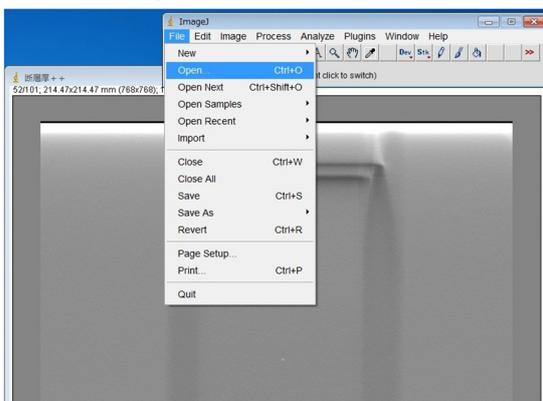


2 Slice thickness

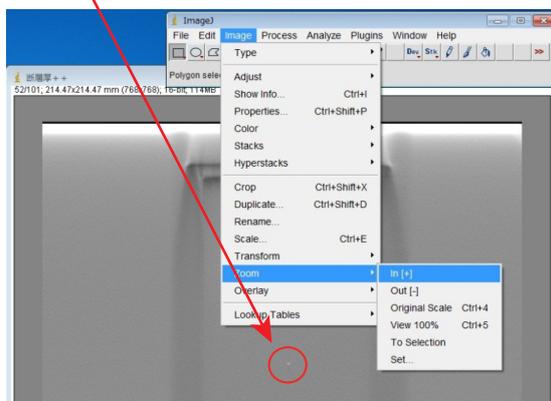
The data used in this manual are images without image procession.

One example using free software

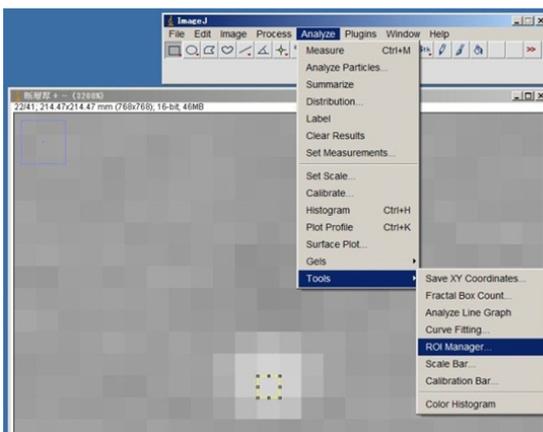
- ① Download image data
[File]→[Open]



- ② Enlarge hole part.
[Image]→[Zoom]→[in] (until 3200%)

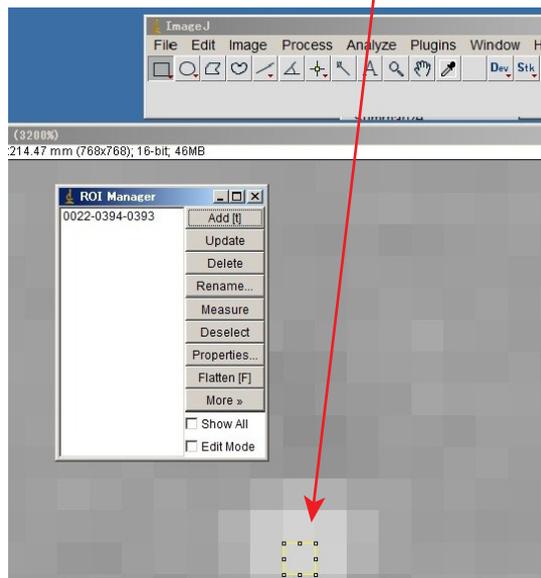


- ③ Cover 1 Pixel (white part)
[Analyze]→[Tools]→[ROI Manager]



- ④ Register all the reconstructed image to ROI address.

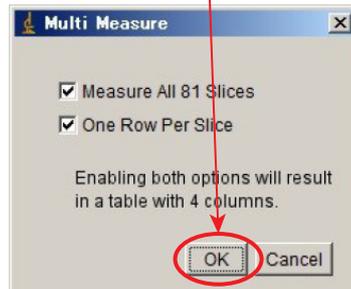
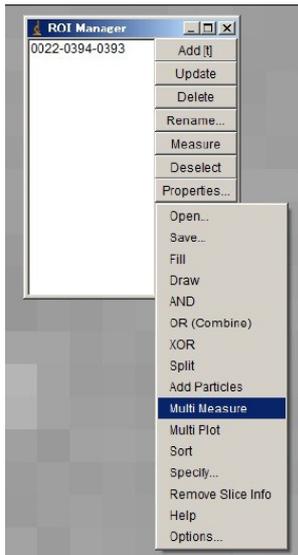
[ROI Manager]→[Add]



2 Slice thickness

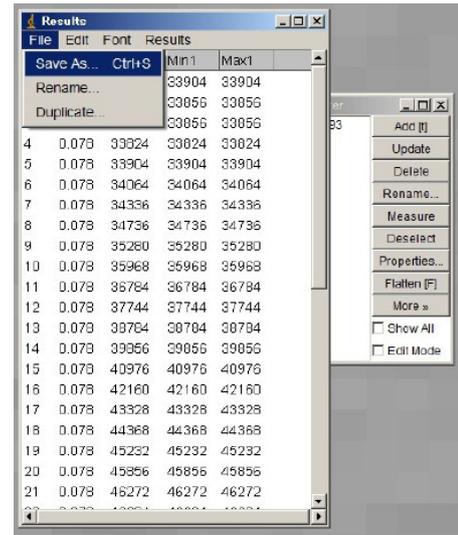
⑤ Register all the reconstructed image to ROI address.

[Add]→[More]→[Multi Measure]→[ok]



⑥ Save the result

[File]→[Save As]→File name
【Slice thickness(filter number)】



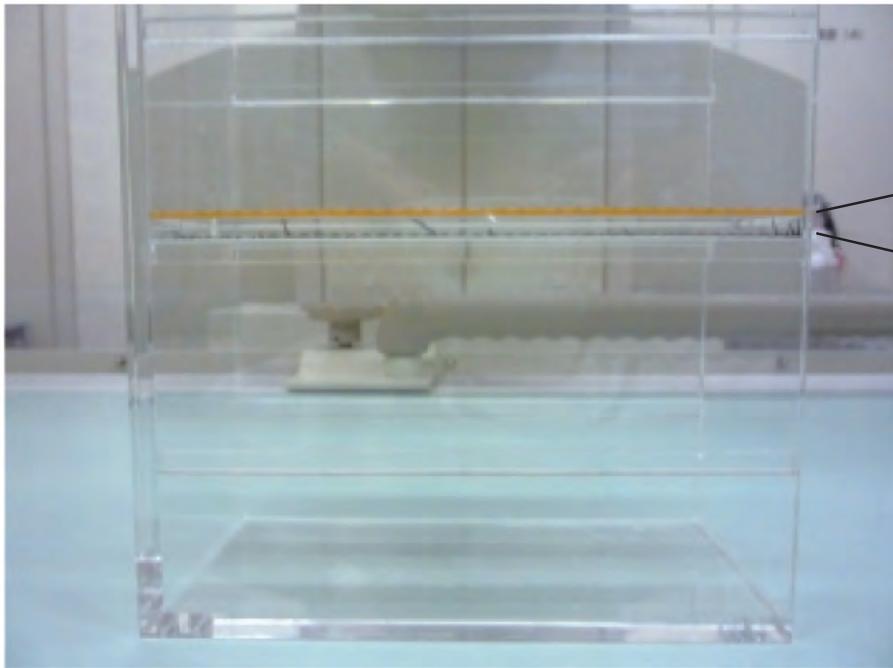
⑦ Calculate slice thickness

- 1 measurement = 0.5mm
- $(\text{max} + \text{min}) / 2 = \text{central point}$



3 Uniformity

Insert slice thickness unit to height setting rack and put is vertically long.

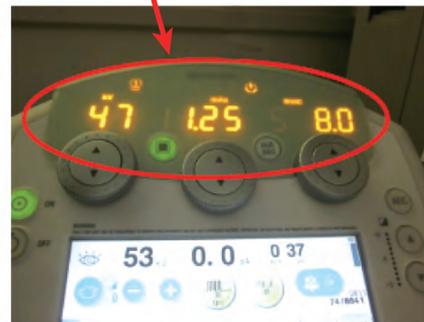


Grid plate
(thickness 1.2mm)
Acrylic plate
(thickness 5mm)

Image acquisition condition : Angle 40° , Slow , HAND F

Unify condition as below. Three images can be analyzed.

- 1.Thickness (++)
- 2.Thickness (+-)
- 3.Thickness (--)



This image is a sample

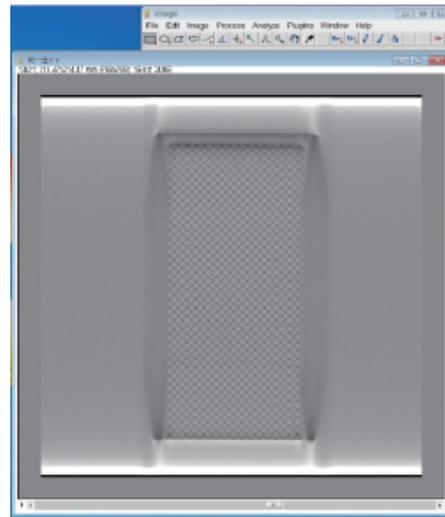
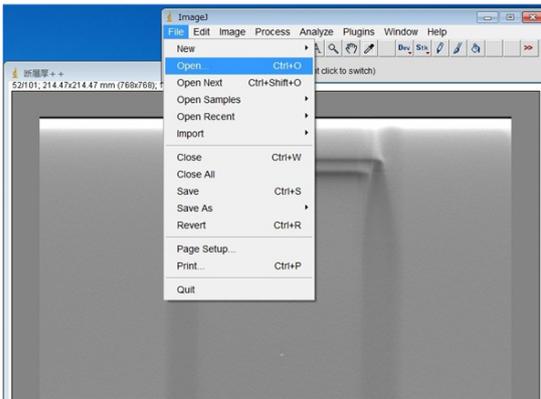
3 Uniformity

The data used in this manual are images without image procession.

One example using free software

① Open image data

[File]→[Open]

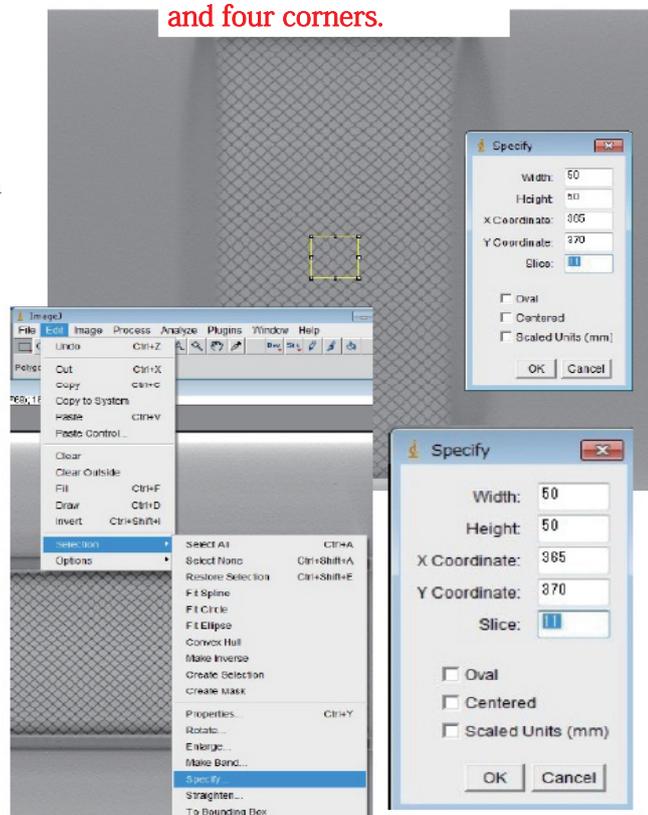


Set same ROI at the center and four corners.

② Among 21 image reconstruction data, choose one data visually in focus

[Edit]→[Selection]→[Specify]→Input value on right bottom.

※Width, Height shall be set at 50 ! X, Y can be set at the center of coordinate point.



One example using free software

3 Uniformity

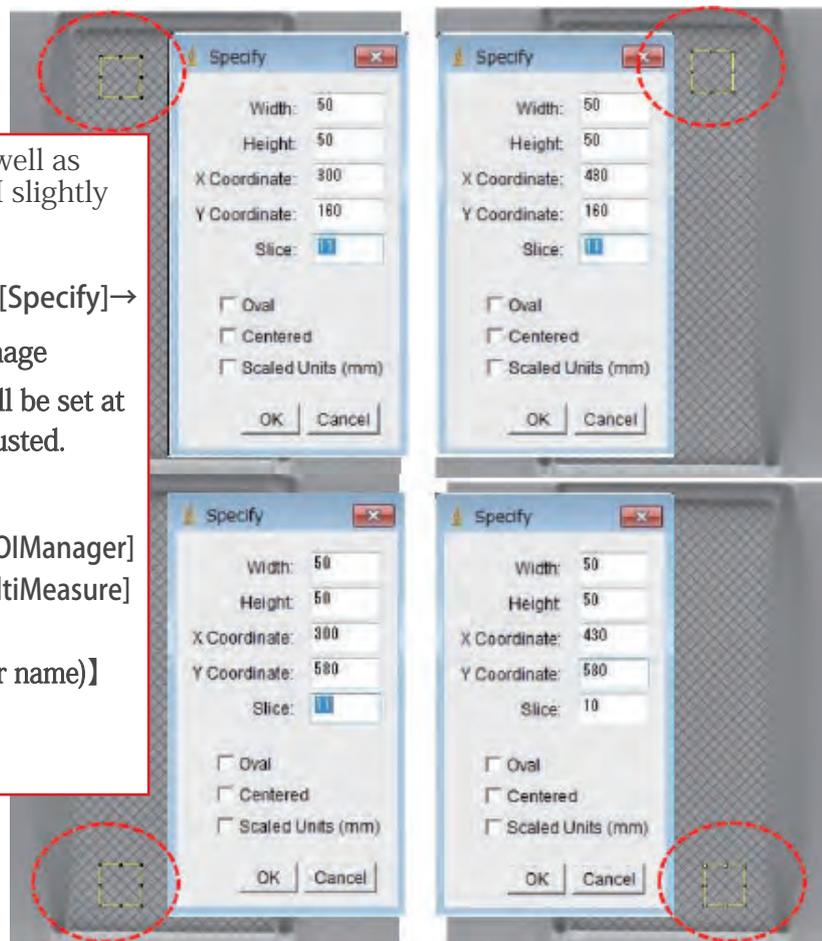
③ Measure center as well as four corners. Take ROI slightly inside the grid plate

[Edit]→[Selection]→[Specify]→

Input data in the image

※Width, Height shall be set at 50 ! X, Y can be adjusted.

[Analyze]→[Tools]→[ROIManager]
→[Add]→[More]→[MultiMeasure]
→[ok]→[Save As]→File
name [Uniformity(filter name)]

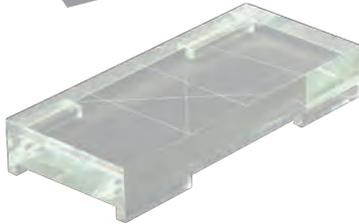
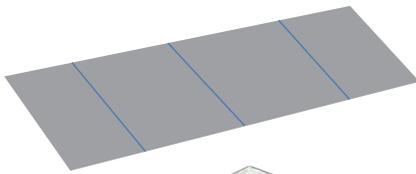


One example using free software

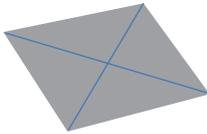
4 Reconstruction interval

Upper side

Height in focus 120mm



Bottom side



Height in focus 100mm

Set reconstruction interval unit to 95mm high

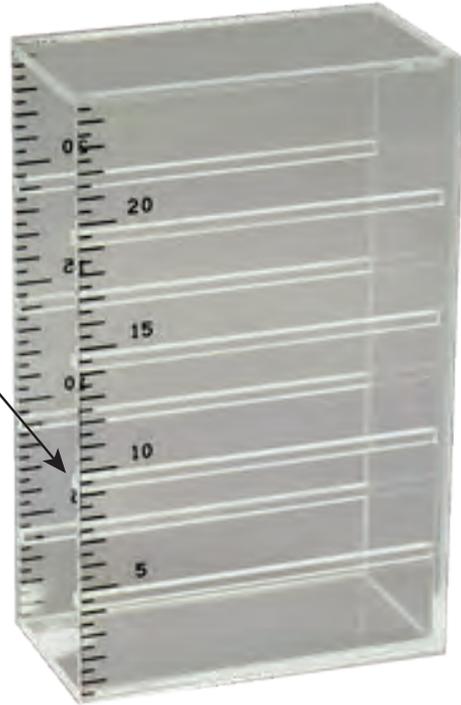


Image acquisition condition :
Angle 40° , Slow , HAND F

Image to be analyzed

Thickness (+-)
0.5mm interval

Height in focus
100mm



This image is a sample

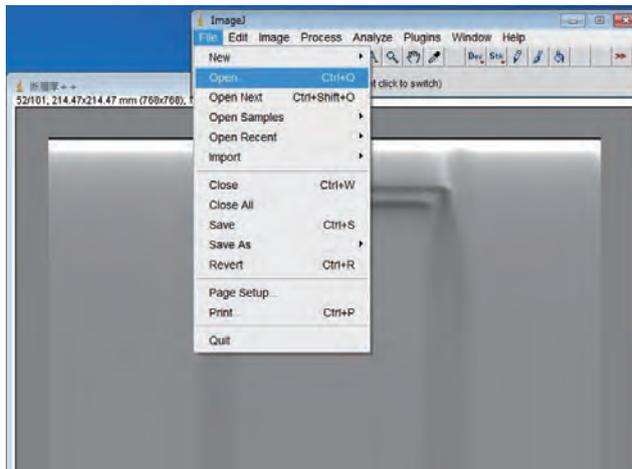
4 Reconstruction interval

The data used in this manual are images without image procession.

One example using free software

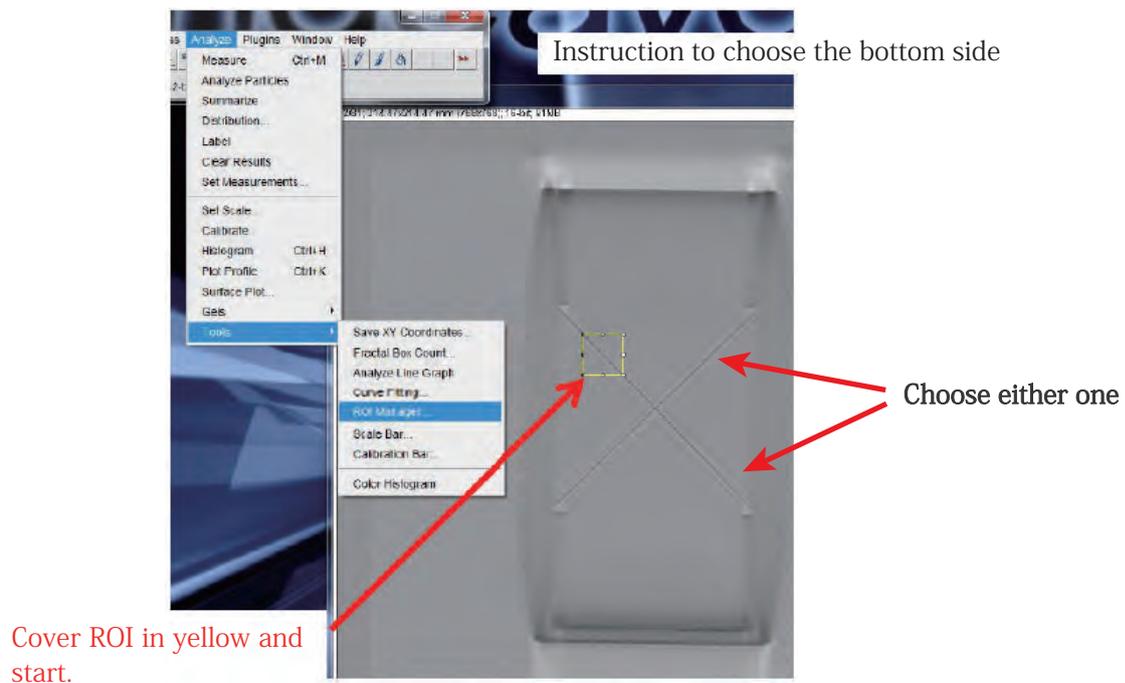
① Open image data

[File]→[Open]



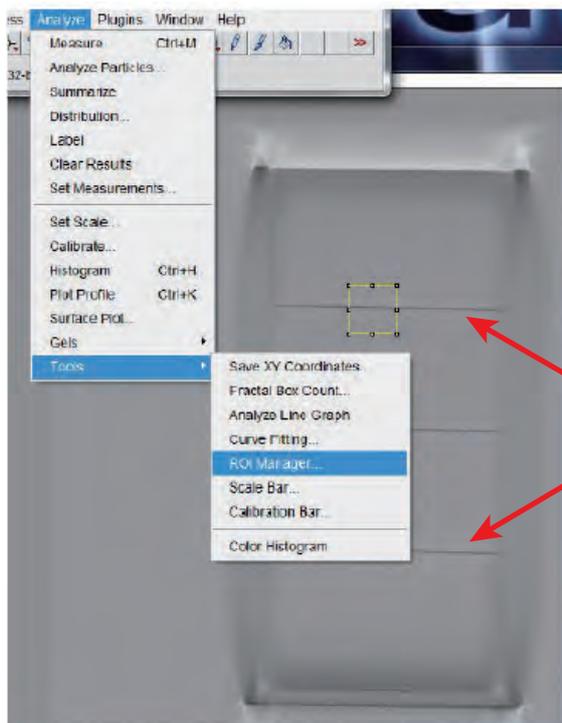
② Choose one image which is visually in focus

[Analyze]→[Tools]→[ROI Manager]



4 Reconstruction interval

- ④ Choose one image which is visually in focus
[Analyze]→[Tools]→[ROI Manager]

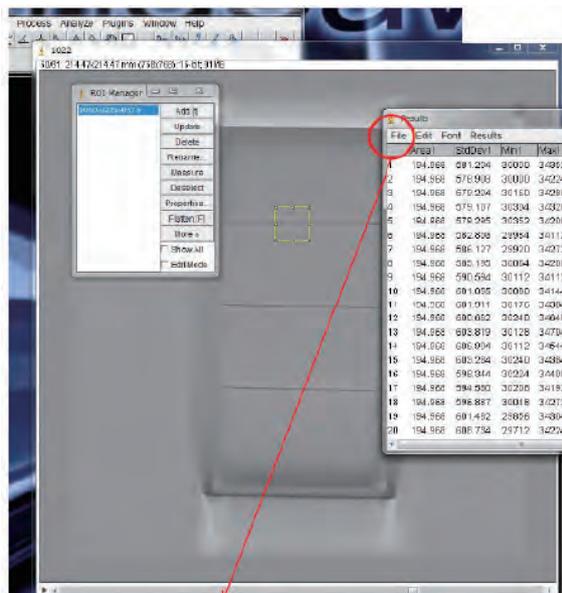


Instruction to choose the bottom side

Cover ROI in yellow and start.

Choose either one

- ⑤ [Add]→[More]→[Multi Measure]→[ok]



Instruction to choose the upper side

[File]→[Save As]→Save

4 Reconstruction Interval

⑤ bottom side

Result

⑥ upper side

Height from the floor 100mm (Theoretically visual in focus)

height from the floor

The surface with maximum Max-min value are defined as "in focus". Then check the difference between the actual height and calculated height.

	Min	Max	Max-min	Height from the floor
1	30512	34624	4112	90
2	30512	34768	4256	90.5
3	30352	34864	4512	91
4	30256	34768	4512	91.5
5	30288	34688	4400	92
6	30352	34736	4384	92.5
7	30448	34688	4240	93
8	30544	34736	4192	93.5
9	30560	34688	4128	94
10	29920	34560	4640	94.5
11	29200	34528	5328	95
12	28416	34448	6032	95.5
13	27552	34560	7008	96
14	26368	34800	8432	96.5
15	25120	34864	9744	97
16	24048	34928	10880	97.5
17	23264	35264	12000	98
18	22320	35536	13216	98.5
19	21472	35776	14304	99
20	20912	35920	15008	99.5
21	20784	35920	15136	100
22	21040	35840	14800	100.5
23	21104	35728	14624	101
24	21248	35568	14320	101.5
25	21840	35344	13504	102
26	22368	35072	12704	102.5
27	22912	34752	11840	103
28	23472	34384	10912	103.5
29	24048	33968	9824	104
30	24640	33504	8640	104.5
31	25248	33000	7352	105
32	25872	32464	6016	105.5
33	26512	31896	4684	106
34	27168	31296	3328	106.5
35	27840	30664	1964	107
36	28528	30000	672	107.5
37	29232	29304	-928	108
38	29952	28576	-2376	108.5
39	30688	27816	-3872	109
40	31440	27024	-5316	109.5
41	32208	26200	-6708	110
42	33000	25344	-8056	110.5
43	33808	24456	-9352	111
44	34640	23536	-10604	111.5
45	35488	22584	-11804	112
46	36352	21600	-12952	112.5
47	37232	20584	-14048	113
48	38128	19536	-15092	113.5
49	39040	18456	-16084	114
50	39968	17344	-17024	114.5
51	40912	16200	-17912	115
52	41872	15024	-18748	115.5
53	42848	13816	-19532	116
54	43840	12576	-20264	116.5
55	44848	11400	-20948	117
56	45872	10196	-21576	117.5
57	46912	9064	-22148	118
58	47968	7904	-22664	118.5
59	49040	6716	-23124	119
60	50128	5500	-23528	119.5
61	51232	4256	-23876	120
62	52352	3000	-24172	120.5
63	53488	1728	-24416	121
64	54640	440	-24616	121.5
65	55808	-1008	-24776	122
66	57000	-2144	-24896	122.5
67	58208	-3328	-24968	123
68	59432	-4560	-24992	123.5
69	60672	-5840	-24968	124
70	61928	-7168	-24896	124.5
71	63200	-8544	-24676	125
72	64488	-9968	-24304	125.5
73	65792	-11440	-23784	126
74	67112	-12960	-23116	126.5
75	68448	-14528	-22304	127
76	69800	-16144	-21344	127.5
77	71168	-17808	-20236	128
78	72552	-19520	-18984	128.5
79	73952	-21280	-17584	129
80	75368	-23088	-16032	129.5
81	76800	-24944	-14336	130
82	78248	-26848	-12496	130.5
83	79712	-28792	-10520	131
84	81192	-30776	-8408	131.5
85	82688	-32800	-6160	132
86	84200	-34864	-3784	132.5
87	85728	-36968	-1288	133
88	87272	-39112	1312	133.5
89	88832	-41304	3728	134
90	90408	-43544	10864	134.5
91	92000	-45832	19468	135
92	93608	-48168	29140	135.5
93	95232	-50552	39880	136
94	96872	-52984	51688	136.5
95	98528	-55464	64564	137
96	100200	-57992	78508	137.5
97	101888	-60568	93520	138
98	103592	-63192	109604	138.5
99	105312	-65864	126768	139
100	107048	-68584	145012	139.5
101	108800	-71352	164356	140
102	110568	-74168	184800	140.5
103	112352	-77024	206344	141
104	114152	-79928	228988	141.5
105	115968	-82872	252732	142
106	117800	-85856	277576	142.5
107	119648	-88880	303520	143
108	121512	-91944	330584	143.5
109	123392	-95048	358768	144
110	125288	-98192	388080	144.5
111	127200	-101376	418512	145
112	129128	-104600	450072	145.5
113	131072	-107864	482760	146
114	133032	-111168	516584	146.5
115	135008	-114512	551544	147
116	137000	-117904	587648	147.5
117	139008	-121344	624896	148
118	141032	-124832	663296	148.5
119	143072	-128368	702848	149
120	145128	-131952	743552	149.5
121	147200	-135584	785416	150
122	149288	-139264	828440	150.5
123	151392	-142992	872632	151
124	153512	-146768	918000	151.5
125	155648	-150592	964544	152
126	157800	-154464	1012264	152.5
127	160000	-158384	1061168	153
128	162216	-162352	1111264	153.5
129	164448	-166368	1162560	154
130	166696	-170432	1215056	154.5
131	169000	-174544	1268752	155
132	171268	-178704	1323648	155.5
133	173592	-182912	1379744	156
134	175972	-187168	1437040	156.5
135	178408	-191472	1495536	157
136	180800	-195824	1555232	157.5
137	183248	-200224	1616128	158
138	185752	-204672	1678224	158.5
139	188312	-209168	1741520	159
140	190828	-213712	1806016	159.5
141	193400	-218304	1871712	160
142	196028	-222944	1938608	160.5
143	198712	-227632	2006704	161
144	201452	-232368	2076000	161.5
145	204248	-237152	2146504	162
146	207096	-241984	2218208	162.5
147	209996	-246864	2291120	163
148	212948	-251792	2365240	163.5
149	215952	-256768	2440568	164
150	219008	-261792	2517104	164.5
151	222116	-266864	2594848	165
152	225276	-271984	2673792	165.5
153	228488	-277152	2753936	166
154	231752	-282368	2835280	166.5
155	235068	-287632	2917824	167
156	238436	-292944	3001568	167.5
157	241856	-298304	3086512	168
158	245328	-303712	3172656	168.5
159	248852	-309168	3260000	169
160	252428	-314672	3348544	169.5
161	256056	-320224	3438288	170
162	259736	-325824	3529232	170.5
163	263468	-331472	3621376	171
164	267252	-337168	3714720	171.5
165	271088	-342912	3809264	172
166	275000	-348704	3905008	172.5
167	278968	-354544	4001952	173
168	282992	-360432	4100196	173.5
169	287072	-366368	4199740	174
170	291208	-372352	4300584	174.5
171	295400	-378384	4402728	175
172	299648	-384464	4506172	175.5
173	303952	-390592	4610916	176
174	308312	-396768	4716960	176.5
175	312728	-402992	4824304	177
176	317200	-409264	4932948	177.5
177	321728	-415584	5042892	178
178	326312	-421952	5154136	178.5
179	330952	-428368	5266680	179
180	335648	-434832	5380524	179.5
181	340400	-441344	5495668	180
182	345208	-447904	5612112	180.5
183	350072	-454512	5729856	181
184	355000	-461168	5848900	181.5
185	360000	-467872	5969244	182
186	365064	-474624	6090888	182.5
187	370192	-481424	6213832	183
188	375384	-488264	6338076	183.5
189	380640	-495144	6463620	184
190	385960	-502064	6590464	184.5
191	391344	-509024	6718608	185
192	396792	-516024	6848052	185.5
193	402304	-523064	6978896	186
194	407880	-530144	7111140	186.5
195	413520	-537264	7244784	187
196	419224	-544416	7379828	187.5
197	425000	-551600	7516272	188
198	430848	-558816	7654116	188.5
199	436768	-566064	7793360	189
200	442760	-573344	7934004	189.5
201	448824	-580656	8076048	190
202	454960	-588000	8219492	190.5
203	461168	-595376	8364336	191
204	467448	-602784	8510580	191.5
205	473800	-610224	8658224	192
206	480224	-617696	8807268	192.5
207	486720	-625192	8957712	193
208	493288	-632712	9109556	193.5
209	499928	-640256	9262800	194
210	506640	-647824	9417444	194.5
211	513424	-655416	9573488	195
212	520280	-663032	9730932	195.5
213	527208	-670672	9889776	196
214	534208	-678336	10050020	196.5
215	541280	-686024	10211664	197
216	548424	-693736	10374708	197.5
217	555640	-701472	10539152	198
218	562928	-709232	10705006	198.5
219	570288	-717016	10872270	199
220	577720	-724824	11040944	199.5
221	585224	-732656	11211028	200
222	592800	-740512	11382522	200.5
223	600448	-748392	11555426	201
224	608168	-756296	11729740	201.5
225	6159			

Reference

MEDICAL NOW No.71 Special appendix (2012) P12-P13

MEDICAL NOW No.73 (2013) P48-P49

MEDICAL NOW No.75 (2014) P40-P41

MEDICAL NOW No.77 (2015) P50-P51



Caution

Don't mark on the phantom with pen or leave printed materials contacted on its surface.
Ink marks on the phantom will be irremovable.

• If you have any questions, please contact the dealer you purchased the product or Kyoto Kagaku Co., Ltd. below.

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