APPROXIMATE HEATING TIMES FOR DIFFERENT SHAPES

DOUGLAS BALDWIN

mm	Slab	Cylinder	Sphere
5	00:01–00:02	00:01–00:01	00:00–00:01
10	00:05–00:08	00:03–00:04	00:02–00:03
15	00:11–00:17	00:06–00:09	00:04–00:06
20	00:19–00:29	00:11–00:16	00:07–00:11
25	00:29–00:44	00:17–00:24	00:10–00:17
30	00:42–01:03	00:25–00:34	00:15–00:24
35	00:56–01:25	00:33–00:46	00:20–00:33
40	01:13–01:50	00:43–00:59	00:26–00:42
45	01:31–02:18	00:54–01:14	00:33–00:53
50	01:52–02:49	01:06–01:31	00:40–01:05
55	02:15–03:22	01:20–01:49	00:49–01:18
60	02:40–04:01	01:35–02:10	00:58–01:33
65	03:07–04:40	01:51–02:31	01:08–01:48
70	03:36–05:28	02:08–02:57	01:18–02:06
75	04:07–06:13	02:26–03:21	01:30–02:24
80	04:41–07:05	02:47–03:49	01:42–02:43
85	05:18–07:58	03:08–04:18	01:55–03:04
90	05:55–08:54	03:30–04:49	02:09–03:26
95	06:34–09:55	03:54–05:22	02:23–03:49
100	07:15–10:53	04:17–05:53	02:38–04:12
105	07:59–11:59	04:43–06:28	02:53–04:37
110	08:44–13:08	05:11–07:05	03:10–05:04
115	09:33–14:21	05:39–07:45	03:28–05:32
120	10:22–15:36	06:09–08:26	03:46–06:01
125	11:16–16:54	06:40–09:07	04:05–06:32
130	12:10–18:15	07:12–09:51	04:25–07:03
135	13:05–19:40	07:46–10:38	04:45–07:36
140	14:04–21:09	08:21–11:24	05:07–08:10
145	15:06–22:40	08:57–12:15	05:29–08:45
150	16:09–24:15	09:35–13:04	05:52–09:21

In the table, thickness refers to twice the shortest distance to the least accessible part of the food, "slab" refers to something between an infinite slab and $2 \times 3 \times 5$ block, "cylinder" refers to something between an infinite cylinder and a $1 \times 1 \times 5$ block, and "sphere" refers to something between a cube and a sphere. For the calculations, I assumed a thermal diffusivity of 1.4×10^{-7} m^2/sec and a surface heat transfer coefficient of 600 W/m^2-K. The times are for the least accessible part of the thawed food to reach 1°F (0.5°C) less than the temperature of the water bath, and is valid for water bath temperatures between 111–176°F (44–80°C) .