

**In-Shell Egg Heating Times in a 75°C Water Bath Using Circumference or Diameter
for Chicken Eggs, starting from 5°C
By Douglas E. Baldwin**

Dia- meter	Circum- ference	Desired yolk core temperature							
		60°C	61°C	62°C	63°C	64°C	65°C	66°C	67°C
30	94	6:32	6:45	6:58	7:13	7:29	7:47	8:06	8:28
31	97	6:55	7:08	7:23	7:39	7:56	8:14	8:35	8:58
32	101	7:19	7:33	7:48	8:05	8:23	8:42	9:04	9:28
33	104	7:43	7:58	8:14	8:32	8:50	9:11	9:34	10:00
34	107	8:08	8:24	8:41	8:59	9:19	9:41	10:05	10:32
35	110	8:34	8:50	9:08	9:27	9:48	10:11	10:36	11:05
36	113	9:00	9:17	9:36	9:56	10:18	10:42	11:09	11:38
37	116	9:27	9:46	10:05	10:27	10:50	11:15	11:43	12:14
38	119	9:55	10:14	10:35	10:57	11:21	11:48	12:17	12:50
39	123	10:23	10:43	11:05	11:28	11:54	12:21	12:52	13:26
40	126	10:52	11:13	11:36	12:00	12:26	12:55	13:27	14:03
41	129	11:21	11:43	12:06	12:32	12:59	13:29	14:02	14:39
42	132	11:47	12:09	12:33	12:59	13:27	13:58	14:31	15:09
43	135	12:20	12:44	13:09	13:36	14:06	14:38	15:14	15:54
44	138	12:54	13:19	13:46	14:15	14:46	15:20	15:58	16:40
45	141	13:27	13:53	14:21	14:51	15:23	15:59	16:38	17:22
46	145	14:00	14:27	14:56	15:27	16:01	16:38	17:19	18:05
47	148	14:34	15:02	15:32	16:05	16:40	17:19	18:01	18:49
48	151	15:09	15:38	16:09	16:43	17:19	17:59	18:44	19:33
49	154	15:44	16:14	16:46	17:21	17:59	18:41	19:27	20:18
50	157	16:19	16:51	17:24	18:01	18:40	19:23	20:11	21:04
51	160	16:55	17:27	18:02	18:39	19:20	20:04	20:53	21:48
52	163	17:32	18:05	18:41	19:20	20:02	20:48	21:39	22:36
53	167	18:09	18:44	19:21	20:01	20:45	21:33	22:26	23:25
54	170	18:48	19:24	20:02	20:44	21:29	22:18	23:13	24:14
55	173	19:27	20:04	20:44	21:27	22:13	23:05	24:01	25:04
56	176	20:06	20:45	21:26	22:10	22:59	23:52	24:50	25:55
57	179	20:46	21:26	22:09	22:55	23:45	24:39	25:40	26:47
58	182	21:27	22:08	22:52	23:40	24:31	25:28	26:30	27:40
59	185	22:09	22:51	23:37	24:26	25:19	26:17	27:21	28:33
60	188	22:51	23:35	24:21	25:12	26:07	27:07	28:14	29:28

TABLE 4.2: Heating time to a desired core temperature in a 75°C water bath. The diameter (or circumference) is measured in millimeters around the skinnier part of the egg. Times were computed using a thermal diffusivity of $1.85 \times 10^{-7} \text{ m}^2 / \text{s}$, a $\beta = 1.8$, and a surface heat transfer coefficient of $200 \text{ W/m}^2\text{-K}$. Heating times are in mm:ss. Diameter values are exact, circumference values are rounded.