

## CAPÍTULO 6

### EVALUACIÓN DE NÚMEROS ADIMENSIONALES

#### 6.1 Números de Nusselt y Rayleigh en Función de $\delta$

Una vez obtenidos todos los valores de espesor de capa límite térmica para los valores experimentales obtenidos en el capítulo 4 fue necesario producir los números de Nusselt y Rayleigh en función de la nueva longitud característica, el espesor de capa límite. Fue por ello que en el capítulo 4 se calcularon los factores  $ky$  ( $g\beta\Delta T$ )/ $(v\alpha)$  puesto que:

$$Nu = \frac{h L}{k} \quad (6.1)$$

$$Ra = \frac{g\beta\Delta T}{v\alpha} L^3 \quad (6.2)$$

$$L = \delta \quad (6.3)$$

Entonces,

$$Nu_{\delta} = \frac{h}{k} \delta \quad y \quad (6.4)$$

$$Ra_{\delta} = \frac{g\beta\Delta T}{v\alpha} \delta^3 \quad (6.5)$$

De esta manera mediante el factor  $h/k$  obtenido en el capítulo 4 y el espesor de capa límite térmica obtenido en el capítulo anterior fue posible producir las siguientes tablas de datos:

Tabla 6.1  $T_w - T_A = 2.7^\circ\text{C}$ . [11]

# de punto	Nu $\delta$ (5.1)	Nu $\delta$ (5.2)	Nu $\delta$ (5.7)	Nu $\delta$ (5.8)	Nu $\delta$ (5.9)	Ra $\delta$ (5.1)	Ra $\delta$ (5.2)	Ra $\delta$ (5.7)	Ra $\delta$ (5.8)	Ra $\delta$ (5.9)
1	9.1757E-05	0.0003951	9.0844E-13	4.27107E-32	1.153E-06	5.478E-11	4.372E-09	5.3156E-35	5.52E-93	1.087E-16
2	0.00039338	0.0013574	4.5773E-11	6.7583E-28	9.453E-06	3.328E-09	1.367E-07	5.2424E-30	1.69E-80	4.618E-14
3	0.00091619	0.0027666	4.7081E-10	2.22445E-25	3.255E-05	3.956E-08	1.089E-06	5.3682E-27	5.66E-73	1.774E-12
4	0.00170117	0.0045516	3.3621E-09	3.68124E-23	8.614E-05	3.735E-07	7.153E-06	2.883E-24	3.78E-66	4.849E-11
5	0.00337916	0.0081946	1.9955E-08	2.80989E-21	0.0002282	2.315E-06	3.302E-05	4.768E-22	1.33E-60	7.134E-10
6	0.00701612	0.0149868	1.7016E-07	6.4718E-19	0.0006873	2.438E-05	0.0002377	3.4786E-19	1.91E-53	2.292E-08
7	0.00908157	0.0187091	3.2956E-07	3.20957E-18	0.0009891	4.773E-05	0.0004173	2.2809E-18	2.11E-51	6.166E-08

Tabla 6.2  $T_w - T_A = 6.9^\circ\text{C}$ . [11]

# de punto	Nu $\delta$ (5.1)	Nu $\delta$ (5.2)	Nu $\delta$ (5.7)	Nu $\delta$ (5.8)	Nu $\delta$ (5.9)	Ra $\delta$ (5.1)	Ra $\delta$ (5.2)	Ra $\delta$ (5.7)	Ra $\delta$ (5.8)	Ra $\delta$ (5.9)
1	4.4393E-05	0.0002027	2.2844E-13	2.33285E-33	4.696E-07	1.84E-11	1.752E-09	2.5078E-36	2.67E-96	2.178E-17
2	0.00028861	0.0009668	4.6726E-11	1.49117E-27	7.566E-06	5.771E-09	2.169E-07	2.4491E-29	7.96E-79	1.04E-13
3	0.000844	0.0023701	9.7347E-10	3.03379E-24	3.709E-05	1.522E-07	3.371E-06	2.3356E-25	7.07E-69	1.292E-11
4	0.00145058	0.0037341	4.4071E-09	1.3161E-22	8.226E-05	7.647E-07	1.304E-05	2.1446E-23	5.71E-64	1.394E-10
5	0.00463777	0.0099065	1.1248E-07	4.27797E-19	0.0004543	2.438E-05	0.0002377	3.4786E-19	1.91E-53	2.292E-08
6	0.0074413	0.014941	3.5949E-07	6.82595E-18	0.0008738	7.689E-05	0.0006224	8.67E-18	5.94E-50	1.245E-07
7	0.01399926	0.0253082	2.1755E-06	6.30914E-16	0.0022357	0.000539	0.0031845	2.0226E-15	4.93E-44	2.195E-06
8	0.0301169	0.0481968	1.8186E-05	1.25209E-13	0.0068747	0.0051767	0.0212164	1.1399E-12	3.72E-37	6.157E-05

Tabla 6.3  $T_w - T_A = 10.2^\circ\text{C}$ . [11]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	2.4197E-05	0.0001179	6.0546E-14	1.14963E-34	2.117E-07	5.534E-12	6.398E-10	8.67E-38	5.9E-100	3.706E-18
2	8.1491E-05	0.0003279	1.7131E-12	4.66742E-31	1.248E-06	1.921E-10	1.252E-08	1.7851E-33	3.61E-89	6.907E-16
3	0.00030563	0.0009978	6.5874E-11	4.09862E-27	8.638E-06	9.297E-09	3.235E-07	9.3093E-29	2.24E-77	2.099E-13
4	0.00090453	0.0024525	1.542E-09	1.19577E-23	4.406E-05	2.919E-07	5.818E-06	1.4461E-24	6.74E-67	3.373E-11
5	0.00243801	0.0056725	2.2828E-08	9.42354E-21	0.0001859	4.991E-06	6.287E-05	4.0978E-21	2.88E-58	2.213E-09
6	0.00530923	0.0109376	1.9267E-07	1.87637E-18	0.0005783	4.773E-05	0.0004173	2.2809E-18	2.11E-51	6.166E-08
7	0.01026382	0.0189411	1.2682E-06	2.15445E-16	0.0015432	0.0003678	0.0023118	6.9396E-16	3.4E-45	1.25E-06
8	0.01792156	0.0305272	5.4021E-06	7.35148E-15	0.0034073	0.0016261	0.0080365	4.4535E-14	1.12E-40	1.117E-05
9	0.02410279	0.0391711	1.2261E-05	5.65706E-14	0.0052591	0.0038896	0.0166953	5.1195E-13	5.03E-38	4.04E-05
10	0.05239313	0.0745131	0.0001177	1.73785E-11	0.0168993	0.0462388	0.1330093	5.2424E-10	1.69E-30	0.0015516

Tabla 6.4  $T_w - T_A = 16.2^\circ\text{C}$ . [11]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	1.3371E-05	6.841E-05	1.9376E-14	1.0286E-35	1.013E-07	2.227E-12	2.983E-10	6.777E-39	1E-102	9.69E-19
2	3.8436E-05	0.0001663	3.594E-13	1.47878E-32	4.757E-07	4.98E-11	4.036E-09	4.0713E-35	2.84E-93	9.443E-17
3	0.00022744	0.0007471	4.5798E-11	2.43123E-27	6.314E-06	8.301E-09	2.942E-07	6.777E-29	1.01E-77	1.776E-13
4	0.00078516	0.0021007	1.5517E-09	1.69903E-23	3.976E-05	3.735E-07	7.153E-06	2.883E-24	3.78E-66	4.849E-11
5	0.00239303	0.0053908	3.2109E-08	3.06839E-20	0.0002006	9.091E-06	0.0001039	2.1961E-20	1.92E-56	5.355E-09
6	0.00543982	0.0107238	3.2235E-07	9.85736E-18	0.0006741	0.0001081	0.000828	2.2488E-17	6.43E-49	2.056E-07
7	0.00936429	0.0168822	1.5008E-06	4.67709E-16	0.0015077	0.0005674	0.0033247	2.3356E-15	7.07E-44	2.368E-06
8	0.01510203	0.0252287	5.6533E-06	1.2754E-14	0.0030397	0.0023332	0.0108773	1.2239E-13	1.41E-39	1.903E-05
9	0.02698769	0.041497	2.5429E-05	4.94434E-13	0.0069257	0.010867	0.039506	9.0912E-12	6.68E-35	0.0001837
10	0.062774	0.0834879	0.00029746	2.50611E-10	0.024642	0.1604163	0.3773803	1.7069E-08	1.02E-26	0.0097037

Tabla 6.5  $T_w - T_A = 20.3^\circ\text{C}$ . [11]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	3.1842E-05	0.00013	1.5326E-14	6.90559E-36	8.44E-08	6.602E-12	9.013E-10	1.6275E-38	1.5E-102	2.718E-18
2	0.00011023	0.0003971	7.9514E-12	3.84701E-29	2.336E-06	1.5E-09	7.01E-08	5.629E-31	6.37E-83	1.427E-14
3	0.00067033	0.0018346	1.0293E-09	6.25401E-24	3.176E-05	2.452E-07	5.028E-06	8.8781E-25	1.99E-67	2.609E-11
4	0.00169087	0.0039423	1.547E-08	6.04994E-21	0.0001282	4.802E-06	6.087E-05	3.6779E-21	2.2E-58	2.091E-09
5	0.00469977	0.0094364	2.2705E-07	4.31112E-18	0.0005519	7.689E-05	0.0006224	8.67E-18	5.94E-50	1.245E-07
6	0.00955569	0.0170439	1.7251E-06	7.09816E-16	0.0015875	0.000692	0.0039265	4.0713E-15	2.84E-43	3.173E-06
7	0.01560832	0.0255322	7.3833E-06	2.8755E-14	0.0033411	0.003446	0.0150839	3.6475E-13	2.15E-38	3.38E-05
8	0.02599054	0.0395002	2.7887E-05	7.34213E-13	0.0069017	0.013494	0.0473687	1.6669E-11	3.04E-34	0.0002527
9	0.0740629	0.094576	0.00055196	1.33759E-09	0.0327527	0.3411927	0.7104619	1.4123E-07	2.01E-24	0.0295079

Tabla 6.6  $T_w - T_A = 26.7^\circ\text{C}$ . [11]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	9.9272E-06	5.112E-05	1.341E-14	6.04239E-36	7.385E-08	1.981E-12	2.704E-10	4.8824E-39	4.5E-103	8.154E-19
2	2.6018E-05	0.0001151	1.9039E-13	4.42109E-33	3.019E-07	3.31E-11	2.866E-09	1.2968E-35	1.62E-94	5.171E-17
3	0.00013994	0.0004755	1.9329E-11	4.25852E-28	3.518E-06	4.429E-09	1.738E-07	1.1672E-29	1.25E-79	7.038E-14
4	0.0007965	0.0020688	2.1903E-09	5.18351E-23	4.4E-05	6.477E-07	1.135E-05	1.3468E-23	1.79E-64	1.092E-10
5	0.00529645	0.0101108	4.4894E-07	3.16505E-17	0.0007212	0.0001963	0.0013653	1.1952E-16	4.19E-47	4.954E-07
6	0.01046982	0.0180619	2.74E-06	2.6812E-15	0.0019179	0.0012848	0.0065964	2.3027E-14	2.16E-41	7.897E-06
7	0.01569271	0.0250397	9.7913E-06	7.27584E-14	0.0036131	0.0054668	0.0222088	1.3279E-12	5.45E-37	6.672E-05
8	0.02668003	0.0395304	3.799E-05	1.93578E-12	0.0076326	0.0216258	0.0703407	6.2436E-11	8.26E-33	0.0005063
9	0.04069311	0.0561816	0.0001272	4.05929E-11	0.0143175	0.0801867	0.2110189	2.4491E-09	7.96E-29	0.0034925
10	0.06728837	0.0851592	0.00055403	1.69423E-09	0.0305477	0.4028605	0.8166387	2.2488E-07	6.43E-24	0.0376939

Tabla 6.7 Uso de Extensiones Horizontales [15]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	0.56465869	0.4841995	0.35441489	0.026704362	0.8019033	552.12322	348.13753	136.525521	0.058402	1581.4081
2	0.68155242	0.5673514	0.59522699	0.096936383	1.0558135	957.48436	552.31944	637.795925	2.754827	3559.5531
3	0.77813887	0.631318	0.90470902	0.287258475	1.2997124	1542.5732	823.79455	2424.38289	77.60559	7188.1355
4	0.92892547	0.7271414	1.60912624	1.295352811	1.7232123	2998.0682	1437.9886	15583.6524	8129.487	19138.823
5	1.03867299	0.7990786	2.18218838	2.755708165	2.0271714	4135.377	1882.986	38349.112	77228.62	30743.265
6	1.09399818	0.8334739	2.56201946	4.168172904	2.1970339	4955.6711	2191.4356	63650.2259	274087.9	40138.668
7	1.13384154	0.8585348	2.8434316	5.42704572	2.3184343	5554.4808	2411.3491	87602.1436	609083.5	47486.563
8	1.19005726	0.8930304	3.29881591	7.953866685	2.4983748	6563.6156	2773.5644	139802.134	1959632	60731.269

Tabla 6.8 Uso de Placas Verticales Calentadas [15]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	1.54233819	1.2513265	1.7932111	0.569371011	2.5761418	1542.5732	823.79455	2424.38289	77.60559	7188.1355
2	1.94036018	1.5243916	3.22807071	2.364799661	3.561412	2802.8117	1359.0534	12905.5339	5073.76	17330.596
3	2.35924959	1.8210583	4.77708555	5.534954278	4.5600395	3888.7318	1788.3721	32283.1113	50214.42	28079.679
4	2.73691301	2.0918699	6.1838584	9.253354068	5.4448322	4668.2812	2084.3854	53845.8991	180414.6	36755.94
5	3.08430409	2.328254	8.0035243	16.54298317	6.3636049	5879.8498	2529.2151	102739.741	907269.2	51642.146

Tabla 6.9 Uso de Placas Verticales a Temperatura Ambiente [15]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	0.75410489	0.6348967	0.5805723	0.070451458	1.1300808	776.00949	463.10667	354.112042	0.632764	2611.5611
2	1.00380329	0.8356059	0.87666156	0.142769738	1.555022	957.48436	552.31944	637.795925	2.754827	3559.5531
3	1.2644642	1.0258824	1.47013882	0.46679079	2.1120135	1542.5732	823.79455	2424.38289	77.60559	7188.1355
4	1.64868979	1.2813787	3.09211095	2.996188044	3.1230404	3422.575	1606.8253	22578.8251	20542.03	23263.173
5	1.5545805	1.2040944	3.0292263	3.209110019	2.9745476	3647.7378	1694.984	26988.5231	32087.64	25553.285
6	1.90144674	1.4441556	4.60925737	8.127366724	3.853423	5248.9297	2299.6419	74767.2042	409890.5	43687.614
7	2.00623377	1.505497	5.56124152	13.40886394	4.2118343	6563.6156	2773.5644	139802.134	1959632	60731.269

Tabla 6.10 Placa Horizontal con Lc= 5cm [6]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	8.35560455	4.8624391	392.765955	699639.1724	36.947488	734659.39	144782.12	7.6305E+10	4.31E+20	63519511
2	35.9506161	15.74752	39938.036	1.1403E+11	365.39884	142985956	12017411	1.9604E+17	4.56E+36	1.501E+11
3	65.4522464	25.844962	230787.24	9.7557E+12	901.54455	980177733	60347438	4.297E+19	3.25E+42	2.561E+12
4	90.1985561	33.697966	589132.1	1.04943E+14	1461.2227	2.739E+09	142799573	7.6305E+20	4.31E+45	1.164E+13
5	126.080429	44.149541	1693527.62	1.62246E+15	2469.264	9.108E+09	391053339	2.2072E+22	1.94E+49	6.842E+13
6	217.536727	68.723555	9191752.8	1.27682E+17	5760.1219	6.151E+10	1.939E+09	4.6402E+24	1.24E+55	1.142E+15
7	265.408845	81.191577	16047101.7	5.14315E+17	7722.6423	1.118E+11	3.199E+09	2.4702E+25	8.13E+56	2.753E+15
8	338.571059	97.460354	40294443.5	6.2711E+18	11773.316	3.455E+11	8.242E+09	5.8247E+26	2.2E+60	1.453E+16
9	438.340632	122.60003	71873026.3	2.36248E+19	16583.701	5.894E+11	1.29E+10	2.5982E+27	9.23E+61	3.192E+16
10	613.803989	159.17512	233522565	5.47104E+20	28979.806	2.397E+12	4.18E+10	1.3199E+29	1.7E+66	2.523E+17
11	739.186844	187.38437	362158438	1.53089E+21	37301.53	3.654E+12	5.952E+10	4.297E+29	3.25E+67	4.695E+17
12	953.836711	228.77362	865653875	1.542E+22	56610.973	1.021E+13	1.408E+11	7.6305E+30	4.31E+70	2.134E+18
13	1408.04491	316.84133	2599880749	2.42912E+23	100743.85	3.335E+13	3.8E+11	2.0993E+32	1.71E+74	1.221E+19
14	2015.81819	423.10032	8079525937	4.60549E+24	176860.85	1.214E+14	1.122E+12	7.8136E+33	1.45E+78	8.196E+19
15	3001.6095	592.5524	2.3804E+10	6.66892E+25	315155.42	3.784E+14	2.911E+12	1.8875E+35	4.15E+81	4.38E+20

Tabla 6.11 Placa Horizontal con  $L_c=30\text{cm}$  [6]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	11.1907509	5.3785723	4424.30141	1133758443	86.664743	25554569	2837212.8	1.5792E+15	2.66E+31	1.187E+10
2	22.3481199	9.2527216	46498.1589	5.74028E+11	267.92679	406896585	28878162	3.665E+18	6.9E+39	7.011E+11
3	42.3544473	15.873353	267121.559	4.38506E+13	679.85296	2.583E+09	135983102	6.4805E+20	2.87E+45	1.068E+13
4	77.9706624	26.030495	1781722.01	5.89753E+15	1756.2182	2.208E+10	821600905	2.6347E+23	9.55E+51	2.523E+14
5	177.662864	51.182923	20955223.8	3.19368E+18	6163.3865	3.404E+11	8.139E+09	5.5856E+26	1.98E+60	1.421E+16
6	355.337436	90.474249	165797356	6.25373E+20	17702.41	3.368E+12	5.56E+10	3.4213E+29	1.84E+67	4.164E+17
7	663.553497	150.62805	1111360526	8.27019E+22	46273.373	2.834E+13	3.315E+11	1.3317E+32	5.49E+73	9.612E+18
8	1130.78374	235.48284	4946571500	3.45811E+24	101521.34	1.404E+14	1.268E+12	1.1753E+34	4.02E+78	1.016E+20

Tabla 6.12 Medidas en Aire con  $L/W=0.33$  y  $La/L=0.0$  [7]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	1.37948408	1.0590452	2.96683276	3.956832338	2.7089612	4299.8509	1945.57	42774.2604	101472	32562.045
2	2.01746627	1.4498815	9.04884363	67.06130483	4.8072324	14637.63	5433.1219	1320782.11	5.38E+08	198032.87
3	2.33784708	1.6324667	14.4459885	226.0978124	6.0606873	24967.672	8500.8573	5890762.81	2.26E+10	435006.13
4	2.52934151	1.7391942	18.5521506	433.1847453	6.859727	33225.441	10801.711	13110858.5	1.67E+11	662779.16
5	2.80767179	1.9032461	24.1362975	816.2134672	7.9393903	43287.911	13483.804	27500434.6	1.06E+12	978788.97

Tabla 6.13 Medidas en Aire con  $L/W=0.33$  y  $La/L=0.13$  [7]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	1.53920559	1.1443064	4.73376394	14.54474885	3.320932	7804.4573	3206.8586	227024.435	6585238	78384.966
2	1.81054306	1.3011731	8.12074101	60.18310304	4.3141744	14637.63	5433.1219	1320782.11	5.38E+08	198032.87
3	2.40531891	1.6380637	19.6392246	588.9177073	6.7100529	39726.37	12547.386	21623893.8	5.83E+11	862459.52
4	2.56402519	1.7271216	23.6505145	942.6700045	7.3860825	48680.678	14878.479	38204237.4	2.42E+12	1163676.4

Tabla 6.14 Medidas en Aire con  $L/W=1.0$  y  $La/L=0.0$  [7]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	0.87499907	0.7153526	0.93428602	0.243196971	1.4291121	1338.484	731.39314	1629.40848	28.73855	5831.6209
2	1.16368985	0.9035064	2.20751284	2.196680665	2.2109479	3488.2111	1632.6182	23812.266	23463.45	23923.6
3	1.33428441	1.0089613	3.39617361	6.710625857	2.7389776	5693.7084	2461.9177	93890.0632	724334.3	49251.042
4	1.51706619	1.1208512	5.00034372	18.05920673	3.333382	8759.6143	3532.7691	313668.544	14776358	92923.734

Tabla 6.15 Medidas en Aire con  $L/W=1.0$  y  $La/L=0.05$  [7]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	0.62828457	0.5259357	0.51565546	0.072645748	0.9575121	863.30612	506.39983	477.281389	1.334524	3055.8252
2	0.960844	0.7520662	1.66590339	1.343854836	1.7828418	3002.532	1439.7833	15648.7062	8214.593	19180.831
3	1.18225899	0.8940025	3.00922107	5.946031922	2.4269045	5693.7084	2461.9177	93890.0632	724334.3	49251.042
4	1.31974579	0.9838398	3.93703499	11.26669742	2.8246966	7418.0727	3073.2184	196937.336	4615408	72733.694

Tabla 6.16 Medidas en Aire con  $L/W=1.0$  y  $La/L=0.10$  [7]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	0.69025809	0.5643182	0.73702761	0.191850119	1.1273797	1338.484	731.39314	1629.40848	28.73855	5831.6209
2	0.9805062	0.7570542	1.97892589	2.275572508	1.893538	3867.7472	1780.2783	31797.6952	48348.06	27856.664
3	1.15074892	0.8659309	3.09288067	6.939032374	2.3963044	6234.4347	2656.4707	121044.439	1366948	56296.491
4	1.38437992	1.0183893	4.78889629	19.35970837	3.0807621	9494.2284	3779.5087	393006.834	25965114	104632.91

Tabla 6.17 Medidas en Aire con  $L/W=1.0$  y  $La/L=0.20$  [7]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	0.65923525	0.5389556	0.70390278	0.183227642	1.0767109	1338.484	731.39314	1629.40848	28.73855	5831.6209
2	0.90046488	0.6952538	1.81738092	2.089811487	1.7389634	3867.7472	1780.2783	31797.6952	48348.06	27856.664
3	1.03194615	0.7803387	2.62662761	5.190051264	2.118347	5693.7084	2461.9177	93890.0632	724334.3	49251.042

Tabla 6.18 Medidas en Agua con  $L/W=0.33$  y  $La/L=0.06$  [7]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	59.1868139	24.30615	134834.647	2.05679E+12	726.71434	473282385	32778871	5.5956E+18	1.99E+40	8.761E+11
2	87.6475001	33.201189	490728.532	6.10176E+13	1363.4779	2.118E+09	115143131	3.7179E+20	7.15E+44	7.975E+12
3	247.190692	77.259169	11768597.2	2.15965E+17	6754.1366	7.504E+10	2.291E+09	8.0983E+24	5E+55	1.531E+15

Tabla 6.19 Medidas en Agua con  $L/W=0.33$  y  $La/L=0.11$  [7]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	122.50859	44.028606	1232018.31	6.00775E+14	2223.356	5.622E+09	260985069	5.7182E+21	6.63E+47	3.361E+13
2	231.166704	73.815954	8669608.96	9.11764E+16	5931.9164	5.042E+10	1.642E+09	2.6597E+24	3.09E+54	8.52E+14
3	307.2141	93.349311	20021390.1	7.64413E+17	9117.2364	1.266E+11	3.553E+09	3.5054E+25	1.95E+57	3.31E+15
4	373.162254	109.80069	34785737.3	3.06163E+18	12168.24	2.3E+11	5.859E+09	1.8628E+26	1.27E+59	7.974E+15
5	473.164886	132.98289	73508528.8	2.13046E+19	17648.863	5.387E+11	1.196E+10	2.02E+27	4.92E+61	2.796E+16
6	536.800756	147.58193	106563526	5.47236E+19	21356.782	8.106E+11	1.685E+10	6.3417E+27	8.59E+62	5.105E+16
7	659.788961	175.44262	189898881	2.3201E+20	28945.488	1.506E+12	2.831E+10	3.5896E+28	6.55E+64	1.271E+17

Tabla 6.20 Medidas en Agua con  $L/W=1.0$  y  $La/L=0.05$  [7]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	46.865983	18.228403	195516.969	1.22365E+13	674.7475	1.297E+09	76332593	9.4193E+19	2.31E+43	3.872E+12
2	90.2012961	31.003891	1490253.12	2.31427E+15	1865.4826	1.286E+10	522213979	5.7994E+22	2.17E+50	1.138E+14
3	118.577997	38.514974	3678626.2	2.48496E+16	2894.62	3.675E+10	1.259E+09	1.0973E+24	3.38E+53	5.346E+14
4	147.076403	46.152836	6697176.78	1.10768E+17	3971.8263	6.967E+10	2.153E+09	6.5784E+24	2.98E+55	1.372E+15
5	173.269276	53.097756	10274302.8	3.14679E+17	5015.8933	1.082E+11	3.114E+09	2.2558E+25	6.48E+56	2.625E+15
6	216.061973	64.047671	18546362.2	1.34655E+18	6894.1588	2.004E+11	5.221E+09	1.2677E+26	4.85E+58	6.511E+15
7	246.831463	71.56572	27113705.9	3.50003E+18	8404.0721	3.023E+11	7.369E+09	4.0072E+26	8.62E+59	1.193E+16

Tabla 6.21 Medidas en Agua con  $L/W=1.0$  y  $La/L=0.10$  [7]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	166.248151	51.312195	9102743.89	2.31483E+17	4712.7485	9.474E+10	2.786E+09	1.5551E+25	2.56E+56	2.158E+15
2	229.559353	67.12906	22928045.3	2.37053E+18	7622.7473	2.58E+11	6.451E+09	2.5706E+26	2.84E+59	9.446E+15

Tabla 6.22 Medidas en Aceite con  $L/W=0.33$  y  $La/L=0.06$  [7]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	0.78807592	0.6976025	0.34724443	0.011459575	1.0196885	306.15274	212.35282	26.1902613	0.000941	663.18788
2	1.33745777	1.06151	1.9861959	1.116339959	2.3825462	2319.5093	1159.6533	7596.65012	1348.793	13112.331
3	1.8426043	1.3706901	5.62899123	17.02694615	3.9685263	7717.742	3176.961	220031.939	6089818	77104.866
4	2.38843078	1.7180923	10.6013577	76.67465143	5.6755414	14384.921	5354.3773	1257922.79	4.76E+08	193015.15
5	2.82389006	1.9875243	15.9779135	203.609686	7.152954	21558.237	7516.3536	3905081.33	8.08E+09	350369.41
6	3.18465458	2.191174	23.1952596	532.796941	8.6210288	32838.825	10696.242	12688150.4	1.54E+11	651445.2
7	4.03107264	2.6751823	43.8882334	2575.660334	12.130041	64175.89	18757.292	82823642.2	1.67E+13	1748625.6
8	4.42922004	2.9105669	53.8185892	4080.566668	13.718785	77060.98	21866.815	138245080	6.03E+13	2289811.1



Tabla 6.23 Medidas en Aceite con  $L/W=0.33$  y  $La/L=0.11$  [7]

# de punto	Nuδ (5.1)	Nuδ (5.2)	Nuδ (5.7)	Nuδ (5.8)	Nuδ (5.9)	Raδ (5.1)	Raδ (5.2)	Raδ (5.7)	Raδ (5.8)	Raδ (5.9)
1	1.84819113	1.4016187	4.55506908	8.348662055	3.761876	5396.0121	2353.5417	80782.4786	497373.8	45503.595
2	2.14256593	1.5938278	6.54534716	19.79880037	4.6145714	7717.742	3176.961	220031.939	6089818	77104.866
3	2.45029054	1.7765099	9.96397107	58.7458076	5.6898823	12431.329	4737.7017	835915.132	1.71E+08	155659.15
4	3.05151344	2.1332575	18.6158276	282.7799005	7.8841854	24440.188	8350.0395	5548884.98	1.94E+10	421530.65
5	3.88792853	2.6072078	37.6939422	1687.610722	11.347588	52895.036	15950.968	48203078.7	4.33E+12	1315136.3
6	4.48145413	2.9241066	58.9211288	5369.93478	14.171627	87884.633	24413.818	199741934	1.51E+14	2779170.7