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Additional Data on Surface Slopes of the RAE 100-104 Aerofoil Sections

By

Edna M. Love and J. Williams

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Additional Data on Surface Slopes of the RAE 100 - 104 Aerofoil Sections

- By -

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SUMMARY

To supplement earlier data, the surface slopes of the RAE 100, 101 and 103 sections are tabulated, and for the RAE 102 and 104 sections additional values are quoted closer to the leading edge than before. An elementary but flexible method of specifying the minimum number of tangent planes needed for aerofoil manufacture is also given.

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1. Introduction

Formulae and tables have already been published[1] for the accurate and rapid calculation of the surface slopes and curvatures of the RAE 100 - 104 aerofoil sections[2] and of more general 'rooftop-type' sections. In particular, the surface slopes of the RAE 102 and 104 shapes were tabulated[1] for application with a tangent-plane method of model manufacture[3]. Further data have since been evaluated for these shapes and for the RAE 100, 101 and 103 sections.

2. Surface Slopes

It will be recalled that, forward of the wedge-shaped trailing edge, the ordinates of the RAE 100 - 104 shapes (unit chord) are given by the relation

$$y = a\{f_0(x) + f_1(x)\} + cf_2(x) \qquad \ldots\ldots(1)$$

where $x[= \frac{1}{2}(1 - \cos\theta)]$ denotes the chordwise distance behind the leading edge[1,2]. The ratio of the constants a and c together with the position of maximum velocity $x = X_1$ prescribes the section shape, and for convenience the absolute values of the constants are usually assigned to give a section thickness of 10% chord. (see Table 5).

The values of dy/dx for the 10% thick 100, 101 and 103 sections are listed in Table 1a, and can be scaled linearly for other thickness-chord ratios. The corresponding auxiliary functions df_r/dx ($r = 0$, 1 and 2), which were needed for the evaluation of dy/dx for RAE 101 ($X_1 = 0.3$) and 103 ($X_1 = 0.5$)[+] are tabulated in Table 2a. Additional data for RAE 102 ($X_1 = 0.4$) and 104 ($X_1 = 0.6$) at chordwise locations closer to the leading edge than before are also included in Tables 1b and 2b.

Values/

[+] The RAE 100 section ($X_1 = 0$) satisfies the simple equation

$$100\,y = 14.8188\,x^{\frac{1}{2}}(1 - x)^{\frac{1}{2}}\left(1 - \frac{8}{9}x\right)$$

forward of $x = 0.75$, where its wedge-shaped T.E. begins.

Values of certain transcendental functions needed for the calculation of df_r/dx at these additional points, and not published hitherto, are given in Tables 3a and 3b*. The aerofoil ordinates at these points are listed in Table 4, in the form of an extension to Table II of Ref.- 2.

3. Choice of Tangent Planes for Model Manufacture

For the manufacture of aerofoil models by tangent plane milling (or grinding)[3], the tangent planes are usually selected so that the distance ℓ from the intersection of two neighbouring tangents to the required aerofoil profile (i.e., the excess metal) never exceeds a certain value, say 10^{-4} of the aerofoil chord.

A convenient approximate formula for this distance is

$$\ell \simeq \left[1 + \left(\frac{\delta y}{\delta x}\right)^2\right]^{\frac{1}{2}} . \frac{\pi\ \delta\chi}{1440} . \delta x \qquad .....(2)$$

where the tangents to the profile at the adjacent points (x, y) and $(x + \delta x,\ y + \delta y)$ are at angles x and $x + \delta x$ degrees to the chord-line. This formula essentially assumes that the circular arc passing through these two points, and tangential to the aerofoil profile there, is a reasonable approximation to the profile between the points. Furthermore, except close to the leading edge where dy/dx and d^2y/dx^2 are not small, the relation (2) can for our purposes be simplified to

$$\ell \simeq \left[1 + \tfrac{1}{2}\left(\frac{dy}{dx}\right)^2\right] . \frac{\pi . \delta\chi}{1440} . \delta x \qquad .....(3)$$

The chordwise spacings δx, for a minimum number of tangent planes consistent with the limitation on ℓ, can be determined fairly simply by a trial and error method using the relations (2) and (3). For a chosen x and δx the values of dy/dx and $\delta\chi$ are readily derived from the tables of this report or Ref. 1. The trial and error procedure can be expedited by appealing to the relation (3), which shows for example that when the chordwise interval is doubled the value of ℓ is roughly quadrupled. Moreover, the value of ℓ is required only to an accuracy of about ±10 percent in practice (e.g., to within 10^{-5} of the chord.

More elaborate procedures can be devised, but the above has so far proved reasonably quick and conveniently flexible.

References/

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*These, with Table 3 of Ref. 1, facilitate the calculation of dy/dx and d^2y/dx^2 for a wider range of 'rooftop-type' sections.

References

No.	Author(s)	Title, etc.
1	J. Williams and Edna M. Love	Surface slopes and curvatures of the RAE 100 - 104 and other rooftop-type aerofoil sections. A.R.C. Current Paper 129. (October, 1952).
2	R. C. Pankhurst and H. B. Squire	Calculated pressure distributions for the RAE 100 - 104 aerofoil sections. R.A.E. T.N. Aero.2039. A.R.C. Current Paper 80. (March, 1950).
3	R. S. Marriner	The manufacture of aerofoil models by tangent plane milling. A.R.C. Current Paper 166. (June, 1953).

TABLE 1a/

TABLE 1a

Surface Slopes for RAE 100, 101 and 103-Sections (10% Thick)

	RAE 100		RAE 101		RAE 103	
x	$\frac{dy}{dx}$	χ (degs.)*	$\frac{dy}{dx}$	χ (degs.)*	$\frac{dy}{dx}$	χ (degs.)*
0	∞	90.000	∞	90.000	∞	90.000
0.0002	5.234871	79.185	4.366658	77.101	3.976417	75.884
0.0004	3.698526	74.870	3.086332	72.047	2.810694	70.415
0.0005	3.306682	73.174	2.759890	70.083	2.513488	68.305
0.0006	3.017314	71.664	2.518867	68.347	2.294059	66.447
0.0008	2.610889	69.043	2.180439	65.363	1.985965	63.273
0.001	2.333299	66.801	1.949382	62.843	1.775632	60.613
0.002	1.642996	58.673	1.375371	53.980	1.253194	51.411
0.003	1.335875	53.182	1.120491	48.252	1.021293	45.604
0.004	1.152033	49.041	0.968211	44.075	0.882788	41.438
0.005	1.026059	45.737	0.864057	40.829	0.788088	38.241
0.006	0.932691	43.005	0.787002	38.203	0.718050	35.680
0.007	0.859832	40.690	0.726980	36.016	0.663512	33.565
0.0075	0.828904	39.655	0.701535	35.051	0.640399	32.635
0.008	0.800868	38.690	0.678490	34.157	0.619467	31.777
0.009	0.751832	36.937	0.638234	32.547	0.582915	30.239
0.01	0.710186	35.382	0.604103	31.136	0.551934	28.896
0.012	0.642719	32.730	0.548944	28.764	0.501891	26.652
0.0125	0.628366	32.144	0.537234	28.246	0.491271	26.164
0.014	0.589876	30.535	0.505880	26.834	0.462848	24.837
0.016	0.546954	28.677	0.471009	25.221	0.431256	23.328
0.018	0.511131	27.073	0.441994	23.845	0.404986	22.047
0.02	0.480600	25.669	0.417335	22.652	0.382677	20.941
0.025	0.420268	22.795	0.368832	20.246	0.338850	18.719
0.03	0.374928	20.552	0.332610	18.398	0.306180	17.024
0.035	0.339073	18.730	0.304125	16.916	0.280538	15.671
0.04	0.309680	17.207	0.280891	15.690	0.259664	14.556
0.05	0.263663	14.771	0.244738	13.752	0.227276	12.804
0.06	0.228628	12.878	0.217387	12.265	0.202879	11.468
0.07	0.200594	11.343	0.195591	11.067	0.183524	10.399
0.075	0.188476	10.674	0.186185	10.547	0.175202	9.937
0.08	0.177366	10.058	0.177565	10.069	0.167593	9.514
0.09	0.157622	8.957	0.162237	9.215	0.154115	8.761
0.1	0.140504	7.998	0.148916	8.470	0.142465	8.108
0.12	0.111998	6.390	0.126562	7.213	0.123085	7.017
0.14	0.088907	5.081	0.108138	6.172	0.107324	6.126
0.15	0.078852	4.509	0.099966	5.709	0.100413	5.734
0.16	0.069597	3.981	0.092329	5.275	0.094009	5.371
0.18	0.053075	3.038	0.078324	4.479	0.082431	4.712
0.2	0.038694	2.216	0.065578	3.752	0.072128	4.125
0.22	0.026011	1.490	0.053689	3.073	0.062785	3.593
0.24	0.014712	0.843	0.042326	2.424	0.054175	3.101
0.25	0.009506	0.545	0.036740	2.104	0.050090	2.868
0.26	0.004565	0.262	0.031155	1.784	0.046128	2.641
0.28	-0.004606	-0.264	0.019712	1.129	0.038513	2.206
0.3	-0.012935	-0.741	0.006331	0.363	0.031222	1.788

$$^{*}\chi = \tan^{-1}\frac{dy}{dx}$$

TABLE 1a contd./

TABLE 1a (Contd.)

x	RAE 100		RAE 101		RAE 103	
	$\frac{dy}{dx}$	χ (degs.)*	$\frac{dy}{dx}$	χ (degs.)*	$\frac{dy}{dx}$	χ (degs.)*
0.32	-0.020529	-1.176	-0.006549	-0.375	0.024164	1.384
0.34	-0.027473	-1.574	-0.016469	-0.944	0.017258	0.989
0.35	-0.030723	-1.760	-0.020896	-1.197	0.013838	0.793
0.36	-0.033836	-1.938	-0.025047	-1.435	0.010427	0.597
0.38	-0.039675	-2.272	-0.032657	-1.870	0.003594	0.206
0.4	-0.045037	-2.579	-0.039488	-2.261	-0.003327	-0.191
0.42	-0.049961	-2.860	-0.045660	-2.614	-0.010441	-0.598
0.44	-0.054479	-3.118	-0.051258	-2.934	-0.017888	-1.025
0.45	-0.056595	-3.239	-0.053861	-3.083	-0.021802	-1.249
0.46	-0.058620	-3.355	-0.056343	-3.225	-0.025894	-1.483
0.48	-0.062407	-3.571	-0.060963	-3.489	-0.034909	-1.999
0.5	-0.065861	-3.768	-0.065156	-3.728	-0.047009	-2.691
0.52	-0.068999	-3.947	-0.068952	-3.944	-0.058883	-3.370
0.54	-0.071835	-4.109	-0.072377	-4.140	-0.067219	-3.846
0.55	-0.073143	-4.183	-0.073957	-4.230	-0.070799	-4.050
0.56	-0.074381	-4.254	-0.075452	-4.315	-0.074086	-4.237
0.58	-0.076649	-4.383	-0.078193	-4.471	-0.079927	-4.570
0.6	-0.078647	-4.497	-0.080614	-4.609	-0.084953	-4.856
0.62	-0.080382	-4.596	-0.082726	-4.729	-0.089285	-5.102
0.64	-0.081860	-4.680	-0.084540	-4.832	-0.093006	-5.314
0.65	-0.082505	-4.717	-0.085538	-4.878	-0.094655	-5.407
0.66	-0.083086	-4.750	-0.086063	-4.919	-0.096170	-5.493
0.68	-0.084064	-4.805	-0.087300	-4.989	-0.098817	-5.643
0.7	-0.084796	-4.847	-0.088256	-5.044	-0.100977	-5.766
0.72	-0.085283	-4.875	-0.088933	-5.082	-0.102671	-5.862
0.74	-0.085526	-4.888	-0.089333	-5.105	-0.103915	-5.933
0.75	-0.085556	-4.890	-0.089430	-5.110	-0.104371	-5.958
0.76			-0.089459	-5.112	-0.104719	-5.978
0.78					-0.105090	-5.999
Wedge Tail	-0.085556	-4.890	-0.089429	-5.110	-0.104873	-5.987
At Inflection Point	-0.085556	-4.890	-0.089459	-5.112	-0.105119	-6.001

$$^*\chi = \tan^{-1}\frac{dy}{dx}$$

TABLE 1b

Surface Slopes for RAE 102 and 104 Sections (10% Thick)

	RAE 102		RAE 104	
x	$\frac{dy}{dx}$	χ (degs.)*	$\frac{dy}{dx}$	χ (degs.)*
0.0002	4.139394	76.419	3.848090	75.433
0.0004	2.925811	71.130	2.720047	69.815
0.0005	2.616396	69.083	2.432454	67.652
0.0006	2.387949	67.278	2.220123	65.752
0.0008	2.067188	64.185	1.922002	62.512

Supplementary to Table 1 of Ref. 1

$$^{*}\chi = \tan^{-1}\frac{dy}{dx}$$

TABLE 2a/

TABLE 2a

Values of Auxiliary Functions df_r/dx for X_1 = 0.3 and 0.5

x	X_1 = 0.3			X_1 = 0.5		
	$\frac{df_0}{dx}$	$\frac{df_1}{dx}$	$\frac{df_2}{dx}$	$\frac{df_0}{dx}$	$\frac{df_1}{dx}$	$\frac{df_2}{dx}$
0	∞	∞	∞	∞	∞	∞
0.0002	15.894026$_5$	15.148453	4.302251$_5$	20.067154$_5$	12.861579	2.415998$_5$
0.0004	11.215488$_5$	10.726092	3.043416$_5$	14.171499$_5$	9.104507	1.708991
0.0005	10.021028	9.600197	2.722681	12.667272	8.147787$_5$	1.528846$_5$
0.0006	9.138404	8.769661$_5$	2.485973	11.556189	7.441956$_5$	1.395893$_5$
0.0008	7.897639$_5$	7.604997$_5$	2.153812	9.995146	6.451983$_5$	1.209319$_5$
0.001	7.049156	6.811275	1.927230	8.928478$_5$	5.777140$_5$	1.082042$_5$
0.002	4.932577	4.848594$_5$	1.365599$_5$	6.272931	4.107324	0.766516
0.003	3.985127	3.985115$_5$	1.117336$_5$	5.088837$_5$	3.371740	0.627001
0.004	3.414665$_5$	3.473848$_5$	0.969666$_5$	4.378531	2.935657$_5$	0.543992
0.005	3.021547	3.127263	0.869113$_5$	3.890791$_5$	2.639680	0.487452$_5$
0.006	2.728569$_5$	2.873108	0.795054	3.528556	2.422378	0.445797$_5$
0.007	2.498718	2.676867	0.737625	3.245326	2.254397$_5$	0.413486$_5$
0.0075	2.400755$_5$	2.594228$_5$	0.713363	3.124916$_5$	2.183597$_5$	0.399833
0.008	2.311721	2.519704	0.691438	3.015656$_5$	2.119714	0.387492$_5$
0.009	2.155416	2.390357$_5$	0.653269$_5$	2.824293$_5$	2.008745$_5$	0.366004
0.01	2.022001	2.281628$_5$	0.621055$_5$	2.661459	1.915364$_5$	0.347862
0.012	1.804332	2.108101$_5$	0.569348$_5$	2.396952	1.766102$_5$	0.318727$_5$
0.0125	1.757742$_5$	2.071663	0.558437	2.340547$_5$	1.734718$_5$	0.312576$_5$
0.014	1.632249$_5$	1.974900$_5$	0.529357$_5$	2.189030$_5$	1.651298$_5$	0.296178$_5$
0.016	1.491229$_5$	1.868826$_5$	0.497283	2.019556$_5$	1.559703$_5$	0.278079$_5$
0.018	1.372539$_5$	1.782001	0.470852	1.877641	1.484598$_5$	0.263153
0.02	1.270566	1.709395$_5$	0.448610	1.756296	1.421693$_5$	0.250582
0.025	1.066500$_5$	1.570332$_5$	0.405602	1.515268$_5$	1.300929$_5$	0.226237
0.03	0.910526$_5$	1.470348$_5$	0.374314	1.332833$_5$	1.213873	0.208482
0.035	0.785344	1.394485	0.350373$_5$	1.187622$_5$	1.147721$_5$	0.194858$_5$
0.04	0.681400	1.334632$_5$	0.331395$_5$	1.067881$_5$	1.095522$_5$	0.184024
0.05	0.516149$_5$	1.245450$_5$	0.303141	0.878994$_5$	1.017941	0.167806
0.06	0.388346$_5$	1.181255	0.283132$_5$	0.733931	0.962588$_5$	0.156214$_5$
0.07	0.285084$_5$	1.131904$_5$	0.268313$_5$	0.617061	0.920714	0.147528
0.075	0.240279$_5$	1.110989	0.262300	0.566338$_5$	0.903267	0.143963
0.08	0.199170$_5$	1.091947	0.257023$_5$	0.519734	0.887598$_5$	0.140808
0.09	0.126216	1.058165	0.248275	0.436704	0.860455$_5$	0.135496$_5$
0.1	0.063364$_5$	1.028527	0.241442	0.364571$_5$	0.837524	0.131238
0.12	-0.039288$_5$	0.976675	0.231982$_5$	0.244396$_5$	0.799974$_5$	0.124998
0.14	-0.118730	0.929626	0.226606$_5$	0.147419$_5$	0.769177$_5$	0.120905$_5$
0.15	-0.151566$_5$	0.906662	0.225101	0.105452$_5$	0.755288$_5$	0.119455$_5$
0.16	-0.180455$_5$	0.883611	0.224270$_5$	0.067048$_5$	0.742047$_5$	0.118330
0.18	-0.227691	0.836184	0.224433$_5$	-0.000745$_5$	0.716766$_5$	0.116905$_5$
0.2	-0.262326$_5$	0.785466$_5$	0.226860	-0.058587	0.692174	0.116413
0.22	-0.285323$_5$	0.729704$_5$	0.231545$_5$	-0.108268$_5$	0.667477	0.116718
0.24	-0.296817	0.666868	0.238730	-0.151056$_5$	0.642093$_5$	0.117744
0.25	-0.298020$_5$	0.631940	0.243431	-0.170161$_5$	0.628998$_5$	0.118513$_5$
0.26	-0.295879$_5$	0.593996	0.249036$_5$	-0.187866	0.615567	0.119451$_5$
0.28	-0.279330$_5$	0.505311$_5$	0.263998	-0.219368	0.587512	0.121835$_5$
0.3	-0.229416	0.374498	0.291353$_5$	-0.246054$_5$	0.557574$_5$	0.124916

TABLE 2a contd./

TABLE 2a (Contd.)

x	X_1 = 0.3			X_1 = 0.5		
	$\frac{df_0}{dx}$	$\frac{df_1}{dx}$	$\frac{df_2}{dx}$	$\frac{df_0}{dx}$	$\frac{df_1}{dx}$	$\frac{df_2}{dx}$
0.32	-0.176009	0.243479	0.318402	-0.268277	0.525406	0.128742$_5$
0.34	-0.148898	0.154206$_5$	0.332452	-0.286272$_5$	0.490638	0.133394$_5$
0.35	-0.138753	0.115853	0.337385	-0.293731	0.472151	0.136065$_5$
0.36	-0.130075$_5$	0.080465	0.341277	-0.300175$_5$	0.452851	0.138991
0.38	-0.115908$_5$	0.016659$_5$	0.346474$_5$	-0.310017	0.411540	0.145702$_5$
0.4	-0.104769	-0.039874	0.348767	-0.315709	0.366056	0.153777
0.42	-0.095757	-0.090707	0.348552	-0.317006$_5$	0.315510	0.163585
0.44	-0.088316$_5$	-0.136677$_5$	0.346067	-0.313418	0.258575$_5$	0.175716$_5$
0.45	-0.085066	-0.158452	0.344022	-0.309520	0.227075$_5$	0.182948$_5$
0.46	-0.082080	-0.179121$_5$	0.341458$_5$	-0.303974$_5$	0.193019	0.191213
0.48	-0.076792$_5$	-0.217987$_5$	0.334812	-0.286461$_5$	0.114156	0.212337$_5$
0.5	-0.072268$_5$	-0.253902	0.326170$_5$	-0.250000	0	0.250000
0.52	-0.068372	-0.287205$_5$	0.315545	-0.212337$_5$	-0.114156	0.286461$_5$
0.54	-0.064999	-0.318176$_5$	0.302918	-0.191213	-0.193019	0.303974$_5$
0.55	-0.063484$_5$	-0.332861	0.295840$_5$	-0.182948$_5$	-0.227075$_5$	0.309520
0.56	-0.062070	-0.347048$_5$	0.288245	-0.175716$_5$	-0.258575$_5$	0.313418
0.58	-0.059523$_5$	-0.374023	0.271458$_5$	-0.163585	-0.315510	0.317006$_5$
0.6	-0.057311$_5$	-0.399276$_5$	0.252463$_5$	-0.153777	-0.366056	0.315709
0.62	-0.055395$_5$	-0.422967$_5$	0.231137	-0.145702$_5$	-0.411540	0.310017
0.64	-0.053746$_5$	-0.445243	0.207323	-0.138991	-0.452851	0.300175$_5$
0.65	-0.053015	-0.455894$_5$	0.194424	-0.136065$_5$	-0.472151	0.293731
0.66	-0.052342$_5$	-0.466244$_5$	0.180827	-0.133394$_5$	-0.490638	0.286272$_5$
0.68	-0.051167$_5$	-0.486111$_5$	0.151407	-0.128742$_5$	-0.525406	0.268277
0.7	-0.050211	-0.504989	0.118764	-0.124916	-0.557574$_5$	0.246054$_5$
0.72	-0.049468$_5$	-0.523032$_5$	0.082522	-0.121835$_5$	-0.587512	0.219368
0.74	-0.048941$_5$	-0.540419$_5$	0.042208	-0.119451$_5$	-0.615567	0.187866
0.75	-0.048761	-0.548931	0.020341$_5$	-0.118513$_5$	-0.628998$_5$	0.170161$_5$
0.76	-0.048638	-0.557360$_5$	-0.002782	-0.117744	-0.642093$_5$	0.151056$_5$
0.78	-0.048574	-0.574118	-0.053234$_5$	-0.116718	-0.667477	0.108268$_5$
0.8	-0.048777	-0.591033	-0.110190	-0.116413	-0.692174	0.058587
0.82	-0.049289$_5$	-0.608570$_5$	-0.175066$_5$	-0.116905$_5$	-0.716766$_5$	0.000745$_5$
0.84	-0.050177	-0.627395	-0.249854	-0.118330	-0.742047$_5$	-0.067048$_5$
0.85	-0.050791$_5$	-0.637583	-0.291821$_5$	-0.119455$_5$	-0.755288$_5$	-0.105452$_5$
0.86	-0.051542	-0.648503$_5$	-0.337457	-0.120905$_5$	-0.769177$_5$	-0.147419$_5$
0.88	-0.053549	-0.673480$_5$	-0.442340	-0.124998	-0.799974$_5$	-0.244396$_5$
0.9	-0.056480	-0.705028$_5$	-0.571824$_5$	-0.131238	-0.837524	-0.364571$_5$
0.92	-0.060858	-0.748213$_5$	-0.739069	-0.140808	-0.887598$_5$	-0.519734
0.925	-0.062285	-0.761874	-0.789410	-0.143963	-0.903267	-0.566338$_5$
0.94	-0.067786$_5$	-0.813889$_5$	-0.971058$_5$	-0.156214$_5$	-0.962588$_5$	-0.733931
0.95	-0.072955	-0.862602	-1.129184$_5$	-0.167806	-1.017941	-0.878994$_5$
0.96	-0.080153	-0.930903	-1.336371$_5$	-0.184024	-1.095522$_5$	-1.067881$_5$
0.975	-0.098801	-1.111286$_5$	-1.832347$_5$	-0.226237	-1.300929$_5$	-1.515268$_5$
0.98	-0.109527	-1.217002$_5$	-2.102042	-0.250582	-1.421693$_5$	-1.756296
0.9875	-0.136797	-1.490199	-2.760847	-0.312576$_5$	-1.734718$_5$	-2.340547$_5$
1.0	$-\infty$	$-\infty$	$-\infty$	$-\infty$	$-\infty$	$-\infty$

TABLE 2b/

TABLE 2b

Values of Auxiliary Functions df_r/dx for $X_1 = 0.4$ and 0.6

x	$X_1 = 0.4$			$X_1 = 0.6$		
	$\frac{df_0}{dx}$	$\frac{df_1}{dx}$	$\frac{df_2}{dx}$	$\frac{df_0}{dx}$	$\frac{df_1}{dx}$	$\frac{df_2}{dx}$
0.0002	18.155662	13.903803_5	3.285266	21.718070_5	11.949683	1.676978
0.0004	12.817784	9.843281_5	2.323931_5	15.340399	8.458385	1.186213_5
0.0005	11.455540	8.809377	2.078989	13.713449_5	7.569291	1.061165_5
0.0006	10.449183	8.046640	1.898215_5	12.511836	6.913328	0.968875
0.0008	9.034978_5	6.976932	1.644538_5	10.823837_5	5.993250_5	0.839361

Supplementary to Table 2 of Ref. 1

TABLE 3a

Values of Transcendental Functions for the Determination of df_r/dx and d^2f_r/dx^2

x	$\cos\theta$	$\sin\theta$	$\operatorname{cosec}\theta$	$\cot\theta$	$\operatorname{cosec}^3\theta$
0.0002	0.9996	0.0282814	35.358875	35.344732	44207.435
0.0004	0.9992	0.0399920	25.005002	24.984997	15634.380
0.0005	0.999	0.0447102	22.366272	22.343906	11188.730
0.0006	0.9988	0.0489751	20.418541	20.394039	8512.8331
0.0008	0.9984	0.0565459	17.684745	17.656449	5530.9075

Supplementary to Table 3a of Ref. 1

TABLE 3b

$$\text{Values of } -\frac{1}{\pi}\log_e \frac{\sin\frac{1}{2}\,|\theta-\theta_1|}{\sin\frac{1}{2}\,(\theta+\theta_1)}$$

	X_1	0.3	0.4	0.5	0.6
x	θ_1	1.1592795	1.3694384	1.5707963	1.7721542
0.0002		0.0137561	0.0110288	0.0090047	0.0073521
0.0004		0.0194590	0.0156002	0.0127366	0.0103990
0.0005		0.0217586	0.0174433	0.0142412	0.0116272
0.0006		0.0238384	0.0191101	0.0156017	0.0127379
0.0008		0.0275333	0.0220708	0.0180183	0.0147106

Supplementary to Table 3b of Ref. 1.

TABLE 4/

TABLE 4

Co-ordinates of RAE 100 - 104 (10% Thick)

x	100 y				
	RAE 100	RAE 101	RAE 102	RAE 103	RAE 104
0.0002	0.2095	0.1747	0.1656	0.1591	0.1540
0.0004	0.2962	0.2471	0.2342	0.2250	0.2177
0.0005	0.3311	0.2762	0.2618	0.2515	0.2434
0.0006	0.3627	0.3025	0.2868	0.2755	0.2666
0.0008	0.4187	0.3493	0.3311	0.3181	0.3078
Supplementary to Table II of Ref. 2					

TABLE 5

Basic Design Constants for RAE 100 - 104 Sections

Aerofoil	RAE 100	101	102	103	104
X_1	0	0.3	0.4	0.5	0.6
a = b	0.214049	0.147860	0.134822	0.125357	0.117920
c	-0.049396	-0.051899	-0.055681	-0.062678	-0.072757

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