

4.2.3 Airfoil Selection and Design

Raymer shows some NACA airfoil sections in Fig. 4.6, but offers no insight as to the methodology behind the designation of these airfoils.

NACA 4415

- 4 = maximum camber of the mean line is $0.04c$
- 4 = position of the maximum camber is at $0.4c$
- 15 = maximum thickness is $0.15c$

NACA 23012

- 2 = maximum camber of the mean line is approximately $0.02c$ (design lift coefficient is 0.15 times the first digit for this series)
- 30 = position of the maximum camber is at $0.30/2 = 0.15c$
- 12 = maximum thickness is $0.12c$

NACA 65₃-421

- 6 = series designation
- 5 = minimum pressure is at $0.5c$
- 3 = drag coefficient is near its minimum value over a range of lift coefficients of 0.3 above and below the design lift coefficient
- 4 = design lift coefficient is 0.4
- 21 = maximum thickness is $0.21c$

Fig. 4.2.3.1 NACA Airfoil Terminology Examples

Fig. 4.2.3.1, taken from Ref. 4.2.3.1, shows examples of NACA airfoil terminology which will help you understand Fig. 4.6 and the choice of airfoil sections in the design examples in Chapter 23.

References:

- 4.2.3.1. Nicolai, L.M. and Carichner, G.E. "Fundamentals of Aircraft and Airship Design", AIAA Education Series, 2010.