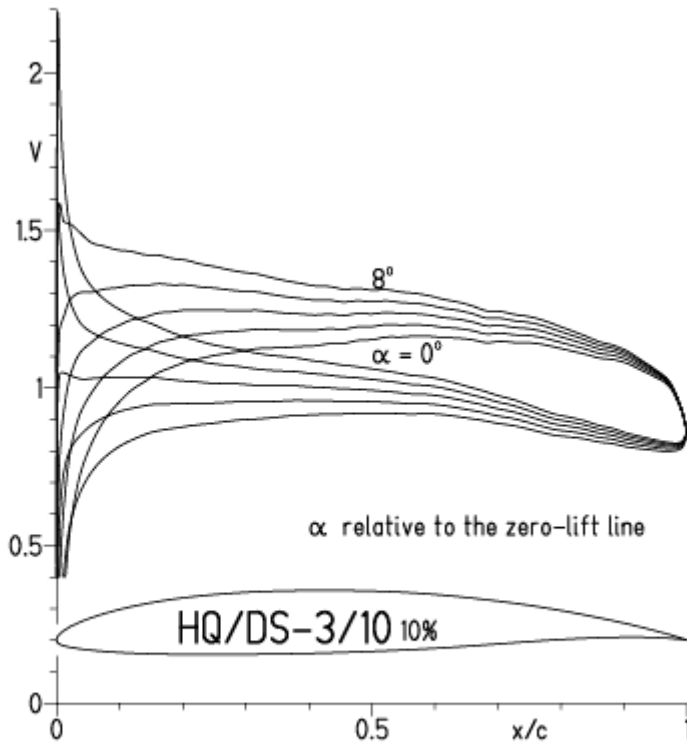
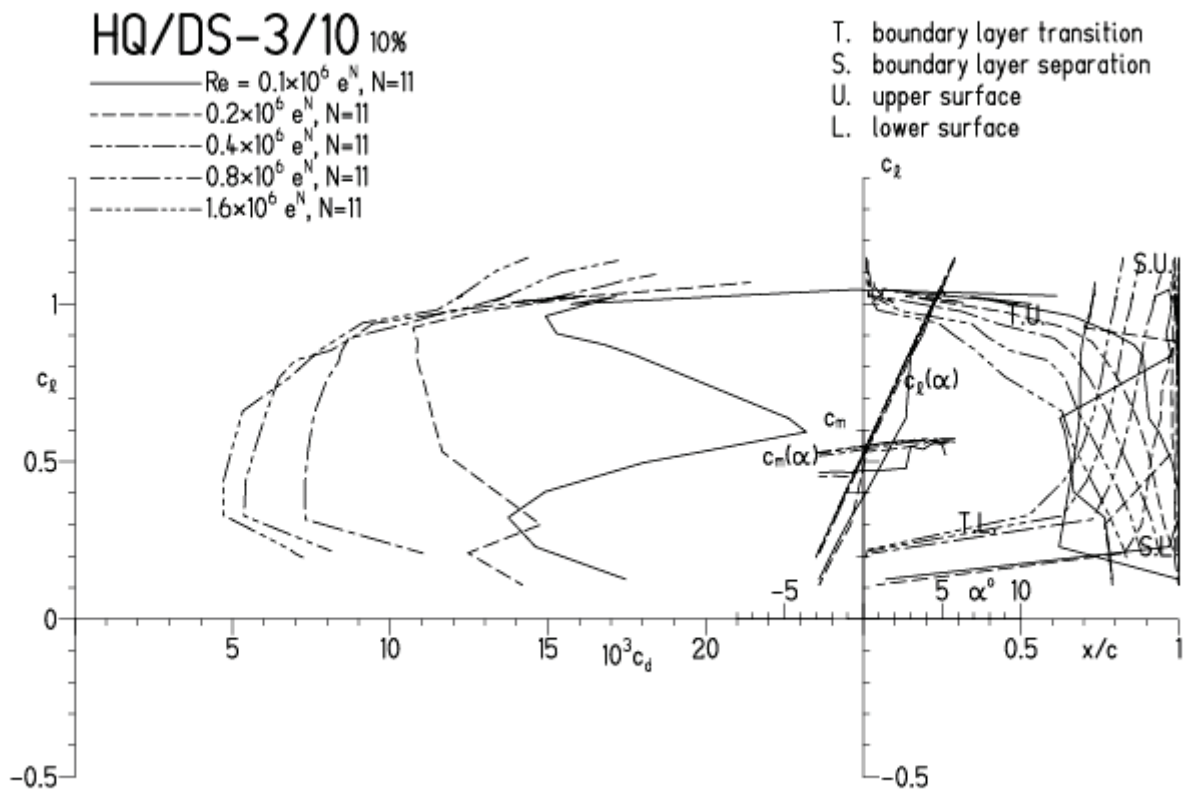


# HQ/DS-3/10, N=11

EPPLER 2005 V. 8.5.07 RUN 14.4.12 12:50

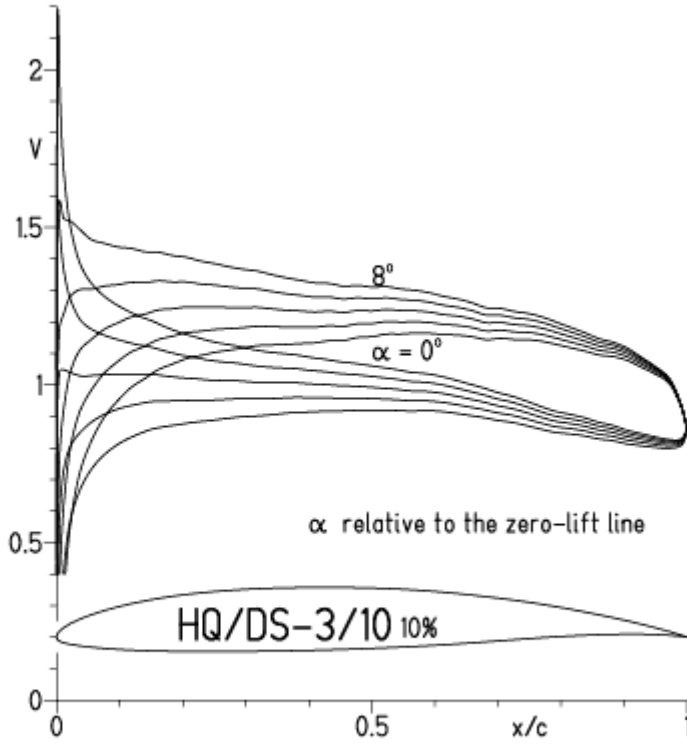


EPPLER 2005 V. 8.5.07 RUN 14.4.12 12:50

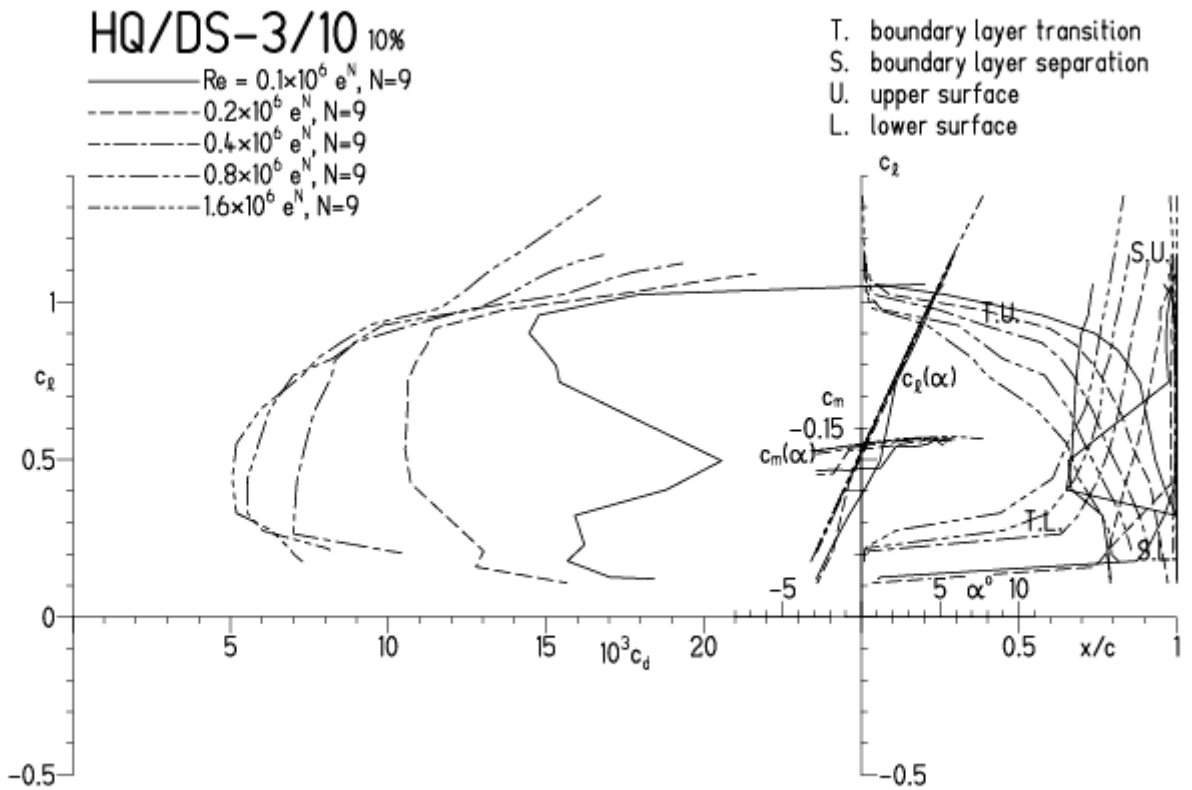


HQ/DS-3/10, N=9

EPPLER 2005 V. 8.5.07 RUN 14.4.12 13:13

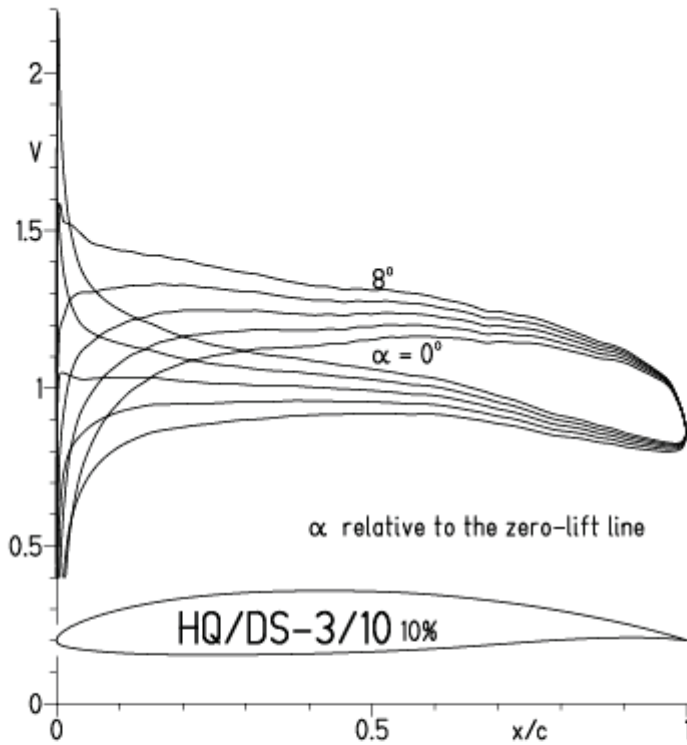


EPPLER 2005 V. 8.5.07 RUN 14.4.12 13:13



HQ/DS-3/10, N=9, Turbulatoreffekt bei niedrigen Re-Zahlen  
 (Optimale Turbulatorposition bei 45 – 55 % der Profiltiefe)

EPPLER 2005 V. 8.5.07 RUN 14.4.12 13:20

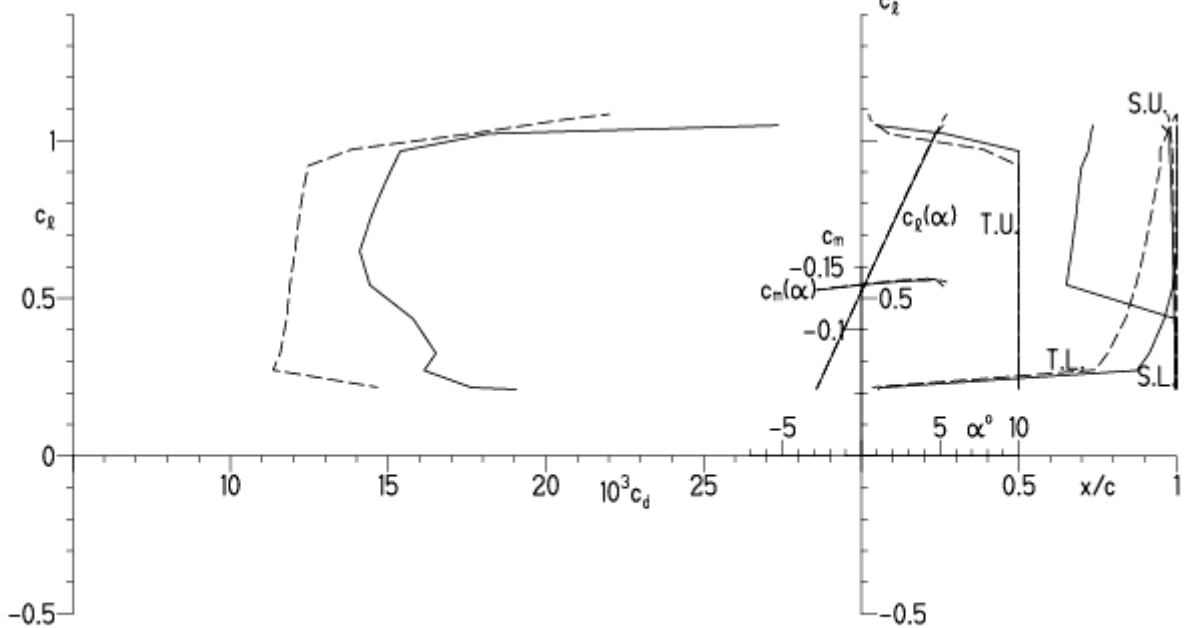


EPPLER 2005 V. 8.5.07 RUN 14.4.12 13:20

HQ/DS-3/10 10%

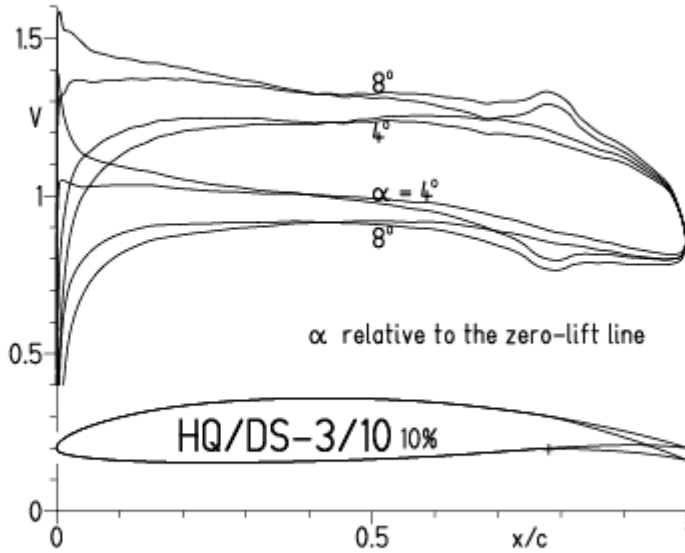
—  $Re = 0.1 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$   
 - - -  $0.2 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$

T. boundary layer transition  
 S. boundary layer separation  
 U. upper surface  
 L. lower surface

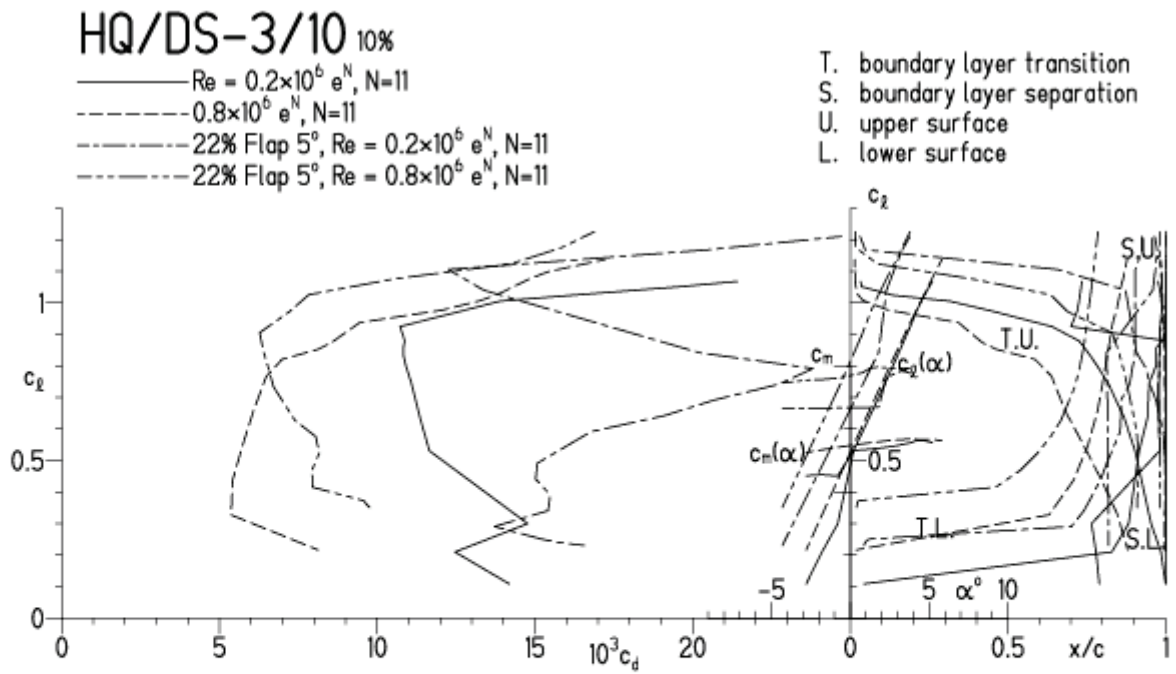


HQ/DS-3/10, N=11, mit 5° Wöbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 14.4.12 17:17

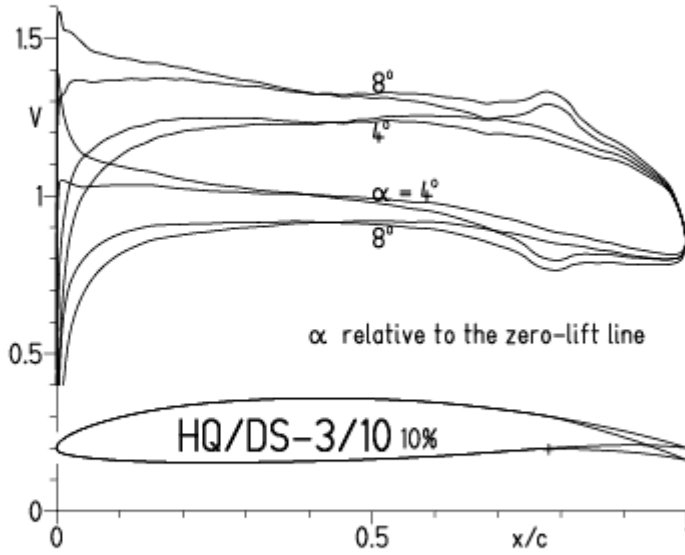


EPPLER 2005 V. 8.5.07 RUN 14

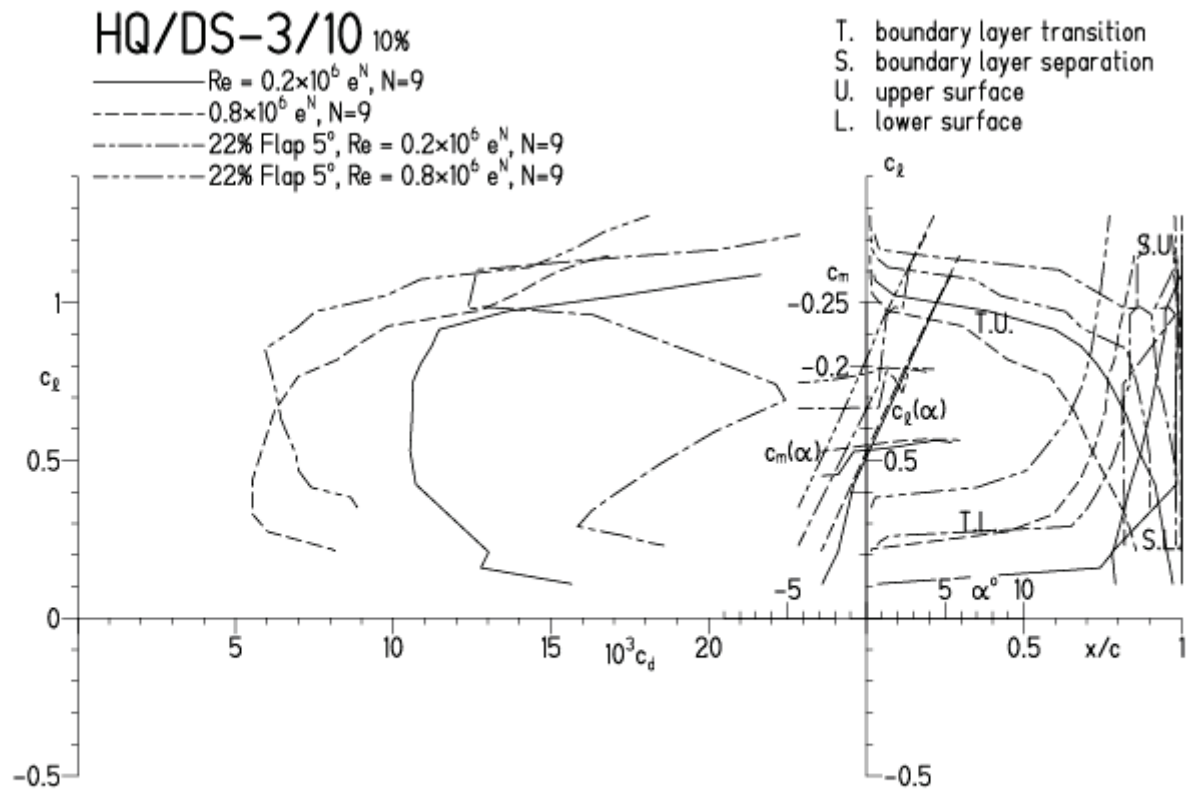


HQ/DS-/10, N=9, mit 5° Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 14.1.12 18:44

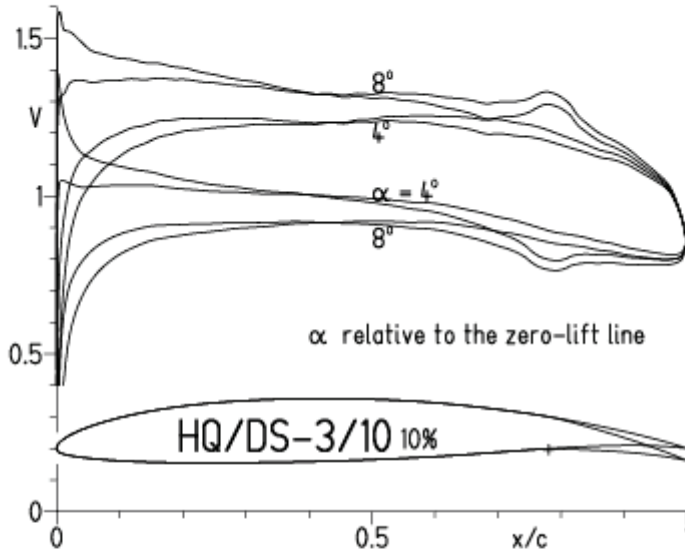


EPPLER 2005 V. 8.5.07 RUN 14.1.12 18:44

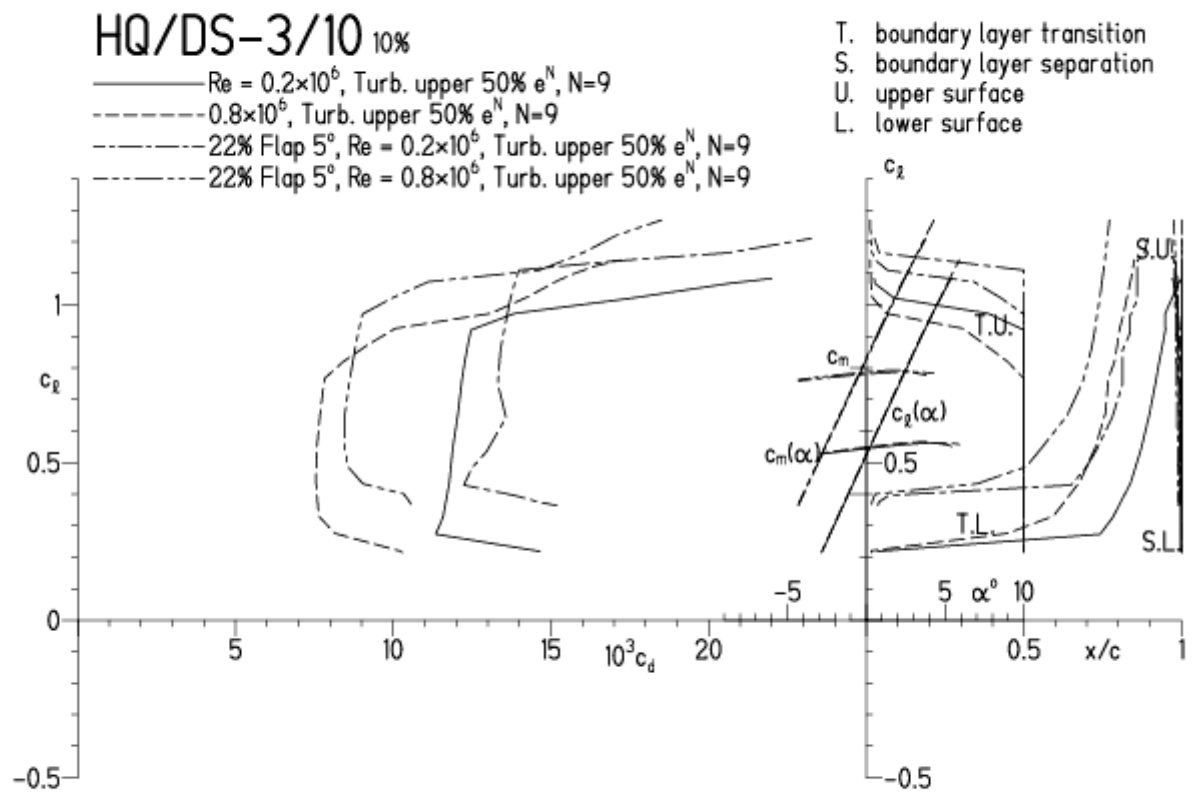


**HQ/DS-3/10, N=9, mit 5° Wölbklappenausschlag, Turbulatoreffekt**  
 (optimale Turbulatorposition bei 45 – 55 % Profiltiefe, für niedrige Re-Zahlen)

EPPLER 2005 V. 8.5.07 RUN 26.2.14 11:44

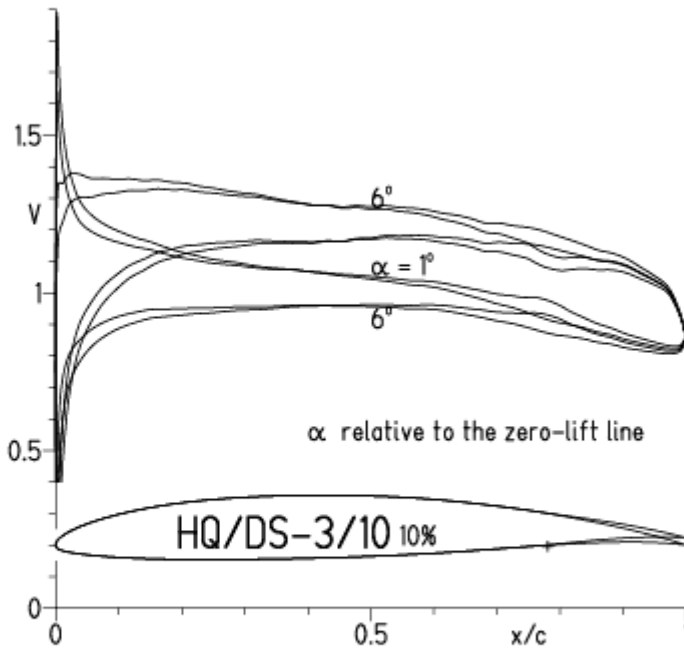


EPPLER 2005 V. 8.5.07



# HQ/DS-3/10, N=11, mit $-3^\circ$ Wölbklappenausschlag

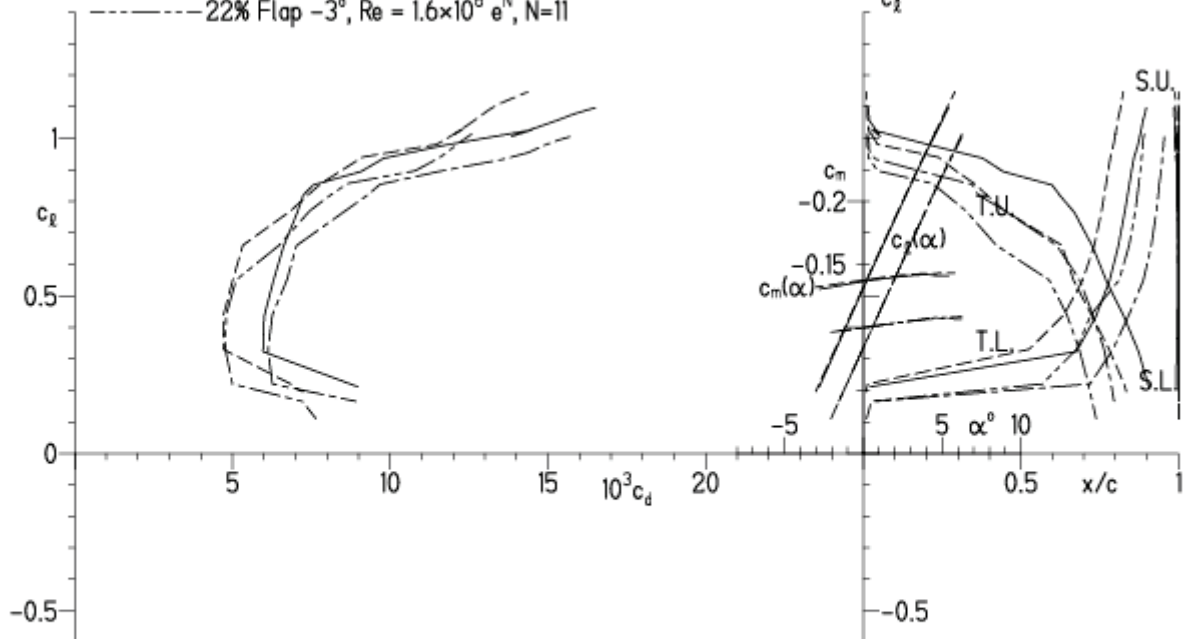
EPPLER 2005 V. 8.5.07 RUN 26.2.14 11:57



EPPLER 2005 V. 8.5.07 RUN

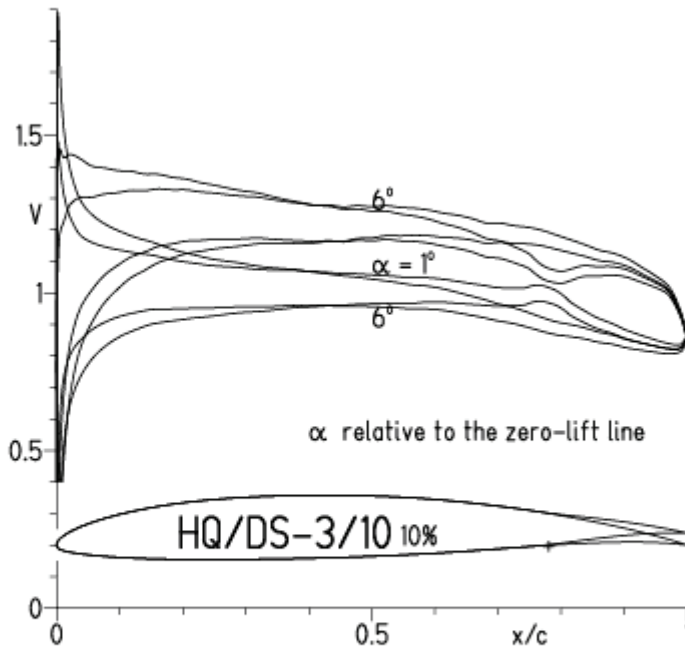
## HQ/DS-3/10 10%

- $Re = 0.6 \times 10^6 e^N, N=11$
- - -  $1.6 \times 10^6 e^N, N=11$
- · -  $22\% \text{ Flap } -3^\circ, Re = 0.6 \times 10^6 e^N, N=11$
- · -  $22\% \text{ Flap } -3^\circ, Re = 1.6 \times 10^6 e^N, N=11$

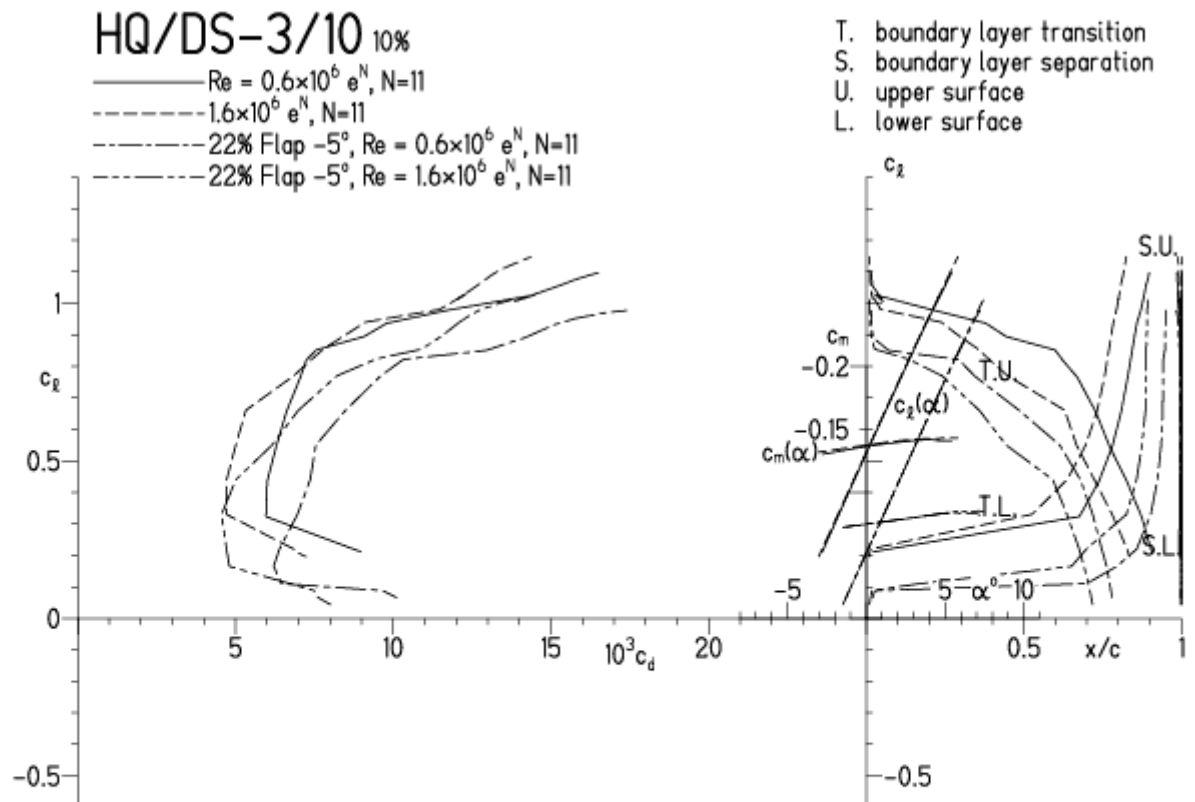


# HQ/DS-3/10, N=11, mit $-5^\circ$ Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 26.2.14 11:50



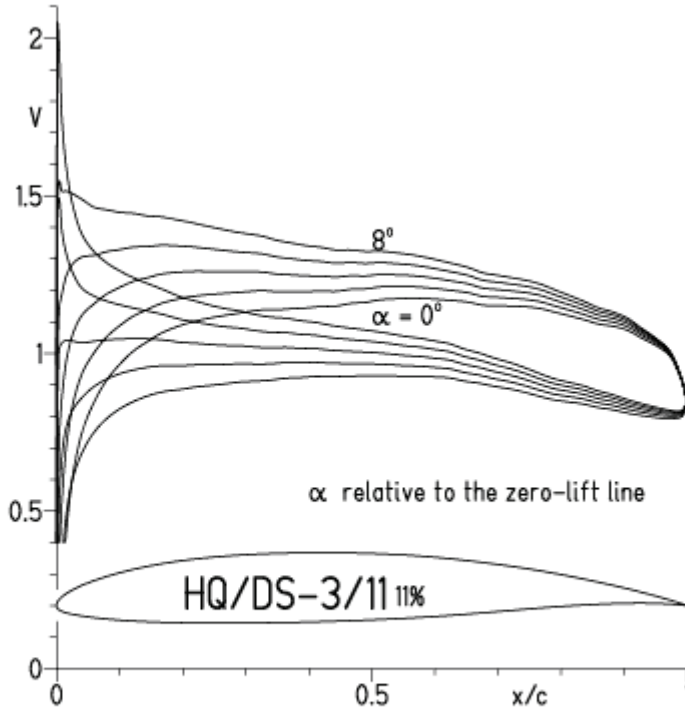
EPPLER 2005 V. 8.5.07 RUN 26.2.14 11:50



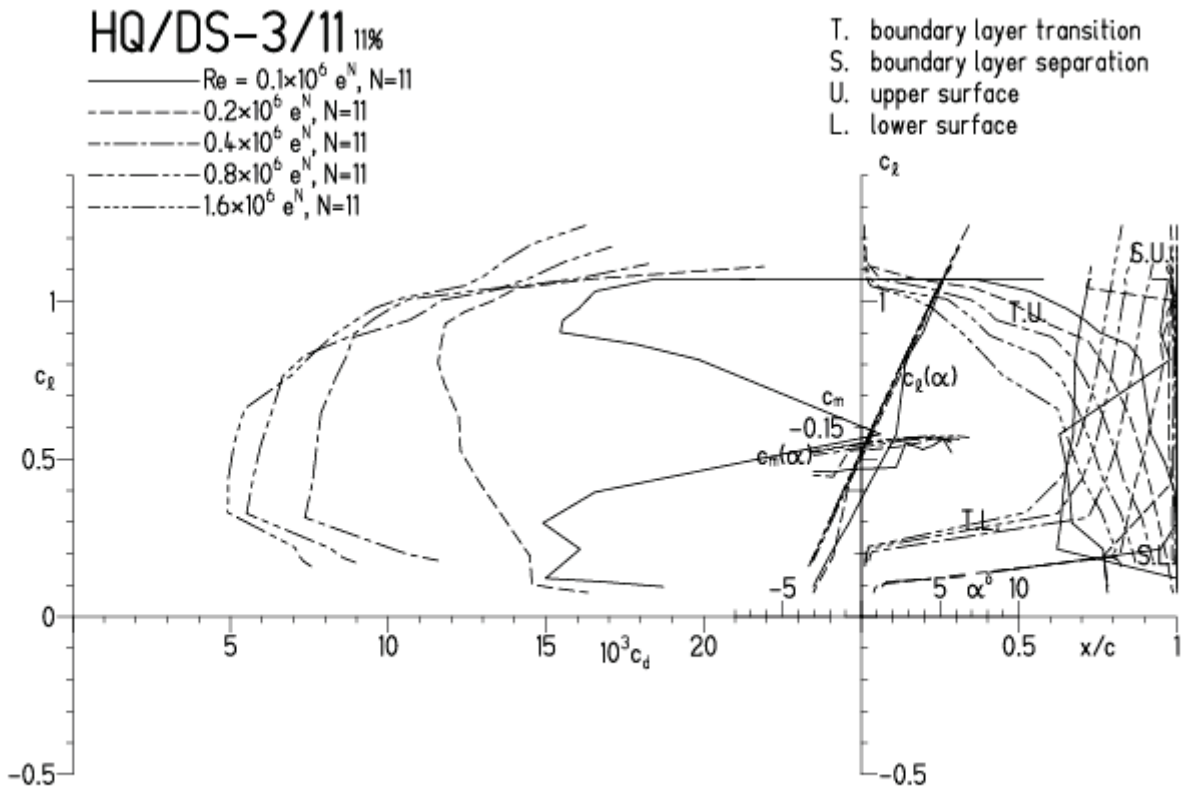


HQ/DS-3/11, N=11

EPPLER 2005 V. 8.5.07 RUN 16.4.12 11:59

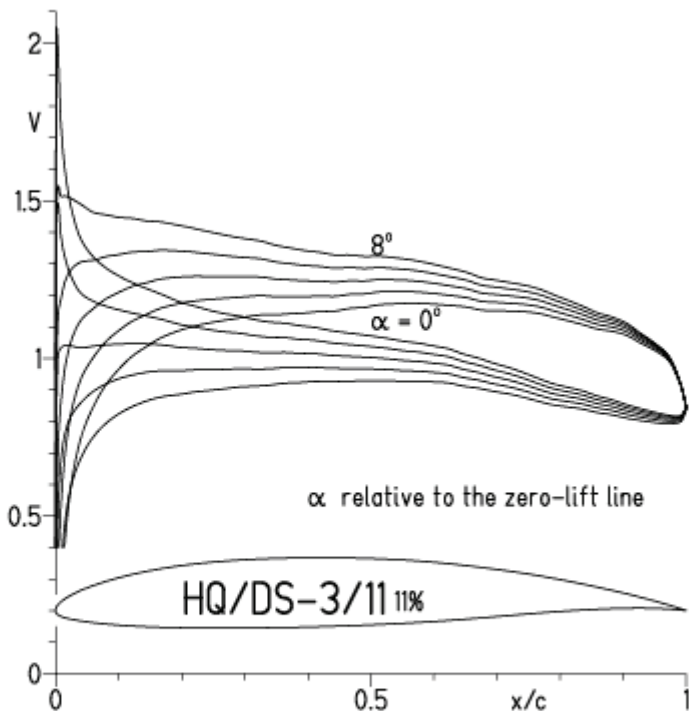


EPPLER 2005 V. 8.5.07 RUN 16.4.12 11:59

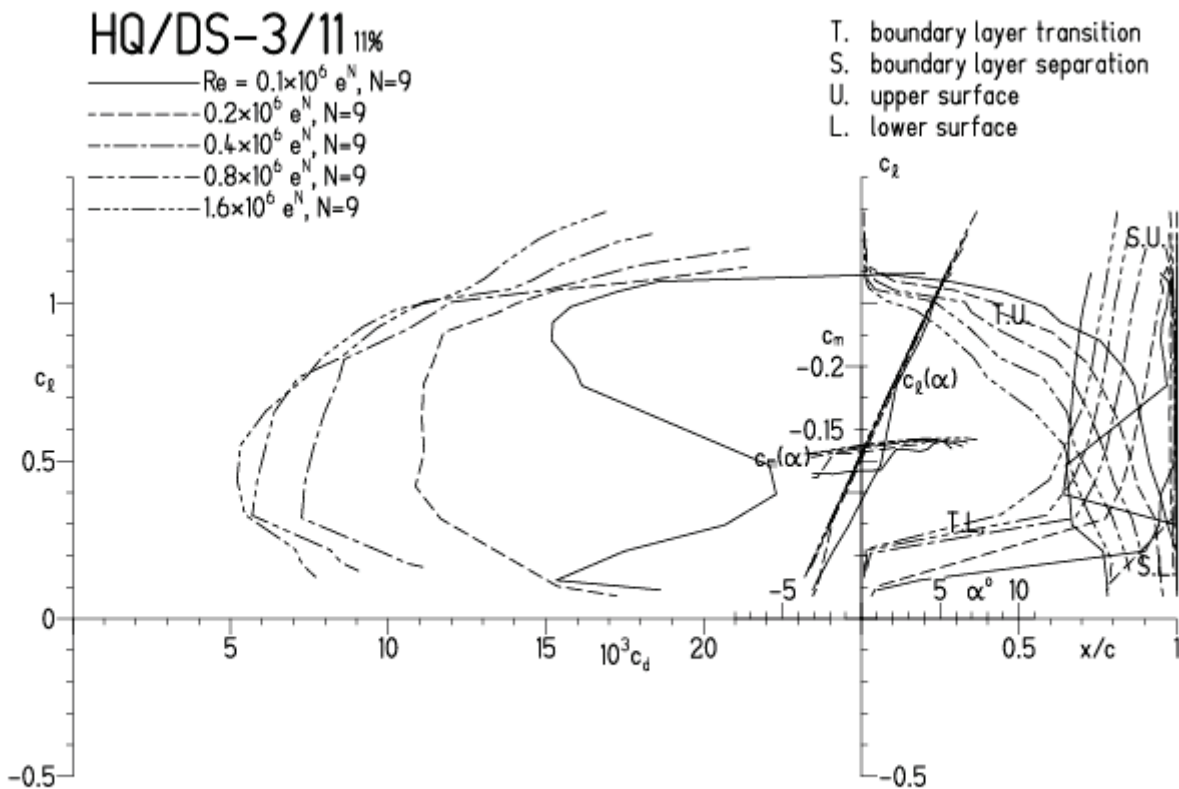


HQ/DS-3/11, N=9

EPPLER 2005 V. 8.5.07 RUN 16.4.12 12:19

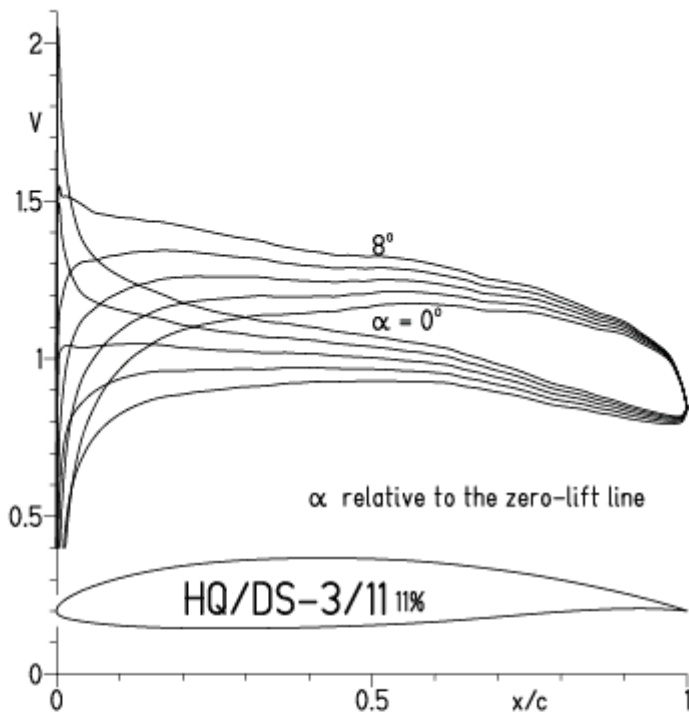


EPPLER 2005 V. 8.5.07 RUN 16.4.12 12:19



HQ/DS-3/11, N=9, Turbulatoreffekt bei niedrigen Re-Zahlen  
 (Optimale Turbulatorposition bei 45 – 55 % der Profiltiefe)

EPPLER 2005 V. 8.5.07 RUN 16.4.12 12:26

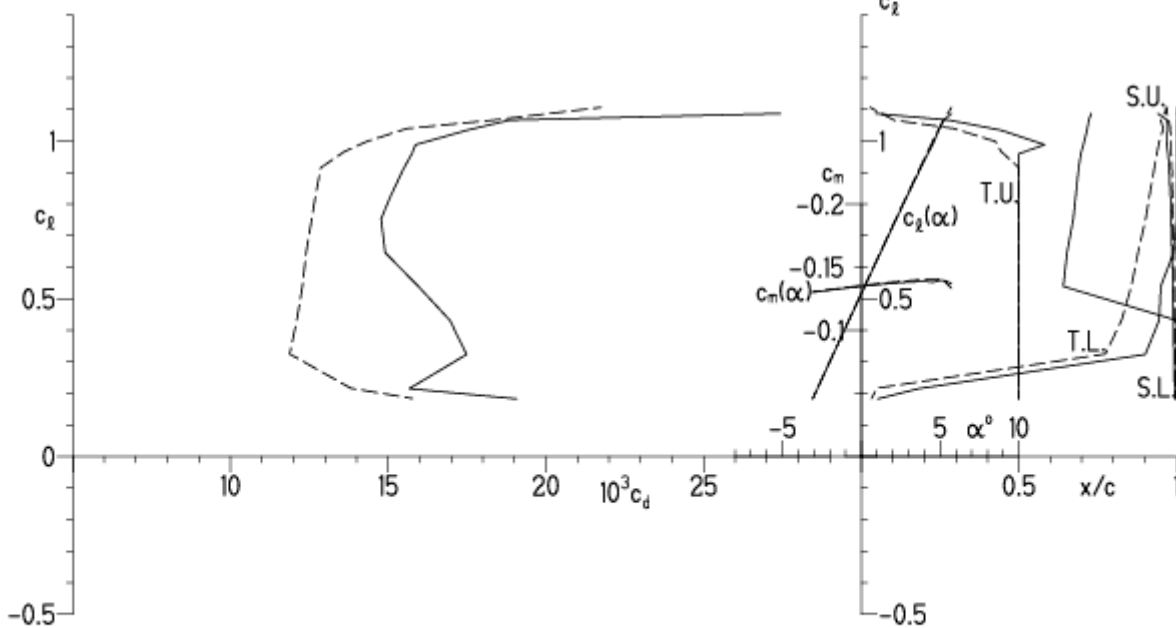


EPPLER 2005 V. 8.5.07 RUN 16.4.12 12:26

HQ/DS-3/11 11%

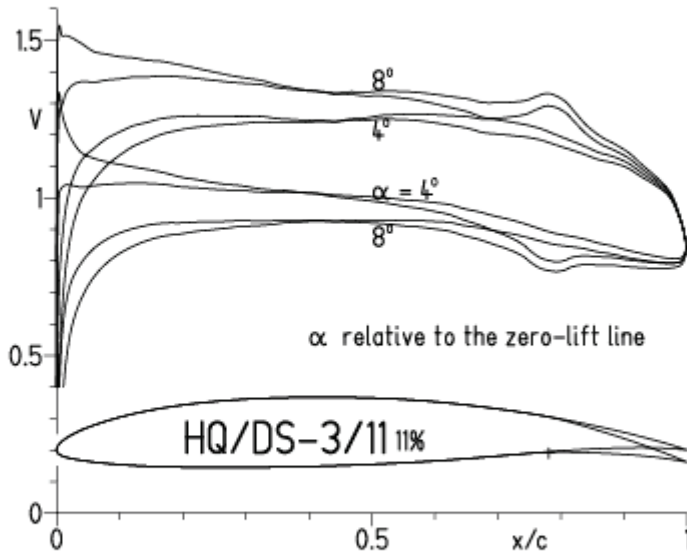
—  $Re = 0.1 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$   
 - - -  $0.2 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$

T. boundary layer transition  
 S. boundary layer separation  
 U. upper surface  
 L. lower surface

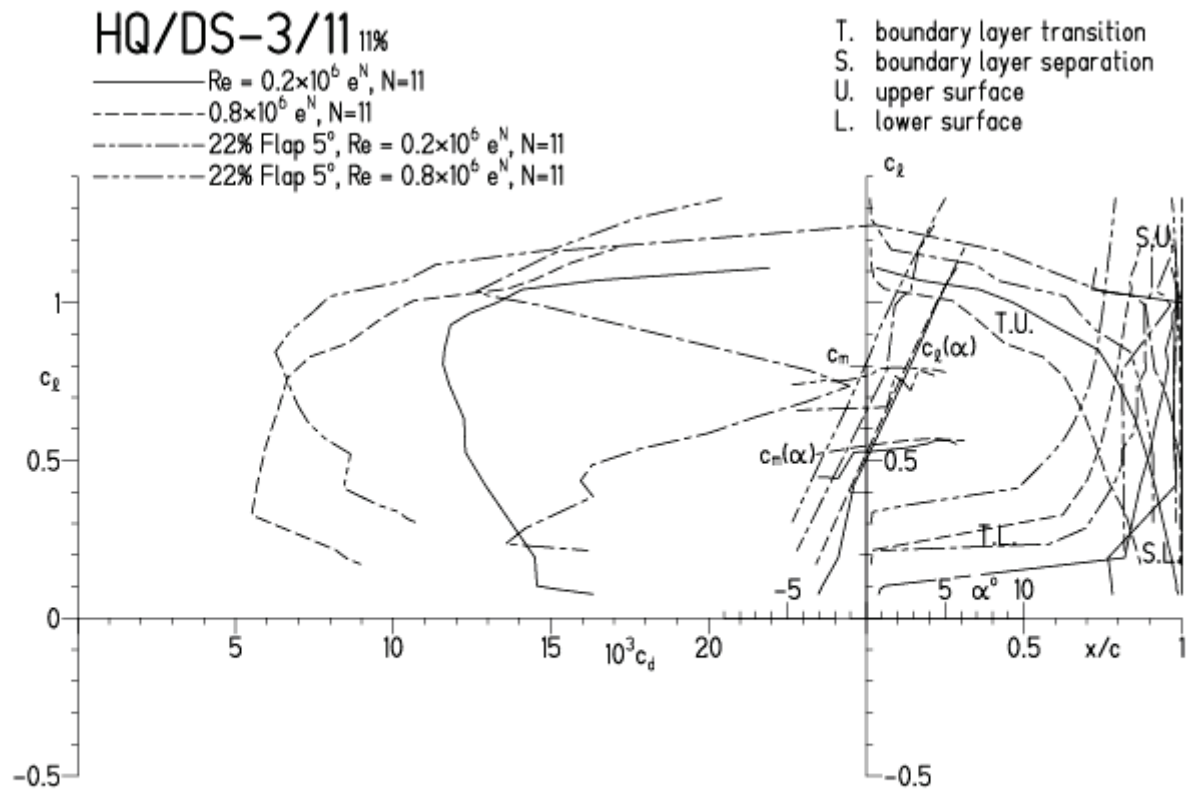


HQ/DS-3/11, N=11, mit 5° Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 16.4.12 13:00

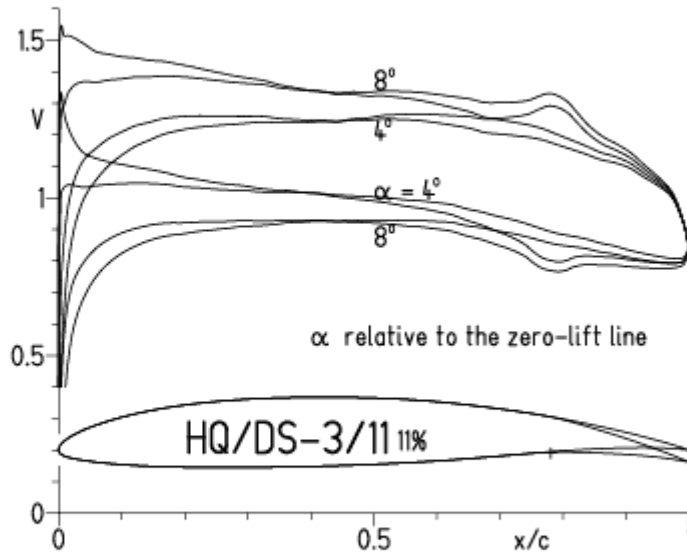


EPPLER 2005 V. 8.5.07 RUN 16.4.12 13:00

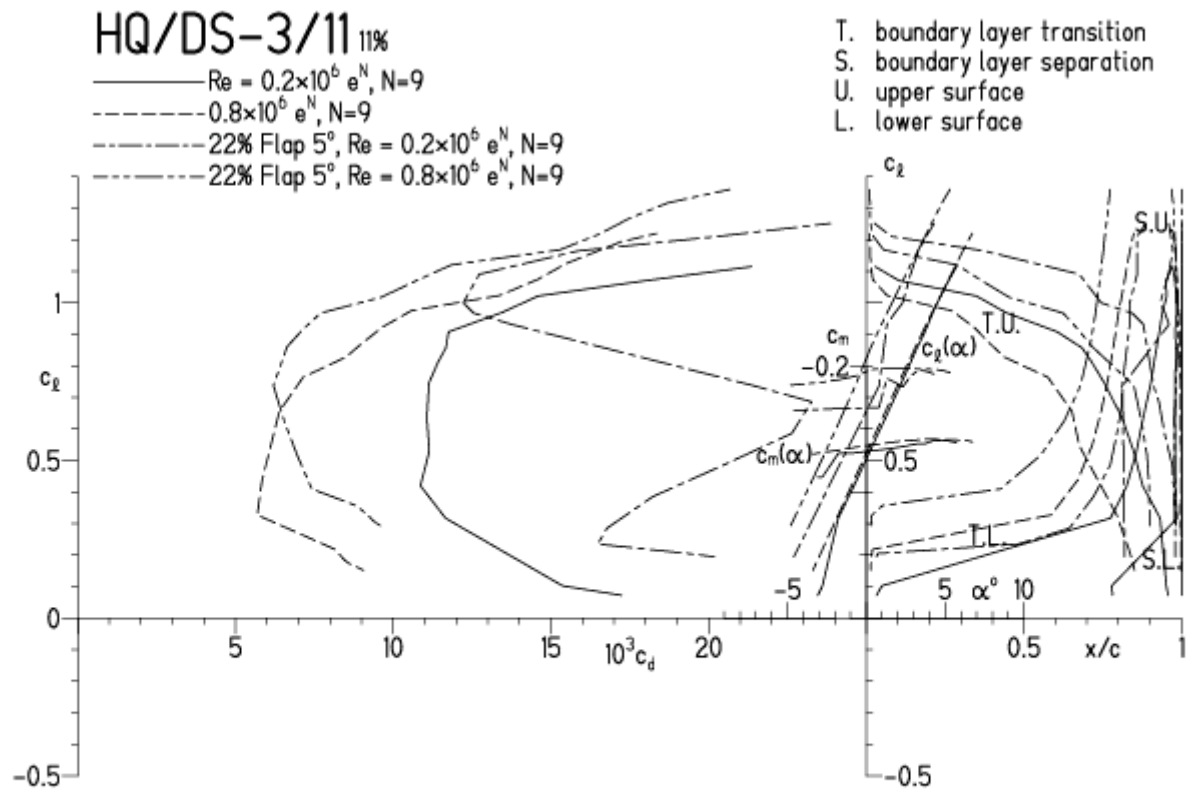


# HQ/DS-3/11, N=9, mit 5° Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 16.4.12 13:13

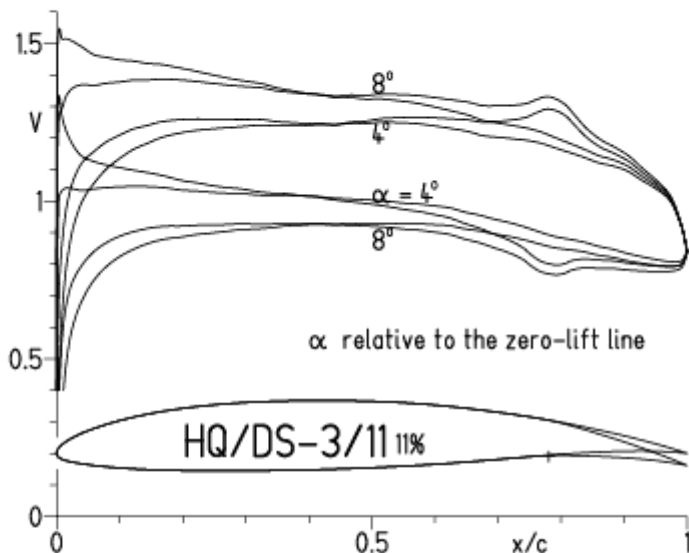


EPPLER 2005 V. 8.5.07 RUN 16.4.12 13:13



**HQ/DS-3/11, N=9, mit 5° Wölbklappenausschlag, Turbulatoreffekt**  
 (optimale Turbulatorposition bei 45 – 55 % Profiltiefe, für niedrige Re-Zahlen)

EPPLER 2005 V. 8.5.07 RUN 16.4.12 13:20

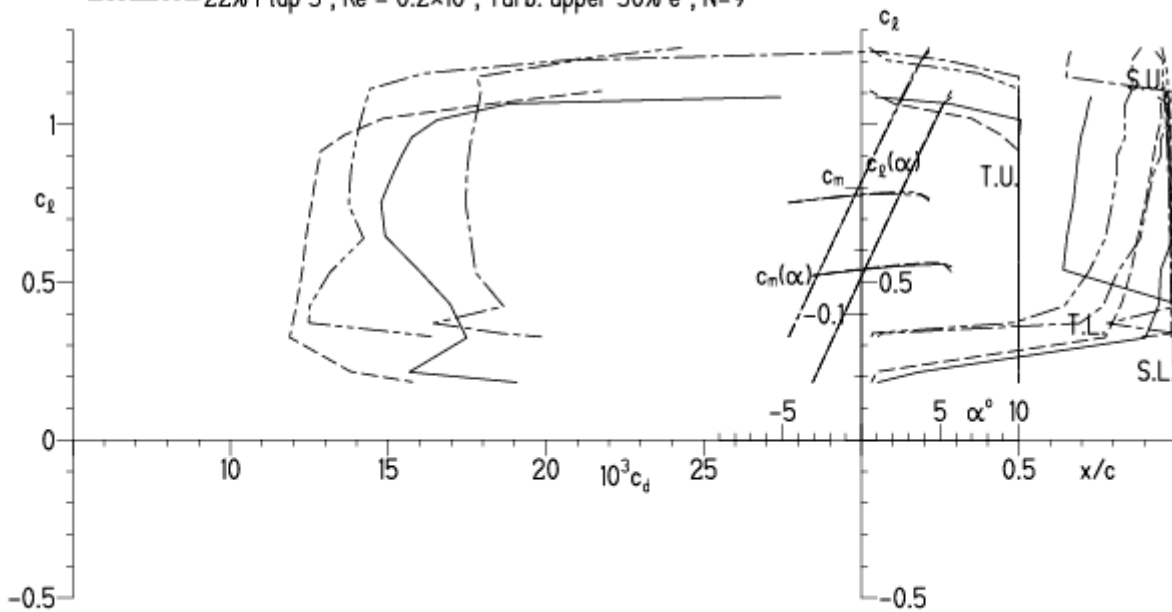


EPPLER 2005 V. 8.5.07 RUN 16.4.12 13:20

**HQ/DS-3/11 11%**

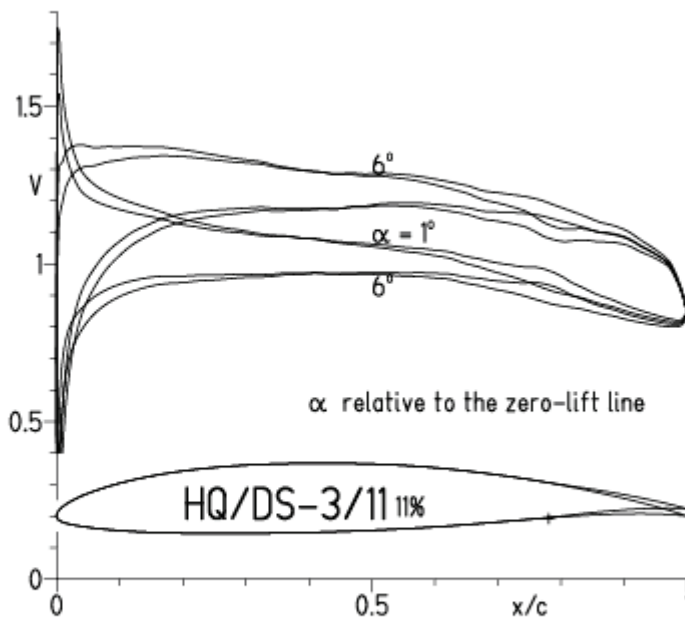
- Re =  $0.1 \times 10^6$ , Turb. upper 50% e<sup>N</sup>, N=9
- - - Re =  $0.2 \times 10^6$ , Turb. upper 50% e<sup>N</sup>, N=9
- · - 22% Flap 5°, Re =  $0.1 \times 10^6$ , Turb. upper 50% e<sup>N</sup>, N=9
- · - 22% Flap 5°, Re =  $0.2 \times 10^6$ , Turb. upper 50% e<sup>N</sup>, N=9

- T. boundary layer transition
- S. boundary layer separation
- U. upper surface
- L. lower surface

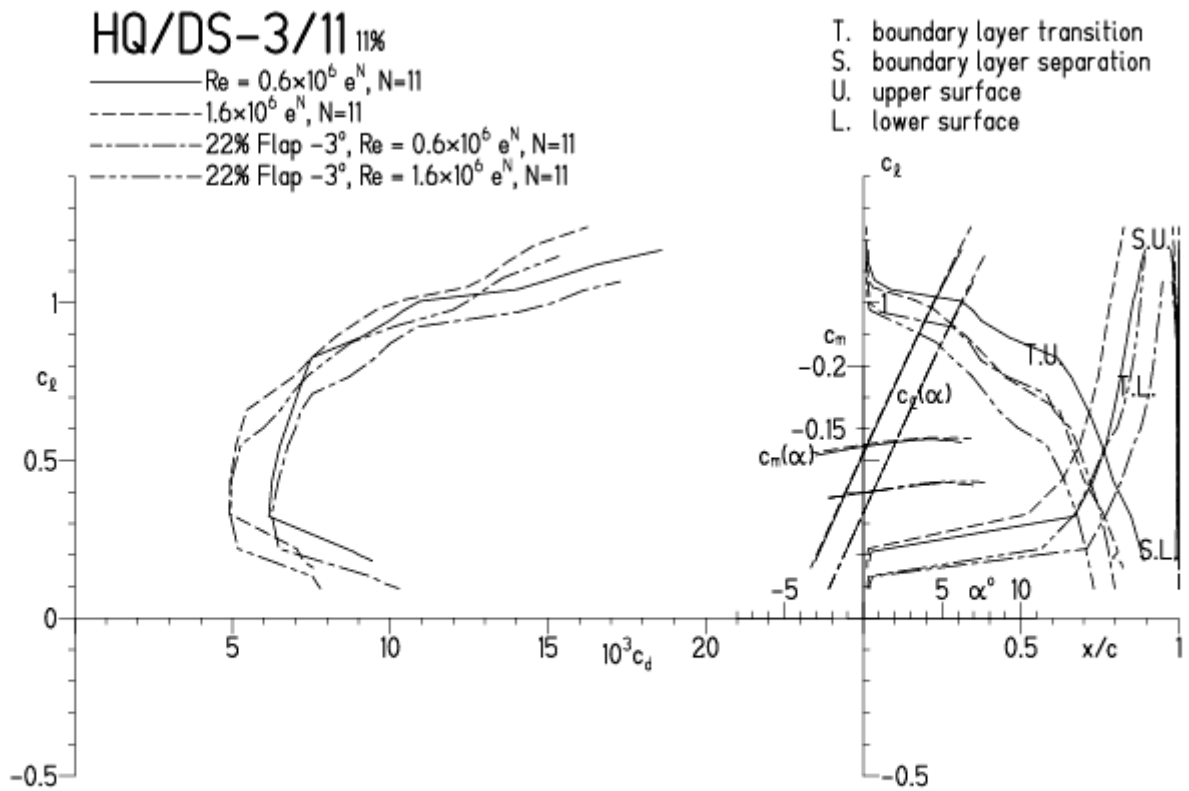


HQ/DS-3/11, N=11, mit  $-3^\circ$  Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 16.4.12 17:02

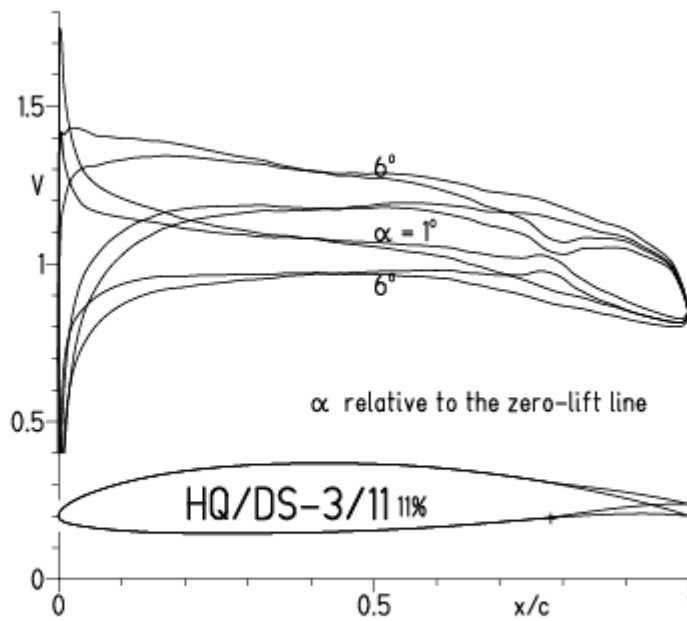


EPPLER 2005 V. 8.5.07 RUN 16.4.12 17:02

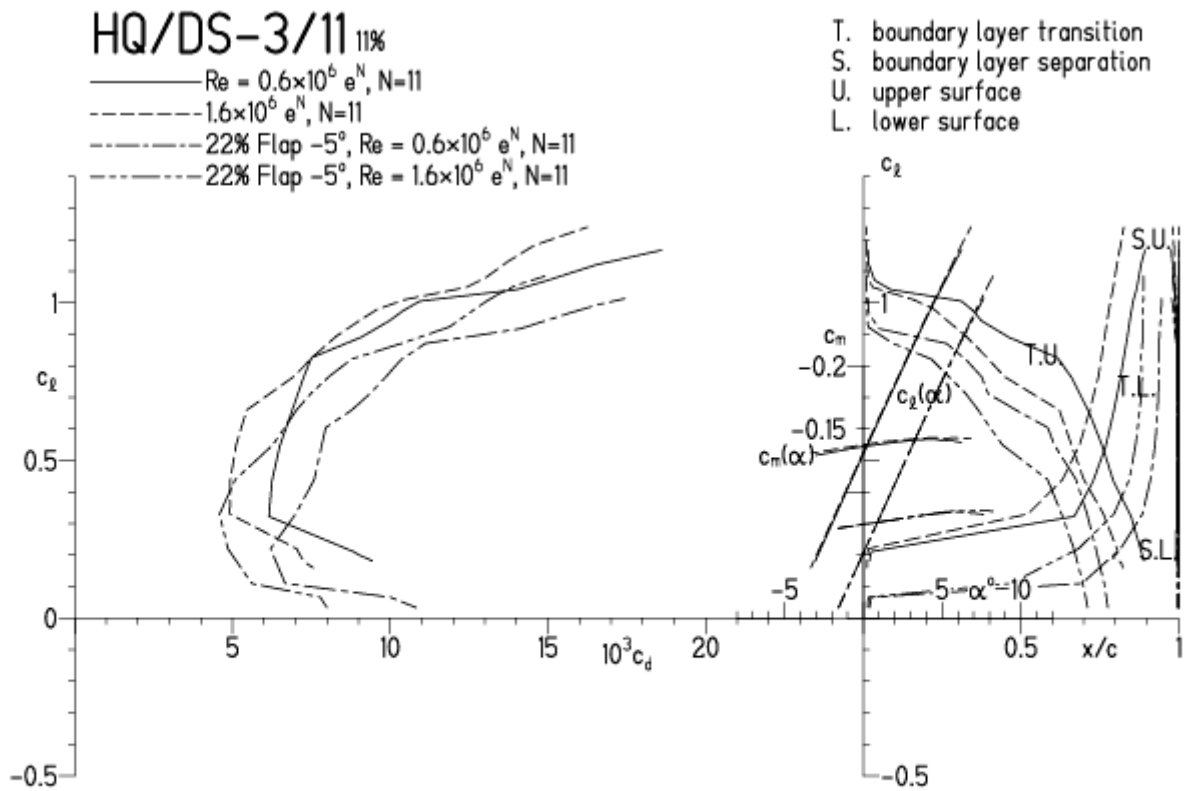


HQ/DS-3/11, N=11, mit  $-5^\circ$  Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 16.4.12 16:45



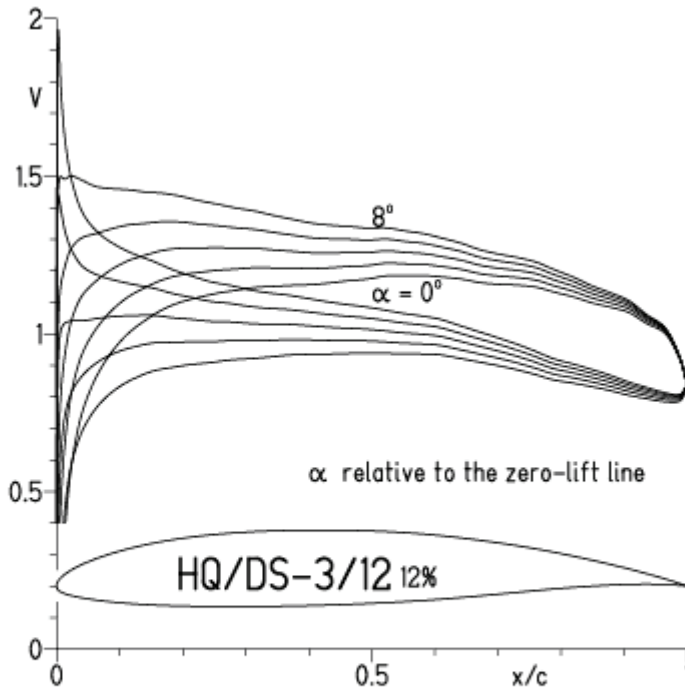
EPPLER 2005 V. 8.5.07 RUN 16.4.12 16:45



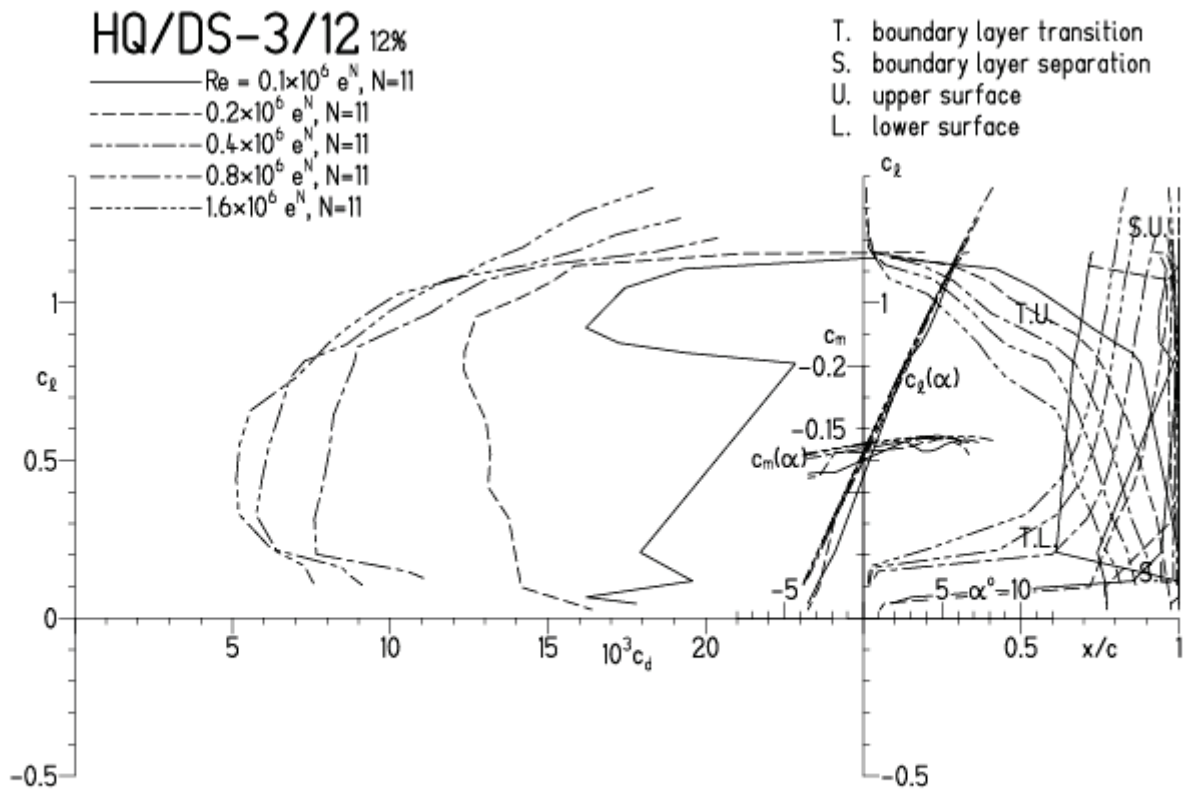


HQ/DS-3/12, N=11

EPPLER 2005 V. 8.5.07 RUN 16.4.12 17:29

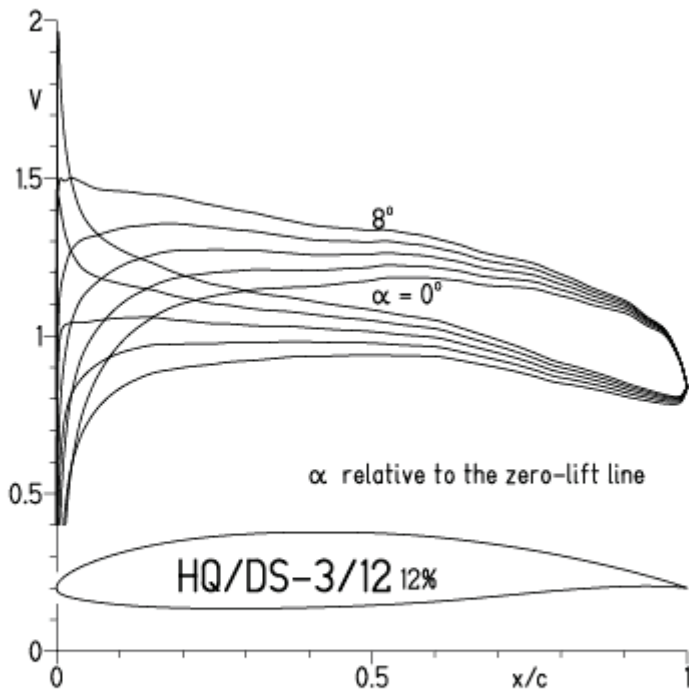


EPPLER 2005 V. 8.5.07 RUN 16.4.12 17:29

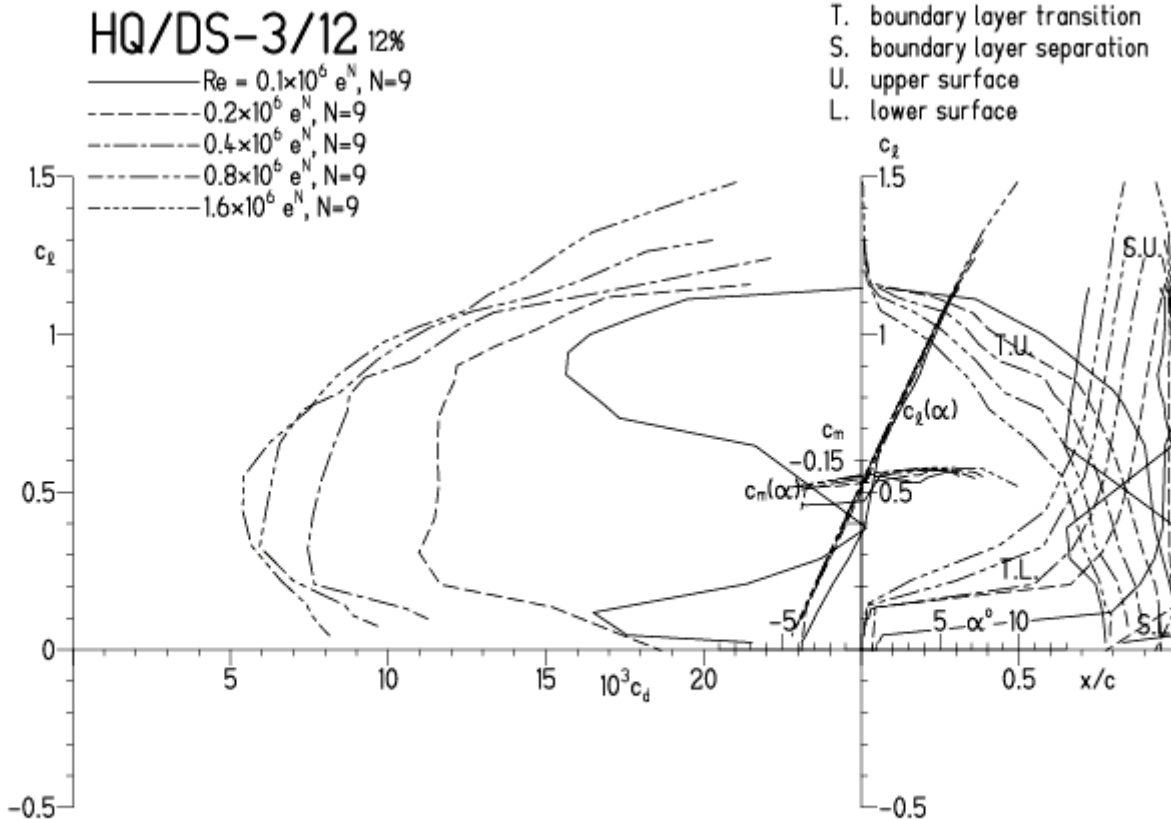


HQ/DS-3/12, N=9

EPPLER 2005 V. 8.5.07 RUN 16.4.12 17:44

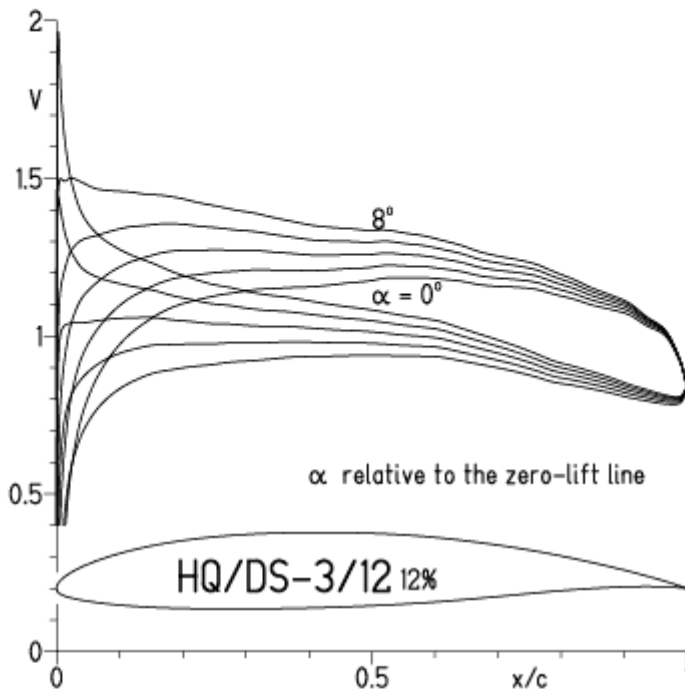


EPPLER 2005 V. 8.5.07 RUN 16.4.12 17:44



HQ/DS-3/12, N=9, Turbulatoreffekt, Turbulatoreffekt bei niedrigen Re-Zahlen  
 (optimale Turbulatorposition bei 45 – 55 % Profiltiefe)

EPPLER 2005 V. 8.5.07 RUN 16.4.12 17:49

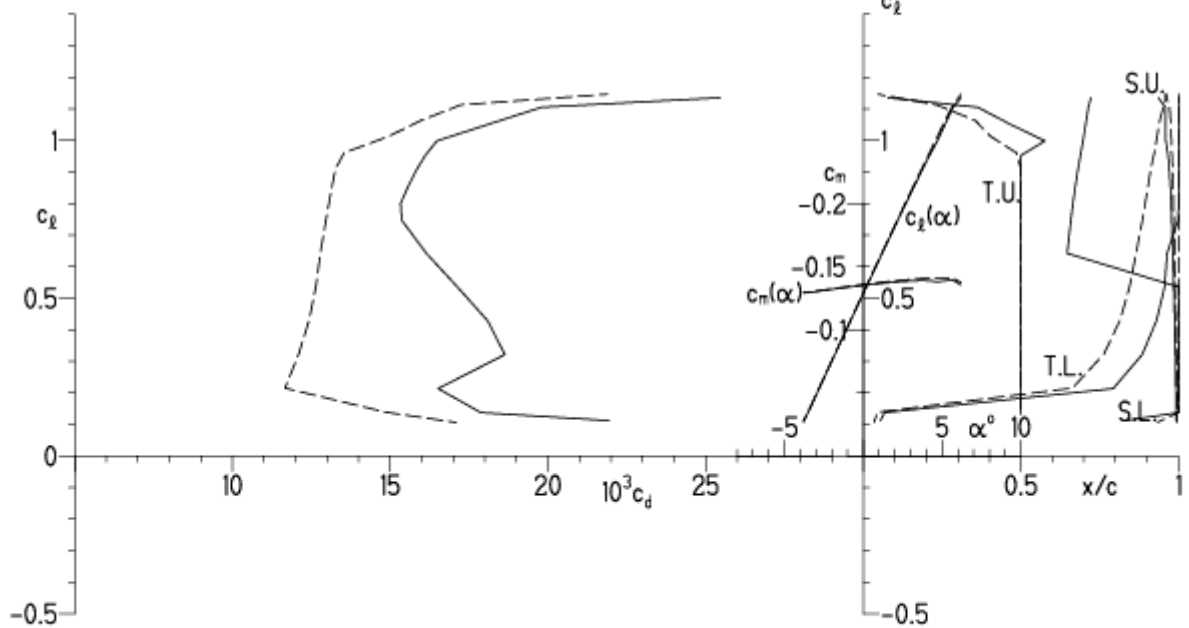


EPPLER 2005 V. 8.5.07 RUN 16.4.12 17:49

HQ/DS-3/12 12%

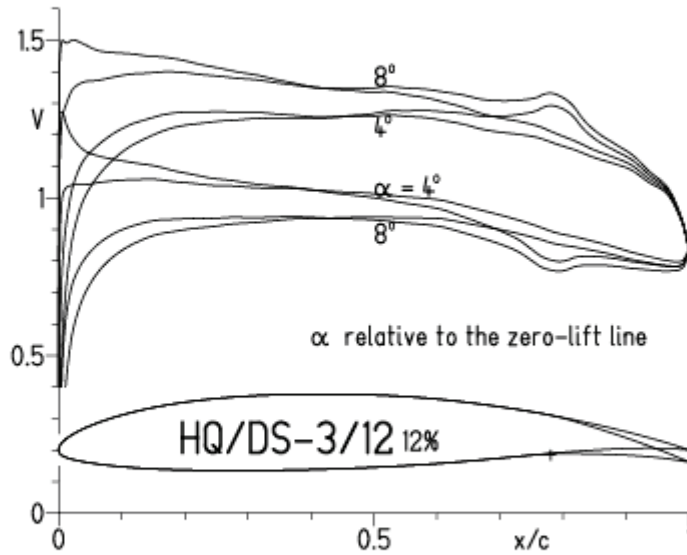
—  $Re = 0.1 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$   
 - - -  $0.2 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$

T. boundary layer transition  
 S. boundary layer separation  
 U. upper surface  
 L. lower surface

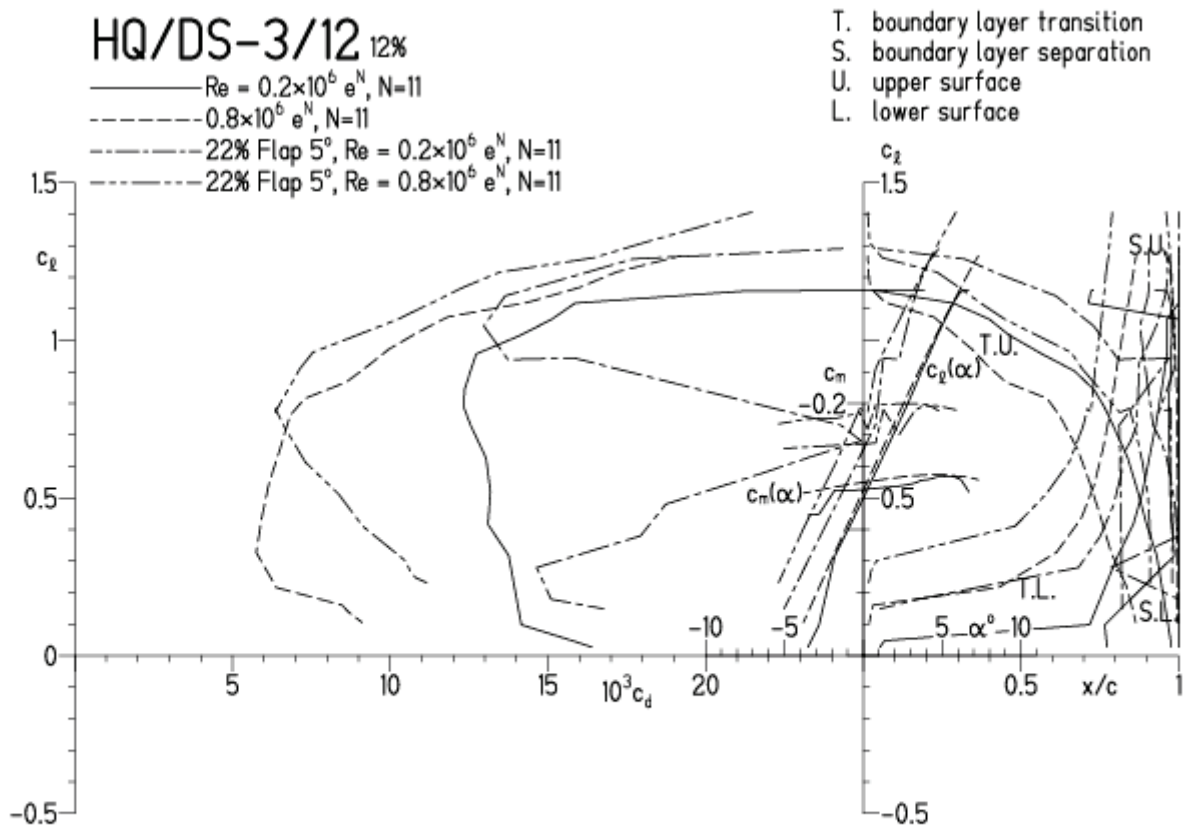


HQ/DS-3/12, N=11, mit 5° Wöbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 16.4.12 18:10

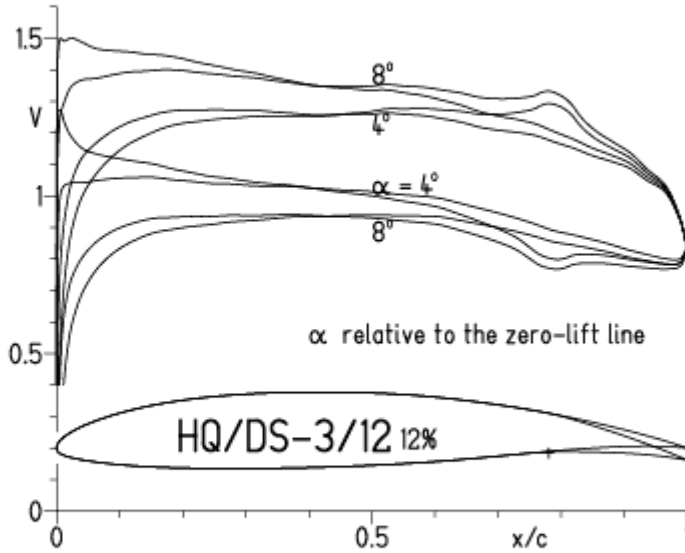


EPPLER 2005 V. 8.5.07 RUN 16.4.12 18:10

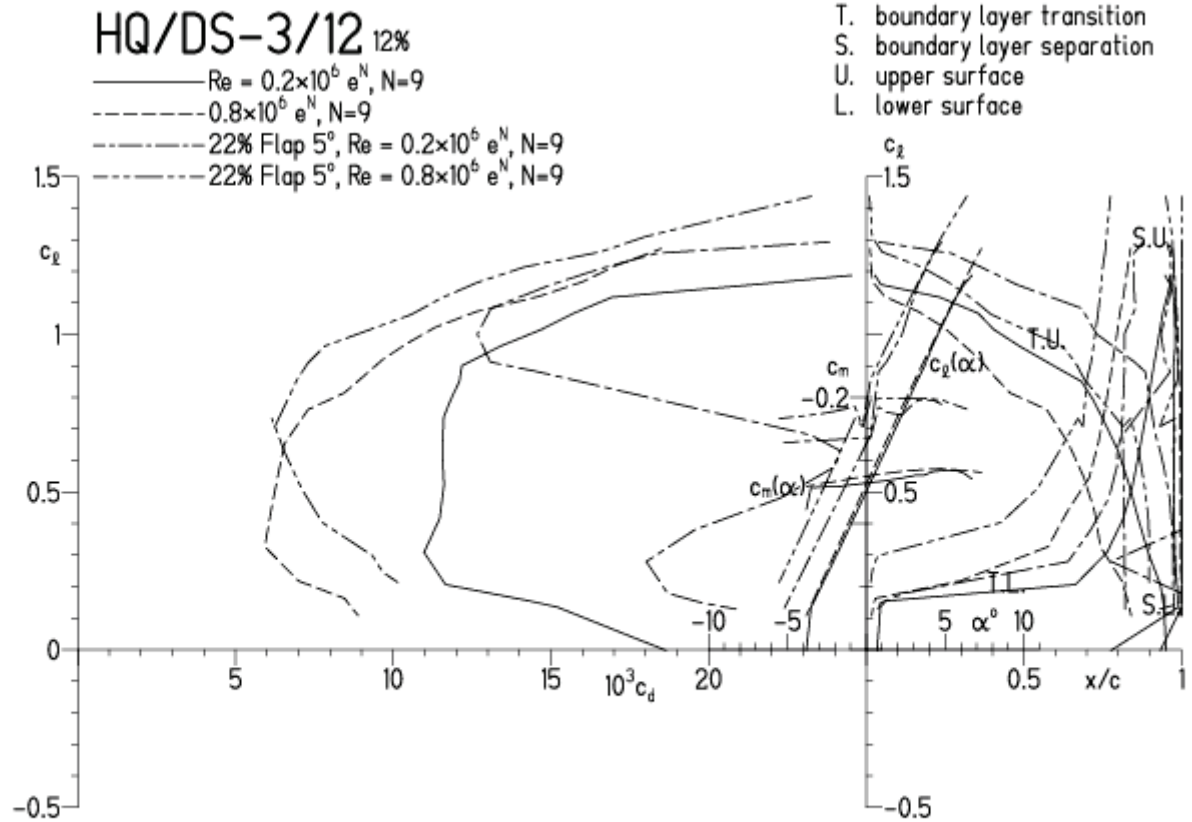


HQ/DS-3/12, N=9, mit 5° Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 16.4.12 18:19

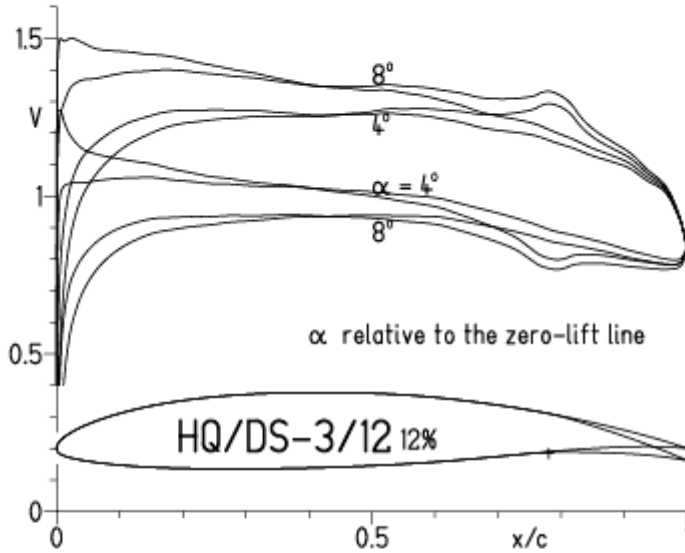


EPPLER 200



**HQ/DS-3/12, N=9, mit 5° Wölbklappenausschlag, Turbulatoreffekt**  
 (optimale Turbulatorposition bei 45 – 55 % Profiltiefe, für niedrige Re-Zahlen)

EPPLER 2005 V. 8.5.07 RUN 16.4.12 18:25

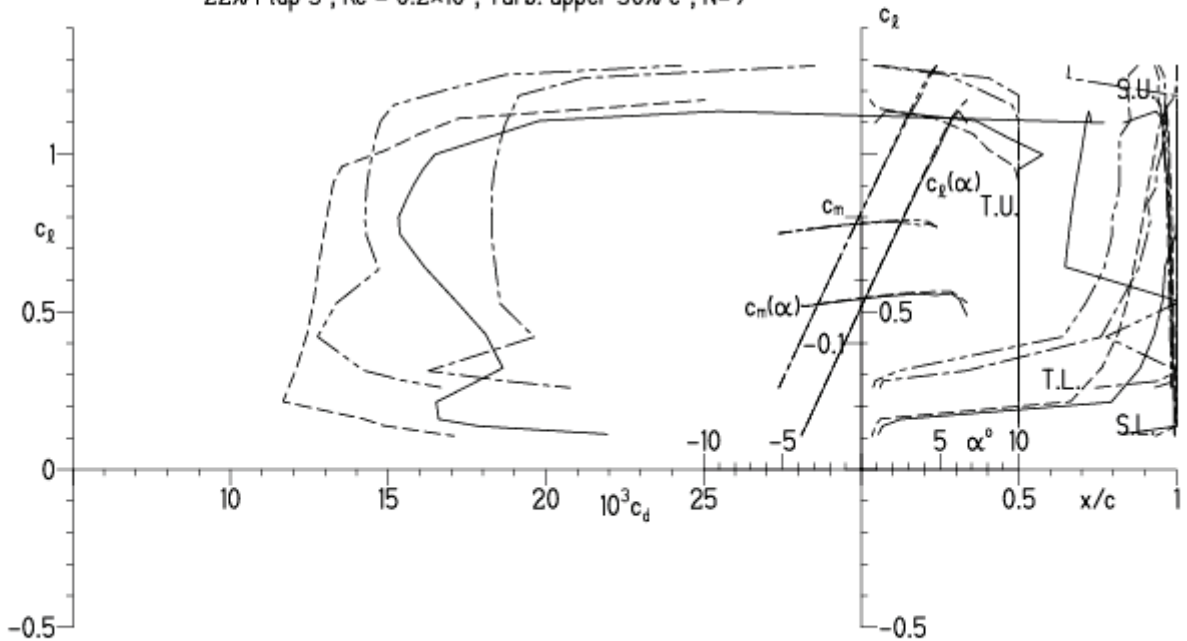


EPPLER 2005 V. 8.5.07 RUN 16.4.12 18:25

**HQ/DS-3/12 12%**

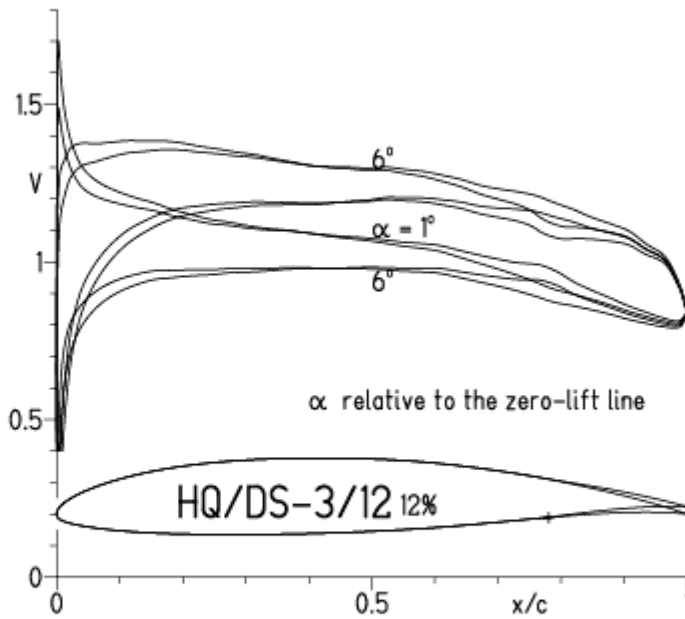
- Re =  $0.1 \times 10^6$ , Turb. upper 50% e<sup>N</sup>, N=9
- - - Re =  $0.2 \times 10^6$ , Turb. upper 50% e<sup>N</sup>, N=9
- · - 22% Flap 5°, Re =  $0.1 \times 10^6$ , Turb. upper 50% e<sup>N</sup>, N=9
- · - 22% Flap 5°, Re =  $0.2 \times 10^6$ , Turb. upper 50% e<sup>N</sup>, N=9

- T. boundary layer transition
- S. boundary layer separation
- U. upper surface
- L. lower surface

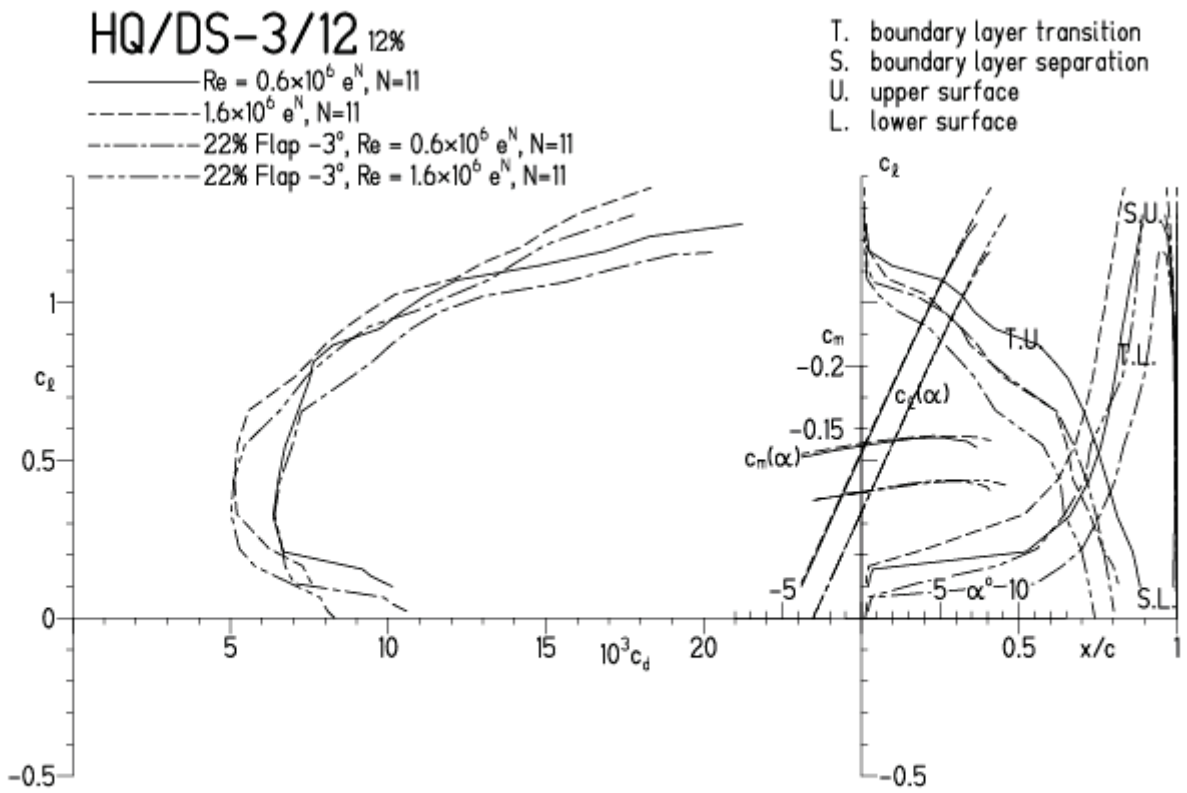


HQ/DS-3/12, N=11, mit  $-3^\circ$  Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 16.4.12 18:40

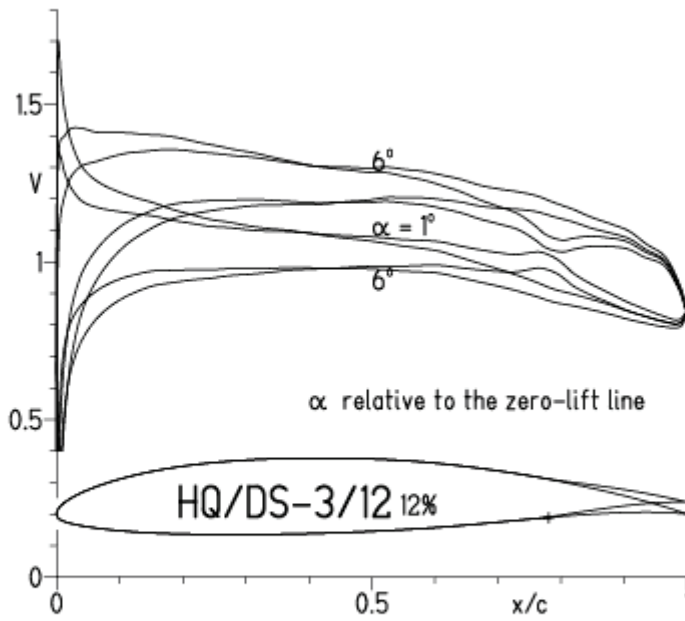


EPPLER 2005 V. 8.5.07 RUN 16.4.12 18:40

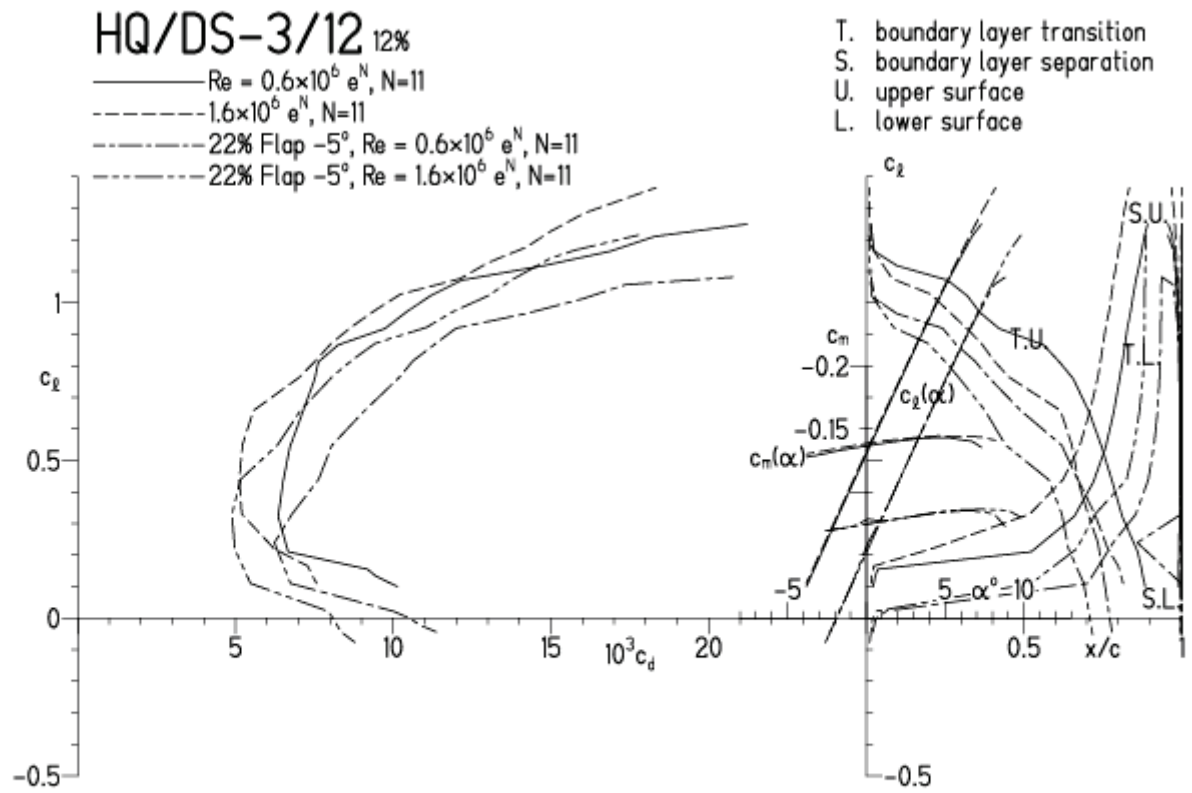


HQ/DS-3/12, N=11, mit  $-5^\circ$  Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 16.4.12 18:51



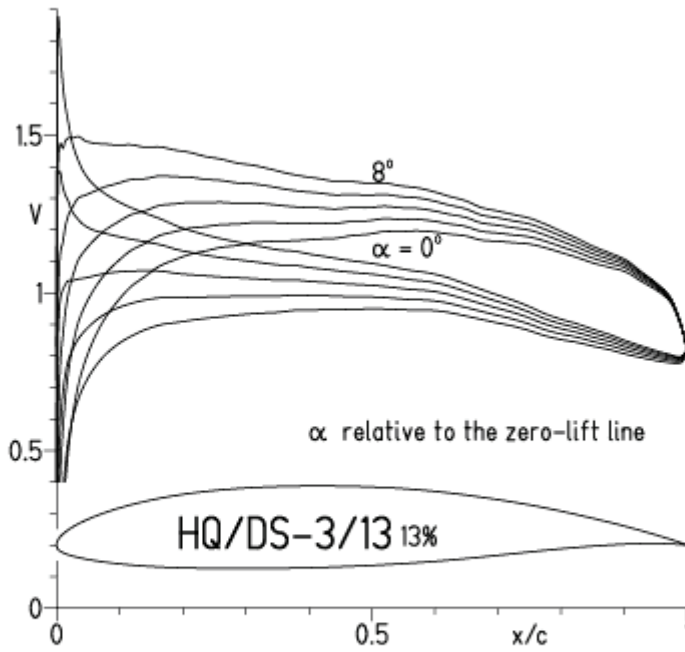
EPPLER 2005 V. 8.5.07 RUN 16.4.12 18:51



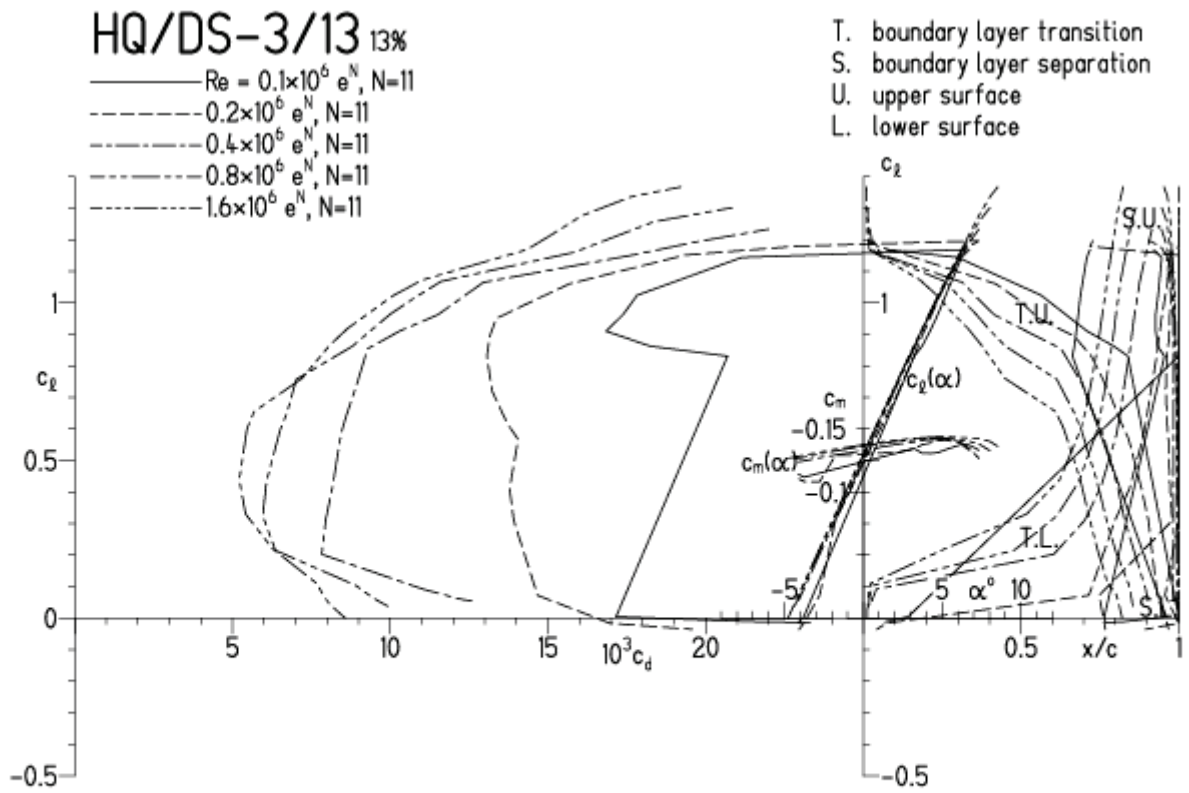


HQ/DS-3/13, N=11

EPPLER 2005 V. 8.5.07 RUN 17.4.12 16:41

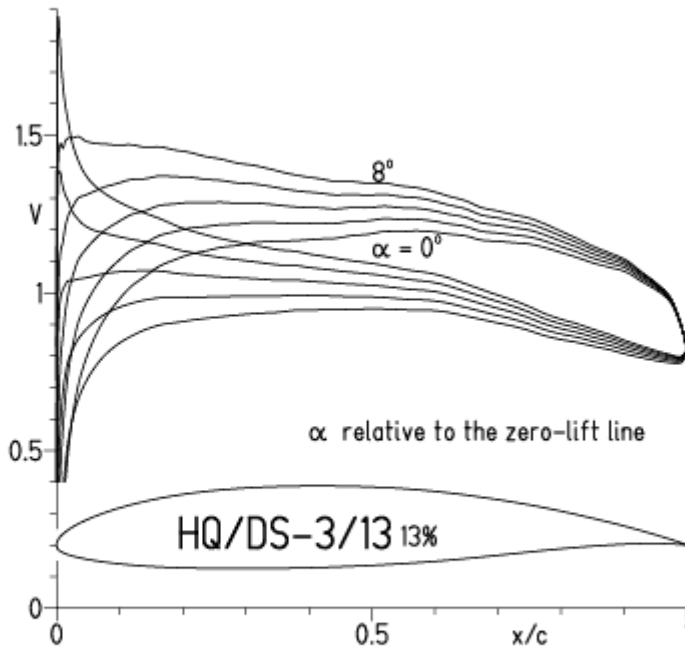


EPPLER 2005 V. 8.5.07 RUN 17.4.12 16:41

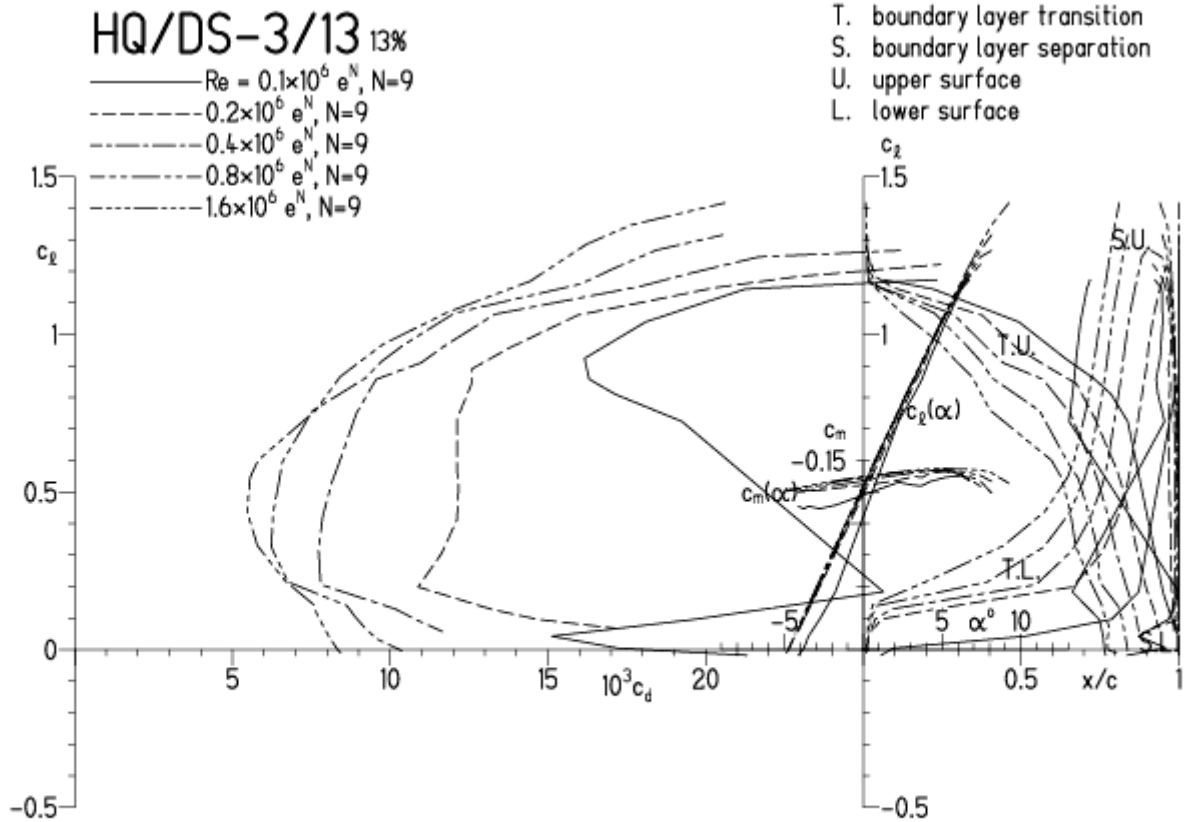


HQ/DS-3/13, N=9

EPPLER 2005 V. 8.5.07 RUN 17.4.12 16:51

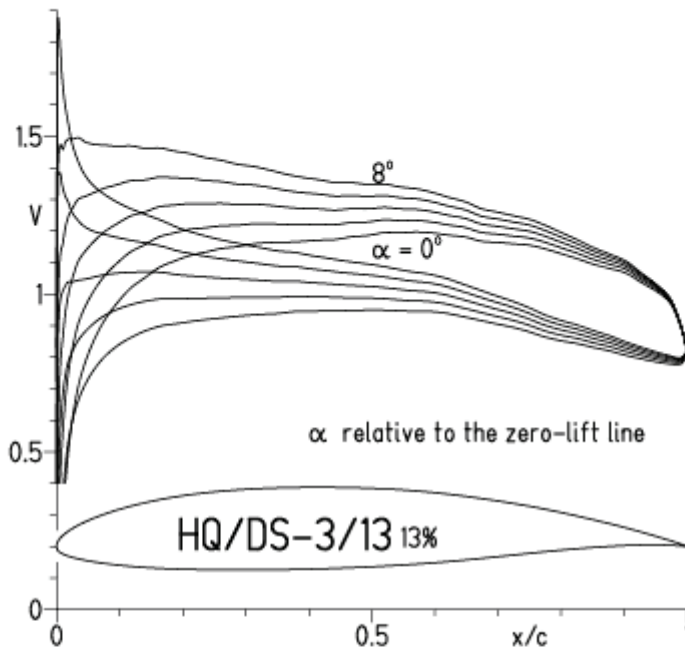


EPPLER 2005 V. 8.5.07 RUN 17.4.12 16:51



HQ/DS-3/13, N=9, Turbulatoreffekt bei niedrigen Re-Zahlen  
 (optimale Turbulatorposition bei 45 – 55 % Profiltiefe)

EPPLER 2005 V. 8.5.07 RUN 17.4.12 16:56

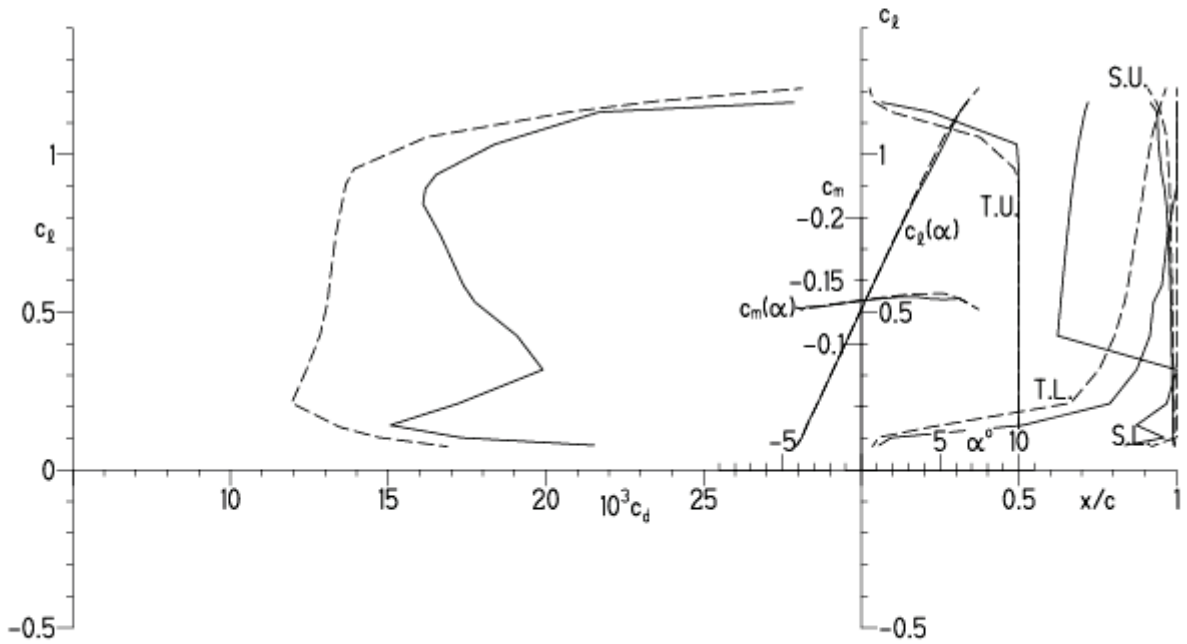


EPPLER 2005 V. 8.5.07 RUN 17.4.12 16:56

HQ/DS-3/13 13%

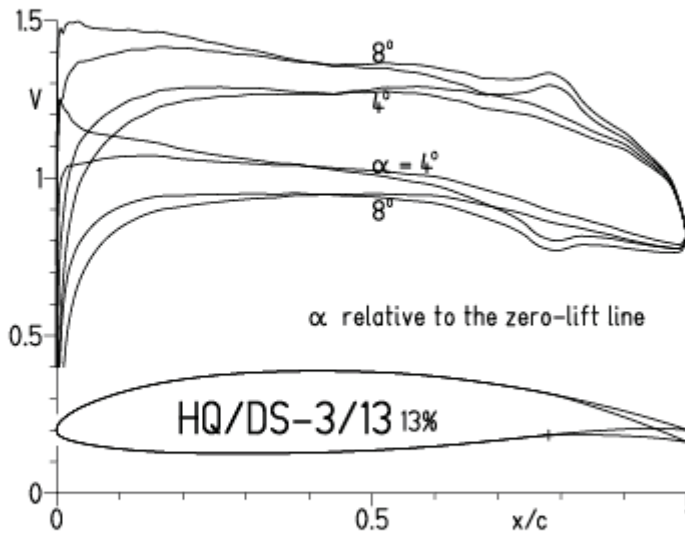
—  $Re = 0.1 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$   
 - - -  $0.2 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$

T. boundary layer transition  
 S. boundary layer separation  
 U. upper surface  
 L. lower surface



HQ/DS-3/13, N=11, mit 5° Wöbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 17.4.12 17:32

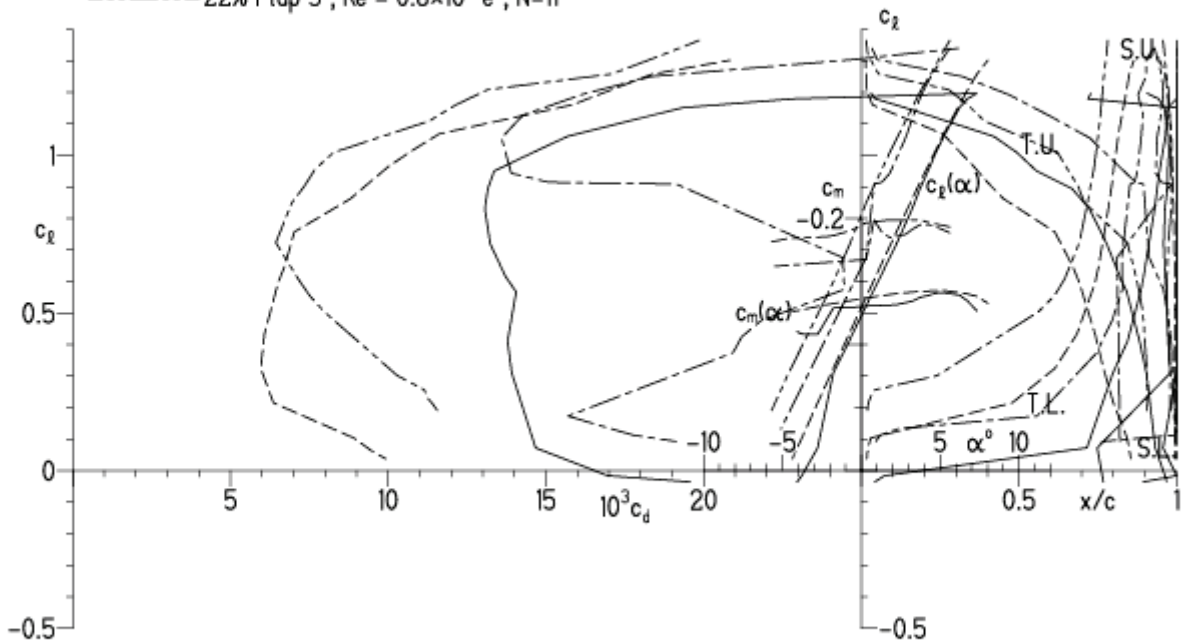


EPPLER 2005 V. 8.5.0

HQ/DS-3/13 13%

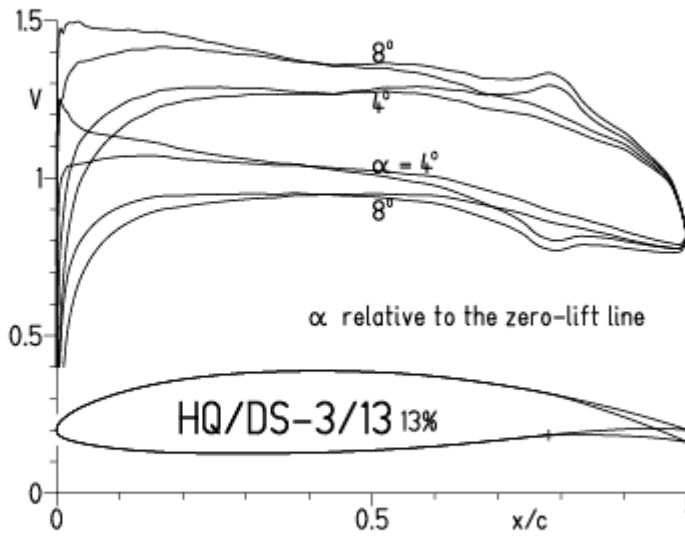
- $Re = 0.2 \times 10^6 e^N, N=11$
- - -  $0.8 \times 10^6 e^N, N=11$
- · -  $22\% \text{ Flap } 5^\circ, Re = 0.2 \times 10^6 e^N, N=11$
- · -  $22\% \text{ Flap } 5^\circ, Re = 0.8 \times 10^6 e^N, N=11$

- T. boundary layer transition
- S. boundary layer separation
- U. upper surface
- L. lower surface

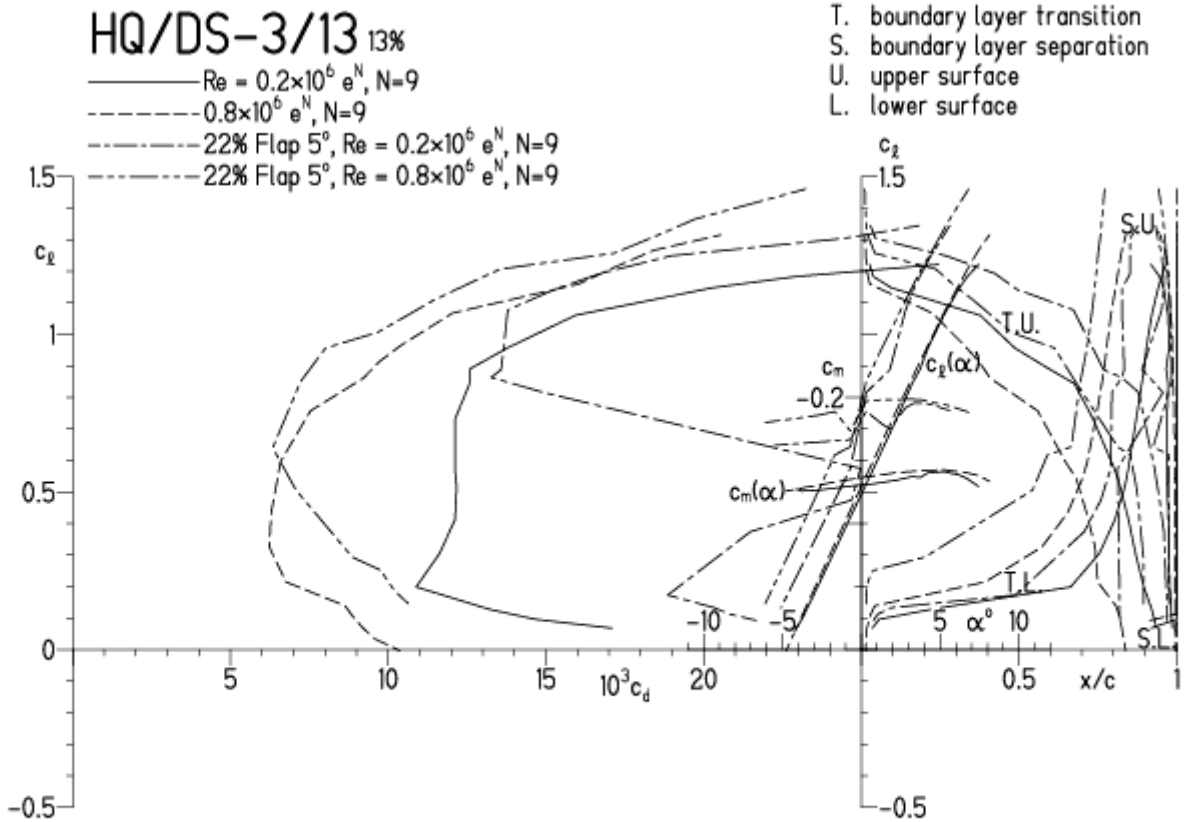


HQ/DS-3/13, N=9, mit 5° Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 17.4.12 17:44

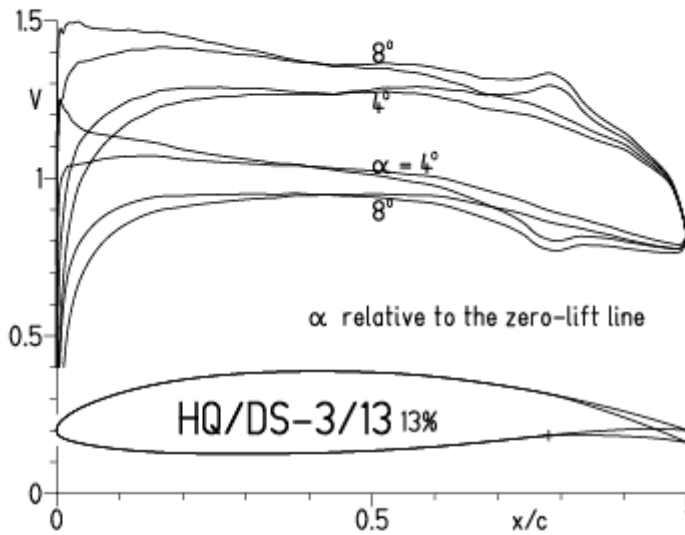


EPPLER



**HQ/DS-3/13, N=9, mit 5° Wölbklappenausschlag, Turbulatoreffekt**  
 (optimale Turbulatorposition bei 45 – 55 % Profiltiefe, für niedrige Re-Zahlen)

EPPLER 2005 V. 8.5.07 RUN 17.4.12 17:49

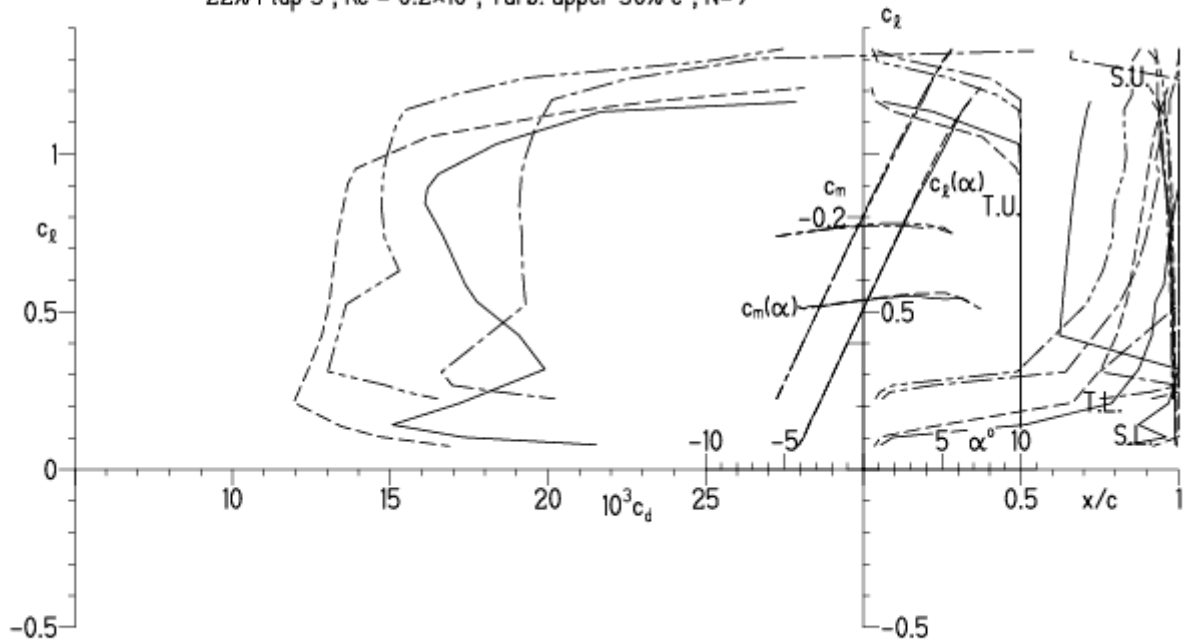


EPPLER 2005 V. 8.5.07 RUN 17.4.12 17:49

**HQ/DS-3/13 13%**

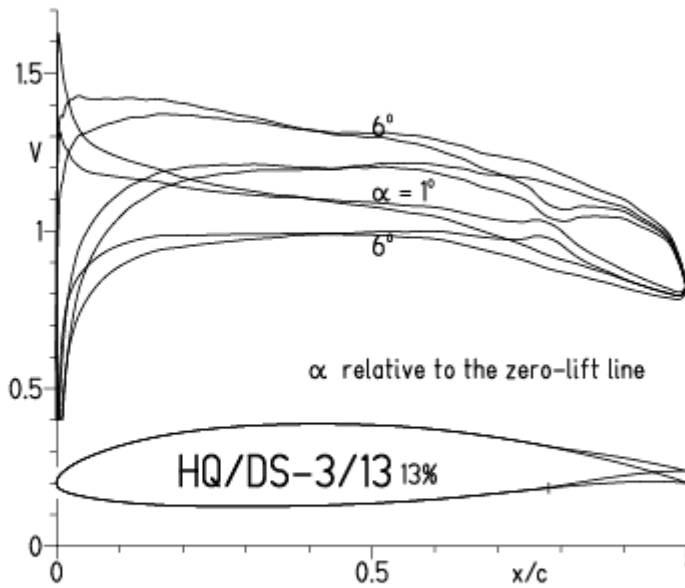
- $Re = 0.1 \times 10^6$ , Turb. upper 50%  $e^N$ , N=9
- - -  $0.2 \times 10^6$ , Turb. upper 50%  $e^N$ , N=9
- · -  $22\%$  Flap  $5^\circ$ ,  $Re = 0.1 \times 10^6$ , Turb. upper 50%  $e^N$ , N=9
- · -  $22\%$  Flap  $5^\circ$ ,  $Re = 0.2 \times 10^6$ , Turb. upper 50%  $e^N$ , N=9

- T. boundary layer transition
- S. boundary layer separation
- U. upper surface
- L. lower surface

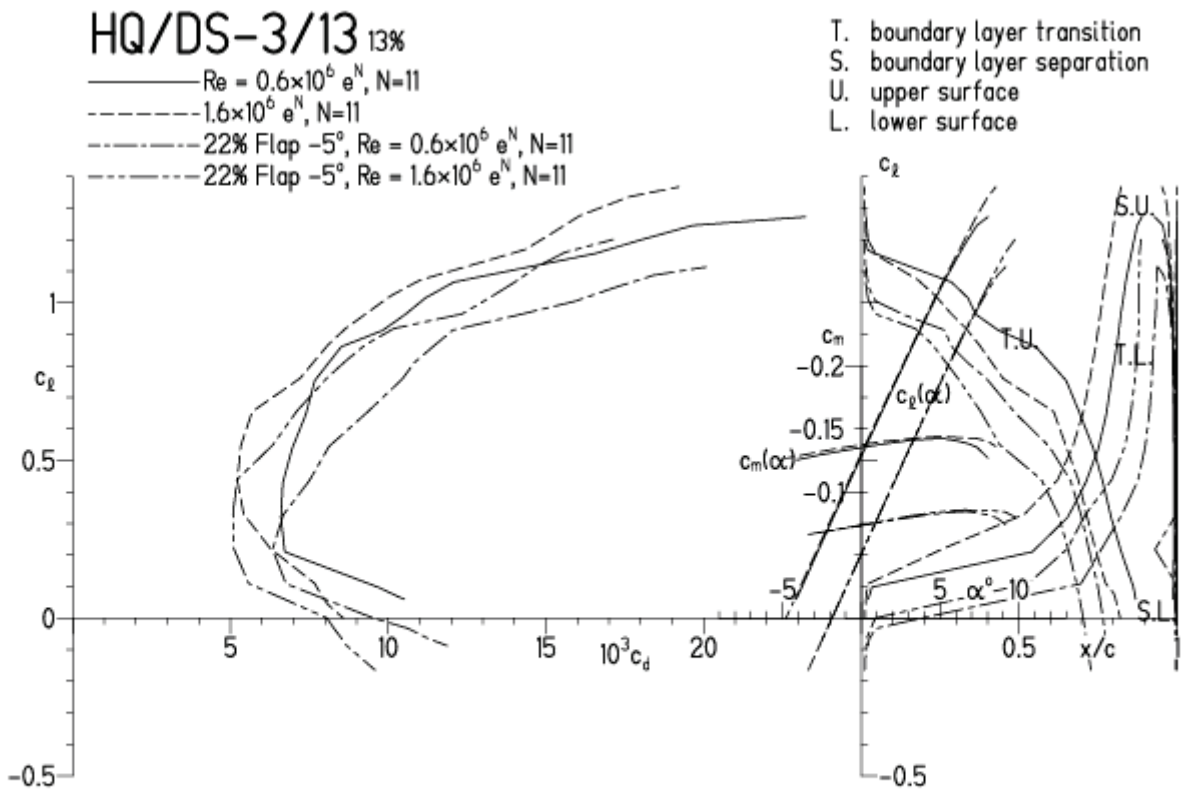


HQ/DS-3/13, N=11, mit -5° Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 17.4.12 18:05

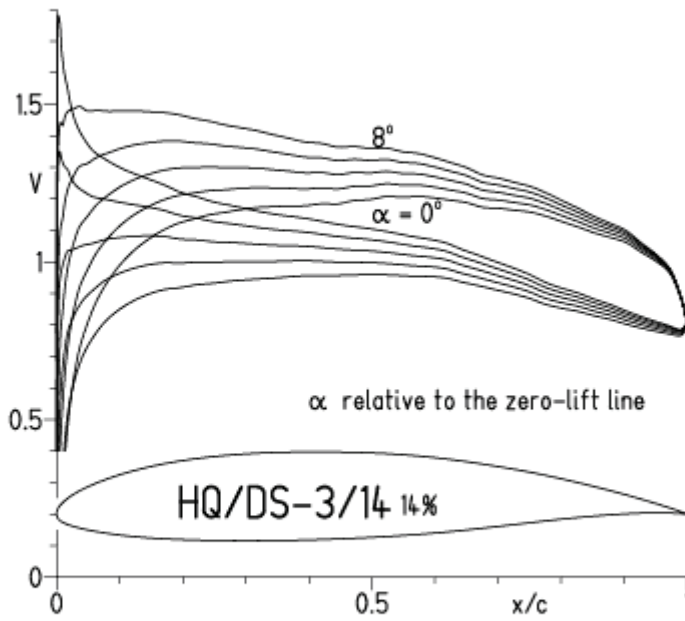


EPPLER 2005 V. 8.5.07 R

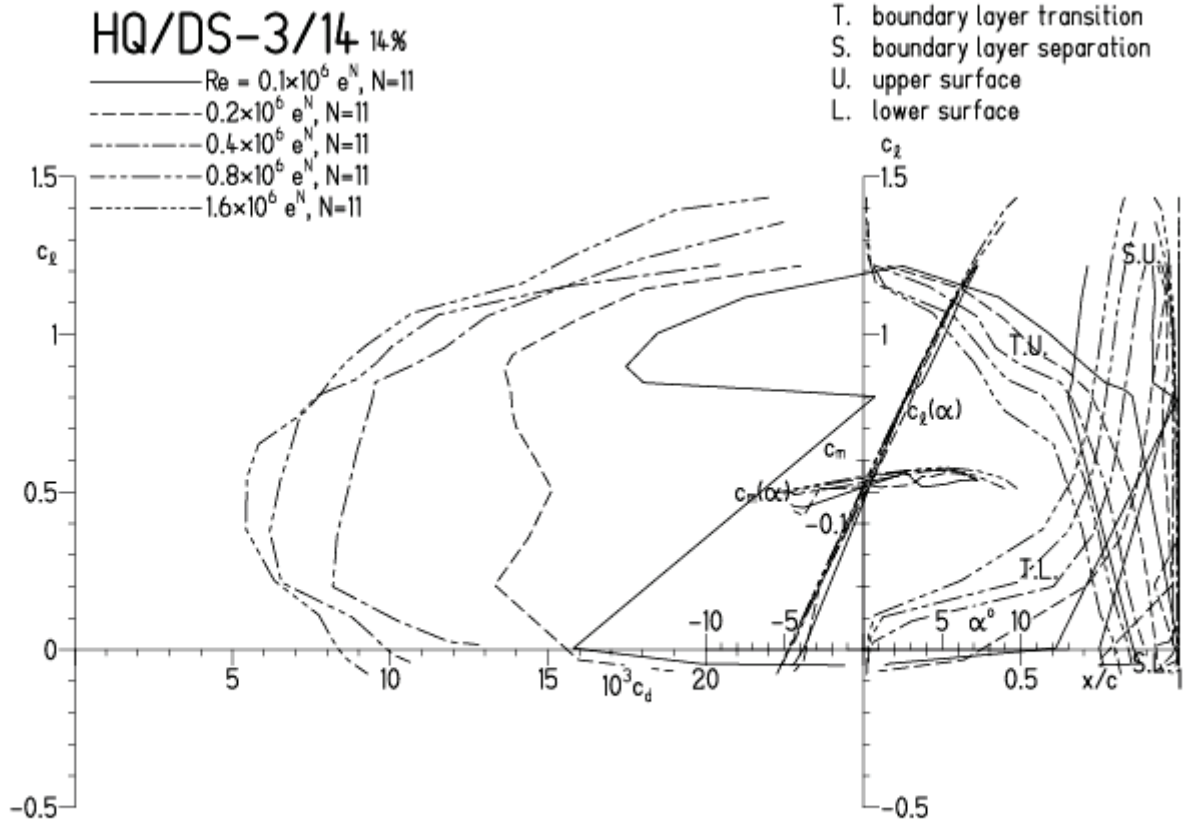


HQ/DS-3/14, N=11

EPPLER 2005 V. 8.5.07 RUN 17.4.12 18:36



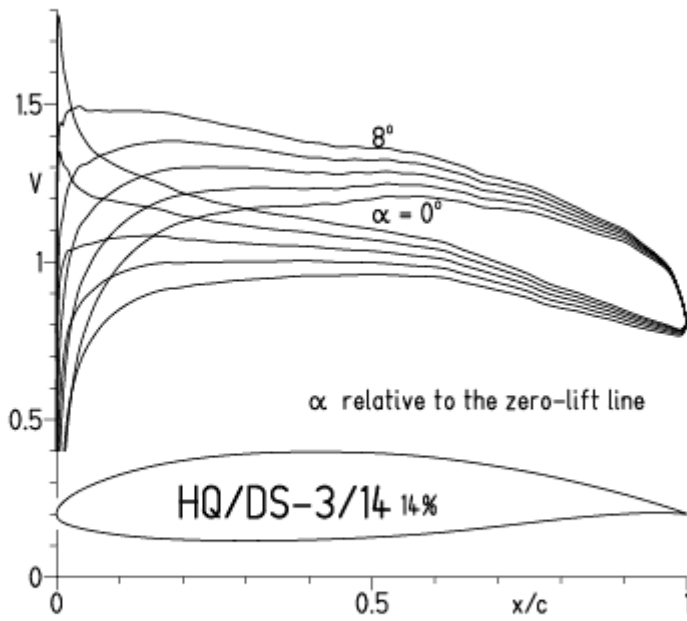
EPPLER 2005 V.



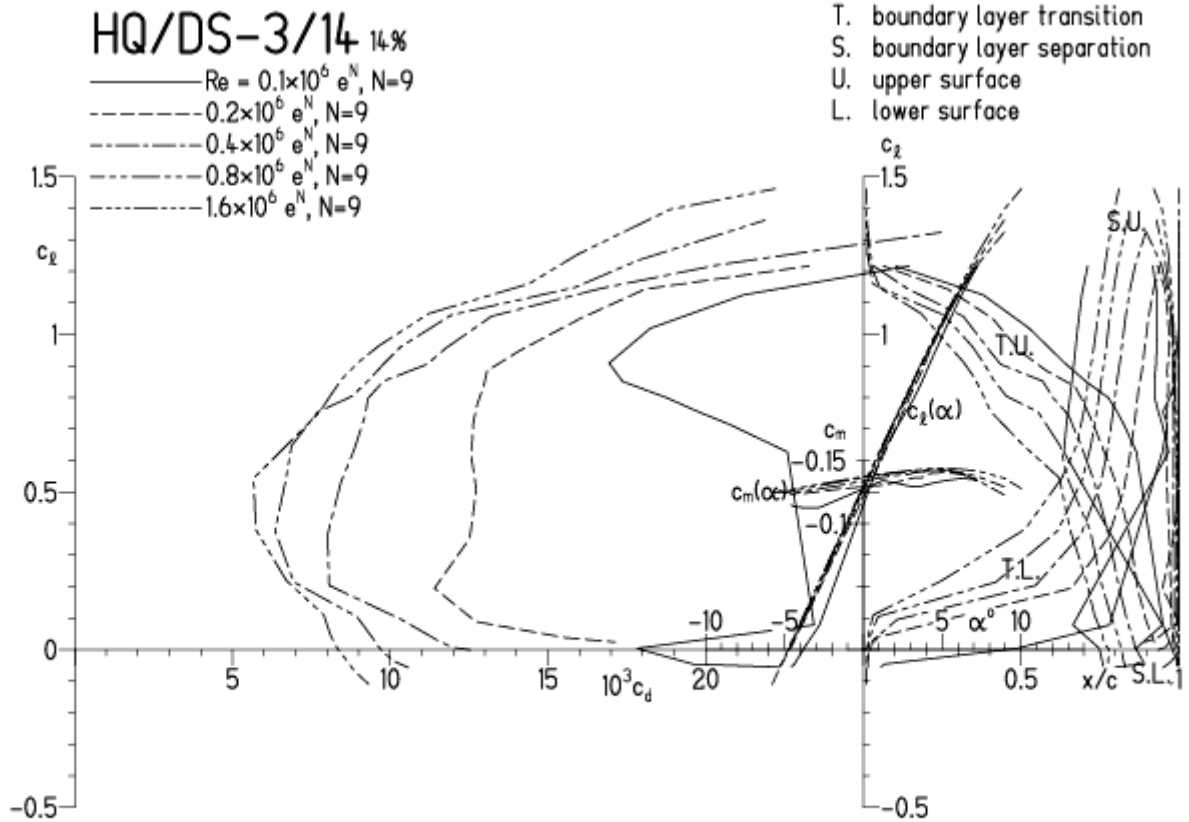


HQ/DS-3/14, N=9

EPPLER 2005 V. 8.5.07 RUN 17.4.12 18:59

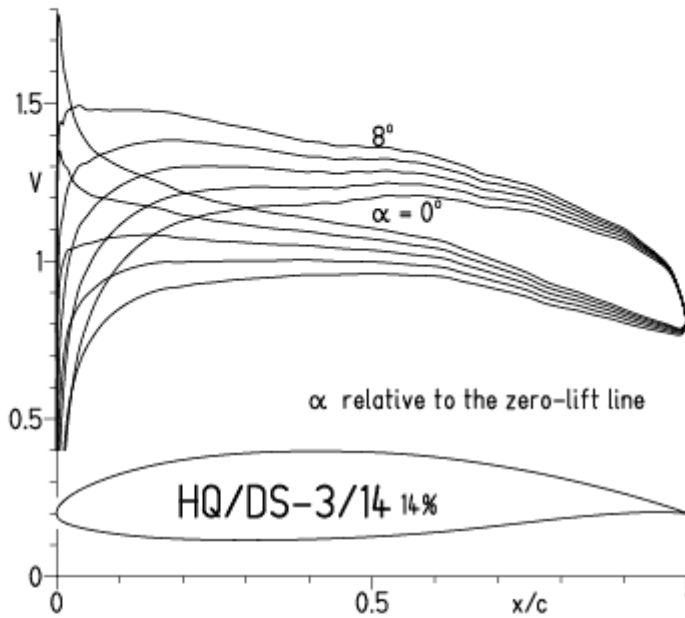


EPPLER 2005 V. 8.5.07 RUN 1



HQ/DS-3/14, N=9, Turbulatoreffekt, Turbulatoreffekt bei niedrigen Re-Zahlen  
 (optimale Turbulatorposition bei 45 – 55 % Profiltiefe)

EPPLER 2005 V. 8.5.07 RUN 17.4.12 19:05

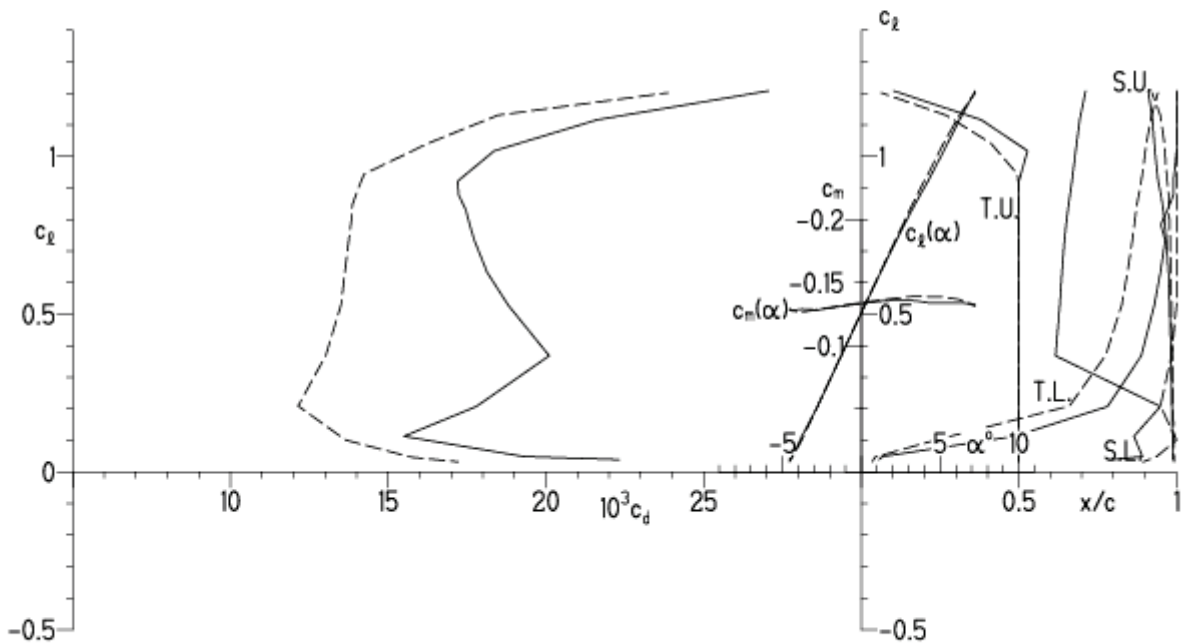


EPPLER 2005 V. 8.5.07 RUN 17.4.12 19:05

HQ/DS-3/14 14%

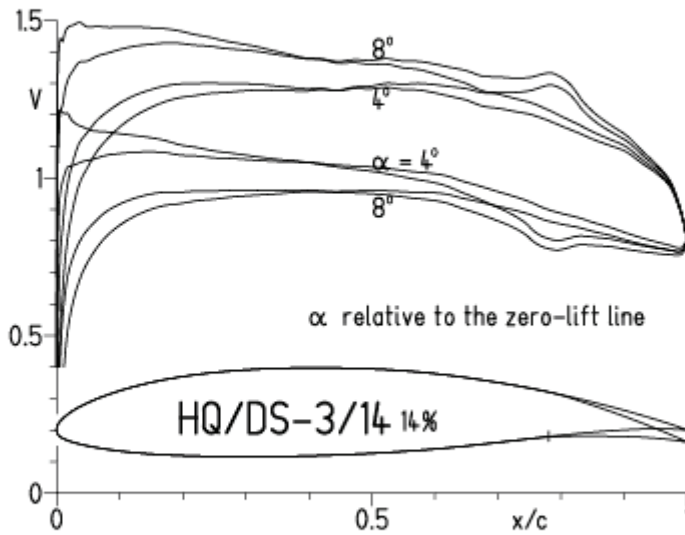
—  $Re = 0.1 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$   
 - - -  $0.2 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$

T. boundary layer transition  
 S. boundary layer separation  
 U. upper surface  
 L. lower surface

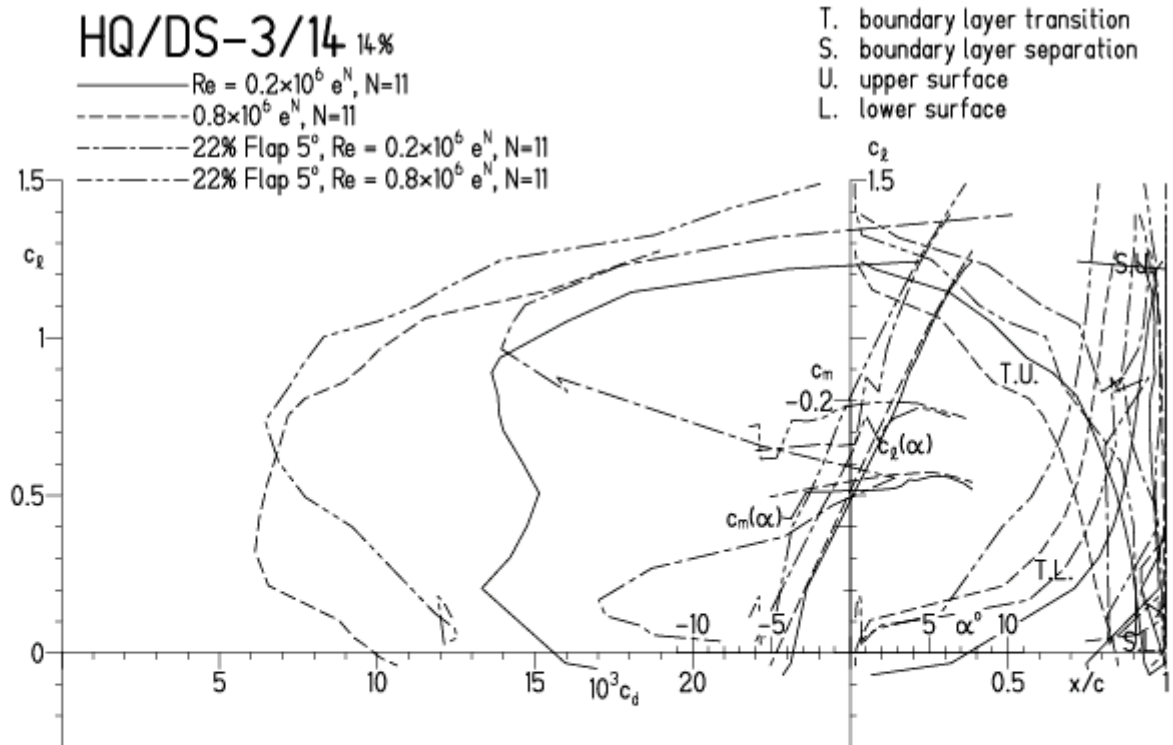


HQ/DS-3/14, N=11, mit 5° Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 26.2.14 12:06

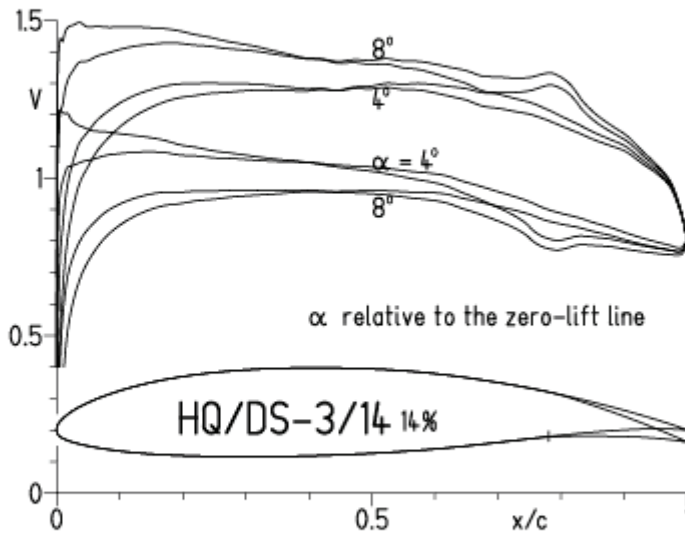


EPPLER 2005 V.

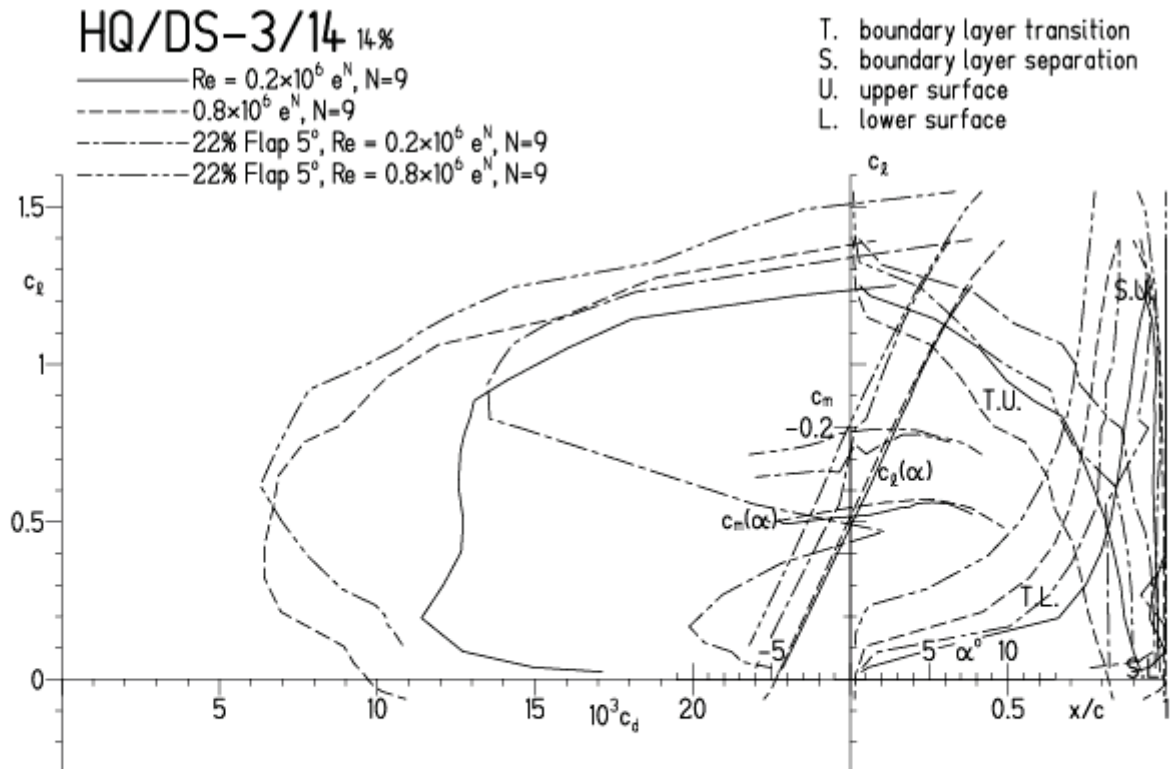


HQ/DS-3/14, N=9, mit 5° Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 26.2.14 12:10

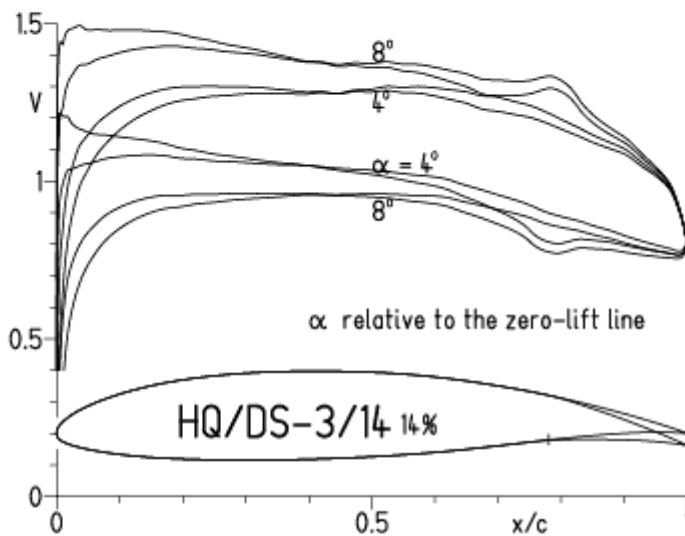


EPPLER 2005 V. 8.5.07 RUN 26.2.14 12:10



**HQ/DS-3/14, N=9, mit 5° Wölbklappenausschlag, Turbulatoreffekt**  
 (optimale Turbulatorposition bei 45 – 55 % Profiltiefe, für niedrige Re-Zahlen)

EPPLER 2005 V. 8.5.07 RUN 26.2.14 12:12

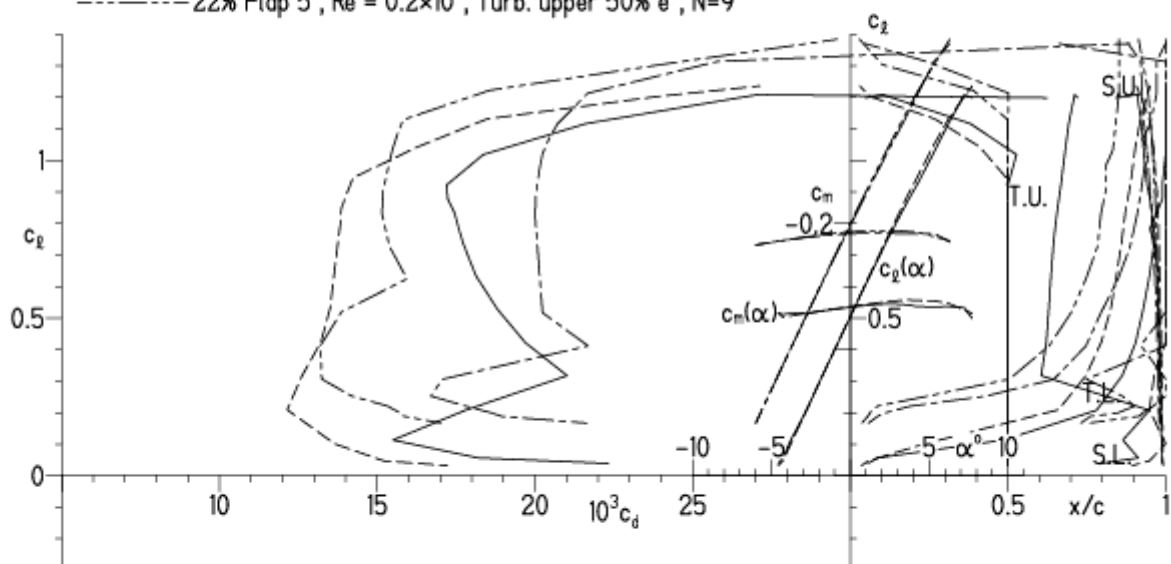


EPPLER 2005 V. 8.5.07 RUN 26.2.14 12:

**HQ/DS-3/14 14%**

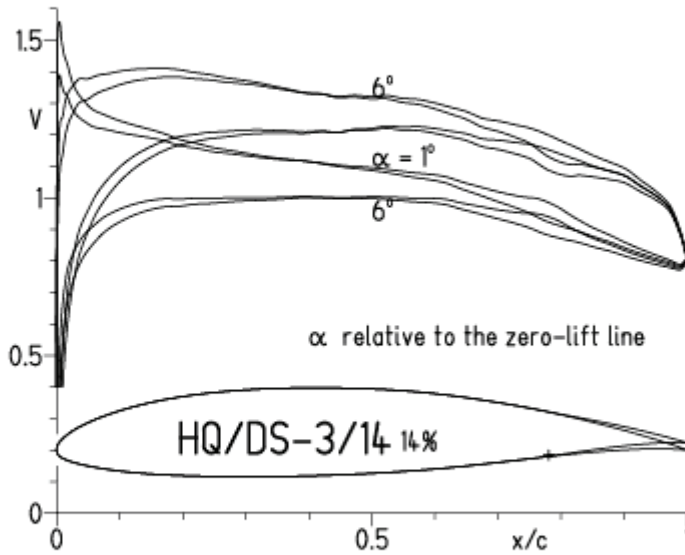
- $Re = 0.1 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$
- - -  $0.2 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$
- · -  $22\%$  Flap  $5^\circ$ ,  $Re = 0.1 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$
- · -  $22\%$  Flap  $5^\circ$ ,  $Re = 0.2 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$

- T. boundary layer transition
- S. boundary layer separation
- U. upper surface
- L. lower surface

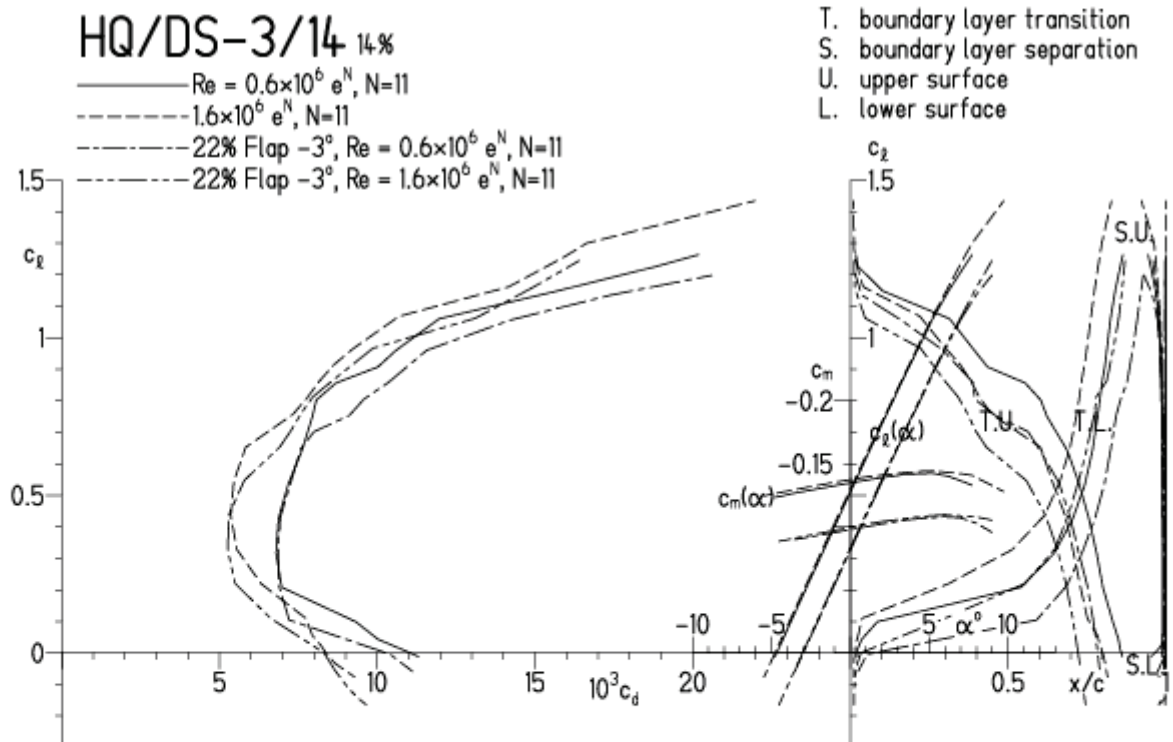


HQ/DS-3/14, N=11, mit  $-3^\circ$  Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 26.2.14 12:16

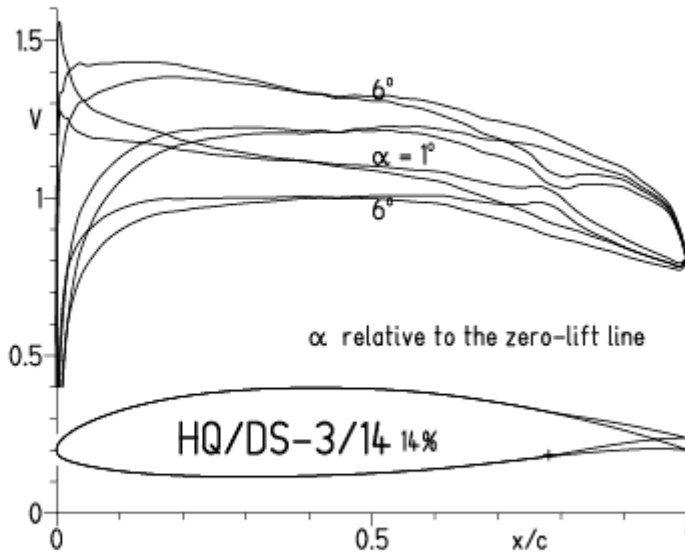


EPPLER 2005 V. 8.5.07 RUN 26.2.14 12:16

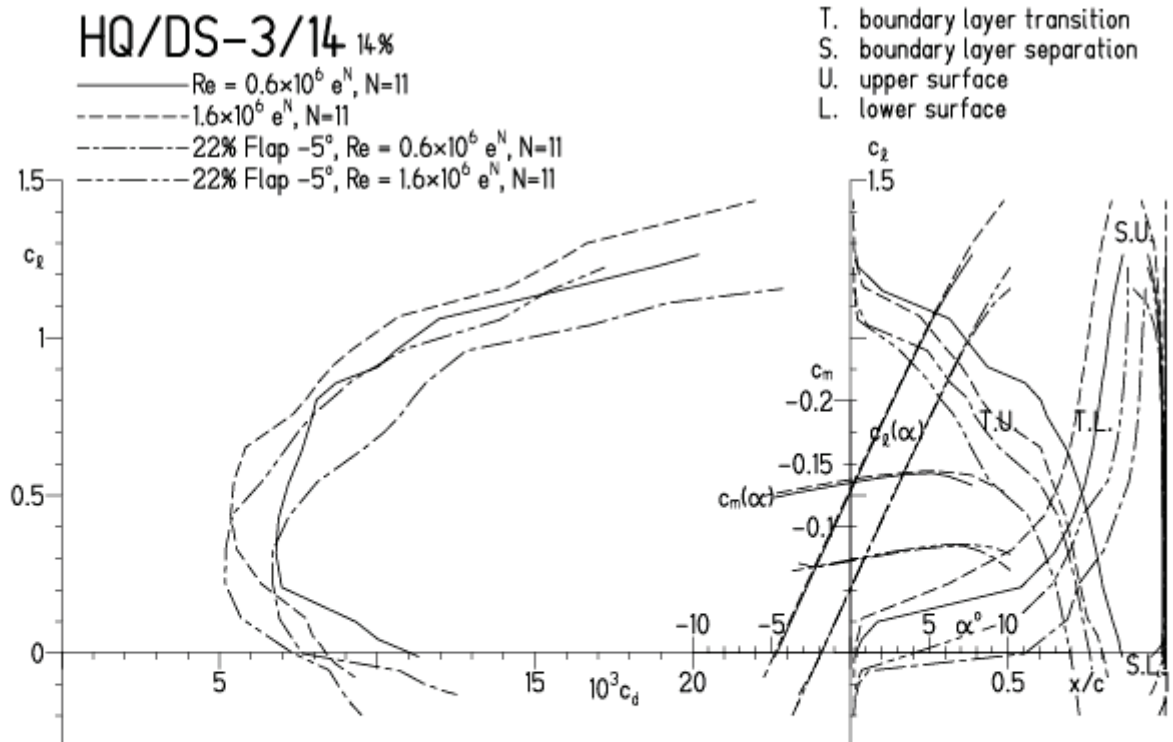


HQ/DS-3/14, N=11, mit  $-5^\circ$  Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 26.2.14 12:18

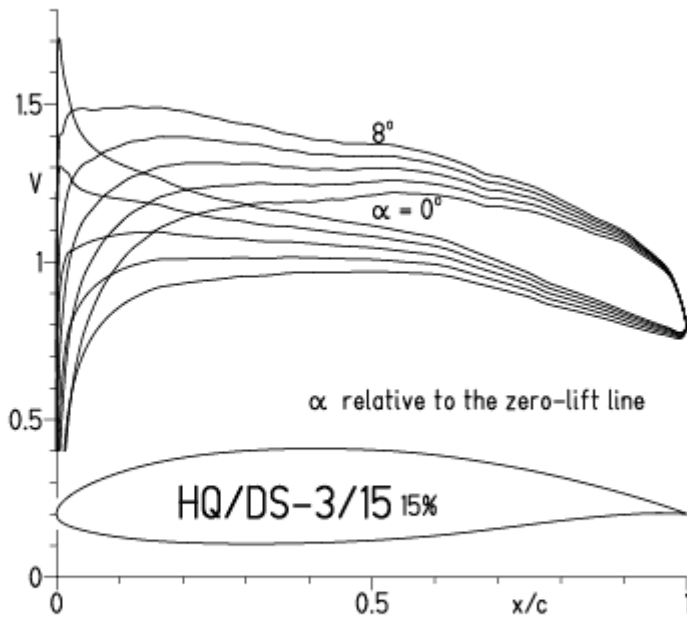


EPPLER 2005 V. 8.5.07 RUN 26.2.14 12:18

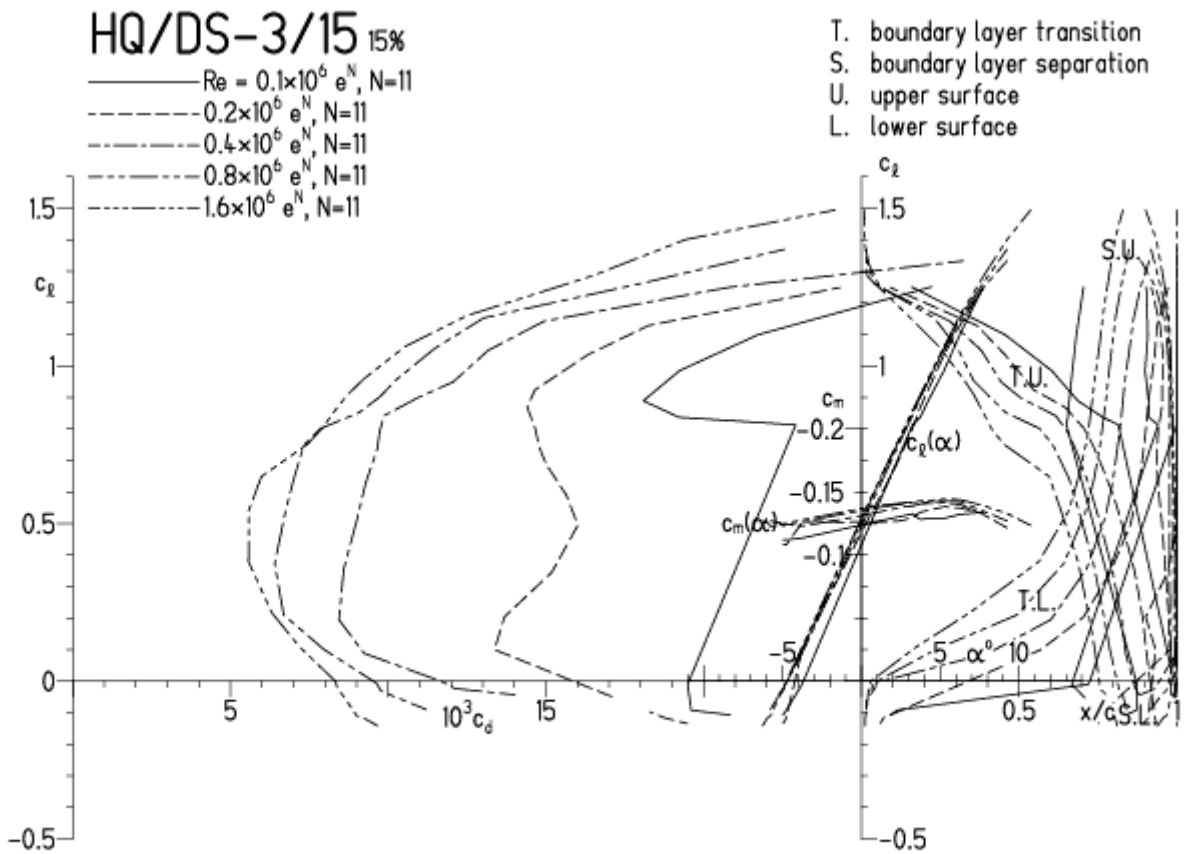


HQ/DS-3/15, N=11

EPPLER 2005 V. 8.5.07 RUN 18.4.12 10:20



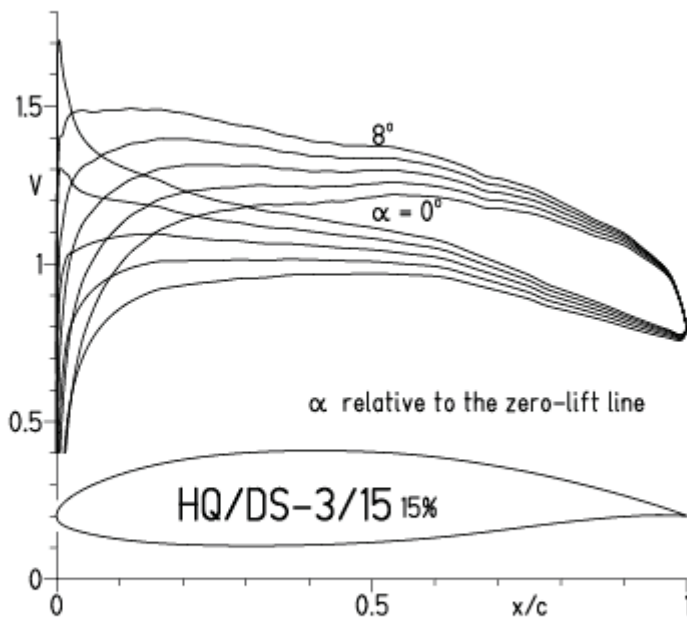
EPPLER 2005 V. 8.5.07 RUN 18.4.12 10:20



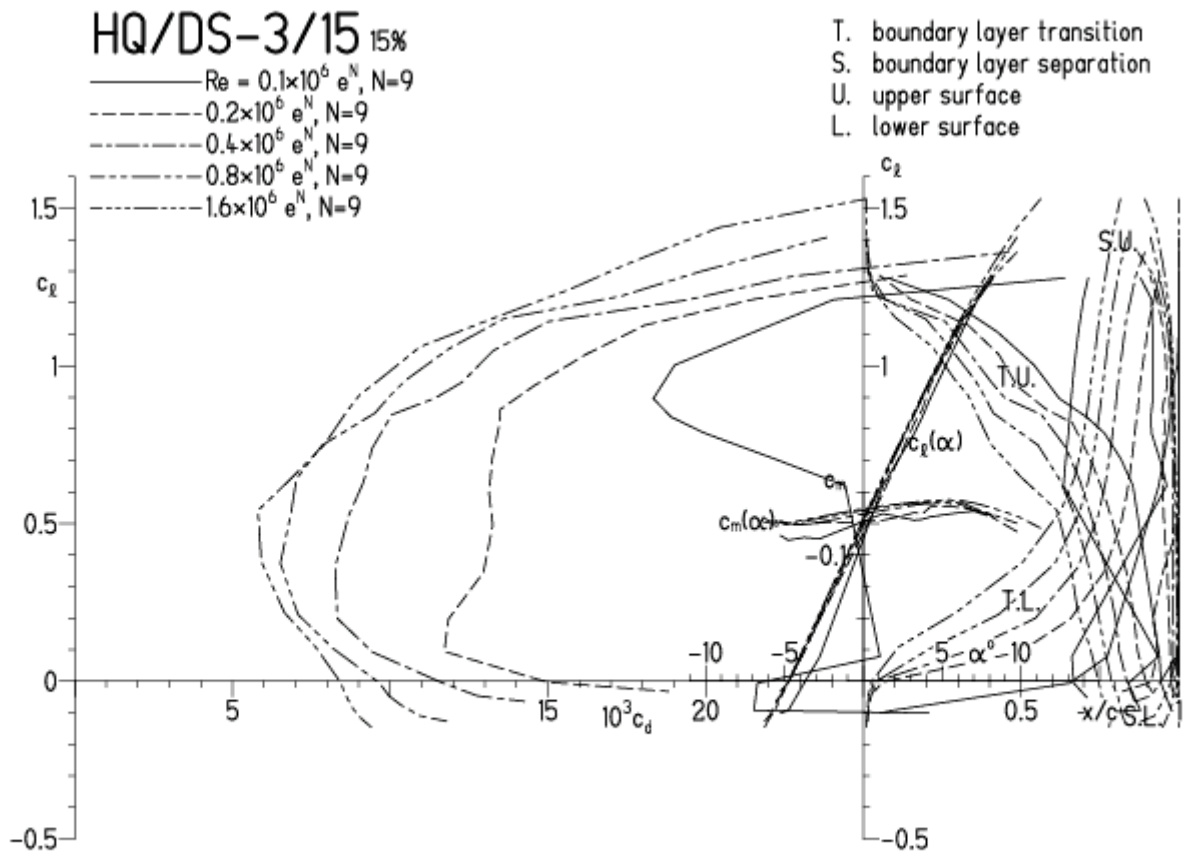


HQ/DS-3/15, N=9

EPPLER 2005 V. 8.5.07 RUN 18.4.12 10:41

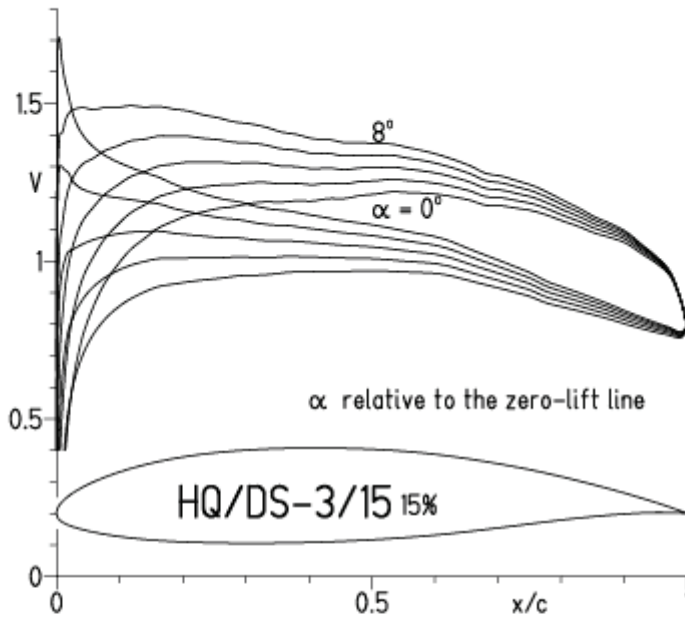


EPPLER 2005 V. 8.5.07 RUN 18.4.12 10:41



HQ/DS-3/15, N=9, Turbulatoreffekt, Turbulatoreffekt bei niedrigen Re-Zahlen  
 (optimale Turbulatorposition bei 45 – 55 % Profiltiefe)

EPPLER 2005 V. 8.5.07 RUN 18.4.12 10:48

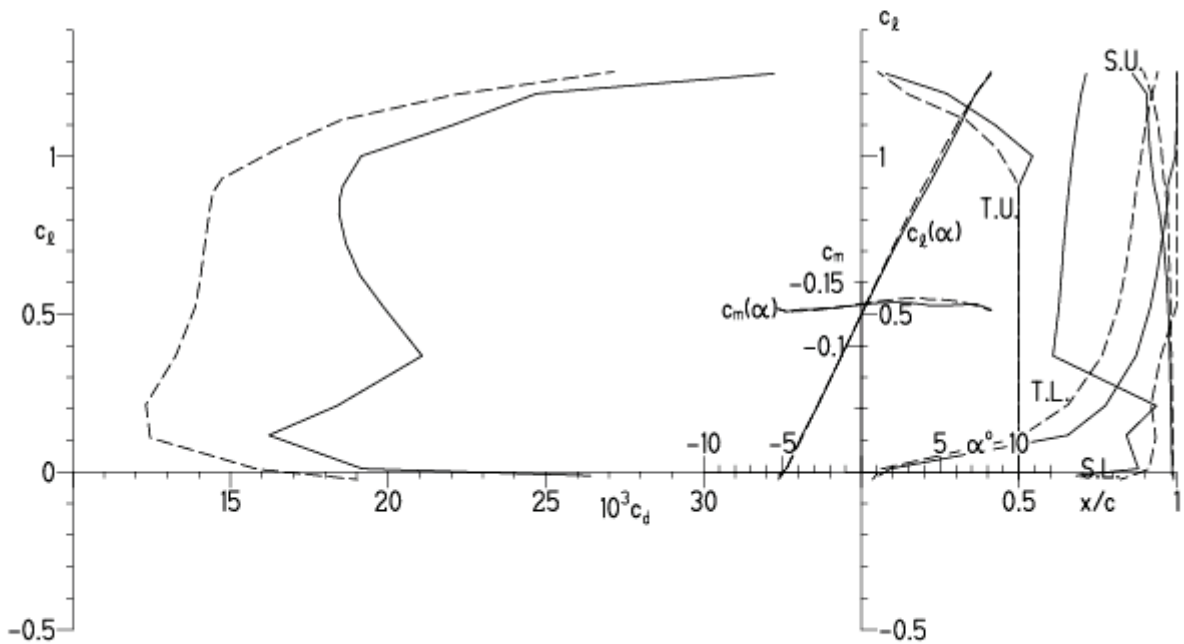


EPPLER 2005 V. 8.5.07 RUN 18.4.12 10:48

HQ/DS-3/15 15%

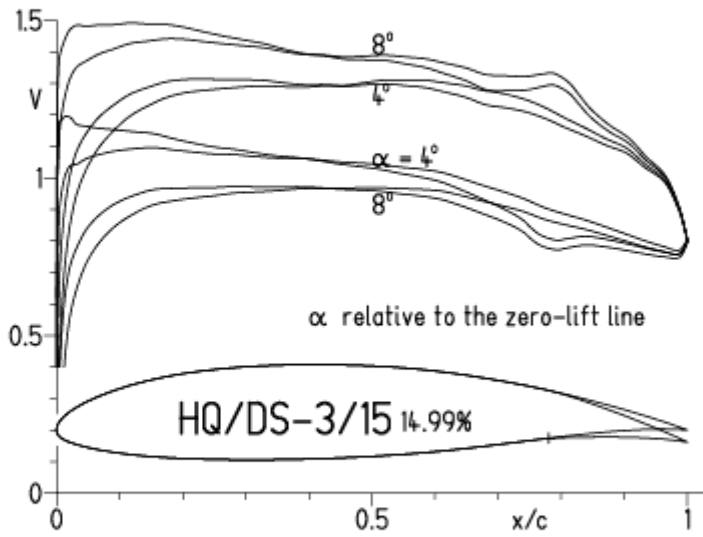
—  $Re = 0.1 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$   
 - - -  $0.2 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$

T. boundary layer transition  
 S. boundary layer separation  
 U. upper surface  
 L. lower surface

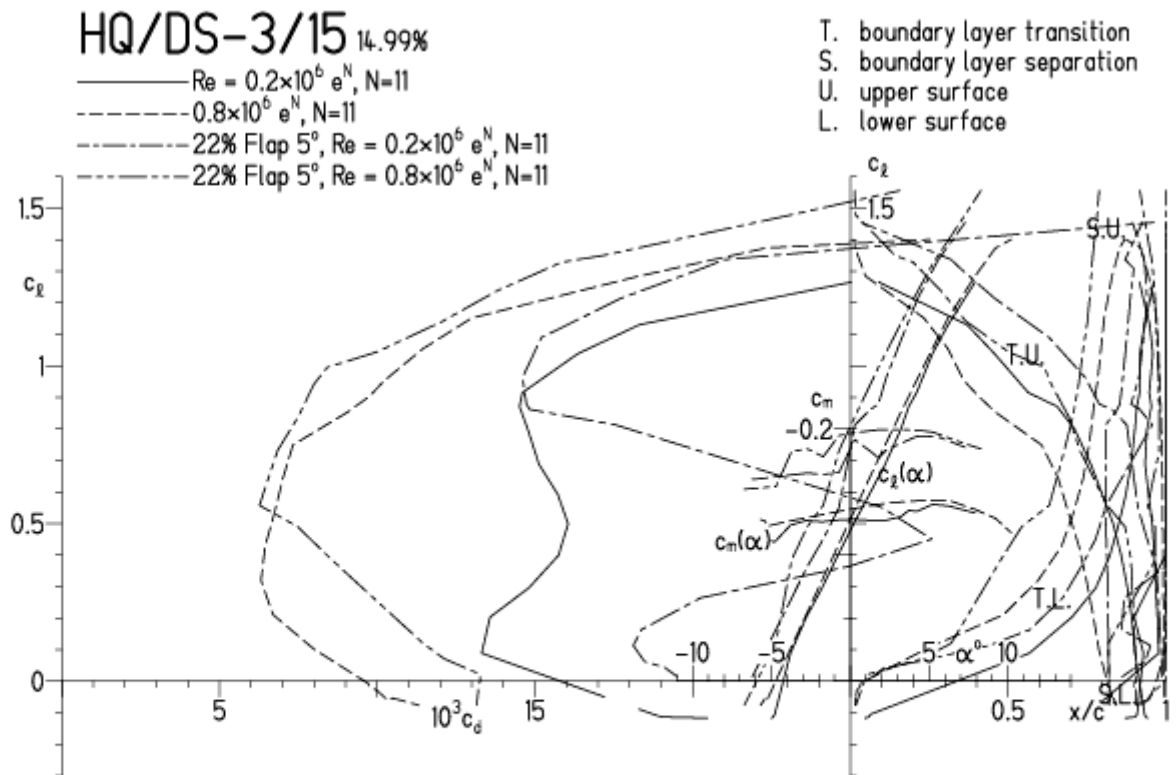


HQ/DS-3/15, N=11, mit 5° Wöbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 18.4.12 12:20

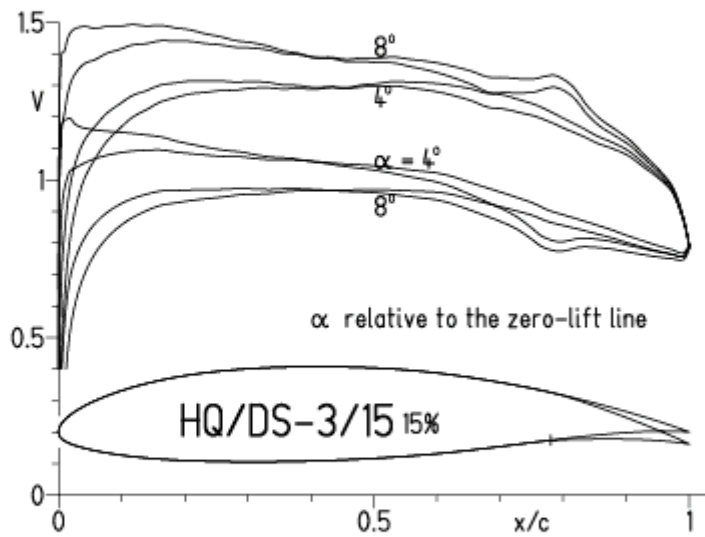


EPPLER 2005 V. 8.5.07 RUN 18.4.12 12:20

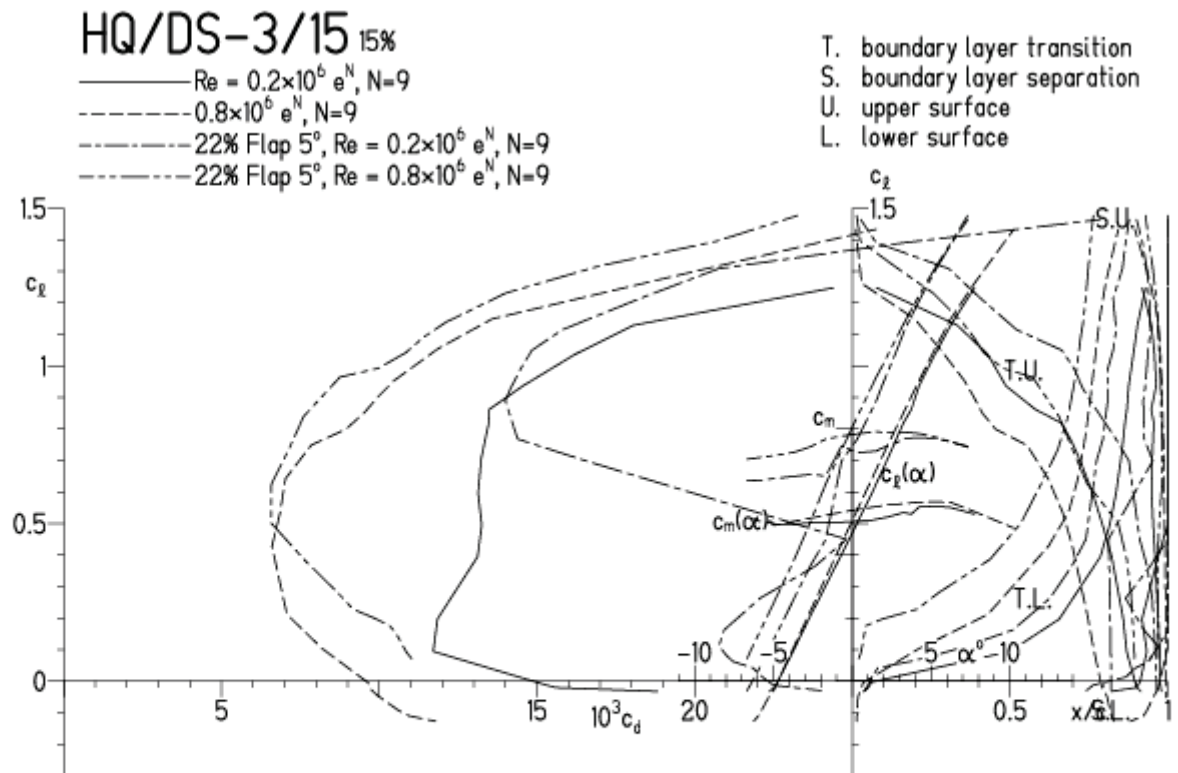


HQ/DS-3/15, N=9, mit 5° Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 18.4.12 11:37

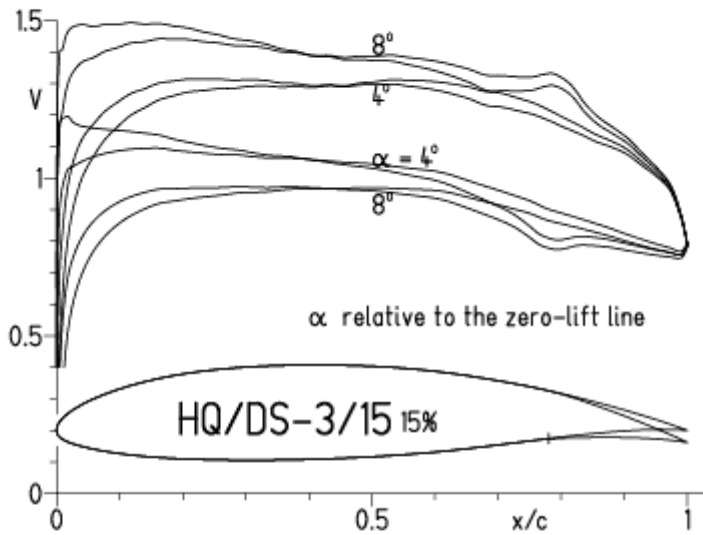


EPPLER 2005 V. 8.5.07 RUN 18.4.12 11:37

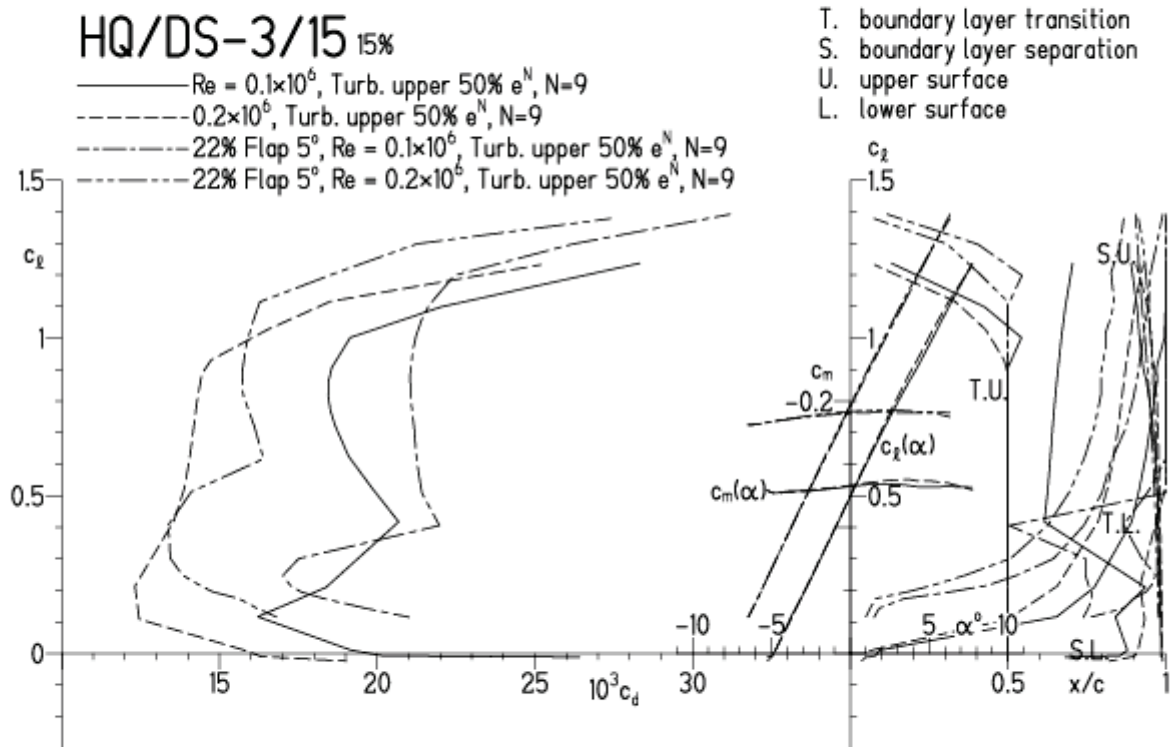


**HQ/DS-3/15, N=9, mit 5° Wölbklappenausschlag, Turbulatoreffekt**  
 (optimale Turbulatorposition bei 45 – 55 % Profiltiefe, für niedrige Re-Zahlen)

EPPLER 2005 V. 8.5.07 RUN 18.4.12 11:24

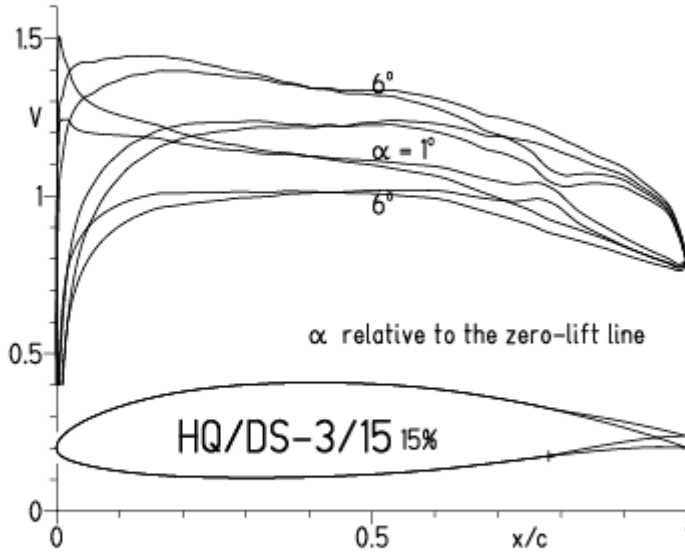


EPPLER 2005 V. 8.5.07

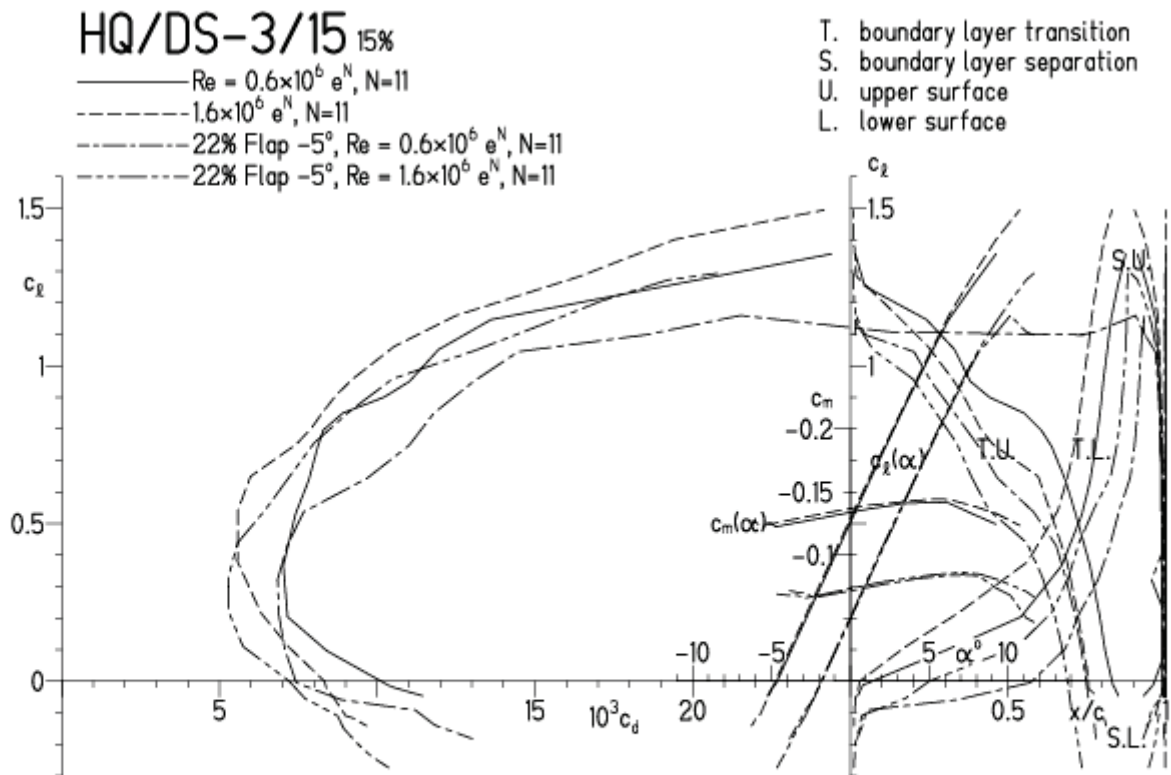


HQ/DS-3/15, N=11, mit  $-5^\circ$  Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 18.4.12 12:34

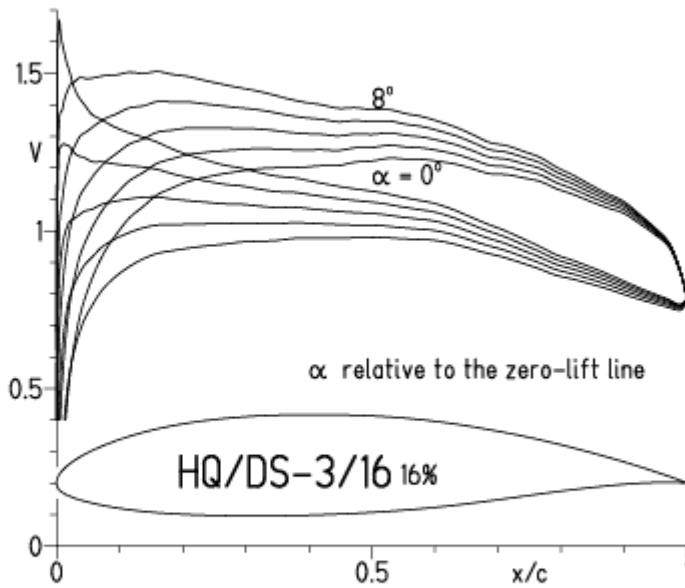


EPPLER 2005 V. 8.5.07 RUN 18.4.12 12:34

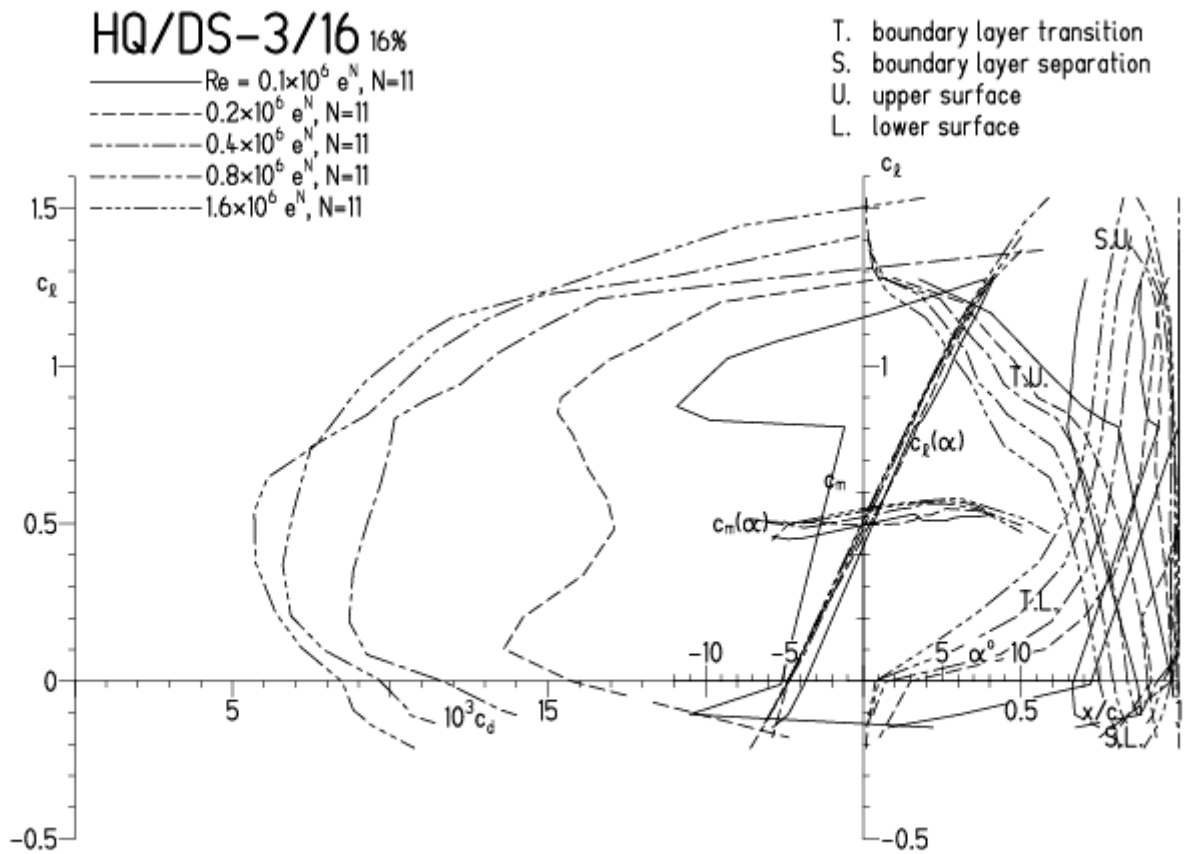


HQ/DS-3/16, N=11

EPPLER 2005 V. 8.5.07 RUN 18.4.12 13:03

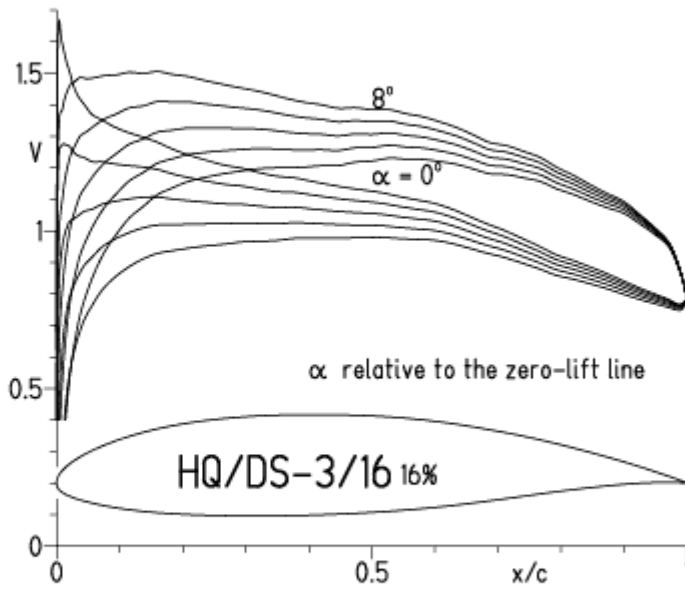


EPPLER 2005 V. 8.5.07 RUN 18.4.12 13:03

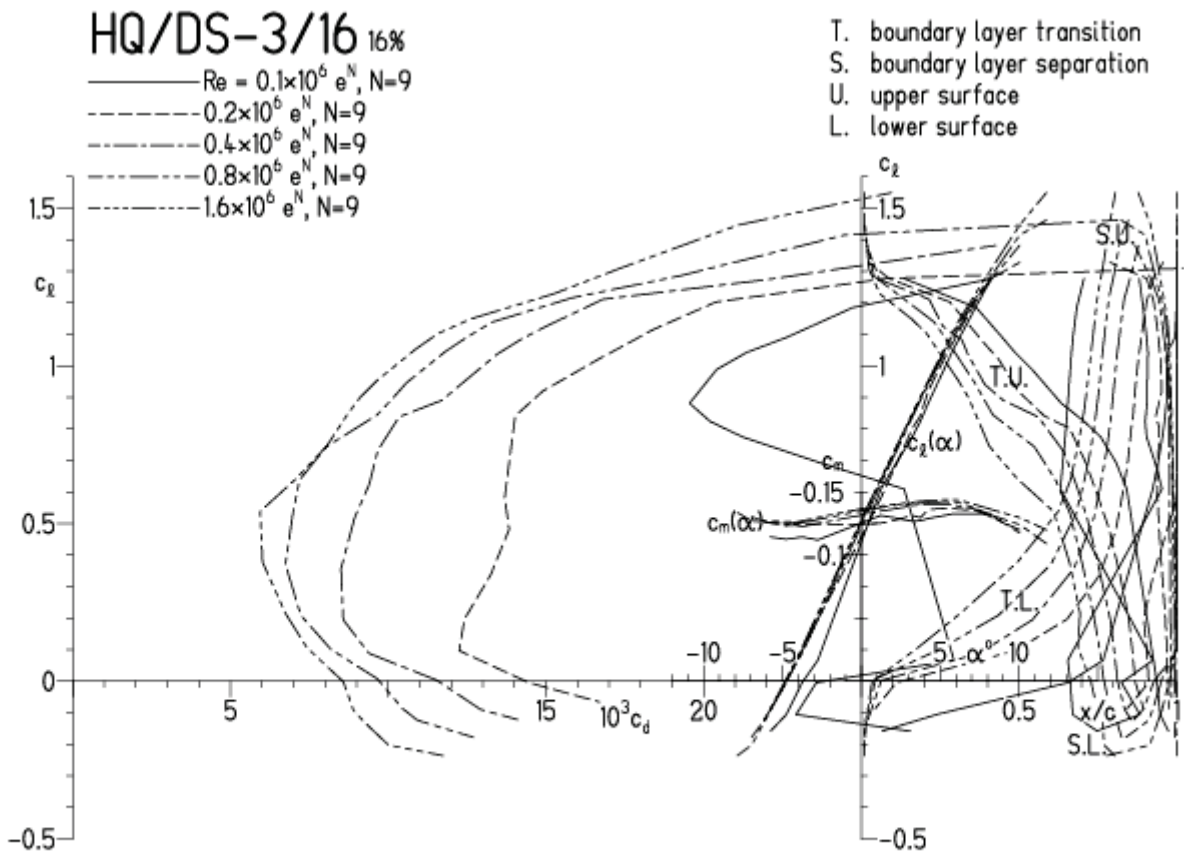


HQ/DS-3/16, N=9

EPPLER 2005 V. 8.5.07 RUN 18.4.12 13:11



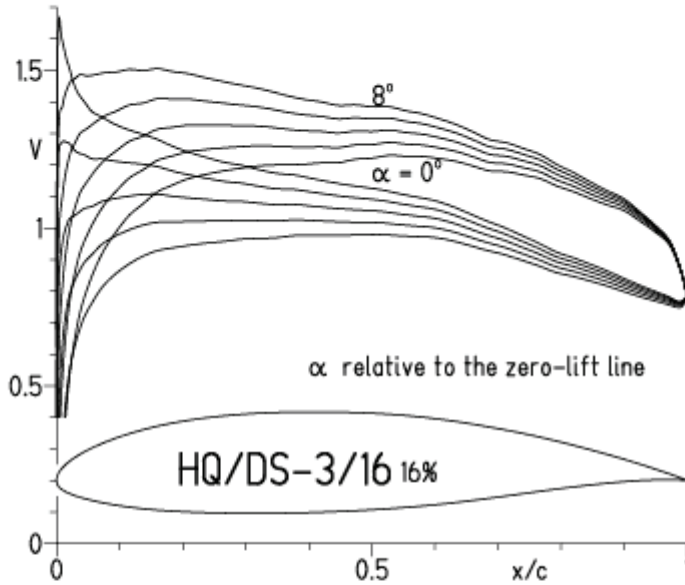
EPPLER 2005 V. 8.5.07 RUN 18.4.12 13:11





HQ/DS-3/16, N=9, Turbulatoreffekt, Turbulatoreffekt bei niedrigen Re-Zahlen  
 (optimale Turbulatorposition bei 45 – 55 % Profiltiefe)

EPPLER 2005 V. 8.5.07 RUN 18.4.12 13:18

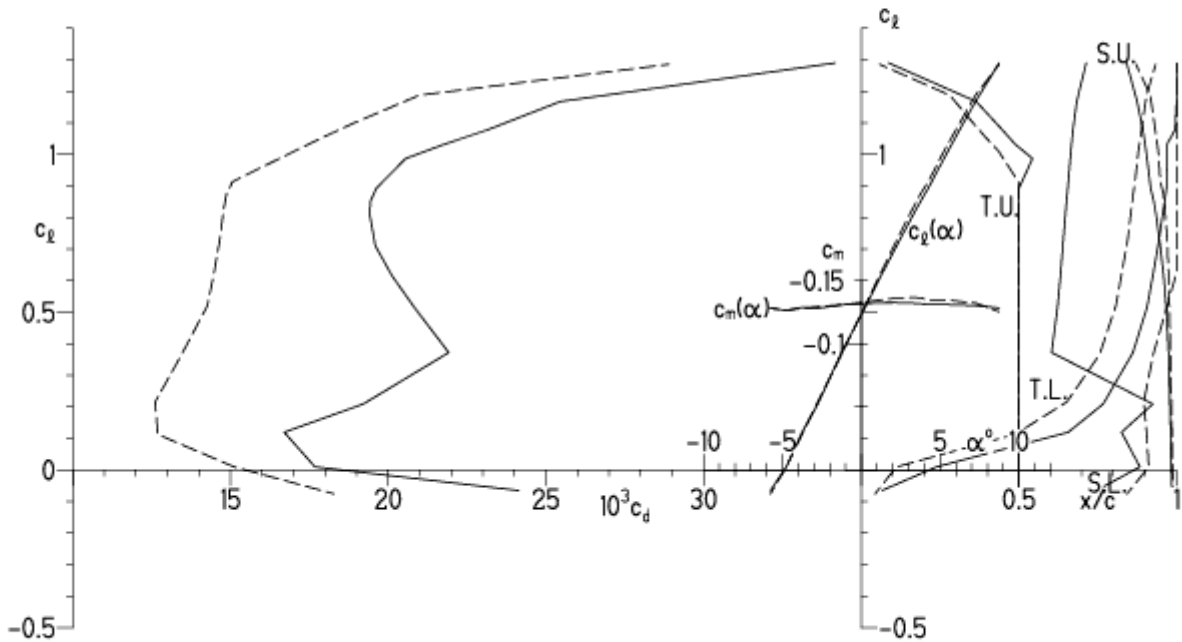


EPPLER 2005 V. 8.5.07 RUN 18.4.12 13:18

HQ/DS-3/16 16%

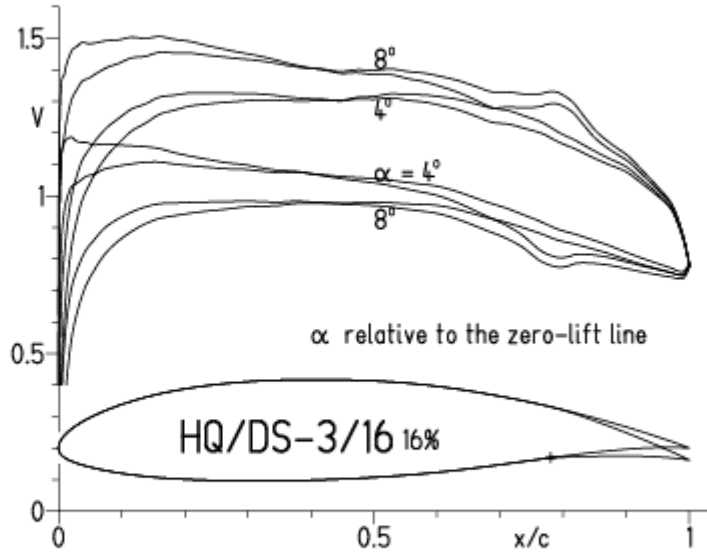
—  $Re = 0.1 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$   
 - - -  $0.2 \times 10^6$ , Turb. upper 50%  $e^N$ ,  $N=9$

T. boundary layer transition  
 S. boundary layer separation  
 U. upper surface  
 L. lower surface

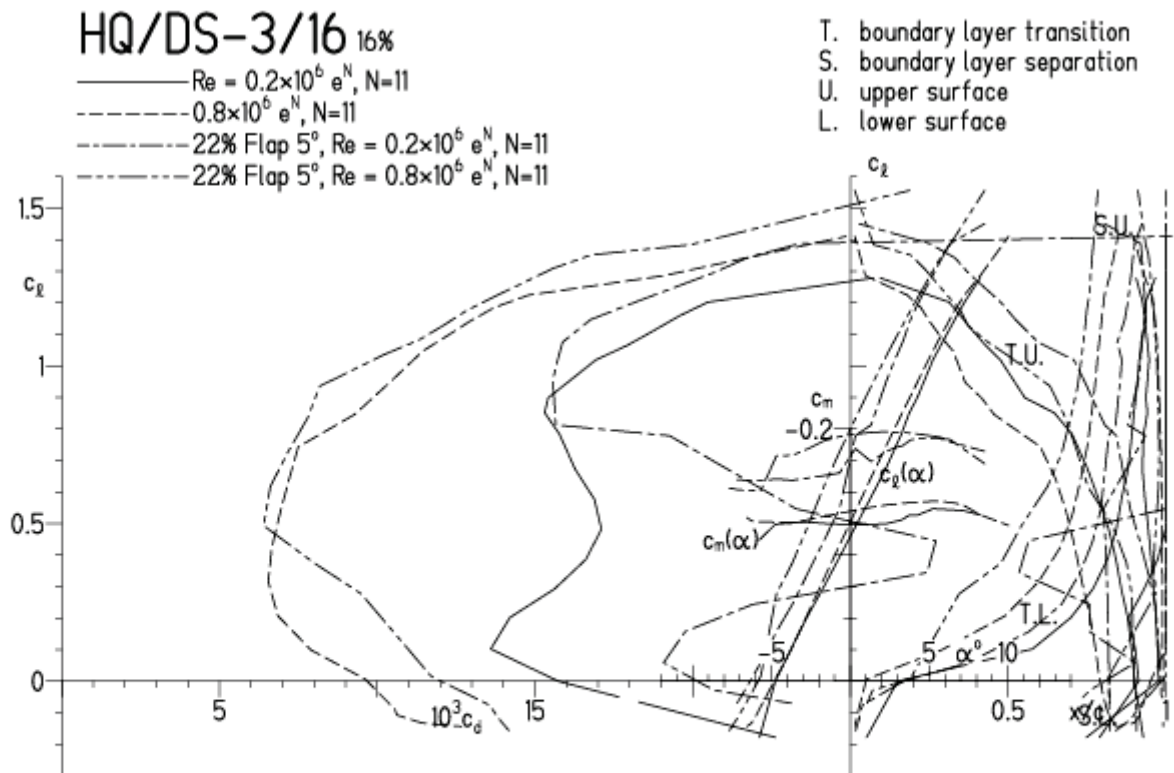


# HQ/DS-3/16, N=11, mit 5° Wöbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 18.4.12 15:28

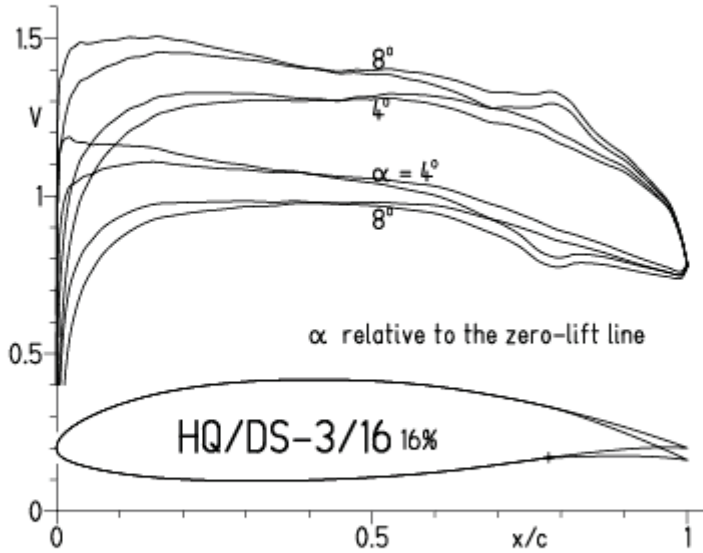


EPPLER 2005 V. 8.5.07 RUN 18.4.12 1

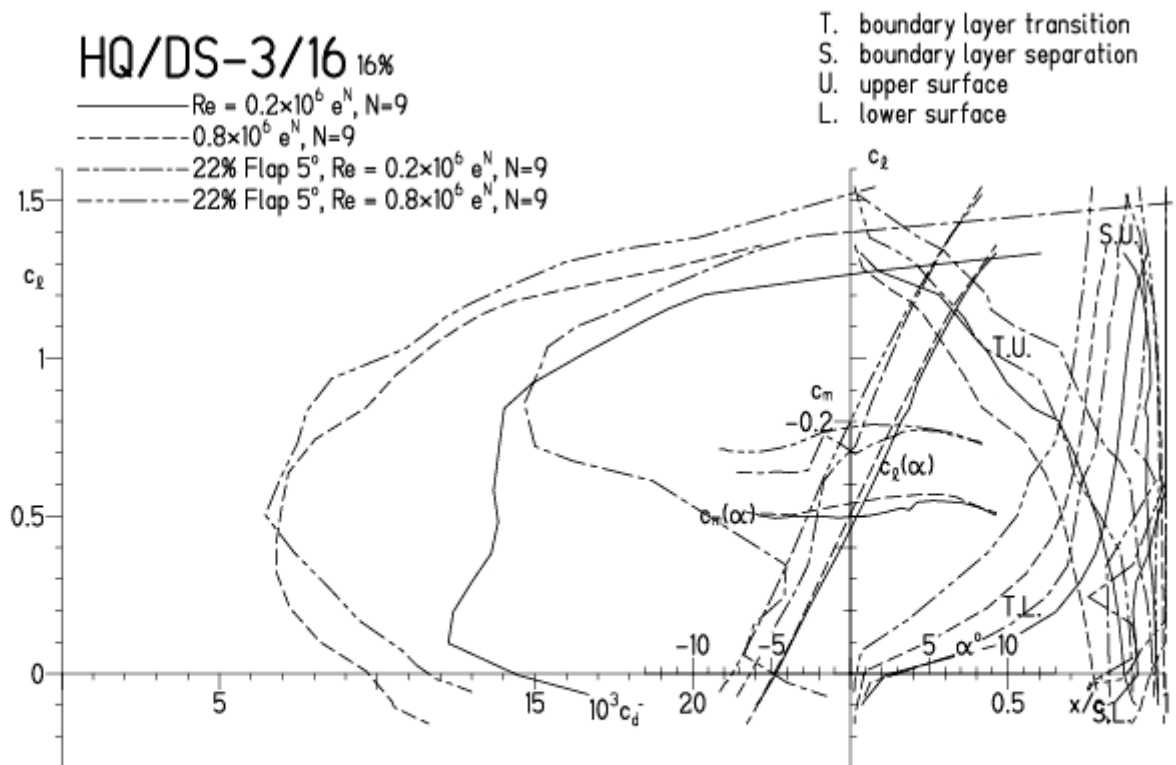


HQ/DS-3/16, N=9, mit 5° Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 18.4.12 15:39

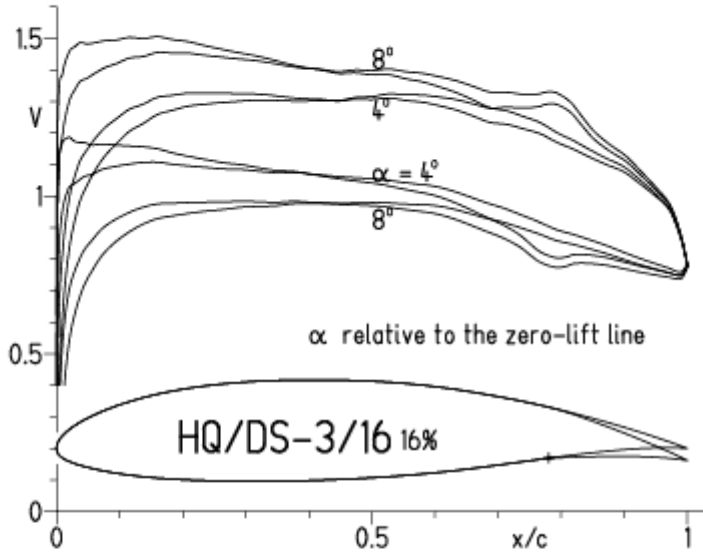


EPPLER 2005 V. 8.5.07 RUN 18.4.12 15:39

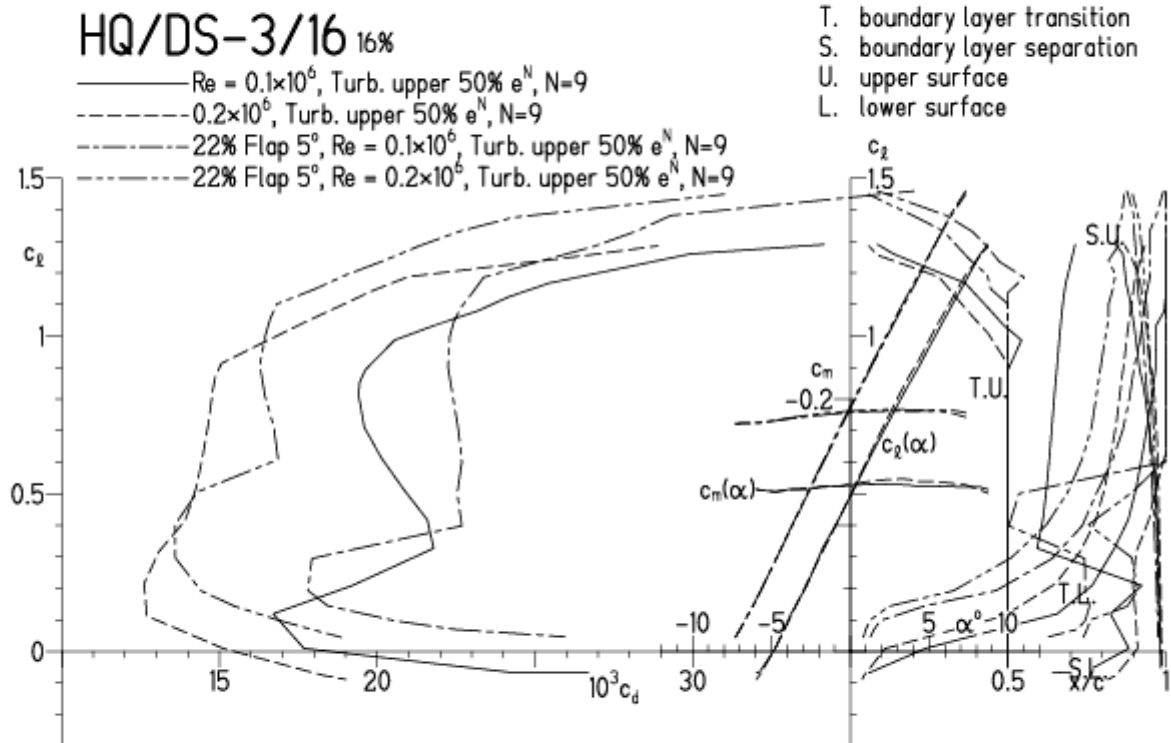


**HQ/DS-3/16, N=9, mit 5° Wölbklappenausschlag, Turbulatoreffekt**  
 (optimale Turbulatorposition bei 45 – 55 % Profiltiefe, für niedrige Re-Zahlen)

EPPLER 2005 V. 8.5.07 RUN 18.4.12 15:48

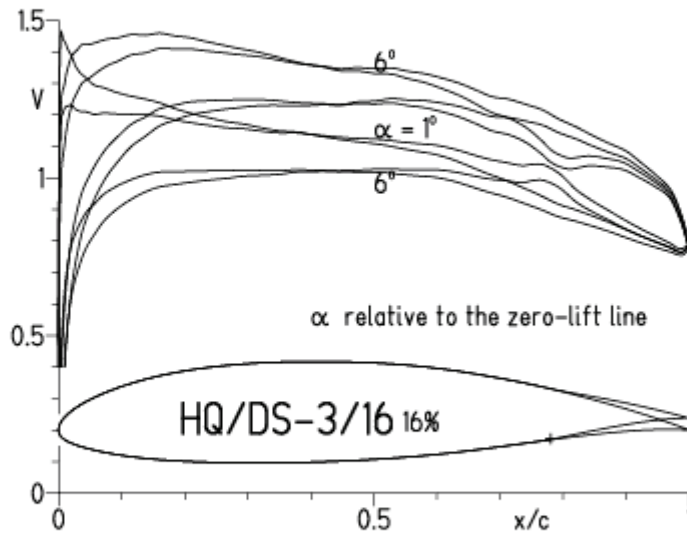


EPPLER 2005 V. 8.5.07 RUN 18.4.12 15:48

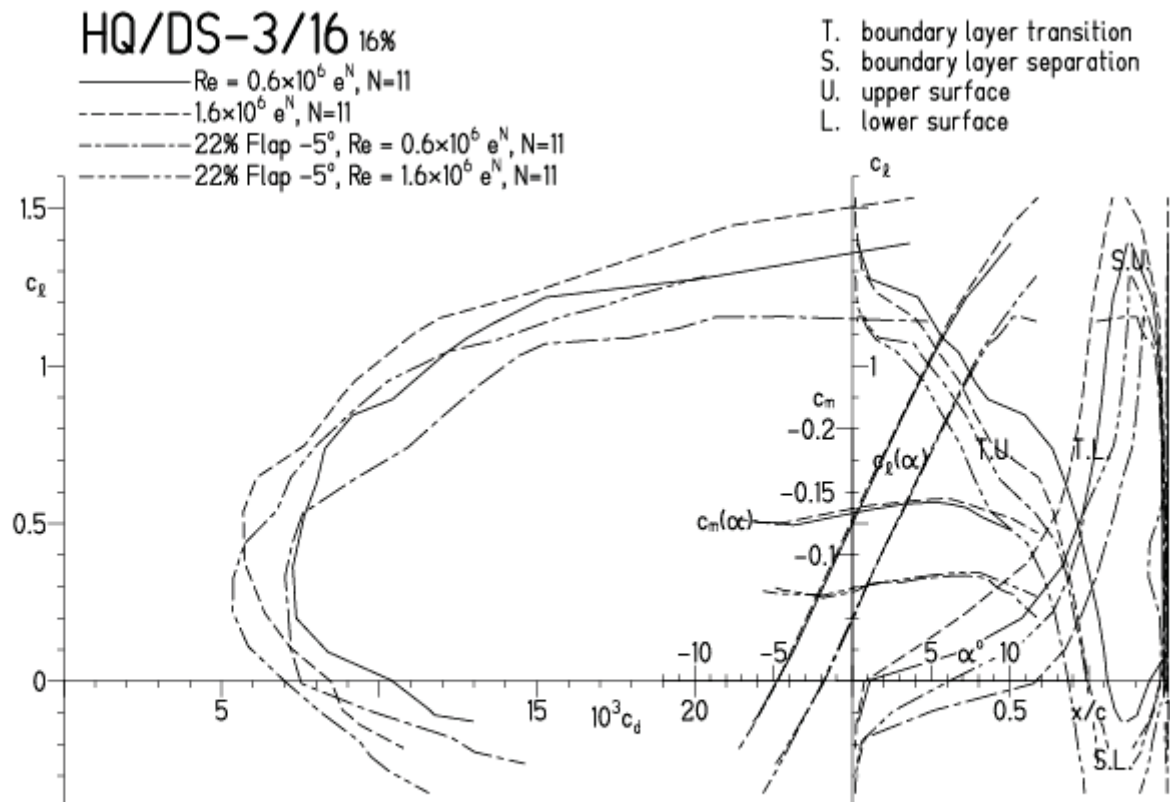


HQ/DS-3/16, N=11, mit  $-5^\circ$  Wölbklappenausschlag

EPPLER 2005 V. 8.5.07 RUN 18.4.12 16:04

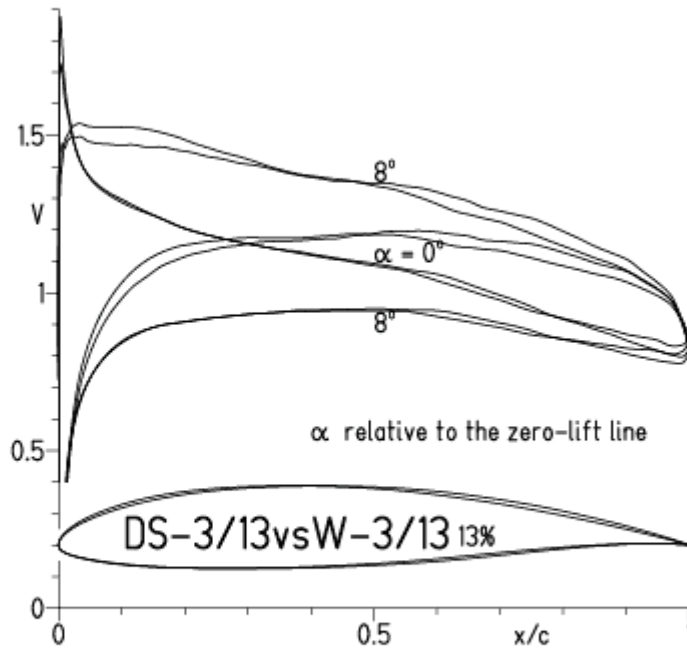


EPPLER 2005 V. 8.5.07 RUN 18.4.12 1



# HQ/DS-3/13 vs. HQ/W-3/13, N=11, mittlerer Geschwindigkeitsbereich

EPPLER 2005 V. 8.5.07 RUN 18.4.12 16:36

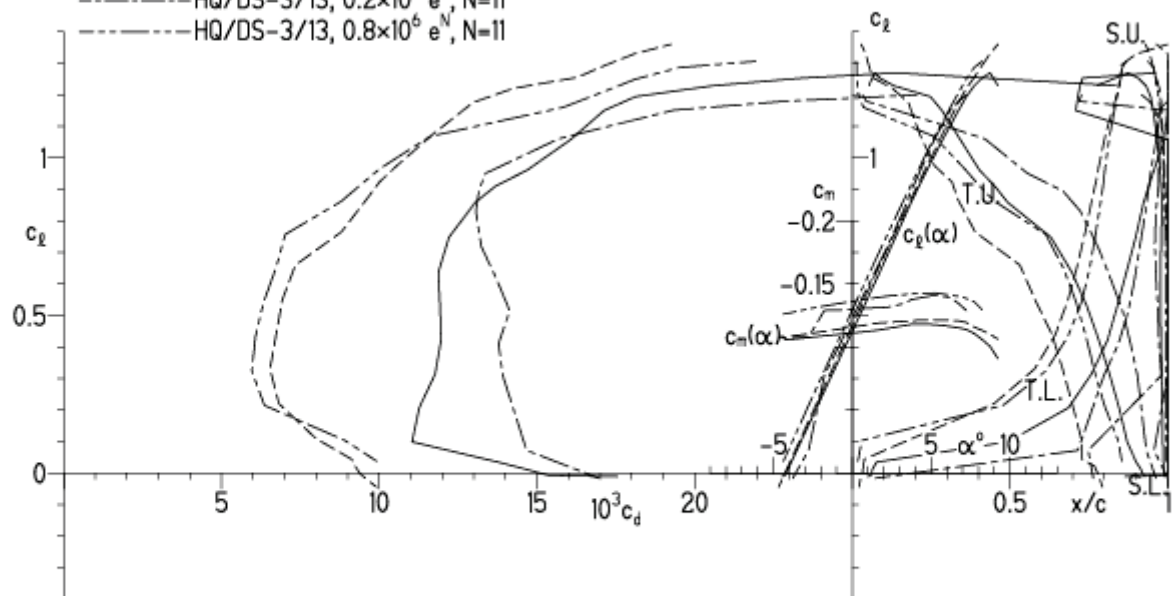


EPPLER 2005 V. 8.5.07 RUN 18.4.12 16:36

## HQ/DS-W-Vergleich 13%, 13%

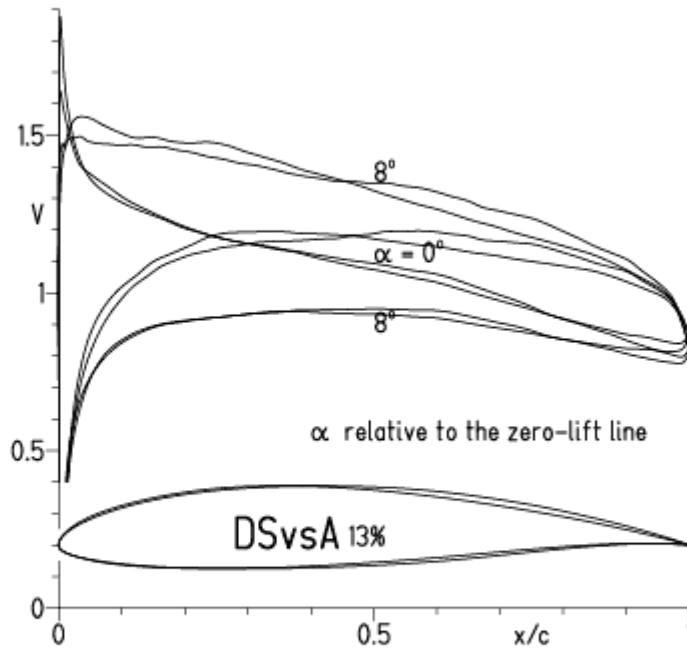
- HQ/W-3/13,  $Re = 0.2 \times 10^6$ ,  $e^N$ ,  $N=11$
- - HQ/W-3/13,  $0.8 \times 10^6$ ,  $e^N$ ,  $N=11$
- · - HQ/DS-3/13,  $0.2 \times 10^6$ ,  $e^N$ ,  $N=11$
- · - HQ/DS-3/13,  $0.8 \times 10^6$ ,  $e^N$ ,  $N=11$

- T. boundary layer transition
- S. boundary layer separation
- U. upper surface
- L. lower surface

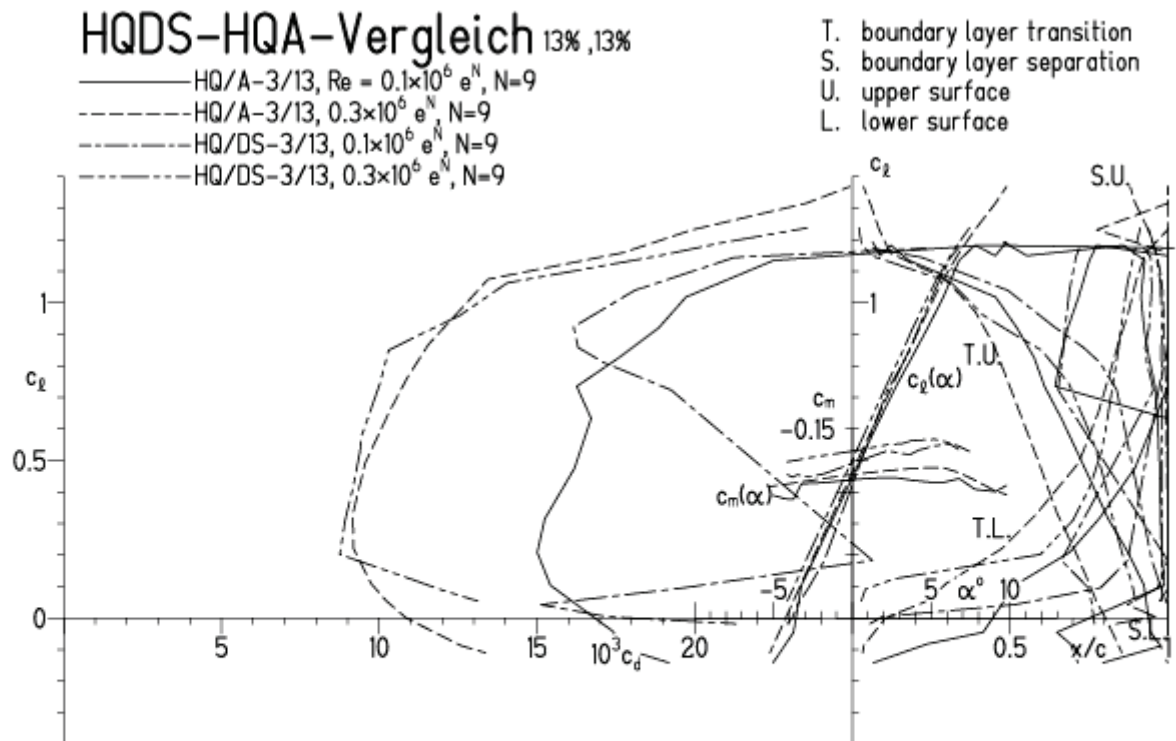


# HQ/DS-3/13 vs. HQ/ACRO-3/13, N=9, niedriger Geschwindigkeitsbereich

EPPLER 2005 V. 8.5.07 RUN 18.4.12 16:24

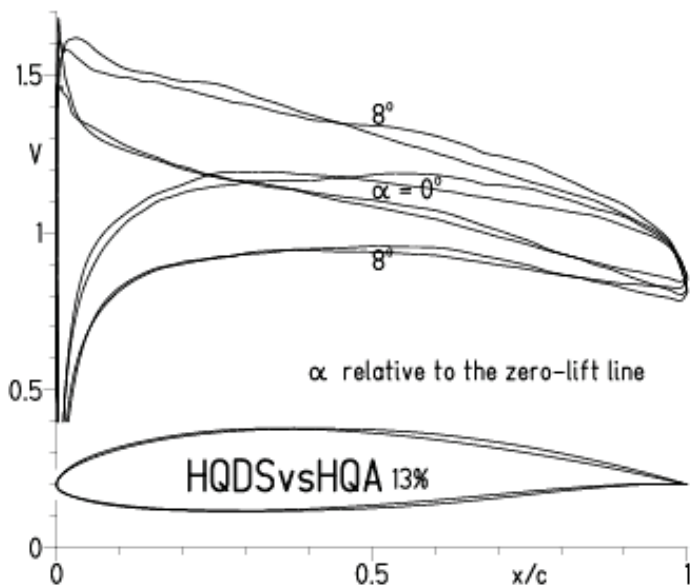


EPPLER 2005 V. 8.5.07 RUN 18.4.12 16:24



HQ/DS-2,5/13 vs. HQ/ACRO-2,5/13, N=9, Turbulatoreffekt bei niedrigen Re-Zahlen  
 (Optimale T-Position beim höchsten Wölbungspunkt)

EPPLER 2005 V. 8.5.07 RUN 15.6.11 16:28



EPPLER 2005 V. 8.5.07 RUN 15.6.11 16:28

