Impact Factor:						
	ISRA (India)	= 6.317	SIS (USA)	= 0.912	ICV (Poland)	= 6.630
	ISI (Dubai, UAE)	= 1.582	РИНЦ (Russia)	= 3.939	PIF (India)	= 1.940
	GIF (Australia)	= 0.564	ESJI (KZ)	= 9.035	IBI (India)	= 4.260
	JIF	= 1.500	SJIF (Morocco)	= 7.184	OAJI (USA)	= 0.350

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REFERENCE DATA OF PRESSURE DISTRIBUTION ON THE SURFACES OF AIRFOILS (HYDROFOILS) HAVING THE NAMES BEGINNING WITH THE LETTER E (THE SECOND PART)

Abstract: *The results of the computer calculation of air (water) flow around the airfoils (hydrofoils) having the names beginning with the letter E (continuation) are presented in the article. The contours of pressure distribution on the surfaces of the airfoils (hydrofoils) at the angles of attack of 0, 15 and -15 degrees in conditions of the subsonic airplane flight speed were obtained.*

Key words: *the airfoil, hydrofoil, the angle of attack, pressure, the surface.*
Language: *English*
Citation: Chemezov, D., et al. (2022). Reference data of pressure distribution on the surfaces of airfoils (hydrofoils) having the names beginning with the letter E (the second part). *ISJ Theoretical & Applied Science, 01 (105)*, 601-671.
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Scopus ASCC: *1507.*

Introduction

Creating reference materials that determine the most accurate pressure distribution on the airfoils (hydrofoils) surfaces is an actual task of the airplane aerodynamics.

Materials and methods

The study of air (water) flow around the airfoils (hydrofoils) was carried out in a two-dimensional formulation by means of the computer calculation in the *Comsol Multiphysics* program. The airfoils (hydrofoils) in the cross section were taken as objects of research [1-16]. In this work, the airfoils (hydrofoils) having the names beginning with the letter *E* were adopted. Air (water) flow around the airfoils (hydrofoils) was carried out at the angles of attack (α) of 0, 15 and -15 degrees. The flight speed of the airplane in each case was subsonic. The airplane flight in the atmosphere was carried out under normal weather conditions. The geometric characteristics of the studied airfoils (hydrofoils) are presented in the Table 1. The geometric shapes of the airfoils (hydrofoils) in the cross section are presented in the Table 2.

Table 1. The geometric characteristics of the airfoils (hydrofoils).

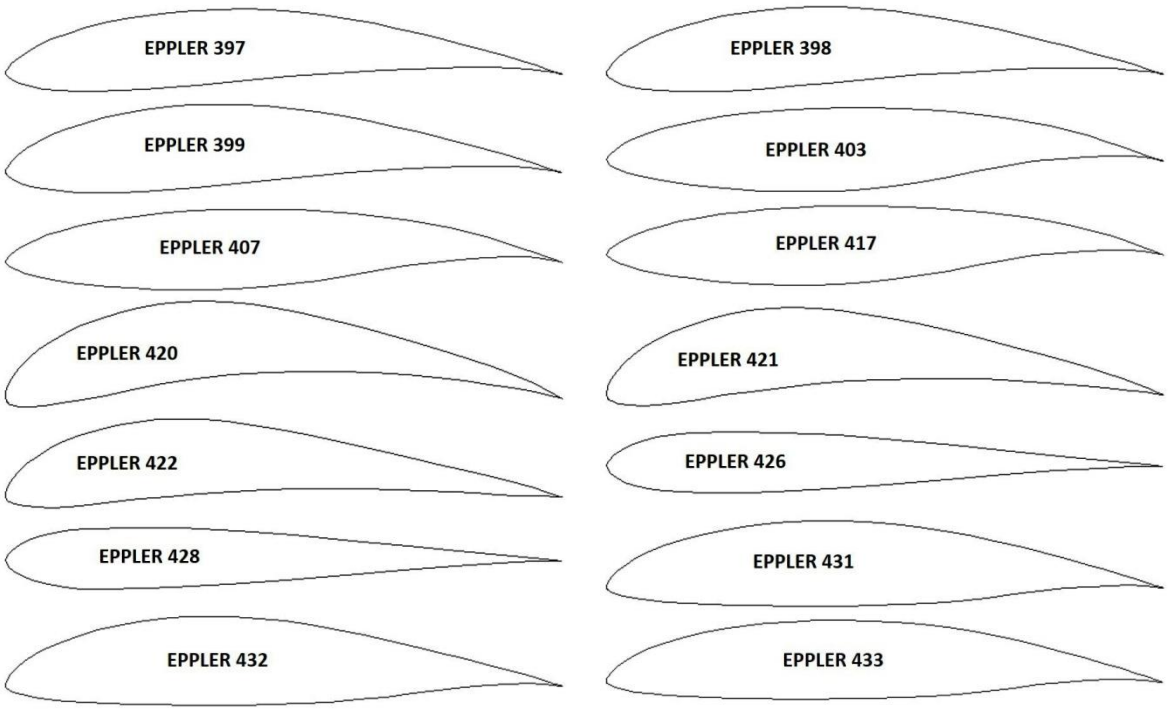
Airfoil (hydrofoil) name	Max. thickness	Max. camber	Leading edge radius	Trailing edge thickness
EPPLER 397	13.51% at 29.6% of the chord	5.3% at 50.9% of the chord	0.7085%	0.0%
EPPLER 398	14.16% at 29.6% of the chord	5.29% at 50.9% of the chord	0.8976%	0.0%
EPPLER 399	14.83% at 29.5% of the chord	5.14% at 50.6% of the chord	0.7714%	0.0%
EPPLER 403	14.95% at 37.0% of the chord	3.31% at 71.7% of the chord	0.9005%	0.0%
EPPLER 407	14.41% at 36.6% of the chord	3.5% at 71.7% of the chord	0.5013%	0.0%
EPPLER 417	14.17% at 37.0% of the chord	3.18% at 76.7% of the chord	0.7976%	0.0%
EPPLER 420	14.29% at 22.8% of the chord	10.71% at 40.5% of the chord	3.3862%	0.0%
EPPLER 421	14.51% at 26.0% of the chord	8.71% at 37.4% of the chord	2.675%	0.0%
EPPLER 422	13.99% at 24.1% of the chord	7.15% at 34.8% of the chord	2.5958%	0.0%
EPPLER 426	10.78% at 25.5% of the chord	0.71% at 40.1% of the chord	0.8648%	0.0%
EPPLER 428	11.08% at 17.2% of the chord	0.6% at 50.6% of the chord	1.1005%	0.0%
EPPLER 431	15.12% at 37.4% of the chord	4.22% at 42.6% of the chord	1.1577%	0.0%
EPPLER 432	15.97% at 37.4% of the chord	4.44% at 37.4% of the chord	1.25%	0.0%
EPPLER 433	14.21% at 42.6% of the chord	3.98% at 42.6% of the chord	0.9563%	0.0%
EPPLER 434	13.33% at 38.6% of the chord	4.31% at 38.6% of the chord	0.9904%	0.0%
EPPLER 435	16.19% at 40.9% of the chord	4.37% at 56.2% of the chord	1.2769%	0.0%
EPPLER 472	12.1% at 17.5% of the chord	0.0% at 0.0% of the chord	1.7011%	0.0%
EPPLER 473	16.19% at 21.2% of the chord	0.0% at 0.0% of the chord	1.9857%	0.0%
EPPLER 476	16.73% at 31.7% of the chord	0.0% at 0.0% of the chord	0.5641%	0.0%
EPPLER 477	15.35% at 31.7% of the chord	0.0% at 0.0% of the chord	0.4933%	0.0%
EPPLER 478	15.7% at 25.9% of the chord	0.0% at 0.0% of the chord	0.9298%	0.0%
EPPLER 479	16.57% at 25.7% of the chord	0.0% at 0.0% of the chord	1.9578%	0.0%
EPPLER 485	12.5% at 31.8% of the chord	1.14% at 27.1% of the chord	0.5113%	0.0%
EPPLER 49	7.19% at 39.0% of the chord	7.82% at 44.8% of the chord	0.1648%	0.0%
EPPLER 502	15.65% at 42.1% of the chord	1.52% at 32.3% of the chord	0.3073%	0.0%
EPPLER 520	15.01% at 36.7% of the chord	0.07% at 0.0% of the chord	0.3232%	0.0%
EPPLER 521	13.77% at 37.0% of the chord	0.07% at 0.0% of the chord	0.2668%	0.0%
EPPLER 540	16.87% at 45.5% of the chord	1.61% at 30.9% of the chord	0.5182%	0.0%
EPPLER 541	16.63% at 46.2% of the chord	1.67% at 36.3% of the chord	0.4912%	0.0%
EPPLER 542	16.86% at 41.3% of the chord	1.91% at 31.5% of the chord	0.5713%	0.0%
EPPLER 543	17.22% at 40.7% of the chord	1.87% at 31.0% of the chord	0.6034%	0.0%
EPPLER 544	17.5% at 40.0% of the chord	1.86% at 30.5% of the chord	0.6465%	0.0%
EPPLER 545	17.45% at 39.3% of the chord	1.81% at 29.9% of the chord	0.7335%	0.0%
EPPLER 546	16.24% at 40.3% of the chord	1.77% at 26.2% of the chord	0.581%	0.0%
EPPLER 547	17.36% at 40.3% of the chord	2.06% at 30.7% of the chord	0.8332%	0.0%
EPPLER 548	17.39% at 35.4% of the chord	2.23% at 26.1% of the chord	1.0157%	0.0%
EPPLER 549	18.1% at 38.7% of the chord	2.08% at 34.0% of the chord	0.8619%	0.0%
EPPLER 550	18.2% at 34.0% of the chord	2.25% at 29.4% of the chord	1.0571%	0.0%
EPPLER 551	18.23% at 32.4% of the chord	2.82% at 57.1% of the chord	0.9978%	0.0%
EPPLER 552	18.44% at 32.4% of the chord	2.58% at 51.8% of the chord	1.0956%	0.0%
EPPLER 553	18.13% at 31.8% of the chord	2.97% at 56.5% of the chord	1.0294%	0.0%
EPPLER 554	18.23% at 31.8% of the chord	2.67% at 56.6% of the chord	1.2562%	0.0%
EPPLER 555	16.03% at 31.9% of the chord	2.6% at 67.4% of the chord	0.9633%	0.0%
EPPLER 556	16.01% at 31.1% of the chord	3.12% at 61.4% of the chord	0.9732%	0.0%
EPPLER 557	16.01% at 30.2% of the chord	3.68% at 60.8% of the chord	1.0419%	0.0%
EPPLER 558	16.03% at 25.9% of the chord	3.55% at 51.5% of the chord	1.4127%	0.0%
EPPLER 559	16.03% at 24.8% of the chord	4.21% at 50.5% of the chord	1.5288%	0.0%
EPPLER 560	16.05% at 23.7% of the chord	4.85% at 49.4% of the chord	1.6742%	0.0%
EPPLER 561	16.88% at 28.2% of the chord	5.11% at 49.4% of the chord	1.8637%	0.0%

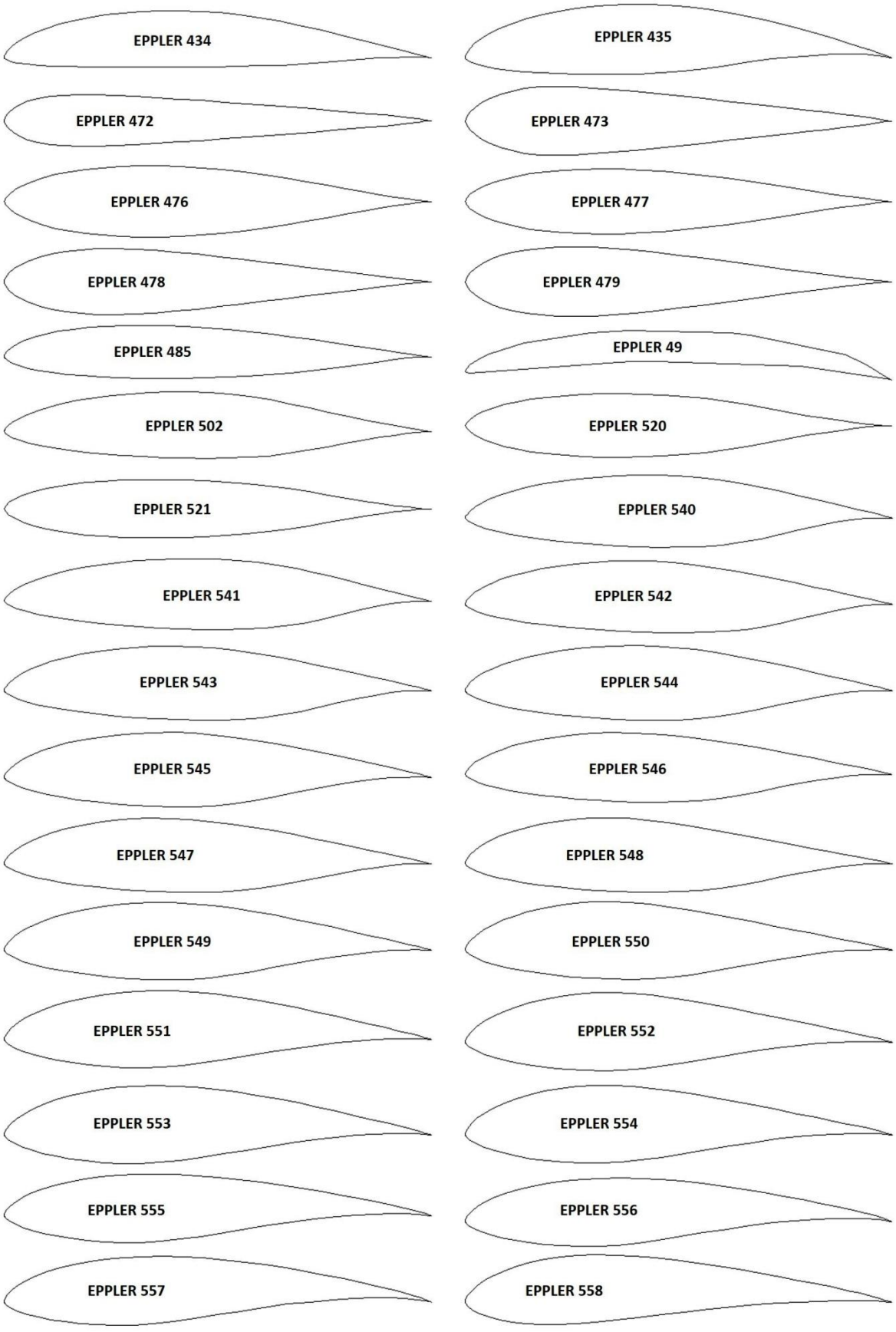
EPPLER 562	14.99% at 25.3% of the chord	3.87% at 56.3% of the chord	1.2801%	0.0%
EPPLER 58	5.6% at 30.0% of the chord	6.45% at 50.0% of the chord	0.6177%	0.0%
EPPLER 580	16.08% at 35.5% of the chord	4.08% at 60.9% of the chord	1.1965%	0.0%
EPPLER 582	14.72% at 37.8% of the chord	4.26% at 43.1% of the chord	0.9815%	0.0%
EPPLER 583	16.47% at 38.0% of the chord	4.48% at 38.0% of the chord	1.2462%	0.0%
EPPLER 584	16.59% at 38.3% of the chord	4.52% at 38.3% of the chord	1.2767%	0.0%
EPPLER 585	14.62% at 37.6% of the chord	4.26% at 42.8% of the chord	0.9729%	0.0%
EPPLER 587	16.63% at 41.1% of the chord	4.14% at 51.2% of the chord	0.9288%	0.0%
EPPLER 59	5.6% at 25.0% of the chord	5.2% at 50.0% of the chord	0.6695%	0.0%
EPPLER 593	11.26% at 24.2% of the chord	4.64% at 29.2% of the chord	1.1103%	0.0%
EPPLER 598	11.11% at 24.2% of the chord	4.51% at 34.4% of the chord	1.1484%	0.0%
EPPLER 603	18.95% at 38.4% of the chord	3.29% at 38.4% of the chord	1.2607%	0.0%
EPPLER 604	18.76% at 37.3% of the chord	3.32% at 42.3% of the chord	0.7306%	0.0%
EPPLER 625	13.0% at 30.0% of the chord	2.9% at 22.5% of the chord	1.3169%	0.0%
EPPLER 635	11.63% at 28.6% of the chord	2.86% at 19.4% of the chord	0.8576%	0.0%
EPPLER 636	11.88% at 27.7% of the chord	3.18% at 23.0% of the chord	0.9631%	0.0%
EPPLER 637	12.06% at 26.7% of the chord	3.54% at 26.7% of the chord	1.1617%	0.0%
EPPLER 638	12.31% at 30.7% of the chord	4.41% at 25.7% of the chord	0.8391%	0.0%
EPPLER 639	12.55% at 29.7% of the chord	4.79% at 29.7% of the chord	0.9494%	0.0%
EPPLER 642	15.06% at 40.4% of the chord	3.11% at 35.3% of the chord	1.0429%	0.0%
EPPLER 654	17.18% at 36.1% of the chord	4.83% at 46.5% of the chord	1.4994%	0.0%
EPPLER 655	17.33% at 37.3% of the chord	3.98% at 42.4% of the chord	1.3771%	0.0%
EPPLER 656	16.21% at 37.0% of the chord	4.81% at 42.2% of the chord	1.3796%	0.0%
EPPLER 657	15.56% at 37.0% of the chord	4.65% at 47.6% of the chord	1.295%	0.0%
EPPLER 66	10.13% at 31.4% of the chord	3.98% at 52.9% of the chord	0.7369%	0.0%
EPPLER 664	16.61% at 44.6% of the chord	2.75% at 39.5% of the chord	1.1508%	0.0%
EPPLER 664 (EXTENDED)	-	-	-	-
EPPLER 668	13.9% at 37.3% of the chord	3.98% at 47.8% of the chord	0.8462%	0.0%
EPPLER 67	11.62% at 31.9% of the chord	3.65% at 53.1% of the chord	0.7299%	0.0%
EPPLER 678	15.08% at 40.0% of the chord	5.21% at 50.6% of the chord	1.112%	0.0%
EPPLER 68	13.1% at 32.5% of the chord	3.33% at 53.4% of the chord	0.8736%	0.0%
EPPLER 682	15.3% at 40.2% of the chord	3.02% at 40.2% of the chord	0.9833%	0.0%
EPPLER 694	15.43% at 40.3% of the chord	4.96% at 56.1% of the chord	1.0328%	0.0%
EPPLER 715	15.02% at 29.3% of the chord	2.77% at 43.9% of the chord	0.7606%	0.0%
EPPLER 748	19.73% at 28.6% of the chord	4.58% at 53.9% of the chord	2.1445%	0.0%
EPPLER 793	15.62% at 25.7% of the chord	4.04% at 45.9% of the chord	1.578%	0.0%
EPPLER 817 HYDROFOIL	10.98% at 32.6% of the chord	2.88% at 68.9% of the chord	0.1512%	0.0%
EPPLER 818 HYDROFOIL	9.37% at 32.9% of the chord	2.79% at 69.4% of the chord	0.0344%	0.0%
EPPLER 855	15.7% at 31.3% of the chord	3.77% at 51.6% of the chord	0.8849%	0.0%
EPPLER 856	18.15% at 30.4% of the chord	4.25% at 50.6% of the chord	1.5131%	0.0%
EPPLER 857	20.34% at 29.4% of the chord	4.68% at 44.2% of the chord	1.2585%	0.0%
EPPLER 858	22.7% at 28.7% of the chord	4.84% at 43.4% of the chord	3.7064%	0.0%
EPPLER 862 STRUT	32.37% at 28.5% of the chord	0.0% at 0.0% of the chord	6.4601%	1.2%
EPPLER 863 STRUT	35.73% at 28.5% of the chord	0.0% at 0.0% of the chord	7.4385%	1.4%
EPPLER 864 STRUT	38.83% at 32.7% of the chord	0.04% at 11.0% of the chord	8.4468%	1.6%
EPPLER 874 HYDROFOIL	7.9% at 27.3% of the chord	0.95% at 34.6% of the chord	0.4646%	0.0%
EPPLER 904	9.0% at 44.5% of the chord	1.34% at 50.3% of the chord	0.3163%	0.0%
EPPLER 908	9.0% at 44.3% of the chord	2.76% at 67.4% of the chord	0.3114%	0.0%
EPPLER E1212	17.7% at 22.0% of the chord	3.21% at 36.4% of the chord	2.6419%	0.0%
EPPLER E1212MOD	17.71% at 20.0% of the chord	2.61% at 35.0% of the chord	3.2979%	0.0%
Eppler E325	12.62% at 34.3% of the chord	1.75% at 16.3% of the chord	0.9487%	0.0%
Eppler E63	4.25% at 19.8% of the chord	5.39% at 52.1% of the chord	0.1503%	0.0%
EPPLER E662	15.02% at 42.4% of the chord	4.08% at 47.6% of the chord	1.0597%	0.0%
EPPLER E836 HYDROFOIL	12.64% at 42.8% of the chord	0.0% at 0.0% of the chord	0.6774%	0.0%
EPPLER E837 HYDROFOIL	16.11% at 36.9% of the chord	0.0% at 0.0% of the chord	0.9612%	0.0%
EPPLER E838 HYDROFOIL	18.37% at 37.2% of the chord	0.0% at 46.5% of the chord	1.0307%	0.0%
EPPLER E850	7.98% at 35.1% of the chord	1.83% at 70.9% of the chord	-0.0238%	0.289%
Eppler E850 propeller airfoil	7.98% at 35.1% of the chord	1.83% at 70.9% of the chord	0.03%	0.0%

EPPLER E851	9.0% at 34.3% of the chord	2.35% at 65.3% of the chord	0.0737%	0.0%
EPPLER E852	10.05% at 38.5% of the chord	2.79% at 59.5% of the chord	0.1253%	0.0%
EPPLER E853	11.59% at 32.8% of the chord	3.03% at 58.6% of the chord	0.3326%	0.0%
EPPLER E854	13.41% at 32.2% of the chord	3.25% at 52.6% of the chord	0.5092%	0.0%
Eppler EA 6 [-1] - 009	9.0% at 30.0% of the chord	0.11% at 95.0% of the chord	0.9166%	0.0%
Eppler EA 6 [-1] - 012	12.0% at 30.0% of the chord	0.0% at 0.0% of the chord	1.5218%	0.0%
EPPLER EA 6(-1)-009	9.0% at 30.0% of the chord	0.0% at 0.0% of the chord	0.9166%	0.0%
EPPLER EA 6(-1)-012	12.0% at 30.0% of the chord	0.0% at 0.0% of the chord	1.5218%	0.0%
Eppler EA 8 [-1] - 006	6.0% at 30.0% of the chord	0.0% at 0.0% of the chord	0.6212%	0.0%
EPPLER EA 8(-1)-006	6.0% at 30.0% of the chord	0.0% at 0.0% of the chord	0.6212%	0.0%
EPPLER EC 86(-3)-914	14.27% at 33.1% of the chord	4.39% at 71.7% of the chord	0.3418%	0.0%
EPPLER STE 87(-3)-914	14.61% at 35.5% of the chord	4.42% at 56.9% of the chord	1.0725%	-0.086%
EPPLER STE 871-514	13.97% at 44.4% of the chord	2.65% at 78.3% of the chord	1.1321%	-0.05%
EPPLER STF 863-615	14.72% at 47.2% of the chord	4.58% at 72.2% of the chord	0.6502%	-0.081%
Eppler/Shen hydrofoil E900	9.01% at 52.5% of the chord	0.0% at 0.0% of the chord	0.4101%	0.0%
ESA40/JCE	10.72% at 27.1% of the chord	2.01% at 12.0% of the chord	1.1745%	0.885%
ESPADA	5.57% at 17.0% of the chord	6.03% at 43.5% of the chord	0.9319%	0.0%

Note:
EPPLER 59 (Eppler E59 low Reynolds number airfoil);
EPPLER E1212 (Eppler E1212 general aviation airfoil);
EPPLER E1212MOD (Eppler E1212 general aviation airfoil (as modified for use as Quickie wing airfoil));
Eppler E63 (Low Reynolds number airfoil (4.25%));
Eppler EA 6 [-1] – 009, *Eppler EA 6 [-1] – 012* (R. Eppler (Germany));
Eppler EA 8 [-1] – 006 (R. Eppler (Germany));
Eppler/Shen hydrofoil E900 (From: Johannes Schoon).

Table 2. The geometric shapes of the airfoils (hydrofoils) in the cross section.




EPPLER 434
EPPLER 435
EPPLER 472
EPPLER 473
EPPLER 476
EPPLER 477
EPPLER 478
EPPLER 479
EPPLER 485
EPPLER 49
EPPLER 502
EPPLER 520
EPPLER 521
EPPLER 540
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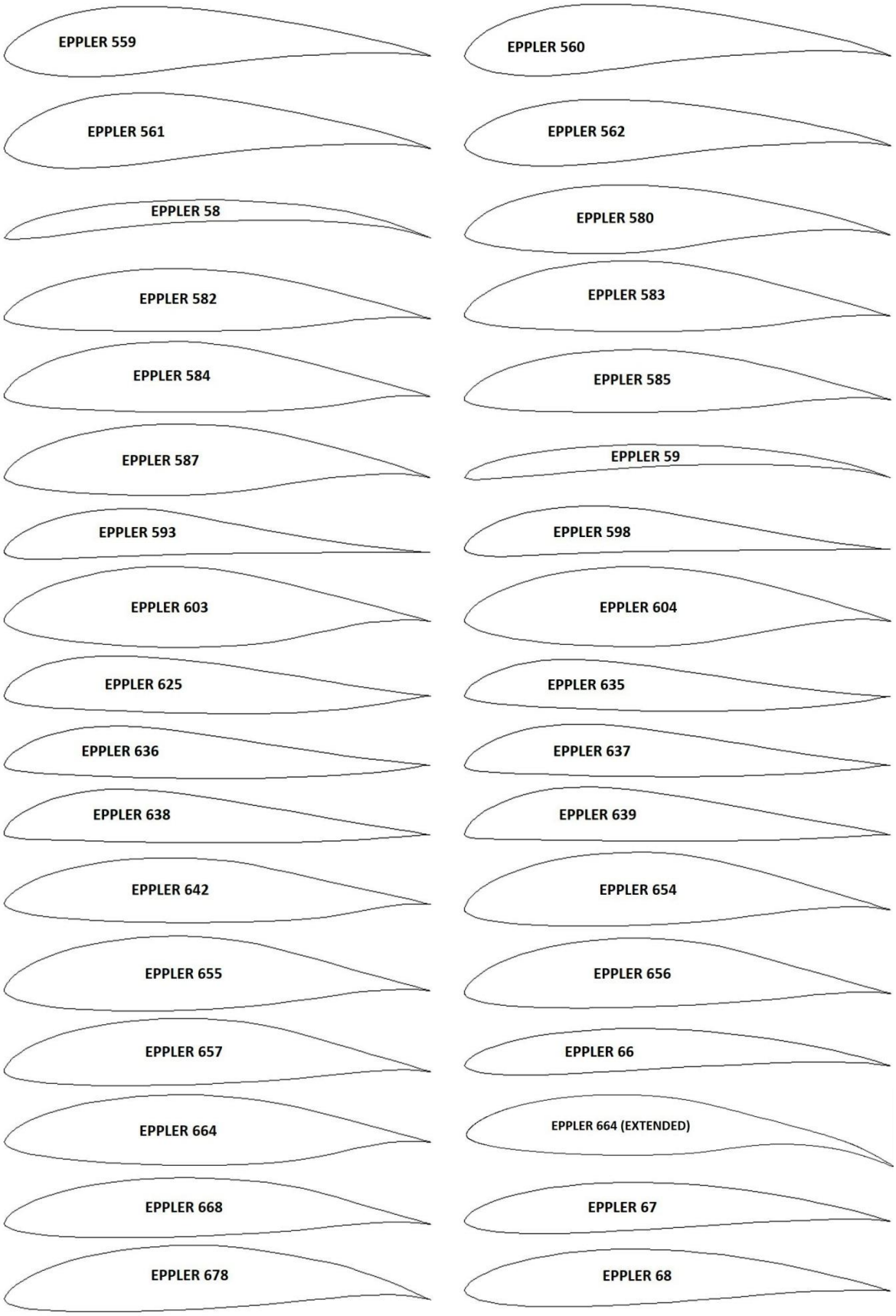
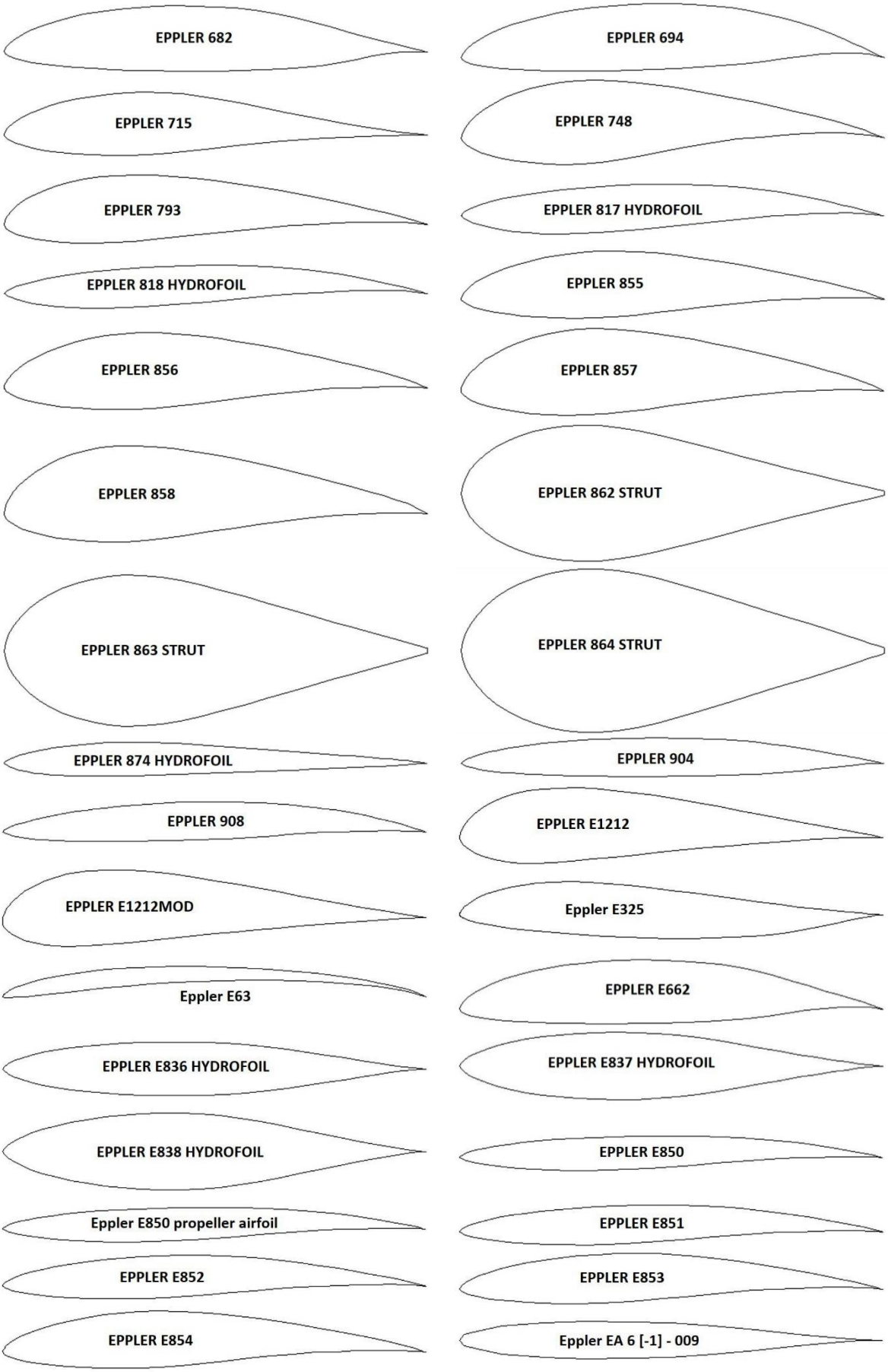
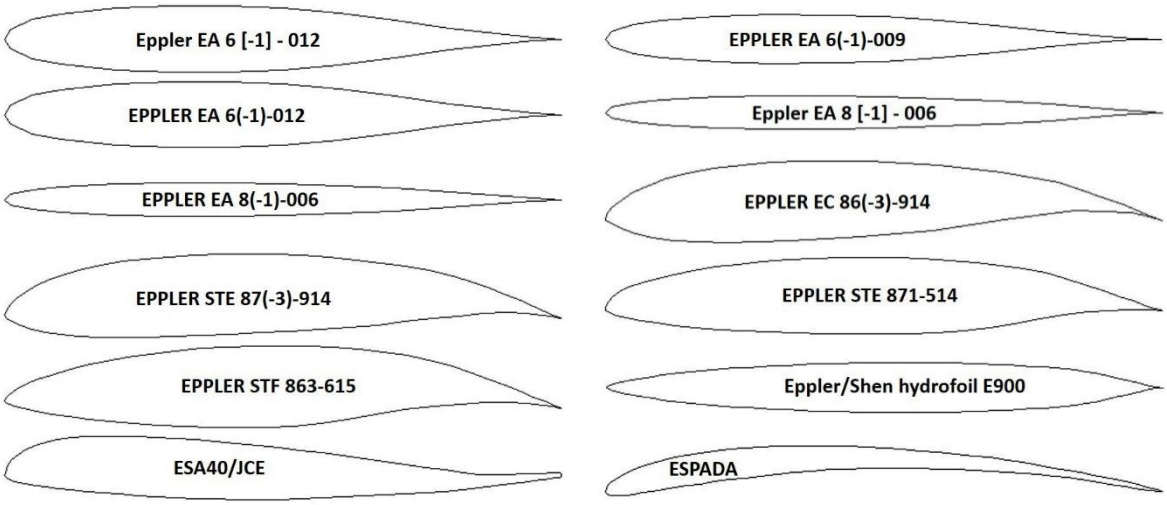
EPPLER 557
EPPLER 558


EPPLER 559
EPPLER 560
EPPLER 561
EPPLER 562
EPPLER 58
EPPLER 580
EPPLER 582
EPPLER 583
EPPLER 584
EPPLER 585
EPPLER 587
EPPLER 59
EPPLER 593
EPPLER 598
EPPLER 603
EPPLER 604
EPPLER 625
EPPLER 635
EPPLER 636
EPPLER 637
EPPLER 638
EPPLER 639
EPPLER 642
EPPLER 654
EPPLER 655
EPPLER 656
EPPLER 657
EPPLER 66
EPPLER 664
EPPLER 664 (EXTENDED)
EPPLER 668
EPPLER 67
EPPLER 678
EPPLER 68


EPPLER 682
EPPLER 694
EPPLER 715
EPPLER 748
EPPLER 793
EPPLER 817 HYDROFOIL
EPPLER 818 HYDROFOIL
EPPLER 855
EPPLER 856
EPPLER 857
EPPLER 858
EPPLER 862 STRUT
EPPLER 863 STRUT
EPPLER 864 STRUT
EPPLER 874 HYDROFOIL
EPPLER 904
EPPLER 908
EPPLER E1212
EPPLER E1212MOD
Eppler E325
Eppler E63
EPPLER E662
EPPLER E836 HYDROFOIL
EPPLER E837 HYDROFOIL
EPPLER E838 HYDROFOIL
EPPLER E850
Eppler E850 propeller airfoil
EPPLER E851
EPPLER E852
EPPLER E853
EPPLER E854
Eppler EA 6 [-1] - 009



Results and discussion

The calculated pressure contours on the surfaces of the airfoils (hydrofoils) at the different angles of attack are presented in the Figs. 1-124.

Calculated magnitudes on the scale can be represented as the basic magnitudes when comparing the pressure drop under conditions of changing the angle of attack of the airfoils (hydrofoils).

The analysis of changing the drag was performed for the EPPLER series airfoils and hydrofoils. The highest magnitudes of positive and negative pressures at the leading edge of the airfoils (hydrofoils) were determined, which characterize the increase in the drag.

The horizontal position of the EPPLER E662 airfoil generates the higher positive pressure at the leading edge than the other airfoils, which leads to the least favorable airplane flight conditions.

An increase in the drag by several times is observed when changing the angle of attack of the airfoil (hydrofoil) by 15 degrees. For example, the leading edge pressure reaches -154 kPa at the positive angle of attack of the EPPLER E852 airfoil. The Eppler/Shen hydrofoil E900 at the positive and negative angles of attack has almost the same mirror pressure drops on the upper and lower surfaces.

The maximum increase in the leading edge pressure occurs at the angle of attack of -15 degrees for the most airfoils (hydrofoils). The maximum increase in pressure at the leading edge occurs at the angle of attack of 15 degrees for the following airfoils (hydrofoils): EPPLER 417, EPPLER 434, EPPLER 472, EPPLER 473, EPPLER 476, EPPLER 478, EPPLER 479, EPPLER 49, EPPLER 58, EPPLER 59, EPPLER 636, EPPLER 637, EPPLER 638, EPPLER 639, EPPLER 664 (EXTENDED), EPPLER 68, EPPLER 817 HYDROFOIL, EPPLER 862 STRUT, EPPLER 864 STRUT, EPPLER 874 HYDROFOIL, EPPLER 904, EPPLER 908, Eppler E63, EPPLER E662, EPPLER E836 HYDROFOIL, EPPLER E837 HYDROFOIL, EPPLER E838 HYDROFOIL, EPPLER E850, Eppler E850 propeller airfoil, EPPLER E851, EPPLER E852, EPPLER E853, Eppler EA 6 [-1] – 012, EPPLER EA 6(-1)-012, EPPLER EC 86(-3)-914, EPPLER STF 863-615, Eppler/Shen hydrofoil E900, ESA40/JCE, ESPADA.

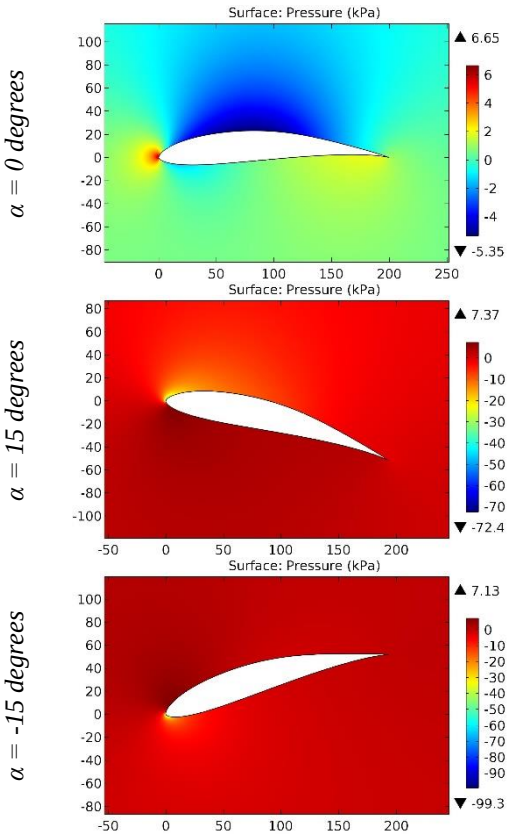


Figure 1. The pressure contours on the surfaces of the EPPLER 397 airfoil.

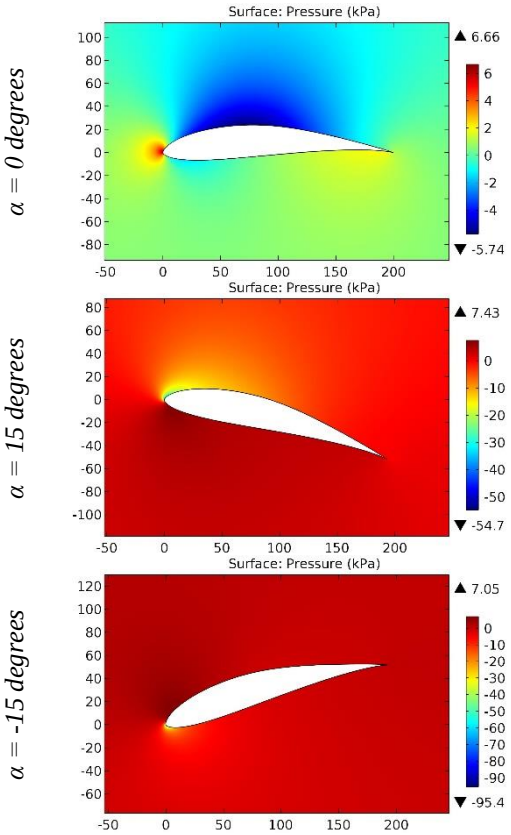


Figure 2. The pressure contours on the surfaces of the EPPLER 398 airfoil.

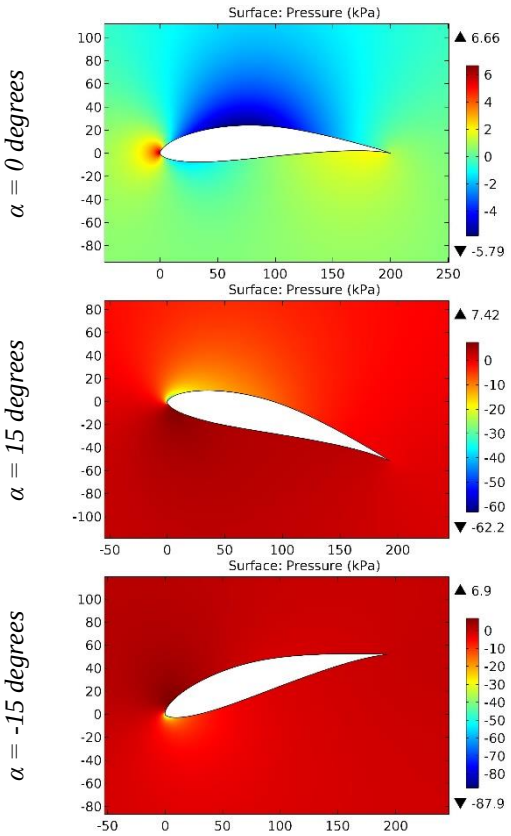


Figure 3. The pressure contours on the surfaces of the EPPLER 399 airfoil.

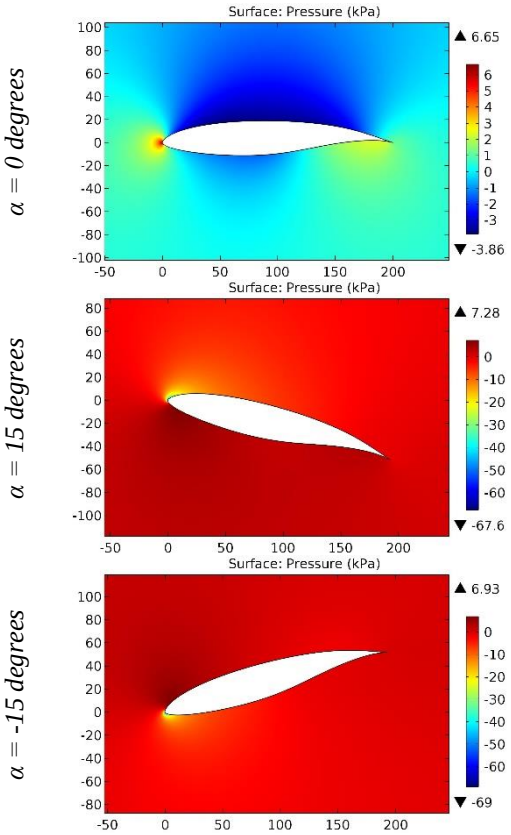


Figure 4. The pressure contours on the surfaces of the EPPLER 403 airfoil.

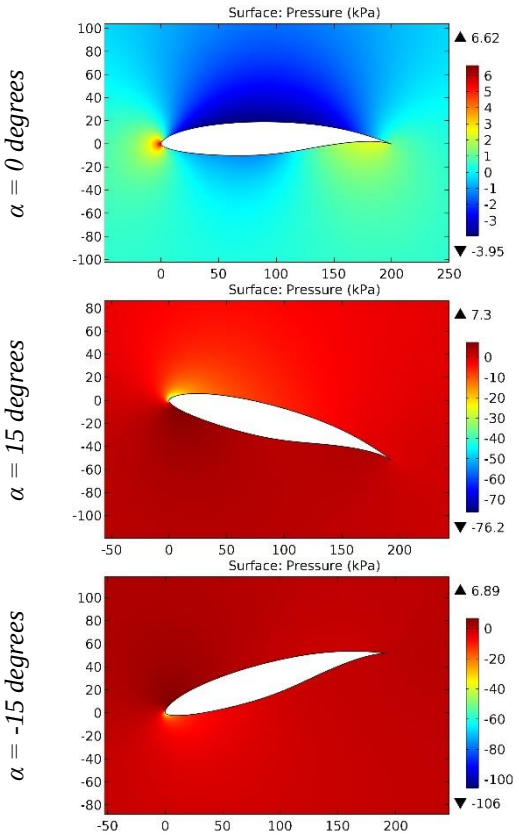


Figure 5. The pressure contours on the surfaces of the EPPLER 407 airfoil.

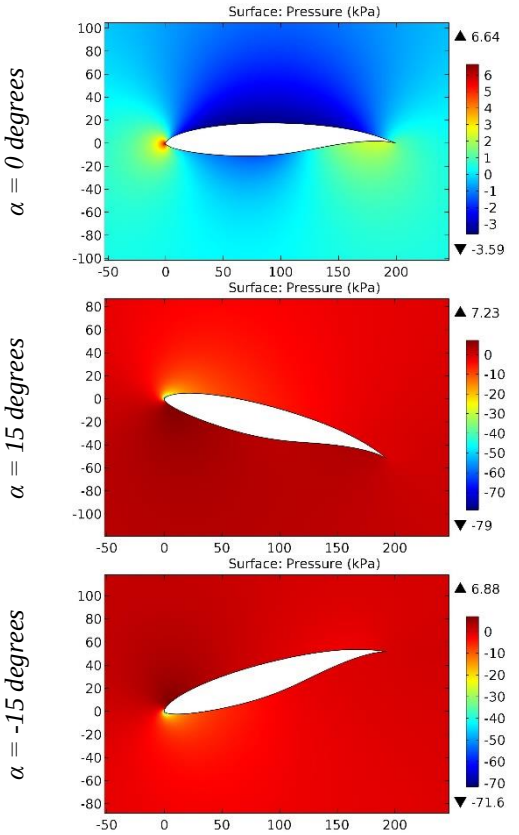


Figure 6. The pressure contours on the surfaces of the EPPLER 417 airfoil.

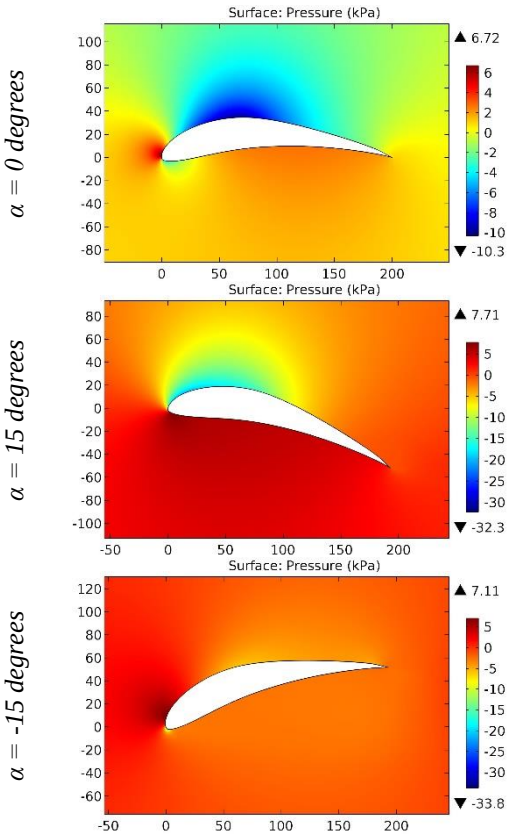


Figure 7. The pressure contours on the surfaces of the EPPLER 420 airfoil.

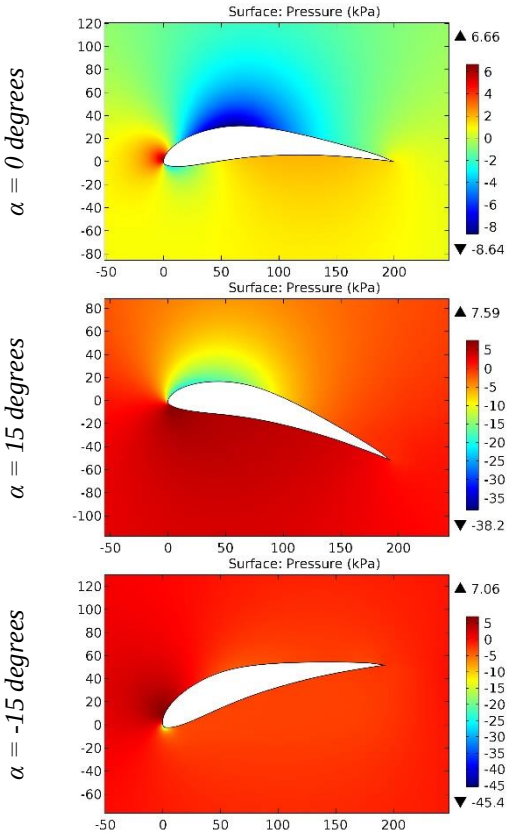


Figure 8. The pressure contours on the surfaces of the EPPLER 421 airfoil.

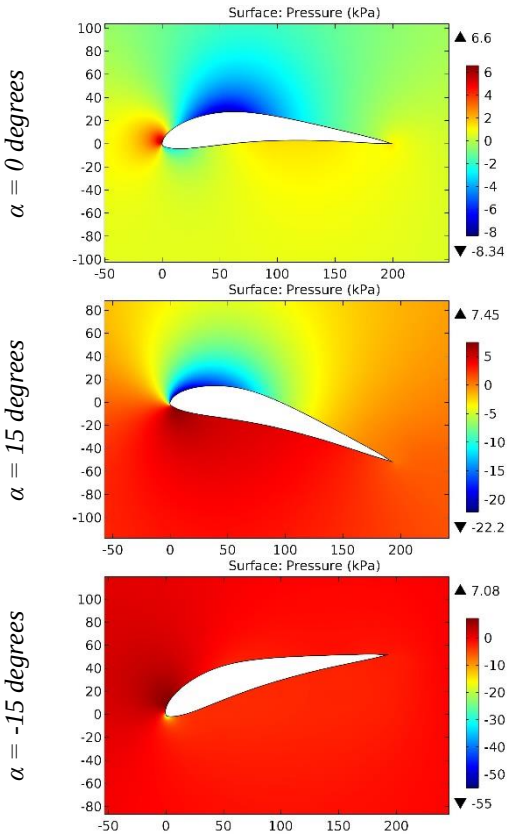


Figure 9. The pressure contours on the surfaces of the EPPLER 422 airfoil.

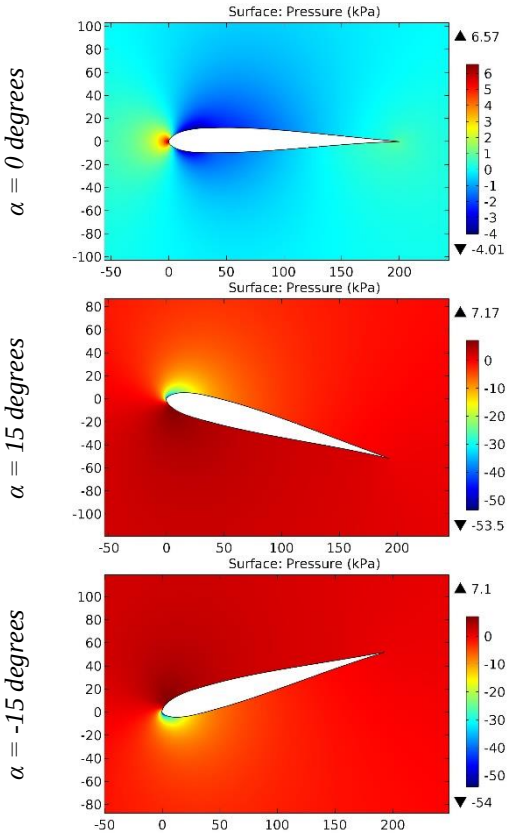


Figure 10. The pressure contours on the surfaces of the EPPLER 426 airfoil.

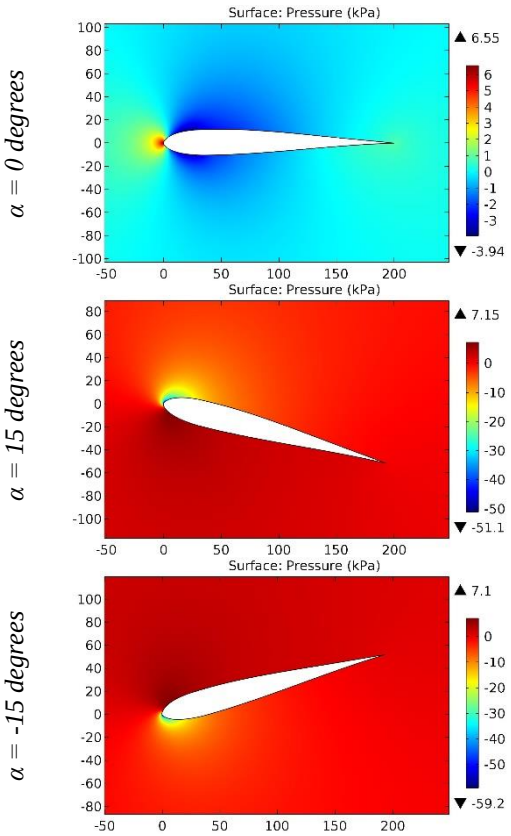


Figure 11. The pressure contours on the surfaces of the EPPLER 428 airfoil.

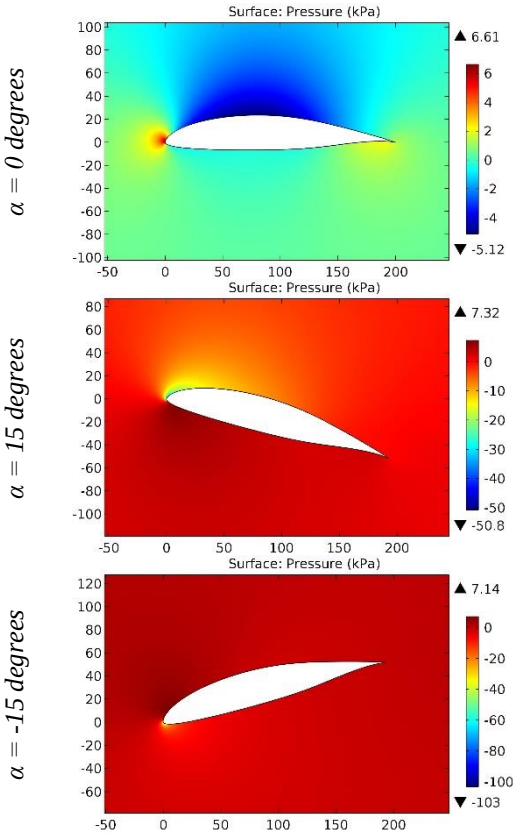


Figure 12. The pressure contours on the surfaces of the EPPLER 431 airfoil.

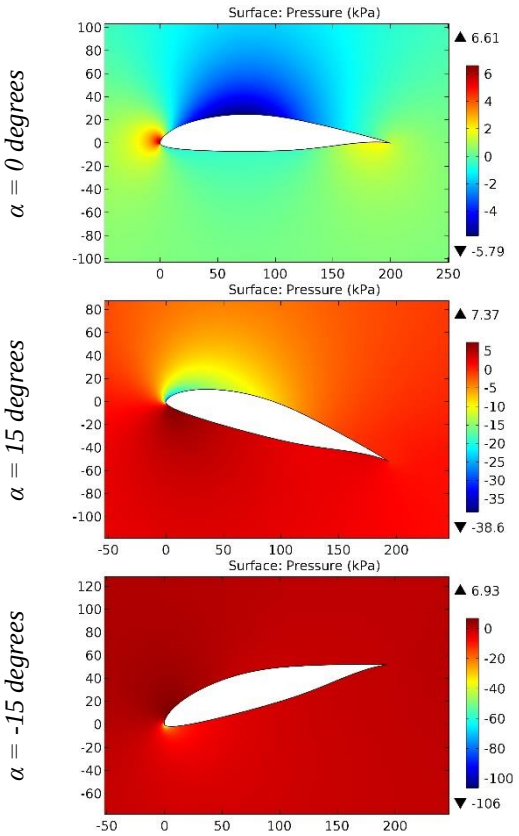


Figure 13. The pressure contours on the surfaces of the EPPLER 432 airfoil.

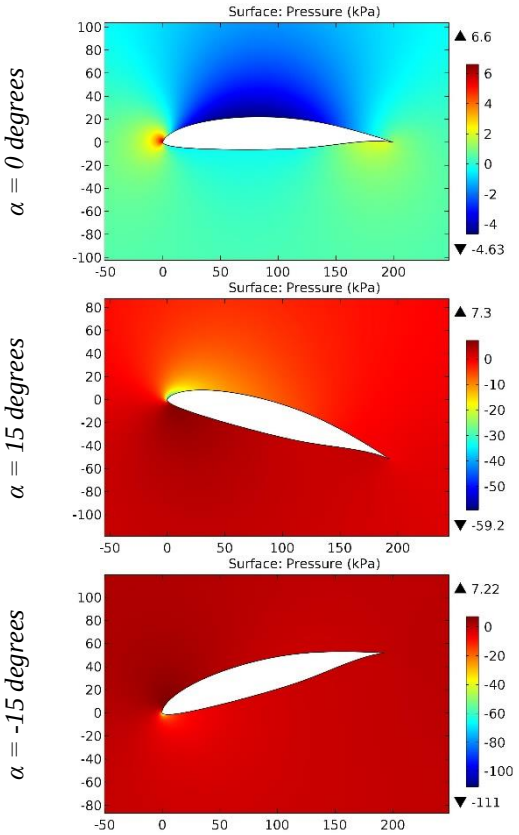


Figure 14. The pressure contours on the surfaces of the EPPLER 433 airfoil.

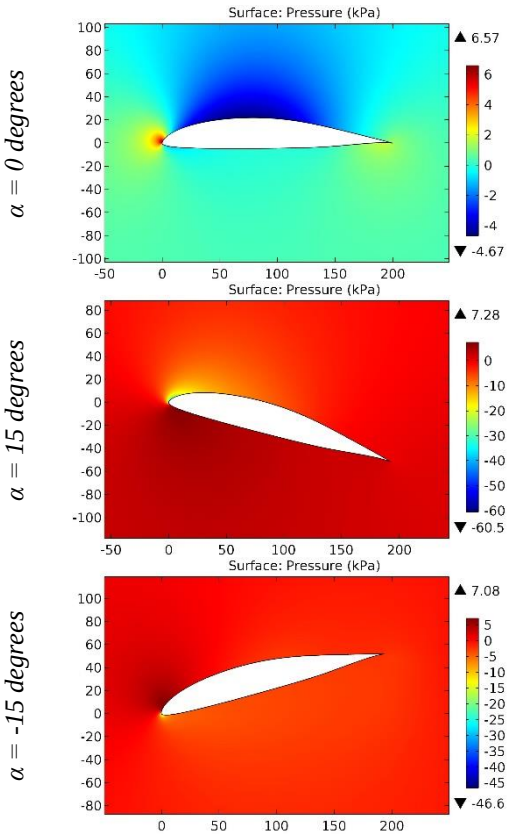


Figure 15. The pressure contours on the surfaces of the EPPLER 434 airfoil.

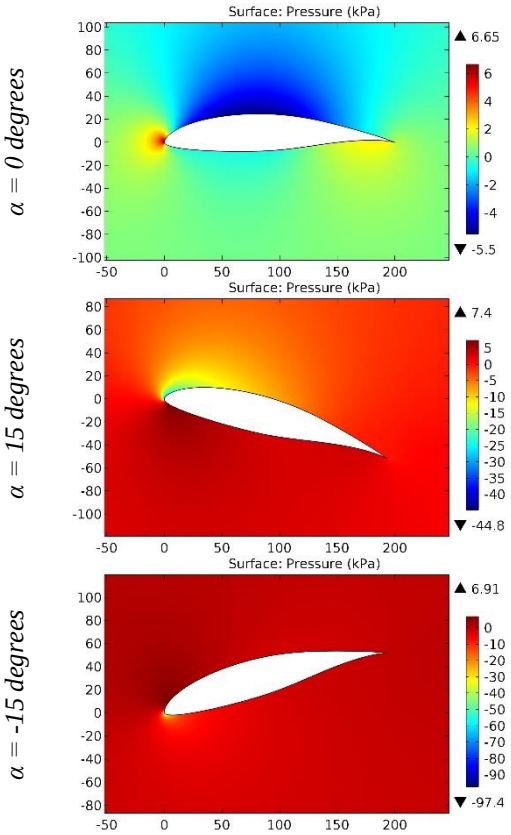


Figure 16. The pressure contours on the surfaces of the EPPLER 435 airfoil.

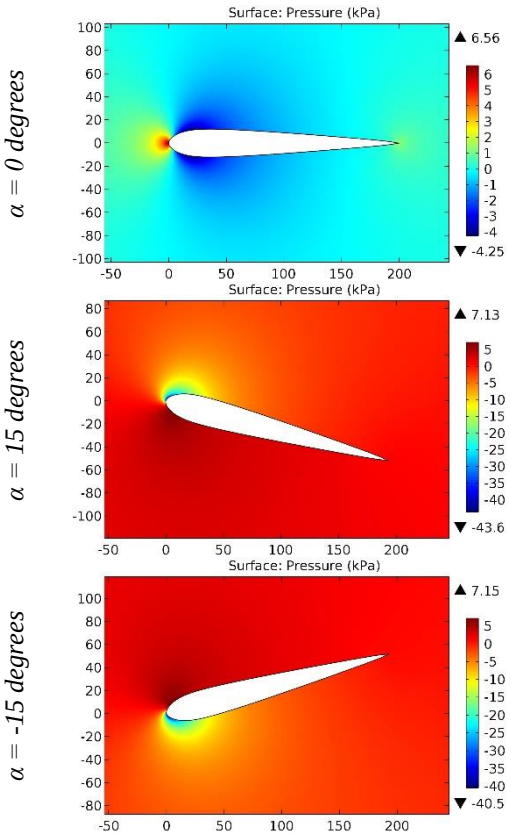


Figure 17. The pressure contours on the surfaces of the EPPLER 472 airfoil.

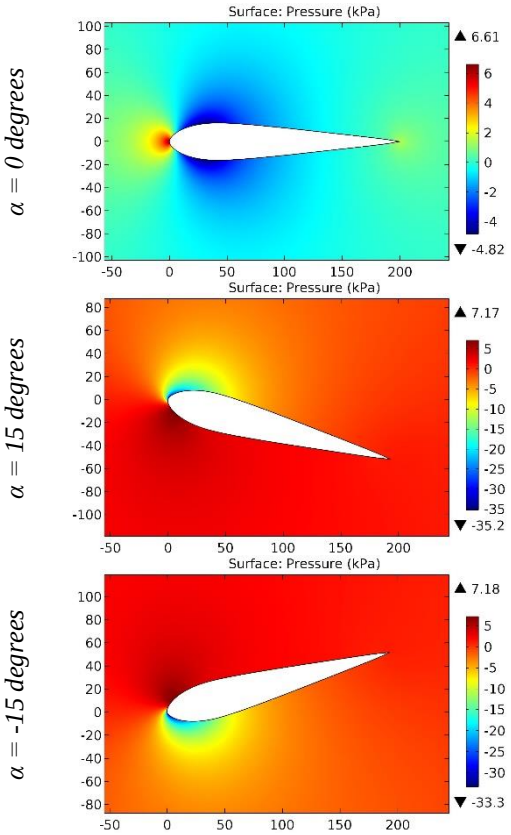


Figure 18. The pressure contours on the surfaces of the EPPLER 473 airfoil.

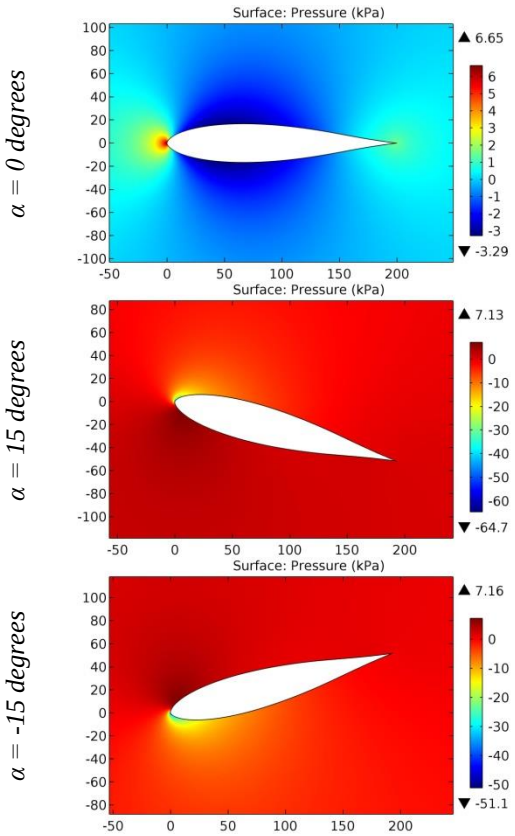


Figure 19. The pressure contours on the surfaces of the EPPLER 476 airfoil.

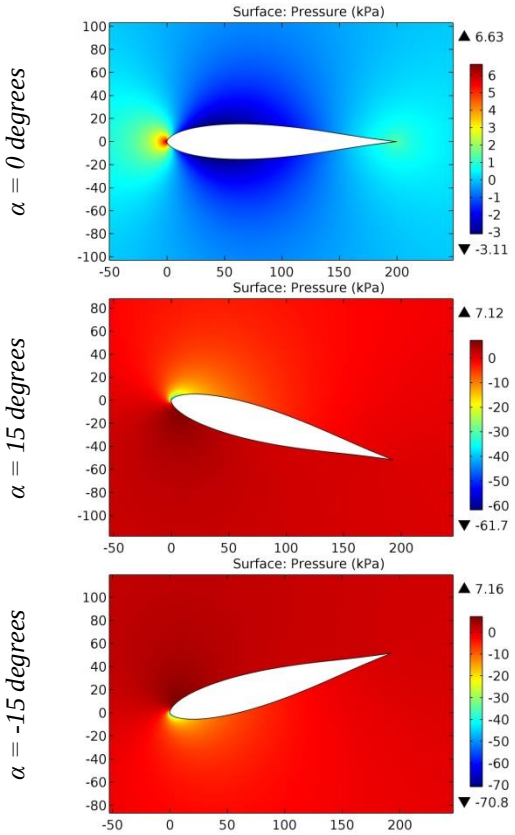


Figure 20. The pressure contours on the surfaces of the EPPLER 477 airfoil.

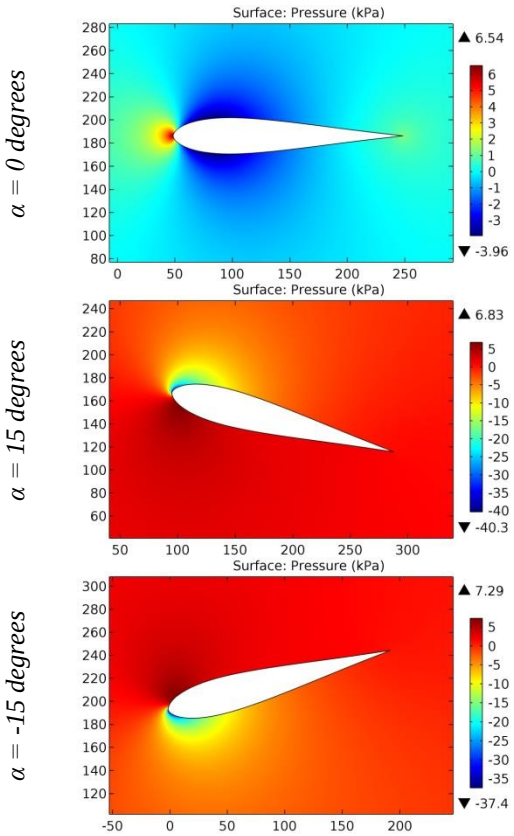


Figure 21. The pressure contours on the surfaces of the EPPLER 478 airfoil.

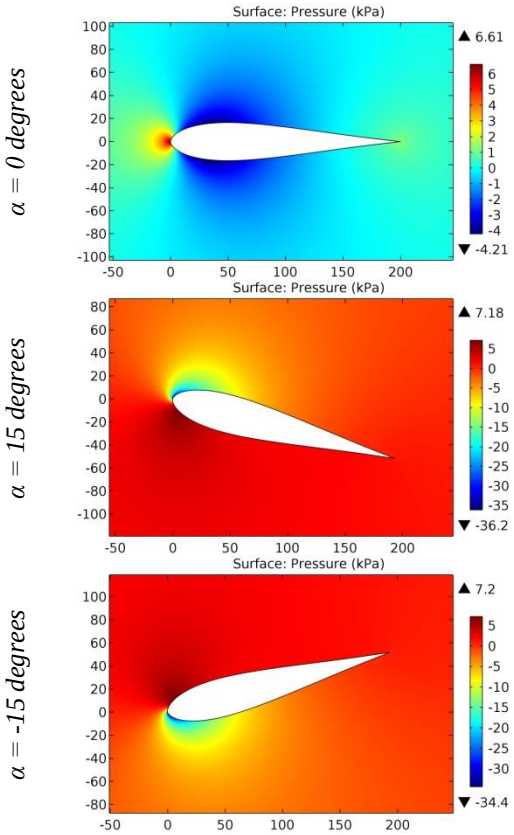


Figure 22. The pressure contours on the surfaces of the EPPLER 479 airfoil.

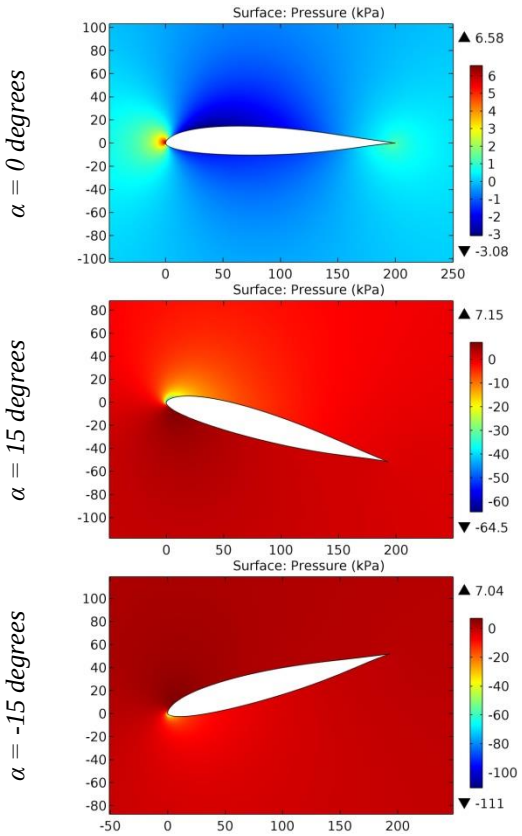


Figure 23. The pressure contours on the surfaces of the EPPLER 485 airfoil.

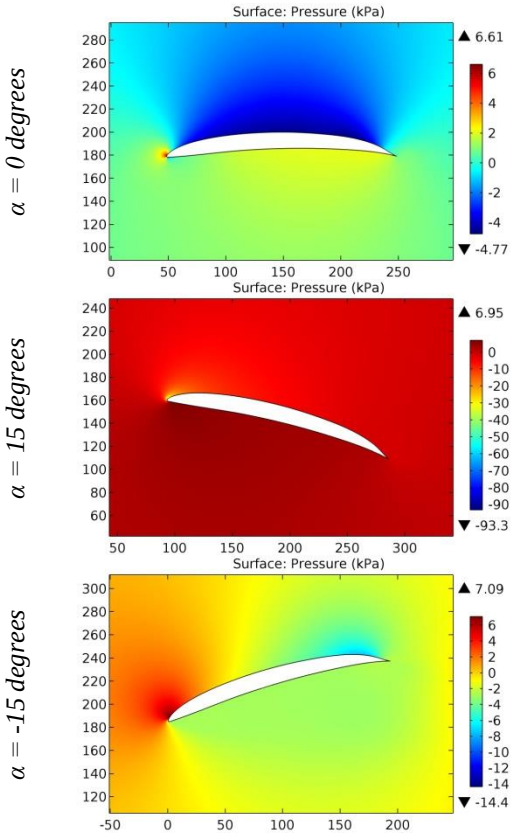


Figure 24. The pressure contours on the surfaces of the EPPLER 49 airfoil.

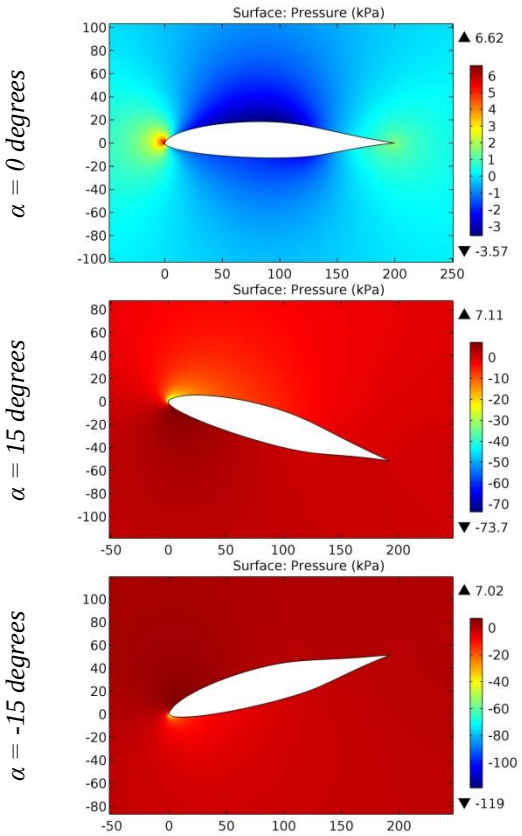


Figure 25. The pressure contours on the surfaces of the EPPLER 502 airfoil.

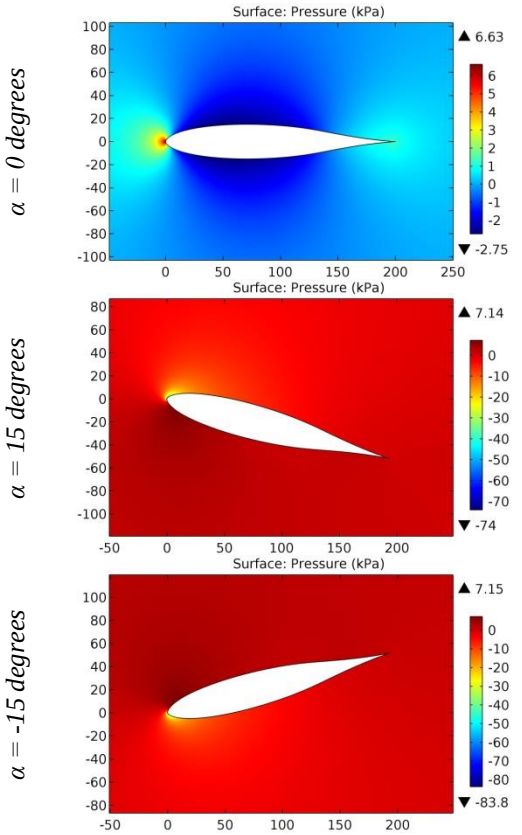


Figure 26. The pressure contours on the surfaces of the EPPLER 520 airfoil.

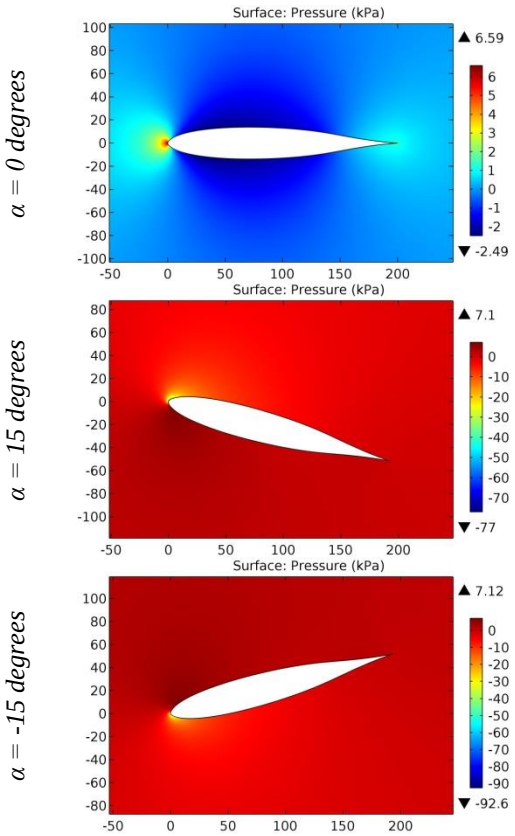


Figure 27. The pressure contours on the surfaces of the EPPLER 521 airfoil.

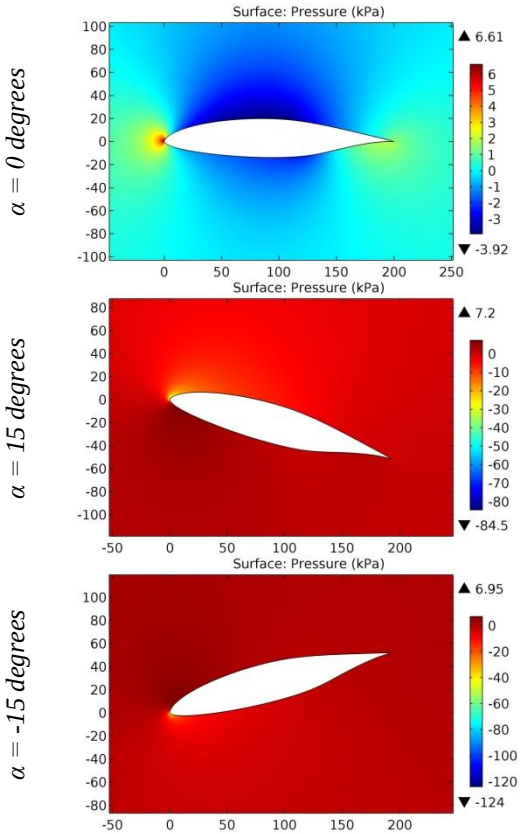


Figure 28. The pressure contours on the surfaces of the EPPLER 540 airfoil.

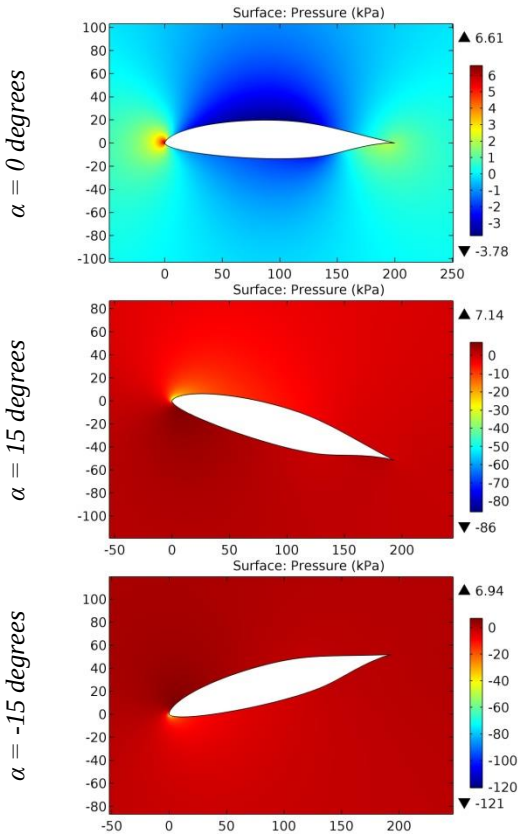


Figure 29. The pressure contours on the surfaces of the EPPLER 541 airfoil.

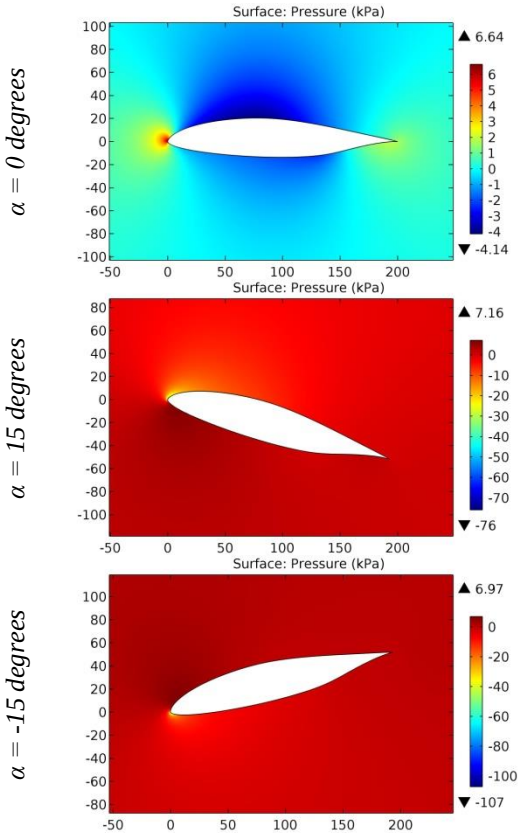


Figure 30. The pressure contours on the surfaces of the EPPLER 542 airfoil.

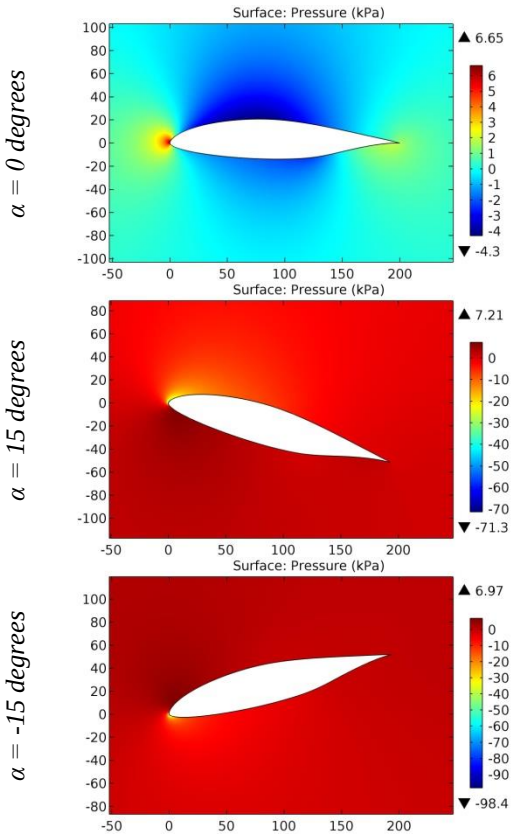


Figure 31. The pressure contours on the surfaces of the EPPLER 543 airfoil.

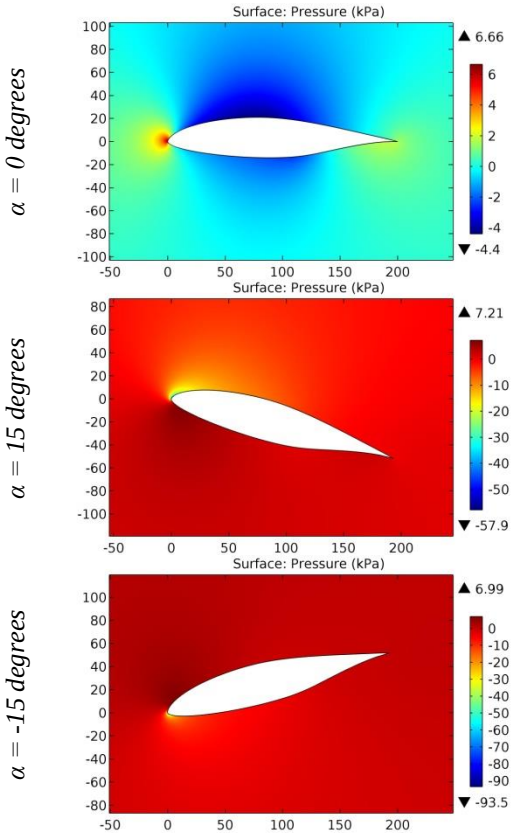


Figure 32. The pressure contours on the surfaces of the EPPLER 544 airfoil.

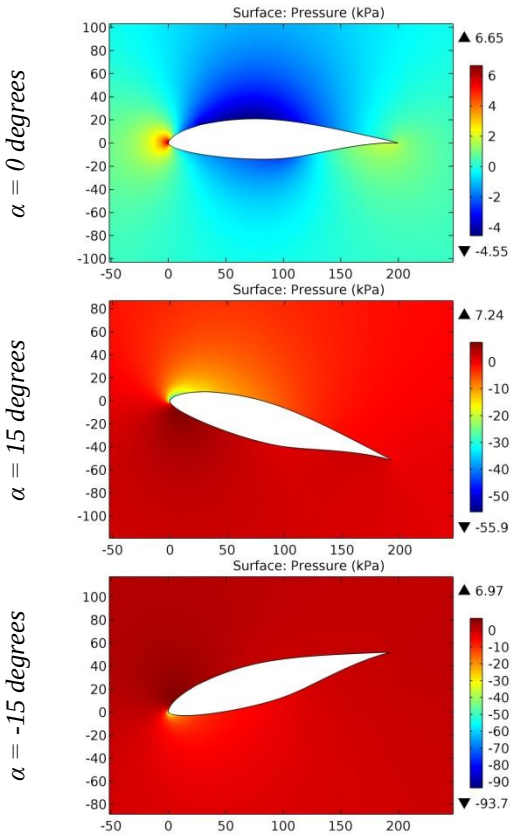


Figure 33. The pressure contours on the surfaces of the EPPLER 545 airfoil.

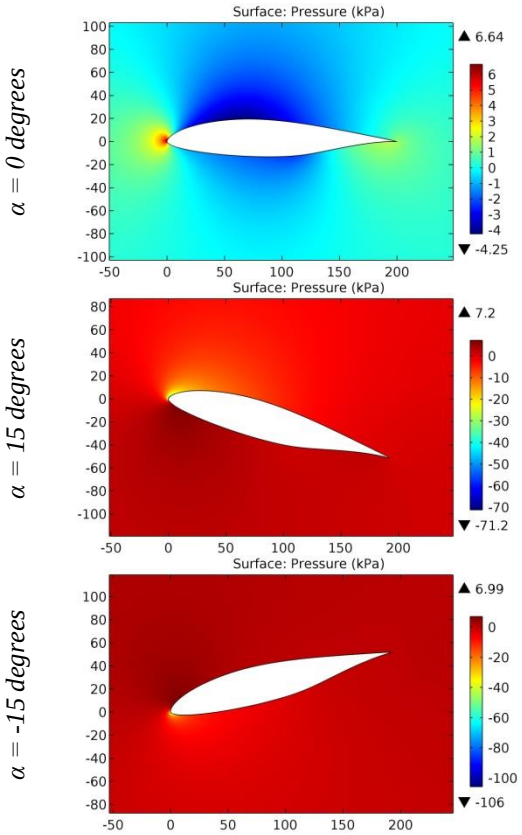


Figure 34. The pressure contours on the surfaces of the EPPLER 546 airfoil.

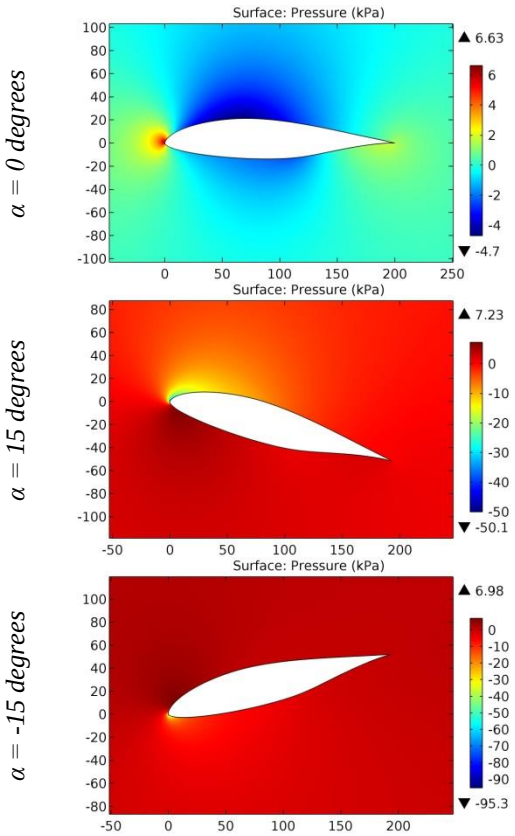


Figure 35. The pressure contours on the surfaces of the EPPLER 547 airfoil.

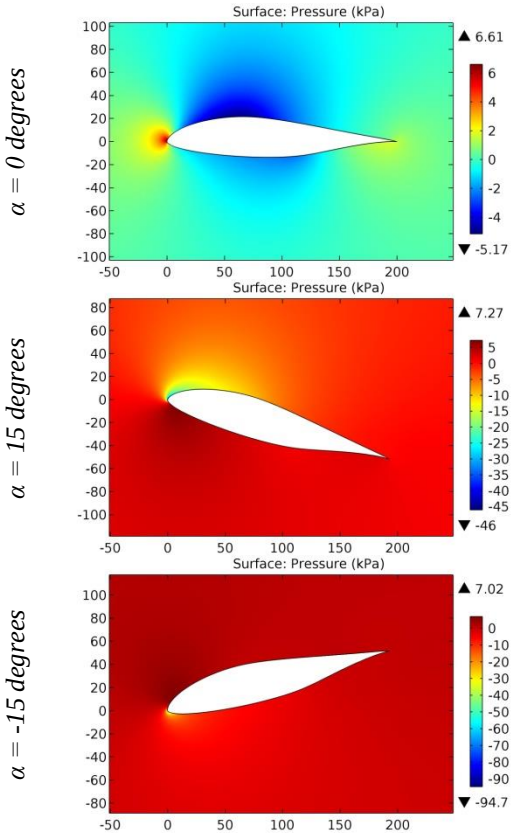


Figure 36. The pressure contours on the surfaces of the EPPLER 548 airfoil.

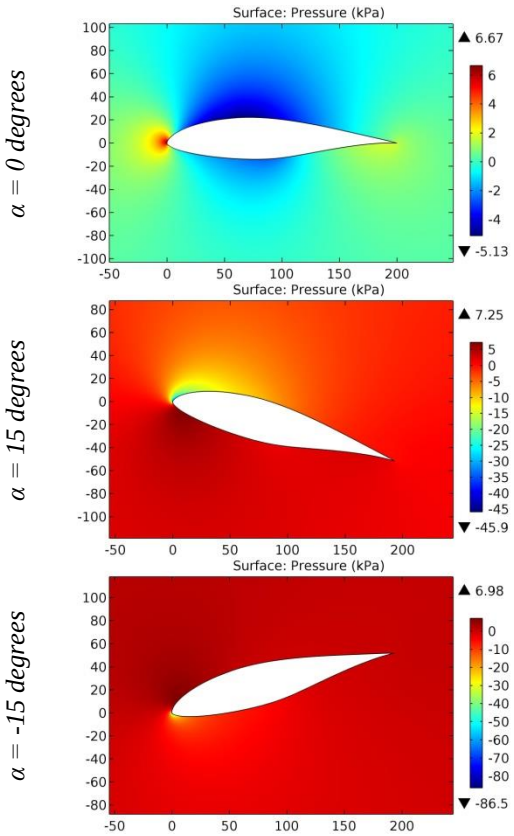


Figure 37. The pressure contours on the surfaces of the EPPLER 549 airfoil.

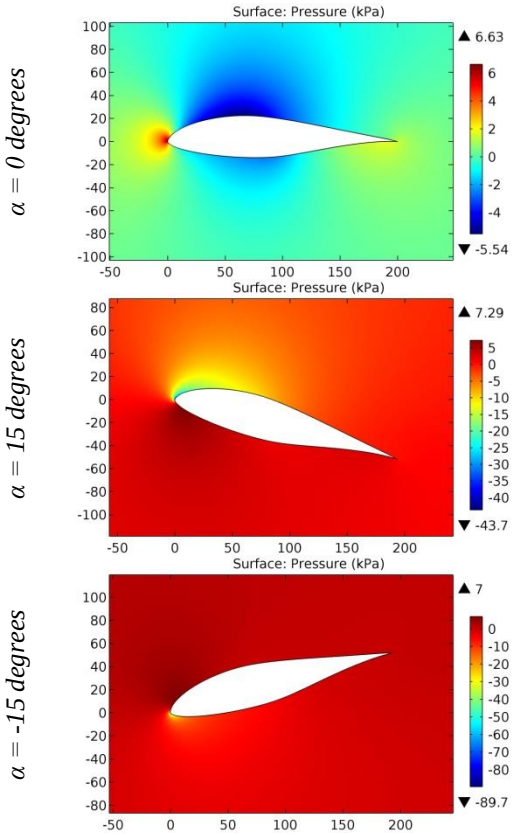


Figure 38. The pressure contours on the surfaces of the EPPLER 550 airfoil.

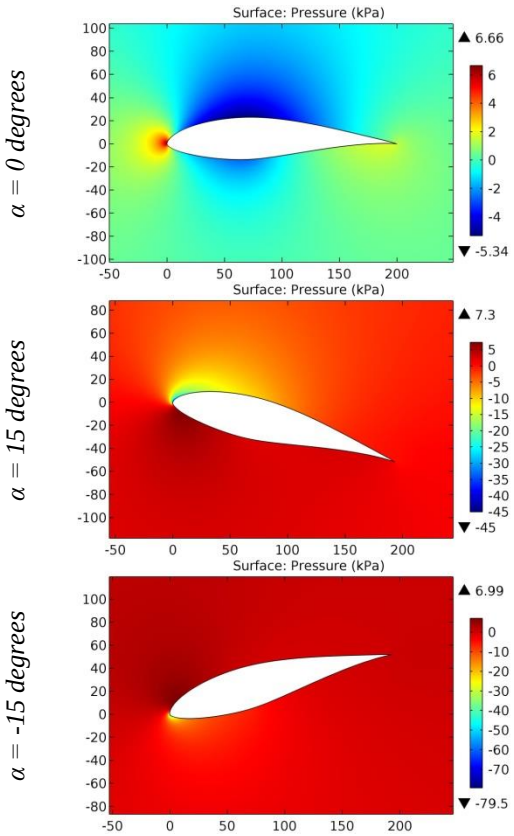


Figure 39. The pressure contours on the surfaces of the EPPLER 551 airfoil.

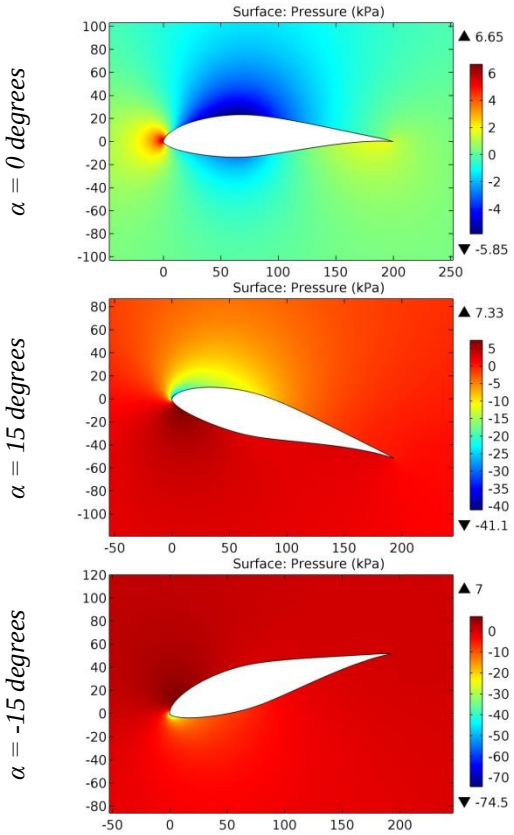


Figure 40. The pressure contours on the surfaces of the EPPLER 552 airfoil.

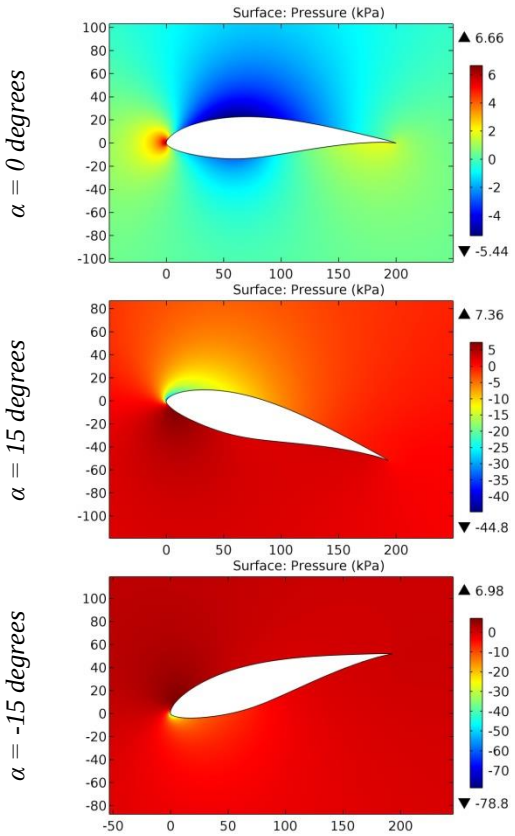


Figure 41. The pressure contours on the surfaces of the EPPLER 553 airfoil.

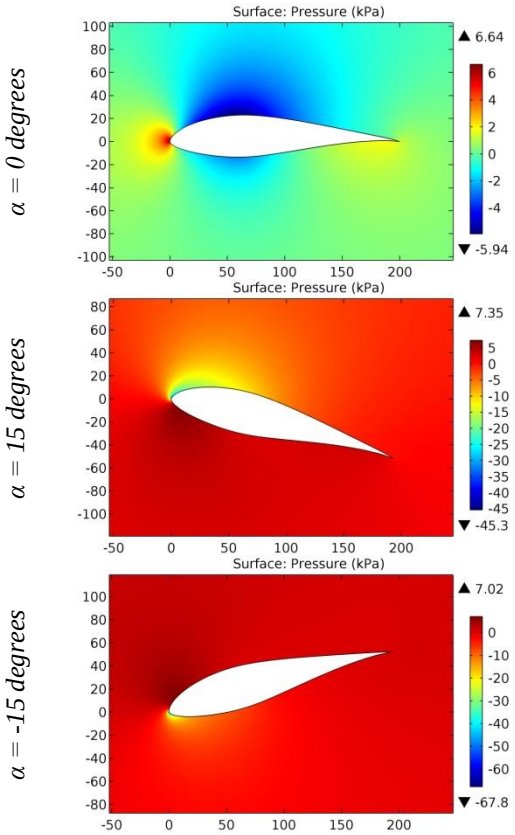


Figure 42. The pressure contours on the surfaces of the EPPLER 554 airfoil.

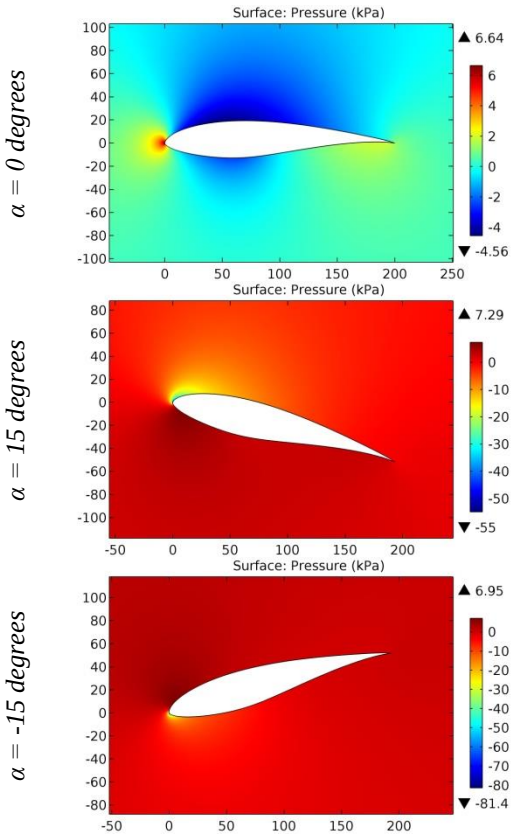


Figure 43. The pressure contours on the surfaces of the EPPLER 555 airfoil.

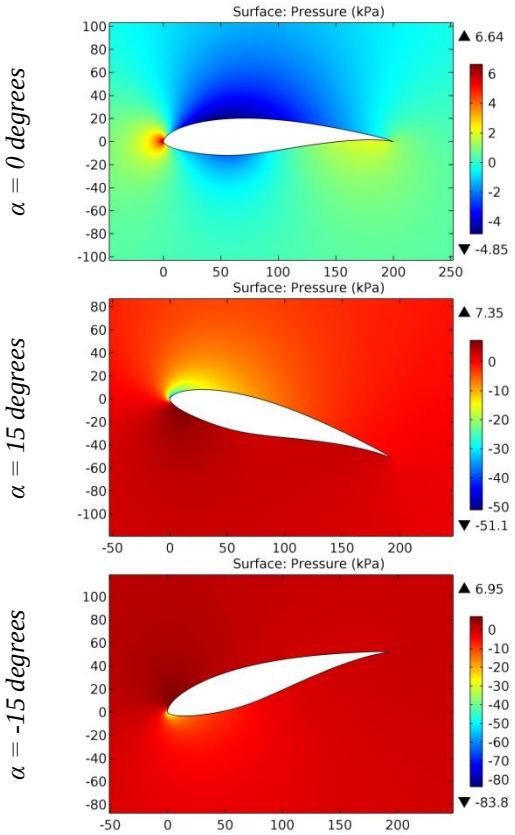


Figure 44. The pressure contours on the surfaces of the EPPLER 556 airfoil.

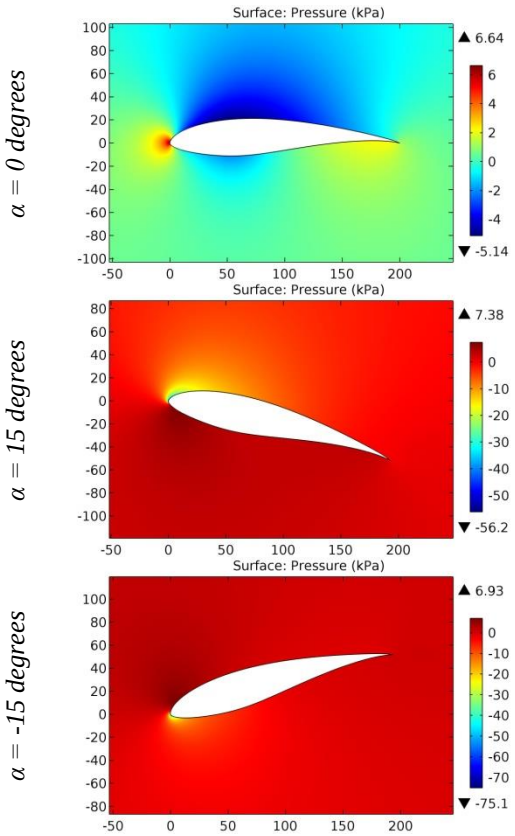


Figure 45. The pressure contours on the surfaces of the EPPLER 557 airfoil.

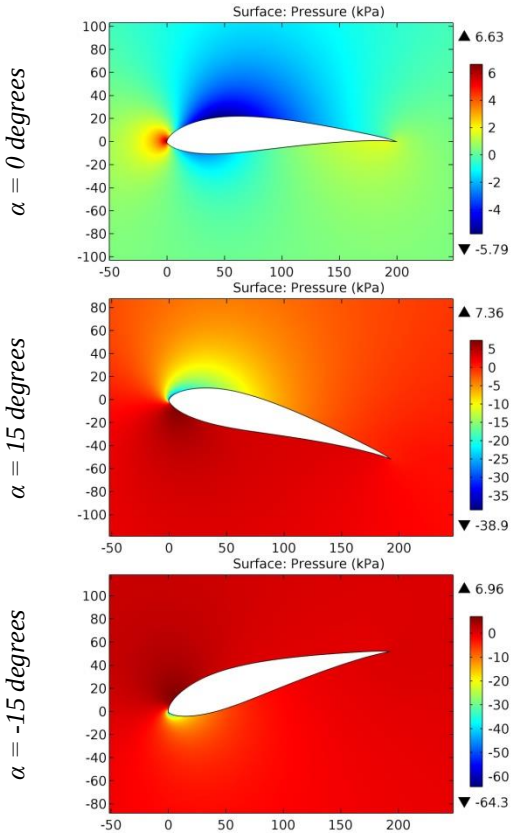


Figure 46. The pressure contours on the surfaces of the EPPLER 558 airfoil.

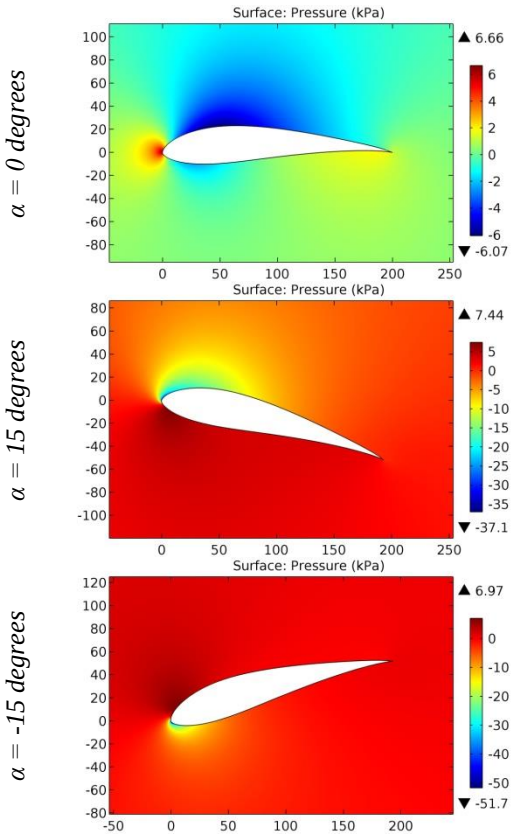


Figure 47. The pressure contours on the surfaces of the EPPLER 559 airfoil.

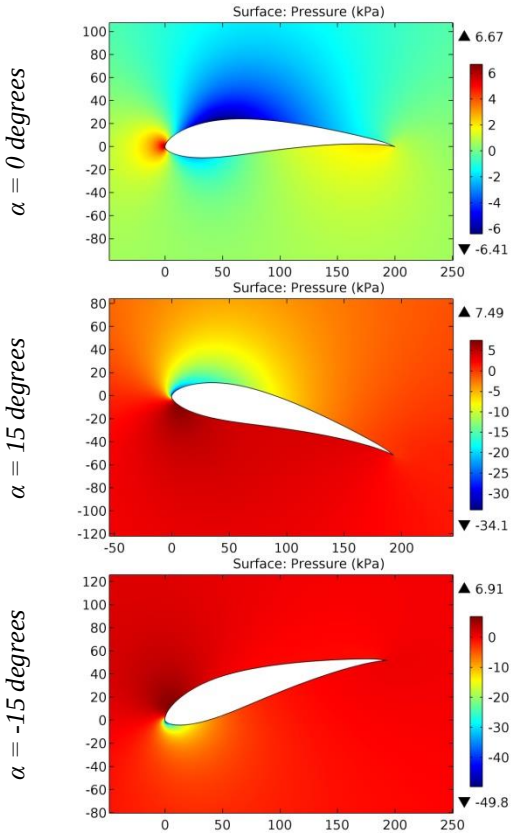


Figure 48. The pressure contours on the surfaces of the EPPLER 560 airfoil.

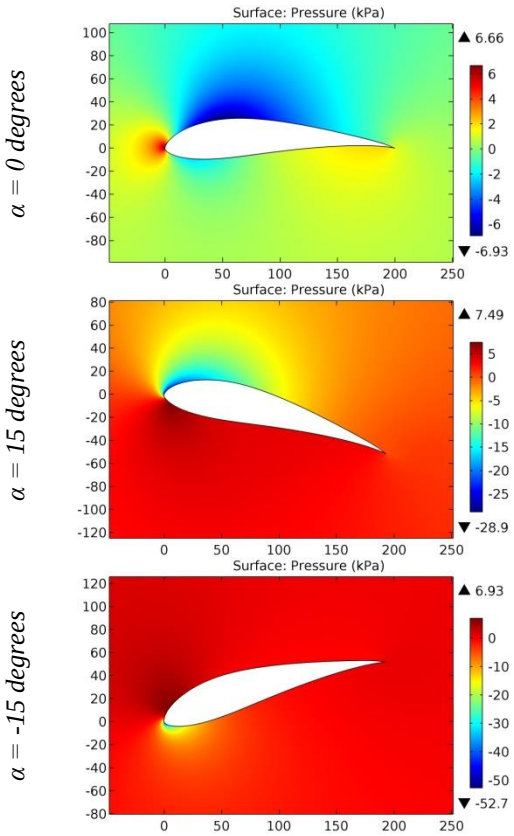


Figure 49. The pressure contours on the surfaces of the EPPLER 561 airfoil.

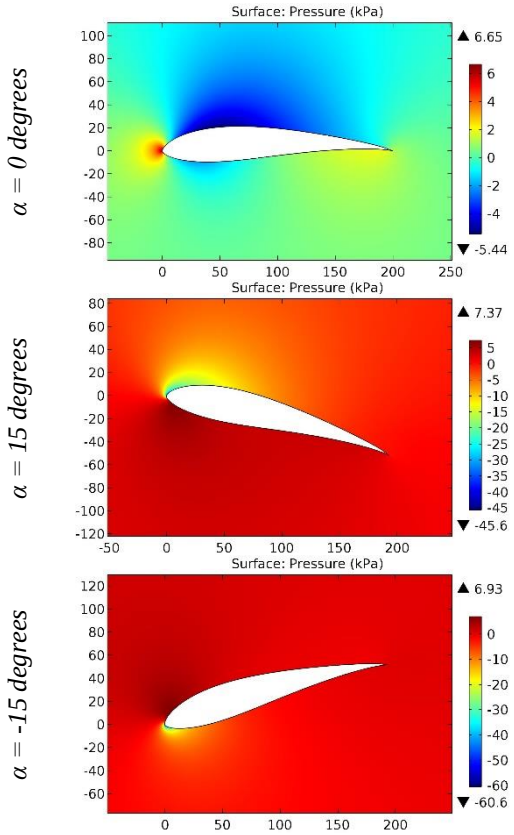


Figure 50. The pressure contours on the surfaces of the EPPLER 562 airfoil.

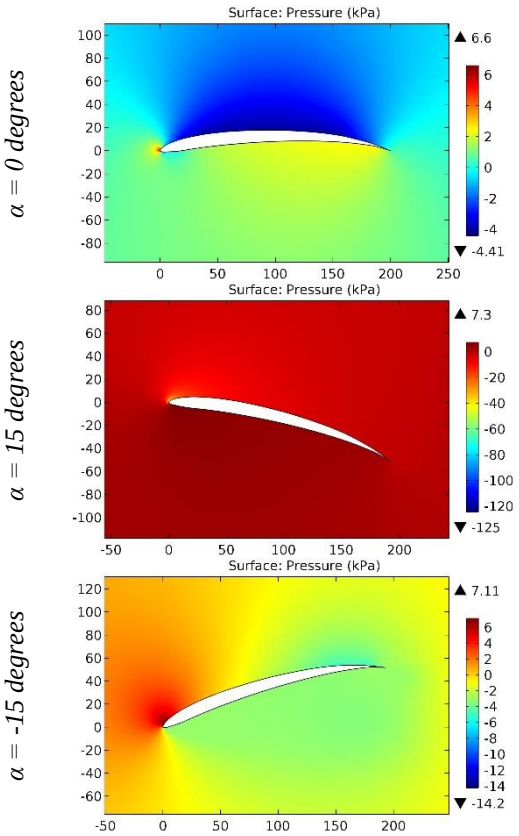


Figure 51. The pressure contours on the surfaces of the EPPLER 58 airfoil.

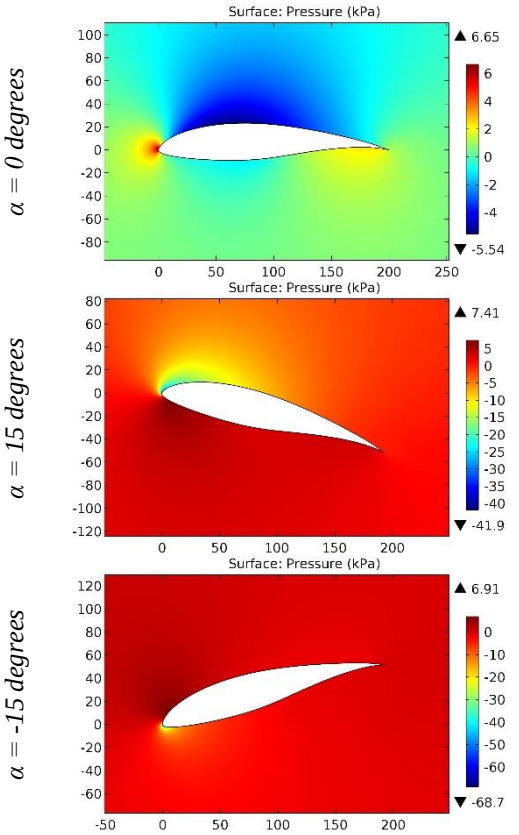


Figure 52. The pressure contours on the surfaces of the EPPLER 580 airfoil.

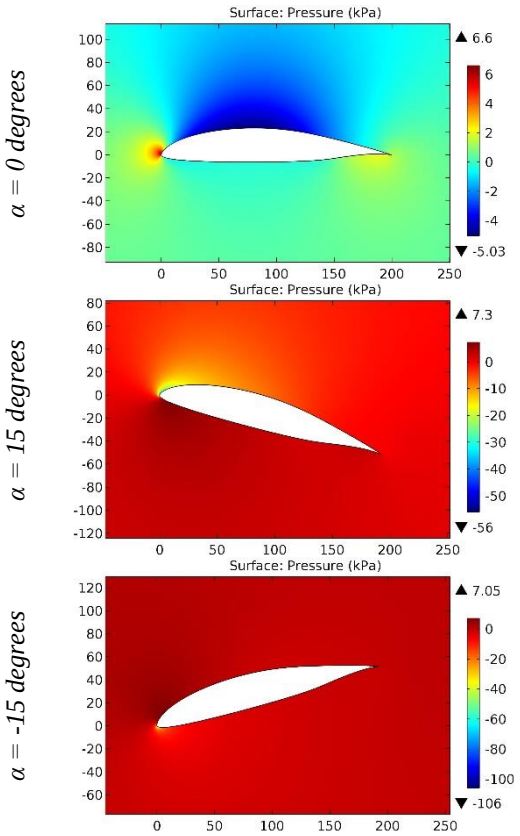


Figure 53. The pressure contours on the surfaces of the EPPLER 582 airfoil.

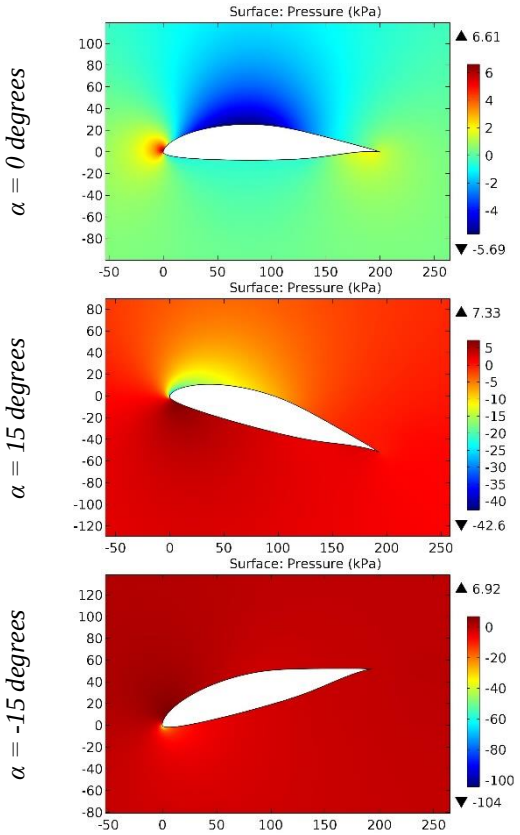


Figure 54. The pressure contours on the surfaces of the EPPLER 583 airfoil.

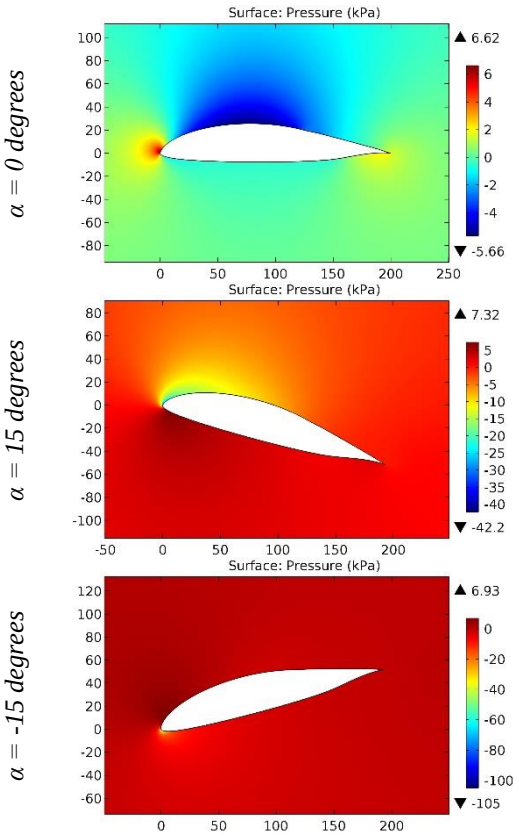


Figure 55. The pressure contours on the surfaces of the EPPLER 584 airfoil.

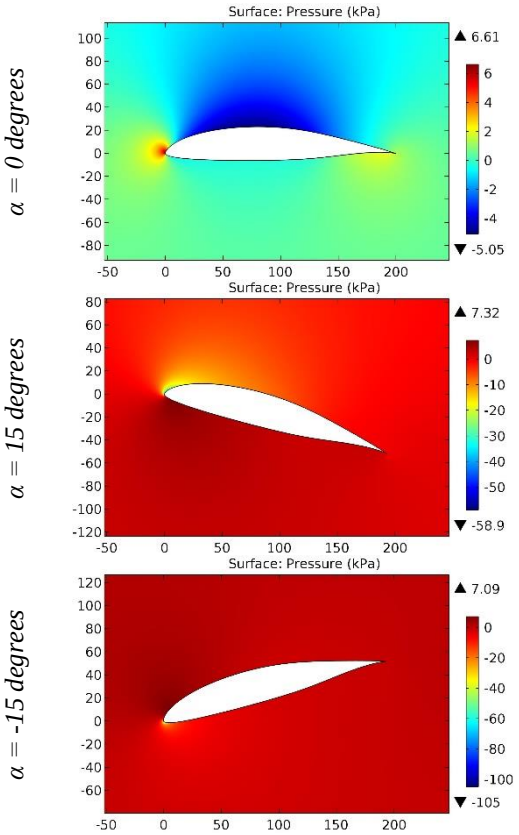


Figure 56. The pressure contours on the surfaces of the EPPLER 585 airfoil.

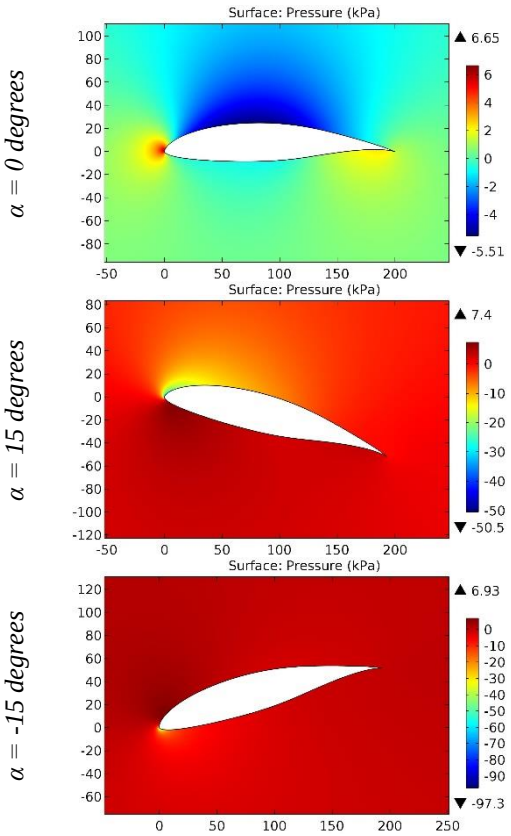


Figure 57. The pressure contours on the surfaces of the EPPLER 587 airfoil.

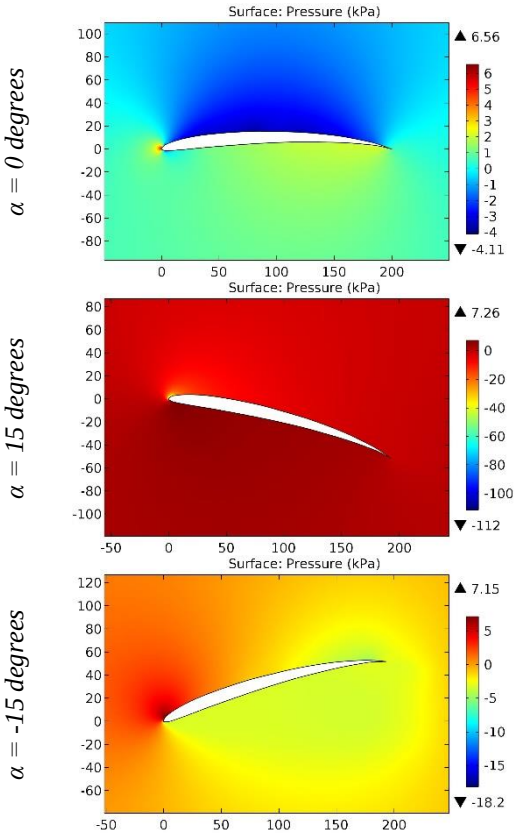


Figure 58. The pressure contours on the surfaces of the EPPLER 59 airfoil.

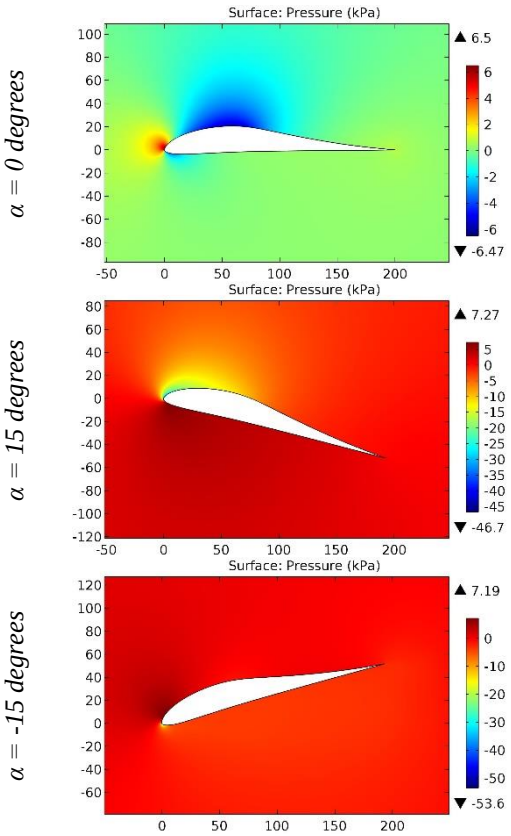


Figure 59. The pressure contours on the surfaces of the EPPLER 593 airfoil.

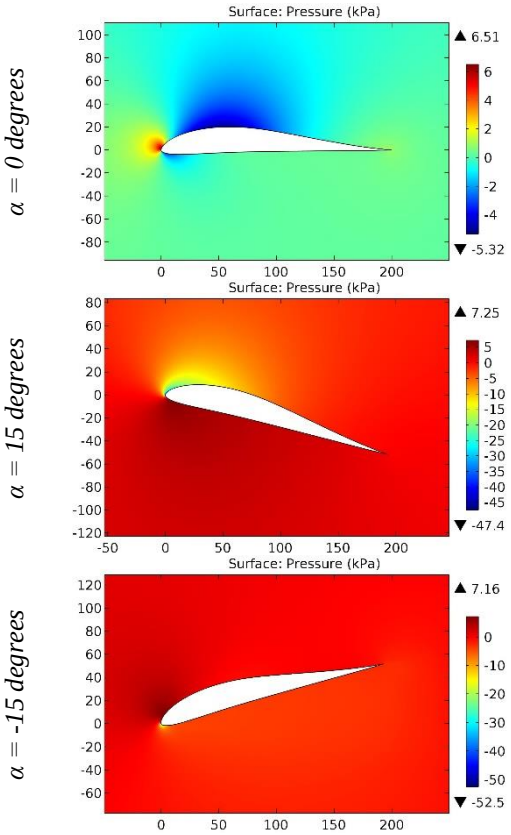


Figure 60. The pressure contours on the surfaces of the EPPLER 598 airfoil.

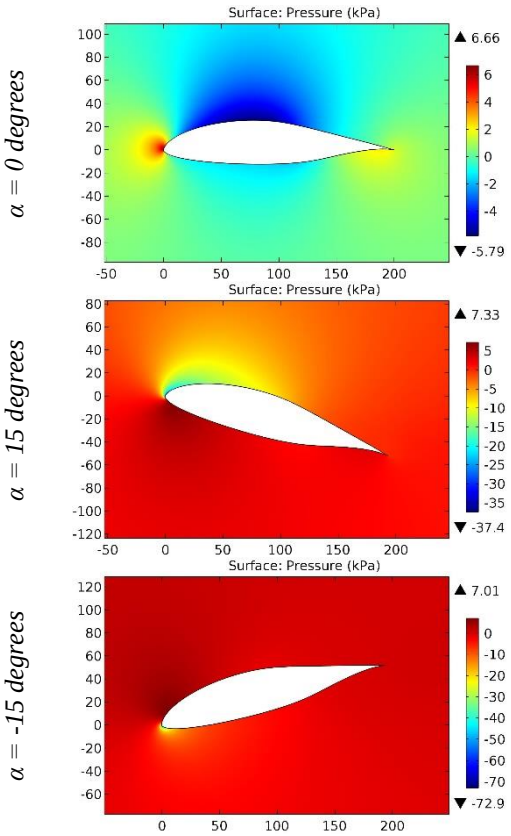


Figure 61. The pressure contours on the surfaces of the EPPLER 603 airfoil.

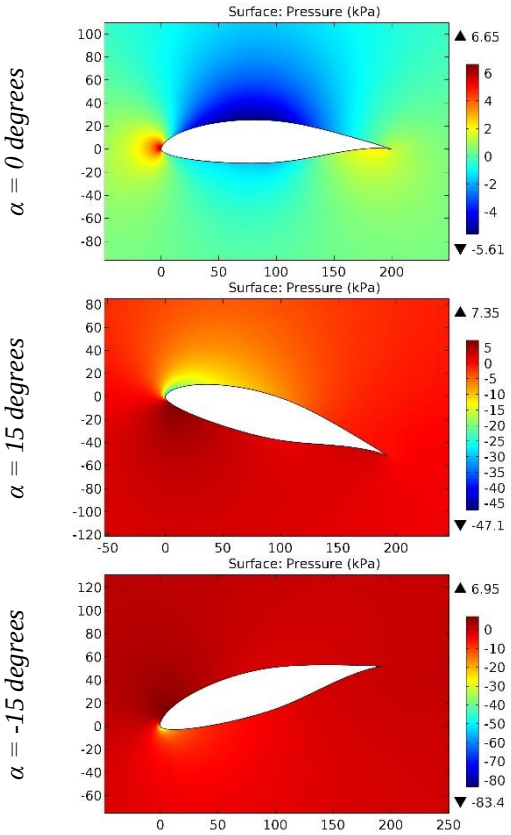


Figure 62. The pressure contours on the surfaces of the EPPLER 604 airfoil.

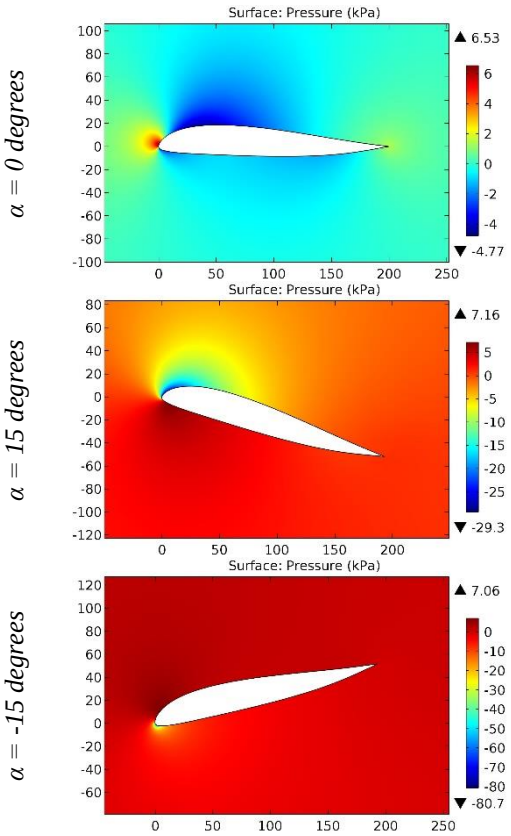


Figure 63. The pressure contours on the surfaces of the EPPLER 625 airfoil.

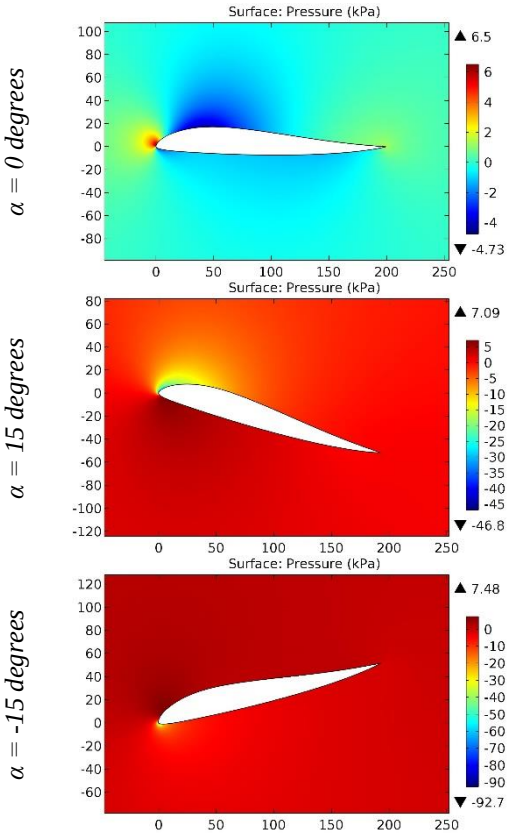


Figure 64. The pressure contours on the surfaces of the EPPLER 635 airfoil.

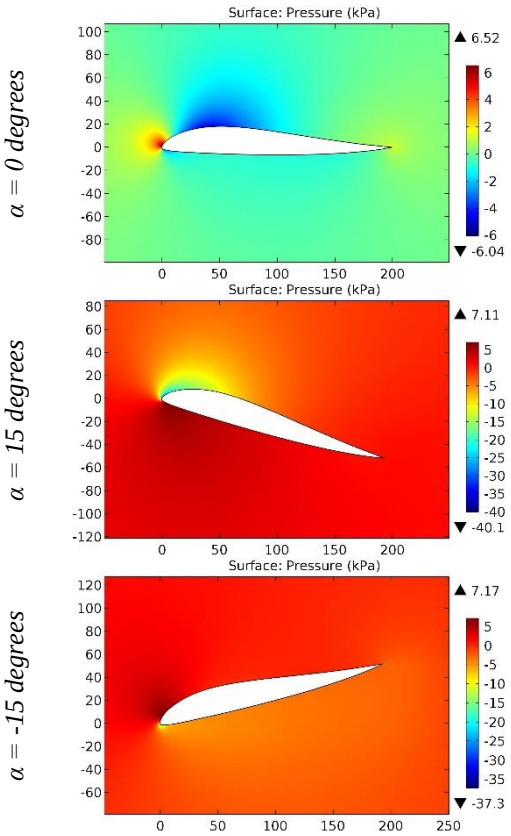


Figure 65. The pressure contours on the surfaces of the EPPLER 636 airfoil.

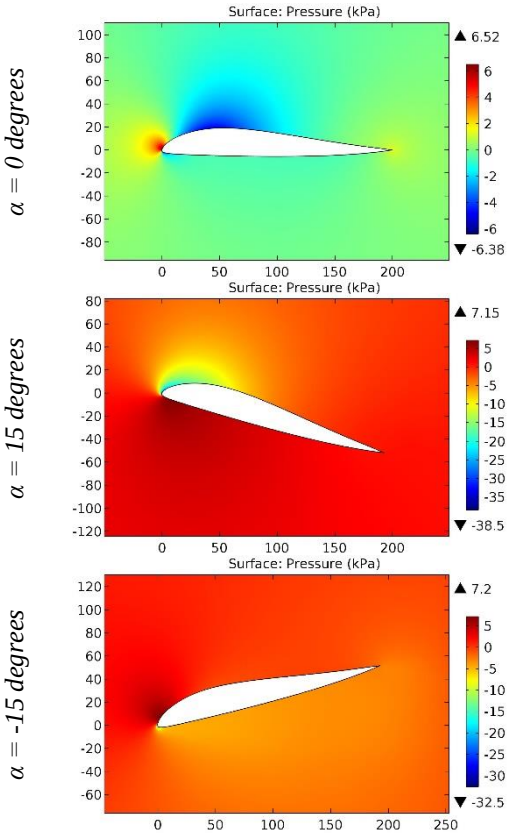


Figure 66. The pressure contours on the surfaces of the EPPLER 637 airfoil.

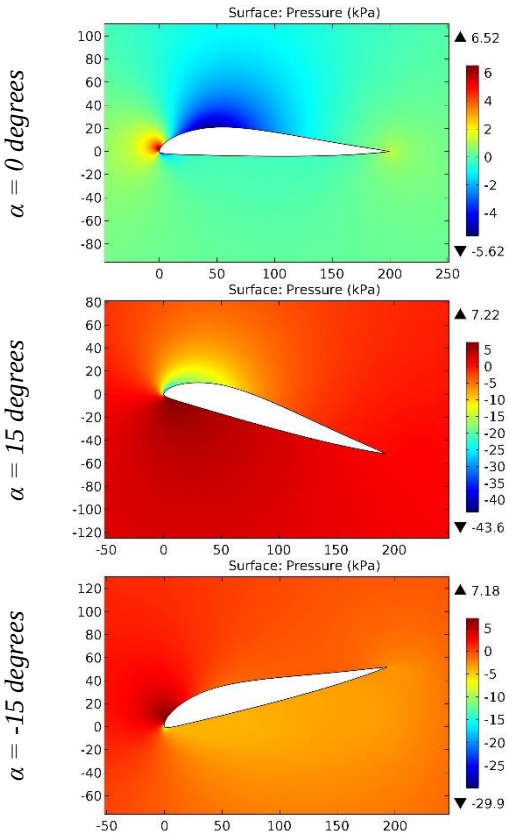


Figure 67. The pressure contours on the surfaces of the EPPLER 638 airfoil.

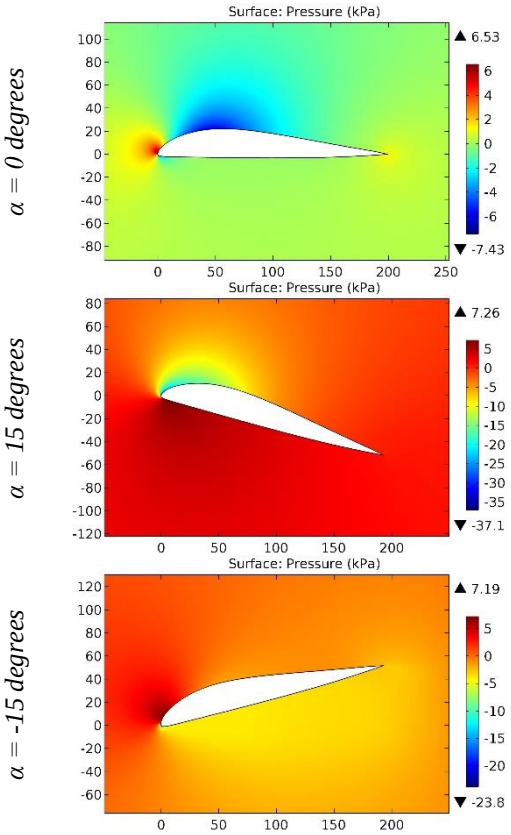


Figure 68. The pressure contours on the surfaces of the EPPLER 639 airfoil.

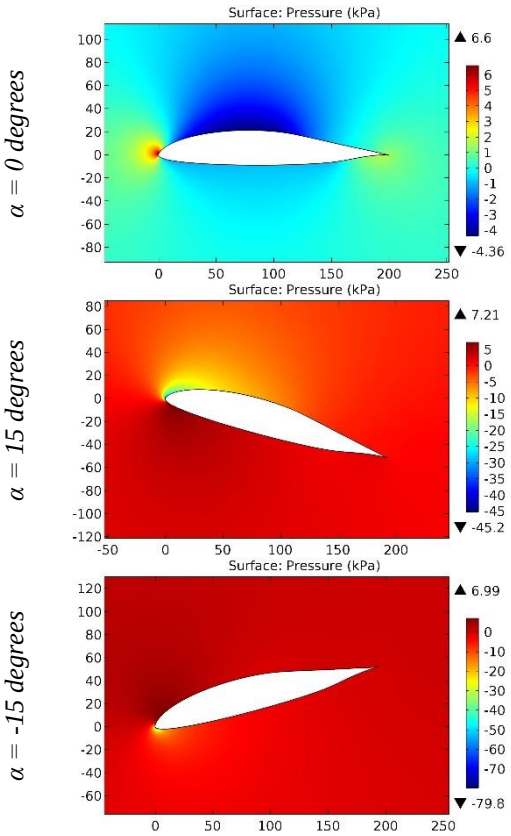


Figure 69. The pressure contours on the surfaces of the EPPLER 642 airfoil.

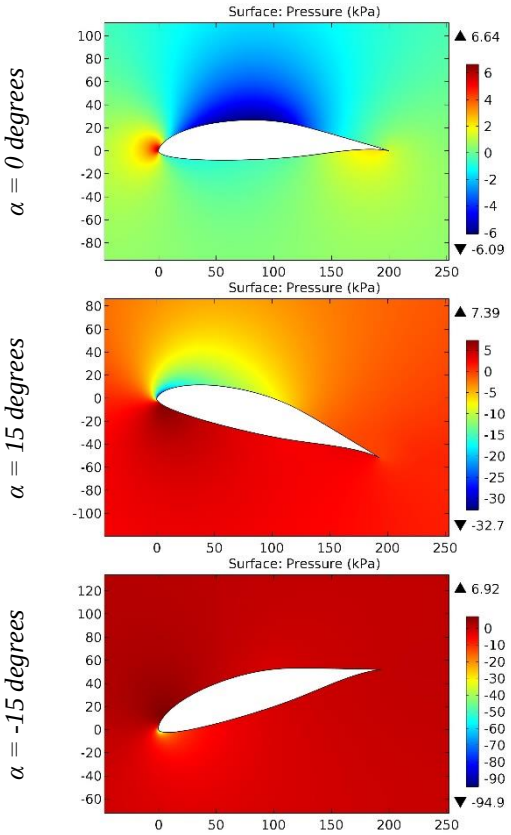


Figure 70. The pressure contours on the surfaces of the EPPLER 654 airfoil.

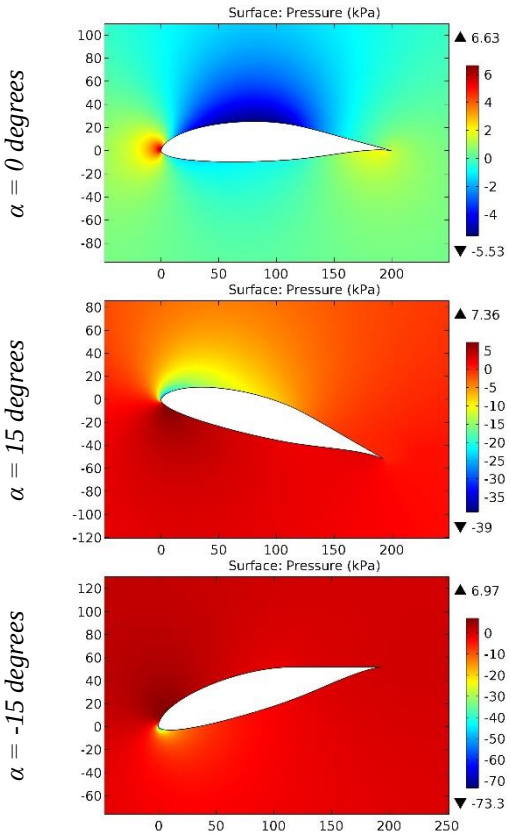


Figure 71. The pressure contours on the surfaces of the EPPLER 655 airfoil.

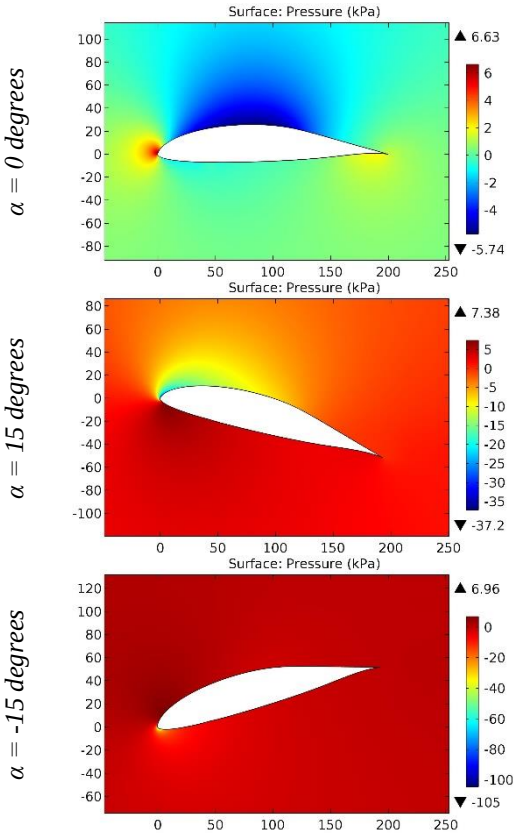


Figure 72. The pressure contours on the surfaces of the EPPLER 656 airfoil.

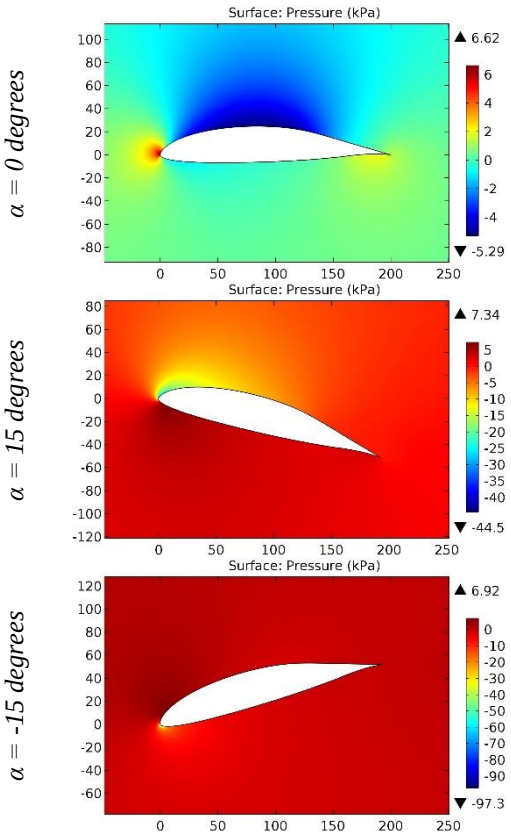


Figure 73. The pressure contours on the surfaces of the EPPLER 657 airfoil.

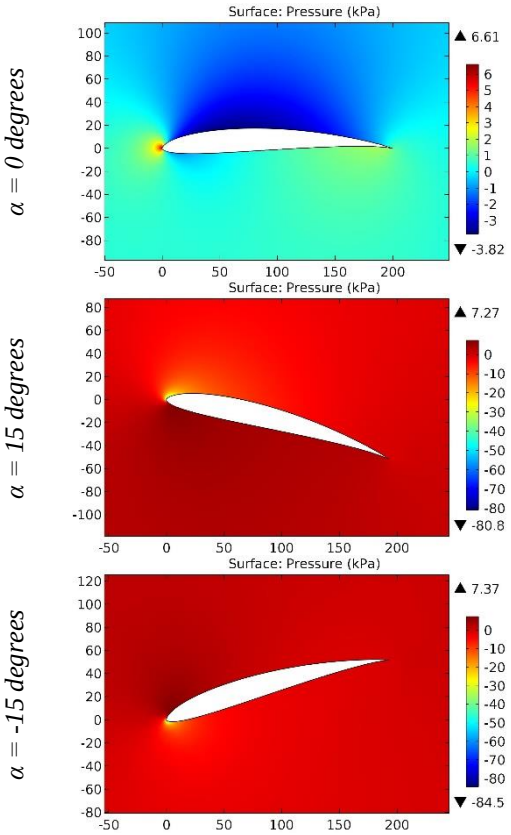


Figure 74. The pressure contours on the surfaces of the EPPLER 66 airfoil.

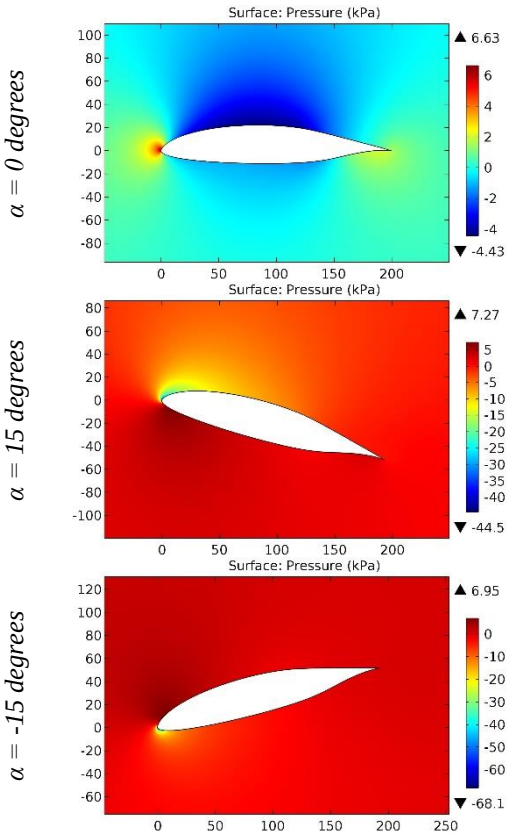


Figure 75. The pressure contours on the surfaces of the EPPLER 664 airfoil.

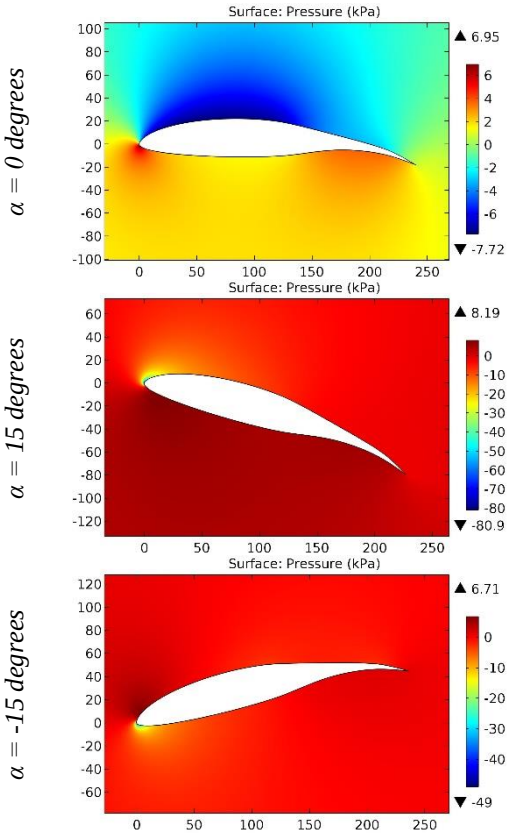


Figure 76. The pressure contours on the surfaces of the EPPLER 664 (EXTENDED) airfoil.

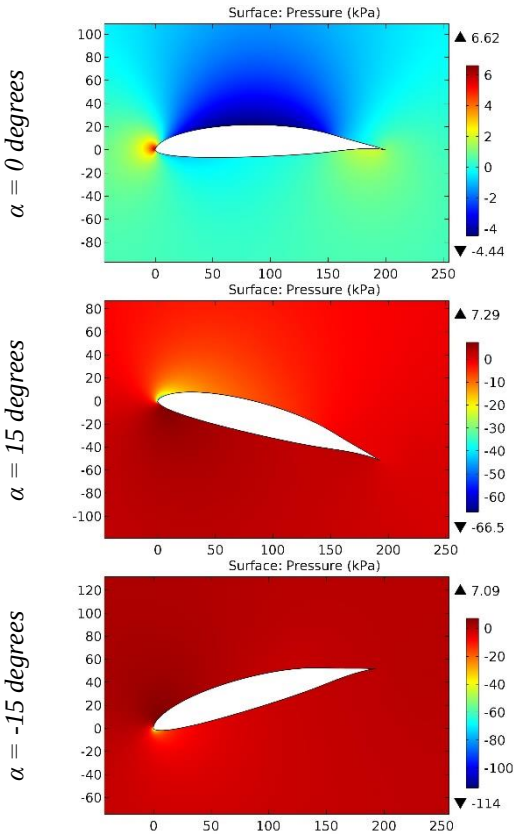


Figure 77. The pressure contours on the surfaces of the EPPLER 668 airfoil.

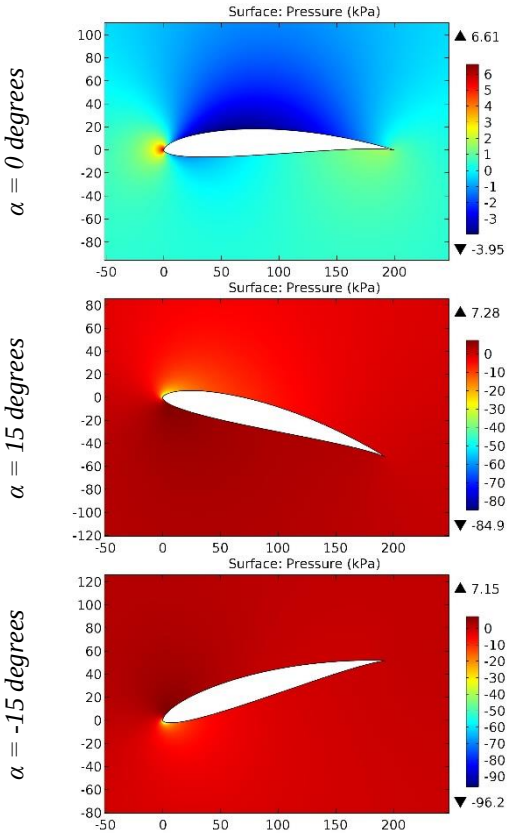


Figure 78. The pressure contours on the surfaces of the EPPLER 67 airfoil.

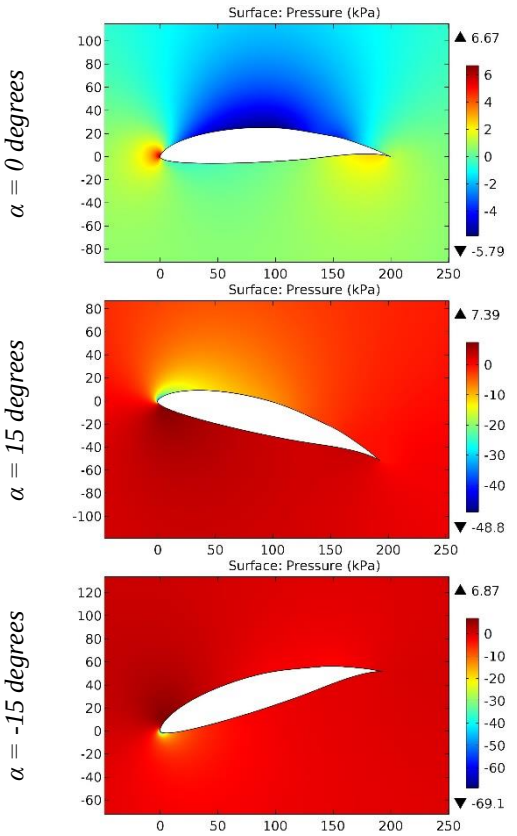


Figure 79. The pressure contours on the surfaces of the EPPLER 678 airfoil.

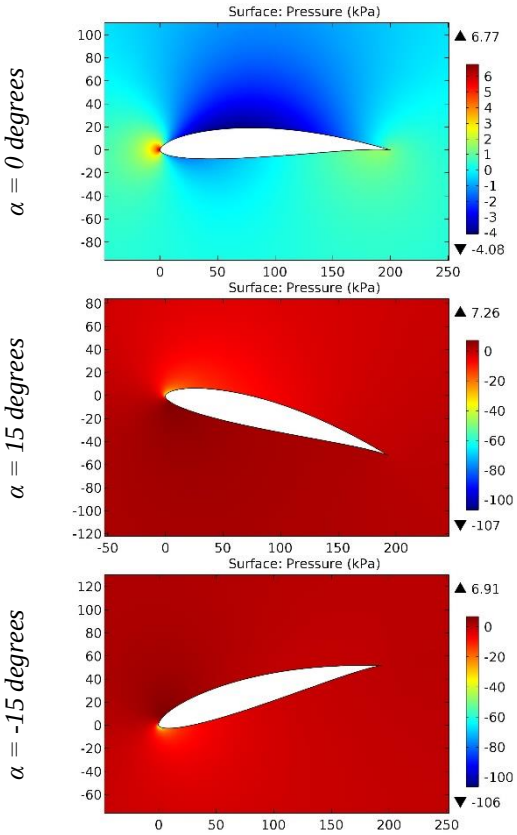


Figure 80. The pressure contours on the surfaces of the EPPLER 68 airfoil.

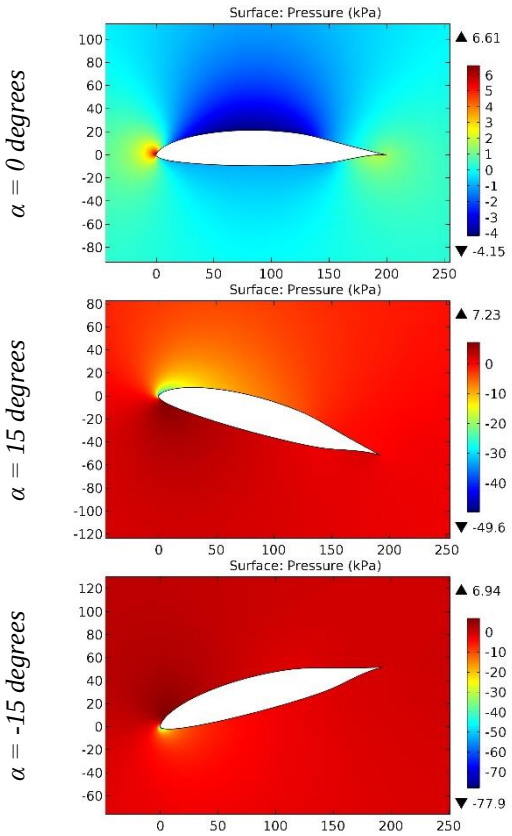


Figure 81. The pressure contours on the surfaces of the EPPLER 682 airfoil.

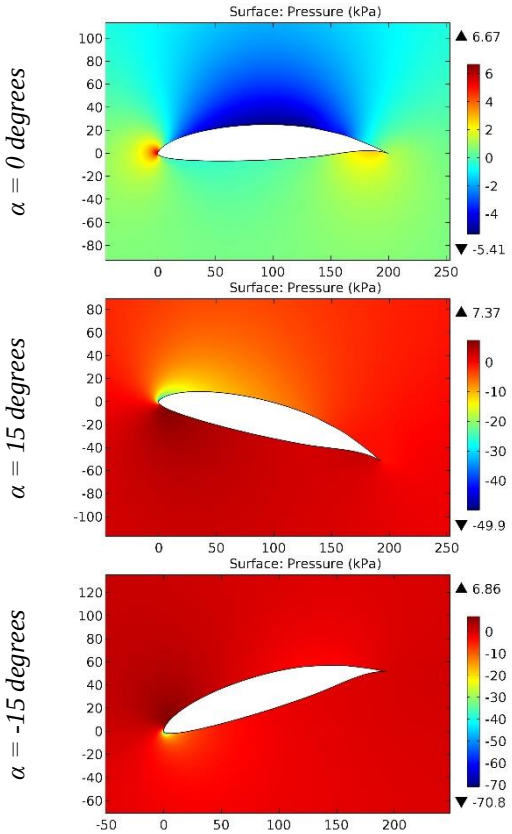


Figure 82. The pressure contours on the surfaces of the EPPLER 694 airfoil.

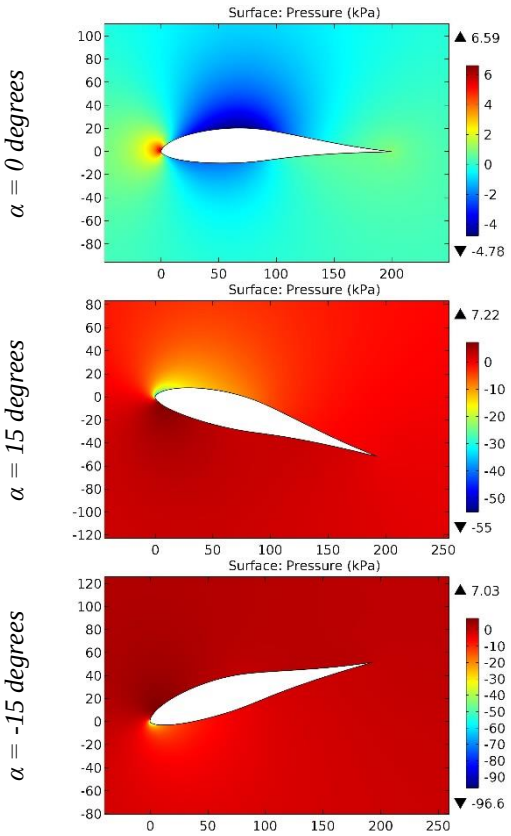


Figure 83. The pressure contours on the surfaces of the EPPLER 715 airfoil.

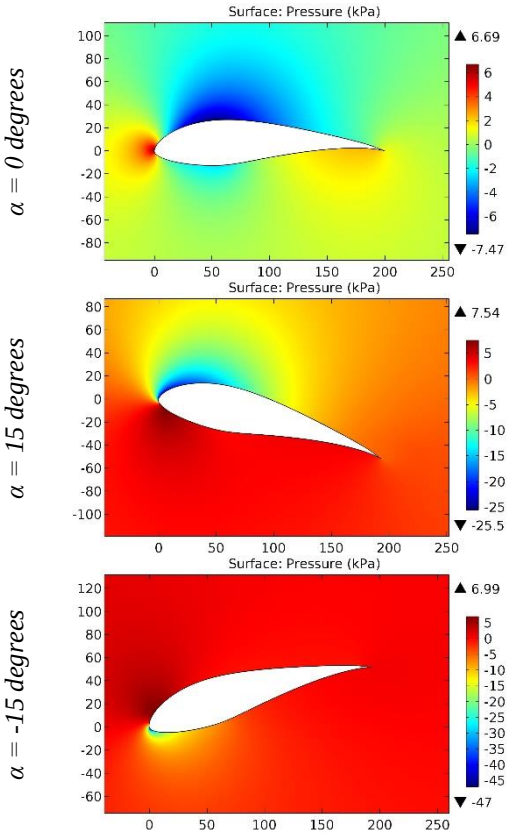


Figure 84. The pressure contours on the surfaces of the EPPLER 748 airfoil.

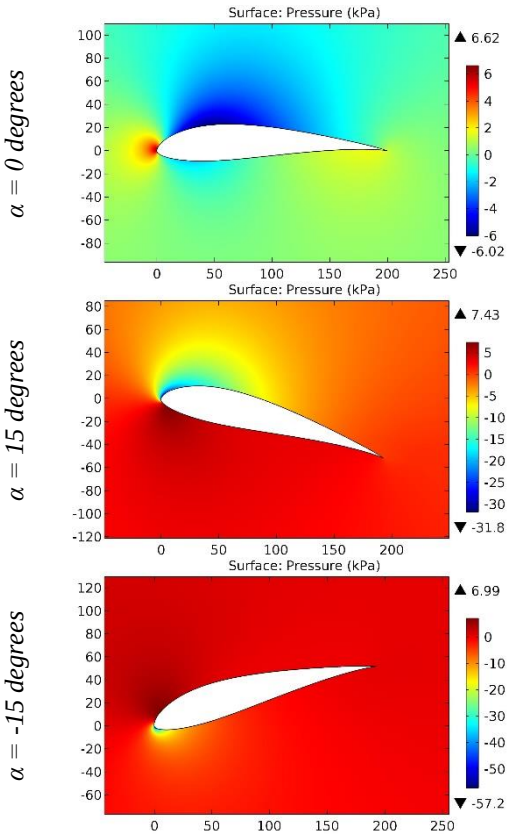


Figure 85. The pressure contours on the surfaces of the EPPLER 793 airfoil.

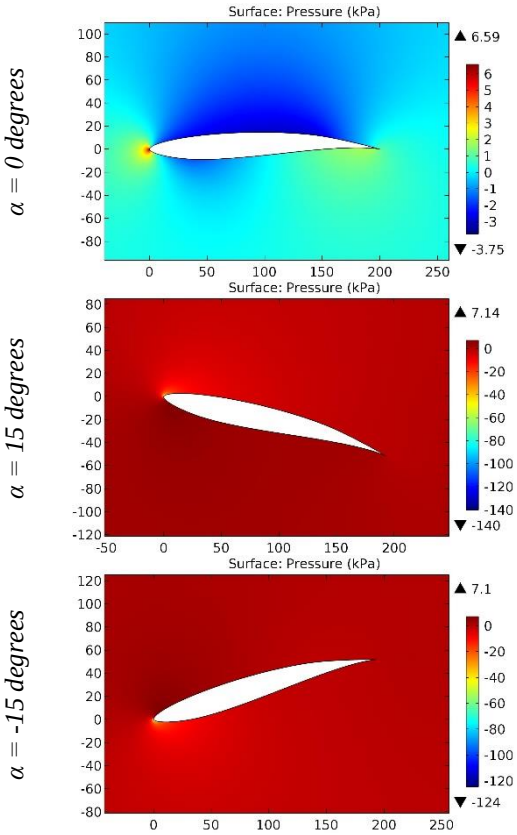


Figure 86. The pressure contours on the surfaces of the EPPLER 817 HYDROFOIL.

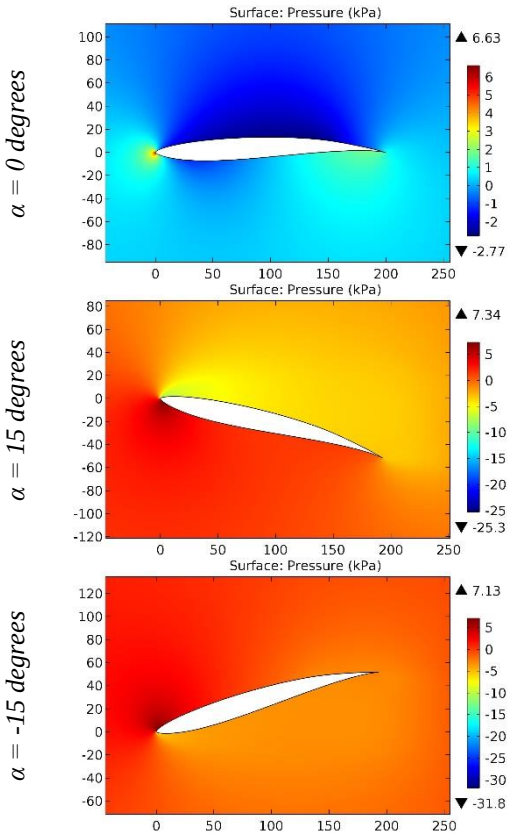


Figure 87. The pressure contours on the surfaces of the EPPLER 818 HYDROFOIL.

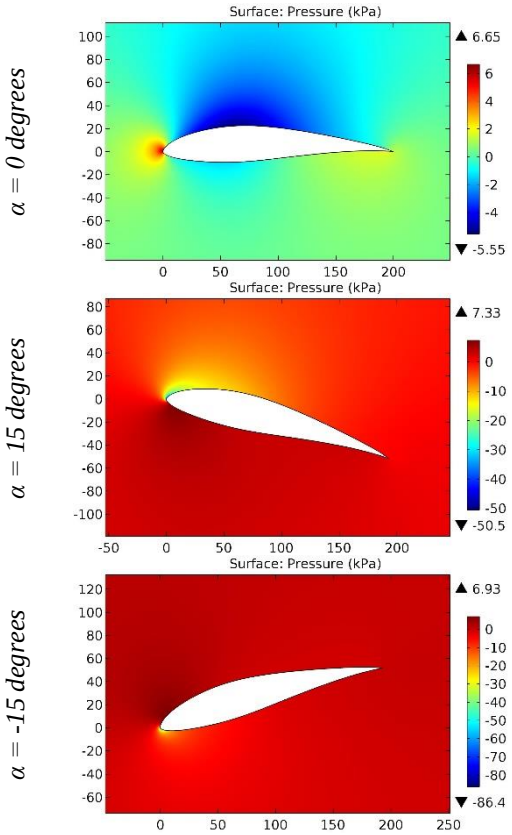


Figure 88. The pressure contours on the surfaces of the EPPLER 855 airfoil.

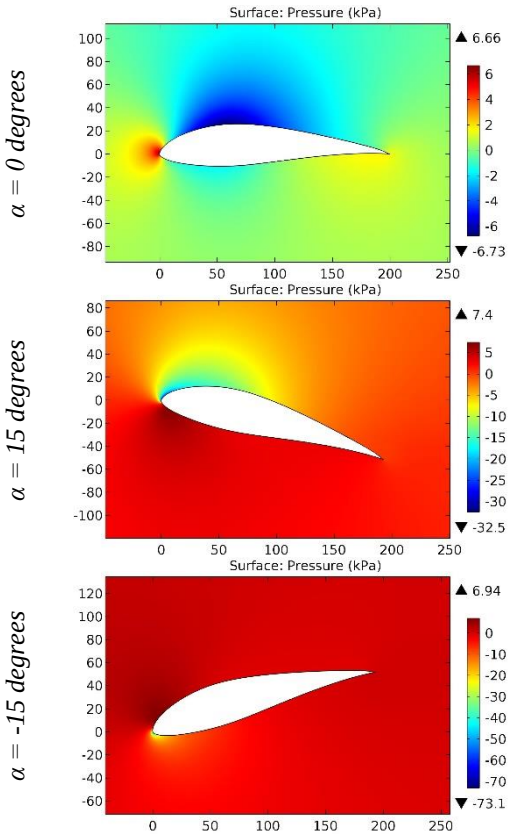


Figure 89. The pressure contours on the surfaces of the EPPLER 856 airfoil.

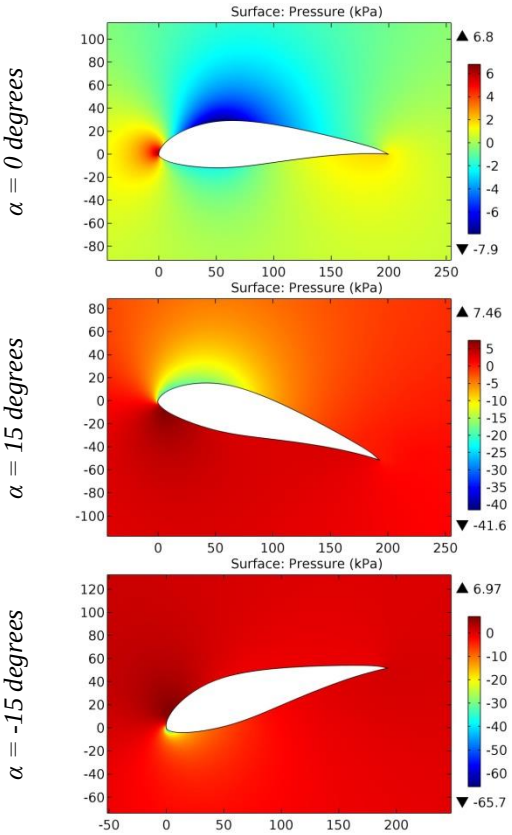


Figure 90. The pressure contours on the surfaces of the EPPLER 857 airfoil.

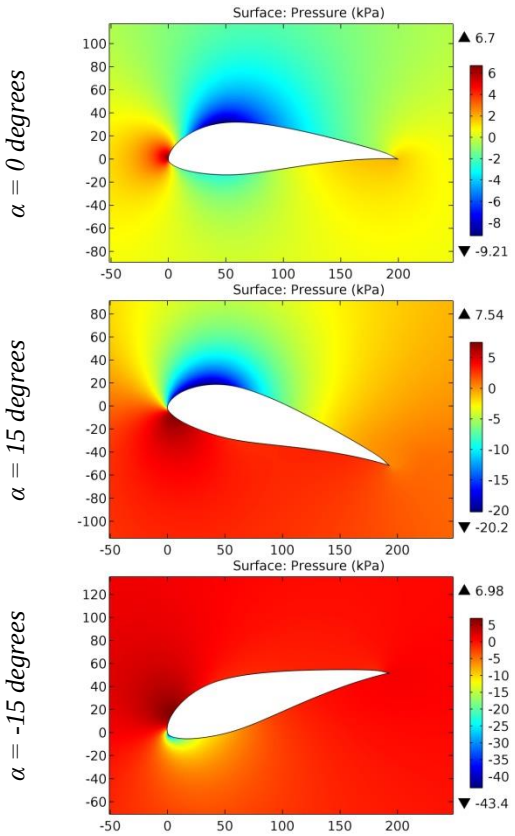


Figure 91. The pressure contours on the surfaces of the EPPLER 858 airfoil.

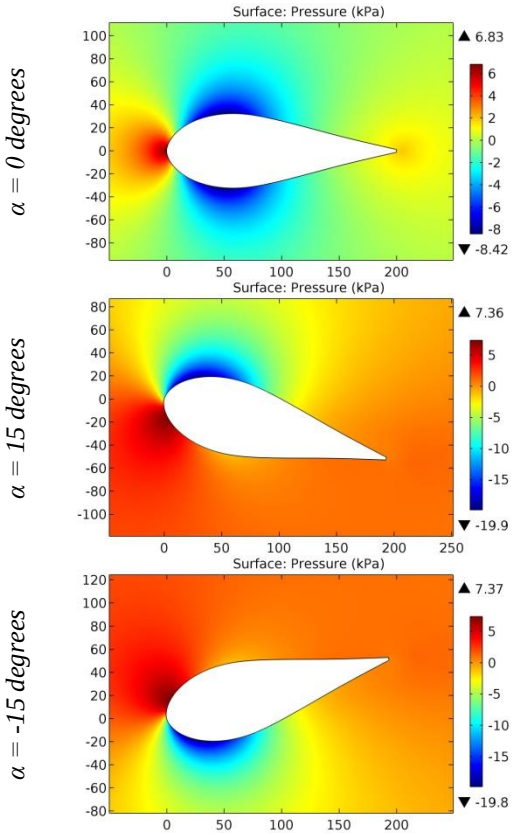


Figure 92. The pressure contours on the surfaces of the EPPLER 862 STRUT airfoil.

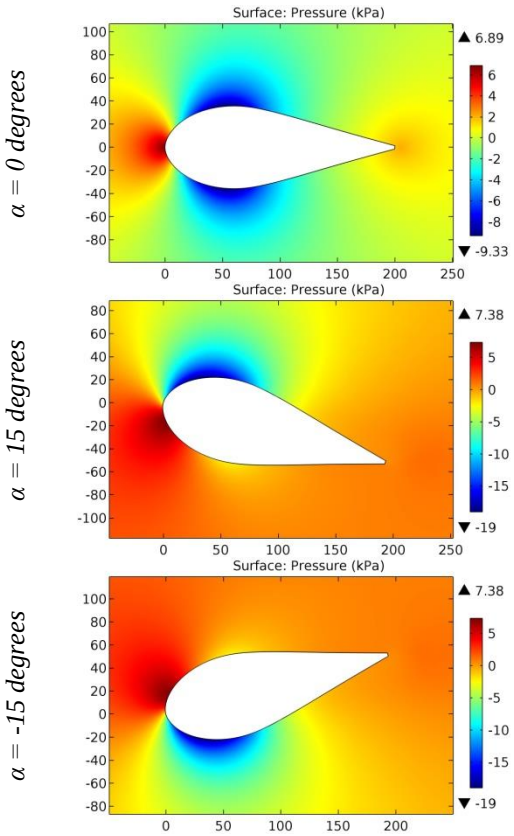


Figure 93. The pressure contours on the surfaces of the EPPLER 863 STRUT airfoil.

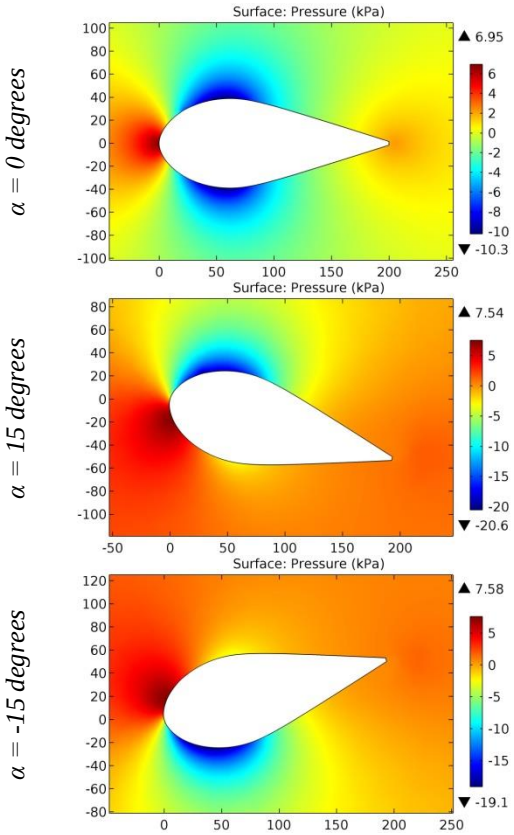


Figure 94. The pressure contours on the surfaces of the EPPLER 864 STRUT airfoil.

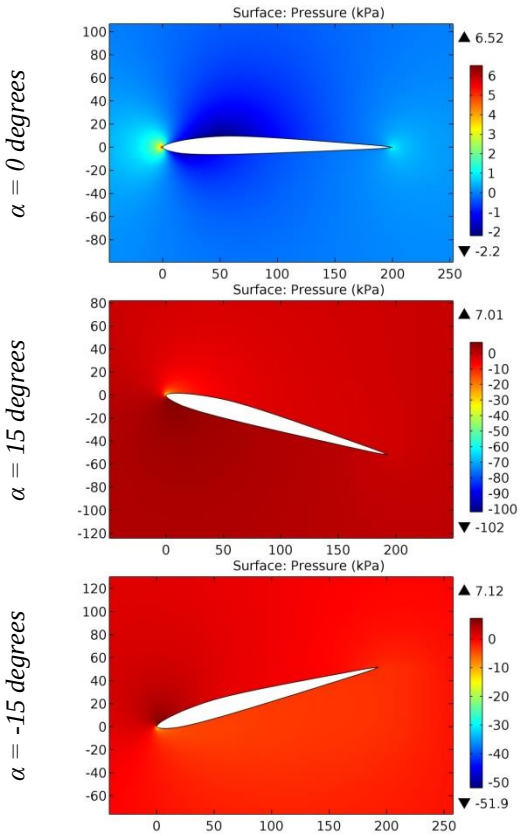


Figure 95. The pressure contours on the surfaces of the EPPLER 874 HYDROFOIL.

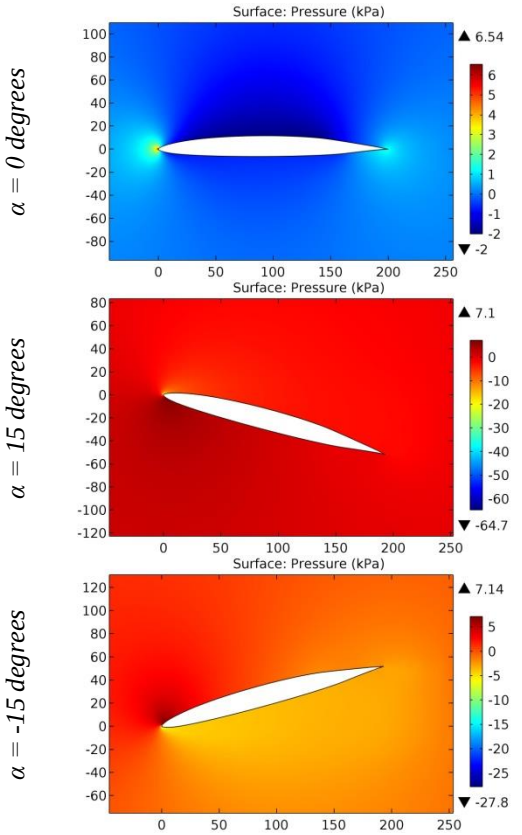


Figure 96. The pressure contours on the surfaces of the EPPLER 904 airfoil.

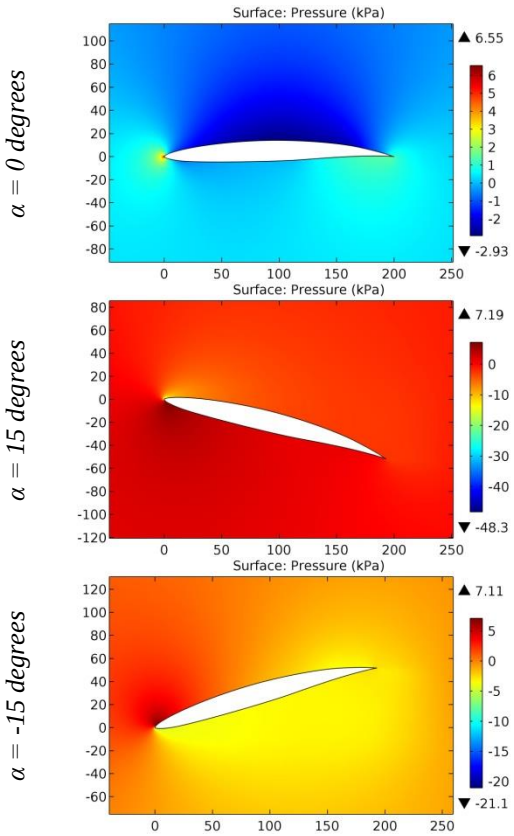


Figure 97. The pressure contours on the surfaces of the EPPLER 908 airfoil.

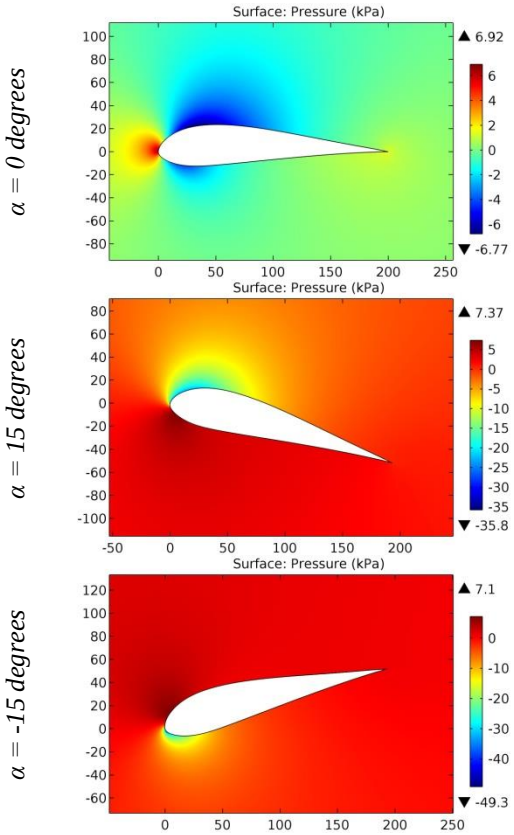


Figure 98. The pressure contours on the surfaces of the EPPLER E1212 airfoil.

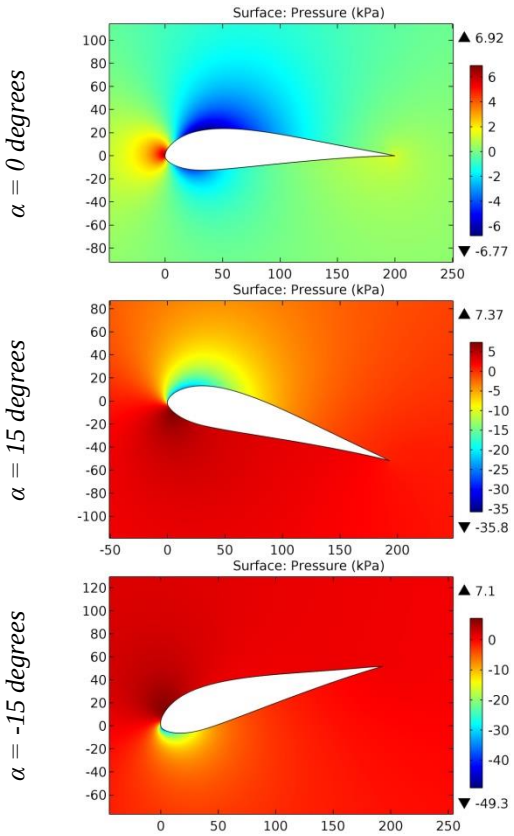


Figure 99. The pressure contours on the surfaces of the EPPLER E1212MOD airfoil.

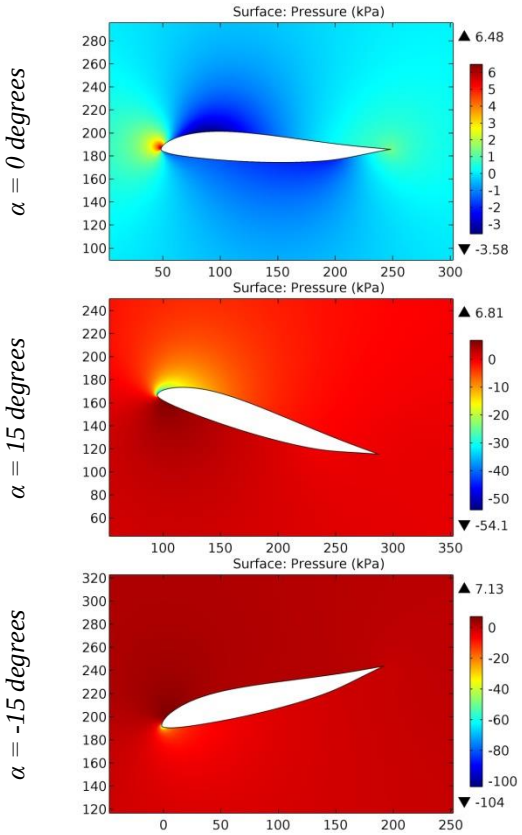


Figure 100. The pressure contours on the surfaces of the Eppler E325 airfoil.

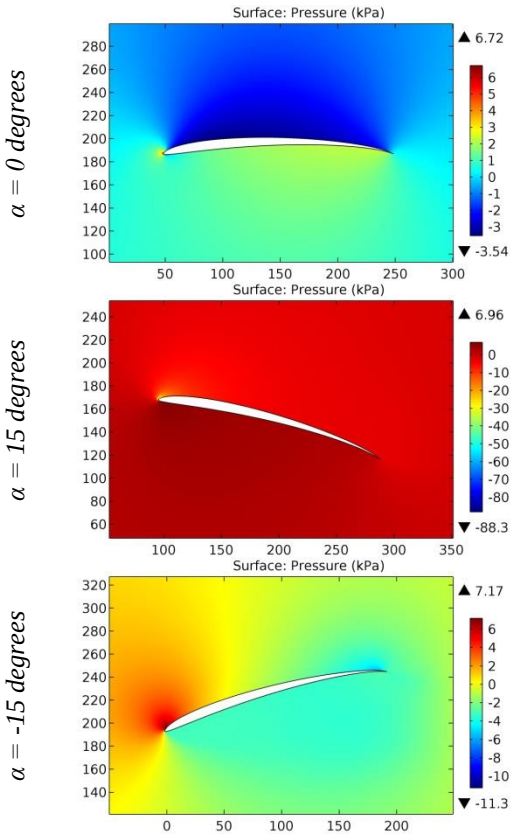


Figure 101. The pressure contours on the surfaces of the Eppler E63 airfoil.

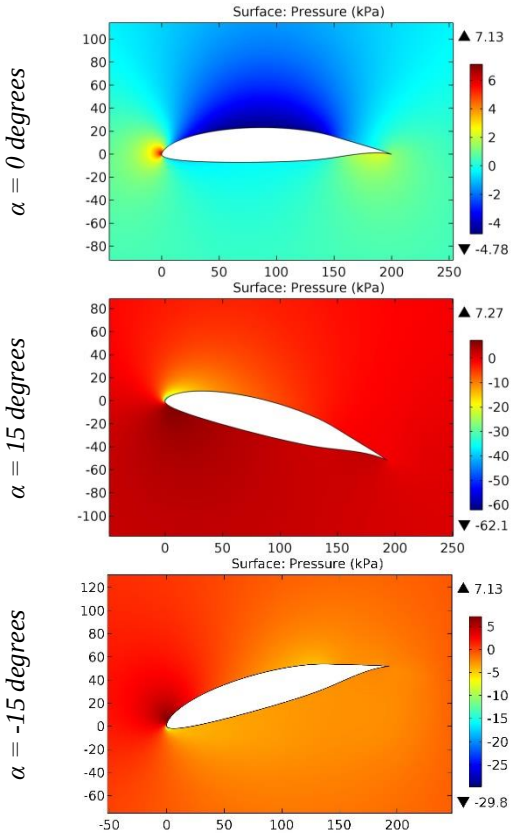


Figure 102. The pressure contours on the surfaces of the EPPLER E662 airfoil.

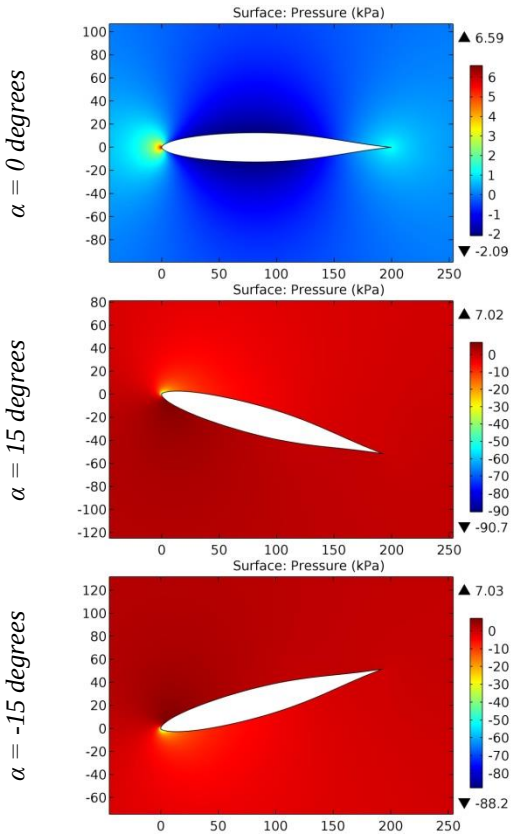


Figure 103. The pressure contours on the surfaces of the EPPLER E836 HYDROFOIL.

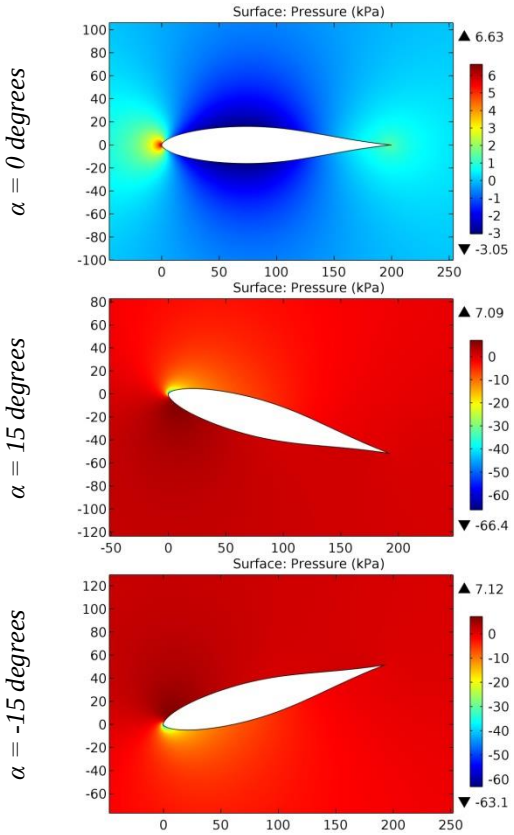


Figure 104. The pressure contours on the surfaces of the EPPLER E837 HYDROFOIL.

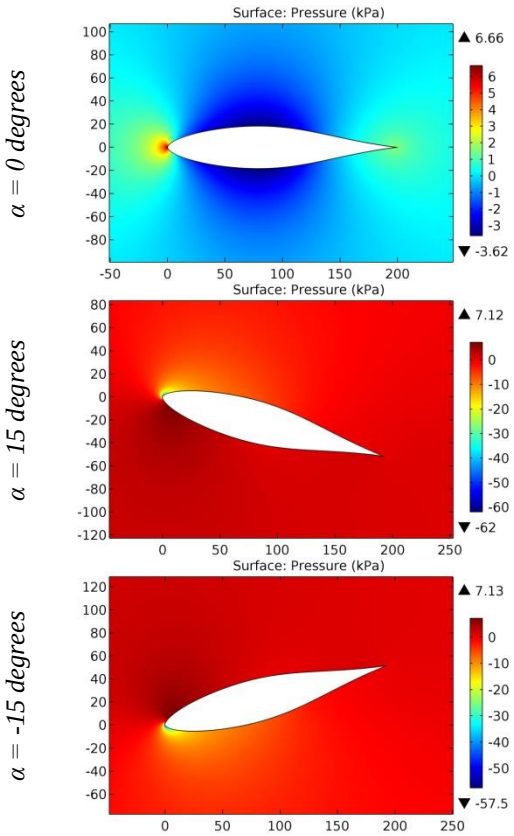


Figure 105. The pressure contours on the surfaces of the EPPLER E838 HYDROFOIL.

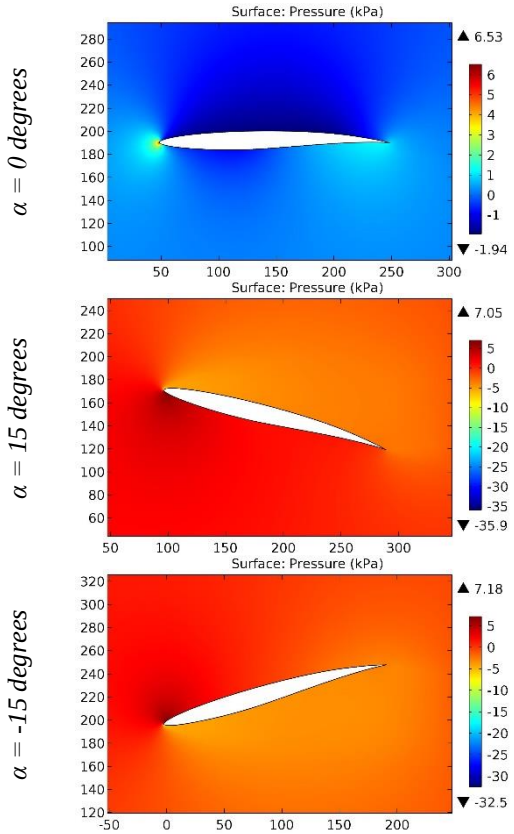


Figure 106. The pressure contours on the surfaces of the EPPLER E850 airfoil.

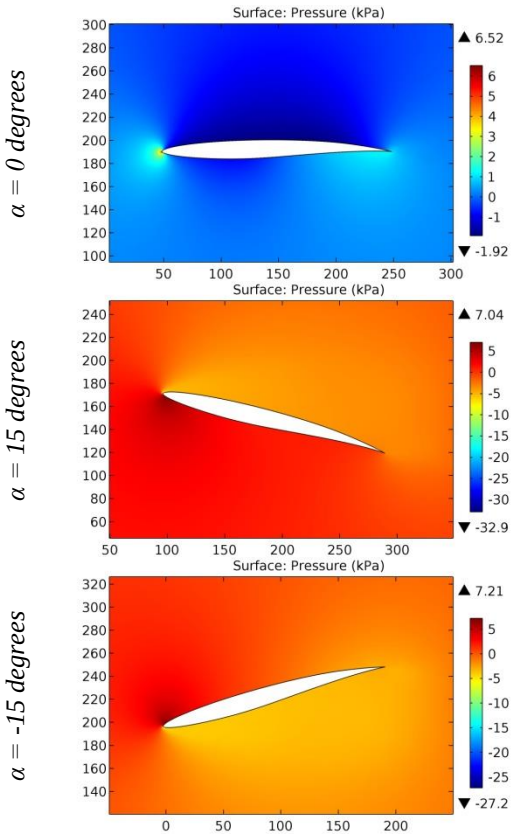


Figure 107. The pressure contours on the surfaces of the Eppler E850 propeller airfoil.

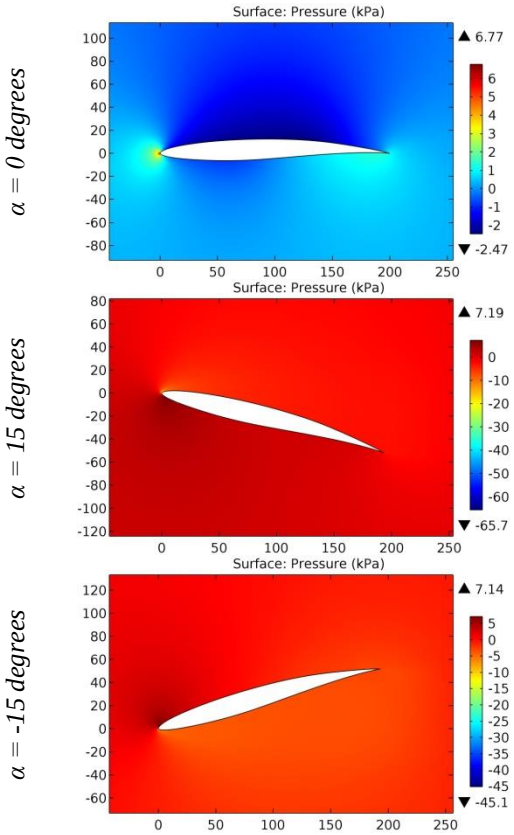


Figure 108. The pressure contours on the surfaces of the EPPLER E851 airfoil.

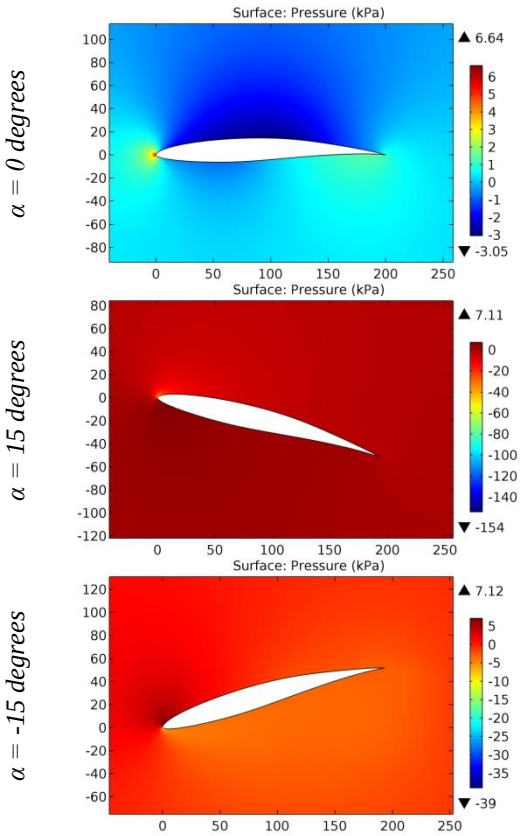


Figure 109. The pressure contours on the surfaces of the EPPLER E852 airfoil.

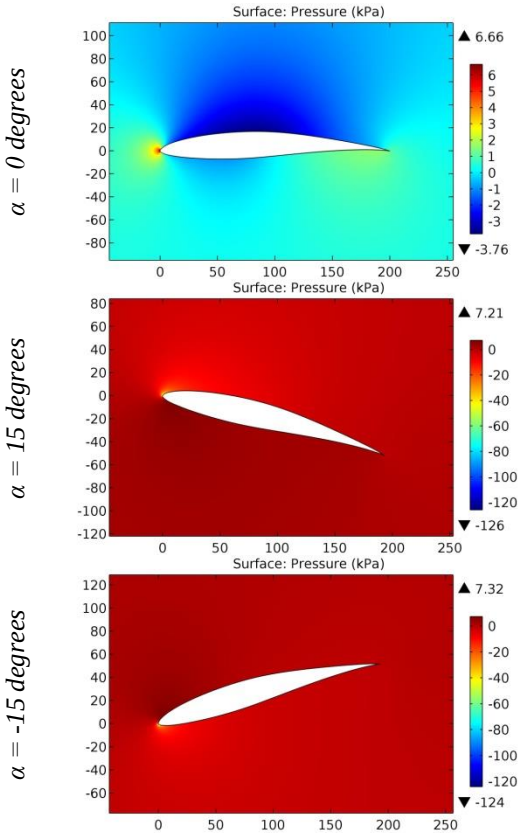


Figure 110. The pressure contours on the surfaces of the EPPLER E853 airfoil.

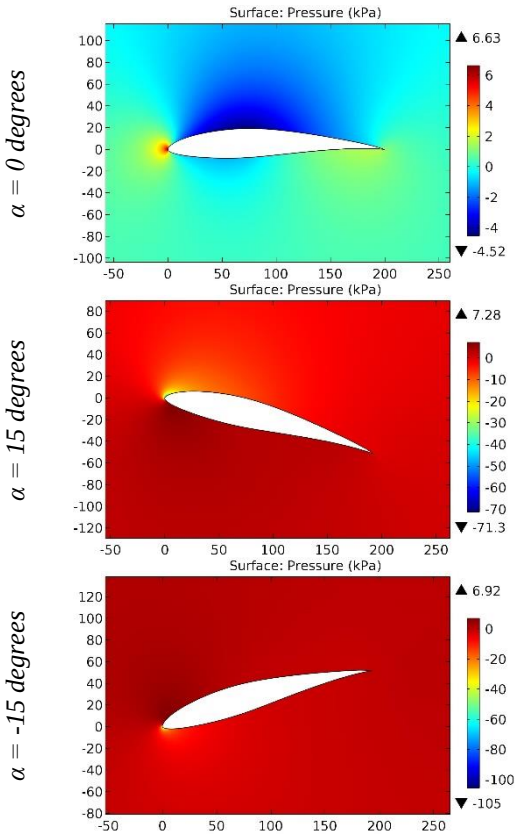


Figure 111. The pressure contours on the surfaces of the EPPLER E854 airfoil.

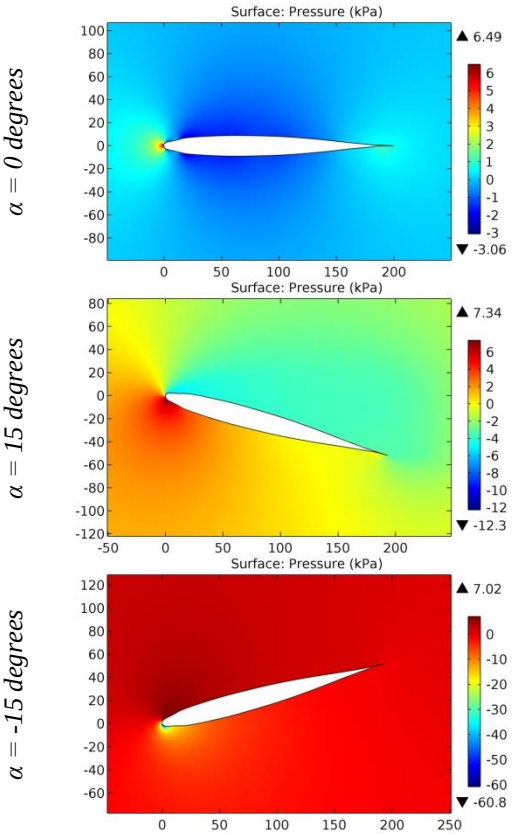


Figure 112. The pressure contours on the surfaces of the Eppler EA 6 [-1] – 009 airfoil.

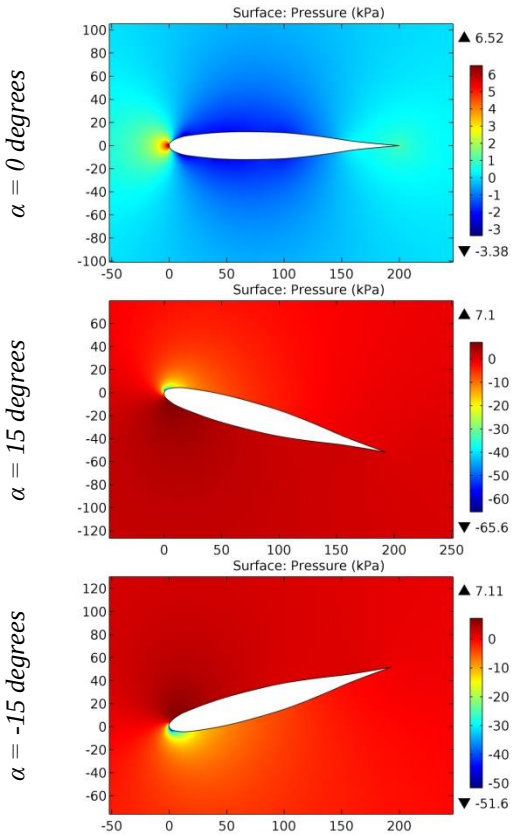


Figure 113. The pressure contours on the surfaces of the Eppler EA 6 [-1] – 012 airfoil.

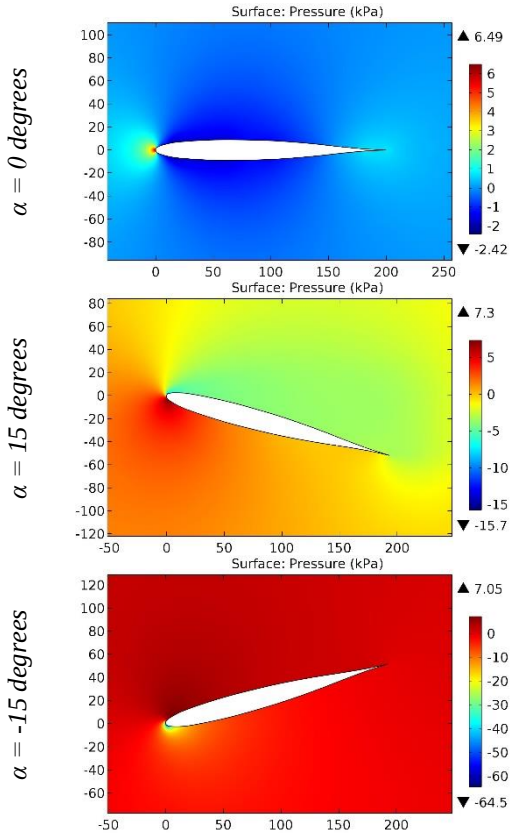


Figure 114. The pressure contours on the surfaces of the EPPLER EA 6(-1)-009 airfoil.

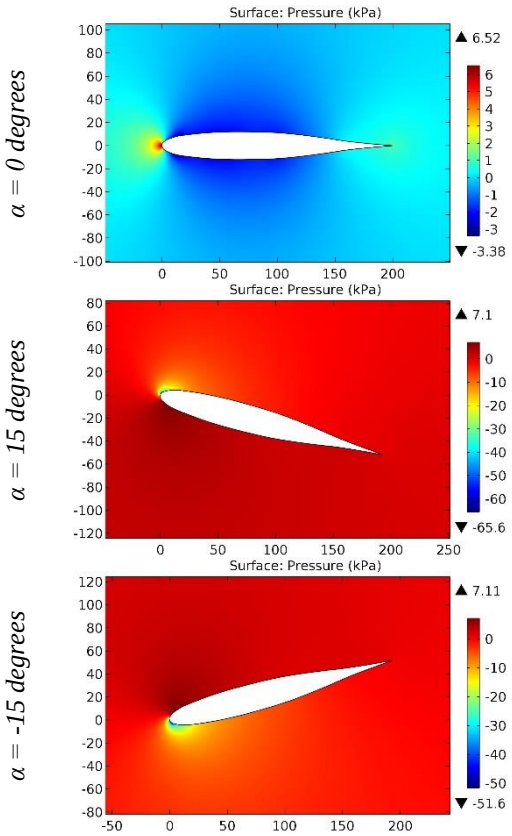


Figure 115. The pressure contours on the surfaces of the EPPLER EA 6(-1)-012 airfoil.

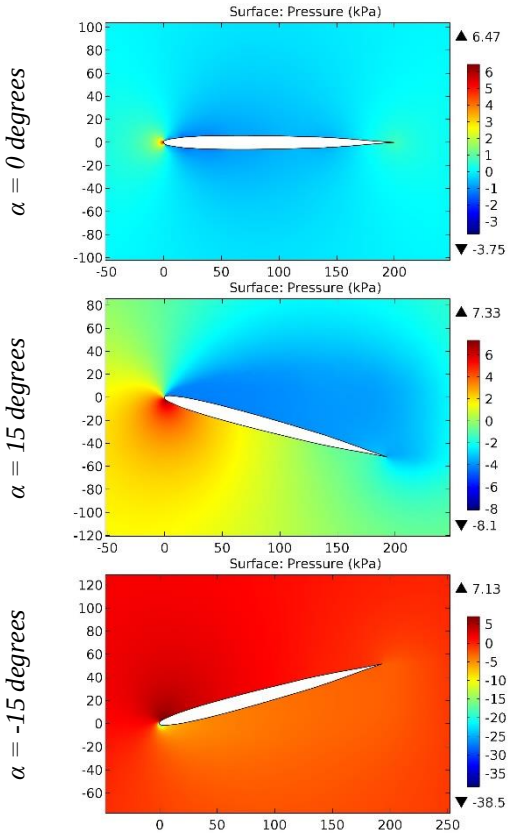


Figure 116. The pressure contours on the surfaces of the Eppler EA 8 [-1] – 006 airfoil.

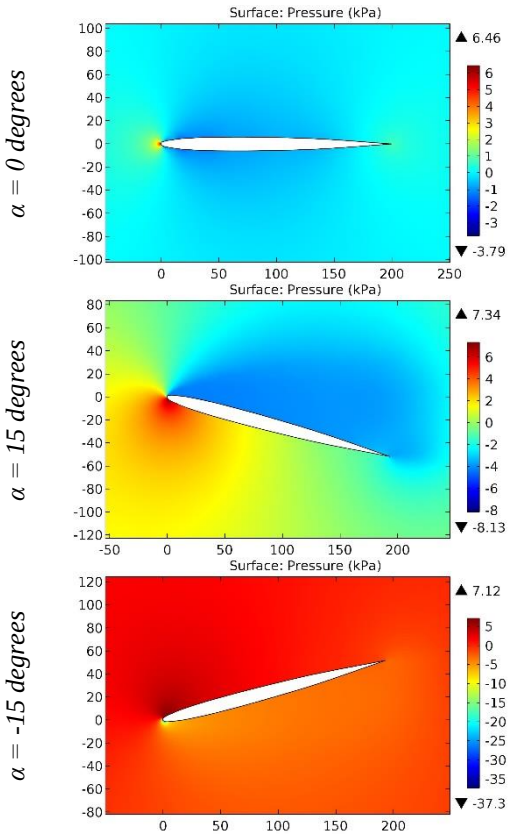


Figure 117. The pressure contours on the surfaces of the EPPLER EA 8(-1)-006 airfoil.

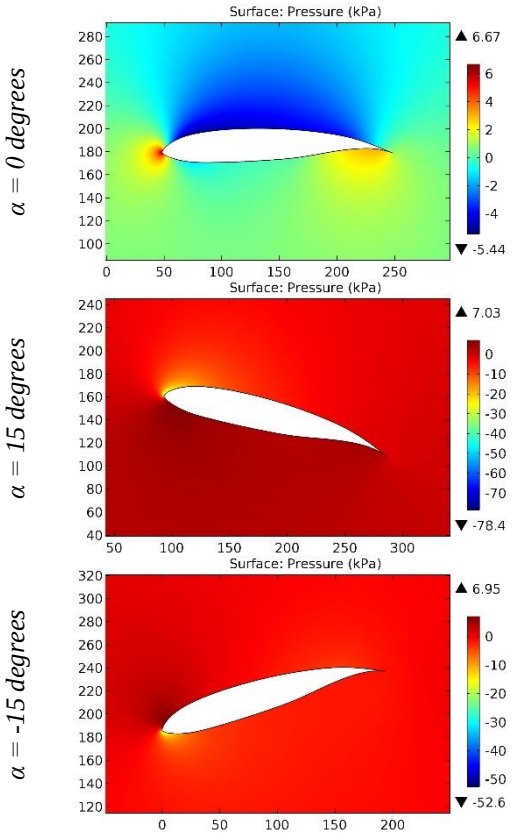


Figure 118. The pressure contours on the surfaces of the EPPLER EC 86(-3)-914 airfoil.

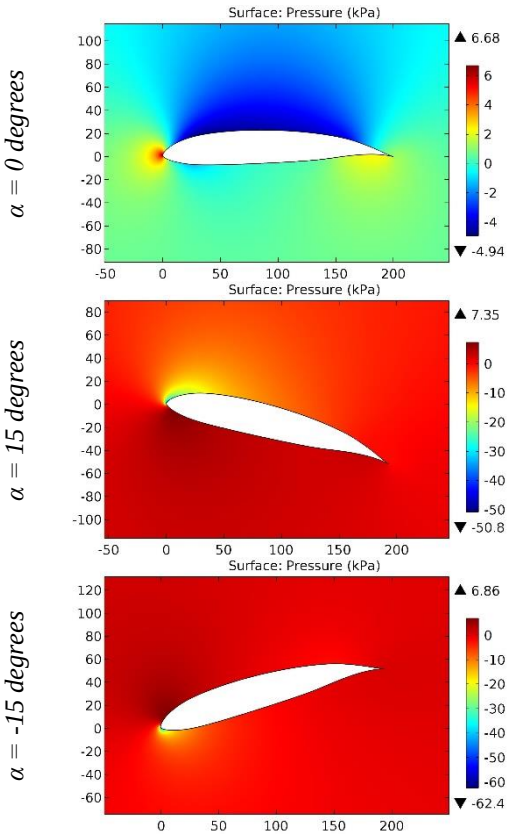


Figure 119. The pressure contours on the surfaces of the EPPLER STE 87(-3)-914 airfoil.

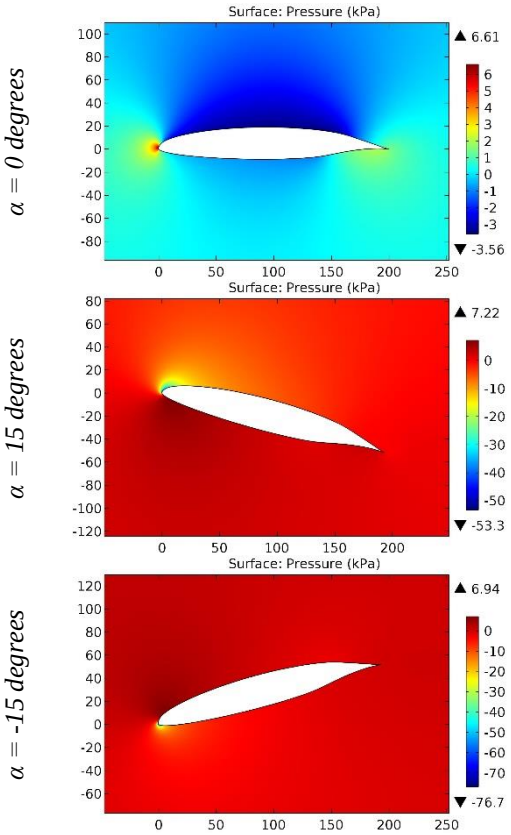


Figure 120. The pressure contours on the surfaces of the EPPLER STE 871-514 airfoil.

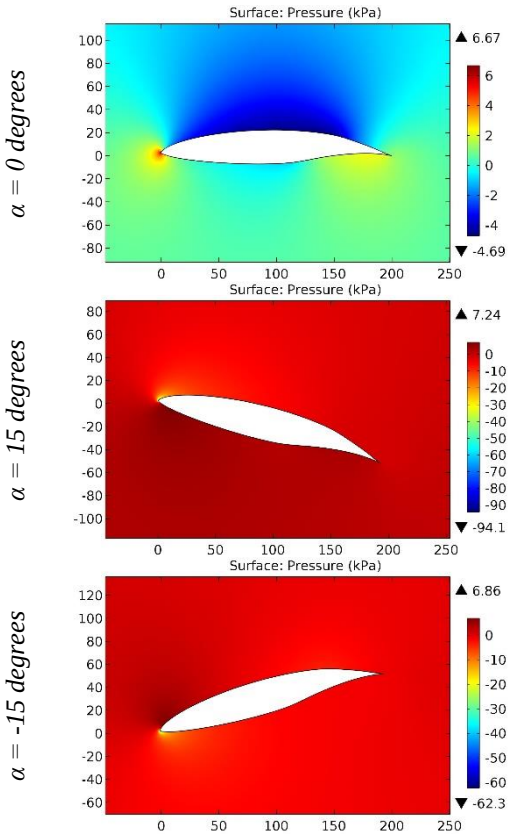


Figure 121. The pressure contours on the surfaces of the EPPLER STF 863-615 airfoil.

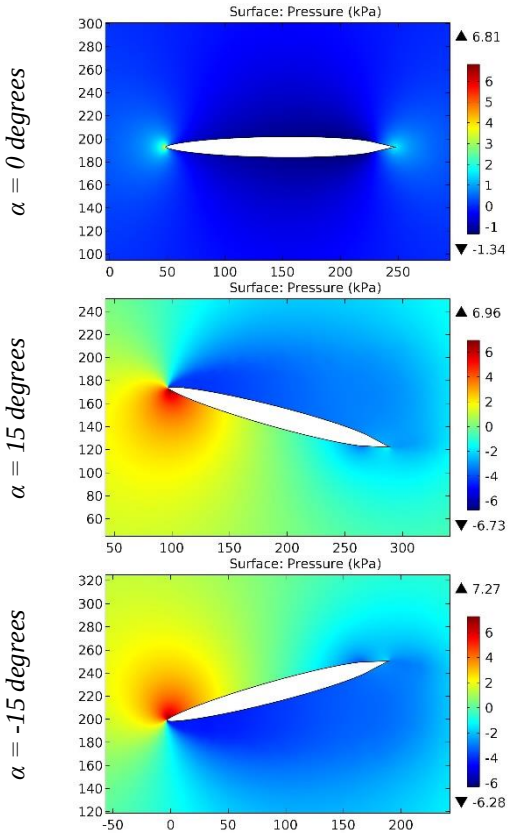


Figure 122. The pressure contours on the surfaces of the Eppler/Shen hydrofoil E900.

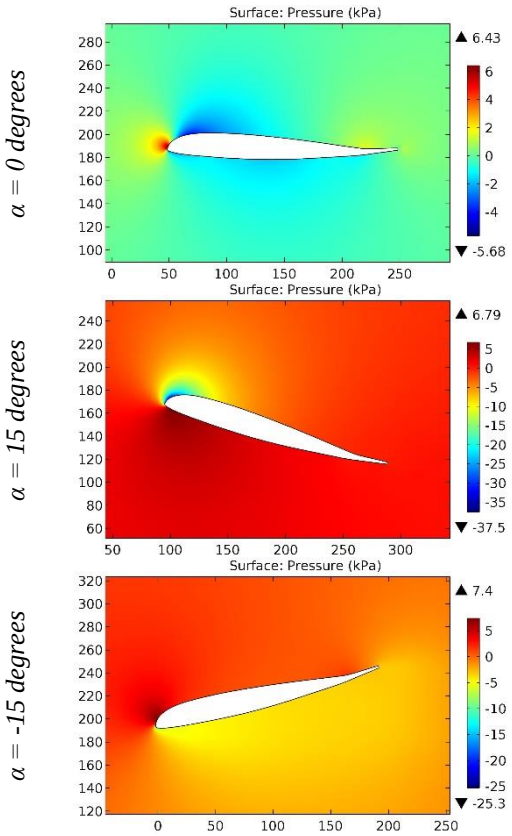


Figure 123. The pressure contours on the surfaces of the ESA40/JCE airfoil.

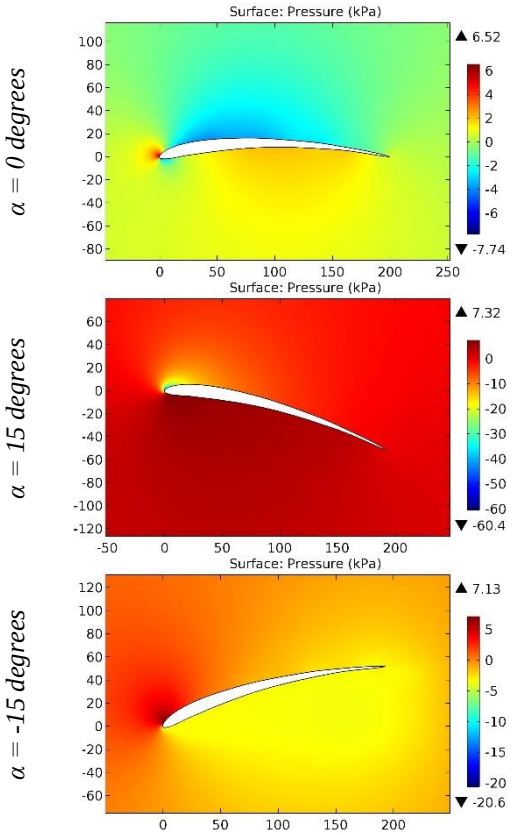


Figure 124. The pressure contours on the surfaces of the ESPADA airfoil.

Conclusion

The calculated pressures gradients were obtained for some airfoils with the negative leading edge radius and the trailing edge thickness in percentage terms. These airfoils differ from the rest by the occurrence of small negative pressure on the upper and lower surfaces and the formation of the positive pressure gradient on the lower surface from the side of the trailing edge. The drag coefficient is the highest at the positive angle of attack of the biconvex asymmetric airfoil with a thickening in the middle. The geometric shape of the Eppler/Shen hydrofoil E900 leads to the formation of low pressures in the certain range at the various angles of attack.

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