

5kW급 튜블러 터빈의 유동해석에 관한 연구

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Flow Analysis on the 5kW Class Tubular Turbine

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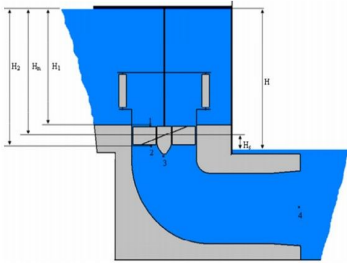
Key Words : Tubular turbine, CFD, GOE airfoil, Pico Scale, Performance analysis.



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I. Theory and Design Procedure:

1. Definition of Head and Design Specification:



- H – Gross head (m), $H = 2.5$ m
- H_n – Net head (m)
- H_1 – Inlet head (m), $H_1 = 2.3$ m
- H_2 – Outlet head (m), $H_2 = 2.4$ m
- H_s – Suction head to avoid cavitation (m)
- Q – Flow rate (m^3/s), $Q = 0.25$ m^3/s
- η_b – Efficiency, $\eta_b = 0.9$
- ρ – Specific weight (kg/m^3), $\rho = 998$ kg/m^3
- g – Gravitational acceleration (m/s^2), $g = 9.81$ m/s^2

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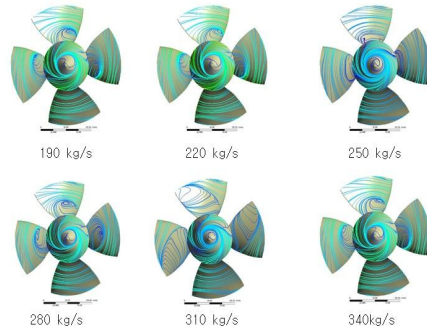
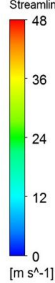


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II. Build tubular turbine model

2.3. Results

Velocity Streamline 1



velocity streamline on the blade at the suction side

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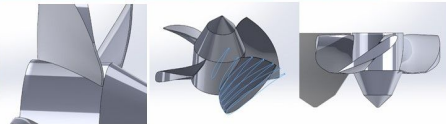
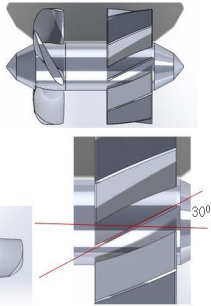


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I. Theory and Design Procedure:

5. Procedure for Blade Characteristics:

Section	Radial Distance (mm)	Chord Length (mm)	Twist (Deg)	Twist Axis (mm)
1	109.5702896	81.275655	24.95211128	24.3827
2	94.48206574	127.63063	27.33229527	38.28919
3	79.39384185	120.96664	30.45675091	36.28999
4	64.30561796	109.08869	34.93102587	32.72661
5	49.21739406	91.996784	41.47700521	27.59904
6	34.12917017	69.690912	54.9858903	20.90727



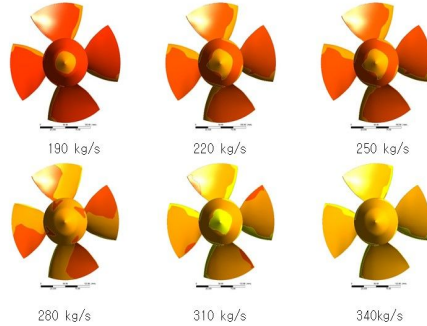
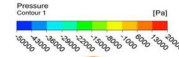
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II. Build tubular turbine model

2.3. Results



Pressure contour on the blade at the suction side

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