

# High-efficiency Hydraulic Turbine Technology

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➤ Total periodic technology for Francis and Kaplan turbine development including engineering analysis, hydraulic design, and design verification for improvement of power generating efficiency.

## Client / Market

- Hydraulic turbine design and development company
- Small hydropower generation company
- Public hydraulic turbine operation enterprise

## Necessity of this Technology

- Globally, the percentage of energy production by hydraulic turbine is high. (hydroelectric power accounting for 16% of world electric power generation)
- There is an Increased demand for localized technology development for improving technology competitiveness of the domestic hydraulic turbine technology.
- The independence of domestic hydraulic turbine design technology is needed to secure technical competitiveness and accomplish renewable energy independence ability.
- High-efficiency hydraulic turbine design technology is required to improve generation efficiency improvement.

## Technical Differentiation

- Equipped with fluid machinery-related R&D experience accumulated over 20 years
- Equipped with total periodic technology required for hydraulic development from design, production, to verification
- Equipped with fluid mechanics and structural mechanics-linked design technology and manpower

## Excellence of Technology

- Equipped with record of designing a high-efficiency 50 MW Francis runner



## DESIRED PARTNERSHIP

### Technology Transfer



### Licensing



### Joint Research



### Other

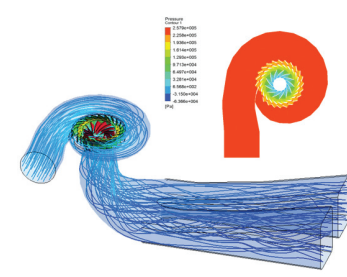


## TECHNOLOGY READINESS LEVEL [TRL]

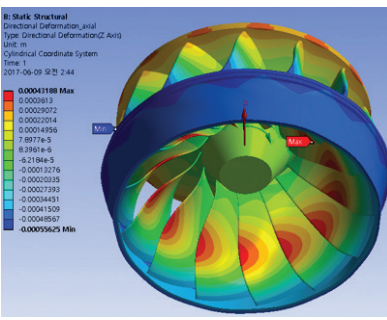


- Improved the efficiency and reliability of hydraulic turbine to the level of advanced countries by applying the structural analysis/flow analysis and performance test technology

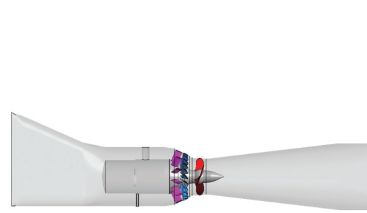
### Francis Hydraulic Turbine Flow Analysis



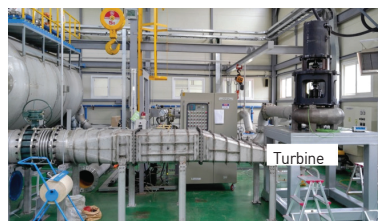
### Francis Runner Structural Analysis



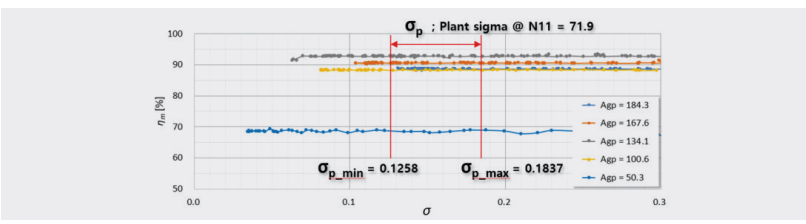
### Kaplan Hydraulic Turbine Flow Analysis



### Design Verification Test Facility



### Cavitation Measurement Curve



## Current Intellectual Property Right Status

### KNOW-HOW

- Francis runner design technology
- Hydraulic turbine model composition design and production technology
- Rotor dynamics technology
- Structural analysis/flow analysis technology
- Performance test technology