

## 하나로 1차 냉각펌프 관성바퀴의 구조적 건전성

박용철<sup>†</sup> · 김봉수\* · 김경련\* · 우종섭\*(원자력연구소)

### Structural Integrity for the Flywheel of Primary Cooling Pump in HANARO

Yong-Chul Park, Bong-Soo Kim, Kyung-Ryun Kim and Jong-Sub WU

**Key Words:** Structural integrities(구조적 건전성), Flywheel(관성바퀴), HANARO (하나로).

**Abstract :** In HANARO, a multi-purpose research reactor of 30 MWth, the primary cooling system is composed of two heat exchangers, two pumps, piping including valves and instruments for cooling a nuclear fission heat during a normal operation. The flywheel attached to each pump motor shaft provides inertia forces to ensure a slow decrease in coolant flow in order to prevent fuel damage as a result of a loss of power to the pump motor. During operation at normal speed, the flywheel has sufficient kinetic energy to produce high-energy missiles and excessive vibration of the reactor coolant pump assembly if the flywheel should fail. It is important to maintain the structural integrity of the flywheel for preventing the flywheel fail. This paper describes the structural integrity of the flywheel including the test requirements, test methods and results. It was confirmed through the test results that the structural integrity of each flywheel is maintained in safety.

## 복합형 분자펌프의 배기성능에 관한 실험적 연구

권명근\* · 이수용\* (성균관대 원) · 황영규<sup>†</sup>(성균관대)

### An Experimental Study on the Performance of Composite-type Molecular Pumps

Myoung-Keun Kwon, Soo-Yong Lee and Young-Kyu Hwang

**Key Words:** Molecular pump (분자펌프), Molecular drag pump (분자드래그펌프), Ultimate pressure (최대도달진공도), Compression ratio (압축비), Pumping speed(배기속도)

**Abstract :** The composite-type high vacuum pumps are widely used in the various processes. The pumping performance of composite-type molecular pumps has been investigated experimentally. The experimented pumps are a compound molecular pump (CMP) and hybrid molecular pump. The CMP consists with helical-type drag pump, at lower part, and with turbomolecular pump (TMP), at upper part. The HMP consists with disk-type drag pump, at lower part, and with TMP, at upper part. The experiments are performed in the outlet pressure of 0.2 ~ 533 Pa. We have measured the ultimate pressure, compression ratio, and pumping speed