

이산화도식에 따른 정사각형 단면을 갖는 90° 곡관 층류유동에 관한 수치해석적 연구

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Numerical Study on Laminar Entry Flows in a Square Duct of 90° Bend with Different Discretization Schemes

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Key Words: Numerical Study(수치해석적 연구), Entry Flow(입구유동), Discretization Scheme(이산화도식), CFD(전산유체역학), Laminar Flow(층류 유동), Curved Square Duct(굽은 정사각 곡관), Unstructured Cell-Centered Method(비정렬 셀 중심 방법)

Abstract : Numerical study on three-dimensional steady incompressible laminar flows in a square duct of 90° bend is undertaken to evaluate the accuracy of four different discretization schemes from lower-order to higher-order by a new solution code(PowerCFD) using unstructured cell-centered method. Detailed comparisons between the computed solutions and the available experimental data are given mainly for the velocity distributions at cross-sections in a 90° bend square duct with developed entry flows. Detailed comparisons are also made with several previous works using lower-order or higher-order schemes. Interesting features of the flow for each scheme are presented in detail.

상부로부터 공기가 유입되는 챔버형 검사 장비의 내부 유동해석

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Internal Flow Analysis in a Chamber-Type Inspection Machine subject to Air Flow from the Top

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Key Words: Inspection Machine(검사 장비), Steady State(정상 상태), Swirling Flow(회선류), Pressure Distribution(압력 분포)

Abstract : For inspection machines used in checking intricate devices, the environment inside the machine should be usually maintained with care in order to avoid possible contamination. In this study, internal flow analysis for a inspection machine is done subject to air flowing from the top using steady state condition. From the numerical results, the maximum velocity is found to be 0.97m/s in the vicinity of exits. The average pressure over the workpiece is calculated as 101.317Pa within 1Pa difference and the net force on the workpiece found to be 34.6N. Also, it is found that there is almost no swirling flow in front of the workpiece.