

# 피스톤 냉각용 Oil Jet 유동 수치해석

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## A Numerical investigation of Oil Jet in an Engine Piston

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**Abstract** : The internal state of an automotive engine is very severe. A piston exposes burnt gas of over 2000℃ and is shocked by high pressure at the time of explosion. Furthermore strong friction is caused by high speed motion. A study on the cooling of the piston requires because the cooling and lubrication of the piston has an effect on the life and efficiency of engine directly. The previous system of oil jet cooled only the bottom of the piston. In order to improve the cooling efficiency, the oil gallery is made inside the piston, and oil flows into the oil gallery. The flow rate of oil at the entrance of oil gallery is important because of the cooling efficiency. The purpose of this study is the investigation of fluid flow characteristics of oil jet and flow rate into the oil gallery .

**Key words** : Oil Jet(오일제트), Secondary Flow(2차 유동), VOF(Volume Of Fluid), Oil Gallery(오일 갤러리)

### 1. 서론

가

가

가

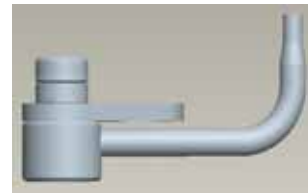


Fig. 1 Geometry of oil jet

가 2.1 mm  
가 2.1 mm

가

가 2.1 mm  
가

### 2. 수치해석

Fig. 1

가 2.7 mm

가 2.7 mm

가 0.3 mm

Reynolds

### 3.2

가

### 3. 수치해석 결과

Fig. 3

가 0.3 mm

#### 3.1

Fig. 2

가 0.3 mm

vector

Z  
Z

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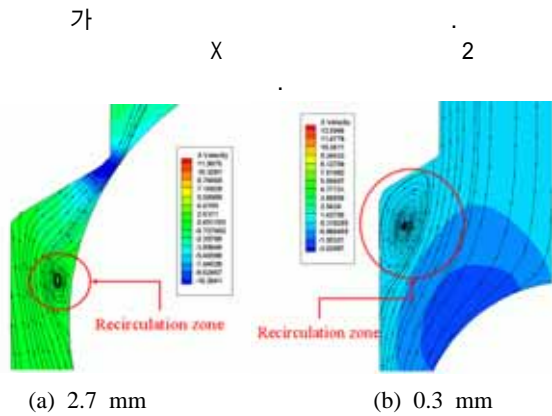


Fig. 2 Streamlines around the ball according to various ball positions

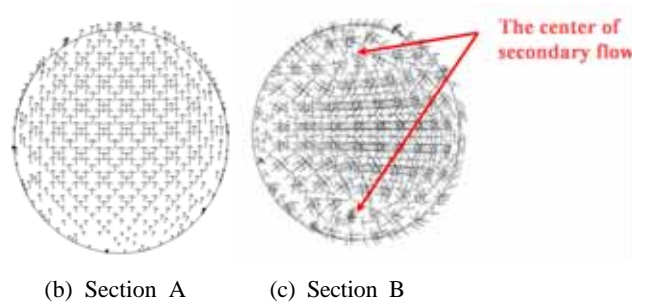


Fig. 3 Sections and velocity vectors at the curved tube

1) 가 2.1mm

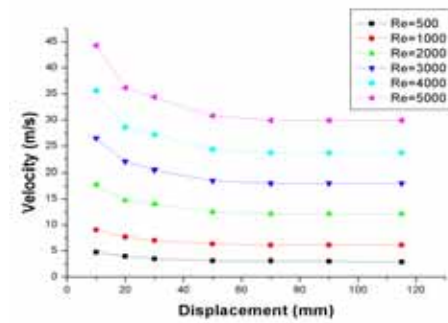


Fig. 4 Velocity distribution along the displacement

2      Dean  
 (      )      Dean 가  
 Reynolds 가  
 7557가  
 0.181 m  
 2

3.3 Reynolds

가      Reynolds  
 가      가  
 Fig. 4      50  
 mm      가      Reynolds 가  
 가      , 50 mm  
 50 mm      Fig. 5      Re=5000  
 Volume fraction  
 Reynolds      volume fraction  
 가

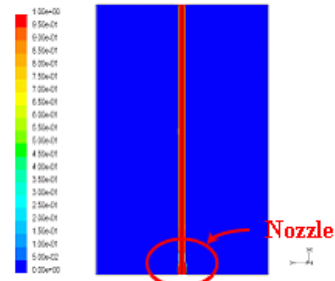


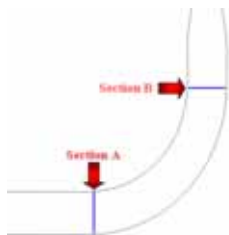
Fig. 5 Volume fraction for the engine-oil at Reynolds number 5000

4. 결 론

2)      2  
 3)      50 mm      가

5. 참고문헌

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(a) Two sections at the curved tube