

압축기 흡입 머플러 통합적 설계 방안

Integrated design method of suction muffler in compressor

왕세명 † · 오승재 ‡

Semyung Wang †, Seungjae Oh ‡

Key Words : Suction muffler(흡입 머플러), Topology optimization(위상 최적화), Input impedance(입력 임피던스)

ABSTRACT

In this paper, the integrated design method of suction muffler in compressor was studied. There are three things to consider when designing this. First, the transmission loss was maximized to consider the noise reduction. Second, dissipation energy of fluid flow was minimized for energy efficiency. Finally, acoustical resonance frequency of suction muffler was controlled because energy efficiency can be increased by supercharging of refrigerant. Therefore, suction muffler was designed to have the specific resonance frequency. The input impedance was used for designing target acoustical resonance frequency. Topology optimization was used for optimization method.

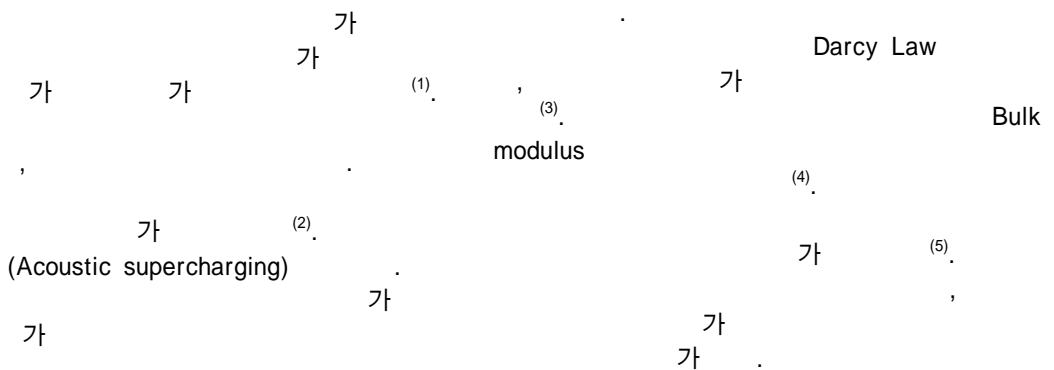
W : 가 , Z :

Φ_v : , GI :

ρ : , TL :

2.

1.



† ;
E-mail : smwang@gist.ac.kr
Tel : +82-62-715-2390, Fax : +82-62-715-2384

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Eq. (1)

Eq.(2)

$$\text{Min } -W_1 \left(\text{Re}(Z)^2 \right) + W_2 (\Phi_v) \quad (1)$$

$$\text{Subject to } GI_d (= 0.23) \leq GI$$

$$0 \leq \rho \leq 1$$

$$\text{Min } -W_1 \left(\text{Re}(Z)^2 \right) - W_2 (TL_{low}) - W_3 (TL_{high}) \quad (2)$$

$$\text{Subject to } \Phi_v \leq \Phi_{vd}$$

$$GI_d (0.23) \leq GI$$

$$0 \leq \rho \leq 1$$

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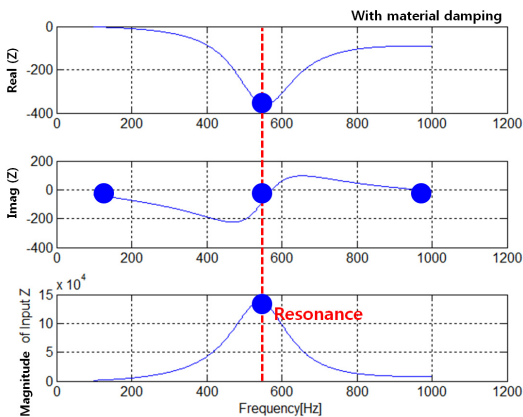


Fig. 1 Acoustical input impedance of muffler