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波瓣混合器喷流降噪技术实验

Experiment of jet noise reduction technology using lobed mixer

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英文关键词: high bypass ratio turbofan engine mixing exhaust system lobed mixer scale model experiment jet noise reduction

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中文摘要:

在消声室内的喷流噪声实验台上,对大涵道比涡扇发动机混合式排气系统缩比模型进行了冷喷流噪声实验,以环形混合器为基准,研究了采用波瓣混合器的喷管喷流远声场频谱特性和降噪效果.研究结果表明:与采用环形混合器的基准型喷管相比,波瓣混合器喷管在低频段有很好的降噪效果但高频段的声压级有所升高,波瓣混合器喷管下游方向(θ=150°)的总声压级明显降低而中游方向和上游方向的总声压级升高.随着波瓣混合器出口处内外涵气流速度差的增大,波瓣混合器喷管低频段的降噪效果越来越明显但高频段声压级的升高也会不同程度地增大,在波瓣混合器喷管下游方向(θ=150°)的总声压级降低更加明显的同时中游方向和上游方向的总声压级也有所升高.

英文摘要:

On the basis of the baseline nozzle with annular mixer, the far field noise spectra performance and the noise reduction of the nozzle with lobed mixer were investigated under cold jet condition through scaled model experiments of high bybass ratio turbofan engine mixing exhaust system. The experiments were carried out on the jet noise experiment rig in the anechoic chamber. The experimental results show that, compared with the baseline nozzle with annular mixer, the nozzle with lobed mixer has better jet noise reduction at low frequencies, but the sound pressure level increases at high frequencies, while overall sound pressure level reduces at downstream(θ=150°)but increases at middlestream and upstream. With increased velocity differences between core exit flow and fan exit flow of lobed mixer, the nozzle with lobed mixer has better noise reduction at low frequencies, but the sound pressure level increases at high frequencies, while overall sound pressure level reduces at downstream(θ=150°)but increases at middlestream and upstream.

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