



航空学报 » 2013, Vol. 34 » Issue (2) :197-207 DOI: 10.7527/S1000-6893.2013.0023

流体力学与飞行力学

最新目录 | 下期目录 | 过刊浏览 | 高级检索

<< | 后一篇 >>

2m超声速风洞结构设计与研究

虞择斌, 刘政崇, 陈振华, 张世洪, 陈万华

中国空气动力研究与发展中心 空气动力学国家重点实验室, 四川 绵阳 621000

Structure Design and Research of 2 m Supersonic Wind Tunnel

YU Zebin, LIU Zhengchong, CHEN Zhenhua, ZHANG Shihong, CHEN Wanhua

State Key Laboratory of Aerodynamics, China Aerodynamics Research and Development Center, Mianyang 621000, China

摘要

参考文献

相关文章

Download: PDF (4072KB) HTML 0KB Export: BibTeX or EndNote (RIS) Supporting Info

摘要

2 m超声速风洞是一座下吹-引射式暂冲型超声速风洞,采用全钢结构。针对该风洞具有结构尺寸大、运行工况多、流场品质要求高、试验段和模型更换快捷以及采用全挠性喷管实现宽马赫数范围调节等特点进行了风洞总体和主要部段结构设计与研究。在风洞设计中利用试验方法以及丰富的风洞设计经验对洞体结构设计中的重点、难点问题进行了研究,广泛使用有限元分析方法进行理论计算,采用新颖的刚性烧结金属丝网材料进行消声降噪处理,并用挠性喷管和试验段一体化设计技术排除了挠性喷管与试验段间阶差对流场品质的影响,运用气垫运输技术使试验段和模型更换快捷、稳定。通过水压试验、振动检测、风洞静调和流场校测等方法验证风洞的结构设计是合理的,设计中新材料、新技术的应用是成功的。

关键词: 超声速风洞 结构设计 水压试验 挠性喷管静调 流校

Abstract:

The 2 m supersonic wind tunnel is an intermittent blowdown-ejector wind tunnel with a full-steel structure. The general structure and main sections are designed and studied based on the characteristics of this wind tunnel, such as large structural size, multiform operational states, high flow quality, quick test section and model conversion, wide Mach number adjustment range for full flexible nozzles, etc. In the course of design, key components and difficult sections are researched by means of testing and solved with our design experiences. Finite element analysis is widely employed for theoretic calculation. A novel multi-layer sinter-wire mesh is used to reduce the strength of current noises, and flexible nozzles and test sections are incorporated in the design to eliminate step influence and improve flow quality, aerocaster movement technology is adopted to convert test sections and models quickly and steadily. Design rationality is proved by structural parameter static state debug,hydraulic testing, vibration inspection and flow quality detection. Applications of new materials and technology are found to be successful.

Keywords: supersonic wind tunnel structural design hydraulic test flexible nozzle static state debug calibration test

Received 2012-02-07; published 2012-07-03

Corresponding Authors: 虞择斌 Email: yhl9998@sina.com

About author: 虞择斌,男,硕士,高级工程师。主要研究方向:风洞结构设计。Tel:0816-2464942,E-mail:yhl9998@sina.com;刘政崇,男,中专,高级工程师。主要研究方向:风洞设计。Tel:0816-2464815,E-mail:lzcpcb1997@yahoo.com;陈振华,男,博士,研究员,硕士生导师。主要研究方向:风洞设计。Tel:0816-2464009,E-mail:czh200240@yahoo.com

引用本文:

虞择斌, 刘政崇, 陈振华, 张世洪, 陈万华. 2m超声速风洞结构设计与研究[J]. 航空学报, 2013, 34(2): 197-207.DOI: 10.7527/S1000-6893.2013.0023

YU Zebin, LIU Zhengchong, CHEN Zhenhua, ZHANG Shihong, CHEN Wanhua. Structure Design and Research of 2 m Supersonic Wind Tunnel[J]. Acta Aeronautica et Astronautica Sinica, 2013, 34(2): 197-207.DOI: 10.7527/S1000-6893.2013.0023

Service

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ Email Alert
- ▶ RSS

作者相关文章

- ▶ 虞择斌
- ▶ 刘政崇
- ▶ 陈振华
- ▶ 张世洪
- ▶ 陈万华

