

440C / AMS5880 / 9Cr18 / 9Cr18Mo 材料对比技术报告

一、材料概念说明 (Conceptual Explanation)

440C (AISI 440C)

中文：美国 AISI 标准的高碳高铬马氏体不锈钢轴承钢，具有高硬度与高耐磨性。

English: AISI 440C is a high-carbon, high-chromium martensitic stainless steel widely used for high- precision bearings due to its high hardness and wear resistance.

9Cr18

中文：中国 GB 标准材料，与 440C 化学成分几乎完全相同，可视为中国版本的 440C。

English: 9Cr18 is the Chinese GB equivalent of AISI 440C, sharing nearly identical chemical composition.

9Cr18Mo

中文：在 9Cr18 的基础上加入 Mo (钼) ，提高耐腐蚀性、耐磨性与回火稳定性。

English: 9Cr18Mo is an improved version of 9Cr18 with added molybdenum, providing enhanced corrosion resistance and wear performance.

AMS5880

中文：航空航天材料规范（不是材料牌号），以 440C 为基础，但要求使用 VIM/VAR 冶炼、极高纯度、严格无损检测。

English: AMS5880 is an aerospace material specification (not a steel grade), based on 440C but requiring VIM/VAR melting, high purity, and strict inspection.

二、化学成分对比表 (Chemical Composition Comparison)

|  SHANDONG FODA BEARING TRANSMISSION CO., LTD | | | | | | | |
|--|---------------|-------|---------|------|------|-------|-------------------------------|
| 材料 / Material | C % | Cr % | Mo % | Mn % | Si % | Ni % | 备注 / Notes |
| 440C (AISI) | 0.95– 1.20 | 16–18 | ≤0.75 | ≤1.0 | ≤1.0 | ≤0.75 | AISI 标准 / Industrial grade |
| 9Cr18 (GB) | 0.95– 1.10 | 17–19 | ≤0.6 | ≤1.0 | ≤1.0 | ≤0.6 | 中国 GB 标准 / Chinese GB |
| 9Cr18Mo (GB) | 0.95– 1.10 | 17–19 | 0.4–0.8 | ≤1.0 | ≤1.0 | ≤0.6 | Mo 加强版 / Mo- enhanced |
| AMS5880 | ≈440C | ≈440C | ≈440C | 严格控制 | 严格控制 | 严格控制 | 航空级 440C / Aerospace grade |

三、性能与应用对比 (Performance & Application Comparison)

|  SHANDONG FODA BEARING TRANSMISSION CO., LTD | | | | |
|--|------|-------|---------|---------|
| 性能 /Performance | 440C | 9Cr18 | 9Cr18Mo | AMS5880 |
| | | | | |

| | | | | |
|------------------------------|-----------------------------|---------------------------|----------------------------------|----------------------------------|
| 硬度 Hardness | 高 / High | 高 / High | 高且更稳定 / More stable | 最高且更均匀 / Highest stability |
| 耐磨性 Wear Resistance | 很好 / Good | 很好 / Good | 更佳 / Better | 极佳 / Excellent |
| 耐腐蚀性 Corrosion Resistance | 中等 / Medium | 中等 / Medium | 优秀 / High | 优-特优 / High-Premium |
| 材料纯净度 Purity | 工业级 / Standard | 工业级 / Standard | 工业级 / Standard | 极高 / Aerospace level |
| 典型应用 Application | 工业轴承 Industrial bearings | 轴承与刀具 Bearings & tools | 腐蚀工况轴承 Corrosive environments | 航空发动机、航天轴承 Aerospace bearings |

四、总结 (Summary)

中文总结：

440C = 国际通用高碳高铬不锈钢轴承材料

9Cr18 = 中国版 440C

9Cr18Mo = 加强型 440C, 添加 Mo 提升耐腐蚀性与耐磨性

AMS5880 = 航空级 440C, 采用 VIM/VAR 冶炼, 纯度高, 性能最优

English Summary:

440C = International standard martensitic stainless bearing steel

9Cr18 = Chinese GB equivalent of 440C

9Cr18Mo = Mo- enhanced version with better corrosion resistance

AMS5880 = Aerospace- grade 440C with VIM/VAR melting and highest purity