ARMSTRONG CEILING PERFORMANCE MANUAL
天花系统性能手册

Inspiring Great Spaces™
创想·天地™

Armstrong
CEILING SYSTEMS
Acoustical Performance
声学性能

声学效果是衡量室内环境质量的重要因素之一，因此材料的声学性能也是设计选材时所必须要考虑的因素。阿姆斯壮的“声学专家”能够有效降低室内噪声级，是吸音及隔音的完美结合，从而大大提升语音清晰度。

Acoustics play an integral role in any space. Surface finishes selected must enhance the indoor environmental quality of a space relative to its functionality. Armstrong ceilings with Total Acoustics™ performance reduce noise levels in interior spaces, allowing for an ideal combination of high performance sound absorption and room-to-room sound attenuation to maximize speech intelligibility.

吸音降噪+隔音=“声学专家”
NRC + CAC = Total Acoustics™ Performance
<table>
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<tr>
<th>空间</th>
<th>现状</th>
<th>声学建议</th>
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<tbody>
<tr>
<td><strong>办公环境 Office</strong></td>
<td>周围同事之间的语音交谈，他人座位的移动以及接听电话都可能导致员工注意力分散，影响工作效率。Employees have difficulty focusing on tasks due to noisy office space. Contributions of distractions include conversations of co-workers in collaboration areas, benches, workstations, and use of speaker phones.</td>
<td>使用具有高吸音性能的“声学专家”天花产品，可以提高员工的工作效率。Worker effectiveness can be increased with ceilings that provide Total Acoustics™ performance using high NRC products in open plan areas to absorb and block sound.</td>
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<tr>
<td><strong>开放办公区 Open Office</strong></td>
<td>闭门隔断内部的反射声以及来自空调系统的噪音，让独立办公室的人员难以集中精力开展技术工作。而声环境也被员工列为工作环境中最不满意的因素。Concentrating on technical work is difficult when sound can be heard through doorways, windows, and HVAC ducts transferring sound from room to room. Employees ranked acoustics the lowest of key attributes in the workplace.</td>
<td>选用同时具有高吸音(NRC)和隔音(CAC)性能的“声学专家”天花产品，可以有效降低外部噪音，保证独立办公室的私密性。Ceilings that provide Total Acoustics™ performance have high CAC and NRC to provide privacy from adjoining offices and corridors.</td>
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<tr>
<td><strong>独立办公室 Closed Office</strong></td>
<td>教室 Classroom</td>
<td>过度的混响会让学生的注意力分散。与此同时，老师要提高音量，容易导致说话含糊不清。研究发现在混响时间过长的教室中，在每一个教师的四个单词中，学生只能听清3个，缺乏高达25%的内容。Excessive reverberation inhibits student understanding and increases teacher vocal strain. Studies indicate that students typically hear only 3 out of every 4 words, missing 25% of what is said in the classroom.</td>
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<tr>
<td><strong>教育环境 Education</strong></td>
<td>大面积的开放空间可被用于多种用途(如餐厅、报告厅、体育馆等)，其声学要求根据功能而各不相同。Open multi-purpose spaces change from cafeterias to auditoriums to gymnasiums requiring different acoustical needs depending on use.</td>
<td>消音性能是解决这一问题的关键。高吸音系数的“声学专家”天花产品可实现此效果，同时其良好的隔音性能，能够有效防止噪音传入邻近的教室。Sound absorption is key and can be accomplished with Total Acoustics™ ceilings with high NRC products along with CAC for sound blocking to prevent sound from traveling into adjacent classrooms.</td>
</tr>
<tr>
<td><strong>多功能厅 Cafeteria</strong></td>
<td>医疗环境 Healthcare</td>
<td>如果使用硬质表面的装饰材料，人来人往的走动，忙碌的护士站，叫号声，开放的诊疗室，全天候的接诊服务，都可能导致该区域的噪声水平超过世界卫生组织规定的标准。Noise caused by hard surfaces, active corridors, busy nurses' stations, alarms, non-private treatment areas, and a 24/7 work environment all help to create sound levels that exceed those recommended by the World Health Organization.</td>
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<tr>
<td><strong>大堂及护士站 Lobby and Nurse Station</strong></td>
<td>病房 Patient Room</td>
<td>个人的健康信息应当仅限于病人本身和相关的医护人员知晓，而不应传入他人耳。The need to share private medical information between patients, doctors, and other medical staff without worrying about being overheard by others is key in a healthcare environment.</td>
</tr>
<tr>
<td><strong>Patient Room</strong></td>
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</table>
Noise Reduction Coefficient (NRC)
降噪系数(NRC)

Ceiling Attenuation Class (CAC)
隔音等级(CAC)

Sound Absorption in (Sabin)
吸声量赛宾(Sabin)

用于衡量在封闭空间内（如办公室），某个材料对声波吸收能力的指标。在该空间内，声波在物体表面之间可能多次反射。

降噪系数NRC对于任何封闭式空间很重要，以下环境中需考虑混响时间和嗓音量：
- 封闭式办公室
- 开放式/混合式办公环境
- 大堂、工作区域
- 教室/学习环境，如体育馆、餐厅
- 医院，接待厅，诊室，医生办公室
- 零售环境，其他客户服务环境

隔音等级CAC在两个相邻的封闭式工作空间（如办公室）之间，声波穿透天花板上方空间进入隔邻的办公室，衡量此过程天花板系统作为隔音体对声波穿透隔断的能力。如果天花板系统的隔音等级CAC<25，则表示材料的隔音性能不佳；反之如果隔音等级CAC>35，则表示该材料的隔音性能较好。

隔音等级CAC在两个相邻的封闭式工作空间（如办公室）之间很重要：
- 封闭式办公室
- 开放式/混合式办公环境
- 大堂、工作区域
- 医院，接待厅，诊室，医生办公室

用于衡量安装在建筑空间内的材料对于声音的吸收能力。吸声量赛宾值根据ASTM423测量。单单位赛宾值等于该房间暴露在声音中的总面积（平方英尺）乘以材料的吸声系数。赛宾的优点在于能计算单独的房间吸声体（如挂毯，垫片，软吸板）的吸声能力，适用于：
- 开放式办公室
- 零售环境
- 公共区域
- 走廊/大堂

A measure for rating the overall sound absorption of a material when used in an enclosed architectural space such as an office, where sound is reflected at many angles of incidence.
NRC is important in any close space where reverberation time and noise levels are an issue:
- Closed offices, conference rooms
- Open/mixed plan offices
- Lobbies, work areas
- Classrooms/core learning areas, gymnasiums, cafeterias
- Healthcare reception areas, exam rooms, doctor's offices
- Retail spaces, other customer contact areas

A measure for rating the performance of a ceiling system as a barrier to airborne sound transmission through a common plenum between adjacent closed spaces such as offices. A ceiling system with a CAC < 25 is considered low performance, whereas one with CAC 35 or higher is high performance.

A measure of sound absorption provided by a material when installed within an architectural space. Absorption of sabin is measured according to ASTM C423. The number of sabin per unit is approximately equal to the total surface area of the unit (in square feet) that is exposed to sound, multiplied by the absorption coefficient of the material. Sabin per unit is preferred to characterize the absorption provided by an individual “space absorber,” such as a baffle, blade, cloud, or canopy in:
- Open offices or retail spaces
- Open plenum areas
- Corridors/lobbies
Sound Transmission Class (STC)

声音传输等级

用于衡量墙壁系统作为隔声体对声波穿透进入相邻密闭空间（如办公室）的阻隔能力。如果墙壁系统的声传输等级STC<35，则表示隔声性能不好，反之如果声传输等级STC>55，则表示隔声性能很好。声音传输等级STC相当于墙壁系统的隔声等级CAC。

声音传输等级STC在相邻密闭空间之间和许多开放式办公环境中很重要：

- 封闭式办公室、走廊
- 开放式办公室的声音传输等级根据ASTM E90测量

Reverberation

混响

一间房间里当声源停止后，仍有声音持续反射的现象。声音混响的级别取决于房间的容积及房间的吸音体总量。比如说，安装木地板的小房间比安装瓷砖的大房间听起来“响”。

在线混响计算器

全新的交互式在线网络工具，通过这一工具可以针对特定空间计算混响时间及语音清晰度，这对建筑环境而言非常重要。用户可以使用不同的材料来实现空间的布局。无论是全新项目还是系统改造工程，这一工具都可以方便快捷为您提供适合的吸音天花板面改造前后的区别。

The sound is still continuously reflected after the sound source ceased in a room. The degree of reverberation of a space depends on its volume and the amount of sound absorbing material. For example, a small room with a hardwood floor sounds louder than a large all - decorated room.

Online Reverberation Calculator

Our new interactive web-based tool calculates reverberation and sound quality for speech intelligibility which is very important for the built environment. This tool allows you to hear the before and after difference. Providing recommendations for both new spaces and upgrades to existing spaces, this easy-to-use tool makes specifying recommended sound-absorptive ceilings and walls easy, and cost effective.

A measure for rating the performance of a wall system as a barrier to airborne sound transmission between adjacent closed spaces, such as offices. A wall system with an STC<35 is considered low performance, whereas one with an STC>55 is high performance. STC is the wall equivalent of CAC.

STC is important between closed spaces and in many open plan spaces:

- Closed offices, corridors
- Open offices with dividers STC is measured according to ASTM E90

cn&measure=m&domain=cn
Light Reflectance

The three most common open plan office lighting options are direct, indirect and combination direct and indirect. While each offers advantages and disadvantages, the benefits of indirect lighting easily surpass those of the other systems in open plan or similar environments.

Indirect lighting in work environments is increasingly important in areas without natural light. The indirect lighting leads to higher visual comfort levels which has been proven to increase employee effectiveness.
Direct Lighting
直接光源照明系统

尽管直接光源照明系统的主要优势在于其相对较低的初期成本（如照明系统购买及安装成本），然而在如今的工作场所，尤其是开放式办公室或教室等大空间场所，直接光源照明具有以下主要缺点：

- 高的运行成本
- 灯具的眩光干扰，影响舒适度及效率。（见对比照）

The primary advantage of direct lighting - prismatic lensed or parabolic down lighting has comparatively low initial cost. However, direct lighting has major disadvantages for today’s workplace, especially open plan offices or multi-station environments like classrooms:

- Traditionally high operating costs
- Annoying visual interferences - glare and/or harsh shadows - which seriously affect occupant comfort and effectiveness.
  See comparison photos on the right.

Indirect Lighting
间接光源照明系统

尽管间接光源照明的购买及安装成本相对较低，但舒适度的增长及日常运行成本节省带来的优势远远超过初期成本较低的直接光源。

- 更加明亮，和谐的照明，特别是配合使用高反光的天花板
- 降低日常运行和维修成本（对于同等程度的照明，利用光源所需的照明装置减少）
- 减少眩光和眩光效应，降低视觉疲劳
- 增强整体的照度效果，在天花板上无需为照明装置增加开孔，可安装更多的吸音天花板。

While indirect lighting can be more expensive to purchase and install, improved comfort levels and savings on operational expenses far outweigh initial cost considerations:

- Brighter, more uniform illumination - especially with a high - LR ceiling
- Reduced operating and maintenance costs - fewer fixtures are required for the same level of useable lighting
- Reduced glare and softer shadows - less eyestrain
- Enhanced overall sound absorption - no fixture openings in the ceiling allow for more acoustical panels

Armstrong High Light Reflectance
阿姆斯壮高反光度天花板

高反光度天花板通过提供更多的间接光源照明，从而改进光源整体性和一致性。普通的天花板只能反射其表面75%的光源，而高反光度天花板则高达90%。

- 整体建筑能源节约达到11%
- 高反光度天花板可节约高达23%的照明能源（减少其他间接光源的使用和灯光的更换）
- 节约7%的制冷系统能源
- 提高员工的满意度和工作效率
- 符合LEED计分标准

High light reflectance ceiling benefits can include:

- Total building energy savings up to 11%
- 23% reduction in lighting energy at same light level (fewer indirect lighting fixtures and lamp/ballast replacements)
- 7% savings in cooling system energy
- Increased occupant satisfaction and productivity
- Ability to contribute to LEED® credits
Humidity Resistance

有时，在建筑物完成整体封闭之前，就进行天花板的安装工作，那么这时，天花板有可能处于较高的湿度环境中，可能产生下陷。天花板下陷不仅破坏了空间的整体美观程度，而且会使天花板更容易受污，抗光度降低，甚至是产生安全隐患！所以选择合适的具有防下陷性能的天花板尤为重要。

Sometimes, ceilings are installed before buildings are enclosed, exposing the building materials to high levels of humidity, which may lead to sagging. Sagging not only diminishes the attractiveness of the entire space, but also makes ceiling soil-stained more easily and deteriorate the light reflectance performance, even collapses or falls down! So it is quite critical to choose ceiling with proper humid resistance performance.
Armstrong HumiGuard Ceilings
阿姆斯壮防潮系列天花板

阿姆斯壮防潮系列天花板及龙骨系统具有优良的防潮性能，配合使用能够帮助承建商有效缩短施工工期，并且凭借系统优异的持久性设计，阿姆斯壮防潮系列天花板在投入使用后能够有效减少因天花板变形而需的更换次数，节约维护成本。

阿姆斯壮防潮RH99，RH95天花板与阿姆斯壮工程龙骨同时安装时，享有防下陷三十年有限品质保证。

Armstrong HumiGuard ceiling with hot dipped galvanized grid system enjoy excellent humid resistance performance, enables contractors to install the ceiling before the building is enclosed and minimizes panel replacement afterwards. Thus greatly add value during and after the construction process.

30-Year Limited Warranty
All Armstrong RH99 / RH95 ceilings are backed by a 30-Year Limited Warranty against warping or sagging when installed with Armstrong project Grid System.

防潮 RH99
HumiGuard Plus (RH99)
防潮RH99系列产品适用于温度在0℃~49℃之间，相对湿度不超过99%的环境之下。此系列阿姆斯壮天花板处于高湿度的环境中能提供有效的防潮性能，但不可用于积水环境、与水有直接接触的环境或室外。

Formulated to withstand conditions with temperatures up to 49℃ and relative humidity up to 99% (RH99). This category of Armstrong ceilings provides validated performance required for all high humidity applications just short of standing water, direct contact with water or exteriors. These products can be installed earlier in the construction process (before the building is enclosed), wherever HVAC systems might be shut down, or in all high humidity applications other than outdoors or where subjected to standing water.

防潮 RH95
HumiGuard (RH95)
防潮RH95系列产品适用于温度在0℃~49℃之间，相对湿度不超过95%的环境之下，不可用于积水环境、与水有直接接触的环境或室外。

Humidity-resistant HumiGuard (RH95) performance to inhibit panel sag. Formulated to withstand conditions with temperatures up to 49℃ and relative humidity up to 95%.

防潮 RH90
HumiGuard (RH90)
防潮RH90系列产品适用于温度在0℃~49℃之间，相对湿度不超过90%的环境之下，不可用于积水环境、与水有直接接触的环境或室外。

Humidity-resistant HumiGuard (RH90) performance to inhibit panel sag. Formulated to withstand conditions with temperatures up to 49℃ and relative humidity up to 90%.

TIPS
不同城市环境不同，选择适当防潮性能的天花板可有效避免天花板变形下陷的风险。
- 矿棉天花板为室内装修材料，请勿安装在室外环境或有积水以及与水有直接接触的环境中。
- 在装修过程中，请在门窗、空调系统安装完成后再安装天花板。
- 对于学校、度假胜地等区域，空调系统可能会间歇性关闭，在此段时间内应保持室内良好通风。
Durability
耐用度

对于天花系统来说，经常会遇到使用不当、易破损、需要经常移动等问题。此时，选择一款经久耐用、易于维护的天花产品尤为重要。如果您在选择天花板时主要关注如下因素：防菌、耐撞击、耐摩擦、耐擦洗、防污性能和耐水性等，我们推荐具有极佳耐用度的阿姆斯壮天花板。

Durability and easy maintenance are important wherever ceilings are subject to improper use, vandalism, or frequent removal for plenum access. These Armstrong products are recommended for use in applications where bioguard impact, scratch, washability, scrubbability and/or soil resistance are key considerations.
Anti-Microbial 防菌性

Armstrong’s BIOGUARD/Antimicrobial Test Result:
阿姆斯壮“防菌板”产品抗菌性能检测报告

具备防菌功能的天花板表面经过特殊处理，对于多种细菌具有抑制滋生、繁殖的作用。
阿姆斯壮防菌板经过国际应用科学研究院（TI）依照种子层测试（Seed layer test）和Kirby Bauer纸片扩散法（Kirby Bauer agar diffusion test）检测证实阿姆斯壮防菌板能够有效抑制多种细菌滋生。

A test for antimicrobial has been conducted by the Royal Netherlands Academy of Arts & Sciences (TI) on Armstrong’s BIOGUARD, employing the Seed Layer Test and Kirby Bauer Test (Disk Diffusion Antibiotic Sensitivity Test). These methods are able to test 10 different microorganisms.

These photos show Armstrong Bioguard is against a wide range of microorganisms. 以上对比表明阿姆斯壮防菌板对多种试验菌有完全抑制作用。

Water Repellency 防水性

附着在具备防水性能天花板表面的水滴，可保持原有形状而不渗入天花板内部。测试证明阿姆斯壮防菌板防水性能良好，可用湿布清洁，表面完好如初。

The test demonstrates Armstrong Bioguard surfaces are resistant to water penetration and withstand washing.

These photos show the excellent water repellency of BIOGUARD versus a less water repellent ceiling.

对比照片表明阿姆斯壮防菌板具备优异的防水性能，相比较的一款是普通天花板。

Washability 可擦洗

Washability Test (ASTM 4828) 可擦洗性能测试（根据ASTM 4828等标准）

安装在实验室、洁净室以及食品加工场所及其他卫生设施的天花板应当具备可擦洗性能而不影响天花板表面整体效果。具备可擦洗性能的阿姆斯壮天花板经ASTM 4828可擦洗性能测试，具备出众的可擦洗性能。

Ceilings installed in laboratories, clean rooms, food preparation areas, and other sanitary applications are required to meet washability test, which evaluates a ceiling’s ability to withstand washing.

These photos show the superior washability of Fine Fisured with FPG versus a standard ceiling.

以上对比照片表明防菌板可擦洗表现具备优异的可擦洗性能，相比较的一款是普通天花板。

阿姆斯壮特殊性能天花板所标明的耐用度结果均依据标准测试方法（如美国ASTM标准，ISO14644/美国联邦标准209E有关洁净室Class100的规范），测试结果真实可靠。

All durability performance claimed are confirming with standard test for example, the Scrub Test or ISO14644/Federal Standard 209E for Class 100 clean rooms.
**Soil Resistance 防污**

Simulated Supply Air Diffuser Soiling Test
空调出风口尘污模拟测试

天花板上沾附的尘污不仅碍观瞻，而且会因需要重新喷漆或者调换天花板，增加维护费用。同时尘污不仅会减弱天花板的反光度，影响室内光线。绝大多数房间在这种反光度天花板都具有优异的防污性能，从而保证天花板持久耐用。

在空调出风口尘污模拟测试中，阿姆斯壮防污天花板的防污性能比普通天花板更强，能够减少因灰尘造成的光反射损失，确保长期使用的性能和价值。

A test for antimicrobial has been conducted by the Royal Netherlands Academy of Arts & Sciences (RGI) on Armstrong’s BioGuard, employing the Seed Layer Test and Kirby Bauer Test (Disk Diffusion Antibiotic Sensitivity Test). These methods are able to test 10 different microorganisms.

These photos show the excellent soil resistance of Ultima versus a competitive fine texture ceiling.

以上对比照片表明阿姆斯壮防污面相比其他品牌的细纹天花板。

**Scratch Resistance 耐刮擦**

Hess Fake Test
Hess 刮擦测试

在实际使用中，部分场所的天花板需要经常移动以便进入上方空间进行检修。在这些情况下，天花板的耐刮擦性能就显得尤为重要。

经刮擦测试证明，具备耐刮擦性能的阿姆斯壮天花板表面耐刮擦，可反复安装，移动和替换。

In any areas where lay-in ceiling panels frequently need to be removed for plenum access, surface scratch resistance is highly desirable. The Hess Fake Test evaluates surface scratch resistance.

These photos show the excellent scratch resistance of Ultima (with its Durabrite surface) versus a competitive fine texture ceiling.

以上对比照片表明阿姆斯壮天花板表面（Durabrite表面处理）具备优秀的耐刮擦性能，相比对比一款其它品牌的细纹天花板。

**Resistance to Disinfectants 抗消毒剂及抗氯消毒剂**

阿姆斯壮防菌板表面含氯消毒剂以及双氧水消毒剂，可以在经常使用消毒剂的场所放心使用。

The bioguard paint has enhanced resistance to disinfectants including Hydrogen Peroxide and Chlorine.

The product can be used in areas with cleaning-disinfection operation.

These photos show Armstrong Bioguard is against a wide range of microorganisms.

以上对比表明阿姆斯壮防菌面板对多种试验有完全抑制作用。

**Impact Resistance 耐撞击**

Falling Ball Impact Test (Modified ASTM D-1037 Procedure)
下落球体撞击测试—修正版美国ASTM D-1037测试方法

安装在学校走廊、健身房内的天花板有可能频繁遭受硬质物体的撞击，在此环境下，天花板表面很容易因撞击造成损坏。

经美国ASTM D-1037测试证明具备耐撞击性能的阿姆斯壮天花板比普通天花板更具耐撞击性能。

Ceiling in areas like school corridors of gymnasiums need to withstand abuse, including surface impact. The Falling Ball Impact Test evaluates a ceiling's impact resistance.

*如果原始测试数据，请与您的阿姆斯壮代表联系。
You can, if necessary, obtain this verified test data for Armstrong products from your Armstrong representative.*
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<th>隔音等级CAC</th>
<th>防火等级</th>
<th>防潮等级</th>
<th>反光度LR</th>
<th>利用度Durability</th>
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<tr>
<td>雅丽ANF</td>
<td>矿物纤维</td>
<td>0.50</td>
<td>30</td>
<td>A</td>
<td>RH90</td>
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<tr>
<td>美丽Beauti-Sky</td>
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<tr>
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<td>RH95</td>
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<tr>
<td>思雅School Zone Smart</td>
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<td>RH95</td>
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<td>雅丽Fine Fused</td>
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<td>33/35</td>
<td>B1</td>
<td>RH90</td>
<td>0.85</td>
<td>√</td>
</tr>
<tr>
<td>银晶Elite</td>
<td>矿物纤维</td>
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<td>30</td>
<td>B1</td>
<td>RH99</td>
<td>0.87</td>
<td>√</td>
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<tr>
<td>雅丽Classic Lite</td>
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<td>30</td>
<td>B1</td>
<td>RH90</td>
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<td>√</td>
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<tr>
<td>雅丽Dune</td>
<td>矿物纤维</td>
<td>0.50</td>
<td>30/33</td>
<td>B1</td>
<td>RH90</td>
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<tr>
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<td>35</td>
<td>A</td>
<td>RH99</td>
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<tr>
<td>高级雅丽Dune Max</td>
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<tr>
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<td>A</td>
<td>RH99</td>
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<td>√</td>
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<tr>
<td>优品Suprema</td>
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<td>36</td>
<td>A</td>
<td>RH99</td>
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<tr>
<td>普派Ultima</td>
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<td>A</td>
<td>RH99</td>
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<td>漫声室音抗震板 Green Room BioGuard Acoustic</td>
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<td>A</td>
<td>RH99</td>
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<td>RH90</td>
<td>0.85</td>
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<tr>
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<td>0.50</td>
<td>35</td>
<td>A/B1</td>
<td>RH99</td>
<td>0.85</td>
<td>√</td>
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<tr>
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<td>矿物纤维</td>
<td>0.50/0.55</td>
<td>30/33/35</td>
<td>A/B1</td>
<td>RH90</td>
<td>0.85</td>
<td>√</td>
</tr>
<tr>
<td>优品条板Suprema Plank</td>
<td>矿物纤维</td>
<td>0.60</td>
<td>36</td>
<td>A</td>
<td>RH99</td>
<td>0.88</td>
<td>√</td>
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<tr>
<td>极品条板Ultima Plank</td>
<td>矿物纤维</td>
<td>0.65/0.70</td>
<td>37</td>
<td>A</td>
<td>RH90</td>
<td>0.88</td>
<td>√</td>
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<tr>
<td>Ultima with Air Guard Coating</td>
<td>矿物纤维</td>
<td>0.70</td>
<td>35</td>
<td>A</td>
<td>RH99</td>
<td>0.88</td>
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<tr>
<td>Perla</td>
<td>覆盖矿物纤维</td>
<td>0.00</td>
<td>30</td>
<td>B1</td>
<td>RH95</td>
<td>0.85</td>
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<tr>
<td>天穹Soundscapes Basics</td>
<td>玻璃纤维</td>
<td>Sabine 2.05/片</td>
<td>A</td>
<td>RH99</td>
<td>0.88</td>
<td>√</td>
<td>√</td>
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<tr>
<td>天穹Soundscapes Canopies</td>
<td>玻璃纤维</td>
<td>Sabine 2.44/片</td>
<td>A</td>
<td>RH98</td>
<td>0.88</td>
<td>√</td>
<td>√</td>
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<tr>
<td>天穹Soundscapes Shapes</td>
<td>玻璃纤维</td>
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<td>A</td>
<td>RH99</td>
<td>0.88</td>
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<td>√</td>
</tr>
</tbody>
</table>
Fire Reaction

防疫性能

循此图标寻找阿姆斯壮天花板防疫性能。
Look for this icon that represents ceiling’s Fire Reaction Performance.

作为建筑内部装饰材料的重要组成部分，天花吊顶材料应当符合相应的防疫性能标准。

依据中国标准GB8624-2012中关于燃烧性能等级的规定，建筑材料及制品的燃烧性能分为A/B1/B2/B3四个等级。

As an important part of building interior decoration material, all products used for ceiling should bear sufficient certain fire reaction performance to ensure safe usage.

According to China national standard GB 8624-2012 “Classification for Burning Behavior of Building Material and Products”, the fire reaction performance of building materials and products can be classified into four categories: A/B1/B2/B3.
阿姆斯壮生产的所有天花板产品均委托中国国家防火建筑材料产品质量监督检验中心检验，确保达到A级或B1级的防火性能。

- 阿姆斯壮A级防火性能矿棉板，依据GB6524-2012中平板状建筑材料及制品的燃烧性能等级及分级判定标准，采用燃烧热值法*测定符合A级防火性能。

- 依据【GB86242建筑内部装修设计防火规范2.0.4条】的规定，安装在钢龙骨上燃烧性能达到B1级的70mm厚，可作为A级装修材料使用。故阿姆斯壮B1级防火性能矿棉板搭配钢龙骨使用也可以取得A级防火性能。

---

中国标准GB8624-2012中平板状建筑材料及制品A级燃烧性能的判定标准包括燃烧热值法和持续燃烧时间法，两种建筑材料制品采用任何一种方法测试合格均可以认定为A级燃烧性能。阿姆斯壮A级矿棉天花板采用燃烧热值法判定。

平板状建筑材料及制品的燃烧性能等级和分级判定

<table>
<thead>
<tr>
<th>燃烧性能等级</th>
<th>名称</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>不燃材料（制品）Non-Combustible</td>
</tr>
<tr>
<td>B1</td>
<td>难燃材料（制品）Difficult-Combustible</td>
</tr>
<tr>
<td>B2</td>
<td>可燃材料（制品）Combustible</td>
</tr>
<tr>
<td>B3</td>
<td>易燃材料（制品）Flammable</td>
</tr>
</tbody>
</table>

GB 8624-2012

All Armstrong ceiling products sell in China all achieved authoritative fire reaction performance test reports issued by NFTC (China National Center for Quality Supervision and Testing of Fire Building Materials), ensuring sufficient fire reaction performance for safety usage.

- Armstrong ceiling products with Class A fire reaction are tested under Heat of Combustion Test Method regulated by GB6524-2012.

- According to 2.0.4 item in China GB86242 "Code for Fire Prevention in Design of Interior Decoration of Buildings", when installed with steel grid system, class B1 mineral fiber ceiling panel can also be treated as having class A fire reaction.
Armstrong have a long-standing reputation for sustainable innovation and we try to keep harmony with nature in all our products and operations.

We decrease the environmental footprint of our operations mainly through four aspects: Energy Reduction, Responsible Water Management, Waste Reduction and Forest Protection.
Armstrong Contribute to Green Building
阿姆斯壮构建绿色环保建筑

阿姆斯壮在国内首创了天花回收项目，从而使数以吨计的建筑垃圾免于填埋。我们还致力于开发对环境影响更小的产品，有时我们的产品甚至有助于减少建筑物的生态足迹。

通过阿姆斯壮天花回收计划：
- 77,500 吨的废旧天花板被回收
- 2,470,000 吨的二氧化碳温室气体被排除
- 3,674,000,000 加仑的饮用水被节约
- 793,412,000 立方米的天然气被节约

Armstrong was the first to establish a ceiling recycling program that’s diverted thousands of tons of construction waste from landfills. We develop products that have lower environmental footprints, and in some cases, reduce the environmental footprints of the buildings where they are installed.

With Armstrong Ceiling Recycling Programs:
- More than 77,500 tons of construction waste diverted from landfills
- 2,470,000 tons CO₂ was avoided
- 3,674,000,000 gallon water was saved
- 793,412,000 M³ LNG was saved

USGBC & LEED
领先能源与环境设计评级体系

领先能源与环境设计（Leadership in Energy & Environmental Design）是美国绿色建筑委员会（USGBC）于1998年制定并公布的一项绿色建筑评价认证体系，用以评估建筑性能是否符合可持续性发展。LEED是目前国际公认的绿色建筑评价体系，也是目前我国广泛认可的国际绿色建筑认证体系，被誉为“目前世界上最具影响力的高性能绿色建筑可持续设计、建造和运营管理的评估标准”

Leadership in Energy & Environmental Design (LEED) rating system was created by the U.S. Green Building Council (USGBC) to encourage and facilitate the development of more sustainable buildings. As the most recognized green building certification program LEED is transforming the way people think about buildings and how communities are designed, constructed, maintained and operated across the globe.

Armstrong’s Potential Contribution to LEED Credits
阿姆斯壮对LEED 的贡献

目前LEED体系正在推行的版本是LEED V4。新评级体系涵盖5大类21种建筑类型，总分为110分。Armstrong的产品主要适用于其中60+C和BD+C类别，并对其中的“材料与资源”和“室内环境品质”两项有得分帮助。

As the newest version promoted, LEED V4 covers five rating systems that address multiple project types, and contains 110 points in total. Among all scoring items, Armstrong products could help on “Material & Resources” and “Indoor Environmental Quality” which appears in “BD+C” and “ID+C” categories.

LEED Rating System and Certification
LEED 评分系统和分级

LEED 评分系统按级别分为：
- 评分达40-49，则该建筑物达到LEED认证级（Certified）
- 评分达50-59，则该建筑物达到LEED银级认证（Silver）
- 评分达60-79，则该建筑物达到LEED金级认证（Gold）
- 评分达80分及以上，则该建筑物达到LEED白金级认证（Platinum）

There are four levels of certification
- 40-49 points Certified Certification
- 50-59 points Silver Certification
- 60-79 points Gold Certification
- 80+ points Platinum Certification
| 铅型 | ARF | Φ | Φ | Φ | Φ |
| 钢梁 | Fasturl-Sky | Φ | Φ | Φ | Φ |
| 金属 | Mayee | Φ | Φ | Φ | Φ |
| 金属 | NZ Panel | Φ | Φ | Φ | Φ |
| 金属 | School Zone Smart | Φ | Φ | Φ | Φ |
| 金属 | Cortoga | Φ | Φ | Φ | Φ |
| 金属 | Fine Fission | Φ | Φ | Φ | Φ |
| 金属 | Elta | Φ | Φ | Φ | Φ |
| 金属 | Classic Lite | Φ | Φ | Φ | Φ |
| 金属 | Duna | Φ | Φ | Φ | Φ |
| 金属 | High Performance FF High NRC | Φ | Φ | Φ | Φ |
| 金属 | High Performance Dune Max | Φ | Φ | Φ | Φ |
| 金属 | Biegard | Φ | Φ | Φ | Φ |
| 金属 | Supreme | Φ | Φ | Φ | Φ |
| 金属 | Ultima | Φ | Φ | Φ | Φ |
| 金属 | Clean Room Biegard Acoustic | Φ | Φ | Φ | Φ |
| 金属 | Fine Fission Plank | Φ | Φ | Φ | Φ |
| 金属 | Elite Plank | Φ | Φ | Φ | Φ |
| 金属 | Duna Plank | Φ | Φ | Φ | Φ |
| 金属 | Supreme Plank | Φ | Φ | Φ | Φ |
| 金属 | Ultima Ultrasound Coating | Φ | Φ | Φ | Φ |
| 金属 | Perla | Φ | Φ | Φ | Φ |
| 金属 | Metalsworks Lay in | Φ | Φ | Φ | Φ |
| 金属 | Metalsworks Clip in | Φ | Φ | Φ | Φ |
| 金属 | Metalworks Vector | Φ | Φ | Φ | Φ |
| 金属 | Metalworks Traffic | Φ | Φ | Φ | Φ |
| 金属 | Metalworks Mesh | Φ | Φ | Φ | Φ |
| 金属 | Metalworks C Plank | Φ | Φ | Φ | Φ |
| 金属 | Metalworks F Plank | Φ | Φ | Φ | Φ |
| 金属 | Soundscapes Basics | Φ | Φ | Φ | Φ |
| 金属 | Soundscapes Canopies | Φ | Φ | Φ | Φ |
| 金属 | Soundscapes Shapes | Φ | Φ | Φ | Φ |
| 金属 | Soundscapes - Soundsoak Wall | Φ | Φ | Φ | Φ |
## 阿姆斯壮对取得LEED计分的贡献

### 室内环境品质

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<th>低挥发性材料</th>
<th>照明</th>
<th>声学性能</th>
<th>最低声学性能要求 (先决条件)</th>
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</thead>
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<td><strong>Medium</strong></td>
<td><strong>Low Emissions</strong></td>
<td><strong>Interior Lighting</strong></td>
<td><strong>Acoustic</strong></td>
<td><strong>Minimum Acoustic Performance</strong></td>
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<tr>
<td>EPD</td>
<td><strong>Materials</strong></td>
<td><strong>Quality</strong></td>
<td><strong>Perquisite</strong></td>
<td><strong>Acoustic</strong></td>
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<tr>
<td><strong>MR</strong></td>
<td><strong>MR3 B&amp;O</strong></td>
<td><strong>MR4 ID&amp;C</strong></td>
<td><strong>EQ</strong>*</td>
<td><strong>EQ26</strong></td>
</tr>
</tbody>
</table>

*阿姆斯壮产品可提供第三方机构认证的第Ⅲ类PED环境产品声明。

**可出具第Ⅰ类PED环境产品声明的产品在可选1的整个产品计分。**

*Armstrong 3rd party certified, Type II EEDs (www.armstrong.com/trp) Product specific type III EEDs are valued as one whole product. (www.armstrong.com/epd)

- **EQ**
  - 选项1: 阿姆斯壮可持续性声明（以1/2分值计算）。
  - 选项2: 绿色穹顶设计符合“领导建筑”标准中的“生产可持续性”要求。
  - 选项3: Armstrong ceiling tiles meet the requirement of "Lighting Quality". Choose ceilings with LDR, 85, Walls, 60 as one of strategies.

### 声学性能

- 声学性能
  - Armstrong products meet the requirement of "Lighting Quality".
  - Choose ceilings with LDR 85, Walls 60 as one of strategies.

### 最低声学性能要求 (先决条件)

- 作为先决条件之一，声学 (LDR 85) 的数量和等级要求。要求区域必须在建筑物内部的某个区域得到足够的声学材料，并且所使用的材料的声学性能要求AKR ≥ 0.70。

---

**EQ** Minimum Acoustic Performance: Perquisite, applies to School Classroom and core learning spaces <20000(GF15650CM Option 1)

**Materials** NR ≥ 0.70.
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ARMSTRONG CEILING
PERFORMANCE MANUAL
天花板系统性能手册

免费咨询热线：
400-779-3966

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