the challenge:

Marshall Erdman & Associates specializes in healthcare facility planning, design and construction. Even before HIPAA became law, the firm had always prided itself on protecting patient privacy by reducing sound intrusion between rooms. One of the methods the firm used is a combination of a suspended acoustical ceiling and rigid fiberglass insulation boards installed vertically as a plenum barrier between the top of a wall and the deck above.

In the standard design, the panels in the acoustical ceiling have a Noise Reduction Coefficient (NRC) of 0.50, meaning they absorb 50% of the sound that strikes them, and a Ceiling Attenuation Class (CAC) of 33. The CAC indicates the ability of a ceiling to block sound transmission between adjacent closed spaces that share a common plenum.

To improve patient privacy, the firm was looking for new ways to reduce sound intrusion levels between patient spaces even further while reducing construction costs.

the solution:

As part of the design of the Palos Hills, Illinois, Orthopedic Clinic, the firm decided to forego traditional design and explore a new approach that eliminates the fiberglass plenum barrier and uses a Cirrus® ceiling panel from Armstrong that features improved performance at an NRC of 0.70 and CAC of 40.

“Installing the rigid insulation is extremely labor intensive,” states Marshall Erdman Project Manager, Frank Feit. “This method will provide the privacy level required, while saving significant time and money for us and our clients.”

And, research shows it will work. Acoustical studies indicate that a confidential level of Speech Privacy is more likely to be achieved in more circumstances than for the previous design standard. Moreover, based on RS Means Data, the installed cost of a CAC 40 ceiling with no plenum treatment compared to a traditional ceiling with fiberglass board plenum treatment is at least 40% lower, based on the number of plenum walls removed.

Balanced Acoustical Design:

You can block noise with an effective combination of wall and ceiling construction, using a high performance CAC ceiling. Other considerations affecting the ability to effectively block sound:

- Door and window seals
- Wall system joints
- Penetration in light fixtures
- Wall/floor interface
- Air returns

Application Considerations:

CAC is important between closed spaces and from closed rooms to adjacent spaces, such as corridors:

- Closed office, conference rooms
- Classrooms/core learning areas
- Mixed plan offices
- Healthcare exam rooms, doctors’ offices

Other resources available:

- Website www.armstrong.com/acoustics
- BPCS-3832 Marshall Erdman case study
- BPCS-3513 HIPAA/Speech Privacy white paper
- BPCS-3712 Office Acoustics white paper
- BPCS-4556 Sound Design™ brochure

Armstrong Product Families Offering High CAC

- MetalWorks™ (unperforated)
- Ultima®
- Cirrus®
- Mesa™
- School Zone® Fine Fissured™
- Ceramaguard®
- Ceramaguard® Fine Fissured™
- Clean Room™ VL
- Cortega®
Effective Building Design for Speech Privacy Using Sound Blocking Techniques

Building design can have significant impact on speech privacy and construction costs. Below are typical construction scenarios showing how speech privacy is affected.

### Scenario 1: Typical Design

**Concrete Deck**

- Plenum
- Ceiling CAC 33
- Wall w/R11 STC = 44

- Mineral fiber ceiling (NRC 0.50/CAC 33)
- Wall to ceiling
- No plenum barrier
- Background noise at ASHRAE recommended 37 dBA

Privacy Index* is less than 95%

### Scenario 2: Perceived Upgrade

**Concrete Deck**

- Plenum
- Ceiling CAC 22-27
- Wall w/R11 STC = 44

- Fiberglass or stone wool ceiling (NRC 0.90/CAC 22-27)
- Wall to ceiling
- No plenum barrier
- Background noise at ASHRAE recommended 37 dBA

Privacy Index* is significantly lower than 95%

### Scenario 3: HIPAA Compliant Solution

**Concrete Deck**

- Plenum
- Ceiling CAC 35
- Wall w/R11 STC = 44

- Mineral fiber ceiling (NRC 0.70/CAC 35)
- Wall to ceiling
- No plenum barrier
- Background noise at ASHRAE recommended 37 dBA

Privacy Index* is greater than 95% and confidential speech privacy is achieved

*Privacy Index measurement and calculation are defined in ASTM E1130