SLOPED CEILINGS

TECHNICAL GUIDE

Inspiring Great Spaces®

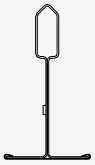
Armstrong® CEILING SOLUTIONS

SLOPED CEILINGS TECHNICAL GUIDE

ARMSTRONG® CEILING PANELS ACCEPTABLE IN SLOPED INSTALLATIONS

Mineral Fiber Lay-in, Tegular, and Vector® Ceiling Panels
Fiberglass Lay-in, Tegular, and Vector Ceiling Panels
MetalWorks™ Tegular and Vector Ceiling Panels
WoodWorks® Tegular Ceiling Panels

ARMSTRONG SUSPENSION SYSTEMS ACCEPTABLE IN SLOPED INSTALLATIONS



Prelude® XL®

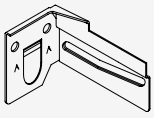
Suprafine® XL

Silhouette® 1/4" XL

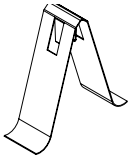
Silhouette® 1/8" XL

Interlude® XL

ACCESSORIES:

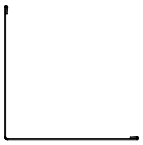


BERC2 —
Beam End Retaining Clip

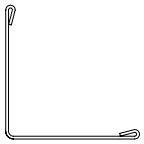


PMHDC —
Maximum Hold Down Clip

WALL MOLDINGS:



7808 2" Angle Molding



7800 Hemmed Angle

GENERAL

Designing and installing a sloped suspended ceiling can provide the opportunity to enhance daylighting, conserve energy, and contribute to LEED EQ Daylighting credits.

Generally, a sloped suspended ceiling and its supports and attachments are installed and designed in the same manner as a flat or level suspended ceiling. Current building code states that suspended ceiling main beams must be leveled to within 1/4" in 10'; sloped installations are not addressed. The International Building Code (IBC), as well as its antecedents, permits alternate designs, materials, and methods of construction so long as any alternate is approved by the Authority Having Jurisdiction (AHJ).

Actual construction of a sloped suspended ceiling may require engineering documents by code officials/ authorities having jurisdiction in your area; a strict interpretation of the code may rule out sloped designs.

Armstrong® Ceilings has a long history of product development and innovation for suspended ceiling systems and continues to commit resources to this endeavor. Armstrong Ceilings has thoroughly examined sloped ceilings utilizing ceiling panels for Seismic Design Categories C, D, E, F. We have conducted full-scale seismic shake table testing on multiple sloped ceiling designs at the Structural Engineering Earthquake Simulation Lab located at the State University of New York at Buffalo. Armstrong Ceilings can provide documentation of these test results to design professionals, code officials, and building departments on a project specific basis in the form of a Seismic White Paper. For more information on seismic design, please reference our ***Seismic Design: What You Need to Know Brochure***.

Since each sloped ceiling design is unique, general detail drawings accompany these guidelines. Project shop drawings are the responsibility of the contractor. The structural engineer of record is responsible for verifying and approving the use of Armstrong Ceilings components in these unique installations.

SLOPED CEILING INSTALLATION GUIDELINES

The following guidelines are in addition to the requirements set forth in ASTM C636 and ASCE 7.

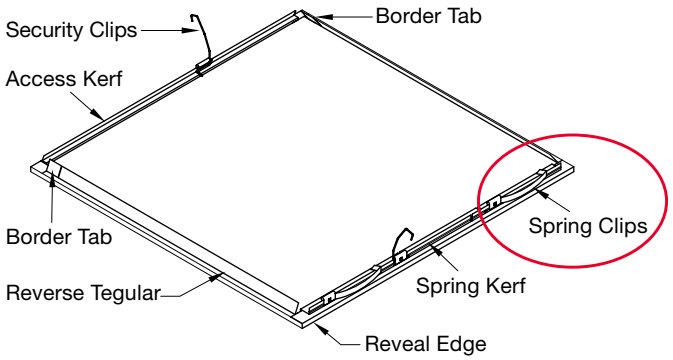
ANGLE GUIDELINES

- Maximum ceiling slope angle shall not exceed 30°.
- Ceilings with a slope angle >30° require project specific engineering, which is the design team's responsibility.

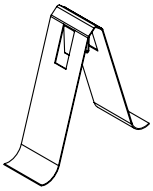
MAXIMUM HOLD DOWN CLIP GUIDELINES

The Maximum Hold Down Clip is required for all sloped ceiling applications except MetalWorks™ Vector ceiling panels which have integrated spring clips in the panel.

Metalworks Vector Spring Clip

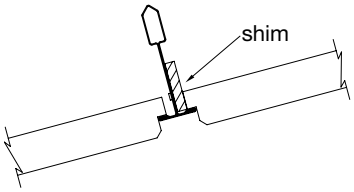


- The use of the Maximum Hold Down Clip will reduce the accessibility of the panel.



SHIM GUIDELINES

- Panels will tend to slide downhill, especially on steeper angles.
- If needed, place 1/8" or 3/32" shims (depending on panel type) between the panel edge and the web of the cross tee at the lower edge of each panel to center the panel in the suspension system opening.



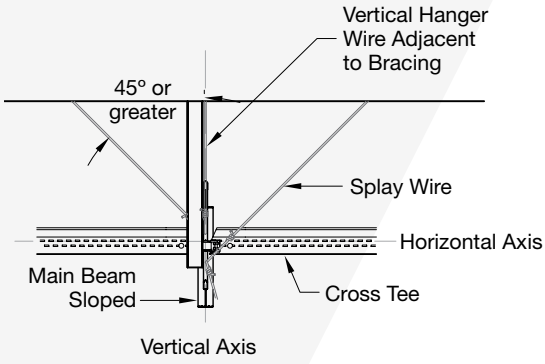
SUSPENSION SYSTEM GUIDELINES

- Install main beams parallel (up/down the incline) the slope.
- DO NOT INSTALL MAIN BEAMS PERPENDICULAR TO THE SLOPE AS THIS MAY RESULT IN SUSPENSION SYSTEM FAILURE.
- Main beams should be spaced 4'-0" on center, maximum.
- If I-beams, joists, or trusses are running up the slope and do not have purlins between them, bridge the beams, joists, or trusses with a material capable of supporting the ceiling system load.

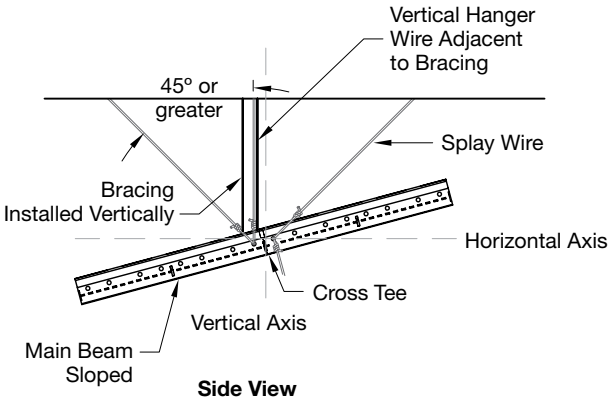
HANGER WIRE GUIDELINES

- 12 gauge hanger wire must comply with ASTM C636 requirements.
- Hanger wires should be suspended vertically and plumb.
- If lateral force bracing is required in severe seismic areas, it shall remain vertical and the splay wires shall be installed at maximum 45° to the horizontal.

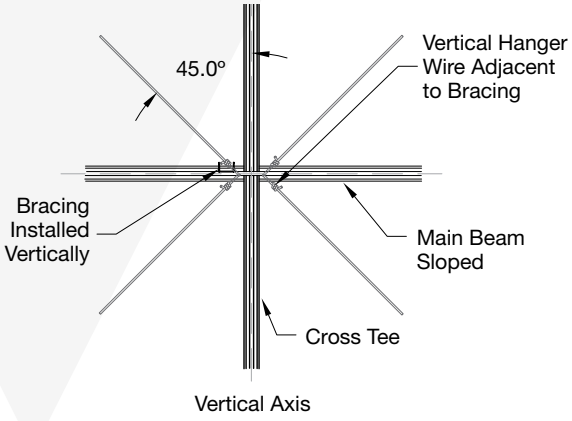
Lateral Force Bracing (Compression Posts and Splay Wires)



Front View



Side View



Top View

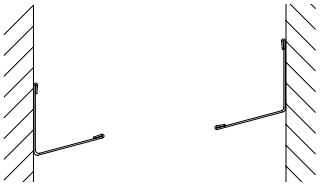
PERIMETER TREATMENT GUIDELINES

Sloped Ceilings Perimeter Solution Matrix

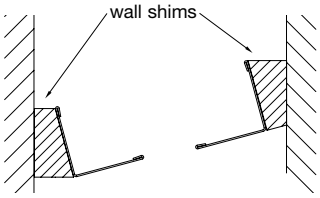
	Non-Seismic Areas		Seismic Cat. C, D, E, F
Suspended Ceiling Slope	Option 1	Option 2	Option 3
Up to 30°	Field Modified 2" Item 7808 Wall Angle with positive cross tee attachment at all ends	Wall shim with 7/8" Item 7800 Wall Angle kept at 90° with positive cross tee attachment at all ends	SEISMIC RX solution – Wall shim with 7/8" Item 7800 Wall Angle kept at 90° and BERC2 Clip with positive cross tee attachment on adjacent attached walls
Over 30°	Requires project specific engineering		

PERIMETER TREATMENT GUIDELINES

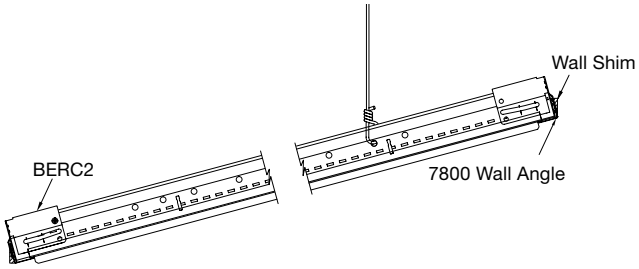
Perimeter Solution Options



- **OPTION 1:** Wall angles at the top and bottom of the slope should be re-bent to the correct angle by the contractor or at a local sheet metal shop.
  - 2" wall angle Item 7808 should be used. **NOTE:** If 7/8" molding is field bent upwards, the result is no room to mount your cross tees to the angle, unless you back cut the web and bulb severely, which impacts loading.



- **OPTION 2:** Wall angles are painted and wall shimmed to achieve the correct angle.
  - 7/8" wall angle Item 7800 should be used.
  - The field crafted wall shim must keep the angle 90° to the slope.



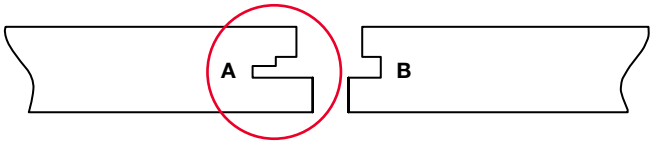
- **OPTION 3 (SEISMIC):** Wall angles are painted and wall shimmed to achieve the correct angle.
  - 7/8" wall angle Item 7800 should be used.
  - The field crafted wall shim must keep the angle 90° to the slope in order to use Seismic Rx® BERC2 clips.

FLOATING SLOPED CEILING PERIMETERS

- Non-Seismic Considerations: Refer to ASTM C636 for standard practice for installation.
- Seismic Considerations: If sloping a floating cloud, project specific engineering is required.

VECTOR® CEILING PANEL CONSIDERATIONS

- Ultima® and Optima® Vector ceiling panels in a sloped installation must have the access kerf (A) oriented towards the **top of the slope.**



LOAD CONSIDERATIONS

Special consideration should be given with lighting in sloped ceilings.

QUICK REFERENCE GUIDE FOR SEISMIC SLOPED CEILINGS

Panel Type	Mineral Fiber and Fiberglass Lay-In, Tegular, and Vector Ceiling Panels Metalworks™ Tegular and Vector Ceiling Panels		Woodworks® Tegular Panels	
Seismic Category	Seismic C	Seismic D,E, F	Seismic C	Seismic D,E,F
Grid ASTM Class	Intermediate Duty (0° < slope < 15°) Heavy - Duty (15° < slope < 30°)	Heavy - Duty	Heavy - Duty	Heavy - Duty
Perimeter Support Wires 8" or Less from Wall	None Required	Required	None Required	Required
Wall Clearance	3/8"	3/4"	3/8"	3/4"
Minimum Wall Molding Width	7/8"	2" or 7/8" with BERC2 Clip	7/8"	2" or 7/8" with BERC2 Clip
Fastened Perimeter Tee Connections	Required	Required	Required	Required
Lateral Force Bracing (splay wires/rigid bracing) for Ceiling Areas > 1,000 ft²	None Required	Required	None Required	Required
Compression Posts for Ceilng Areas > 1,000 ft²	None Required	Required	None Required	Required
Seismic Separation Joints for Ceiling Areas > 2,500 ft²	None Required	Required	None Required	Required
Maximum Weight per ft²	3.0 lbs/ft² (Intermediate-Duty Grid) 4.0 lbs/ft² (Heavy-Duty Grid)	4.0 lbs/ft²	4.0 lbs/ft²	4.0 lbs/ft²
Maximum Hold Down Clip Configuration	See page 9 for layout configuration	See page 10 for layout configuration	See page 9 for layout configuration	See page 10 for layout configuration

QUICK REFERENCE GUIDE FOR NON-SEISMIC SLOPED CEILINGS

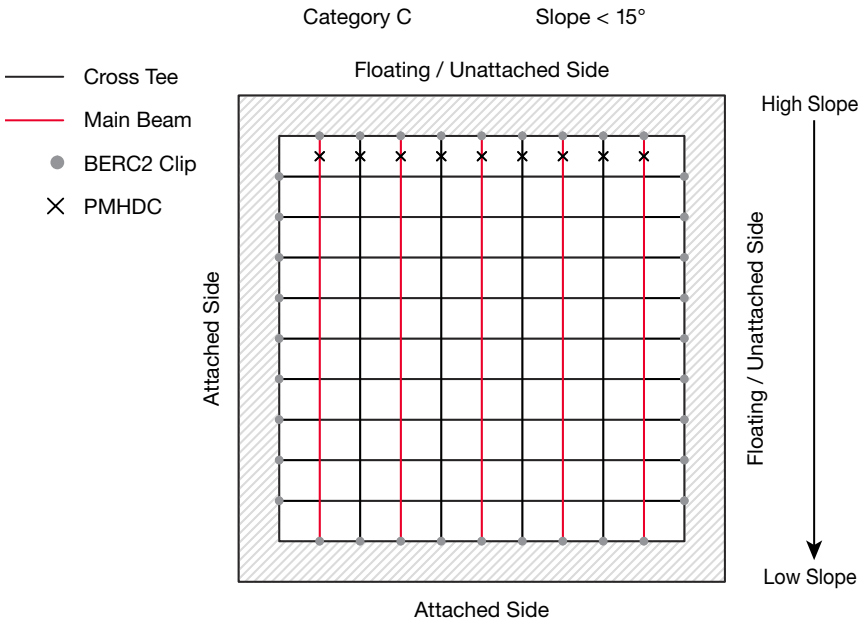
Non-Sesimic Sloped Ceiling Requirements

Grid ASTM Class	Intermediate-Duty or Heavy-Duty
Perimeter Support Wires 8" or Less from Wall	None Required
Wall Clearance	None Required
Minimum Wall Molding Width	None Required
Fastened Perimeter Tee Connections	None Required
Lateral Force Bracing (splay wires/rigid bracing) for Ceiling Areas > 1,000 ft²	None Required
Compression Posts for Ceilng Areas > 1,000 ft²	None Required
Seismic Separation Joints for Ceiling Areas > 2,500 ft²	None Required
Maximum Hold Down Clip Configuration	None required.

Seismic Categories C, D, E, F Sloped Ceiling Layouts for Mineral Fiber and Fiberglass Lay-In, Tegular, Vector and Concealed Ceiling Panels and Metalworks™ Tegular and Vector Ceiling Panels

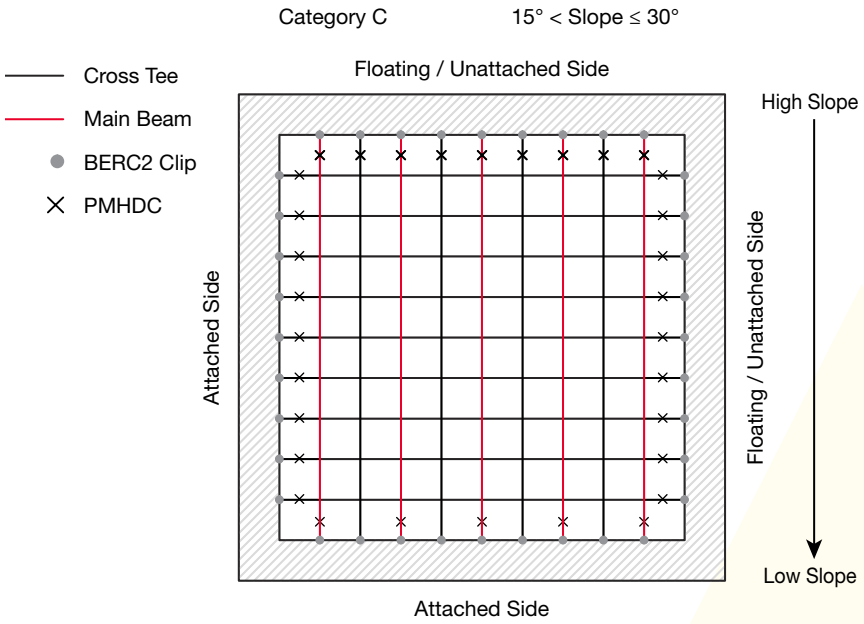
Seismic Category C Sloped Ceiling Layout for Slopes ≤ 15°

Mains should run parallel to the slope.



Seismic Category C Sloped Ceiling Layout for 15° < Slope ≤ 30°

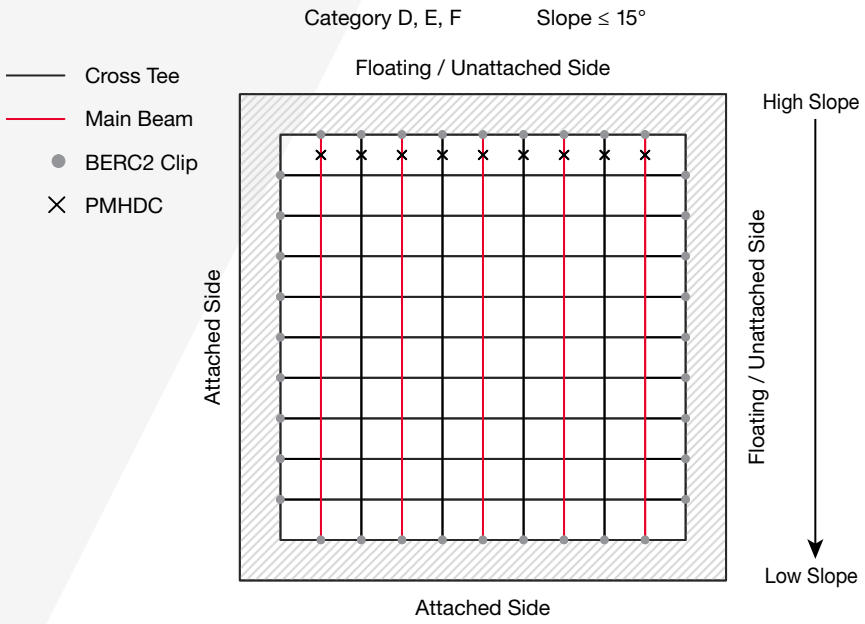
Mains should run parallel to the slope.
*Heavy-duty grid must be used.



SLOPED CEILING LAYOUTS

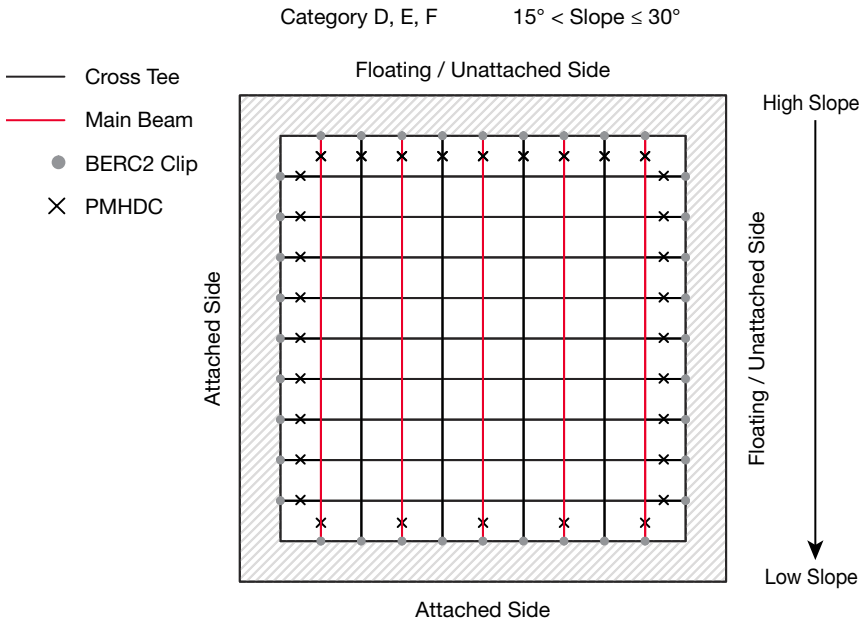
Seismic Category D, E, F Sloped Ceiling Layout for Slopes ≤ 15°

Mains should run parallel to the slope.



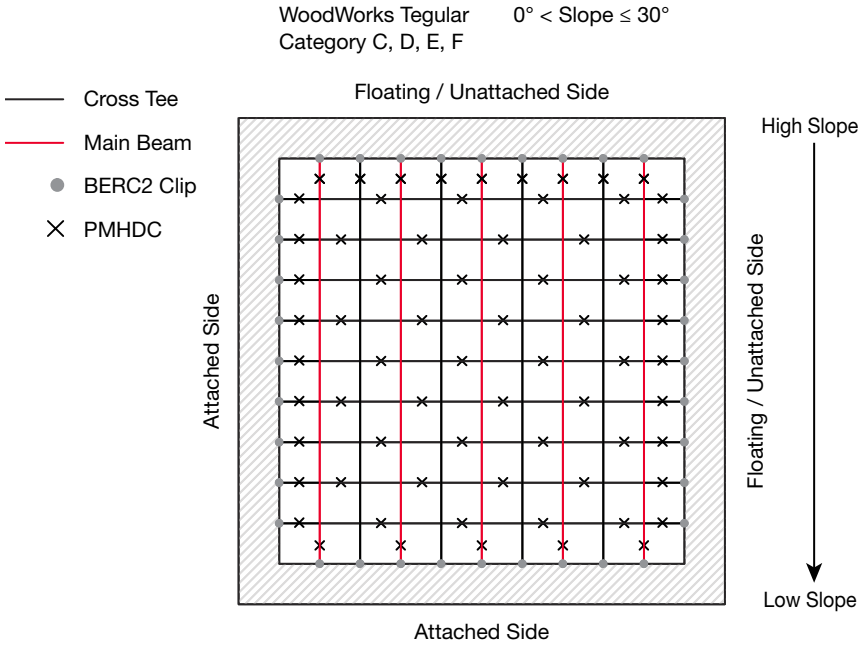
Seismic Category D, E, F Sloped Ceiling Layout for 15° < Slope ≤ 30°

Mains should run parallel to the slope.



Woodworks Tegular Seismic Category C, D, E, F Sloped Ceiling Layout for 0° < Slope ≤ 30°

Mains should run parallel to the slope.



1 877 ARMSTRONG (276-7876)

Customer Service Representatives
7:45 a.m. to 5:00 p.m. EST
Monday through Friday

TechLine – Technical information, detail drawings, CAD design assistance, installation information, other technical services – 8:00 a.m. to 5:30 p.m. EST, Monday through Friday. FAX 1 800 572 8324
or email: techline@armstrongceilings.com

armstrongceilings.com/commercial

Latest product news

Standard and custom product information

Online catalog

CAD, Revit®, SketchUp® files

A Ceiling for Every Space® Visual Selection Tool

Product literature and samples – express service or regular delivery

Contacts – reps, where to buy, who will install

YOU INSPIRE™ SOLUTIONS CENTER

1 800 988 2585
email: solutionscenter@armstrongceilings.com
armstrongceilings.com/youinspire

Design Assistance

Collaborative design

Detail drawings

Specifications

Planning and budgeting

Pre-construction Assistance

Layout drawings for standard and premium products

Project installation recommendations

Contractor installation assistance

you inspire™
solutions center

helping to bring your one-of-a-kind ideas to life

TechLine℠ / 1 877 ARMSTRONG
1 877 276 7876
armstrongceilings.com/sloped

Inspiring Great Spaces®

Armstrong® CEILING SOLUTIONS

BPCS-5618-417