



Introducing USG Danoline<sup>™</sup> Acoustical Perforated Gypsum Ceiling Panels. With an innovative design that balances aesthetics and acoustics, USG Danoline<sup>™</sup> helps you meet the unique challenges of every project — without compromise. Made from gypsum, a sustainable building material, and featuring distinctive perforations, USG Danoline<sup>™</sup> is engineered for an extensive range of design solutions, delivering elegance, comfort and performance.

### **TABLE OF CONTENTS**

UNDERSTAND YOUR SYSTEM	Page	
Table of Contents	2	
Sustainability	3	
Overview Overview	4	
FINISH OPTIONS & PAINTING PANELS	5-6	
Perforations	7	
Panel Sizes and Options	8	
DETAILS - WALL AND CEILING PANELS	9-10	
DETAILS - DIRECT MOUNT PANELS	11-12	
Panel Mounting Diagrams	13-15	
System Installation	16-19	

## **SUSTAINABILITY**

## USG ENVIRONMENTAL POLICY

USG is an environmentally responsible company, committed to long term sustainable development. We work continuously to manage our impact on the environment and to prevent pollution. We do this by:

- Using environmentally responsible raw materials in our manufacturing processes.
- Using packaging that can be recycled.
- Optimizing the consumption of energy, raw materials and packaging.
- Promoting the widest possible use of recycled materials as raw materials.

## AVAILABLE DOCUMENTATION

The sustainable properties of USG Danoline products are supported by:

Environmental Management ISO 14001.

#### SUSTAINABILITY FIRST

USG Danoline acoustic ceiling and wall materials are manufactured from gypsum board. The gypsum in the USG Danoline panels are sourced from the following gypsum types:

- naturally occurring gypsum, found in large quantities in the ground.
- synthetic gypsum, produced from as a by-product at local power plants during desulphurization

   a chemical process in which the sulphur dioxide is removed using limestone powder mixed with water to form the by-product gypsum.
- pre-consumer recycled gypsum, waste produced through the USG Danoline production processes.
- post-consumer recycled gypsum, is plasterboard waste that is received from gypsum recycling companies. Companies gathering and recycling gypsum waste from building sites across Denmark.

The panels are manufactured in Denmark and are produced is an ISO certified facility with constant focus on environmental management and optimization of the production processes to the benefit of the local surroundings, our customers and the environment in general. USG Danoline products are distinguishable by their unique features:

- long lifetime and service time
- environmentally responsible production
- high quality service life

In order to ensure the possibility that used USG Danoline panels can be recycled, they are painted with water-based paint, which not only allows recycling, but also does not affect the humidity regulating properties of the gypsum material. Another essential prerequisite for the recycling of gypsum board is to keep the gypsum core free from harmful additives.

The acoustic felt on the back of USG Danoline's perforated gypsum panels is made of cellulose which makes it unnecessary to remove the felt before the recycling of gypsum board.

The face paper used in our Gypsum Board products is produced from 100% recycled sources.

# **OVERVIEW**

USG Danoline™ direct mount solutions allow you to enhance the acoustics in your open to structure space while giving you the flexibility to express your design creativity. With numerous perforation options, the direct-mount panels can be grouped and spaced to create dramatic design statements, while maintaining an open to structure aesthetic. Panels are furnished with a factory applied soundabsorbing backer and can significantly diminish background noise improving speech intelligibility in exposed structure environments. Wall and Ceilings panels offer new options for balancing aesthetics with acoustics.

### **FEATURES AND BENEFITS**

- · New direct mount and non-demountable wall and ceiling panels offer the ultimate design flexibility with superior acoustics and elegant aesthetics.
- Offers limitless options for direct mount and exposed structure designs.
- Perforated gypsum panel offers a smooth face, factory painted white and can be field roller painted any color.
- Additional sound absorbing panels may be installed behind the perforated gypsum panel to provide higher acoustical performance.
- The system is ideal for exposed structure environments to provide design statements or maintain the exposed structure aesthetic.
- Durable and easy to maintain.
- Specially engineered USG Drywall Suspension System allows for simple suspension attachment, in addition to furring strips.



# **FINISH OPTIONS**

Gypsum is a natural occurring white material, that when perforated, exposes the white crystalline structure of the panel. Typical factory finishes are:

- Natural Finish.
- Factory Painted White RAL 9003.
- Custom, check with your USG representative for more information.

### **Direct Mount Panels**

Are furnished with a factory painted white color and may be field painted with acrylic paint.

### **Wall & Ceiling Panels**

Are furnished unpainted and are intended to be field painted or sealed with acrylic paint or acrylic clear sealer.



The perforated gypsum panels may be painted for concealment or to maintain the open to structure aesthetic.

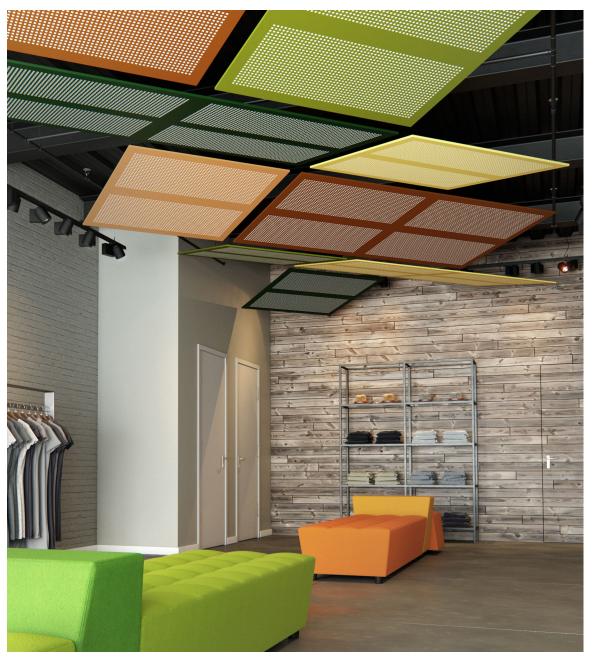


Panels may be painted to add color accents.

# **PAINTING PANELS**

USG Danoline™ panels are packaged and delivered to the construction site in the following finishes: standard white or natural finish. Panels may be painted in field if colored panels are desired. When painting a panel, darker colors will enhance the contrast of the exposed gypsum perforation.

- Verify that the joint compound is completely dry, the surface is smooth and free from dust.
- Priming should be carried out in accordance with the paint manufacturer's instructions.
- Carefully apply paint with a low-nap foam roller. Remove (backroll) all excess paint prior to applying roller to surface of the panel.
- Do not get excess paint in holes and or on the acoustical membrane. Paint applied to backer will reduce acoustical performance of panel.
- Apply back-rolled brush carefully to panel surface, avoid clogging perforations with paint.
- Do not spray panels, as this will clog the acoustical backer and will detrimentally affect the acoustical performance of the panel.
- For best results, apply paint after panel is installed to minimize paint getting into the perforations.



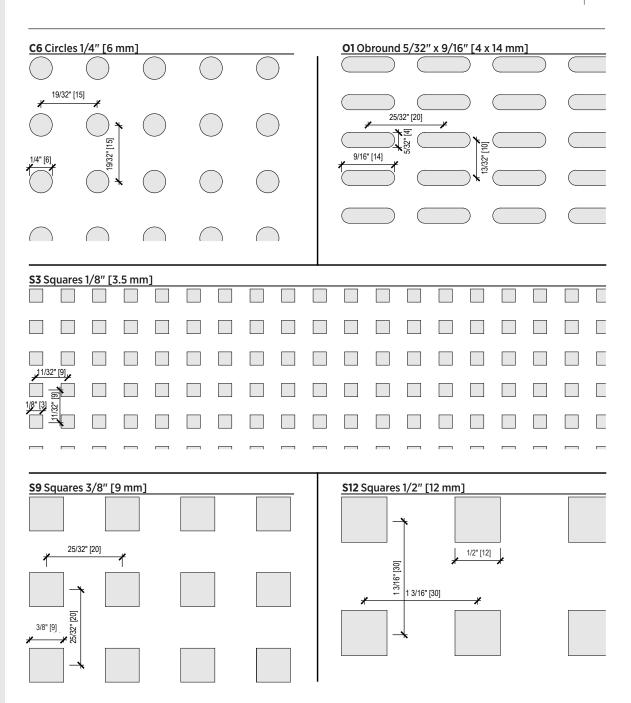
# **PERFORATIONS**

### **PERFORATION SUMMARY**

Perforation Geometry <sup>1</sup>	Perforation Pattern	Open Area		
		Quarter 2L2 panel Configuration	Eighth 2L4 panel Configuration	Thirds 3L1 Configuration
C6	Round 1/4"	9.3%	8.3%	n/a
O1	Obround 5/32" x 9/16"	n/a	n/a	15.5%
S3	Square 1/8"	12.3%	10.7%	n/a
S9	Square 3/8"	15.0%	13.6%	n/a
S12	Square 1/2"	12.2%	11.2%	n/a

 $<sup>^{1}</sup>$  C = round holes, O = Obround holes, S = Square holes, all are square pattern

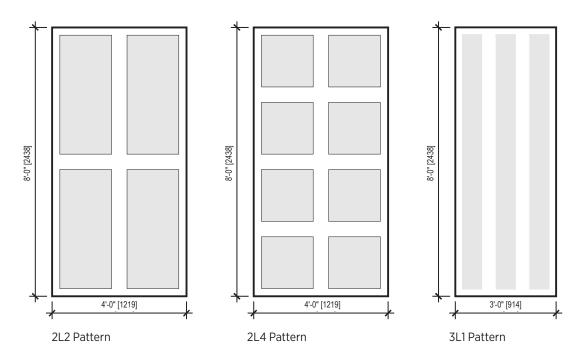
### **PERFORATION DETAILS**



Note: Perforation patterns shown at 100% of actual size.

# PANEL SIZES AND OPTIONS

### **PERFORATION CONFIGURATIONS**



### **ACOUSTICAL PERFORMANCE**

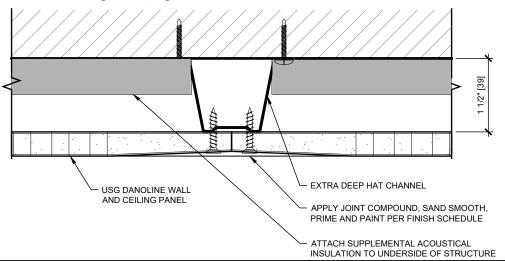
Perforation	Panel + Insulation Sabins per ft² (1,3)	Panel only Sabins per ft² (1,3)
C6	.80 - 1.25	.45 - 65
01	.80 - 1.25	.45 - 70
S3	.80 - 1.25	.45 - 65
S9	.80 - 1.25	.45 - 70
S12	.80 - 1.25	.45 - 65

### Notes:

- 1. Includes the factory applied acoustical backer plus an additional fiberglass backer panel.
- 2. Factory applied acoustical backer only.
- 3. Higher acoustical performance achieved with 1-1/2" fiberglass backer panel. Performance value ranges based on mounting heights from 1 - 1/2" to 24". Contact a USG sales representative for more information.

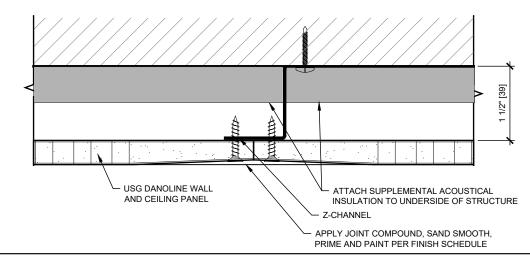
### USG DANOLINE™ WALL AND CEILING PANELS

1. DIRECT MOUNT WITH EXTRA DEEP HAT CHANNEL USG Danoline™ Wall and Ceiling Panels - Direct Mount with extra-deep hat channel and supplimental USG Mars™ High-NRC/High-CAC Acoustical Panels.



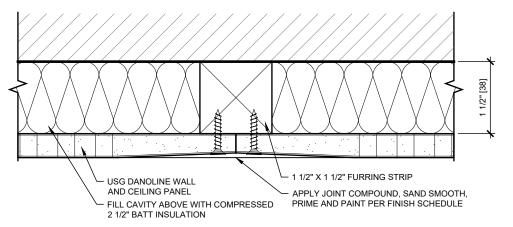
2. DIRECT MOUNT WITH Z-CHANNEL

USG Danoline™ Wall and Ceiling Panels - Direct Mount with Z furring channel and supplimental USG Mars™ High-NRC/High-CAC Acoustical Panels.



3. DIRECT MOUNT WITH BLOCKING

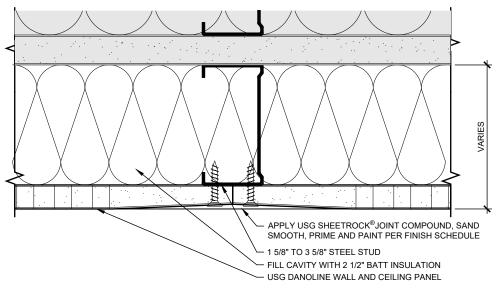
 $USG\ Danoline^{\tiny{TM}}\ Wall\ and\ Ceiling\ Panels\ -\ Direct\ Mount\ with\ blocking\ and\ supplimental\ acoustical\ backer.$ 



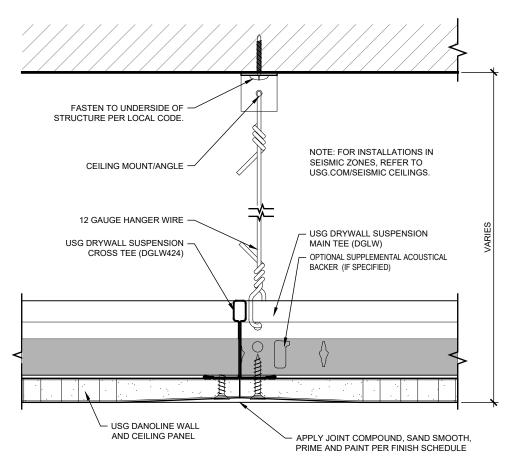
### USG DANOLINE™ WALL AND CEILING PANELS

4. WALL AND CEILING **PANELS WITH STEEL STUD** (DEPTH VARIES)

USG Danoline™ Wall and Ceiling Panels - Direct Wall Mount with steel studs (size varies) and supplimental acoustical backer.

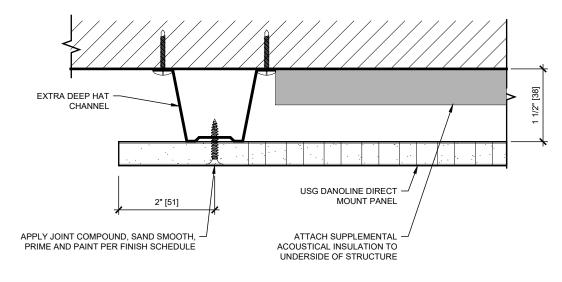


**5. WALL AND CEILING PANELS WITH USG DRYWALL SUSPENSION GRID**  USG Danoline™ Wall and Ceiling Panels - Suspended ceiling mount with USG Drywall Suspension system grid and supplimental acoustical backer.



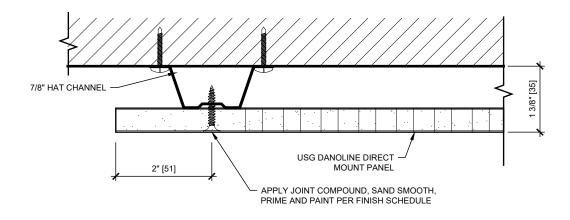
## USG DANOLINE™ DIRECT MOUNT PANELS

6. DIRECT MOUNT WITH EXTRA-DEEP HAT CHANNEL (DEPTH VARIES) USG Danoline  $^{\text{\tiny TM}}$  Direct Mount Panels - Direct Ceiling Mount with extra-deep hat channel and supplimental acoustical backer.



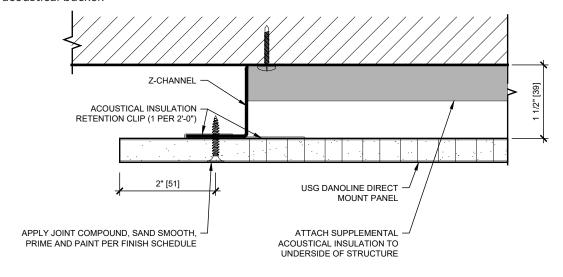
7. DIRECT MOUNT WITH HAT CHANNEL

 ${\sf USG\ Danoline^{\tiny TM}\ Direct\ Mount\ Panels\ -\ Direct\ Ceiling\ Mount\ with\ hat\ channel}.$ 



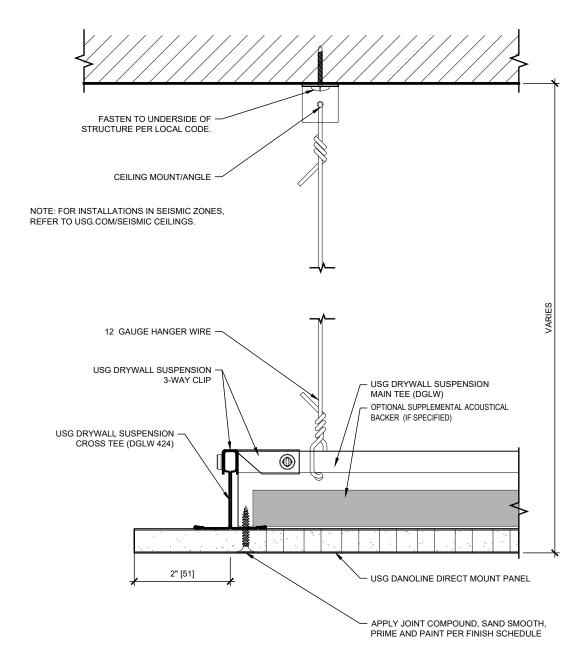
8. DIRECT MOUNT WITH Z-CHANNEL (DEPTH VARIES)

USG Danoline™ Direct Mount Panels - Direct Ceiling Mount with Z furring channel and supplimental acoustical backer.



## USG DANOLINE™ DIRECT MOUNT PANELS

9. DIRECT MOUNT WITH **DRYWALL SUSPENSION**  USG Danoline™ Direct Mount panels - Suspended Ceiling Mount with USG Drywall Suspension system and supplimental acoustical backer.



# **PANEL MOUNTING**

## USG DANOLINE™ DIRECT MOUNT PANELS

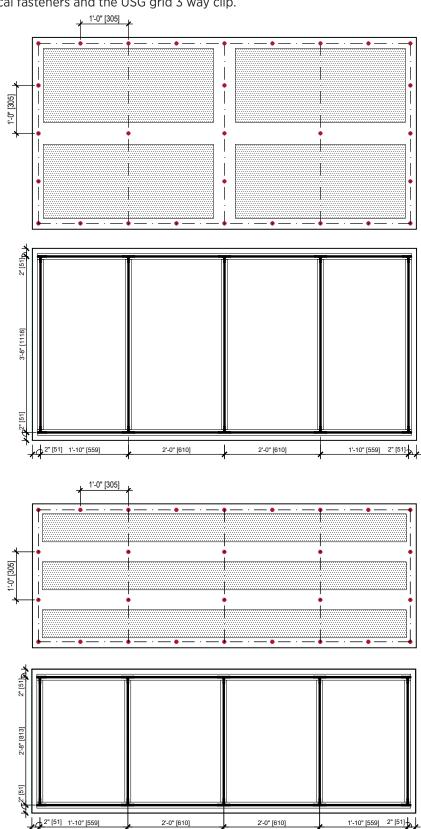
USG Danoline™ Direct Mount Panels - fastener spacing at 12" [305] along panel edges and framing members. Using Drywall Suspension main tees, cut to length as needed. Attach tees together with mechanical fasteners and the USG grid 3 way clip.

DIRECT MOUNT 4' X 8' PANEL WITH DRYWALL SUSPENSION

DRYWALL SUSPENSION LAYOUT FOR 4' X 8' PANEL

DIRECT MOUNT 3' X 8' PANEL WITH DRYWALL SUSPENSION

DRYWALL SUSPENSION LAYOUT FOR 3' X 8' PANEL

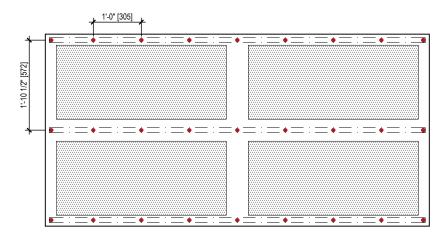


# **PANEL MOUNTING**

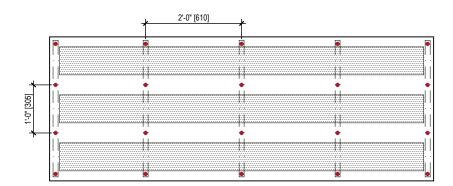
## USG DANOLINE™ DIRECT MOUNT PANELS

USG Danoline™ Direct Mount Panels - fastener spacing at 12" along framing members.

**DIRECT MOUNT 4' X 8'** PANEL WITH 11/2" HAT **OR Z CHANNEL** 



**DIRECT MOUNT 3' X 8'** PANEL WITH 11/2" HAT **OR Z CHANNEL** 

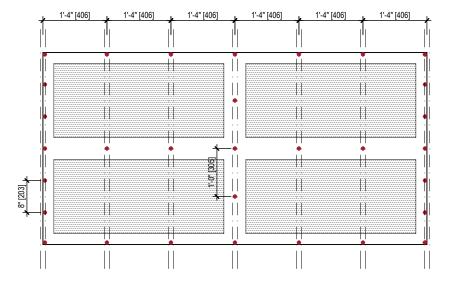


# **PANEL MOUNTING**

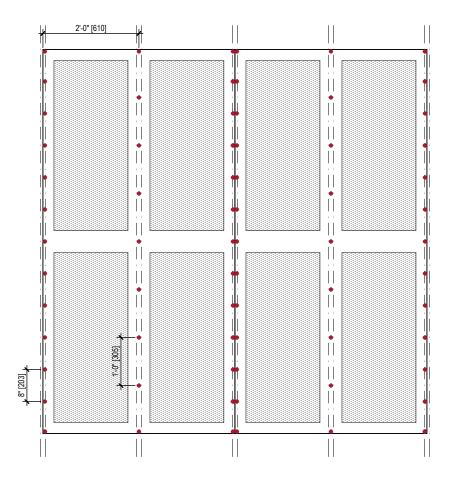
### USG DANOLINE™ WALL AND CEILING PANELS

USG Danoline™ Wall and Ceiling Panels - Direct Mount to vertical or horizontal framing, apply screws at 8" O.C. at panel edge (where possible). Mid-field screws are to be spaced 12" O.C. along framing members, typical.

**APPLYING PANELS** TO VERTICAL STEEL **STUDS AT 16" O.C.** 



**APPLYING PANELS** TO VERTICAL STEEL STUDS AT 2'-0" O.C.



### **GENERAL NOTES**

Follow proper safety and industrial hygiene practices while handling and installing all products and systems. Take necessary precautions and wear appropriate personal protective equipment as needed. When removing ceiling pans from grid, we recommend wearing a dust mask, cut-resistant gloves, and eye protection. Provide drop cloths to cover and protect furnishings below. When using a ladder or lift, follow the equipment manufacturer's precautions, instructions, and safety guidelines.

All ceiling products and systems must be installed and maintained in accordance with current USG written instructions and in compliance with ASTM C636, ASTM E580, CISCA, and standard industry practices. Placement of USG Danoline™ Perforated Gypsum Panels may obstruct or distort the existing or planned fire sprinkler water distribution pattern, or possibly delay the activation of the fire sprinkler or fire detection system. USG recommends design coordination with a fire protection engineer, NFPA 13, and the local code authority for guidance on the proper installation techniques where fire detection or suppression systems are present.

Care must be taken to safeguard products from damage during delivery and while they are stored at the jobsite. The products must always be protected from vibration, chemical fumes, and direct contact with water both before and after installation.

The perforated gypsum panels will lose their acoustic absorption if the perforations are blocked or filled with paint. this applies to the front and back of the panel.

When installing the USG Danoline™ Wall and Ceiling panel on a fixed surface, USG recommends filling the cavity between the back of the panel and the furring channel with mineral wool or High NRC Mars panels. This is primarily to ensure low frequency sound absorption.

Reference USG Gypsum Construction Handbook for detailed instructions. The following chapters are relevant for the installation of USG Danoline<sup>™</sup> panels:

- Ceiling framing chapter 2
- Gypsum panel installation chapter 3
- Panel Finishing Chapter 5.

### **DELIVERY, STORAGE AND HANDLING**

- A. Delivery of materials: Deliver materials in original, unopened packages clearly labeled with a manufacturer's name, item description, part number, type and class, as applicable.
- B. Inspection: Promptly inspect delivered materials, file freight claims for damage during shipment and order replacement of materials as required. Any damaged materials should be promptly removed from the job site.
- C. Storage: Store in a manner that will prevent warpage, water damage or damage of any kind. Prevent interference to/by other trades and any other adverse job conditions due to storage locations or
  - Warning: Store all USG Danoline™ Perforated Gypsum Panels flat. Panels are heavy and can fall over, causing serious injury or death. Do not move unless authorized.
- D. Handling: Handle in such a manner to prevent racking, distortion or physical damage of any kind.

#### **PROJECT CONDITIONS**

- A. Existing conditions: (include general conditions or specific alteration work requirements for the project).
- B. Environmental requirements:
  - 1. Building Conditions: Building shall be enclosed with all windows and exterior doors in place and glazed, and roof watertight before installation of suspension system.
  - 2. Interior temperature/humidity in building: Conditions in areas to receive Direct mount or Danoline™ Wall and Ceiling Panels shall range from 60° F (16° C) to 104° F (40° C) and relative humidity of not more than 90% shall be maintained before installation of components.
  - 3. In cold weather during gypsum panel installation and joint-finishing application, temperatures within the building shall be maintained in the range of 55-70° F (13-21° C). Heat and ventilation should be evenly provided to facilitate curing and drying.
- C. Coordination with other work:
  - 1. General: Coordinate with other work supported by or penetrating through the ceiling, including mechanical and electrical work and partition systems.
  - 2. Mechanical work: Ductwork above system shall be complete and permanent HVAC systems
  - 3. Electrical Work: Installation of conduit above suspension system shall be complete before installation of suspension system.

## DIRECT MOUNT TO STRUCTURE

Rigid furring or Z-channels shall be used to ensure an air gap between the gypsum panels and the ceiling structure to minimize moisture and condensation issues.

- Rigid furring channel height must be minimum 7/8" [22 mm] in. to accommodate supplemental acoustical backer panels if standard Mars, NRC 0.75, backers are used.
- Rigid furring or Z channel height must be minimum 1-1/2" [38 mm]. to accommodate supplemental acoustical backer panels if High NRC Mars, NRC 0.90, backers are used.
- Rigid furring and Z channel maximum spacing is 24" [609 mm] and maximum span is 4 ft [1219 mm].

The furring channel must be attached to structure with an approved fastener and spaced for the structure type. These requirements can vary by structure type. Contact a fastener manufacturer for specifications and engineering support data.

Use 1-1/4" [32 mm] sharp point drywall screws to attach gypsum panels to the support structure spaced 12" in. [305 mm] O.C. at unperforated edge of gypsum panels and located 3/8" [9 mm] from panel edges and spaced 12" [305 mm] O.C. in the field. Drive fasteners in unperforated areas of panels first, working toward ends and edges. Hold panels in firm contact with framing while driving fasteners. The fasteners must be in the field of the board, not the perforations. The fastener head should be countersunk just below the surface without tearing the paper face.

Supplemental acoustical backers are secured to the structure above the gypsum panels, if enhanced acoustical performance is required.

To finish a panel, apply USG Sheetrock® Brand Joint Compound to all fasteners, sand and prime to a smooth and uniform appearance. When dry, apply finish coat of paint – reference painting section for more information.

## SUSPENDED FROM STRUCTURE

Determine the finished ceiling height. Attach hanger wires to structure above using the appropriate method. Hanger wires shall be spaced and attached to DGW26 USG Drywall Suspension Heavy Duty Main Tee 48" [1219 mm] O.C. max.

Using pliers, bend the hanger wires at 1-1/2" [38 mm] above the finished ceiling height. This will set the wires at the correct height for suspending the USG Drywall Suspension Heavy Duty Main Tee and 5/8" [16 mm] perforated gypsum panel.

Secure gypsum panels to ceiling framing, wall framing or USG Drywall Suspension system. Use 1-1/4" [32 mm] sharp point drywall screws to attach gypsum panels to support members spaced 12" [305 mm] O.C. at periphery of gypsum panels and located 3/8" [9 mm] from panel edges and spaced 12" [305 mm] O.C. in the field. Drive fasteners in field of panels first, working toward ends and edges. Hold panels in firm contact with framing while driving fasteners. The fastener head should be countersunk just below the surface without tearing the paper face. Supplemental acoustical backers are secured to the structure above the gypsum panels, if enhanced acoustical performance is required.

To finish a panel, apply USG Sheetrock® Brand Joint Compound to all fasteners, sand and prime to a smooth and uniform appearance. When dry, apply finish coat of paint – reference painting section for more information.

### WALL APPLICATIONS

Please note that when USG Danoline™ Wall and Ceiling panels are applied to wall surfaces, the partition receiving the panels must be finished to a minimum of a "level 2" finish:

Level 2 drywall finish may be specified for standard gypsum board surfaces in garages, warehouse storage or other similar areas where surface appearance is not of primary importance. All joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with a joint knife or trowel, leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

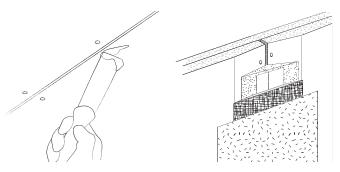
Install furring or wall support to create desired acoustical performance of the wall. Prior to installing USG Danoline™ panels, install desired supplemental acoustical absorber (panels or batts). Supplemental acoustical backers are installed behind the gypsum panels between the furring channels.

- Hat or Z channel height must be minimum 1-1/2" [38 mm] to accommodate supplemental acoustical panels: USG Mars High NRC and High CAC Acoustical Panels, NRC 0.90. The hat or Z channels are to be mounted horizontally and spacing is either 16" [406] or 24" [609 mm] O.C.
- Light Gauge Steel framing 1-5/8" [41 mm] to 6" [153 mm], mounted vertically 16" [406] or 24" [609 mm] O.C.

The light gauge metal framing or furring channel must be attached to structure with an approved fastener and spaced for the structure type. These requirements can vary by structure type. Contact a fastener manufacturer for specifications and engineering support data.

Use 1-1/4" [32 mm] sharp point drywall screws to attach gypsum panels to the support structure spaced 8 in. O.C. at unperforated edge of gypsum panels and located 3/8" [9 mm] from panel edges and spaced 12" [305 mm] O.C. in the field. Drive fasteners in unperforated areas of panels first, working toward ends and edges. Hold panels in firm contact with framing while driving fasteners. Care shall be taken not to countersink screws, break the face paper of the gypsum panels or install fasteners through any perforations.

USG Danoline™ panel sizes are nominal and must be installed with a gap typically at distances of up to 1/8" from each other. Apply joint compound at all reveal edge joints all the way up between the edges of the panels. At corners or ends of panels that are less than the overall panel size, cut panels (if necessary) with a fine-toothed saw, sand rough edges if needed. The USG Danoline™ wall & ceiling panel should always be installed with beveled edge to beveled edge (same applies for soffits). We recommend using USG Sheetrock® Brand Ultralight Panels 1/2" at all adjacent wall or ceiling surfaces. Prior to applying Joint compound, apply painters' tape at all perforation fields adjacent to beveled edges to avoid plugging holes. Apply USG Sheetrock® Brand Joint Compound to finish all joints and gaps, remove tape after sanding joint compound. If necessary and holes require filling due to ceiling soffit or changes in wall direction, apply painters tape to holes that are not to be filled. Fill perforations with USG Sheetrock® Brand Joint Compound as needed.





First coat of USG Sheetrock® Brand Joint Compound



USG Sheetrock® Brand Paper Joint Tape



Second coat of USG Sheetrock® Brand Joint Compound



Third coat of USG Sheetrock® Brand Joint Compound

#### JOINT TREATMENT

- Reference USG Gypsum Construction Handbook for Industry Standard of Gypsum Board Installation, for finishing of panel joints, reference Chapter 5.
- Apply painters' tape at all perforation fields that are adjacent to a beveled edge.
- Apply the first layer of Sheetrock® Brand Joint Compound, press firmly.
- Apply paper tape to uncured USG Sheetrock® Brand Joint Compound.
- Allow the USG Sheetrock® Brand Joint Compound to dry. When dry, sand with fine sandpaper. Be careful not to damage the paper surface.
- Apply the second layer of USG Sheetrock® Brand Joint Compound.
- Allow the filler to dry. Sand with fine sandpaper. Be careful not to damage the paper surface.
- Apply the third layer of USG Sheetrock® Brand Joint Compound. The USG Sheetrock® Brand Joint Compound must be completely dry before sanding. Sand with fine sandpaper until the joint is completely smooth.

### **FILLING SCREW HOLES**

- Check that the screws have been countersunk (do not over-drive).
- Apply USG Sheetrock® Brand Joint Compound, overfill slightly.
- Sand dry joint compound to a smooth, uniform appearance, to not damage adjacent paper.
- Apply primer to all USG Sheetrock® Brand Joint Compound applications.
- Apply finish coat of paint, reference painting instructions above.

### **SAMPLE APPLICATION**



Wall panels applied to horizontal hat channels.



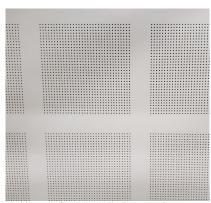
Painters tape applied to perforation field edges.



Application of joint compound.



Third coat of USG Sheetrock® Brand Joint Compound applied.



Final coat of paint applied to panels.

#### PRODUCT INFORMATION

For the most up-to-date technical information, visit usgdesignstudio.com or cgcdesignstudio.com

### **CUSTOMER SERVICE**

**USG**: 800 950-3839 **CGC**: 800 387-2690

#### **TECHNICAL SERVICE**

800 USG.4YOU (874-4968)

### **WEBSITES**

usg.com cgcinc.com usgdesignstudio.com cgcdesignstudio.com

### SAMPLES/LITERATURE/FAX

USG: 866 528-7089 CGC: Contact Local Sales Rep

### Installation

Must be installed in compliance with ASTM C636, ASTM E580, CISCA and standard industry practices, within all applicable code requirements. Alternative assemblies and installation methods may be utilized when approved by the Authority Having Jurisdiction. USG recommends checking with the Authority Having Jurisdiction prior to designing and installing a suspended ceiling system.

#### **Code Compliance**

The information presented is correct to the best of our knowledge at the date of issuance. Because codes continue to evolve, check with a local official prior to designing and installing a ceiling system. Other restrictions and exemptions may apply.

#### **Notice**

We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

### Safety First!

Follow good safety/industrial hygiene practices during installation. Wear appropriate personal protective equipment. Read MSDS and literature before specification and installation.

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