



PHASE-2[®]

Solid PVC Siding, Roofing, and Louver

Installation Guide



Manufactured by Palram
for H&F Manufacturing.



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! IMPORTANT INFORMATION

Profile-Specific Information for Installation

Each Phase-2 profile has its own profile-specific addendum to this guide which includes additional details such as:

- Profile Drawings and Dimensions
- Load and Span Data
- Maximum Recommended Lengths
- Maximum Recommended Radius
- Fastener Recommendations and Schedules

See the list below to select the appropriate addendum for the product you intend to use or specify. Request the appropriate addendum from your H&F representative, or call H&F Manufacturing Corp.



- ▼ If viewing this document as a PDF, you can click on the download button for any of the profiles listed below to download the related document.

Profile-Specific Downloadable Installation Info				
Link	Form #	H&F Ref	Palram Name & Designation	Palruf Profile #
▼	ITS-Phase2_07	4.2" x 1-1/16"	American 4.2" 27/107	07
▼	ITS-Phase2_06	2.67" x 7/8"	American 2.6" 20/68	06
▼	ITS-Phase2_10	Astoria Box Rib Embossed	Astoria 38/305	10
▼	ITS-Phase2_19	7.2" x 1-1/2"	7.2 38.1/82.9 (1.5"/7.2")	19
▼	ITS-Phase2_15	Ag-Tuf Greca Rib	Greca 76 18/76	15
▼	ITS-Phase2_20	Ag-Tuf UV 9"	9" 3/4"/9"	20



Palram Americas produces many products for H&F Manufacturing in its US headquarters and state-of-the-art manufacturing facility located in Kutztown, PA.

Manufactured by Palram for H&F Manufacturing.

Palram Industries, Ltd. is a thermoplastics manufacturing leader, specializing in the production of polycarbonate and PVC sheet in flat, multi-wall and corrugated configurations.

H&F Manufacturing Corp. has been a valued Palram customer and a distributor of many of Palram's products since 1973. H&F has tremendous experience and expertise in the industrial cladding applications market, and provides customer and market feedback to Palram to assist in new product development and application usage.

Phase-2® is produced by Palram for H&F Manufacturing according to H&F's exacting standards and specifications.

Introduction to Phase-2 PVC

Phase-2 PVC Siding, Roofing, and Louver Panels are solid, heavy gauge Polyvinyl Chloride (PVC) extruded sheets that maintain color and structural integrity under the toughest weather conditions and physical abuse.

Phase-2 PVC had successfully passed FM Standard 4880 for unlimited height use, without the need for sprinkler protection, and offers a Non-Combustible Flame Spread Rating of 12. Phase-2 PVC also performs exceptionally in resisting most corrosive conditions from many organic and inorganic chemical fumes and liquids.

Phase-2 PVC is UV resistant and resists yellowing or discoloring, and will block out harmful UV radiation.

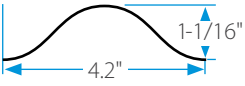

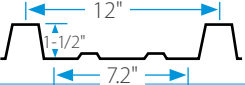
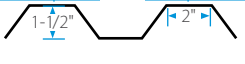
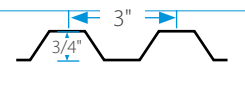
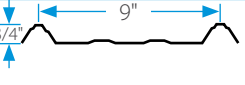



Certifications

Phase-2 Panels...

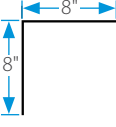
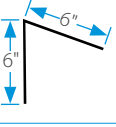

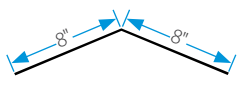
- Offer excellent resistance against water and a broad range of chemicals in the forms of solids, liquids, or fumes. For a detailed overview of Phase-2's chemical resistance, see the document titled: Phase-2 PVC Chemical Resistance (*if viewing this as a PDF, [download here](#)*).
- Have extremely high impact strength (6 ft. lbs./in. Izod), which means that the panels are highly breakage resistant and will not dent due to impact, over the entire temperature range for which Phase-2 panels are recommended.
- Are non-combustible, i.e., they will not support combustion, and have a Flame Spread Rating of 12 (Class 1– Non-Combustible Material of Construction).
- Were subjected to the Factory Mutual Wind Uplift Pressure Test (FMRC Standard 4470) and had successfully passed the test. Phase-2 PVC Panels met the minimum 60 psf FMRC requirement for Class I-60 Windstorm Classification and the 90 psf FMRC requirement for Class I-90 Windstorm Classification.
- Had satisfactorily passed the FMRC Simulated Hail Damage Test using the FMRC Class I-MH Simulated Hail Damage Test apparatus.

Phase-2 PVC Corrugated and Flat Panels

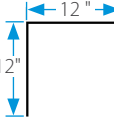
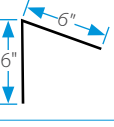
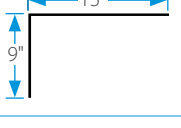
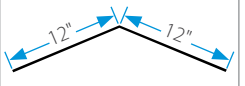
Profile	Configuration Detail	Width	Max. Length	Thickness		Oz/ Ft. ²	Conforms To:
4.2" x 1-1/16"		42"	38'	3/32" 1/8" 3/16"	White, Gray White, Gray, Clear, Tan, Blue White Gray	12 16 24	FRP, Asbestos Cement
2.67" x 7/8"		40"	38'	3/32"	White, Gray, Clear	12	FRP, Steel, Aluminum
Astoria Box Rib Embossed Surface		40-1/4"	38'	3/32"	White, Tan	12	Proprietary Configuration
7.2" x 1-1/2"		47-7/8"	38'	1/8"	White, Gray, Clear	16	FRP, Steel, Aluminum
Ag-Tuf Greca Rib		38"	Standard Lengths up to 20'4"	1/32"	White	4	Box Rib
Ag-Tuf UV 9" Classic Rib		38"	Standard Lengths up to 20'4"	1mm	White, Tan	5	FRP, Steel, Aluminum
Flat UV		4' x 8' Standard		1/16", 1/8"	White, Gray, Clear, Tan, Blue	8, 16	Flat, or Thermoformable
Type 1, Type 2				1/8", 3/16" 1/4", 1/2"	White, Dark Gray	16, 24 32, 48	Flat, or Thermoformable
Flat Astoria Embossed				3/32"	White, Tan	12	Flat, or Thermoformable

Non-standard colors and sizes for all profiles and product lines available upon request. Minimum order requirements may apply.

Flashings for Use with Phase-2 PVC Panels

Flashing Type	Configuration Detail	Dimensions
Corner Trim		Thickness: 1/8" Legs: 8" x 8" Length: 8' 0" Angle: 90°
Eave Trim		Thickness: 1/8" Legs: 6" x 6" Length: 8' 0" Angle: 70°
Gable Trim		Thickness: 1/8" Legs: 6" x 10" Length: 8' 0" Angle: 90°
Ridge Trim		Thickness: 1/8" Legs: 8" x 8" Length: 8' 0" Angle: 135°

Non-standard leg lengths and angles available upon request.

Flashing Type	Configuration Detail	Dimensions*
Corner Trim		Thickness*: 3/32" & 1/8" Legs: 12" x 12" Length: 8' 0" Angle: 90°
Eave Trim		Thickness*: 3/32" & 1/8" Legs: 6" x 6" Length: 8' 0" Angle: 70°
Gable Trim		Thickness*: 3/32" & 1/8" Legs: 9" x 15" Length: 8' 0" Angle: 90°
Ridge Trim		Thickness*: 3/32" & 1/8" Legs: 12" x 12" Length: 8' 0" Angle: 135°

* Astoria flashings 3/32" thick; 7.2x1-1/2" flashings 1/8" thick

Transportation, Handling and Storage

H&F Manufacturing Corp. recommends the following practices regarding the transportation, handling and storage of Phase-2 panels:

1. Transport and store Phase-2 panels horizontally, on flat, sturdy pallets, equal or longer than the longest panels. Short panels should be stacked on top of longer ones. The panels should be secured and fastened to the pallet during transportation.
2. Store Phase-2 panels in a cool and shaded place, out of direct sunlight. Avoid covering the stack of panels with dark or heat-absorbing materials or objects, to prevent solar heat buildup.
3. When necessary to store panels outdoors, cover the stack with a white opaque polyethylene sheet, corrugated cardboard or other materials that do not absorb or conduct heat. Verify that the entire stack is covered.
4. Phase-2 panels are tough, requiring no special care. Nevertheless, H&F Manufacturing Corp. recommends some cautionary steps:
 - Avoid stepping or driving on the panel while the panel is on the ground
 - Avoid folding panels during handling and installation
 - To prevent scratching, do not drag the panels on the ground or scrape them against structural elements or other rough objects.



Chemical Resistance and Fire Hazard Comments

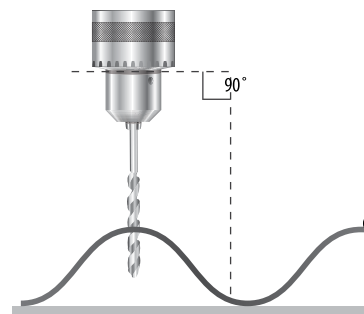
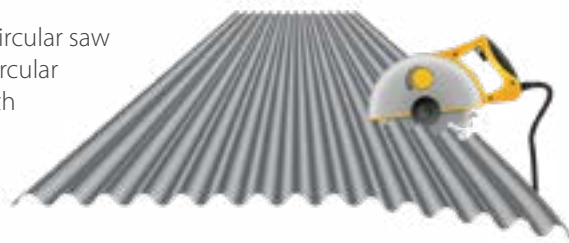
1. Phase-2 panels are resistant to a variety of chemicals and exhibit limited resistance to a second group of chemicals. A third group of chemical may attack and damage the panel. Degree and severity of damage depends on chemical type and duration of exposure. To assess the nature of anticipated chemical resistance, consult H&F Manufacturing Technical Support Department.
2. Consult the Phase-2 Chemical Resistance Table that can be downloaded at <http://tinyurl.com/Phase-2-Chem-Comp>, or [click here](#). When in doubt, consult H&F Manf. Corp.
3. Standard operating temperature range for PVC is -4°F to 122°F.

Sawing, Cutting and Drilling

1. Phase-2 panels can be cut or sawed by manual or power tools. A bench/table circular saw is best for straight long cuts. For better results cut a few panels together. Portable circular saws are suitable for on-site straight cuts. A jigsaw is used for cutting a limited length of irregular or curved lines. Hand tools such as handsaw, metal shears or hand-held cutting knives can be used for localized, limited work.

IMPORTANT: If clear Phase-2 panels have been stored below 40° F, allow panels to acclimate to room temperature before cutting.

2. Sawing is done with plywood saw blade, installed in reverse direction, with small teeth, or special blades for plastics, spinning at high speeds, with a slow feed rate. Panels should be supported near the cut-line and clamped during sawing, to avoid vibrations. Avoid intersecting cuts. Drill a hole at intersection point, then cut the panel up to the hole. Clean dust and cutting chips away after cutting.
3. Drilling is done using a power drill, with regular high-speed steel bits intended for metal, rotating at about 1,000 RPM. Better results with Phase-2 are achieved using bits ground to shallower tip angle than for metal. Clamp the drilled panel down to avoid vibrations or movement during operation.



Safety Measures

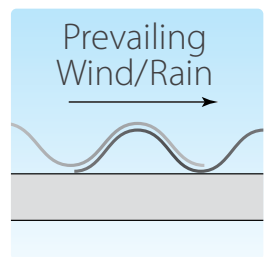
The following safety measures should be followed during and after installation of Phase-2 panels.

1. Use ladders, crawling boards and other safety equipment required for safe installation. Use all safety measures required according to local safety regulations.
2. Always use appropriate scaffolding to service panels. Scaffolding should provide proper worker safety and ensure proper placement and distribution of weight to avoid damage to panels. **Do not walk on panels for fear of falling and other severe bodily harm.**
3. Never leave Phase-2 panels unattended on the roof until all the required fasteners have been appropriately installed or the panels secured to the supporting structure.
4. Always follow local and/or national building and OSHA safety codes.



Panel Orientation

1. All Phase-2 panels should be positioned so that both outside vertical edges are pointing down. This is especially important for clear Phase-2 products, which feature UV-protection on one side of the panel. The UV protected side is facing up when both vertical edges are pointing down.
2. Installation Direction: For multi-panel runs, begin installation of Phase-2 on the side away from wind and rain direction.



General Information for Installation

Panels should not be installed on inclines of less than 1" in 12".

Panels should not be installed where temperatures exceeds the upper limit service limit of 122°F. When installed where outside temperatures approach the upper serviceable limits, it is recommended to consult with your H&F Manufacturing representative.

Prior to actual installation study the Phase-2 Installation Guide carefully. Make sure all the instructions are understood and all required materials, accessories and tools are available. Please contact H&F Manf. regarding any applications, requests and inquiries you may have before starting installation.

! IMPORTANT INFORMATION Profile-Specific Information for Installation

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- Maximum Recommended Lengths
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▼	ITS-Phase2_06	2.67" x 7/8"	American 2.6" 20/68	06
▼	ITS-Phase2_10	Astoria Box Rib Embossed	Astoria 38/305	10
▼	ITS-Phase2_19	7.2" x 1-1/2"	7.2 38.1/82.9 (1.5"/7.2")	19
▼	ITS-Phase2_15	Ag-Tuf Greca Rib	Greca 76 18/76	15
▼	ITS-Phase2_20	Ag-Tuf UV 9"	9" 3/4"/9"	20







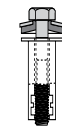






Recommended Washers & Fasteners

H&F recommends the use of Palram brand EPDM-washed fastener only. Palram fasteners for Phase-2 PVC panels are tested and approved to be compatible with PVC, whereas other brands may not be. Incompatible washers can result in panel failure that is not covered by warranty. Contact H&F Manufacturing for information about availability.

When using fasteners shown below, pre-drill all fastener holes with a 3/8" drill bit to accommodate thermal expansion and contraction of the panel. Over-drill by an extra 1/8" for other fastener diameters. Failure to accommodate for thermal movement may cause buckling of the sheet and, potentially, eventual failure.

The fasteners shown below are available from H&F Manufacturing Corp. Other fasteners should be submitted to H&F Manufacturing for compatibility testing prior to use in order to ensure proper warranty coverage.

Umbrella Washer		Fastener Tip Types			For Side Laps	
						
25 mm	19 mm	Sharp Point (a.k.a. A Point)	Self-Drilling	Blunt Point (a.k.a. B Point)	Grommet	
Targeted Use	Washer Type and Size and Tip Type	Item #	Fastener Shank Gauge	x Fastener Length	Fastener Head Size	Corrosion Resistance*
Wood		14 x 1-1/2" HWHA-MP (5/16)	14	x 1-1/2"	5/16"	Mechanically Zinc Coated Carbon Steel
		14 x 3" HWHA-MP (5/16)	14	x 3"	5/16"	
		14 x 1-1/2" HHA (3/8AF) 304SS	14	x 1-1/2"	3/8"	304 Stainless Steel
		14 x 2-1/2" HHA (3/8AF) 304SS	14	x 2-1/2"	3/8"	
Metal		12-14 x 1-1/2" HWH (5/16) SD3	12-14	x 1-1/2"	5/16"	Mechanically Zinc Coated Carbon Steel
		12-14 x 3" HWH (5/16) SD3	12-14	x 3"	5/16"	
		14 x 1-1/2" HHB (3/8AF) 304SS	14	x 1-1/2"	3/8"	304 Stainless Steel
		14 x 2-1/2" HHB (3/8AF) 304SS	14	x 2-1/2"	3/8"	

* Mechanically Zinc Coated Carbon Steel fasteners are designed to withstand years of exposure to Mother Nature's most tortuous elements. In spite of that, environmental pollutants and chemicals can accelerate weathering. If installing Phase-2 in a location with above normal exposure to salt-air, chemicals, or pollutants, H&F Manufacturing highly recommends the use of 304 Stainless Steel fasteners.

Profile-Specific Washer, Fastener and Fastening Schedule Information

See "Profile-Specific Installation Addendum" for detailed information about fastener selection for the corrugation profile you've chosen, as well as fastener placement and spacing (fastening schedule). For more information about Profile-Specific Addendums, how to obtain printed copies, and how to download PDF versions, see the bottom of Page 4, "Profile Specific Information About Installation."



A Word of Caution About Fastening & Fastener Selection



DO NOT Over-tighten fasteners causing the rubber washer to compress. Tighten all fasteners until they are "snug." If the neoprene washer becomes deformed, the fastener is too tight. Drive fasteners perpendicular to the Phase-2 face (see illustration at right). Tighten moderately by hand or with an adjustable torque power screwdriver. NEVER use an impact wrench / driver for fastening Phase-2.

IMPORTANT NOTE: The washers / gaskets chosen for use with Phase-2 panels were selected after careful testing. Shaped gaskets provide an excellent seal over the fasteners' holes and heads without exerting excessive pressure on the Phase-2 panel, allowing for limited thermal expansion, and reducing stress on the panel. H&F's recommended washer / gasket compatibility with PVC is assured by H&F Manufacturing and Palram.








Planning for Expansion & Contraction of Phase-2 Products

Palram recommends that Phase-2 panels are not installed below 40°F or above 80°F. See notes on previous page in Recommended Washers & Fasteners, and in the Profile Specific Installation Addendum for important notes about pre-drilling panels with oversize holes to accommodate expansion and contraction of panels.

Sealing and Bonding

1. Silicone Sealant - H&F Manufacturing Corp. strongly recommends the use of 100% Silicone sealant. For other materials, please consult your local H&F Manufacturing sales representative.
2. Corrugated sealing closure strips should be used to prevent the entry of water, wind, insects or other small animals between installed sheets. A seal between the sheet and the edge purlin of the roof can be created using a sealing strip in the form of the profile. This is held in place by the same screw used to fasten the sheet to the purlin.
3. Sealing strip between overlapping sheets should be used where the pitch of the roof is less than 15%. Only Butyl rubber strips should be used. The strip should be placed between overlapping sheets along the length and width of the overlap at both edges. In cases where penetration of wind or fumes must be prevented, a sealing strip should be used regardless of the slope of the roof. Wherever a sealing strip is inserted, a fastening sheet to sheet screw tightening the seal should be used.

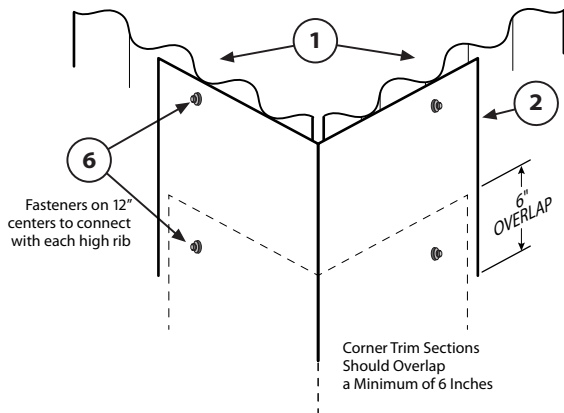
Closure Strips for Use With Phase-2 PVC Panels

H&F Item No.	Length	Profile Name (Usage)	Configuration Detail
HCS - 42	35-3/4"	4.2" x 1-1/16" (Horizontal, Inner or Outer)	
VCS - 42 / 72	39"	4.2" x 1-1/16" / 7.2" x 1-1/2" (Vertical)	
HCS - 26	38-5/8"	2.67" x 7/8" (Horizontal, Inner or Outer)	
VCS - 26	39"	2.67" x 7/8" (Vertical)	
AST - I36	36"	Astoria (Inner)	
AST - O36	36"	Astoria (Outer)	
HCS-72	35-3/4"	7.2" x 1-1/2"	

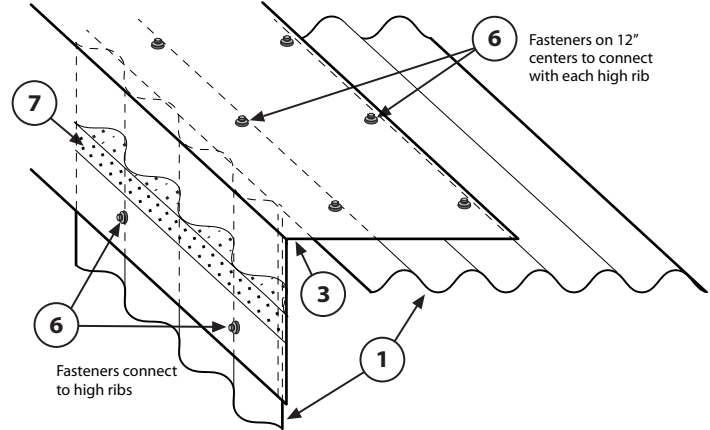
General Design Details for Installation of Phase-2 PVC Panel Flashing Accessories

The details shown below apply to the most frequently encountered area of a building where a flashing is required to complete the area. Flashings of non-standard size and cross section can be furnished on special order. While only Phase-2 4.2 panel is depicted, the same basic concepts apply to other profiles.

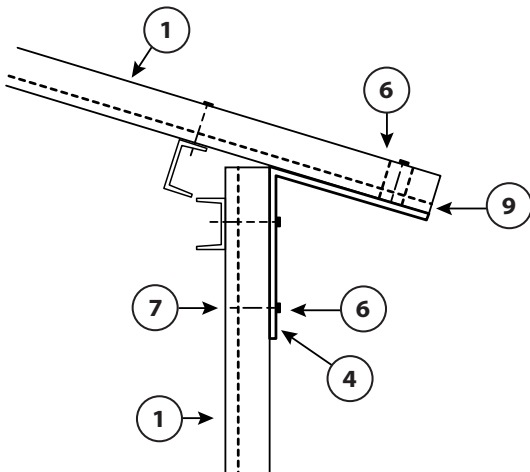
Typical Corner Trim Detail



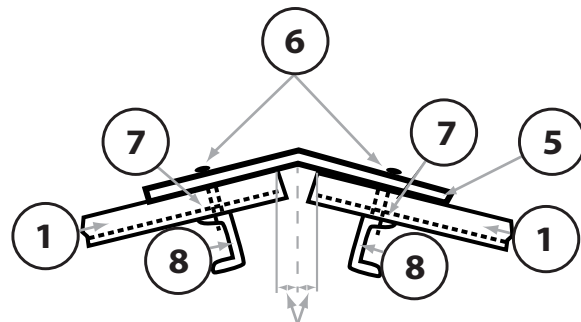
Typical Gable Trim Detail



Typical Eave Trim Detail



Typical Ridge Trim Detail



Legend

- ① Phase-2 panel
- ② Phase-2 corner trim
- ③ Phase-2 gable trim
- ④ Phase-2 eave trim
- ⑤ Phase-2 ridge trim
- ⑥ Crest fastener or grommet (length suitable for high point of rib)
- ⑦ Shaped outer closure strip (fits outer side of panel)
- ⑧ Supporting purlin or girt
- ⑨ Inner closure strip (fits under side of panel)

Important notes about installation of Phase-2 Ridge Caps and Flashings

1. Do not over tighten screws when installing. If ridge cap deforms, screws are too tight.
2. Use recommended fasteners as stated in the Profile-Specific Technical Installation Addendum for the product you are using (see page 5 for more information).
3. When installing clear ridge caps on wood purlins, purlins should be painted with white acrylic-based paint prior to installation. This will help prevent overheating and possible charring of the purlins.

Important Installation Comments

1. Avoid overtightening the fasteners. Allow gaskets to squeeze slightly until full contact with panel. Overtightening induces undue internal stresses, leading to premature failure. Regular Washer/ Gaskets (Tek Screws) for metal panels apply excessive pressure, are inadequate for Phase-2 sealing, and cause undue internal stresses in the panel. The stresses result in crazing, fractures, and eventual failure.
2. Never apply paints, shading compounds, paint thinners or any material that may chemically attack Phase-2, without first verifying compatibility to the panel by contacting H&F Manufacturing.
3. Always work safely. Follow safety recommendations in the Installation Instructions.
4. Always use recommended fasteners for securing Phase-2. Never install Phase-2 by nailing.
5. End-Lap Support: Phase-2/ Phase-2 panel end-lap should always be fully supported, to avoid deflection at that area. This also applies to ridge-cap/Phase-2 end-lap.
6. Refer to H&F Manufacturing for other approved sealing or bonding materials should they be required. Unapproved sealing or bonding material may be incompatible, damage the panels, cause failure and void warranty.
7. Butyl-Rubber Seals: Side-laps and End-laps of any Phase-2 profile should be sealed with butyl-rubber, placed between the overlapping panels at all edges. In shallow pitch roofs (less than 5 percent) double (parallel) sealing strips are recommended at end-laps.
8. Shaped Foam Closures: Expanded foam polyethylene (XPE) closure strips are used to seal the space between the upper or lower Phase-2 profile to edge purlins or ridge caps.
9. When installing clear Phase-2, it is advisable to paint wood purlins using white acrylic paint, or to cover with aluminum tape, in order to prevent over-heating and/or charring of the purlins.
10. It is not recommended to install Clear Phase 2 directly on top of a sub-roof of any kind.
11. Cleaning: Most normal dirt & dust accumulation is washed off by periodic rains. Regular hosing of the panels with clean lukewarm water is sufficient in dry areas. In polluted, oily environments, mild household detergent may be used, assisted by a soft rag or soft-bristled brush. Never use aggressive or abrasive cleaning agents or glass window cleaners. They may scratch or chemically attack the panel. Large areas-could be washed by a pressure washer, optionally, in conjunction with diluted detergent. Dry with soft cotton rags to avoid spotting.
12. Repair: Minor damages to the panel may be repaired. Small punctures can be stopped by dabs of approved silicone sealant. Larger tears may be patched by pieces of matching panel, bonded & sealed on top of the tear with compatible structural silicone.
13. Accessories Information & Supply: H&F Manufacturing will assist, advise and supply, upon request, various additional accessories that may be required for appropriate installation, such as butyl-rubber or expanding sealing tape, special fasteners and washer/gaskets, etc.

Physical Properties

A detailed overview of Phase-2 physical properties can be downloaded at: <http://www.hfmfgcorp.com>

Warranty

Phase-2 Panels carry a limited 10 year warranty against manufacturing defects and UV degradation and hail. For complete text of the Phase-2 warranty visit www.hfmfgcorp.com or contact H&F Manufacturing Corp.

Technical Support

H&F Manufacturing Technical Support is available weekdays 9am to 5pm EST by calling 1-800-474-2732. Questions may also be via the Contact Us page at www.hfmfgcorp.com.

Palram Americas reserves the right to change product specifications and/or information contained in this brochure without notice.



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Web Site: www.hfmfgcorp.com



Manufactured for H&F
Manufacturing by Palram, a
thermoplastic manufacturing
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