

TPO (Thermoplastic Polyolefin) and PVC (Polyvinyl Chloride) Specification

Part 1 – General

1.1 Summary

This specification is specific to mechanically-fastened and fully-adhered TPO (Thermoplastic Polyolefin) and PVC (Polyvinyl Chloride) single-ply roofing systems herein called TPO/PVC. For all other applications, including ballasted TPO/PVC, please see the corresponding specification. Application is strictly limited to roofing systems in sound condition where the membrane is in need of rejuvenation due to normal wearing and age. When applied monolithically, meeting minimum film thickness standards in all areas, and without misses, gaps, holidays, etc., the Ecodur Roofing System will protect the membrane from further degradation by elements such as UV, water, and normal wear.

1.2 Intended Use

This document and the information contained herein are intended to aid qualified specifiers in the creation of project-specific specifications. Castagra makes no warranty, express or implied, as to the suitability of this specification for a specific project.

1.3 Warranty

Warranties, including Labor and Material warranties may be available with pre-approval. Only Castagra Licensed Companies qualify to offer Labor and Material warranties. Premier Materials warranties can be offered by Castagra Certified Applicators. See warranty documentation for details.

1.4 Contractor Qualifications

Contractor shall be a Castagra Certified Applicator with a minimum of 5 years roof coating experience. Contractor shall possess a strong general knowledge of standard roofing practices and system construction. Contractor shall be in good standing with Castagra Products, Inc. with no unresolved application failures.

1.5 Manufacturer Qualifications

Manufacturer shall have a minimum of 10 years' experience in the manufacture of nature-based coating and waterproofing products.

1.6 Project Qualifications

It is the responsibility of the contractor to verify that the system to be coated is in a condition reasonably described as Clean, Dry, and Tight. To ensure this condition, testing is required including but not limited to Adhesion Testing, Moisture Scanning, and Core Sampling. The membrane must be well affixed to the substrate, mechanically or fully adhered. Changing the TPO/PVC fastening system fundamentally changes the properties of the roof system. The TPO/PVC membrane would need to be tested to verify there is sufficient remaining strength and its other physical properties are sufficient to use in such an alternative fastening system. It is noted that TPO/PVC tends to expand and contract through weather cycles and generally becomes weaker and more brittle over time. TPO/PVC traditionally used plasticizers that bleed out over time causing such weakening and embrittlement. The fastening system needs to have been designed with these properties accounted for.

1.7 Project Conditions

Substrate conditions must remain clean and dry throughout application. For application temperatures outside the range of 35° to 110°F, please consult a Castagra Products, Inc. representative. If rain occurs during application, use a moisture scanner to ensure conditions are dry prior to restarting work.

Part 2 – Products

2.1 Manufacturer

Castagra Products, Inc.
PO Box 41270
Reno, NV, 89504
888-388-2935
info@Castagra.com
www.Castagra.com

2.2 System Description

When installed correctly to a suitable substrate, the Ecodur Roof Coating system will create a very strong monolithic waterproofing system that is easy to maintain and will eliminate the need for tear-off. It is applied directly to the substrate in one or more distinct layers, building strength and protecting existing surfaces from UV, water, and other damage. When selected, Ecodur 201R or Ecodur+ with a reflective topcoat, or Ecodur1 as a standalone will help reduce cooling costs, energy consumption, and HVAC wear.

2.3 Materials

- A Ecodur1: Fiber-reinforced, highly sag-resistant, non-self-leveling, premium castor oil and gypsum-based cool roof coating, or:
- B Ecodur+: Castor oil and gypsum-based roof coating with anti-sag additives to reduce self-leveling over granulated surfaces, elevation changes, and vertical surfaces, or:
- C Ecodur 201R: Castor oil and gypsum-based roof coating
- D Soladur 800 (or Soladur 700): Water-based acrylic reflective topcoat
- E Other materials not provided by manufacturer, including but not limited to substitutions, reinforcing fabric, additives, etc. must be submitted to the manufacturer, in writing, no later than 14 days prior to project commencement.

2.4 Product Handling and Storage

ECODUR PRODUCTS

Do not allow products to freeze. Keep containers in a cool, dry location away from direct UV exposure. Keep containers tightly closed. Shaking may be required on containers that have settled for prolonged periods. Consult Castagra if application temperatures will be outside of 35° to 110°F.

SOLADUR PRODUCTS

Do not allow products to freeze. Keep containers in a cool, dry, well-ventilated location away from direct UV exposure. Keep containers tightly closed. Do not store above 90°F. Apply only at temperatures above 40°F and rising with less than 90% humidity and no threat of rain for 48 hours. Do not apply to surfaces over 100°F.

Part 3 – Execution

3.1 Contractor Responsibility

Proper execution of the project, including but not limited to all sections included in this specification is the responsibility of the installer. Do not proceed with installation until all unsatisfactory conditions have been remedied. Castagra assumes no responsibility for application failures.

3.2 Project Inspection

- A Measure existing membrane thickness to ensure that it is within 90% of the original thickness.
- B A moisture survey must be performed. All wet, damaged, or otherwise unsuitable materials must be removed and replaced. If more than 10% of the total project area needs replacement, it is likely not a good candidate for liquid-applied roof rejuvenation.
- C All repairs, structural or component related, to be performed prior to proceeding when possible. If repairs are to be performed in conjunction with application, consult Castagra.
- D All seams must be inspected. Cold-welds and other imperfect seams must be marked for repair via 3-course method.
- E Because of plasticizers and other similar additives used in manufacturing single-ply membranes, care must be taken to ensure that adhesion testing is performed in dissimilar environments on the roof. Examples include, but are not limited to: beneath ducting, on parapet walls, or anywhere else where UV and weather exposure may vary from the general field of the membrane.

3.3 Surface Preparation

- A All obstacles, including but not limited to obsolete equipment, uncurbed HVAC, ducting, and anything else that prevents proper cleaning and coating must be removed.
- B Any weak, damaged, or brittle areas, including but not limited to chemical spills, mechanical damage, blisters, previous repairs, etc. must be removed and repaired prior to coating.
- C All caked-on dirt/debris, especially in low areas must be removed using a wire brush. The coating must contact the substrate directly.
- D All dirt, debris, membrane dust, and other foreign materials must be completely removed using a power broom, blower, industrial vacuum, scraper, wire brush, etc.
- E Alternate directions between multiple passes with a soft-bristled power broom.
- F All silicone must be completely removed leaving no residue. Acrylic, urethane, and most other repairs can remain only if they were properly applied, well bonded, and free from damage. Asphalt-based repair products may be chemically incompatible with the TPO/PVC membrane. Any asphalt patches or repairs should be removed and the remaining membrane inspected for chemical damage.
- G Pressure washing is generally not recommended but may be required when grease, biological materials, or other foreign materials are present. After pressure washing, allow to dry thoroughly and confirm dryness via moisture scanning.
- H Preparation, including cleaning, can reveal existing conditions in the roof assembly. Any unsatisfactory conditions must be remedied prior to proceeding. If anything revealed is even mildly questionable, consult Castagra before proceeding.

3.4 Application

A. Repairs

1. Where wet insulation was replaced, repair membrane with suitable means per membrane manufacturer's instructions. Embed reinforcing fabric along all repair perimeters. New membrane materials must be primed with a single-ply primer per membrane manufacturer's recommendations.
2. Reinforce via 3-coursing all cold-welded or otherwise imperfect seams, terminations, patches, etc.
3. Treat tears, cracks, and other minor substrate damage by embedding reinforcing fabric a minimum of 2" on either side of the damage and extend repair to a minimum of 4" beyond the repair area in both directions.
4. Reinforce all transitions (parapets, curbs, etc.) and anywhere the TPO/PVC system meets other roofing materials. If the TPO/PVC membrane is in contact with asphaltic roofing materials, consult an engineer to determine if the membrane is properly protected from chemical attack.
5. Reinforce all areas showing signs of movement (pinching, twisting, etc.).
6. Repair or replace all defective penetrations, edge details, flashings, etc. If new single-ply materials are used, a proper primer will be needed.
7. Repair mole runs, doming, sagging, or other undesirable conditions according to membrane manufacturer's instructions, using recommended materials. Reinforce repair seams. If new single-ply materials are to be used for repair, a proper primer will be needed.
8. Many repairs can be made using Ecodur products. Please consult Castagra for specific assistance.

B. Detail

1. Using thickened Ecodur 201R or Ecodur+, or Ecodur1 as-is, coat all curbs, penetrations, vents, etc. to a minimum of 60 mils at the base and a minimum of 30 mils on vertical surfaces. If indicators of movement are visible, use reinforcing fabric. Reinforce all cold welds, bad seams, tears, punctures, and other surface anomalies using reinforcing fabric.
2. Pitch pans can be filled with Ecodur products to seal fastened legs, odd penetrations, and many other anomalies. Consult Castagra for specific project assistance.

C. Field (Ecodur+ or Ecodur 201R)

1. Apply Ecodur+ or Ecodur 201R at a rate of approximately 160 to 190sf per kit as needed to maintain a minimum of 30 mils at the thinnest points. Use 40-45mil notched squeegees and backroll with ¾" roller covers. Prime new roller covers by dipping the roller into a fully mixed bucket of Ecodur 201R or Ecodur+. Do not use dry roller covers. Coverage rates will vary depending on field conditions, including loss due to soaking in to aged membranes. Actual coverage rates may be less than listed. It is advisable to conduct a test area to determine actual coverage. A second coat may be required to reach the minimum thickness. Do not use a dark color over TPO/PVC unless a highly reflective topcoat such as Soladur 700 or 800 is used. Dark colors absorb solar energy and can cause overheating of the membrane and materials underneath.
2. Spray or roll Soladur 700 or 800 (or approved substitute) in two 25 mil (approximately 1.25 to 1.5 gallons per 100sf) passes for a minimum of 24 dry mils. Apply according to current product data sheets available at Castagra.com. Curing/drying times will vary depending on temperature, humidity, sunlight exposure, application technique, and other factors.
Ecodur may be applied at any thickness but do not apply Soladur thicker than recommended or "mud-cracking" and slow drying may occur.
3. Total system thickness (Ecodur and Soladur) shall not be less than 30 dry mils at the thinnest location where no topcoat is applied and 54 dry mils where a reflective acrylic topcoat is employed.

D. Field (Ecodur1)

- Using the chart below as a guide only, use appropriately sized notched squeegees and backroll with ¾” roller covers. Prime new roller covers by dipping the roller into a fully mixed bucket of Ecodur1. Do not use dry roller covers. Coverage rates will vary depending on field conditions, including loss due to soaking in to aged membranes. Actual coverage rates may be less than listed. It is advisable to conduct a test area to determine actual coverage. A second coat may be required to reach the minimum required thickness.

Chart 1:

Specification	10-Year	15-Year	20-Year	25-Year
Minimum Film Thickness	30 mils	40 mils	50 mils	60 mils
Approximate Coverage	140-170sf/kit	110-140sf/kit	80-110sf/kit	50-80sf/kit

***Coverage rates are estimates only, based on best case scenarios and may not reflect actual field conditions. Minimum film thicknesses must always be met regardless of coverage.**

E. Finish

- Create pads using Ecodur products at a minimum of 50 mils for each riser, sleeper, support, or any other equipment to be housed on the rooftop. Soft composite materials are preferred. All other materials should be placed on slip sheets to protect the coating from sharp edges and organic decay.
- Create walk pads using Ecodur1 as a standalone, or Ecodur 201R/Ecodur+ with an approved thickener. Mark outlines in duct tape and remove tape before fully cured. Apply Ecodur products at a minimum of 50 mils. Walk pads should be a minimum of 30” wide and cover all traffic, maintenance, and other areas where increased wear may occur. For best results, apply a topcoat of Soladur 700 or 800, or approved substitution tinted “Safety Yellow”. Grip additives should be added for slip resistance. Care must still be taken when walking on a wet roof. Alternatively, Ecodur products can be used to secure many commercially available adhered walk pads, such as yellow spaghetti or many options made of recycled materials. Test adhesion prior to application.

F. Miscellaneous

- Castagra does not practice roof design, consultation, or act as roof inspectors. Any assistance, advice, or observations made are for the purpose of assisting the contractor and the asset owner toward a successful project. Castagra assistance, advice, and observations do not serve as warranty for the suitability of any project. It is the contractor's responsibility to conduct proper due diligence, execute proper application, and ensure project success.
- The use of Castagra products for any purpose other than those specifically detailed is forbidden.
- All roofing systems must be maintained. It is the responsibility of the asset owner to follow Castagra’s Owner Maintenance Guidelines available here: www.castagra.com/warranty
- While every attempt has been made to create a thorough and useful specification, it is impossible to foresee all potential features, obstacles, and conditions. Please consult Castagra for all project-specific questions.

5. This specification is not intended to cover abnormal climate variations such as those in recent years where the daily high temperatures are generally increasing and the number of such high temperature days per year also has been trending upward. Frequency, intensity and duration of severe thunderstorms, hailstorms, etc. have also been increasing in some regions and are also to be considered abnormal as would an annually increasing number of freeze/thaw cycles or severe winter storms.

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