The information on this chapter is complementary to Chapter 1 (Design) and Chapter 3 (Installation) and serves to complete the design and execution of Firestone UltraPly™ TPO roofing systems in a safe and durable way.

Specifiers and installers will find a vast list of standard drawings that contain information about the correct build-up of the different Firestone UltraPly™ TPO roofing details.

Please note that these drawings are not designed on scale and do not include any information on vapor control layers. Therefore, they need to be considered as details that are applicable in standard roofing situations.

For an easy tracking, we have organized the Firestone UltraPly™ TPO details in the following sections:

5.1 Welded seams 5.3
5.2 Base tie-ins 5.15
5.3 Corners 5.25
5.4 Penetrations 5.33
5.5 Drains 5.43
5.6 Expansion joints 5.49
5.7 Roof edges 5.55
5.8 Wall terminations 5.63

As the situation on site may differ from the conditions represented in these details, please contact Firestone’s technical department or a Firestone technician for design and approval of an alternative detail.
5.1 Welded seams

T-WS-1  Welded seam using automatic welder
T-WS-2  Welded seam using hand welder
T-WS-3  Fastener layout and factory markings
T-WS-4  TPO induction welding plate
T-WS-5  Membrane repair over TPO induction welding plate
T-WS-6  Cut edge treatment
T-WS-7  T-joint with Unsupported Flashing
T-WS-8  T-joint with Unsupported Flashing at intersection of two seams
T-WS-9  T-joint with Unsupported Flashing at base of curb or wall
T-WS-10 T-joints at 4 T-crossing membranes
UltraPly TPO Membrane

120-150 mm

20 mm (Min.)

75 mm (Min.)

20 mm (Min.)

38 mm (Min.)

Approved Plates Fastened with Appropriate Fasteners

Weld using Automatic Welder

UltraPly TPO Membrane

SLOPE

Firestone Building Products

UltraPly TPO
Welded seam using Automatic Welder

No.: T - WS - 1
05/2018

Systems
All
Center Hole $\varnothing = 7 \text{ mm} \pm 0.1 \text{ mm}$

TPO coated surface

Material Thickness $0.7 \text{ mm} \pm 0.1 \text{ mm}$

Vent hole centered on face of ramp

DETAIL A

DETAIL Z-Z

UltraPly TPO
TPO Induction Welding Plate

No.: T-WS-4

Systems
Induction Weld

05/2018
UltraPly TPO Membrane

UltraPly TPO T-Joint cover / TPO Unsupported Flashing (above membrane) min. 100mm x 100mm

Induction Weld

TPO Induction Welding Plate and fastener (below membrane)

TPO Induction Welding Plate (below membrane)

UltraPly TPO T-Joint cover / TPO Unsupported Flashing (min. 100mm x 100mm)

UltraPly TPO Membrane

Firestone

UltraPly TPO
Membrane repair over TPO Induction Welding Plate

No.: T-WS-5

05/2018

Systems
Induction Weld
UltraPly TPO Membrane

Welded Seam

Continuous Bead of UltraPly TPO Cut Edge Sealant or GP Sealant

UltraPly TPO Membrane Cut Edge

Note: When polyester reinforcement of TPO is exposed, apply Cut Edge or GP Sealant to entire exposed edge.
UltraPly TPO Membrane

UltraPly TPO Membrane

UltraPly TPO Unsupported Flashing (see note)

Note: T-joint with UltraPly TPO Unsupported Flashing required for 1.52 mm membrane only

Firestone

Firestone Building Products

UltraPly TPO
T-joint with Unsupported Flashing

No.: T - WS - 7

Systems
All

05/2018
UltraPly TPO Membrane

UltraPly TPO Unsupported Flashing (see note)

UltraPly TPO Membrane

Note: T-joint with UltraPly TPO Unsupported Flashing required for 1.52 mm membrane only

UltraPly TPO
T-joint with Unsupported Flashing at intersection of two seams

No.: T-WS-8
Systems: All

05/2018
UltraPly TPO Membrane

UltraPly TPO Unsupported Flashing (see note)

Note: T-joint with UltraPly TPO Unsupported Flashing required for 1.52 mm membrane only

UltraPly TPO

T-joints at 4 T-crossing Membranes

No.: T-WS-10

Systems: All

05/2018
5.2 Base tie-ins

T-BT-1 Base tie-in using plates fastened to deck
T-BT-2 Base tie-in using plates fastened to upstand
T-BT-3 Base tie-in using plates fastened to upstand with existing cant
T-BT-4 Base tie-in at inside corner using HD seam plates
T-BT-5 Base tie-in at inside corner using non-Firestone plates
T-BT-6 Base tie-in at outside corner using HD seam plates
T-BT-7 Base tie-in at outside corner using non-Firestone plates
T-BT-8 Base tie-in with TPO induction welding plates
UltraPly TPO Membrane
UltraPly TPO Bonding Adhesive / BA 2012 / BA 2012 S
Approved Plates Fastened with Appropriate Fasteners (Max. 300 mm)
Welded Seam
UltraPly TPO Membrane

Insulation
Roof Deck
UltraPly TPO Membrane
UltraPly TPO Bonding Adhesive / BA 2012 / BA 2012 S
Wood Nailer
Cant Strip
Approved Plates Fastened with Appropriate Fasteners (Max. 300 mm)
Welded Seam
UltraPly TPO Membrane
Insulation
Roof Deck

150 mm (Max.)
Wall / Upstand Attachment

UltraPly TPO Membrane

20 mm (Min.)
15 mm (Min.)

150 mm (Max.)

Note: Base Flashings and Terminations are not shown for clarity. Refer to appropriate Termination & Base Tie-In details.

Roof Deck Attachment

UltraPly TPO Membrane

15 mm (Min.)
150 mm (Max.)

Firestone
Firestone Building Products

UltraPly TPO
Base Tie-In at Inside Corner using HD Seam Plates

No.: T-BT-4
05/2018

Systems
All
Wall / Upstand Attachment

150 mm (Max.)

150 mm (Max.)

20 mm (Min.)

15 mm (Min.)

UltraPly TPO Membrane

Roof Deck Attachment

150 mm (Max.)

150 mm (Max.)

15 mm (Min.)

UltraPly TPO Membrane

Note: Base Flashings and Terminations are not shown for clarity. Refer to appropriate Termination & Base Tie-In details.
Wall / Upstand Attachment

![Diagram of Wall / Upstand Attachment]

Roof Deck Attachment

![Diagram of Roof Deck Attachment]

Note: Base Flashings and Terminations are not shown for clarity. Refer to appropriate Termination & Base Tie-In details.

---

**Firestone Building Products**

**UltraPly TPO**
Base Tie-In at Outside Corner using HD Seam Plates

**No.:** T - BT - 6

**Systems:** All

**Date:** 05/2018
Wall / Upstand Attachment

20 mm (Min.)
15 mm (Min.)

150 mm (Max.)

UltraPly TPO Membrane

Roof Deck Attachment

15 mm (Min.)

150 mm (Max.)

UltraPly TPO Membrane

Note: Base Flashings and Terminations are not shown for clarity. Refer to appropriate Termination & Base Tie-In details.

UltraPly TPO
Base Tie-In at Outside Corner using non-Firestone Plates

No.: T - BT - 7
Systems: All

05/2018
Induction Welding Plate must be at least 25 mm away from angle-change but not more than 150 mm.

UltraPly TPO Membrane

UltraPly TPO Bonding Adhesive / BA 2012 / BA 2012 S

Firestone fastener and
TPO Induction Welding Plate max. 300 mm o.c.
Weld using approved
induction welding tool

UltraPly TPO Membrane

Insulation

Roof Deck

UltraPly TPO Base Tie-In with TPO Induction Welding Plates
(Flash membrane continues flashing upstand)

No.: T - BT - 8

Systems
Induction weld
5.3 Corners

T-C-1 Outside corner using pre-molded UltraPly TPO corner piece

T-C-2 Inside corner using pre-molded UltraPly TPO corner piece

T-C-3 Inside corner with continuous wall flashing using pre-molded UltraPly TPO corner piece

T-C-4 Field-fabricated inside corner with continuous wall flashing

T-C-5 Field-fabricated inside corner

T-C-6 Field-fabricated outside corner

T-C-7 Field-fabricated outside corner with reinforcement patch
UltraPly TPO Membrane

Pre-Molded UltraPly TPO Inside/Outside Corner piece

50 mm (Min.)

UltraPly TPO Membrane

Firestone
Firestone Building Products

UltraPly TPO
Outside Corner using Pre-Molded UltraPly TPO corner piece

No.: T - C - 1

05/2018

Systems
All
Pre-Molded UltraPly TPO Inside/Outside Corner

UltraPly TPO Membrane

UltraPly TPO Membrane

UltraPly TPO Unsupported Flashing (or T-joint cover)

UltraPly TPO

Firestone Building Products

UltraPly TPO
Inside Corner with Continuous Wall Flashing using Pre-Molded UltraPly TPO corner piece

No.: T - C - 3

Systems: All

05/2018
**STEP #1**

UltraPly TPO Unsupported Flashing to Field Fabricated Inside Corner

**STEP #2**

Field Fabricated Inside Corner

UltraPly TPO Membrane

UltraPly TPO Unsupported Flashing (or T-joint cover)
UltraPly TPO Membrane

Field Fabricated Inside Corner
**STEP #1**

UltraPly TPO Membrane

**STEP #2**

UltraPly TPO Unsupported Flashing

**STEP #3**

apply heat and form by hand prior to installing

25 mm (Min.)

UltraPly TPO Membrane

UltraPly TPO Unsupported Flashing

Firestone Building Products

UltraPly TPO
Field Fabricated Outside Corner

No.: T-C-6

05/2018

Systems: All
UltraPly TPO Membrane

UltraPly TPO Unsupported Flashing (Reinforcement Patch)

UltraPly TPO Membrane

UltraPly TPO Unsupported Flashing

apply heat and form by hand prior to installing

Firestone Building Products

UltraPly TPO
Field Fabricated
Outside Corner with
Reinforcement Patch

No.: T - C - 7

Systems
All

05/2018
5.4 Penetrations

T-P-1 Penetration with UltraPly TPO Pipe Flashing
T-P-2 Penetration with UltraPly TPO Universal Pipe flashing
T-P-3 Penetration with UltraPly TPO Unsupported Flashing
T-P-4 Penetration with UltraPly TPO Unsupported Flashing (alternative method)
T-P-5 Hot pipe penetration
T-P-6 Penetration using TPO Penetration Pocket Kit
T-P-7 Penetration pocket using UltraPly TPO Coated Metal
T-P-8 Membrane securement layout at penetration (target patch)
T-P-9 Membrane securement layout at penetration (cover strips)
Continuous Bead of UltraPly TPO GP Sealant

Stainless Steel Clamping Ring

Pre-Molded UltraPly TPO Pipe Flashing

UltraPly TPO Membrane

Insulation

Roof Deck

Round Penetration (accessible from top)

Approved Plates Fastened with Appropriate Fasteners

Welded Seam

Ø100-200mm

50mm

Firestone

UltraPly TPO
Penetration With UltraPly TPO Pipe Flashing

No.: T-P-1

Systems

05/2018

All
Firestone Pourable Sealer
Pre-Molded UltraPly TPO Penetration Pocket
Precut PVC Pipe
Welded Seam

UltraPly TPO Quickprime
UltraPly TPO Membrane
Insulation
Penetration
Non-Shrinking Grout
Roof Deck

Note: Refer to T-P-8 Detail for appropriate Base Tie-In.

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<tr>
<th>Firestone Building Products</th>
<th>UltraPly TPO Penetration using TPO Penetration Pocket Kit</th>
<th>No.: T-P-6</th>
<th>Systems: All</th>
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</tbody>
</table>
**Firestone Building Products**

**UltraPly TPO**
Membrane Securement Layout at Penetration (Cover Strips)

**No.:** T-P-9

**Systems:** All

**Date:** 05/2018
5.5 Drains

- T-D-1 Drain using TPO pre-molded insert piece
- T-D-2 Drain using insert piece with UltraPly TPO membrane laminated to flange
- T-D-3 Drain with clamping ring
- T-D-4 TPO pre-molded scupper
1. TPO Insert Piece
   - UltraPly TPO Membrane

2. TPO Unsupported Flashing
   - Welded Seam

3. TPO Unsupported Flashing
   - UltraPly TPO Membrane
   - Welded Seam
   - Approved Plates Fastened with Appropriate Fasteners

4. Insulation
   - Roof Deck

---

**UltraPly TPO**

Drain using TPO
Pre-molded insert piece

**No.:** T-D-1

**05/2018**

**Systems:** All
Approved Plates Fastened with Appropriate Fasteners

Welded seam

Insulation

Roof Deck

Insert piece with UltraPly TPO Membrane laminated to flange

Note: A bead of Cut Edge Sealant is required.
Extend TPO into Bowl 15 to 20 mm (Min.)

Strainer Basket

Clamping Ring Drain

Continuous Bead of Water Block

UltraPly TPO Membrane

Insulation

Roof Deck

Note: Maximum slope to Drain is 1:12.
UltraPly TPO Bonding Adhesive / BA 2012 / BA 2012 S

Continuous weld (50 mm)

Approved Plates Fastened with Appropriate Fasteners

TPO Unassembled Flashing

Welded Seam

UltraPly TPO Membrane

Insulation

Roof Deck

TPO Pre-molded Scupper

UltraPly TPO

TPO Pre-molded Scupper

Systems

All

No.: T-D-4

05/2018
5.6 Expansion joints

T-E-1 Flat expansion joint
T-E-2 Raised expansion joint
T-E-3 Raised expansion joint with metal joint cover
T-E-4 Wall expansion joint
Approved Plates Fastened with Appropriate Fasteners (Max. 300 mm)

Welded Seam

Compressible Tube

UltraPly TPO Membrane

Insulation

Roof Deck

Compressible Insulation with Insulation Retainer

Firestone

UltraPly TPO
Flat Expansion Joint

No.: T - E - 1

Systems

05/2018

All
Compressible Tube
Wood Nailer
UltraPly TPO Bonding Adhesive BA 2012 / BA 2012 S
Wood Nailer
UltraPly TPO Membrane
Insulation
Roof Deck

Approved Plates Fastened with Appropriate Fasteners (Max. 300 mm)
Welded Seam

Firestone
Firestone Building Products

UltraPly TPO
Raised Expansion Joint

No.: T-E-2

05/2018

Systems
All
Fastener 300 mm o.c. (Max.)

Expansion Joint Cover by others

Wood Nailer

UltraPly TPO Bonding Adhesive
BA 2012 / BA 2012 S

Wood Nailer

UltraPly TPO Membrane

Approved Plates Fastened with Appropriate Fasteners (Max. 300 mm)

Welded Seam

Roof Deck

UltraPly TPO
Raised Expansion Joint with Metal Joint Cover

No.: T - E - 3

05/2018

Systems
All
5.7 Roof edges

T-RE-1  Roof edge gutter using profile of UltraPly TPO Coated Metal
T-RE-2  Roof edge using profile of UltraPly TPO Coated Metal
T-RE-3  Joint between profiles of UltraPly TPO Coated Metal
T-RE-4  Roof edge with edge profile
T-RE-5  Alternative roof edge with edge profile
T-RE-6  Roof edge using TPO QuickSeam Flashing
Welded Seam (50mm)

Appropriate Fastener (200 mm o.c.)

Wood Nailer

UltraPly TPO Membrane

Insulation

Roof Deck

UltraPly TPO Coated Metal

**Firestone Building Products**

**UltraPly TPO**

Roof Edge Gutter using profile of UltraPly TPO Coated Metal

**No.:** T - RE - 1

05/2018

**Systems**

All
**STEP #1**

UltraPly TPO Coated Metal

**STEP #2**

UltraPly TPO Coated Metal

**STEP #3**

Heat Resistant Tape or Unsupported Flashing

UltraPly TPO Membrane welded to UltraPly TPO Coated Metal

**STEP #4**

UltraPly TPO Flashing (Unsupported)
Detailed drawing of a roofing system with labeled components:

- UltraPly TPO QuickPrime
- TPO QuickSeam Flashing
- Continuous Bead of UltraPly TPO GP Sealant
- Insulation
- Roof Deck
- Appropriate Fastener (200 mm o.c.)
- Standard Metal Profile

Systems:
- All

Details:
- No.: T-RE-6
- Date: 05/2018
- Roof Edge using TPO QuickSeam Flashing
5.8 Wall terminations

T-T-1  Termination bar

T-T-2  Termination bar at outside parapet wall

T-T-3  Coping stone

T-T-4  Metal coping

T-T-5  Counterflashing

T-T-6  Termination bar – elevation change

T-T-7  Termination bar at joint in precast concrete panel

T-T-8  Termination bar at wall expansion joint

T-T-9  Monotrim profile

T-T10  Intermediate attachment at wall flashing
Continuous Bead of GP Sealant

Continuous Bead of Water Block

Appropriate Fastener (200 mm o.c.)

Firestone Termination Bar

UltraPly TPO Membrane

UltraPly TPO Bonding Adhesive
BA 2012 / BA 2012 S

---

Firestone Building Products

UltraPly TPO Termination Bar

No.: T - T - 1

05/2018

Systems

All
UltraPly TPO Membrane

UltraPly TPO Bonding Adhesive / BA 2012 / BA 2012 S

Continuous Bead of GP Sealant

Continuous Bead of Water Block

Appropriate Fastener (200 mm o.c.)

Firestone Termination Bar

50 mm (Min.)

UltraPly TPO Termination Bar at outside parapet wall

No.: T - T - 2

05/2018

Systems

All
Continuous Bead of High Grade Sealant
Continuous Bead of GP Sealant
Metal Batten Bar fastened 300 mm o.c. (Max.)
Metal Counterflashing
UltraPly TPO Membrane
UltraPly TPO Bonding Adhesive BA 2012 / BA 2012 S

Refer to local standards
**Firestone**

**UltraPly TPO**

- Termination Bar
- Elevation change

**No.:** T-T-6

**Systems**

- All

Max. 10 mm

- Appropriate Fastener (200 mm o.c.)
- Termination Bar
- Continuous Bead of GP Sealant

**Wall/Substrate**

**UltraPly TPO Membrane**
**Detail Drawings**

**Joint in Precast Concrete**

- **Continuous Bead of GP Sealant**
- **25 mm (Max.)**
- **Do not fasten Termination Bar on this side of joint**
- **Appropriate Fastener (200 mm o.c.)**
- **Termination Bar**
- **UltraPly TPO Membrane**

**UltraPly TPO**

Termination Bar at Joint in Precast Concrete Panel

<table>
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<th>T - T - 7</th>
<th>Systems</th>
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<td>Date:</td>
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<td>All</td>
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</table>
Continuous Bead of GP Sealant

Termination Bar

25 mm (Max.)

25 mm (Max.)

75 mm (Max.)

75 mm (Max.)

Wall/Substrate

Appropriate Fastener (200 mm o.c.)

Metal Counterflashing in Reglet

UltraPly TPO Membrane

UltraPly TPO
Termination Bar at Wall Expansion Joint
No.: T-T-8
05/2018
Systems
All
UltraPly TPO Membrane
UltraPly TPO Bonding Adhesive / BA 2012 / BA 2012 S
Continuous Bead of Cut Edge Sealant
Welded Seam
UltraPly TPO Membrane (Cover Strip)
Approved Plates Fastened with Appropriate Fasteners
Welded Seam
Continuous Bead of Cut Edge Sealant
UltraPly TPO Membrane
Approved Plates Fastened with Appropriate Fasteners
Welded Seam
UltraPly TPO Bonding Adhesive BA 2012 / BA 2012 S