Abstract

The “TWS-General” detail set outlines the general guidelines for design using the THERMAX™ Wall System (TWS), focusing on maintaining continuity of the four control layers (thermal, air, vapor, and water). These details can be used as guides for any THERMAX Wall project.

Cladding specific supplemental sets, “TWS-Masonry,” “TWS-Rainscreen,” and “TWS-Applied,” address conditions that apply to specific cladding types. These are meant to be used in addition to the TWS-General set.

Other system detail sets available at dowbuildingsolutions.com
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Other system detail sets available at dowbuildingsolutions.com
DESIGN INTENT
1. EXTERIOR INSULATION WITH 4 MIL ACRYLIC COATED ALUMINUM FACER ACTS AS 4 PRIMARY CONTROL LAYERS: THERMAL (CI), WATER-RESISTIVE, AIR SEALING, & VAPOR RETARDING, WHILE THE INSULATION JOINT TREATMENT (LIQUIDARMOR™ FLASHING) WILL SEAL & COMPLETE CONTINUITY OF THE 4 CONTROL LAYERS.
2. STYROFOAM™ BRAND CM SERIES SPRAY POLYURETHANE FOAM TO BE INSTALLED AFTER ALL MAJOR PENETRATIONS.
3. CONTINUOUS INSULATION THICKNESS TO BE DETERMINED TO MINIMIZE CONDENSATION POTENTIAL AND COMPLY WITH ENERGY CODE.

ASTM STANDARDS
THERMAX XARMOR™ (CI)
- ASTM C518 R-6.5 @ 1”
- ASTM C1289 TYPE I CLASS 2
- ASTM E84 CLASS A
THERMAX XARMOR™ (CI) + LIQUIDARMOR™ FLASHING @ SEAMS
- AIR BARRIER PER ASTM E2357, ASTM E283
- WATER BARRIER PER ASTM E331
- CLASS 1 VAPOR RETARDER PER ASTM E96
STYROFOAM™ BRAND CM SERIES SPRAY FOAM
- SECONDARY AIR/WATER/VAPOR BARRIER PER ABOVE

MINIMUM REQUIREMENTS
1. BREACHES TO EXTERIOR INSULATION FACER MUST BE SEALED WITH LIQUIDARMOR™ FLASHING. MIN. WIDTH AND THICKNESS APPLIED ON FACER AROUND BREACH BASED ON DETAIL TWS-G02.
2. GAPS GREATER THAN 1/4” MUST BE FILLED USING GREAT STUFF PRO GAPS & CRACKS OR OTHER APPROVED SEALANT PRIOR TO FLASHING INSULATION.
3. SHIPLAP EDGE AVAILABLE FOR INSulations 1.5” THICK & GREATER, MUST BE INSTALLED AS SHOWN ABOVE FOR SUPERIOR WATER SHEDDING.
4. INSULATION JOINTS TO BE SEALED WITH LIQUIDARMOR™ FLASHING BASED ON DETAIL TWS-G02 REQUIREMENTS.
5. THERMAX XARMOR™ INSULATION CAN BE LEFT EXPOSED FOR MAX. 180 DAYS PRIOR TO INSTALLATION OF EXTERIOR CLADDING.
6. SPRAY FOAM INSULATION MIN. 1.5” THICK WITH A MAX. INSTALLATION PASS THICKNESS OF 1.5”.
**WARRANTIES AVAILABLE WITH REGISTRATION**

15 YEAR, 10 YEAR, AND 5 YEAR SYSTEM WARRANTIES AVAILABLE WITH REGISTRATION DEPENDING ON PRODUCTS USED. VISIT DOWBUILDINGSOLUTIONS.COM FOR MORE INFORMATION.

NOTE: THERMAL WARRANTIES AND EXPOSURE WARRANTIES ARE ALSO AVAILABLE.

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**DESIGN INTENT**

1. THE BASIS OF DESIGN FOR THE THERMAX™ WALL SYSTEM USES THERMAX XARMOR™ (CI), LIQUIDARMOR™ CM OR LT FLASHING, AND STYROFOAM™ BRAND CM SERIES SPRAY POLYURETHANE FOAM. NOTE THAT OTHER OPTIONS ARE ACCEPTABLE PER CODE.
2. THE THERMAX™ WALL SYSTEM CAN BE COMPOSED OF SEVERAL DIFFERENT OPTIONS, CHOOSING ANY COMBINATION OF ITEMS FROM SECTIONS (A) THRU (E). ALL OPTIONS WILL MEET CODE FOR CONTINUOUS INSULATION (R-VALUE REQUIREMENTS VARY BY CLIMATE ZONE), AIR BARRIER, VAPOR RETARDER, AND WATER BARRIER.
3. VERIFY NFPA 285 COMPLIANCE VIA ENGINEERED LETTER.

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**MINIMUM REQUIREMENTS**

1. INSULATION JOINTS TO BE SEALED W/ MIN. 2" WIDTH (CENTERED OVER JOINT) LIQUIDARMOR™ CM FLASHING @ 50 +/- 5 WET MILS OR MIN. 1" WIDTH (CENTERED OVER JOINT) LIQUIDARMOR™ LT FLASHING @ 30 +/- 5 WET MILS OR MIN. 4" WIDTH COMPATIBLE TAPE.
2. FASTENERS AND WASHERS ALONG BOARD BOARD JOINTS MUST BE COMPLETELY COVERED WITH LIQUIDARMOR™ FLASHING AND SEALANT.
3. MIN. 1.5" THICK WITH MAX. PASS THICKNESS OF 1.5".
4. NO OTHER MANUFACTURER’S BRAND OF SPRAY FOAM MAY BE APPLIED DIRECTLY ON THE BACK OF RIGID POLYISOCYANurate INSULATION BOARD AS THIS WOULD BE PATENT INFRINGEMENT.
5. EXTERIOR GYPSUM SHEATHING IS NOT REQUIRED TO MEET WEATHER RESISTIVE & AIR BARRIER REQUIREMENTS, BUT MAY BE REQUIRED FOR HOURLY RATED WALL ASSEMBLIES OR OTHER PROJECT SPECIFICS.
THERMAX™ wallsystem

Fastening Guidelines

DESIGN INTENT
1. SECURE THERMAX™ INSULATION TO BUILDING STRUCTURE.
2. USE FASTENERS EVALUATED BY DOW’S TEAM OF BUILDING SCIENTISTS TO ASSURE LONG-TERM PERFORMANCE OF SYSTEM CONTROL LAYERS.
3. MINIMIZE NUMBER OF PENETRATIONS THROUGH INSULATION FACER TO MAINTAIN INTEGRITY OF WATER-RESISTIVE AND AIR BARRIERS.

FASTENER RECOMMENDATIONS

<table>
<thead>
<tr>
<th>Type</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framed Walls</td>
<td>Rodenhouse Thermal Grip® ci Washer, prong or flat, or equivalent 2” diameter washer with solid cap design (no keyholes)</td>
</tr>
<tr>
<td>CMU / Concrete</td>
<td>Rodenhouse Thermal Grip® ci Washer with tap-con or masonry screw</td>
</tr>
<tr>
<td>CMU / Concrete (requires flashing)</td>
<td>Rodenhouse Plasti-Grip® PMF, Ramset T3 Insulfast</td>
</tr>
</tbody>
</table>

RECOMMENDED FASTENERS
2” DIAMETER SOLID CAP WITHOUT KEYHOLES
NO ADDITIONAL SEALING REQUIRED

OTHER FASTENERS
REQUIRE LIQUIDARMOR™ FLASHING
APPLIED OVER TOP OF FASTENER

MINIMUM REQUIREMENTS
1. MIN. 18 GAUGE METAL STUDS.
2. INSULATION BOARDS SHOULD BE INSTALLED IN RUNNING BOND PATTERN.
3. INSULATION TO BE FASTENED @ MAX. 12” O.C. AT WALL PERIMETERS AND AROUND OPENINGS AND MAX 16” O.C. IN WALL FIELD.
4. "OTHER FASTENERS" AND OVER-DRIVEN FASTENERS THAT BREACH THE FACER OF INSULATION MUST BE SEALED WITH LIQUIDARMOR™ FLASHING APPLIED ON FACER AROUND BREACH AS SHOWN IN FIG.2-B USING FLASHING REQUIREMENTS ON DETAIL TWS-G02.
5. ALL FASTENERS USED TO SECURE THERMAX TO SUBSTRATE TO HAVE A MIN. 2” DIA. WASHER.
6. ONE FASTENER CAN BE USED FOR NO MORE THAN 2 BOARDS. WHERE 3 OR MORE BOARDS MEET, USE AT LEAST 1 FASTENER PER EVERY 2 BOARDS.

FIG 1: FASTENING PATTERN LAYOUT | ISOMETRIC
TWS-G03.1  COLOR FOR VISUAL CLARIFICATION ONLY

FIG 2: FASTENING FLASHING | ELEV. (L) & SECTION (R)
TWS-G03.2 FIG. 2A (TOP), FIG 2B (MIDDLE), FIG 2C (BOTTOM)

FIG 3: FASTENING @ BOARD JOINT | ISOMETRIC
TWS-G03.3  COLOR FOR VISUAL CLARIFICATION ONLY

Dow Building Solutions | 1501 Larkin Center Drive, 200 Larkin, Midland, MI 48674 | 1-866-583-2583 | March 2018: Reference most recent set at dowbuildingsolutions.com

®™TRADEMARK OF THE DOW CHEMICAL COMPANY (“DOW”) OR AFFILIATE. REFERENCE DETAIL FOR PLANNING PURPOSES ONLY. REGISTERED PROFESSIONAL TO REVIEW. MAY NOT BE USED FOR CONSTRUCTION.
DESIGN INTENT
1. MUST MAINTAIN CONTINUITY OF ALL CONTROL LAYERS AT TRANSITIONS FROM THERMAX™ WALL SYSTEM TO OTHER SYSTEMS.
2. ENSURE COMPATIBILITY WHERE DOW FLASHING MATERIALS JOIN MATERIALS PRODUCED BY OTHER MANUFACTURERS.
3. COUNTERFLASH MATERIALS TO PROMOTE WATERSHEDDING AT TRANSITION LOCATIONS.

COMPATIBILITY RECOMMENDATIONS
1. CONCRETE & CMU APPLICATIONS: ENSURE ADEQUATE LIQUIDARMOR™ FLASHING THICKNESS IS APPLIED FOR PROPER ADHESION TO AGGREGATE.
2. CHEMICALLY COMPATIBLE ADHESIVE TECHNOLOGIES WITH THERMAX™ INSULATION AND LIQUIDARMOR (NOTE CHEMICAL COMPATIBILITY IS NOT A QUALIFIER OF LONG-TERM ADHESION): ACRYLIC & ACRYLIC LATEX ● BUTYL ● RUBBERIZED ASPHALT ● SILICONE ● HOT RUBBER
3. COMPATIBILITY OF PRODUCTS/CHEMISTRIES NOT LISTED ABOVE MUST BE VERIFIED BY RESPECTIVE MANUFACTURER.

MINIMUM REQUIREMENTS
1. OVERLAP OF SEALANT ADHESION ON ANY TRANSITION FROM FACE OF INSULATION ONTO ADJACENT MATERIALS MUST USE LIQUIDARMOR™ FLASHING BASED ON REQUIREMENTS ON DETAIL TWS-G02.
2. SELF ADHERED MATERIALS SHOULD NOT BE INSTALLED OVER (COUNTERFLASH) FLUID APPLIED MATERIALS; FLUID APPLIED OVER FLUID APPLIED, FLUID APPLIED OVER SELF ADHERED, AND SELF ADHERED OVER SELF ADHERED ARE ACCEPTABLE.
3. FIG.1, GREAT STUFF PRO GAPS & CRACKS OR OTHER APPROVED SEALANT TO FILL JOINTS ≥ 1/4" PRIOR TO FLASHING WITH MIN. OVERLAP TO FACE OF REQUIREMENTS ON DETAIL TWS-G02 TO EACH FACE OF THERMAX.
4. FIG. 2, 3, 4, MIN. WIDTH OF LIQUIDARMOR™ FLASHING REQUIRED BASED ON DETAIL TWS-G02 ONTO FACE OF INSULATION AND FACE OF OTHER SUBSTRATE.
Design Intent
1. ALL PENETRATIONS MUST BE SEALED TO MAINTAIN INTEGRITY OF 4 CONTROL LAYERS AND PREVENT MOISTURE INTRUSION.
2. STYROFOAM™ BRAND CM SERIES SPRAY POLYURETHANE FOAM TO BE INSTALLED AFTER ALL MAJOR PENETRATIONS (CONDUIT, UTILITIES, PLUMBING, ETC.) AS SECONDARY LAYER OF AIR SEALING.

Recommended Sealants
1. GREAT STUFF PRO™ GAPS & CRACKS INSULATING FOAM SEALANT FOR GAPS LESS THAN 3", WITH LIQUIDARMOR™ FLASHING APPLIED OVER TOP
2. LIQUIDARMOR FLASHING FOR GAPS LESS THAN 1/4"
3. DOW CORNING® 758 WEATHER BARRIER SEALANT
4. DOW CORNING 778 LIQUID SILICONE FLASHING

Penetrations CLADDING NEUTRAL

MINIMUM REQUIREMENTS
1. PENETRATION TO BE SEALED WITH LIQUIDARMOR™ FLASHING USING REQUIREMENTS IN DETAIL TWS-G02.
2. GAPS IN INSULATION GREATER THAN 1/4" MUST BE FILLED WITH GREAT STUFF PRO GAPS & CRACKS OR OTHER APPROVED SEALANT PRIOR TO FLASHING.
**DESIGN INTENT**

1. Maintain integrity of 4 control layers by patching as appropriate.
2. Use respective patching technique, dictated by size of damaged area.

**SEALANT OPTIONS**

**ONE COMPONENT FOAM**
- GREAT STUFF PRO™ GAPS & CRACKS
- GREAT STUFF PRO™ WINDOW & DOOR FLUID APPLIED
- LIQUIDARMOR™ LT FLASHING AND SEALANT
- LIQUIDARMOR™ CM FLASHING AND SEALANT

**MINIMUM REQUIREMENTS**

1. See detail TWS-G02 "SYSTEM OPTIONS" for other system configurations and sealant options.
2. THERMAX XARMOR™ INSULATION MUST BE COVERED WITHIN 180 DAYS. CLADDING NOT SHOWN IN DETAIL. SEE DETAIL TWS-G02 "SYSTEM OPTIONS" FOR OTHER INSULATION EXPOSURE LIMITS.
3. See detail TWS-G03 "FASTENING GUIDELINES" for recommended attachment.
MINIMUM REQUIREMENTS

1. SEE DETAIL TWS-G02 "SYSTEM OPTIONS" FOR OTHER SYSTEM CONFIGURATIONS AND SEALANT OPTIONS & REQUIREMENTS.
2. LIQUIDARMOR™ CM NOT ACCEPTABLE OVER CONTROL JOINT.
3. INSULATION MUST BE COVERED WITHIN 90 DAYS. CLADDING NOT SHOWN IN DETAIL.
4. BREACHES TO INSULATION MUST BE SEALED PER DETAIL TWS-G06 "PATCHING INSULATION".
5. SEE DETAIL TWS-G03 "FASTENING GUIDELINES" FOR RECOMMENDED ATTACHMENT.
**DESIGN INTENT**

1. ALLOW UP TO 50% MOVEMENT OF EXPANSION JOINT.
2. MAINTAIN CONTINUITY OF AIR AND WATER BARRIERS ACROSS EXPANSION JOINT USING TRANSITION MEMBRANE.

**MINIMUM REQUIREMENTS**

1. TRANSITION MEMBRANE MUST BE CAPABLE OF BRIDGING JOINT WITH UP TO 50% MOVEMENT AND SEALED TO FACE OF INSULATION.
2. CONFIRM WITH MATERIAL MANUFACTURERS ON ADHESION COMPATIBILITY.
3. SEE DETAIL TWS-G02 "SYSTEM OPTIONS" FOR OTHER SYSTEM CONFIGURATIONS AND SEALANT OPTIONS & REQUIREMENTS.
4. THERMAX XARMOR™ INSULATION MUST BE COVERED WITHIN 180 DAYS. CLADDING NOT SHOWN IN DETAIL. SEE DETAIL TWS-G02 "SYSTEM OPTIONS" FOR OTHER INSULATION EXPOSURE LIMITS.
5. BREACHES TO INSULATION MUST BE SEALED PER DETAIL TWS-G06 "PATCHING INSULATION".
6. SEE DETAIL TWS-G03 "FASTENING GUIDELINES" FOR RECOMMENDED ATTACHMENT.

**TRANSITION MEMBRANE RECOMMENDATIONS**

- SILICONE TRANSITION STRIP* WITH LIQUIDARMOR™ LT FLASHING AND SEALANT TO SEAL EDGES TO FACE OF INSULATION.

*OTHER EXPANSION TRANSITION MEMBRANES MAY BE USED. DESIGNER IS RESPONSIBLE FOR SELECTING EXPANSION TRANSITION MEMBRANE AND VERIFYING MATERIAL & ADHESION COMPATIBILITIES.
MINIMUM REQUIREMENTS

1. MIN. 3" WIDTH OF LIGHT GAUGE METAL STRAPPING, MIN. 16" O.C. ABOVE GRADE, TO ACT AS NAILING BASE FOR TERMINATION BAR.
2. THRU-WALL FLASHING MIN. 40 MIL THICK, MIN 90 DAY UV RESISTANCE, INSTALLED PER MANUFACTURER'S RECOMMENDATIONS USING EDGING TOOL OR ROLLER (HAND APPLIED PRESSURE NOT ACCEPTABLE). LIQUIDARMOR NOT ACCEPTABLE FOR THIS APPLICATION.
3. GREAT STUFF PRO GAPS & CRACKS APPLIED MIN. WIDTH OF INSULATION THICKNESS.
4. FOR MIN. FLASHING WIDTHS FOR LIQUIDARMOR, SEE DETAIL TWS-G02.
5. THERMAX™ INSULATION NOT INTENDED FOR USE BELOW GRADE.
6. MIN. 25 PSI STYROFOAM TYPE IV (PER ASTM C578) EXTRUDED POLYSTYRENE (XPS) TO BE USED WHEN INSULATING BELOW GRADE.
MINIMUM REQUIREMENTS

1. MIN. 3" LIGHT GAUGE METAL STRAPPING, MIN. 16" ABOVE GRADE TO ACT AS NAILING BASE FOR TERMINATION BAR.
2. METAL FLASHING MUST BE ABLE TO RESIST TEMPERATURES OF MIN. 200°F GENERATED BY 2LB SPRAY POLYURETHANE FOAM.
3. DESIGNS WHERE SPRAY POLYURETHANE FOAM IS APPLIED ON THRU-WALL FLASHING MEMBRANES, POLYETHELENE-FACED AND RUBBERIZED ASPHALTIC SELF ADHERED MEMBRANES ARE NOT ACCEPTABLE.
4. IN THIS DESIGN, THERMAX XARMOR CI ACTS AS COUNTERFLASHING TO METAL THRU-WALL FLASHING.
5. THERMAX™ INSULATION NOT INTENDED FOR USE BELOW GRADE; MIN. 25 PSI STYROFOAM™ TYPE IV (PER ASTM C578) EXTRUDED POLYSTYRENE (XPS) TO BE USED WHEN INSULATING BELOW GRADE.
DESIGN INTENT
1. USE LIQUIDARMOR™ BRAND FLASHING & SEALANT TO TRANSITION THE AIR & WATER RESISTIVE BARRIER FROM THE FACE OF THE THERMAX™ INSULATION INTO ALL JAMBS, SILLS, & WINDOW HEADS PRIOR TO INSTALLATION OF PUNCH WINDOWS & WINDOW RECEPTORS.
2. SEALANTS AND CAULKS AS SPECIFIED BY WINDOW MANUFACTURER TO BE USED AS PRIMARY DEFENSE AGAINST MOISTURE INTRUSION & AIR INFILTRATION.
3. WINDOW RECEPTOR TO ATTACH TO WOOD BLOCKING THROUGH DOW SEALANT MEMBRANES FOR ENHANCED AIR AND MOISTURE SEALING.

GENERAL RECOMMENDATIONS
1. WINDOW SEALANT COMPATIBILITY SHOULD BE VERIFIED FOR LONG-TERM ADHESION TO DOW FLASHING.
2. BLOCKING CAN BE USED TO PROVIDE ADDED RIGIDITY AND A NAILING BASE AT JAMBS, SILLS, & HEADS.
3. A DOUBLE STUD IS RECOMMENDED AT JAMBS TO ALLOW FOR GREATER FLEXIBILITY WITH CLADDING TERMINATIONS AROUND WINDOWS & DOORS.

MINIMUM REQUIREMENTS
1. DOW SEALANT TO BE INSTALLED 3" ONTO FACE OF INSULATION AND MIN. 3" INTO ROUGH OPENING (SILL, JAMB, & HEADER) OR 1" PAST PRIMARY AIR/WATER SEAL OF WINDOW, WHICHEVER IS GREATER.
2. ACCEPTABLE BLOCKING TYPES TO BRIDGE RAW EDGE OF INSULATION AROUND PUNCH OPENING: DIMENSIONAL LUMBER, OSB / PLYWOOD SHEATHING, OR METAL ANGLE TRIM (ALSO KNOWN AS "L" ANGLE OR "SHINY 90") (SHOWN).
### DESIGN INTENT

1. USE LIQUIDARMOR™ BRAND FLASHING & SEALANT TO TRANSITION THE AIR & WATER RESISTIVE BARRIER FROM THE FACE OF THE THERMAX™ INSULATION INTO ALL JAMBS, SILLS, & WINDOW HEADS PRIOR TO INSTALLATION OF PUNCH WINDOWS & WINDOW RECEPTORS.

2. SEALANTS AND CAULKS AS SPECIFIED BY WINDOW MANUFACTURER TO BE USED AS PRIMARY DEFENSE AGAINST MOISTURE INTRUSION & AIR INFILTRATION.

3. WINDOW RECEPTOR TO ATTACH TO WOOD BLOCKING THROUGH DOW SEALANT MEMBRANES FOR ENHANCED AIR AND MOISTURE SEALING.

### GENERAL RECOMMENDATIONS

1. WINDOW SEALANT COMPATIBILITY SHOULD BE VERIFIED FOR LONG-TERM ADHESION TO DOW FLASHING.

2. BLOCKING IS PREFERRED TO PROVIDE ADDED RIGIDITY AND A NAILING BASE AT JAMBS, SILLS, & HEADS.

3. A DOUBLE STUD IS RECOMMENDED AT JAMBS TO ALLOW FOR GREATER FLEXIBILITY WITH CLADDING TERMINATIONS AROUND WINDOWS & DOORS.

### MINIMUM REQUIREMENTS

1. DOW SEALANT TO BE INSTALLED 3" ONTO FACE OF INSULATION AND MIN. 3" INTO ROUGH OPENING (SILL, JAMB, & HEADER) OR 1" PAST PRIMARY AIR/WATER SEAL OF WINDOW, WHICHEVER IS GREATER.

2. ACCEPTABLE BLOCKING TYPES TO BRIDGE RAW EDGE OF INSULATION AROUND PUNCH OPENING: DIMENSIONAL LUMBAR (SHOWN), OSB / PLYWOOD SHEATHING, OR METAL ANGLE TRIM (ALSO KNOWN AS “L” ANGLE OR “SHINY 90”).
MINIMUM REQUIREMENTS

1. DOW SEALANT TO BE INSTALLED MIN. 3" ONTO FACE OF INSULATION AND MIN. 3" INTO ROUGH OPENING (SILL, JAMB, & HEADER) OR 1" PAST PRIMARY AIR/WATER SEAL OF WINDOW, WHICHEVER IS GREATER.

2. ALL FLANGE PENETRATIONS TO BE THROUGH SELF-SEALING DOW FLASHING MATERIAL AT WINDOW JAMBS & HEADER.

3. AFTER WINDOW INSTALLATION, FLANGE TO BE SEALED WITH LIQUIDARMOR. NOTE: IF USING MORE THAN ONE TYPE OF SEALANT, USE SEQUENCING GUIDELINES FROM DETAIL TWSG02.

4. CAULK @ WINDOW FLANGE TO BE INSTALLED AS PER WINDOW MANUFACTURER REQUIREMENTS.

5. DOUBLE STUD AT WINDOW JAMB RECOMMENDED TO ALLOW FOR FLEXIBILITY WITH CLADDING ATTACHMENT.
MINIMUM REQUIREMENTS

1. DOW SEALANT TO BE INSTALLED MIN. 3" ONTO FACE OF THERMAX AND MIN. 3" INTO ROUGH OPENING (SILL, JAMB, & HEADER) OR 1" PAST PRIMARY AIR/WATER SEAL OF WINDOW, WHICHEVER IS GREATER.

2. ALL FLANGE PENETRATIONS TO BE THROUGH SELF-SEALING DOW FLASHING MATERIAL AT WINDOW JAMBS & HEADER.

3. AFTER WINDOW INSTALLATION, FLANGE TO BE SEALED WITH LIQUIDARMOR. NOTE: IF USING MORE THAN ONE TYPE OF SEALANT, USE SEQUENCING GUIDELINES FROM DETAIL TWSG02.

4. CAULK @ WINDOW FLANGE TO BE INSTALLED AS PER WINDOW MANUFACTURER REQUIREMENTS.

5. DOUBLE STUD AT WINDOW JAMB RECOMMENDED TO ALLOW FOR FLEXIBILITY WITH CLADDING ATTACHMENT.
**DESIGN INTENT**

1. MINIMIZE THERMAL BRIDGING WITH CONTINUOUS INSULATION INSTALLED OVER EDGE OF SLAB.
2. MAINTAIN INTEGRITY OF FOUR CONTROL LAYERS BY SEALING OVER EDGE OF SLAB TO PREVENT UNWANTED MOISTURE/AIR INFILTRATION.

**GENERAL RECOMMENDATIONS**

1. EDGE OF SLAB TO BE FLUSH WITH FACE OF EXTERIOR METAL STUD TO MAINTAIN CONTINUITY AND THICKNESS OF WALL SYSTEM AT FLOOR TO FLOOR CONDITIONS.
2. THINNER PIECES OF THERMAX MAY BE USED WHERE EDGE OF SLAB IS NOT FLUSH WITH EXTERIOR FACE OF METAL STUD. HOWEVER, THIS CONDITION CAN BE LABOR INTENSIVE.
3. WHERE EDGE OF SLAB IS FLUSH WITH EXTERIOR FACE OF THERMAX INSULATION, MUST FLASH RAW SLAB EDGE WITH LIQUIDARMOR™ OR DEFENDAIR 200 TO MAINTAIN CONTINUITY OF CONTROL LAYERS.

**MINIMUM REQUIREMENTS**

1. EDGE OF SLAB MUST NOT BE LEFT EXPOSED. A MOISTURE RESISTANT/AIR SEALING MEMBRANE MUST BE USED TO TRANSITION FROM FACE OF THERMAX, OVER RAW SLAB EDGE, ONTO FACE OF THERMAX BELOW IN A SHINGLE-LAP FASHION.
2. FASTENERS USED TO SECURE THERMAX TO EDGE OF SLAB MUST BE SEALED WITH LIQUIDARMOR USING REQUIREMENTS LISTED IN DETAIL TWS-G02.
3. FLOOR TO FLOOR FIRE-STOPPING CONSTRUCTION DETAILS TO BE DESIGNED/VERIFIED BY FIRE PROTECTION ENGINEER / FIRE STOP MANUFACTURER / OR EQUAL.
MINIMUM REQUIREMENTS

1. INSULATION CORE (RAW EDGES) TO BE ENCAPSULATED BY FLASHING WITH MIN. ADHERENCE BASED ON DETAIL TWS-G02 ON FACE OF EACH ADJOINING BOARD.
MINIMUM REQUIREMENTS
1. INSULATION SHOULD BE LAYERED IN A SHINGLE-LAP FASHION (AS SHOWN) TO PROMOTE WATER SHEDDING AND PREVENT MOISTURE INTRUSION AT HORIZONTAL INSULATION JUNCTURES.
2. ANY GAPS 1/4" OR GREATER, INCLUDING WHERE TWO BOARDS MEET, MUST BE FILLED WITH GREAT STUFF PRO™ GAPS & CRACKS OR OTHER APPROVED SEALANT PRIOR TO INSTALLATION OF ANY FLASHING MATERIALS.
3. MIN. ADHESION WIDTH OF LIQUIDARMOR ONTO EACH FACE OF INSULATION BASED ON DETAIL TWS-G02.
**DESIGN INTENT**

USE THERMAX™ BRAND INSULATION ALONG CURVED FACADE WHILE MAINTAINING INTEGRITY OF THE 4 CONTROL LAYERS.

1. WITHOUT KERF: USE THERMAX OVER SPECIFIC RADII OF CURVATURE WITHOUT THE NEED TO CUT, SCORE, OR KERF.
2. EXTERIOR FACE KERF: FILL ALL VOIDS WITH GREAT STUFF PRO™ GAPS & CRACKS AND FLASH USING LIQUIDARMOR™ TO SEAL FROM MOISTURE & AIR INFILTRATION.
3. INTERIOR FACE KERF: SEAL WITH STYROFOAM™ BRAND CM SERIES SPRAY POLYURETHANE FOAM.

**GENERAL RECOMMENDATIONS**

1. FOR EXTREME RADII OF CURVATURE WITH THICKNESSES OF THERMAX EXCEEDING 2", USE MULTIPLE LAYERS OF THINNER THERMAX.
2. FLASHING TECHNIQUES OUTLINED IN OTHER DETAILS WILL STILL BE RELEVANT FOR RADII OF CURVATURE ESPECIALLY AS THEY PERTAIN TO FASTENERS & FENESTRATIONS.

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**INSULATION THICKNESS**

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<tr>
<th>INSULATION THICKNESS</th>
<th>MAX RADIUS OF CURVATURE WITHOUT CUTTING</th>
</tr>
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<tbody>
<tr>
<td>1 INCH</td>
<td>75 FEET</td>
</tr>
<tr>
<td>2 INCH</td>
<td>125 FEET</td>
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</tbody>
</table>

**MINIMUM REQUIREMENTS**

1. IF MAX RADIUS OF CURVATURE OR MAX INSULATION THICKNESS IS EXCEEDED, THERMAX WILL NEED TO BE "KERF CUT" TO PROPERLY ENCLOSE THE EXTERIOR STRUCTURE.
2. EACH CUT TO HAVE A MAX DEPTH NO GREATER THAN \( \frac{1}{2} \) OF INSULATION THICKNESS.
3. CUTS TO EXTERIOR INSULATION FACER MUST BE FILLED WITH GREAT STUFF PRO™ GAPS & CRACKS INSULATING FOAM SEALANT, OR OTHER APPROVED SEALANT, SUCH THAT THE FOAM EXPANDS TO THE EXTERIOR FACE OF THERMAX AND FULLY FILLS ALL VOIDS.
4. EXCESS GREAT STUFF PRO GAPS & CRACKS, OR OTHER APPROVED SEALANT MUST BE TRIMMED FLUSH TO THE FACE OF THE BOARD AND FLASHED W/ LIQUIDARMOR™ FLASHING BASED ON WIDTH REQUIREMENTS FROM TWS-G02.
DESIGN INTENT
1. SUCCESSFULLY TRANSITION 4 CONTROL LAYERS FROM VERTICAL WALL PLANE TO HORIZONTAL ROOFING PLANE WITHOUT INTERRUPTION.
2. INSULATION & AIR BARRIER TO SEAL OFF UNCONDITIONED PARAPET WALL FROM INTERACTING WITH CONDITIONED INTERIOR AIR TO FURTHER PREVENT CONDENSATION POTENTIAL.
3. TRANSITION TO ROOFING MEMBRANE MATERIALS USING COMPATIBLE MATERIALS.

GENERAL RECOMMENDATIONS
1. COMBINATION OF MATERIALS MAY BE USED TO ENCAPSULATE PARAPET WALL - ALL MANUFACTURERS SHOULD BE CONSULTED TO ENSURE CHEMICAL COMPATIBILITY OF MEMBRANE/TRANSITION MATERIALS TO THERMAX™ INSULATION.
2. 3RD PARTY MATERIAL TO TRANSITION FROM ROOFING MEMBRANE OVER/UNDER COPING TO TERMINATE ON FACE OF THERMAX™ INSULATION.
3. FROTH-PAK™ INSULATION AT ROOF DECK / PARAPET JUNCTURE TO BE INSTALLED PRIOR TO ROOF INSULATION & MEMBRANE.

MINIMUM REQUIREMENTS
1. LIQUIDARMOR™ FLASHING IS NOT ACCEPTABLE PRODUCTS FOR TRANSITIONING WRB/AIR BARRIER MEMBRANE FROM FACE OF THERMAX™ INSULATION, AROUND PARAPET CAP, ONTO ROOFING MEMBRANE. TRANSITION MEMBRANES TO BE PROVIDED BY ROOFING MANUFACTURER.
2. LIQUIDARMOR™ FLASHING NOT SUITABLE FOR ROOFING MEMBRANE MATERIALS AND CANNOT BE LEFT EXPOSED INDEFINITELY.
3. ALL PENETRATIONS AT PARAPET MUST BE MADE THROUGH SELF-SEALING MEMBRANES.
4. FLASHING DETAILS AT FRONT OF PARAPET SHOULD BE INSTALLED IN A SHINGLE-LAP PATTERN SUCH THAT THEY COUNTER FLASH ONTO THERMAX™ INSULATION.
5. AT ROOF WALL JUNCTURE, MIN. 1.5”+/- 0.5” APPLICATION SPRAY POLYURETHANE FOAM TO BE INSTALLED TO PREVENT AIR EXFILTRATION AT PARAPET.
6. FOR STUD ASSEMBLIES THAT RUN PAST ROOF DECK TO CREATE PARAPET WALL, MINERAL WOOL BLOCKING OR EQUAL TO ACT AS SUBSTRATE FOR 2LB SPRAY POLYURETHANE FOAM TO PROPERLY SEAL CAVITY.
7. 2LB SPRAY POLYURETHANE FOAM CANNOT BE LEFT EXPOSED AND REQUIRES A THERMAL BARRIER IN PLENUM SPACES.
8. FOR THERMAL BARRIER REQUIREMENTS, SEE DETAIL TWS-G16 CEILING PLENUM.
DESIGN INTENT
1. SUCCESSFULLY TRANSITION 4 CONTROL LAYERS FROM VERTICAL WALL PLANE TO HORIZONTAL ROOFING PLANE WITHOUT INTERRUPTION.
2. INSULATION & AIR BARRIER TO SEAL OFF UNCONDITIONED PARAPET WALL FROM INTERACTING WITH CONDITIONED INTERIOR AIR TO FURTHER PREVENT CONDENSATION POTENTIAL.
3. TRANSITION TO ROOFING MEMBRANE MATERIALS USING COMPATIBLE MATERIALS.

GENERAL RECOMMENDATIONS
1. COMBINATION OF MATERIALS MAY BE USED TO ENCAPSULATE PARAPET WALL - ALL MANUFACTURERS SHOULD BE CONSULTED TO ENSURE CHEMICAL COMPATIBILITY OF MEMBRANE/TRANSITION MATERIALS TO THERMAX™.
2. 3RD PARTY MATERIAL TO TRANSITION FROM ROOFING MEMBRANE OVER/UNDER COPING TO TERMINATE ON FACE OF THERMAX INSULATION.
3. FROTH-PAX™ INSULATION AT ROOF DECK / PARAPET JUNCTURE TO BE INSTALLED PRIOR TO ROOF INSULATION & MEMBRANE.

MINIMUM REQUIREMENTS
1. LIQUIDARMOR™ FLASHING IS NOT ACCEPTABLE PRODUCTS FOR TRANSITIONING WRB/AIR BARRIER MEMBRANE FROM FACE OF INSULATION, AROUND PARAPET CAP, ONTO ROOFING MEMBRANE. TRANSITION MEMBRANES TO BE PROVIDED BY ROOFING MANUFACTURER.
2. LIQUIDARMOR™ FLASHING NOT SUITABLE FOR ROOFING MEMBRANE MATERIALS AND CANNOT BE LEFT EXPOSED INDEFINITELY.
3. ALL PENETRATIONS AT PARAPET MUST BE MADE THROUGH SELF-SEALING MEMBRANES AS DEFINED BY ASTM E331.
4. FLASHING DETAILS AT FRONT OF PARAPET SHOULD BE INSTALLED IN A SHINGLE-LAP PATTERN SUCH THAT THEY COUNTER FLASH ONTO THERMAX™ INSULATION.
5. AT ROOF WALL JUNCTURE, MIN. 1.5"+/- 0.5" APPLICATION SPRAY POLYURETHANE FOAM TO BE INSTALLED TO PREVENT AIR EXFILTRATION AT PARAPET.
6. FOR STUD ASSEMBLIES THAT RUN PAST ROOF DECK TO CREATE PARAPET WALL, MINERAL WOOL BLOCKING OR EQUAL TO ACT AS SUBSTRATE FOR 2LB SPRAY POLYURETHANE FOAM TO PROPERLY SEAL CAVITY.
7. 2LB SPRAY POLYURETHANE FOAM CANNOT BE LEFT EXPOSED AND REQUIRES A THERMAL BARRIER IN PLENUM SPACES.
8. SEE DETAIL TWS-G16 REQUIREMENTS FOR EXPOSED SPF WHERE INTERIOR GYPSUM IS NOT CONTINUOUS TO BOTTOM OF ROOF DECK.
MINIMUM REQUIREMENTS

1. MIN. 6" OVERLAP OF SPRAY APPLIED THERMAL BARRIER BELOW CEILING LINE.

2. 2LB SPRAY POLYURETHANE FOAM CANNOT BE LEFT EXPOSED AND REQUIRES A THERMAL BARRIER IN PLENUM SPACES.

3. THERMAX™ BRAND INSULATION MAY BE LEFT EXPOSED IN PLENUM WITHOUT ADDITIONAL THERMAL BARRIER.
MINIMUM REQUIREMENTS

1. THERMAX™ BRAND INSULATION SHOULD BE CUT TO RUN INTO RAFTERS AND RUN TO TOP OF WALL PLATE.
2. SPRAY POLYURETHANE FOAM AT RAFTER TO BE INSTALLED ALONG BAFFLE TO AIR SEAL WHILE ALLOWING FOR PROPER VENTILATION.
3. MAX. SPF APPLICATION THICKNESS OF 6" AT JUNCTURE BETWEEN TOP OF WALL PLATE AND RAFTER. (NOTE 6" SPF THICKNESS REQUIRES 4 SEPARATE PASSES, EACH INSTALLATION PASS NOT TO EXCEED 1"-1.5" TO PREVENT DISTORTION OF BAFFLE MATERIAL DUE TO HEAT.)
MINIMUM REQUIREMENTS

1. THERMAX™ BRAND INSULATION SHOULD BE CUT TO RUN INTO RAFTERS AND RUN TO TOP OF WALL PLATE.
2. GREAT STUFF PRO™ GAPS & CRACKS, OR OTHER APPROVED SEALANT, TO BE USED TO SEAL BETWEEN THERMAX™ INSULATION AND ALL RAFTERS TO COMPLETE AIR SEAL.
3. FROTH-PAK™ CLASS A MAX. 6" HEIGHT AND MAX. 2" DEPTH, MAY BE LEFT EXPOSED WITHOUT ADDITIONAL THERMAL BARRIER.
The “TWS-General” detail set outlines the general guidelines for design using the THERMAX™ Wall System (TWS), focusing on maintaining continuity of the four control layers (thermal, air, vapor, and water). These details can be used as guides for any THERMAX Wall project.

Cladding specific supplemental sets, “TWS-Masonry,” “TWS-Rainscreen,” and “TWS-Applied,” address conditions that apply to specific cladding types. These are meant to be used in addition to the TWS-General set.

Other system detail sets available at dowbuildingsolutions.com
MINIMUM REQUIREMENTS

1. ACCEPTABLE DETAILS INCLUDE, BUT ARE NOT LIMITED TO, THOSE LISTED ABOVE. MUST REFERENCE THERMAX WALL SYSTEM GENERAL DETAILS (CLADDING NEUTRAL) FOR OTHER MIN. REQUIREMENTS.

**DETAILS GUIDE**

1. WALL SECTION LISTS APPLICABLE DETAILS FOR REFERENCE.
2. DETAIL NAMING SYSTEM:
   - TWS-X00.0
   - 0 - DETAIL NUMBER ON PAGE
   - 00 - DETAIL NUMBER IN SET
   - G - GENERAL
   - M - MASONRY
   - TWS - THERMAX™ WALL SYSTEM
3. FULL DETAIL SETS FOR "TWS-G" AND "TWS-M" AVAILABLE AT DOWBUILDINGSOLUTIONS.COM

**MASONRY OVERVIEW SECTION**

**TWS-M01**  
COLOR FOR VISUAL CLARIFICATION ONLY

**PARAPET DETAILS**
- TWS-G15.1
- TWS-G15.2
- TWS-G16.1
- TWS-G16.2

**EDGE OF SLAB DETAILS**
- TWS-G12.1
- TWS-G12.2
- TWS-M06.1
- TWS-M06.2

**WINDOW DETAILS**
- TWS-G09.1
- TWS-G09.2
- TWS-G09.3
- TWS-G09.4
- TWS-G10.1
- TWS-G10.2
- TWS-G10.3
- TWS-G10.4

**FOUNDATION DETAILS**
- TWS-G07.1
- TWS-G07.2
- TWS-G07.3
- TWS-G07.4
- TWS-M04.1
- TWS-M04.2
**Design Intent**

1. Use self-sealing masonry anchors to maintain integrity of 4 control layers.
2. Select fasteners with thermal breaks to improve effective R-value of the envelope.
3. Use barrel-like masonry fasteners to reduce number of penetrations to envelope.
4. Seal unevaluated fasteners with self-sealing Dow membranes.

**Masonry Anchor Recommendations**

**EVALUATED SELF-SEALING BARREL STYLE ANCHORS**
- Heckmann Pos-I-Tie® with Rodenhouse Thermal-Grip® CI Washer
- Hohmann & Barnard 2-Seal™ Tie, 2-Seal Thermal Wingnut Anchor, & Thermal 2-Seal Tie
- Wire-Bond Sure Tie with Thermal Washer

**ANCHORS REQUIRING ADDITIONAL FLASHING**
- Hohmann & Barnard: DW-10X Series, HB200/213 Series
- Wire-Bond: HCL Series, Type III X Series

**List Not Exhausive.**

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**Self-Sealing Barrel Fasteners (Recommended)**

**Engineered Tie (High Rise)**

Requires additional flashing / sealant

**Face Mounted / Penetrating Anchor**

Requires additional flashing / sealant (not recommended)

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**Minimum Requirements**

1. General fastening pattern is 16” O.C. vertically & horizontally unless specified differently by licensed engineer.
2. Approved anchors must include washer.
3. Where anchor uses min. 2” dia. washer, masonry anchor may be used to replace 1 insulation fastener at that location.
4. All penetrating anchors must be installed through Liquidarmor™ flashing w/ min. width based on detail TWS-G02.
5. Must seal gaps around all shear / plate anchors w/ Great Stuff Pro™ insulating foam sealant or other approved sealant and flash using Liquidarmor™ flashing.
Anchor Guidelines on CMU

MINIMUM REQUIREMENTS

1. THERMAX™ BRAND INSULATION BOARDS TO BE CUT AT 16” O.C. WITH A SQUARE EDGE (NOT SHIP-LAPPED).
2. JOINTS AT BOARD PERIMETER TO BE FILLED WITH GREAT STUFF PRO™ GAPS & CRACKS INSULATING FOAM SEALANT OR OTHER APPROVED SEALANT PRIOR TO INSTALLATION OF LIQUIDARMOR™ FLASHING.
3. GREAT STUFF PRO™ GAPS & CRACKS MUST TACK OVER (10-15 MIN.) PRIOR TO INSTALLATION OF LIQUIDARMOR™ FLASHING.
4. SELF ADHERED FLASHING MATERIALS ARE NOT ACCEPTABLE FOR THIS APPLICATION DUE TO THE DIFFICULTY IN CREATING A PROPER SEAL AROUND MASONRY WIRE TIES.
5. LIQUIDARMOR™ FLASHING CAN SPAN A MAX. 1/4” GAPS - ALL AREAS WHERE JOINTS BETWEEN THERMAX™ INSULATION BOARDS EXCEED 1/4” REQUIRE GREAT STUFF PRO™ GAPS & CRACKS OR OTHER APPROVED SEALANT TO BE INSTALLED.
6. GREAT STUFF PRO™ GAPS & CRACKS MAY BE LEFT EXPOSED FOR 60 DAYS MAX.
7. SEE DETAIL TWS-G02 FOR LIQUIDARMOR™ FLASHING MIN. APPLICATION REQUIREMENTS AND EXPOSURE LIMITS.
8. GREAT STUFF PRO™ GAPS & CRACKS MAY BE USED TO ADHERE INSULATION BOARDS TO CMU SUBSTRATE.
MINIMUM REQUIREMENTS

1. MIN. 3" WIDTH OF LIGHT GAUGE METAL STRAPPING, MIN. 16" O.C. ABOVE GRADE, TO ACT AS NAILING BASE FOR TERMINATION BAR.
2. THRU-WALL FLASHING MIN. 40 MIL THICK, MIN 90 DAY UV RESISTANCE, INSTALLED PER MANUFACTURER'S RECOMMENDATIONS USING EDGING TOOL OR ROLLER (HAND APPLIED PRESSURE NOT ACCEPTABLE); LIQUIDARMOR™ FLASHING NOT ACCEPTABLE FOR THIS APPLICATION.
3. FOR MIN. WIDTHS OF LIQUIDARMOR APPLICATION, SEE DETAIL TWS-G02.
4. THERMAX™ BRAND INSULATION NOT INTENDED FOR USE BELOW GRADE.
5. MIN. 25 PSI STYROFOAM™ TYPE IV (PER ASTM C578) EXTRUDED POLYSTYRENE (XPS) TO BE USED WHEN INSULATING BELOW GRADE.
6. SEE THERMAX™ WALL SYSTEM GENERAL DETAIL SET ("TWS-G") FOR OTHER FOUNDATION OPTIONS AND REQUIREMENTS.

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**DESIGN INTENT**

1. Use LiquidArmor™ flashing to transition the air & water resistant barrier from the face of the THERMAX™ insulation into all jamb, sill, & window heads prior to installation of punch windows & window receptors.
2. Sealants and caulks as specified by window manufacturer to be used as primary defense against moisture intrusion & air infiltration.
3. Window receptor to attach to wood blocking through dow sealant membranes for enhanced air and moisture sealing.

**GENERAL RECOMMENDATIONS**

1. Window sealant compatibility should be verified for long-term adhesion to Dow flashing.
2. Blocking can be used to provide added rigidity and a nailing base at jamb, sill, & head.
3. A double stud is recommended at jambs to allow for greater flexibility with cladding terminations around windows & doors.

**MINIMUM REQUIREMENTS**

1. Dow sealant to be installed onto face of THERMAX™ insulation min. 3" and min. 3" into rough opening (sill, jamb, & header) or 1" past interior caulk joint, whichever is greater.
2. If not using wood blocking at window jamb, head, sill, must use metal angle trim ("shiny 90") to bridge insulation core (raw edge).
3. See THERMAX™ wall system general detail set ("TWS-G") for other window options & requirements.
**MINIMUM REQUIREMENTS**

1. FOR MIN. APPLICATION THICKNESS AND WIDTH OF LIQUIDARMOR, SEE DETAIL TWS-G005.
2. WHERE INSULATION COUNTERFLASHES THRU-WALL FLASHING, SELF ADHERED MEMBRANES ARE ONLY ACCEPTABLE IF SLAB PROVIDES SUFFICIENT SUBSTRATE TO BE INSTALLED ON - ALL OTHER APPLICATIONS WILL REQUIRE METAL THRU-WALL FLASHINGS.
3. INSULATION SHOULD BE FLASHER TO BOTTOM EDGE OF RELIEF ANGLES TO PREVENT MOISTURE INTRUSION.
4. IF THRU-WALL FLASHING INSTALLED ON FACE OF INSULATION, LIQUIDARMOR™ FLASHING MUST COUNTER FLASH LEADING EDGE OF THRU-WALL FLASHING.
5. SEE THERMAX™ WALL SYSTEM GENERAL DETAIL SET ("TWS-G") FOR OTHER EDGE OF SLAB OPTIONS & REQUIREMENTS.
Abstract

The “TWS-General” detail set outlines the general guidelines for design using the THERMAX™ Wall System (TWS), focusing on maintaining continuity of the four control layers (thermal, air, vapor, and water). These details can be used as guides for any THERMAX Wall project.

Cladding specific supplemental sets, “TWS-Masonry,” “TWS-Rainscreen,” and “TWS-Applied,” address conditions that apply to specific cladding types. These are meant to be used in addition to the TWS-General set.

Other system detail sets available at dowbuildingsolutions.com
DETAILS GUIDE
1. WALL SECTION LISTS APPLICABLE DETAILS FOR REFERENCE.
2. DETAIL NAMING SYSTEM:
   - TWS-X00.0
   - TWS - THERMAX™ WALL SYSTEM
   - 00 - DETAIL NUMBER IN SET
   - 0 - DETAIL NUMBER ON PAGE
   - G - GENERAL
   - R - RAINSCREEN
3. FULL DETAIL SETS FOR "TWS-G" AND "TWS-R" AVAILABLE AT DOWBUILDINGSOLUTIONS.COM
4. SEE TWS-G DETAIL SET FOR MINIMUM REQUIREMENTS.

PARAPET DETAILS
- TWS-G15.1
- TWS-G15.2
- TWS-G16.1
- TWS-G16.2

EDGE OF SLAB DETAILS
- TWS-G12.1
- TWS-G12.2

WINDOW DETAILS
- TWS-G09.1
- TWS-G09.2
- TWS-G09.3
- TWS-G09.4
- TWS-G10.1
- TWS-G10.2
- TWS-G10.3
- TWS-G10.4

FOUNDATION DETAILS
- TWS-G07.1
- TWS-G07.2
- TWS-G07.3
- TWS-G07.4

RAINSCREEN OVERVIEW SECTION
TWS-R01  COLOR FOR VISUAL CLARIFICATION ONLY
Furring Options

1. Hat Channels
2. Z-Furring (Surface Mounted)
3. Z-Furring (to Stud)
4. Flat Strap
5. Wood Furring
6. Knight Wall CI-Girt

*List Not Exhaustive.*

Furring type dictated by cladding weight & design.

Design Intent

1. Use furring system surface mounted over the rigid insulation and fastened to the structure.
2. See table below to find maximum thickness of insulation allowed based on cladding weight and fastening options.
3. Seal penetrations of furring strips using LIQUIDARMOR™ Flashing to maintain continuous air and water barrier at the face of the rigid insulation.
4. Rainscreen panels are attached to the furring strips rather than directly to the studs, minimizing penetrations through the air/water barrier plane.

MINIMUM REQUIREMENTS

1. TABLE 2603.12.2 REFERENCED FROM INTERNATIONAL BUILDING CODE (IBC) 2015. SEE CODE FOR OTHER REQUIREMENTS.
2. SEE DETAIL TWS-G02 FOR MIN. LIQUIDARMOR™ FLASHING APPLICATION THICKNESS & WIDTH.
3. VERIFY WITH ENGINEER THAT ATTACHMENT METHOD ADEQUATE FOR WEIGHT OF CLADDING.
**Typical Cladding Types Using Hat Channel**

**Horizontal Attachment**
- Fiber Cement Panels
- Backer Board for Applied Finishes

**Vertical Attachment**
- Fiber Cement Panels
- ACM Panels
- MCM Panels

*Note: List Not Exhaustive*

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**MINIMUM REQUIREMENTS**

1. SEE DETAIL TWS-G02 FOR MIN. LIQUIDARMOR™ FLASHING APPLICATION THICKNESS & WIDTH.
2. SEE DETAIL TWS-G02 FOR COMPATIBLE TAPE OPTIONS AND NOTED WARRANTY DIFFERENCES.
3. SEE DETAIL TWS-R02 FOR MIN FURRING REQUIREMENTS AND VERIFY ATTACHMENT WITH ENGINEER TO ENSURE ADEQUACY FOR CLADDING WEIGHT REQUIREMENTS.

---

**HAT CHANNEL FURRING**

TWS-R03  COLOR FOR VISUAL CLARIFICATION ONLY
Z-Furring (Surface Mounted)

Typical Cladding Types Using Z-Furring

1. MCM Panel
2. ACM Panel
3. Terra Cotta
4. Fiber Cement Panel
5. Backer Board for Applied Finishes

Note: List Not Exhaustive

MINIMUM REQUIREMENTS

1. SEE DETAIL TWS-G02 FOR MIN. LIQUIDARMOR™ FLASHING AND SEALANT APPLICATION THICKNESS & WIDTH.
2. SEE DETAIL TWS-G02 FOR COMPATIBLE TAPE OPTIONS AND NOTED WARRANTY DIFFERENCES.
3. SEE DETAIL TWS-R02 FOR MIN FURRING REQUIREMENTS AND VERIFY ATTACHMENT WITH ENGINEER TO ENSURE ADEQUACY FOR CLADDING WEIGHT REQUIREMENTS.
Design Intent

Attaching metal Z-furring directly to stud significantly reduces the continuous insulation's effectiveness due to thermal bridging. If this method is to be used, take into consideration the "ci" reduction values that correspond with horizontal and vertical Z-furring. Source for values used for thermal effectiveness and reduction in effective R-value is RDH Technical Bulletin No. 11: Cladding Attachment Solutions for Exterior Insulated Commercial Walls, 2015.

Key

- LIQUIDARMOR™ Flashing (over)
- GREAT STUFF PRO™ Gaps & Cracks
- THERMAX XARMOR™ CI (section)
- THERMAX XARMOR™ CI (elevation)
- STYROFOAM™ Brand CM Series SPF

THERMAL EFFECTIVENESS: 30-50%
REDUCTION IN "CI" R-VALUE: ~60%
(EX. R-13CI * 0.4 => ~R-5.2 WHEN FASTENED USING Z-GIRTS HORIZONTALLY ATTACHED TO STUDS)

THERMAL EFFECTIVENESS: 20-40%
REDUCTION IN "CI" R-VALUE: ~70%
(EX. R-13CI * 0.3 => ~R-3.9 WHEN FASTENED USING Z-GIRTS VERTICALLY ATTACHED TO STUDS)

MINIMUM REQUIREMENTS

1. SEE DETAIL TWS-G02 FOR MIN. LIQUIDARMOR™ FLASHING APPLICATION THICKNESS & WIDTH.
2. SEE DETAIL TWS-R02 FOR MIN. FURRING REQUIREMENTS AND VERIFY ATTACHMENT WITH ENGINEER TO ENSURE ADEQUACY FOR CLADDING WEIGHT REQUIREMENTS.
Typical Cladding Types Using Flat Strap Furring

1. MCM Panel
2. ACM Panel
3. Terra Cotta
4. Fiber Cement Panel
5. Backer Board for Applied Finishes

Note: List Not Exhaustive

MINIMUM REQUIREMENTS

1. SEE DETAIL TWS-G02 FOR MIN. LIQUIDARMOR™ FLASHING AND SEALANT APPLICATION THICKNESS & WIDTH.
2. SEE DETAIL TWS-G02 FOR COMPATIBLE TAPE OPTIONS AND NOTED WARRANTY DIFFERENCES.
3. SEE DETAIL TWS-R02 FOR MIN FURRING REQUIREMENTS AND VERIFY ATTACHMENT WITH ENGINEER TO ENSURE ADEQUACY FOR CLADDING WEIGHT REQUIREMENTS.
Typical Cladding Types Using Wood Furring

1. MCM Panel
2. ACM Panel
3. Terra Cotta
4. Fiber Cement Panel
5. Backer Board for Applied Finishes

Note: List Not Exhaustive

Key
- LIQUIDARMOR™ Flasing and Sealant visible (L), hidden (R)
- Compatible tape visible (L), hidden (R)
- THERMAX XARMOR™ CI (section)
- THERMAX XARMOR™ CI (elevation)
- STYROFOAM™ BRAND CM SERIES SPF

MINIMUM REQUIREMENTS

1. SEE DETAIL TWS-G02 FOR MIN. LIQUIDARMOR™ FLASHING AND SEALANT APPLICATION THICKNESS & WIDTH.
2. SEE DETAIL TWS-G02 FOR COMPATIBLE TAPE OPTIONS AND NOTED WARRANTY DIFFERENCES.
3. SEE DETAIL TWS-R02 FOR MIN FURRING REQUIREMENTS AND VERIFY ATTACHMENT W/ ENGINEER TO ENSURE ADEQUACY FOR CLADDING WEIGHT REQUIREMENTS.
4. FILL JOINT WITH LIQUIDARMOR™ FLASHING AND SEALANT. IF GAP > 1/4", FILL WITH GREAT STUFF PRO™ GAPS & CRACKS BEFORE APPLYING LIQUIDARMOR™ FLASHING AND SEALANT.
Typical Cladding Types Using Knight Wall

1. MCM Panel
2. ACM Panel
3. Terra Cotta
4. Fiber Cement Panel
5. Backer Board for Applied Finishes

Note: List Not Exhaustive

Key
- Compatible tape over object
- Compatible tape behind object
- THERMAX XARMOR™ CI (section)
- THERMAX XARMOR™ CI (elevation)
- STYROFOAM™ BRAND CM SERIES SPF

MINIMUM REQUIREMENTS

1. SEE DETAIL TWS-G02 FOR COMPATIBLE TAPE OPTIONS AND NOTED WARRANTY DIFFERENCES.
2. SEE DETAIL TWS-R02 FOR MIN FURRING REQUIREMENTS AND VERIFY ATTACHMENT WITH ENGINEER TO ENSURE ADEQUACY FOR CLADDING WEIGHT REQUIREMENTS.
3. VISIT KNIGHT WALL WEBSITE FOR MANUFACTURER SPECIFICS.
MINIMUM REQUIREMENTS

1. THERMAX™ INSULATION NOT INTENDED FOR USE BELOW GRADE.
2. MIN. 25 PSI STYROFOAM™ TYPE IV (PER ASTM C578) EXTRUDED POLYSTYRENE (XPS) TO BE USED WHEN INSULATING BELOW GRADE.
3. EXTEND COATING MIN. 6" BELOW GRADE.
4. MIN. APPLICATION WIDTH & THICKNESS OF LIQUIDARMOR™ FLASHING ONTO INSULATION BASED ON DETAIL TWS-G02.
5. LIQUIDARMOR™ FLASHING TO BE APPLIED TO INSULATION BOARD SEAMS (NOT OVER ENTIRE INSULATION FACE). SEE DETAILS TWS-R03 THROUGH TWS-R08 FOR FURRING SEALING OPTIONS.
Abstract

The “TWS-General” detail set outlines the general guidelines for design using the THERMAX™ Wall System (TWS), focusing maintaining continuity of the four control layers (thermal, air, vapor, and water). These details can be used as guides for any THERMAX Wall project.

Cladding specific supplemental sets, “TWS-Masonry,” “TWS-Rainscreen,” and “TWS-Applied,” address conditions that apply to specific cladding types. These are meant to be used in addition to the TWS-General set.

Other system detail sets available at dowbuildingsolutions.com
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   - TWS - THERMAX™ WALL SYSTEM
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4. SEE TWS-G DETAIL SET FOR MINIMUM REQUIREMENTS.

PARAPET DETAILS
- TWS-G15.1
- TWS-G15.2
- TWS-G16.1
- TWS-G16.2

EDGE OF SLAB DETAILS
- TWS-G12.1
- TWS-G12.2

WINDOW DETAILS
- TWS-G09.1
- TWS-G09.2
- TWS-G09.3
- TWS-G09.4
- TWS-G10.1
- TWS-G10.2
- TWS-G10.3
- TWS-G10.4

FOUNDATION DETAILS
- TWS-G07.1
- TWS-G07.2
- TWS-G07.3
- TWS-G07.4

APPLIED OVERVIEW SECTION
TWS-A01 COLOR FOR VISUAL CLARIFICATION ONLY
Design Intent

1. Use lath surface mounted over the rigid insulation and fastened to the structure.
2. Use table below as a guide for max thickness of insulation depending on cladding weight and fastening options.
3. Seal penetrations of lath attachment to maintain continuous air and water barrier at the face of the rigid insulation.

Sealant Options

1. LIQUIDARMOR™ CM Flashing
2. LIQUIDARMOR™ LT Flashing

See detail TWS-G02 for more options.

### IBC 2015: TABLE 2603.12.1

**CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT**

<table>
<thead>
<tr>
<th>CLADDING FASTENER THROUGH FOAM SHEATHING INTO:</th>
<th>CLADDING FASTENER TYPE AND MINIMUM SIZE</th>
<th>FASTENER SPACING IN FURRING (Inches)</th>
<th>MAXIMUM THICKNESS OF FOAM SHEATHING² (Inches)</th>
<th>16&quot; o.c. furring¹</th>
<th>24&quot; o.c. furring¹</th>
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<tr>
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<td>#8 screw into 33 mil steel or thicker</td>
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<td>4 psf</td>
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<td>#10 screw into 43 mil steel or thicker</td>
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For SI: 1 inch = 25.4 mm; 1 pound per square food (psf) = 0.0479 kPa, 1 pound per square inch = 0.00689 MPa.
DR = design required; o.c. = on center.

a. Steel framing shall be minimum 33 ksi steel for 33 mil and 43 mil steel and 50 ksi steel for 54 steel or thicker.
b. Screws shall comply with the requirements of AISI S200.
c. Foam sheathing shall have a minimum compressive strength of 15 pounds per square inch in accordance with ASTM C578 or ASTM C1289.
**Design Intent**

1. Use lath surface mounted over the rigid insulation and fastened to the structure.
2. Seal penetrations of lath attachment using LIQUIDARMOR™ Flashing to maintain continuous air and water barrier at the face of the rigid insulation.

**Key**

- LIQUIDARMOR™ Flashing (over)
- LIQUIDARMOR™ Flashing (behind)
- THERMAX XARMOR™ CI (section)
- BUILDING PAPER
- THERMAX XARMOR™ CI (elevation)

**Minimum Requirements**

1. See detail TWS-G02 for min. LIQUIDARMOR™ FLASHING APPLICATION THICKNESS & WIDTH.
2. See detail TWS-A02 for FASTENING & MAX INSULATION THICKNESS REQUIREMENTS, and verify attachment with engineer to ensure adequacy for cladding weight requirements.
3. LIQUIDARMOR™ FLASHING REQUIRED AS SEAM TREATMENT OVER INSULATION BOARD JOINTS IF USING THE THERMAX™ WALL SYSTEM AS AIR AND WATER BARRIER, BUT OPTIONAL BEHIND LATH FASTENING.
MINIMUM REQUIREMENTS

1. THERMAX™ INSULATION SHIP-LAPPED HORIZONTAL EDGE (ON 1.5" AND GREATER THICKNESS) SHOULD BE LAYERED IN A SHINGLE-LAP FASHION (AS SHOWN) TO PROMOTE WATER SHEDDING AND PREVENT MOISTURE INTRUSION AT HORIZONTAL INSULATION JUNCTURES.

2. APPLY DIAMOND MESH LATH WITH LONG DIMENSIONS PERPENDICULAR TO STUD FRAMING AND ATTACH WITH GALVANIZED STEEL SCREWS OF TYPE & LENGTH SUITABLE FOR MIN. 2/3" PENETRATION OF STEEL STUD SYSTEM.

3. MIN. ADHESION OF LIQUIDARMOR™ FLASHING ONTO EACH FACE OF INSULATION BASED ON DETAIL TWS-G02.
INSULATING FOAM sealant and adhesive products contain isocyanate and a flammable blowing agent. Read all instructions and (Material) Safety Data Sheet carefully before use. Wear protective clothing (including long sleeves), gloves, goggles and proper respiratory protection. Supplied air or an approved air-purifying respirator equipped with an organic vapor sorbent and a P100 particulate filter is required to maintain exposure levels below ACGIH, OSHA, WEEL or other applicable limits. Provide adequate ventilation. Contents under pressure. STYROFOAM™ Brand SPF should be installed by a trained SPF applicator.

CAUTION: When cured, these products are combustible and will burn if exposed to open flame or sparks from high-energy sources. Do not expose to temperatures above 240°F (116°C). For more information, consult (Material) Safety Data Sheet (M)SDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400 in the U.S. or 1-519-339-3711 in Canada.

GREAT STUFF PRO™ Insulating Foam sealant and adhesive products contain isocyanate and a flammable blowing agent. Read all instructions and (Material) Safety Data Sheet (M)SDS, carefully before use. Eliminate all sources of ignition before use. Cover all skin. Wear long sleeves, gloves, and safety glasses or goggles. Not for use in aviation, or food/beverage contact, or as structural support in marine applications. Provide adequate ventilation or wear proper respiratory protection. Contents under pressure. Not to be used for filling closed cavities or voids such as behind walls and under tub surrounds.

CAUTION: When cured, these products are combustible and will burn if exposed to open flame or sparks from high-energy sources. Do not expose to temperatures above 240°F (116°C). For more information, consult (Material) Safety Data Sheet (M)SDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400 in the U.S. or 1-519-339-3711 in Canada.

Dow Polyurethane Foam Insulation and Sealant

CAUTION: When cured, these products are combustible and will burn if exposed to open flame or sparks from high-energy sources. Do not expose to temperatures above 240°F (116°C). For more information, consult (Material) Safety Data Sheet (M)SDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400 in the U.S. or 1-519-339-3711 in Canada.

CAUTION: This product is combustible and shall only be used as specified by the local building code with respect to flame spread classification and to the use of a suitable thermal barrier. For more information, consult (Material) Safety Data Sheet (M)SDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400 in the U.S. or 1-519-339-3711 in Canada.

LIQUIDARMOR™

Read the instructions and (Material) Safety Data Sheets (M)SDS carefully before use. It is recommended that spray applicators and those working in the spray area wear eye protection. Contact with exposed skin may cause skin discoloration and dryness. Gloves are recommended for prolonged exposures. Ensure adequate ventilation during spray applications.

THERMAX™ Brand Polyisocyanurate Insulation

CAUTION: This product is combustible and shall only be used as specified by the local building code with respect to flame spread classification and to the use of a suitable thermal barrier. For more information, consult (Material) Safety Data Sheet (M)SDS, call Dow at 1-866-583-BLUE (2583), or contact your local building inspector. In an emergency, call 1-989-636-4400.

STYROFOAM™ Extruded Polystyrene Foam Insulation

CAUTION: This product is combustible. Protect from high heat sources. A protective barrier or thermal barrier may be required as specified in the appropriate building code. For more information, consult (Material) Safety Data Sheet (M)SDS, call Dow at 1-866-583-BLUE (2583) or contact your local building inspector. In an emergency, call 1-989-636-4400 in the U.S. or 1-519-339-3711 in Canada.

WARNING: Rigid foam insulation does not constitute a working walkable surface or qualify as a fall protection product.

Building and/or construction practices unrelated to building materials could greatly affect moisture and the potential for mold formation. No material supplier including Dow can give assurance that mold will not develop in any specific system.

References to “DOW” or the “Company” mean The Dow Chemical Company and its consolidated subsidiaries unless otherwise expressly noted.

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