

DESIGN GUIDE - CANADA

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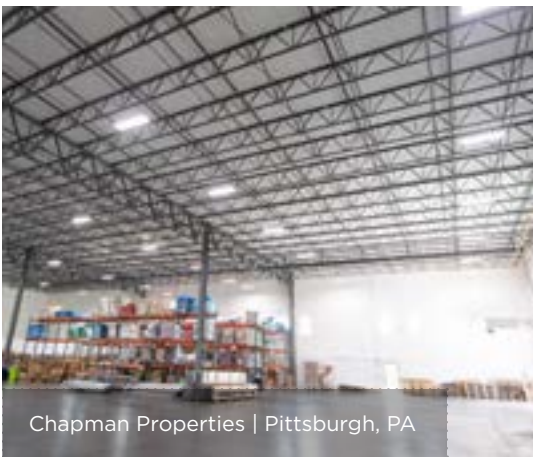
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Procedure for OneDek Membrane and Tapered Systems

OBJECTIVE

This design guide will highlight the steps required to determine wind uplift design loads and diaphragm shear for all membrane and tapered insulation attachment types on OneDek projects.

BACKGROUND

OneDek is a roofing assembly that includes RD1 or RD1-M insulated roof decks. The insulated roof deck assemblies is covered with TPO or PVC single ply membranes and may include tapered polyiso boards for optimized counter slope drainage. The attachment of single ply membranes and tapered polyiso board assemblies are either fully adhered (FA) or mechanically attached (MA).

OneDek can be designed into a roof assembly with or without diaphragm capabilities. Each design assembly will have implications on fastening and attachment of the insulated roof deck panels to the structural members. If the diaphragm design is built into the structural framing, the insulated roof decks do not need to act as a diaphragm. In this case, the insulated

roof deck can be fastened using the concealed clip fastening system at the side joints. If diaphragm design is required, the insulated roof decks will require a specific fastening pattern based on diaphragm load requirements.

It is important to take consideration of each component of the system when evaluating the performance of the assembly. These components, such as deck thickness, insulation values, steel gauge, slope, membrane type, tapered systems, and attachment methods, each may have an effect in determining the correct wind uplift requirements, diaphragm requirements, and fire rating for the project. Note that allowable panel spans may be governed by diaphragm or wind uplift, and wind uplift may limit the membrane or tapered insulation attachment type.

PROCEDURE

1. Deck Diaphragm and Wind Uplift Capacity

The deck diaphragm and wind uplift capacity is the maximum load allowed when diaphragm resistance is required. This is based on diaphragm shear values specified, the diaphragm pattern on the RD1 and RD1-M panels and its wind uplift capacity. This Deck Diaphragm and Wind Uplift Capacity only needs to be checked when diaphragm is required for the project. If diaphragm resistance is not required, proceed to Step 2.

The maximum span of the panel is determined by the required design load for diaphragm shear. The table requires the shear design safety or resistance factors to be applied depending on if it is based on Seismic or Wind and if the load is given in ASD, LRFD, or LSD.

1.1 Verify that diaphragm performance from the panel is required for the project.

1.2 If diaphragm resistance is not required, proceed to step 2 to calculate wind uplift based on concealed clip fastening or through fastening. If diaphragm is required, refer to OneDek/RD1/RD1-M Diaphragm Shear Load Table. Note the maximum span, fastening pattern and panel gauge required to meet diaphragm and proceed to the next step.

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PROCEDURE CONT.

1.3 To determine the maximum wind uplift pressure for diaphragm applications, take the information obtained from step 1.2 and reference OneDek/RD1/RD1-M Wind Uplift and Bending Strength Tables. Note the lowest allowable load between wind uplift connection strength and out-of-plane bending strength in PSF and verify against the maximum span determined in Step 1.2 Proceed to Step 3.

2. Deck Non-Diaphragm Wind Uplift Capacity

The Non-Diaphragm wind uplift capacity is the maximum pressure allowed for the RD1 and RD1-M panels when no diaphragm is required.

The load tables include connection and panel strength depending on the fastening pattern, panel span and panel thickness. There are two types of fastening methods for Non-Diaphragm applications. Only one type of fastening method is required for an application.

2.1 For applications with a hidden clip, reference RD1 Hidden Clip Load Span Table for maximum wind uplift of the panel. Note the maximum allowable design in PSF and span for these parameters and proceed to the next step.

2.2 For applications with through fastening, reference Through Fastening Load Span Table for maximum wind uplift of the panel. Note the maximum allowable design in PSF and span for these parameters and proceed to the next step.

3. Tapered Insulation and Membrane Wind Uplift Capacity

The tapered insulation and membrane wind uplift capacity is the maximum pressure allowed for the tapered insulation and membrane system. The attachment method, material, slope, and inclusion of tapered insulation factor into performance.

Please note that inclusion of tapered insulation for crickets may limit the slope applications. Ensure that building slope and loading are within the allowable parameters.

3.1 Refer to the Membrane Attachment Methods table for the applicable mechanically fastened or fully adhered systems. Note the attachment group and proceed to the next step.

3.2 Refer to the table for Wind Uplift for OneDek Membrane and Tapered Systems. Note the maximum slope and allowable wind uplift ratings in PSF required for these parameters and proceed to the next step. For roofs that include tapered insulation, evaluate step 3.2 for both Deck and Tapered Insulation as Membrane Substrate conditions.

4. Conclusion

The lowest span/allowable load from the wind uplift connection, wind uplift bending strength, membrane uplift, and diaphragm tables, if applicable, will govern the design for the OneDek roof assembly. Snow loads are not considered in this design guide. Contact AWIP Technical Services for snow load calculations.

4.1 For Diaphragm applications, note the calculated Diaphragm Wind Uplift Capacity obtained from Step 1 and compare to the Membrane Wind Uplift Capacity obtained from Step 3. The lower capacity is the value that should be used to determine panel, membrane, and attachment requirements for the specific application.

4.2 For Non-diaphragm applications, note the calculated Non-Diaphragm Wind Uplift Capacity obtained from Step 2 and compare to the Membrane Wind Uplift Capacity obtained from Step 3. The lower capacity is the value that should be used to determine panel, membrane, and attachment requirements for the specific application.

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Membrane Attachment Methods

Attachment Group	Attachment Type	Attachment Method
A	#15 Trufast w/2.4" Metal Seam Plates	4" O.C. at laps and center of laps (36" spacing)
B	Holcim LA505 Adhesive	200 sf/gal per surface
C	Holcim LA505 Adhesive	120 sf/gal per surface

Notes:

1. Fully adhered systems with tapered insulation also require roofing adhesive in 12" Max O.C ribbons between tapered insulation and roof deck. Mechanically fastened systems require additional fastening between tapered insulation and roof deck.
2. Consult OneDek General Installation Guide for additional information on tapered insulation attachment.

Wind Uplift for OneDek Membrane and Tapered Systems

OneDek Panel	Membrane Substrate	Membrane	Membrane Width (in)	Attachment Group	Max Slope	Allowable Load (ASD)	Allowable Load (LSD)
RD1-M	Deck	CSP TPO 60 MIL	78	A	½	96	93.6
RD1-M		C3 Plus PVC 60 MIL	78	A	1 ½	96	93.6
RD1		C3 Plus PVC 60 or 80 MIL	78	A	½	80	78
RD1		C3 PVC Fleeceback 60 MIL	78	A	½	80	78
RD1		CSP TPO 60 MIL	78	A	½	80	78
RD1		CSP TPO 60 MIL	78	B	½	60	58.5
RD1		C3 Plus PVC 60 MIL	78	C	1	60	58.5
RD1		C3 PVC Fleeceback 60 MIL	78	B	1	60	58.5
RD1-M		Tapered Insulation	CSP TPO 60 MIL	78	A	½	96
RD1	CSP TPO 60 MIL		78	B	¼	60	58.5
RD1-M	C3 Plus PVC 60 or 80 MIL		78	A	½	96	93.6
RD1	C3 Plus PVC 60 or 80 MIL		78	C	½	60	58.5
RD1	C3 PVC Fleeceback 60 MIL		78	B	½	60	58.5

Notes:

1. A design safety factor of 1.5 has been applied.
2. Allowable Design Pressures are based on dynamic wind uplift resistance testing per CSA A123.21:20.
3. A resistance factor of 0.65 has been applied for limit state design (LSD) per CSA A123.21:20.

Notes



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