

Floors, Walls, Bins & Other Post Harvest Surfaces

Andy Chamberlin
Chris Callahan

@uvmextageng    

 ageng@uvm.edu

 go.uvm.edu/ageng

New England Vegetable and Fruit Conference
December 12, 2019
Manchester, NH



Key Point - Produce Safety

Risk reduction
isn't rocket
science,
but....



Packsheds

- A wide range of buildings can work
- “Four sticks and a lid”
- Special Use Building
 - Wall materials
 - Floor material
 - Tables/work area



Insulation

Foam boards

- Blue (polystyrene)
- White (poly isocyanate)

Spray foam (poly iso)

Rockwool or Mineral wool batts



Generally avoided due to high moisture issues:

- Fiberglass (pink)
- Cellulose

Insulation Options	\$/R/ft ²
Spray Foam - Closed Cell	0.1667
Spray Foam - Open Cell	0.1083
Blue Board	0.0968
Poly Iso Board (HiR)	0.0732
Fiberglass Roll	0.0024



Structural Insulated Panels (SIPs)

- Pre-fabricated insulated panels that can be used for cooler siding
- Can be load-bearing
- Can be used for roof-insulation
- Think about smooth and cleanable finish surface



Avoid Bare Wood & Liquid Water



[go.uvm.edu/coolerwalls,](https://go.uvm.edu/coolerwalls)

[.../hygienicdesign](https://go.uvm.edu/hygienicdesign)

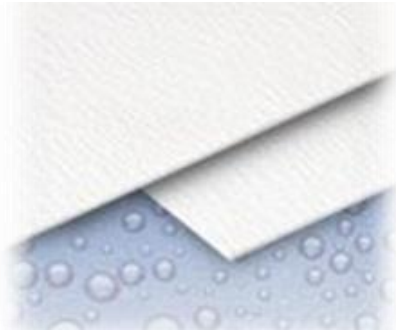


THE UNIVERSITY OF VERMONT
EXTENSION

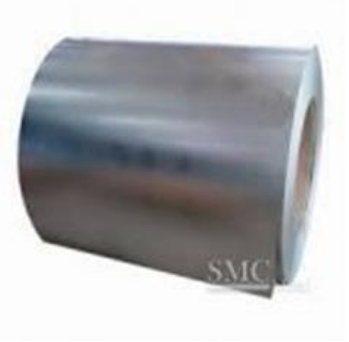
Smooth and Cleanable Materials



Fiber Reinforced Plastic (FRP) aka
"Dairyboard"
\$1.03-1.92 / ft²



WallTuf
\$1.25 / ft²



Galvanized Aluminum (Galvalum)
\$0.76-0.95 / ft²



TrussCore
\$1.52 / ft²



Extrutech
\$2.20 / ft²



Utilite
\$1.85 / ft²



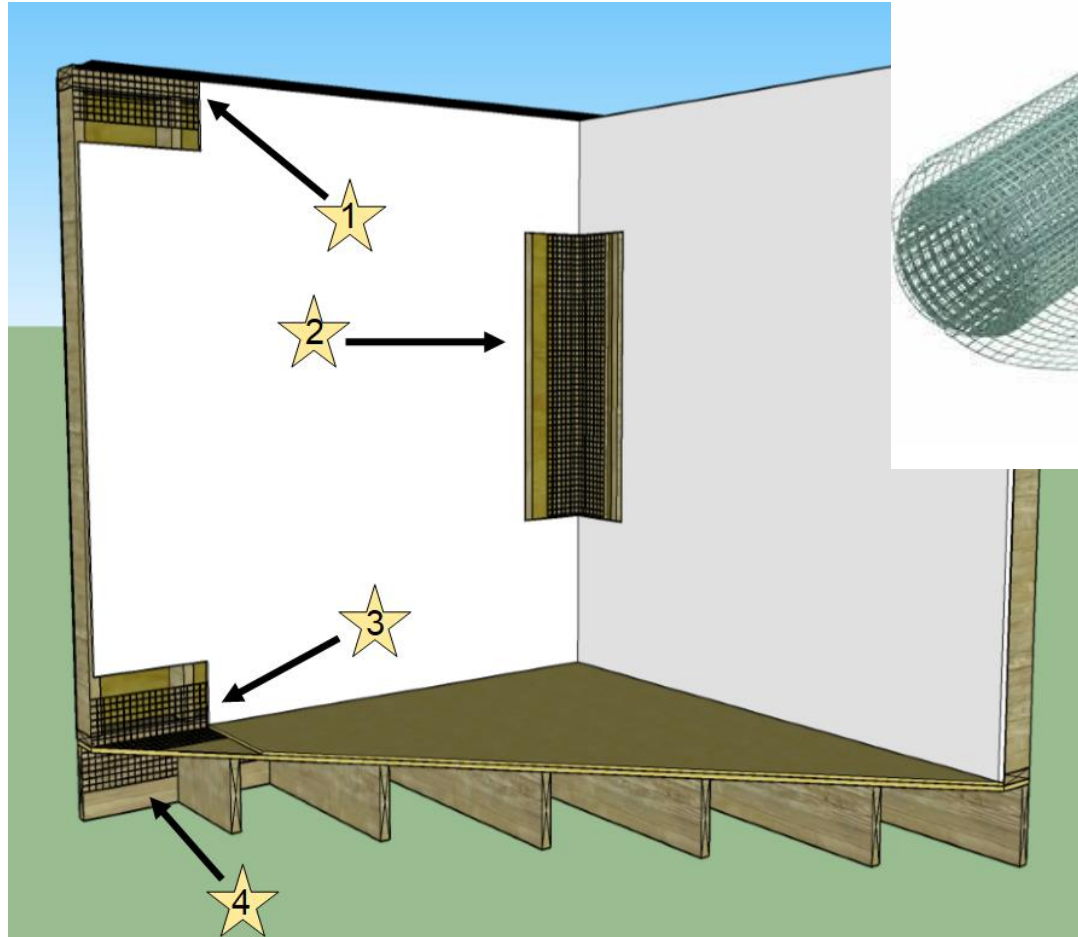
Ribcore
\$0.77 / ft²



Rodent & Pest Control

Limit Access

- Tight construction
- Flashing/wire mesh/hardware cloth at corners
- Cement curbs



Floors



The University of Vermont



go.uvm.edu/floors

Cleanable & Drainable



THE UNIVERSITY OF VERMONT
EXTENSION



Curb with a Cove



go.uvm.edu/floors



THE UNIVERSITY OF VERMONT
EXTENSION



Point & Trench Drains



go.uvm.edu/floors



THE UNIVERSITY OF VERMONT
EXTENSION



Trench Drain Cleanout



go.uvm.edu/floors



THE UNIVERSITY OF VERMONT
EXTENSION



Bin Storage And Cover  go.uvm.edu/floors



THE UNIVERSITY OF VERMONT
EXTENSION



Everything On Wheels!  go.uvm.edu/root5farm



THE UNIVERSITY OF VERMONT
EXTENSION



Leads To A Loading Dock!



THE UNIVERSITY OF VERMONT
EXTENSION

— Walls —



The University of Vermont



Trusscore – Corrugated PVC



THE UNIVERSITY OF VERMONT
EXTENSION



go.uvm.edu/smoothnclean

Bright and Cleanable



THE UNIVERSITY OF VERMONT
EXTENSION



Sheet Metal



go.uvm.edu/smoothnclean



THE UNIVERSITY OF VERMONT
EXTENSION



Metal Roofing



go.uvm.edu/smoothnclean



THE UNIVERSITY OF VERMONT
EXTENSION

Bins, Totes, Crates



The University of Vermont

CONTAINERS: TOTES, LUGS, CARTONS, BINS, BOXES

- What crops?
- Drain holes or a solid bottom?
- Vented sides?
- Cleanable?
- Durability
- Can you easily label?
- Light blocking and UV resistance
- Stacking/Nesting?
- Different colors?
- Is the container ergonomic?



go.uvm.edu/totes



THE UNIVERSITY OF VERMONT
EXTENSION



Buckhorn Flip Top Totes



THE UNIVERSITY OF VERMONT
EXTENSION



Fish Baskets



go.uvm.edu/totes



THE UNIVERSITY OF VERMONT
EXTENSION



Macro Bins



go.uvm.edu/totes



THE UNIVERSITY OF VERMONT
EXTENSION

Work Surfaces



The University of Vermont



All Wash Areas



go.uvm.edu/sinks



THE UNIVERSITY OF VERMONT
EXTENSION



Washing Tanks



go.uvm.edu/sinks



THE UNIVERSITY OF VERMONT
EXTENSION



go.uvm.edu/rinseconveyor

Sorting Tables



THE UNIVERSITY OF VERMONT
EXTENSION



Packing Tables



THE UNIVERSITY OF VERMONT
EXTENSION

Equipment & Tools



The University of Vermont



Dry and Easy to Find



THE UNIVERSITY OF VERMONT
EXTENSION



Many Food Contact Surfaces



THE UNIVERSITY OF VERMONT
EXTENSION



Brushes Can Be Challenging



THE UNIVERSITY OF VERMONT
EXTENSION



go.uvm.edu/rinseconveyor

Equipment Designed for Cleaning



THE UNIVERSITY OF VERMONT
EXTENSION



Willsie Drum Washer

SPINNERS



SPEED QUEEN WASHING MACHINE SPINNER



[go.uvm.edu/greensspinner,](https://go.uvm.edu/greensspinner) [.../shoppingguide](https://go.uvm.edu/greensspinner.../shoppingguide)



THE UNIVERSITY OF VERMONT
EXTENSION

Key Points

- Good hygienic design eases produce safety
 - Drainage
 - Impervious walls
 - Easy to clean equipment
 - Minimizing harborage (collection points)
- All surfaces should be smooth and cleanable



Postharvest Case Studies

Footprint Farm – BarnHouse Construction (\$300k)

go.uvm.edu/footprint



Mighty Food Farm – New Construction (\$100k)

go.uvm.edu/mighty



Last Resort Farm – Dairy Barn Renovation (\$60k)

go.uvm.edu/lrf



Root 5 Farm – Conversion and Expansion of Pole Barn (\$40k)

go.uvm.edu/root5farm



MORE TO COME!



THE UNIVERSITY OF VERMONT
EXTENSION

Floors, Walls, Bins & Other Post Harvest Surfaces

Andy Chamberlin
Chris Callahan

Keep in touch

@uvmextageng



ageng@uvm.edu



go.uvm.edu/ageng

New England Vegetable and Fruit Conference

December 12, 2019

Manchester, NH



THE UNIVERSITY OF VERMONT
EXTENSION

