

**NATURAL RESOURCES CONSERVATION SERVICE
INTERIM CONSERVATION PRACTICE STANDARD**

SEASONAL HIGH TUNNEL SYSTEM FOR CROPS

(ft.²)

CODE 798

DEFINITION

A seasonal polyethylene covered structure that is used to cover crops to extend the growing season in an environmentally safe manner.

PURPOSE

- Improve plant quality
- Improve soil quality
- Reduce nutrient and pesticide transport
- Improve air quality through reduced transportation inputs
- Reduce energy use through local consumption

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to cropland where climate conditions require an extension of the growing season, and to crops grown in the natural soil profile. The installation of permanently raised beds to improve soil condition, fertility and AgrAbility access is permissible.

The practice does not include greenhouses, crops grown on tables or benches or in portable pots, or low tunnel systems that may cover single crop rows.

CRITERIA

General Criteria Applicable to All Purposes

Plan supportive conservation practices to address all environmental concerns associated with the use of tunnel systems.

Plan, design and construct the seasonal tunnel structure in accordance with manufacturer's recommendations. The tunnel frame must be constructed of metal, wood, or durable plastic; and be at least 6 feet in height.

The tunnel cover material shall be of a significant thickness to withstand the temperature modification for the period required. As a minimum, use a 6-mil greenhouse-grade, UV resistant polyethylene cover.

In climate conditions where snow loads may damage the structure, remove the tunnel cover at the end of the growing season, unless the structure is adequate to withstand expected snow loads.

To avoid ponding within the tunnel structure, direct runoff away from the tunnel structure. It is permissible to capture runoff for irrigation if allowed by State law. The minimum design capacity for runoff structures shall be a 10-year storm frequency, 5-minute rainfall precipitation event. Runoff may empty into surface or underground outlets, or onto the ground surface when properly protected. Design surface and underground outlets with sufficient capacity to handle expected runoff events. Provide for clean out as appropriate. When runoff from tunnel covers empties onto the ground surface, provide a detention basin, storage reservoir or stable outlet.

Surface or ground outlets such as rock pads, rock filled trenches with subsurface drains, concrete and other erosion-resistant pads, or preformed channels may be used.

Establish vegetation on all disturbed earth surfaces.

Additional Criteria to Improve Soil Quality

The area inside the seasonal structure shall have a positive Soil Conditioning Index and soil loss with tolerable limits using currently approved agency wind and water erosion-prediction technology.

Additional Criteria to Reduce Nutrient and Pesticide Transport

The irrigation water applied under the covered area shall not exceed the available water capacity of the soil to avoid runoff and leaching below the root zone.

Additional Criteria to Improve Air Quality through Reduced Transportation Inputs

The crops produced for sale and consumption shall be within commuting distances of farmers markets, fruit/produce distribution centers, or other community facilities.

CONSIDERATIONS

Locate the tunnel cover convenient for ingress/egress of plant materials.

Remove or manipulate side covers to control internal temperatures.

Rotate the location of the tunnel to allow rain, wind, sun, and cold temperatures to cleanse the soil from disease build up. Rotation allows growing cover crops on the site during the uncovered period.

Plan the appropriate measures to address:

- crop rotation
- irrigation water management
- nutrient management
- pest management
- runoff from the structure

Have a reliable source of good quality water near or in the tunnel.

PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard.

Record practice specifications on a Seasonal High Tunnel Systems for Crops, 798 Job Sheet.

As a minimum, plans and specifications shall provide the following information.

- Layout and location of the tunnel cover; erosion control, runoff, and vegetative cover practices
- Materials list and structural details of the cover including all necessary appurtenances as appropriate for the complete system

- Procedure and timing for installing the tunnel cover (construction sequence), erosion control, runoff, and vegetative practices
- Procedure and timing to remove tunnel cover prior to inclement weather conditions
- Site preparation

OPERATION AND MAINTENANCE

An operation and maintenance (O&M) plan must be prepared and reviewed with the landowner or operator responsible for the application of the practice. The O&M plan shall provide specific instruction for proper operation and maintenance of each component of this practice and shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice.

Inspect the covered area periodically and reinstall or repair as needed to accomplish the intended purpose.

Removal of cover materials shall be consistent with the intended purpose and site conditions.

Operation of equipment near and on the site shall not compromise the intended purpose of the cover.

REFERENCES

Colorado AgrAbility Project. 2008. Dept. Human Development and Family Studies. Colo. State Univ. Fort Collins, CO.

<http://www.agrability.caahs.colostate.edu/>

Community Garden Guide Season Extension - High Tunnel. 2009. USDA, NRCS, East Lansing, MI. <http://www.plant-materials.nrcs.usda.gov/pubs/mipmctn5922.pdf>

Community Garden Guide Season Extension – Hoophouses. 2009. USDA, NRCS, East Lansing, MI. <http://www.plant-materials.nrcs.usda.gov/pubs/mipmctn5923.pdf>

Neenich, Terrance T. 2004. Introduction to high tunnel production in Minnesota. *In* Minnesota high tunnel production manual for commercial growers. Univ. of Minnesota. Minneapolis-St. Paul, MN.

<http://hightunnels.cfans.umn.edu/Manual/Intro.pdf>

Blomgren, Ted and Tracy Frish. 2007. High tunnels. Univ. of Vermont Center for Sustainable Ag. Burlington, VT.

<http://www.uvm.edu/sustainableagriculture/Documents/HighTunnels.pdf>