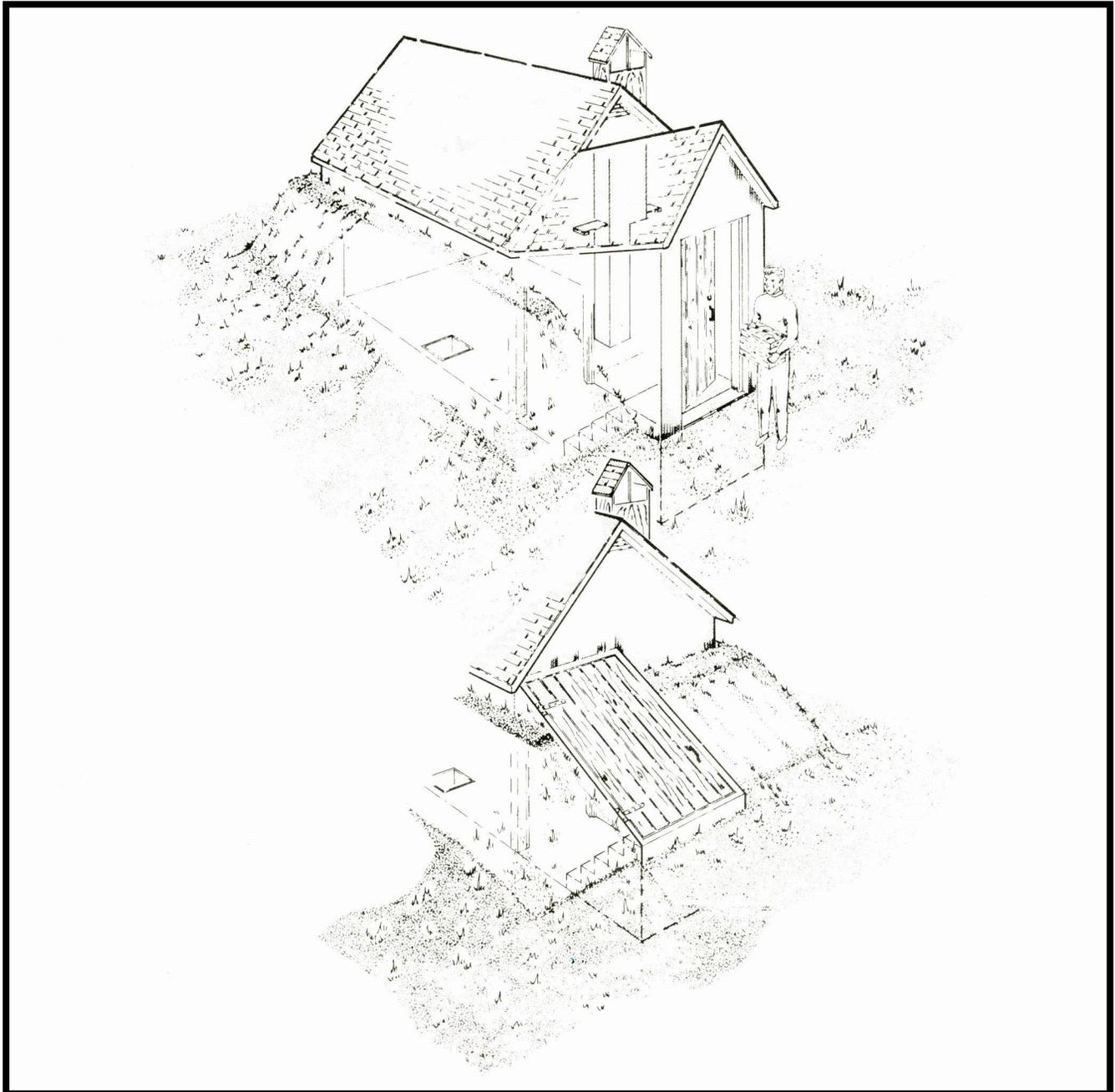


# SMALL ROOT CELLAR



DEVELOPED BY CANADA PLAN SERVICE

## SMALL ROOTCELLAR

CPS

PLAN 6321

REVISED 83:04

This leaflet gives information for building a small rootcellar for home storage of vegetables. Although there are a number of variations and methods of construction for rootcellars, this remains one of the best methods of storing produce throughout the winter. A homeowner can consider an insulated cold room in the basement as an alternative.

**CONSTRUCTION DETAILS** This plan provides construction details for a 10 x 14 ft storage. Two roof types are shown; a permanent gable roof with insulated ceiling, and a cheaper straw roof (flax straw preferred). The latter performs very well, but will likely require replacement in 8 to 10 years.

Build the storage partly below ground with the earth banked up at the walls. A hillside location is best, provided surface and groundwater is drained away. Two types of entrance stairway enclosure are shown on the cover page.

The storage has an earth floor. Walls may be of concrete or reinforced concrete block. Insulate the walls to at least 2 ft below ground level with rigid polystyrene foam insulation which in turn is protected above grade by asbestos-cement board, treated plywood, or steel mesh stucco-lath and cement plaster. Attachment of the insulation and protective covering should be by a construction adhesive that is recommended for the insulation; the wrong adhesive could dissolve the foam insulation. A better alternative with the concrete wall is to tack the polystyrene foam insulation to the inside face of the outside concrete form, using finishing nails. When the concrete hardens it bonds to the polystyrene, and the finishing nails simply pull through the insulation when the forms are stripped off. A wall height of 8 ft conveniently uses standard plywood forms for concrete construction.

An alternate form of construction is to use a large precast concrete vault designed as a septic tank. With this, cut a doorway through at one corner and add a covered stairway.

Another wall alternative is a 'preserved wood foundation' (PWF) as used in some houses. Use pressure-treated 2 x 8 in. studs spaced 12 in. centers and covered outside with ½ in. pressure-treated plywood. Use only preservative treated wood that is CSA approved and stamped 'PWF' **not** penta or creosote. Insulate the wall spaces with friction-fit fiberglass insulation, and staple 6-mil clear plastic vapor barrier to the inside of the studs. Sheath the

inside with **untreated** boards or plywood; vegetables should not be stored in direct contact with preserved wood.

For ceiling insulation in a gable-roof storage, provide at least R28 insulation (8 in. of fiberglass, 10 in. of vermiculite or 14 in. of dry wood shavings), above a polyethylene vapor barrier. A well insulated door is require for good temperature control.

A double ventilation flue provides the small amount of ventilation that is required. Use the insulated wood flue as shown in Figure 2 or 3, or use two lengths of 6 in. plastic sewer pipe covered with preformed foam pipe insulation.

**MANAGEMENT INFORMATION** More complete storage information is available from other publications; however, the following summary relates well to the operation of this type of rootcellar.

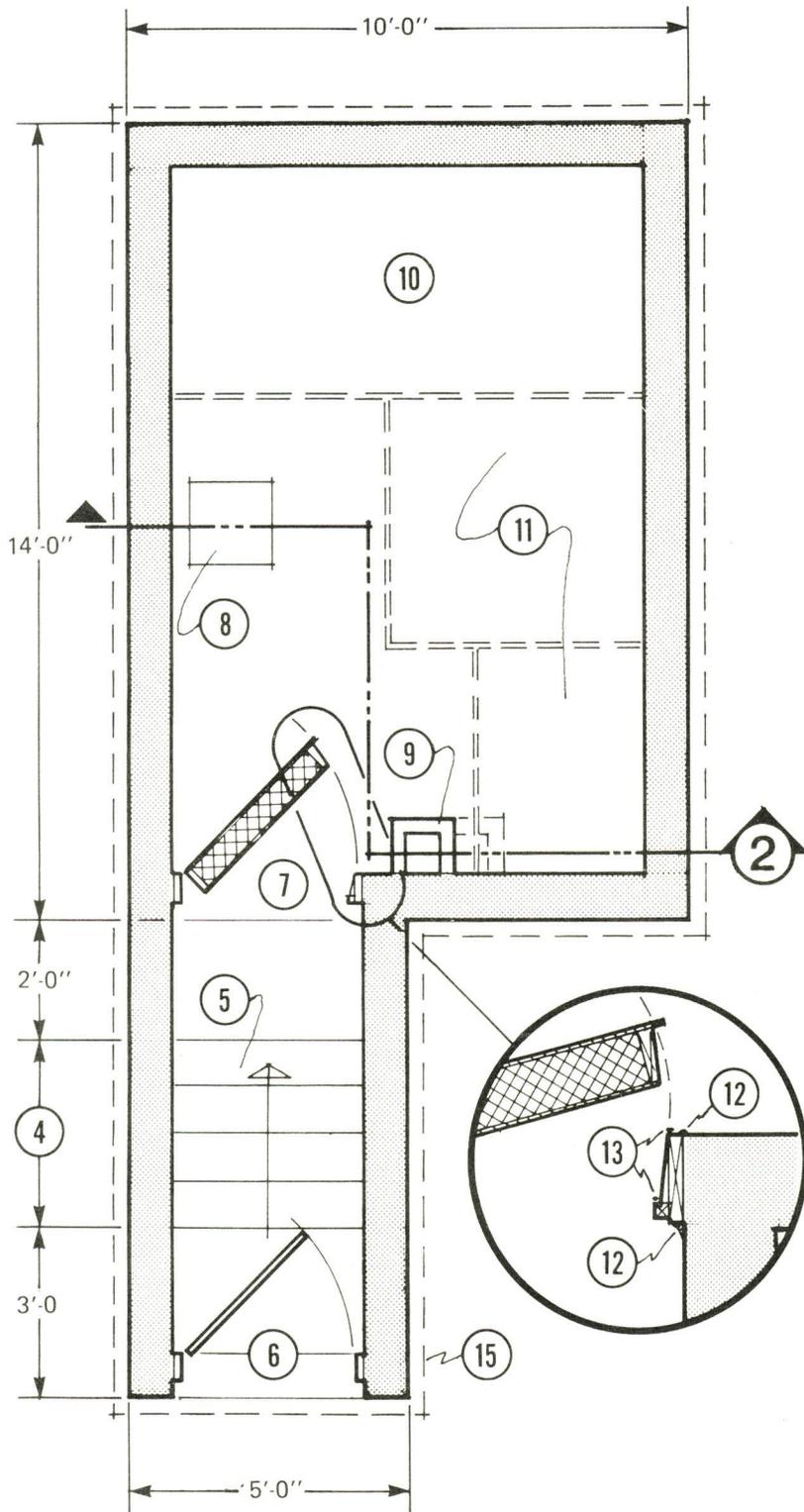
The table on page 5 indicates storage conditions for some of the common vegetables. Ideally, a larger storage might have two compartments; one held at 5°C for potatoes, the other 0°C for other vegetables. For a small storage like this, two compartments are not practical.

Potatoes should not be stored cooler than 5°C because at a lower temperature some of the potato starch converts to sugar. As a result, the potato may darken after boiling, or burn when deep fried. In practice, provided the humidity is kept high, most other vegetables will store reasonably well at 5°C, thus this is the best compromise for a one-room storage. During most of the winter the storage will, in fact, operate at ground temperature which is near 5°C.

Potatoes can be stored in bulk on the earth floor. Other produce will store best in slatted bins, though beets and rutabaga can also be piled directly on the floor. Onions, marrow, pumpkin and squash do not store well in high humidity and thus might keep better in a cool corner of the basement.

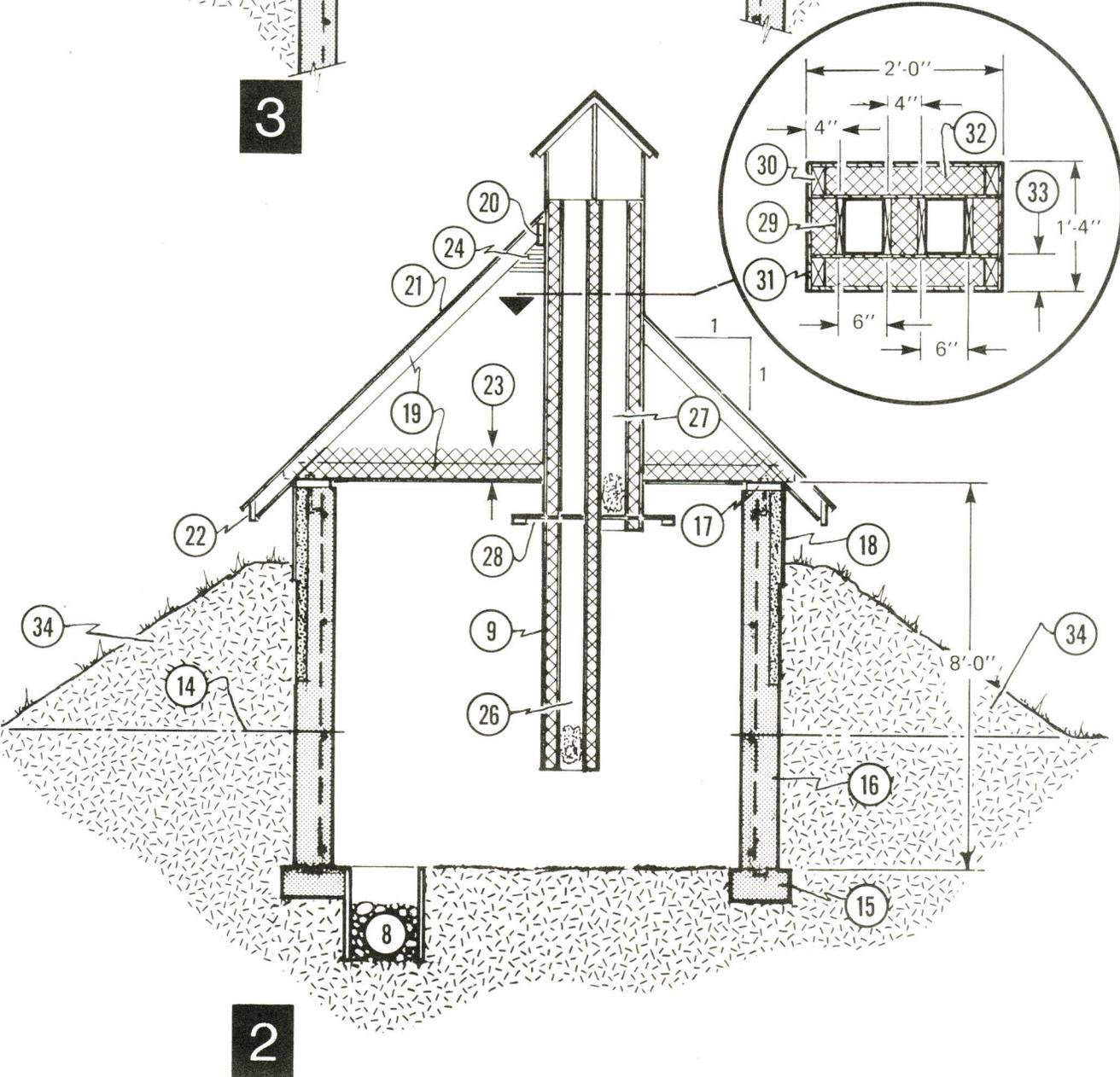
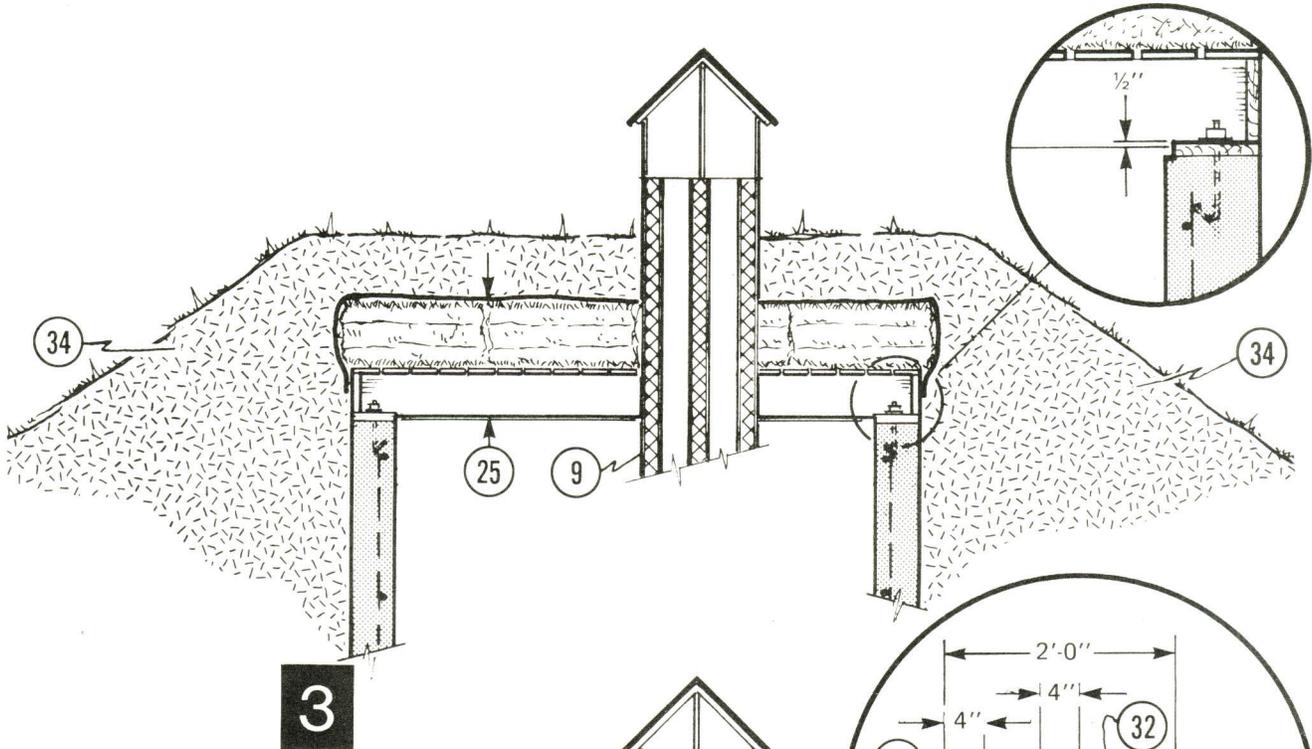
This type of rootcellar is usually too warm in the fall when the soil is warmest. Ventilation is required to cool the cellar and remove heat from the produce. The vent flue is therefore opened at night or during cold weather. Open the door if more rapid cooling is required. After the cellar has cooled sufficiently the vents can be loosely plugged with a burlap sack for most of the winter.

Storage is improved if vegetables can be harvested when ground and produce are cool, such as a cold day or early morning. Snow shoveled into the cellar is excellent for both cooling and humidifying. It is good practice to soak the floor for several days prior to harvest to keep the humidity high. Always use a reliable thermometer in the storage so you know the storage temperature



**1**

1. plan view, size variable (6' x 8' minimum)
2. cross-section
3. alternative roof construction, see note (25)
4. dimension varies
5. steps, 10" treads and 7" risers
6. outside door, 36" x 82"
7. 36" x 82" insulated storage door; frame with 2" x 6", friction-fit insulation between, cover with 3/8" plywood
8. drainage sump (optional), crushed stone fill
9. insulated ventilation duct, paint with wood preservative when earth roof (3) is used (do not use pentachlorophenol or creosote preservatives)
10. bulk storage section, store produce on earth floor or slats
11. slatted storage bins, store produce off floor
12. caulk around 2" x 6" jamb and head
13. weatherstrip around door frame
14. datum line, top of original grade
15. 16" x 8" concrete footing all around storage and stairway
16. foundation walls: 10" concrete (reinforce with No. 4 rebars @ 30" o/c horizontally and vertically, 2" from inside face) or 8" concrete block (reinforce with No. 4 vertical rebars @ 32" o/c near inside face, fill cores with mortar)
17. 2" x 10" CCA or ACA pressure-treated sill, secure with 1/2" x 10" anchor bolts @ 4' - 0" o/c
18. 3/16" x 24" cement asbestos board, over 3" x 48" polystyrene insulation cast into foundation
19. 2" x 4" ceiling joists and rafters @ 24" o/c
20. 2" x 6" ridge board
21. asphalt shingles on 3/8" sheathing plywood, H-clips at unsupported plywood edges
22. 3/4" face board, 3/8" plywood soffit
23. ceiling construction: R28 insulation 6 mil polyethylene vapor barrier, 3/8" sheathing plywood
24. screened gable vent, both ends
25. roof/ceiling construction: 2" x 10" CCA or ACA pressure-treated ceiling joists or 6" diam. cedar poles @ 12" o/c (reinforced concrete also an alternative, obtain design adequate for local conditions); rough sawn boards, air space between edges; straw bales (flax straw preferred); 2 layers 6-mil polyethylene moisture barrier
26. cold air intake duct, stuff with burlap in cold weather
27. warm air exhaust duct, stuff with burlap in cold weather
28. air flow control, sliding dampers
29. 3/4" x 8" framing, 4 required
30. 2" x 4" framing at corners
31. 3/8" sheathing plywood throughout
32. batt or polystyrene insulation, to fill all voids
33. this section not required for portion of duct build against wall of rootcellar
34. earth embankment, 1:2 slope maximum



## RECOMMENDED STORAGE CONDITIONS FOR VEGETABLES

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<b>Produce</b>	<b>Temperature ( °C )</b>	<b>Relative Humidity</b>
Cabbage, carrots, Cauliflower, red beets, parsnip, rutabaga	0-1	Very high 95%
Potatoes	4-7	Very high 90-95%
Onions	0-2	Medium 50-70%
Squash, marrow, pumpkins	10-13	Medium 50-70%

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