



# Raised Bed Gardening:

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# Topics Covered:

- Pros and Cons.
- Why do raised beds.
- What is a raised bed
- Planning.
- Construction.
- Planting and Growing.
- Accessories.
- Maintaining.



## **\* Pros of Raised Beds:**

Improve soil drainage.

Allows soil to dry and warm faster.

Allows gardening in areas with little or no soil, unsuitable soil or contaminated soil.

Fit into small spaces.

Allows for height adjustment.

## **Cons of Raised Beds:**

Good imported soil is often lower quality than native soil and can be a problem getting.

Dries out quicker resulting in more frequent irrigation required.

Time and cost.

Beds require maintenance due to settling or structure deterioration.

Crop rotation requires multiple beds.

Can be permanent.

# \* What is a raised bed?

A raised bed garden can mean many things.

Soil levels a few inches to waist high above surface soil level.

Can use native soil or amended soil.

Can be contained or uncontained.



# Planning:

## Location:

- Bed should receive at least 6 hours of sun per day.
- Bed should be oriented north-south.
- Water should be readily available nearby.
  - 1 gallon of water weighs approximately 8.3 lbs. per gallon. If you have to tote water it probably won't get done enough.
- Beds can be built on slopes without terracing.

## Soil Bed Height:

- The deeper the better - at least 6 inches above the surrounding area, 18 inches deep for root crops.

# Planning:

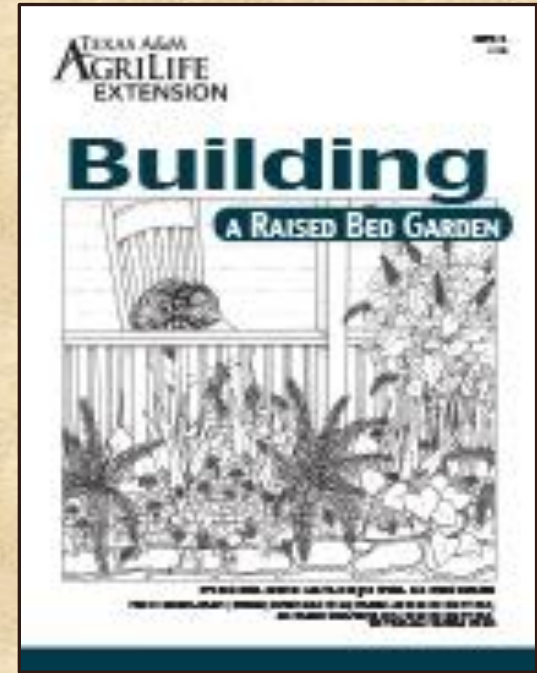
## Dimensions:

- Width should allow you to reach the center, generally 3 to 4 feet total width.
- Length will be based on your terrain, materials & preferences.
- Spacing should be at least 2 feet to 4 feet between beds for walking, wheelbarrows, mowers, kneeling, wheelchairs, etc.
- Bed walls may be made higher than the soil height, dependent on your usage & preferences.

# Construction:

Video: “How to Build a Raised Bed”

Texas A&M AgriLife Extension



EHT-078

<https://cdn-ext.agnet.tamu.edu/wp-content/uploads/2016/05/EHT-078-building-a-raised-garden-bed.pdf>

<http://agriflifeextension.tamu.edu/solutions/raised-garden-beds/>

# Commercial Products:

Raised Bed components are readily available, from connector parts to full kits.





# Construction Alternatives:

Raised Beds do not have to be rectangular wooden boxes, nor do they have to cost money or be permanent.

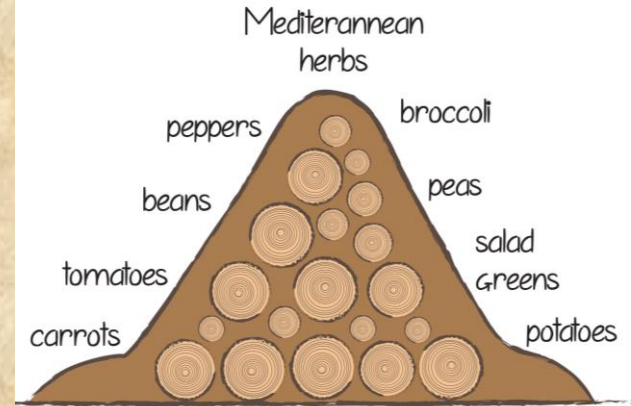


Let's look at some alternatives ...

# Unframed Raised Beds:

- No cost & less labor intensive.
- Allows you to change bed shape and location.
- They tend to need to be reshaped each year.
- You are probably doing this now with your melon, squash, & corn hills ...

hugelkultur



# Silt Fencing Raised Bed:

 **SANDBAGGY Wire Back Silt Fence**



Roll Size: **100 ft Length**  
Fabric Width: **4 ft**  
Welded Wire Width: **3 ft**  
Wire Mesh Opening: **2 inch by 4 inch**

\$148.00



3 feet X 100 feet with stakes every 10 feet \$31.95.



# Burlap Sacks & Sand Bags:



# Straw Bales/Straw Bale Gardening:

<https://s3.wp.wsu.edu/uploads/sites/2071/2013/12/Straw-Bale-Gardening.pdf>



# Logs:



# Recycled Wood:

Cheap & environmentally friendly, but often short lived.



# Wood:



Main garden area:  $30 \times 30 = 900\text{sf}$ , soil area =  $600\text{sf}$ . Beds are 12" above pavers and 18" deep. Hardware cloth underneath all 900sf

Greenhouse: 8 raised beds inside, each is  $4\text{ft} \times 18\text{"} = 6\text{sf}$  for a total =  $48\text{sf}$  soil area. Beds are 12" above pavers and 18" deep. Hardware cloth under entire greenhouse and raised beds.

## Dale Wheeler's Raised Bed.





# BEWARE of Treated Wood!

- Do not use any pressure treated lumber marked CCA (chromated copper arsenate). CCA was voluntarily banned in 2003 for residential use but, you may still find some in recycled lumber and is still produced for industrial use. Look carefully for the lumber markings if still there.
- Never use creosote treated railroad ties. No matter how aged, you can not assume the creosote has stopped leaching out. You cannot trust any liner material to protect your soil from creosote.



[https://www.cpsc.gov/s3fs-public/270\\_0.pdf](https://www.cpsc.gov/s3fs-public/270_0.pdf)

# Treated Wood:

- Residential treated wood after 2003 does not contain arsenic and the most common are:
  - ACQ (alkaline copper quaternary) a water base wood preservative.
  - MCA (micronized copper azole).
  - CA-B or C (copper azole).
- ACQ (copper quat) or CA-B or C (copper azole) treated wood is sold for residential use. It is used by some gardeners, often lined with 6 mil plastic.
- The risk of food contamination is negligible.
- Regardless of the treatment used, avoid growing edible plants within 12 inches of treated wood.



<https://www.clp-inc.com/what-is-micronized-copper-azole/>

If the longevity of your wooden raised bed is a primary concern, consider the natural rot resistance of cedar or redwood.

# Rock:



# Cement Rubble:



# Cement Blocks:



Cinder blocks haven't been made for about 50 years. Old block could have been made from cinder from coal ash hence the term fly ash. Cement blocks nowadays are made from Portland cement and aggregate.



# Metal Siding & Roofing:



# Trex:



Note the concrete/re-bar filled plastic fence posts, the metal plaster mesh liner, and the water pipe.

# Yard Feature:





# Yard Feature:



# Yard Feature:



# Dress up your Beds with color!



# \* Big Pests:



<https://wdfw.wa.gov/species-habitats/living/species-facts>

# Area Fence:



# Integral Fence:



## Removable Fence:



# Burrowing Pests:

To protect from moles, voles, etc., line the bed with 1/4" galvanized mesh hardware cloth before soil is added, continuing at least 3" up along the insides of the bed and stapled in place.



Metal plaster mesh

Poultry Netting



Hardware Cloth



# Soil:

- Your bed should contain about 1/3 native soil. Use your best garden soil and if there are rocks, screen the soil through a piece of 1/2" mesh.
- If you purchase soil, carefully research its source - the soil could be adulterated with weed seeds, herbicides, and/or chemicals.
- If there is no underlying soil, then the bed should be 12 to 18 inches deep as the entire root zone of the plant will be in the bed.



# Soil Mixtures:

- Add 3 to 4 inches of landscaping fill and compost to the native soil in the bed and mix.
- Add soil amendments such as compost, peat, lime, rock phosphate and organic fertilizer, as needed.
- Repeat the last steps until the bed is filled and leveled.

Ref: Home Gardener's Guide to Soils and Fertilizers (WSU Extension Bulletin  
EB1971E)

[https://s3.wp.wsu.edu/uploads/sites/2063/2017/04/HomeGardenersGuideToSoilsand  
Fertilizers WSU eb1971e.pdf](https://s3.wp.wsu.edu/uploads/sites/2063/2017/04/HomeGardenersGuideToSoilsandFertilizers_WSU_eb1971e.pdf)

# Hügelkultur:

Buried wood supplies nutrients and retains moisture, minimizing irrigation & reducing some fertilizer requirements.

Extra Nitrogen needed.

Bed Height will drop as wood decomposes.



## Time Stacking with Hügelkultur



# Planting & Growing:

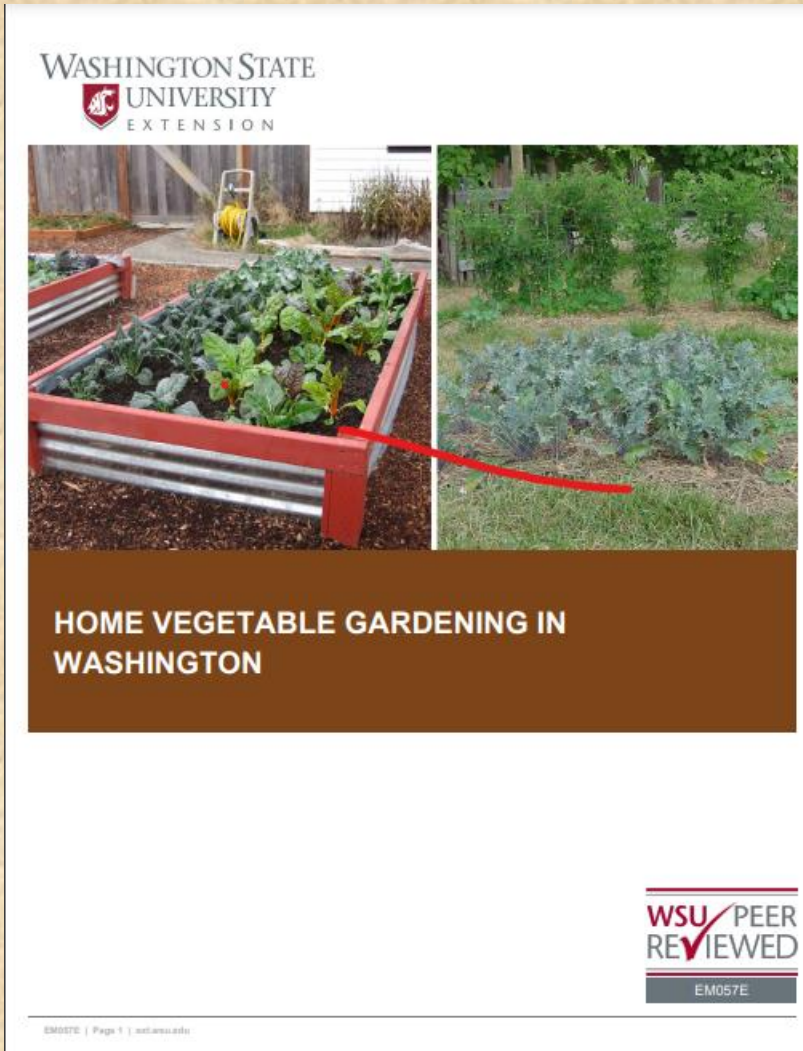
- Monitor air temperatures watching your frost dates. Last predicted frost date 9 May but this is just a prediction.
- Monitor your soil temperatures - you may be able to plant earlier than you have in the past.
- Raised beds are generally planted more densely than row crops. Look up Square Foot Gardening or Block Planting for techniques and spacing.
- Remember to rotate crops to control pests & diseases - raised beds don't change the rules!
- Watch soil moisture closely - due to design & plant density, raised beds can dry out quickly.

**Cement Blocks (2015 installed): 3 beds 4 ft. X 25 ft. each for a total of 300 sq. ft. Planted tomatoes 19 May 2021 and planted corn 12 June 2021.**



# Plant Selection: EM057E

<http://pubs.cahnrs.wsu.edu/publications/wp-content/uploads/sites/2/publications/em057e.pdf>



Vegetable	Garden & Store Difference in Quality	Production per Square Foot	Relative Monetary Value
Asparagus	high <sup>1</sup>	medium	high
Bean, Green	medium <sup>2</sup>	high	medium
Beet	medium	high	medium
Bok Choy	low <sup>3</sup>	medium	medium
Broccoli	medium	high	high
Brussels Sprout	medium	low	high
Cabbage	low	low	low
Carrot	medium	high	medium
Cauliflower	low	medium	high
Celery	low	medium	medium
Chard, Swiss	high	high	medium
Collards	medium	medium	high
Corn, Sweet	high	low	low
Cucumber	medium	medium	high
Edamame	high	medium	high
Eggplant	medium	low	high
Kale	medium	high	high
Kohlrabi	low	medium	medium
Leek	medium	medium	high
Lettuce, Leaf	medium	medium	high
Lettuce, Head	low	low	medium
Muskmelon (Cantaloupe)	low	low	medium
Onion, Bulb	low	medium	low
Onion, Green	high	high	high
Parsnip	low	medium	medium
Pea	high	medium	high
Pepper	medium	low	high
Potato	low	medium	low
Pumpkin	low	low	low
Radish	low	high	medium
Rhubarb	medium	high	high
Spinach	medium	medium	medium
Squash, Summer	high	high	high
Squash, Winter	low	medium	low
Tomato	high	medium	high
Turnip	low	high	medium
Watermelon	low	low	low

# Planting Schedule: EM057E

Table 5. Suggested planting calendar for vegetable crops in the Pacific Northwest; specific dates should be obtained by experimenting in your area (adapted from Miles et al. 2010, 6-29-31).

Crop	Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End	Beginning	Middle	End			
Artichoke																																				
Arugula																																				
Asparagus, Seed																																				
Asparagus, Crown																																				
Basil																																				
Bean, Bush																																				
Bean, Faba																																				
Bean, Pole																																				
Beet																																				
Bok Choy																																				
Broccoli, Summer																																				
Broccoli, Winter																																				
Brussels Sprout																																				
Cabbage, Chinese																																				
Cabbage, Summer																																				
Cabbage, Winter																																				
Carrot, Summer																																				
Carrot, Winter																																				
Cauliflower, Summer																																				
Cauliflower, Winter																																				
Celery																																				
Chard, Swiss																																				
Chicory (Endive)																																				
Cilantro																																				
Collards																																				
Corn Salad																																				
Corn, Sweet																																				
Cucumber																																				
Dill																																				
Eggplant																																				

- Direct Seed
- ✓ Seed Transplant
- ✗ Transplant

- Seedling growth
- Transplant growth
- Harvest

- \* Harvest begins in the second year
- \*\* Harvest begins in the third year

# Enhance your raised beds with accessories:

## with accessories:

Benches



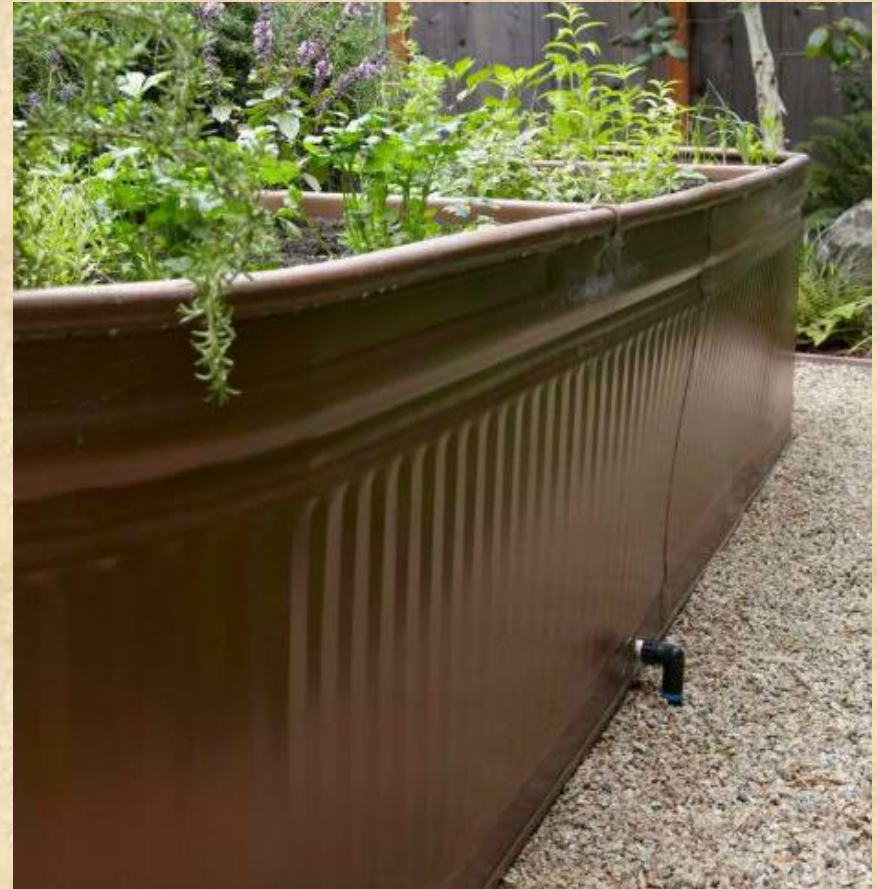
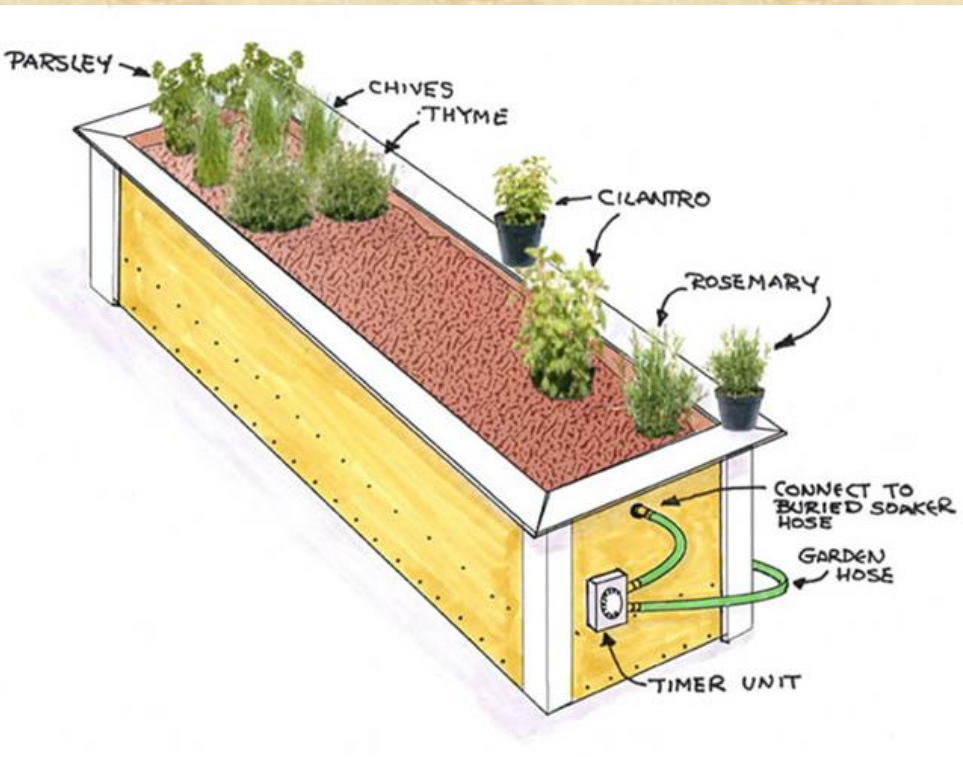


## \*Irrigation:

Avoid overhead watering with dense plantings - water plants at their base to prevent disease.



# Buried Drip Irrigation:



# Cold Frames:



# Bug Screens:



# Row Cover:



# Cloche:

A small translucent dome shaped cover for protecting or forcing outdoor plants. (Original used to be a glass dome but has changed)



“How to Build Your Own  
Raised Bed Cloche”

OSU Extension Bulletin  
EC1627E

<https://extension.oregonstate.edu/pub/ec-1627>



# Soil Maintenance:

- The soil needs to be maintained as a light and well drained growing medium - top dress the bed with 2 to 3 inches of compost at the end of the season to suppress weed growth and add organic material.
- Don't work the soil too early in the spring. Rototill only when necessary.



# Fertilizer:

Raised Beds allow longer growing seasons and more intensive cultural practices - fertilizers are necessary.

- Organic Fertilizer can be added 3 months before planting. Organic fertilizer is broken down first by micro-organisms in the soil, prior to feeding the plant.
- Test your soil for pH, macro- & micro-nutrient levels.
- Inorganic Fertilizer can be added at planting and during the season, however the quantity, composition, strength and timing of addition should be based on the type of plant and the soil condition.
- For a “one size fits all” approach, use a general fertilizer with an NPK ratio of 1-2-1.



# Reference Documents:

**Note:** Type in term add .edu to your searches to focus on Extension publications and other research-based information.

## **Washington State University:**

**EB1971E** Home Gardener's Guide to Soils and Fertilizers

[https://s3.wp.wsu.edu/uploads/sites/2063/2017/04/HomeGardenersGuideToSoilsandFertilizers\\_WSU\\_eb1971e.pdf](https://s3.wp.wsu.edu/uploads/sites/2063/2017/04/HomeGardenersGuideToSoilsandFertilizers_WSU_eb1971e.pdf)

**EM057E** Home Vegetable Gardening in Washington <http://pubs.cahnrs.wsu.edu/publications/wp-content/uploads/sites/2/publications/em057e.pdf>

**Straw Bale Gardening:** <https://s3.wp.wsu.edu/uploads/sites/2071/2013/12/Straw-Bale-Gardening.pdf>

## **Oregon State University:**

**EC1627E** How to Build your Own Raised Bed Cloche

<https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/ec1627.pdf>

## **Texas A&M**

**EHT-078** Building a Raised Bed Garden Bulletin <http://www.agrilifebookstore.org/Building-a-Raised-Bed-Garden-p/eh-078.htm>

### **How to Build a Raised Garden Bed Video**

<http://agriflifeextension.tamu.edu/solutions/raised-garden-beds/>

<https://www.youtube.com/watch?v=qIA-wuB4IFs&feature=youtu.be>

[https://www.cpsc.gov/s3fs-public/270\\_0.pdf](https://www.cpsc.gov/s3fs-public/270_0.pdf)

**Washington Department of Fish and Wildlife:** <https://wdfw.wa.gov/species-habitats/living/species-facts>

### **Treated Wood:**

[https://www.cpsc.gov/s3fs-public/270\\_0.pdf](https://www.cpsc.gov/s3fs-public/270_0.pdf)

<https://www.clp-inc.com/what-is-micronized-copper-azole/>

**Seed Saver Exchange:** [https://www.seedsavers.org/learn?gclid=CjwKCAjw6dmSBhBkEiwA\\_W-EoMGCPHrtDY-FSW3Ddgog-oEJqr9rq2rXU8szDGvKtyMdDegBc\\_LYAhoCA7oQAvD\\_BwE#soil](https://www.seedsavers.org/learn?gclid=CjwKCAjw6dmSBhBkEiwA_W-EoMGCPHrtDY-FSW3Ddgog-oEJqr9rq2rXU8szDGvKtyMdDegBc_LYAhoCA7oQAvD_BwE#soil)

***Thank you for  
joining us today!  
Questions?***

## **Interested in becoming a Master Gardener Volunteer?**

Contact your county's WSU Extension Office for information on joining the WSU Master Gardener Program.

**In Cowlitz County, contact Gary Fredricks at 360-577-3014 Ext. 3 or [garyf@wsu.edu](mailto:garyf@wsu.edu)**

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