Produce Safety Program Grower Information Binder

THE
UNIVERSITY
OF RHODE ISLAND
COLLEGE OF
THE ENVIRONMENT
AND LIFE SCIENCES

Worker Health, Hygiene, and Training

Having a well-trained group of workers is key to successful food safety programs. The food processing industry reported lack of employee training is the biggest food safety problem.[1] Follow the guidelines below to help you develop a strong employee food safety training program.

Training programs must include:

- Principles of food hygiene and food safety.
- Importance of personal hygiene for all personnel and visitors.
- Recognizing symptoms of foodborne illness.

Training programs must:

- Be appropriate for the job and conducted upon hiring.
- Include refresher training throughout the season at least yearly or when a problem arises.
- Be easily understood.
- Be supervised by a qualified person.
- Include a process for documenting the training.
- For harvesters, include training to identify and not harvest contaminated produce.

Workers are required to learn how to:

- Maintain personal cleanliness.
- Avoid contact with animals, other than working animals.
- Maintain gloves in a sanitary condition, if used.
- Remove or cover hand jewelry that cannot be cleaned.
- Not eat, chew gum, or use tobacco in an area used for a covered activity.
- Notify their supervisor if they are ill.

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Rhode Island Produce Safety Program
For more information call (401) 222-2750

PRODUCE SAFETY RULE 21 CFR 112

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- Wash their hands thoroughly using soap and water, and dry hands in a sanitary manner:
  - » Before starting work.
  - » Before putting on gloves.
  - » After using the restroom or toilet facilities.
  - » Upon return from any break or absence.
  - » As soon as practical after touching animals or any waste of animal origin.
  - » At any other time hands may have become contaminated.

Regarding visitors, growers must:

- Make visitors aware of the farm's food safety policies.
- Provide access to toilet and handwashing facilities.

Keep records

Required	Training records should include
Worker training and qualifications	Name of log or task
	Date and time task was completed
	Name of person completing the task
	What task was done
	Any materials relevant to the task

1 Sertkaya, A. et al. 2006. Top Ten Food Safety Problems in the United States Food Processing Industry. *Food Protection Trends*. 26(5):310-315.

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Worker Training Record

Farm name and address:	**Date:**
Trainer:	**Training time:**
Topics covered:	

Training materials: Please attach any printed materials related to the training.

EMPLOYEE NAME (PLEASE PRINT)	**EMPLOYEE SIGNATURE**
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

Reviewed by:	**Title:**	**Date:**

FSMA PSR reference § 112.30(b) Confidential Record

Modified from On-Farm Decision Tree Project: Worker Health, Hygiene, and Training—v14 07/16/2014
E.A. Bihn, M.A. Schermann, A.L. Wszelaki, G.L. Wall, and S.K. Amundson, 2014. www.gaps.cornell.edu

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Soil Amendments

Soil amendments are any chemical, biological, or physical materials intentionally added to the soil to improve and support plant growth and development. The *Produce Safety Rule* focuses on untreated biological soil amendments that come from animals. This is because they present the highest public health risk.

Untreated soil amendments

Untreated biological soil amendments of animal origin are considered **high risk** since they have not been treated to reduce or eliminate pathogens. These soil amendments are considered untreated:

- Raw manure
- "Aged" or "stacked" manure
- Untreated manure slurries
- Untreated manure teas
- Agricultural teas with supplemental microbial nutrients
- Any soil amendment mixed with raw manure

Treated soil amendments

Composting must use one of these scientifically valid processes:

- **Aerated static composting:** aerobic, minimum of 131° F (55° C) for three days, followed by curing with proper management to ensure elevated temperatures throughout all materials
- **Turned composting:** aerobic, minimum of 131° F (55° C) for 15 days, minimum of five turnings, followed by curing
- **Other scientifically valid controlled composting process:** must have proof that process properly reduces or eliminates pathogens

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Minimum application intervals

The *Produce Safety Rule* currently does not include application intervals for raw manure.

- **Untreated soil amendments:** The Food and Drug Administration (FDA) is currently doing research to support application intervals for raw manure. Information will be available to produce growers in the future.
  - » Raw manure must not contact the harvestable portion of the crop.
- **Treated soil amendments:** There is a zero-day application interval for compost treated by a scientifically validated process.
  - » Harvest produce the same day the treated soil amendment is applied.

Keep records

Required (on-farm composting)	Required (supplied by a third party)
Time	Name and address of the supplier
Temperature	What soil amendments were purchased
Turnings	Date and amount purchased
Other processing steps, including curing	Lot information, if available
	Supplier information indicating that they used a scientifically validated treatment process including monitoring during the production of the treated amendment
	Supplier information showing that proper handling requirements were met

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Compost Treatment Record

Farm name and address:

Type of compost method:	**Date piled:**	**Date finished:**	**Row number:**

List all ingredients added to compost:

Use this record for on-farm composting. Record the date piled, turning dates, and the temperatures maintained. Use one sheet for each pile or row

DATE TURNED	TEMP/TIME TEST AREA 1	TEMP/TIME TEST AREA 2	TEMP/TIME TEST AREA 3	TEMP/TIME TEST AREA 4	CLEANED BY (INITIALS)
9 / 25 / 16	135°F / 2:00 p.m.	138°F / 2:01 p.m.	140°F / 2:03 p.m.	135°F / 2:04 p.m.	EAB
9 / 25 / 16	137°F / 2:15 p.m.	137°F / 2:18 p.m.	138°F / 2:19 p.m.	137°F / 2:25 p.m.	EAB

Proper compost production requires a minimum temperature of 131°F be maintained for three days using an enclosed system ***or*** a temperature of at least 131°F for 15 days using a windrow system, during which the materials must be turned five times. (FSMA Produce Rule. 2015. Rule 21 CFR part 112.54(b)).

Reviewed by: **Title:** **Date:**

FSMA PSR reference § 112.60(b)(2) Confidential Record

Modified from On-Farm Decision Tree Project: Soil Amendments—v5 07/16/2014

E.A. Bihn, M.A. Schermann, A.L. Wszelaki, G.L. Wall, and S.K. Amundson, 2014. www.gaps.cornell.edu

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Wildlife, Domesticated Animals, and Land Use

Animals are a produce safety concern because they can carry and spread human pathogens and are difficult to control. Completely excluding animals is not possible, and is not the goal of this portion of the Rule. An animal venturing onto the farm is not covered by the Rule. Action may be required, however, if the animal leaves feces on your covered produce.

Monitor wildlife activity

You are not required to document wild animals passing through the farm. Documentation is only required if the animal left feces on your crops.

- During the growing season:
  - » Monitor for feces and evidence of intrusion.
  - » Evaluate risk of fecal contamination to tree and root crop produce.
  - » Consider past observations and wildlife attractants.
- Immediately before harvest:
  - » Monitor for fecal contamination and signs of animal activity, such as trampling, rooting, feeding, or tracks.
  - » Assess risks and decide if crop or part of crop can be safely harvested.

Take corrective actions if there is contamination

- Do not harvest any produce that may be contaminated.
- Provide training to staff responsible for harvesting produce.
- Decide what to do with the contamination.
  - » Remove, leave or bury contamination, or use other strategies.
  - » Consider risks that could result from these actions, such as cross contamination of equipment with feces.

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- Document all monitoring, deterrence, and corrective actions.
- Consider these suggested corrective actions:
  - » Determine if no-harvest buffer zones around the contamination are enough to reduce risk to allow harvest of the uncontaminated produce.
  - » Create a visual system, such as colored ribbons or ropes, to identify the no-harvest buffer zone.

Keep records

Required	Recommended
None	Pre-planting land assessments
	Monitoring for animal activity
	Actions taken to reduce the risks related to animal intrusion into crops, for both domesticated and wild animals
	Pre-harvest risk assessments
	Intrusion and contamination events
	All corrective actions taken

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Agricultural Water – Production

Safe production water is very important for farm food safety. Production water is used for such things as irrigation, application of pesticides, and frost protection. Pathogens in production water can contaminate growing produce.

The FDA is exploring ways to simplify the microbial quality and testing requirements for agricultural water established in the *Produce Safety Rule* while still protecting public health. Once changes are announced, you will receive an updated information sheet. For now, we strongly recommend that you continue regular laboratory testing.

Inspect agricultural water sources and water distribution systems

Water can be contaminated at the source **or** in the distribution system, so you must:

- Inspect water sources and distribution systems at least yearly.
- Keep water sources free of debris, trash, domesticated animals and other hazards.

Evaluate water quality using microbial water quality profiles

Testing is the only way to evaluate the microbial quality of water quantitatively. The FDA has selected generic *E. coli* as the target indicator species. The water quality profile can help you:

- Understand the long-term quality of source water.
- Understand appropriate uses for each source.
- Determine if corrective measures are needed when microbial water quality exceeds the numerical criteria established in the *Produce Safety Rule.*

Test quality of water used during growing activities

- You must test water used in direct water application to covered produce.

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- You must test each source of production water to evaluate whether its water quality profile meets **both** of these criteria:
  - » **126 or less** colony forming units (CFU) of generic *E. coli* per 100 milliliters (mL) of water geometric mean, **and**
  - » **410 or less** CFU of generic *E. coli* per 100 mL of water statistical threshold value.

For a tool to help calculate the geometric mean and statistical threshold value, go to wcfs.ucdavis.edu.

Follow correct sampling frequency

- **Public water sources:** No testing required if you can provide a copy of test results or current certificates of compliance from your public water provider
- **Ground water sources:**
  - » Initial year: Take four samples throughout the growing season or in one year.
  - » Subsequent years: Take one sample during the growing season.
  - » Samples must be representative of use and collected as close in time as practicable to, but before, harvest.
- **Surface water sources:**
  - » Collect an initial water quality profile of 20 samples over a period of two to four years.
  - » Subsequent years: Take five samples during the growing season.
  - » Samples must be representative of use and must be collected as close in time as practicable to, but before, harvest.

Take any one of these three corrective actions if the microbial water quality profile does not meet the water quality criteria

1. Apply a time interval for microbial die off:
   a. Between last application of water and harvest – FDA allows a microbial die-off rate of 0.5 log per day between last application and harvest for up to four consecutive days.

   Example: If the geometric mean of your water profile is 156
   Rule: Geometric mean is equal to or less than 126
   Log_{10} 126 = 2.1
   Log_{10} 156 = 2.2
   2.2 – 2.1 = 0.1 log reduction needed. Achieve with a one-day pre-harvest interval or conduct a validated procedure such as washing.

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b. Between harvest and end of storage and/or removal during activities such as commercial washing

2. Re-inspect the water system, identify problems, make necessary changes, and confirm effectiveness.
3. Treat the water.

Treat production water

- There are no EPA-registered chemicals for antimicrobial treatment of water used on crops during growth. FDA is working with EPA to register appropriate chemical treatments.
- Non-chemical treatments called "pesticide devices" by EPA, including filter units, ultraviolet lights, and ozonator units, may be used if they adequately reduce microbial risks.
- Avoid water treatments that may have negative environmental and soil quality impacts.
- Keep records of all water treatment monitoring that you conduct.

Keep records

Required	Recommended
Findings of the water system inspection	Monitoring of water treatments
Corrective measures taken, if any	Scientific data or information to support compliance including treatment, calculations, and testing
Water quality test results	Scientific data or information to support alternative indicators, criteria, or sampling frequency

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Water System Inspection Record

Farm name and address:

See farm policy for specific water distribution system inspection procedures.

DATE	TIME	WATER SOURCE OR DISTRIBUTION SYSTEM	OBSERVATIONS	CORRECTIVE ACTIONS TAKEN	INITIALS
4 / 22 / 16	7:00 a.m.	Well 1, north field	Well casing in good shape, backflow prevention device in place, no broken pipes	None	EAB
4 / 22 / 16	9:00 a.m.	Pond, south field	Significant geese presence	Introduced swan decoys. Will monitor.	EAB

Reviewed by: **Title:** **Date:**

FSMA PSR reference § 112.50(b)(1) Confidential Record

Modified from On-Farm Decision Tree Project: Agricultural Water for Production—v4 07/17/2014
E.A. Bihn, M.A. Schermann, A.L. Wszelaki, G.L. Wall, and S.K. Amundson, 2014. www.gaps.cornell.edu

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Agricultural Water Die-Off Corrective Measures Record

Farm name and address:

Water source:		
Current calculated GM:		CFU/100 mL water
Current calculated STV:		CFU/100 mL water
Calculated interval:		Days
Adjusted GM:		CFU/100 mL water
Adjusted STV:		CFU/100 mL water

EXAMPLE

Water source: Southwest Pond		
Current calculated GM:	190	CFU/100 mL water
Current calculated STV:	690	CFU/100 mL water
Calculated interval:	1	Days (0.5-log)
Adjusted GM:	60	CFU/100 mL water
Adjusted STV:	220	CFU/100 mL water

FIELD	CROP	DATE AND TIME OF BEGINNING OF CROP HARVEST	DATE AND TIME OF END OF LAST WATER APPLICATION	TIME AND INTERVAL SINCE LAST WATER APPLICATION	HARVEST SUPERVISOR INITIALS
2A	Cortland Apple	9 / 23 / 2016, 1:00 p.m.	9 / 21 / 2016, 4:00 p.m.	2 days	DMP
2A	Cortland Apple	9 / 25 / 2016, 10:00 a.m.	9 / 21 / 2016, 4:00 p.m.	4 days	EAB

FSMA PSR reference § 112.50(b)(6) Confidential Record

Attach documentation to support calculation, such as the Ag Water Excel Tool at wcfs.ucdavis.edu.

If using a die-off rate other than specified .05 log/day in §112.45(b)(1), include the alternative die-off rate required by §112.50(b)(8).

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Farm name and address:

Water source:		
Current calculated GM:		CFU/100 mL water
Current calculated STV:		CFU/100 mL water
Calculated interval:		Days
Adjusted GM:		CFU/100 mL water
Adjusted STV:		CFU/100 mL water

EXAMPLE

Water source:		
Current calculated GM:		CFU/100 mL water
Current calculated STV:		CFU/100 mL water
Calculated interval:		Days (0.5-log)
Adjusted GM:		CFU/100 mL water
Adjusted STV:		CFU/100 mL water

FIELD	CROP	DATE AND TIME OF BEGINNING OF CROP HARVEST	DATE AND TIME OF END OF LAST WATER APPLICATION	TIME AND INTERVAL SINCE LAST WATER APPLICATION	HARVEST SUPERVISOR INITIALS

FSMA PSR reference § 112.50(b)(6) Confidential Record

Attach documentation to support calculation, such as the Ag Water Excel Tool at wcfs.ucdavis.edu.

If using a die-off rate other than specified .05 log/day in §112.45(b)(1), include the alternative die-off rate required by §112.50(b)(8).

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Post-Harvest Water

Post-harvest water can spread contamination. Post-harvest water is used for rinsing, washing, moving commodities such as in flumes, cooling, ice making, post-harvest fungicide and wax application, hand washing, and cleaning/sanitizing tools and equipment.

Post-harvest water management

- Water
  - » Must know initial quality and intended use
- Anti-microbial products, including sanitizers
  - » Adding a sanitizer to water is **not** intended to "wash" the produce, but instead to prevent cross-contamination.
  - » Anti-microbial products must be labeled for intended use, such as "water for contact with fruits and vegetables."
  - » Many sanitizers are available, including those approved for organic use.

Water quality criteria for harvest and post-harvest activities

- Water must have **no** detectable generic *E. coli* per 100 milliliters (mL) of water per sample if the water is used for:
  - » Direct contact with covered produce during or after harvest.
  - » Direct contact with food contact surfaces.
  - » Making ice.
  - » Hand washing.
- Untreated surface water may not be used for any post-harvest activity.

Water quality testing requirements

- **Public water supply:** Copy of test results or current certificates of compliance; contact your public water supply provider for these documents
- **Untreated ground water:**
  - » Initial year: Take four samples during the growing season.
  - » Subsequent years: Take one sample during the growing season.

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Key water quality variable

- **Quality at start of use:** No detectable generic *E. coli* in 100 mL of sample

Suggested water quality variables to consider

- **pH:** Acidity level can affect sanitizer effectiveness. For example, the recommended pH range for a chlorine sanitizer solution is 6.5 to 7.5.
- **Temperature:** If warm produce is submerged in cold water, bacterial infiltration of produce can occur.
- **Turbidity:** Look at the water. If it appears dirty or cloudy, it's time to change it.

When to change water

- Post-harvest water must be managed, including changing water when necessary.
- Water changing schedules should consider:
  - » Organic load including soil, leaves, or decaying or damaged product.
  - » Turbidity measurements.
  - » Volume of produce.
  - » Type of produce.
  - » Product flow and operating conditions.
  - » Type of antimicrobial product.
  - » Type of equipment.

Keep records

Required	Recommended
Water quality test results for generic *E. coli*	Sanitizer solution concentration
	pH
	Temperature
	Turbidity
	Water changes

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Water Treatment Monitoring Record

Farm name and address:

Please see the food safety plan for overall water treatment procedures.
You may not need to record all factors in this chart. See product EPA label.

DATE	TIME	WATER pH	WATER TEMPERATURE	TURBIDITY	SANITIZER (NAME & RATE)	CORRECTIVE ACTIONS NEEDED (YES OR NO)	INITIALS
10 / 14 / 16	8:35 a.m.	8.5	65° F	25 NTU	NaOCl 75 ppm	Yes – pH was too high, added citric acid; retested - pH 7.0	EAB
10 / 14 / 16	12:00 p.m.	7.0	72° F	47 NTU	NaOCl 55 ppm	no	EAB

Reviewed by: **Title:** **Date:**

FSMA PSR reference § 112.50(b)(4) Confidential Record

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FSMA PSR reference § 112.50(b)(4) Confidential Record

Modified from On-Farm Decision Tree Project: Postharvest Water—v7 07/16/2014
E.A. Bihn, M.A. Schermann, A.L. Wszelaki, G.L. Wall, and S.K. Amundson, 2014. www.gaps.cornell.edu

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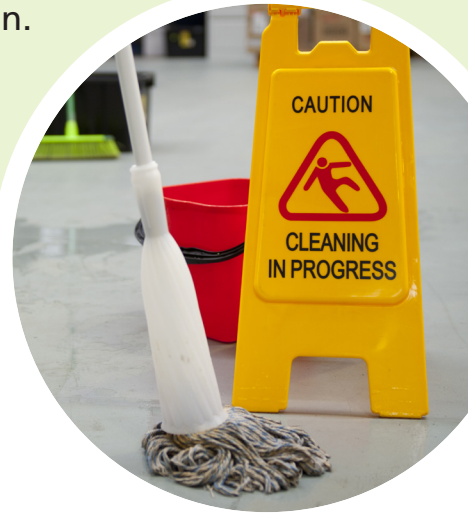
Post-Harvest Handling and Sanitation

Creating sanitation practices will help keep facilities clean. This reduces the chance of post-harvest contamination of produce. Concepts include general upkeep of facilities, training workers to follow sanitation practices properly, getting rid of pests and debris, and minimizing standing water.



Types of packing houses

- **Open:** Open to the environment; may or may not be covered
- **Closed:** Has doors and windows with some ability to control entry into the building

Packing house zones

- **Zone 1** includes any surface that directly contacts fresh produce.
  - » Biggest concern because contamination could result in cross-contamination of produce
  - » Includes harvest and storage bins, workers' hands, conveyors, belts, brushes, rollers, sorting tables, racks, and utensils
  - » Requires most effort because it has the most immediate impact on food safety
- **Zone 2** includes surfaces not in direct contact with, but near, produce.
  - » Includes internal and external parts of washing or processing equipment such as sidewalls, housing, or framework
- **Zone 3** includes all other areas inside the packing house, such as trash cans, cull bins, floors, drains, forklifts, phones, and foot traffic areas.
- **Zone 4** includes areas outside of or next to the packing house, such as loading docks, warehouses, manure or compost piles, and livestock operations.

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Reduce risks in packing areas

- Keep area clean and organized.
- Regularly inspect and maintain equipment.
- Provide proper hygiene facilities and break areas for workers.
- Try to eliminate or reduce pest presence.
- Prevent build-up of standing water.

Clean and sanitize food contact surfaces

- **Step 1:** Remove any obvious dirt and debris from the food contact surface.
- **Step 2:** Apply a detergent that is effective at removing carbohydrates, such as sugars from fruit, and scrub the surface.
- **Step 3:** Rinse the surface with clean water, making sure to remove all the detergent and soil.
- **Step 4:** Apply a sanitizer approved for use on food contact surfaces (when appropriate); rinse if necessary; let surface air dry.

Keep equipment sanitized

- Food contact surfaces should be:
  - » Adequately designed and constructed so they can be properly cleaned and maintained.
  - » Stored and maintained to prevent cross-contamination.
  - » Cleaned and sanitized, when appropriate, to prevent contamination of covered produce.
- Equipment should be designed and installed to make cleaning and sanitizing as easy as possible, including:
  - » Easy access to equipment and adjacent spaces.
  - » Ability to remove or access brushes, rollers, and nozzles for cleaning and sanitizing.
- Packing containers
  - » Keep single-use and reusable packing containers clean.
  - » Store packing containers and materials in a covered area, off the floor, to reduce. the risk of contamination from pests, windblown dirt, and other contaminants.

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Exclude and discourage pests

- Inspect all walls, doors, and windows.
  - » Repair holes and seal any cracks between floors and/or walls.
  - » Make sure door seals are in place to prevent pest entry.
- Use nets or spikes to deter birds from roosting in rafters.
- Keep doors and windows closed as much as possible.
- Cut grass around packing area.
- Remove cull piles and garbage at least every day and as needed during the day.

Keep records

Required	Recommended
Cleaning and sanitizing of tools, equipment, and containers	Pest management
	Building maintenance and monitoring
	Worker training on sanitation standard operating procedures (SOP)
	Packing area and cold storage cleaning and monitoring
	Vehicle cleaning and inspections done before loading

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Cleaning and Sanitizing Record

Farm name and address:

List the date, time, tool or equipment name, and method for each cleaning or sanitizing activity.

DATE	TIME	LIST OF TOOLS OR EQUIPMENT	CLEANED OR SANITIZED?	METHOD USED	CLEANED BY (INITIALS)
10 / 11 / 16	10:07 a.m.	Harvest tools	cleaned	See Cleaning SOP (removed dirt with brush, washed with detergent, rinsed, air dried)	EAB
10 / 11 / 16	10:30 a.m.	Dump tank	cleaned and sanitized	See Dump Tank Cleaning and Sanitizing SOP (drained tank, washed with detergent, rinsed, sanitized with 150 ppm NaOCl)	EAB

Reviewed by: **Title:** **Date:**

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