Introduction

The subject of this Issue Paper is NSF’s self-service food shields. See generally NSF Rule 2, at 5.36. The goal of this Issue Paper is to improve the safety of display foods protected by NSF’s self-service food shields. This Issue Paper proposes amending NSF standards 5.36.2.1, 5.36.6.1, and 5.36.7.2 to require consumer-side vertical barriers (“CSVBs”) on the front, consumer-facing side(s) of NSF’s self-service food shields.

CSVBs will prevent airborne hazards from traveling through the vertical gaps that exist in the space between the bottom leading edges of NSF food shields and the countertops below them. CSVBs will make food safer by preventing the respiratory droplets of COVID-19 and other airborne hazards from passing through these gaps and onto display food.

This Issue Paper ultimately suggests that air curtains (i.e. continuously blown air) will be the ideal type of CSVB for self-service food operations. This is because air-curtain CSVBs will make display food safer, on one hand, while still ensuring convenient self-service, on the other hand.

Cause and Nature of Concern

The particular cause of this concern is the existence of consumer-side “vertical gaps” between two points associated with NSF's self-service food shields. See generally NSF Rule 2, at 5.36. The first point, “Point A,” is the consumer-side bottom leading edge of an NSF self-service food shield. The second point, “Point B,” is the countertop beneath the bottom leading edge of that food shield (Point A). The distance between

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these two points create a “vertical gap” through which airborne hazards can travel before contaminating within display food. The following image illustrates Point A, Point B, and the Vertical Gap between them:

Similar vertical gaps exist on all NSF self-service food shields. They are necessary to allow customer access to self-service food. However, vertical gaps are large enough to allow many thousands of airborne hazards to contaminate food zones at the same time.

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1 Please note that although this image depicts Figure 16A from NSF Rule 2, the same vertical-gap concept applies for all of NSF’s self-service food shields.
By way of illustration, the red box in the following image represents the vertical gap that can exist at a typical buffet operation. It is easy to imagine how many airborne hazards can pass through this space every day before contaminating the display food:

![Image of a buffet operation](image)

The red box in the next image represents the vertical gap that can exist at a typical roller-grill operation. Here, as above, it is easy to imagine how many airborne hazards can pass through this space every day before contaminating the display food:

![Image of a roller-grill operation](image)
Not only are these vertical gaps wide, they are also tall. Consider how many thousands of airborne hazards can simultaneously travel through vertical gaps that are as tall the following, all of which are permissible under NSF Rule 2:

- The maximum permissible height of a vertical gap beneath “self-service food shields” is **13 inches**. See NSF Rule 2, at 5.36.2.1.
- The maximum permissible height of a vertical gap beneath “Self-service food shields attached to counter top equipment” is **15 inches**. See id. at 5.36.7.2.
- The maximum permissible height of a vertical gap beneath a “Free standing Food Shield for use with Countertop Equipment” is **16–18 inches**. Compare id. at 5.36.6.1 (“The maximum vertical distance between the finished floor and the bottom leading edge of a food shield shall be 52 in (1321 mm).”), with id. at Figure 16D (stating that 34–36” is the “assumed counter top height”).
- The maximum permissible height of a vertical gap beneath a “Free Standing Food Shield for use with Roller Grill Type Countertop Equipment” is **22 inches**. Compare id. at 5.36.6.1 (“The maximum vertical distance between the finished floor and the bottom leading edge of a food shield shall be 52 in (1321 mm).”), with id. at Figure 16E (stating that “the assumed counter top height” is 30 inches).

Airborne hazards can freely float through these large vertical gaps and contaminate display food. Although NSF standards require horizontal setbacks to protect food from horizontally traveling contaminants, we would submit that more can be done

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2 We recognize that NSF requires minimum horizontal distances between the bottom leading edges of self-service food shields and the front-facing edge of display food. See, e.g., NSF Rule 2, at 5.36.2.2 (“The minimum horizontal distance between the front inside edge of displayed food and the bottom leading edge of a food shield shall be three-quarters of the vertical distance (0.75 x vertical distance) of 5.36.2.1.”); id. at 5.36.6.2 (“The minimum horizontal distance between the front of counter top equipment and the bottom leading edge of a food shield shall be 7 in (178 mm).”); id. at 5.36.7.3 (“The minimum horizontal distance between the front of the food display area and the bottom leading edge of a food shield shall be 7 in (178 mm).”). It is our understanding that these standards are intended, at least in part, to prevent horizontally traveling airborne hazards from floating beneath the bottom leading
to block hazards at their point of entry through these vertical gaps. Ultimately, we would submit that these vertical gaps are the Achilles heel of NSF’s self-service food shields. For this reason, we would submit that more should be done to boost their protection of display food.

Protecting display food from horizontally traveling airborne hazards is both important and necessary. According to the FDA, display foods “shall be protected from contamination by the use of . . . effective means.” Food Code (2017) 3-306.11 (emphasis added). The FDA lists “food guards” (i.e. food shields) as one way to protect display foods. See id. However, not all food shields are created equally.

Only “effective” food shields satisfy the FDA’s standards. See id. “Effective”3 food shields must prevent horizontally traveling airborne hazards from floating through consumer-side vertical gaps and contaminating display food within.4 See Food Code edges of food shields and onto the food within. This Issue Paper respectfully proposes protections in addition to those horizontal setbacks.

3 The Food Code does not define what is “effective.” However, it does list numerous hazards from which display food must be protected. For instance, display food must be protected from customer contamination. See Food Code 3-306.11. That includes airborne contaminants that “originate from people breathing or sneezing” and can travel “considerable distances on air currents.” See id. at 3-306.11, Annex 3. Such contaminants can travel either horizontally or vertically. Display food must also be protected from airborne hazards—originating from both human and nonhuman sources—floating on “wind gusts,” which are horizontal in nature, and on “air currents,” which can be both vertical and horizontal. See id. at 3-306.11, Annex 3. Food must also be protected from flying insects, which are small and can fly horizontally. See id. at 6-501.11 (“Insects . . . are capable of transmitting disease to humans by contaminating food . . . . Effective measures must be taken . . . .”). There are many similar requirements throughout the Food Code. See, for instance, the catchall provision located at Food Code 3-307.11 (“Food shall be protected from contamination that may result from a factor or source not specified under Subparts 3-301 - 3-306.”). Accordingly, if a food shield does not protect against any single hazard listed above, including any single hazard that would fall into the catchall provision, then it is not “effective” under the FDA’s Food Code.

4 According to the FDA, self-service display foods can be contaminated by airborne hazards that originate both inside and outside of an establishment; from human and non-human sources; and can travel horizontally for considerable distances on air currents. Food Code (2017) 3-306.11, Annex 3. Self-service display foods can be contaminated by horizontally
Joint Committee Issue Paper

3-306.11, Annex 3. Thus, according to the FDA, food shields are “effective” if, but only if, they protect display food from horizontally traveling airborne contaminants.

**Proposed Amendments to NSF Standards 5.36.2.1, 5.36.6.1, and 5.36.7.2**

We would respectfully propose amending NSF’s self-service food-shield standards to make them more “effective” under the FDA’s Food Code. We would specifically propose that NSF require “consumer-side vertical barriers” (CSVBs) to cover consumer-side vertical gaps that exceed 4 inches in height. This would ensure that display foods are better protected from airborne hazards that could travel through larger vertical gaps (taller than 4”). At the same time, however, CSVBs would not be required over smaller gaps (less than 4” tall), as their smaller openings allow relatively fewer hazards to pass through. When required, CSVBs would be located on the front, “consumer-facing” side(s) of self-service food shields. CSVBs would increase food safety, consumer health, and render NSF’s self-service food shields more “effective” under the FDA’s Food Code.

Food Code 3-306.11, Annex 3. Thus, according to the FDA, food shields are “effective” if, but only if, they protect display food from horizontally traveling airborne contaminants.

We acknowledge that vertical barriers could be appropriate on both or all sides of any food shield where airborne hazards could circumvent preexisting food shields. However, we do not propose NSF require vertical barriers on any side other than the consumer-facing side. Doing so might be impracticable to implement and enforce.
**Air-Curtain Consumer-Side Vertical Barriers**

We would submit that CSVBs would ideally be comprised of vertical “air curtains.” An air curtain is a stream of continuously blown air that creates a “curtain” or a “wall” that is effective against preventing airborne hazards, including those as large as flying insects, from entering an area. NSF does not presently contemplate air curtains in its food-shield standards. See generally NSF Rule 2, at 5.36. However, air curtains have been long recognized as an “effective way” to block airborne hazards. For instance, the FDA recommends the use of air curtains to block airborne hazards. See, e.g., Food Code ¶ 6-202.15(D)(2) (including hazards as large as “flying insects”).

With respect to the vertical gaps on food shields, air-curtain CSVBs would blow downward from a food shield’s bottom leading edge. For instance, an air-curtain CSVB could resemble the following for a standard buffet food shield:

![Image of a standard buffet food shield with air curtains blowing downward from the bottom leading edge.](attachment:image)
An air-curtain CSVB could resemble the following for a roller-grill food shield:

![Air-curtain CSVB diagram]

Air-curtain CSVBs could be applied to just about any self-service food shield. For instance:

![Additional CSVB diagrams]

Incorporating this technology into NSF's food-shield standards would advance food safety and consumer health, among other benefits.
**Benefits of Air-Curtain CSVBs**

Utilizing air-curtain CSVBs on self-service food shields will yield many benefits. It would improve food safety. It would also improve customer access to self-service food because customers would be easily able to reach through an air-curtain CSVB to access the food within.

Moreover, air-curtain CSVBs would allow flexibility in the maximum height of consumer-side vertical gaps. For instance, food shields equipped with air-curtain CSVBs could have even larger vertical gaps for increased consumer convenience while still improving overall food safety. This would satisfy industry members concerned with customer throughput of their self-service operations, on one hand, and also those concerned with food safety, on the other hand.

Given the above, we would respectfully propose that NSF amend its rules pertaining to self-service food shields. As stated, we would specifically propose that all vertical gaps on self-service food shields taller than 4 inches be required to be protected by a CSVB.6

**Protection Against COVID-19**

Ultimately, this proposed amendment would help NSF respond to safety concerns arising from COVID-19. According to the Center for Disease Control, COVID-19 travels in the air through “respiratory droplets.” Respiratory droplets float for unknown periods until they eventually contact a surface. NSF-certified food shields currently do little to prevent respiratory droplets from traveling horizontally on air currents, underneath the bottom leading edges of food shields, and onto the food

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6 We would alternatively propose that a CSVB be required only for consumer-side vertical gaps that exceeded the permissible height presently set forth in 5.36.2, 5.36.6, or 5.36.7. This would allow industry members to increase the height of consumer-side vertical gaps beyond their presently permitted maximum height if, but only if, they incorporate a CSVB. This would allow food shields that are both safer and more convenient for customers.
within. Air-curtain CSVBs prevent this contamination. As a result, air-curtain CSVBs will advance NSF’s response to COVID-19.
Recommendation:
Clearly state what action is needed: e.g., recommended changes to the standard(s) including the current text of the relevant section(s) indicating deletions by use of strike-out and additions by highlighting or underlining; e.g., reference of the issue to a Task Group for detailed consideration; etc.

We would respectfully propose amendments to the following sections from Rule 2: 5.36.2.1; 5.36.6.1; and 5.36.7.2. Each proposed amendment is set forth below.

5.36.2.1 The maximum vertical distance between a counter top and the bottom leading edge of a food shield shall be 22 in (558.8 mm). If, within that vertical distance, an unprotected opening exceeding 4 in (101.6 mm) in height exists, then a consumer-side vertical barrier (CSVB) shall be provided to prevent airborne hazards from traveling through the opening and contaminating the food zone within. CSVBs shall be designed to allow reasonable customer access to the food zone(s) they protect while also providing continuous protection against airborne contaminants. CSVBs shall be designed for continuous operation at all times, including before, during, and after the time during which customers access the food zone, without any substantial interruptions or breaks in protection. CSVBs comprised of solid materials (e.g. glass, metal, plastic, rubber, etc.), must be “self-closing,” i.e. designed to automatically close promptly after each use without any customer force or intervention. Continuously forced air, such as vertical air curtains, may satisfy this CSVB requirement. All CSVBs must comply with Rule 5.36.1.

5.36.6.1 The maximum vertical distance between the finished floor and the bottom leading edge of a food shield shall be 52 in (1321 mm). The maximum vertical distance between a counter top and the bottom leading edge of a food shield shall be 22 in (558.8 mm). If, within that vertical distance, an unprotected opening exceeding 4 in (101.6 mm) in height exists, then a consumer-side vertical barrier (CSVB) shall be provided to prevent airborne hazards from traveling through the opening and contaminating the food zone within. CSVBs shall be designed to allow reasonable customer access to the food zone(s) they protect while also providing continuous protection against airborne contaminants. CSVBs shall be designed for continuous operation at all times, including before, during, and after the time during which customers access the food zone, without any substantial interruptions or breaks in protection. CSVBs comprised of solid materials (e.g. glass, metal, plastic, rubber, etc.), must be “self-closing,” i.e. designed to automatically close promptly after each use without any customer force or intervention. Continuously forced air, such as vertical air curtains, may satisfy this CSVB requirement. All CSVBs must comply with Rule 5.36.1.
5.36.7.2 The maximum vertical distance between the food display area and bottom leading edge of a food shield shall be **22 in (558.8 mm)**. If, within that vertical distance, an unprotected opening exceeding 4 in (101.6 mm) in height exists, then a consumer-side vertical barrier (CSVB) shall be provided to prevent airborne hazards from traveling through the opening and contaminating the food zone within. CSVBs shall be designed to allow reasonable customer access to the food zone(s) they protect while also providing continuous protection against airborne contaminants. CSVBs shall be designed for continuous operation at all times, including before, during, and after the time during which customers access the food zone, without any substantial interruptions or breaks in protection. CSVBs comprised of solid materials (e.g. glass, metal, plastic, rubber, etc.), must be “self-closing,” i.e. designed to automatically close promptly after each use without any customer force or intervention. Continuously forced air, such as vertical air curtains, may satisfy this CSVB requirement. All CSVBs must comply with Rule 5.36.1.

Supplementary Materials (photographs, diagrams, reports, etc.): If not provided electronically, the submitter will be responsible to have sufficient copies to distribute to committee members.

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