# Why the average number of meals sold per hour is important to grease interceptor sizing, and how it can be calculated

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When sizing a fats, oils, and grease (F.O.G.) interceptor one very important factor has been ignored, the food service operation's (FSO) grease production and resulting storage capacity needs. Though research was performed that resulted in the ability to determine the grease production per meal for various types of FSOs, no research had been performed to establish the average number of meals sold per hour. In order to design correctly, a design professional or contractor would have to provide very detailed information about the FSO to justify the number of meals used in sizing the interceptor. To simplify things, the industry would be better served by using a national average for meals served for the various types of FSOs. After identifying this key missing element, I began gathering information from national restaurant publications, specifically the yearly sales numbers. I then looked up the restaurant menus, established an average cost of a meal based on each restaurants' specific menu and prices.

- *FSO totals sales /FSO average meal cost = total meals sold for 1 year*

However, this was only the first step because the average yearly meals sold could not be effectively used across the various FSO types. I say this because every FSO is its' own entity. For example, hours and days of operation are determined by their individual corporations, franchise owners, or "Mom & Pop" owners. Since there is no way to classify FSOs based on yearly sales, a consistent formula needs to be used when sizing an interceptor. The best formula to use is to establish an average number of meals sold per hour of operation by FSO classification. Previous research provided some insight into how to begin classifying FSOs. Some have very specific variables from which you could establish an average number of meals sold per hour. Using the meals sold per hour to establish national averages makes sense because the number of hours of service is the least common denominator for all types of FSOs.

This article will discuss FSO meal calculations in three parts:

- Part 1 – FSOs with a simple meals per hour calculation
- Part 2 - Restaurant FSOs - Types and Classifications
- Part 3 – Other FSO Types

**FSOs with a simple meals per hour calculation**

The following FSO types have simple but specific methods for determining the number of meals served. They are each considered a low F.O.G. waste producer as classified through the *2011 Brown Grease Supply Study (REF. 13).* These low F.O.G. producing FSOs are as follows:

*Convenience Stores* often offer food items for sale that require the establishment to obtain a license to operate as an FSO. Luckily, this type of FSO was covered in several articles from which allowed me to establish an average number of sales/meals per hour. (REF. 1,2,3)

- *Convenience Stores = 50 meals per hour*

*Child Daycares* are calculated based on the number of meal services per day times the total number of possible occupants. For instance:

- 75 total possible occupants (listed occupancy on Certificate of Occupancy) x 2 (meals served per day) = 150 meals per day

*Hotel Breakfast Bars* are a great example of a specific FSO type with simple variables. To be clear, a Hotel Breakfast Bar would be a hotel that does not have a full commercial kitchen but does offer a continental breakfast. We can assume they have one breakfast service per day, and it is also reasonable to assume each room will have two occupants. Figuring the meals served in a day is not dependent on the hours of service, but rather the number of possible occupants in this case.

- Total rooms x 2 (double occupancy) = Meals Served per Day

*Pizza Shops* could be classified as full-service restaurants based on their menu and overall business setup. When discussing pizza shops, for the most part, we assume we are discussing pizza shops that only deliver or have dine-in facilities with a limited menu (mainly pizza). This classification will require the design professional or contractor to acquire some additional information from the client. A variation of the meals-per-day approach can be used for pizza shops. The variation is to use the average number of pizzas sold per day as opposed to the average number of meals sold per day. Though each pizza shop will be different, pizzas sold per day is the common denominator. For instance, Pizza Hut, based on their average cost of a large pizza, sells approximately 150 large pizzas per day. Unless the owner provides a business plan that figured making fewer pizzas, always assume at least the average of 150 per day. Pizza shops located close to or on a college campus will more than likely have a higher meals-per-day and should be calculated using between 250 to 300 pizzas per day. (REF. 4, 5, 6, 7)

**Restaurant FSOs - Types and Classifications**

There are many types of restaurants, and though not all types will be listed here, most will fall into one of the following types of restaurants:

- Sub/Deli
- Frozen Yogurt Shop
- Bar
- Sushi Bar
- Snack Bar
- Coffee Shop
- Indian Food Restaurant
- Greek Food Restaurant
- Ice Cream Parlor
- Italian Food Restaurant
- Hamburger Shop (fast food)
- American/Comfort Foods restaurant (includes hamburgers)
- Bakery
- Asian Food Restaurant
- Fried Chicken Restaurant
- Steak House
- Mexican Food Restaurant
- Seafood Restaurant

Within the list of common restaurant types, there are basically two classifications. Some restaurants will fit into both categories, but each will fit into at least one category. Those categories are as follows:

- Fast-Food/Quick-Service Restaurants
- Full-Service Restaurants

The first six restaurants fall into the fast food/quick-service category, as they are all considered to be low F.O.G. waste producers and typically serve with disposable containers/flatware. Hamburger Shops specifically refers to fast-food hamburger operations, such as; Wendy's, McDonald's, Burger King Etc. While the similar classification in the full-service restaurant types would be the American/Comfort Foods Restaurants and would include businesses similar to Red Robin. A steakhouse should always be considered a full-service restaurant.

Initially, my hypothesis was there would be an average number of meals sold per hour specific to each restaurant in each category. My research proved my hypothesis to be false. The research revealed that the average number of meals sold per hour for any fast food/quick service restaurant ranged between 38 to 42 meals per hour. The analysis of this research led me to establish an average number of meals sold per hour for fast food/quick service restaurants at 40 meals per hour.

Based on my research, the results for full-service restaurants established 50 meals per hour as the average. Initially, I thought I miscalculated something, my hypothesis never considered that full-service restaurants could have a higher number of meals sold per hour than fast-food/quick-service restaurants. After reviewing my data in detail, I found the calculation to be correct. The variable I failed to consider between these similar FSO types when formulating my hypothesis was the average number of service hours per day. Most full-service restaurants are open for lunch and dinner service, while fast -food/quick-service restaurants are open for up to 24 hours per day. Fast-food/quick-service restaurants may have longer service hours, but they are not all busy hours. Full-service restaurants typically have less of the non-busy service hours. That means even though more meals are sold in a fast food/quick service restaurant, the average is spread over a wider range of hours, thus lowing the average number of meals sold per hour.

- *Fast Food/Quick Service Restaurants* – 40 meals per hour
  (REF. 7, 8)

- *Full Service Restaurants* – 50 meals per hour
  (REF. 9, 10, 11)

## Other FSO Types

The category *Other FSO Types* covers a wide range of businesses. Many of these businesses will have a rather simple method for determining the number of meals served; while others required a detailed analysis and methodology. Currently there are eleven FSOs listed in the *Other FSO Types* category; however, that number can and probably will change as more information is gathered regarding FSOs and fats, oils, and grease waste.

The list of *Other FSO* types consists of:

- Elementary School Cafeteria
- High School/Middle School Cafeteria
- Nursing Home/Adult Daycare
- Arenas/Stadiums
- Banquet Halls
- Fraternal Organizations (such as VFW)
- Churches
- Golf Club/Country Club
- Common Prep-Kitchen for Mobile FSO Units
- Grocery Meat Department
- Strip Centers with Community Grease Interceptors

*Elementary School Cafeteria* & *H.S. /M.S. Cafeteria* are figured in the same way. The calculation would be as follows:

- Total meals services per day x (total number of students + total number of staff) = Total number of possible meals per day

*Nursing Homes/Adult Daycares* are figured the same way the different school cafeterias are figured. The calculation would be as follows:

- Total number of meals services per day x total possible occupancy (includes staff and clients)

*Arenas/Stadiums* are slightly more challenging to establish an accurate or reasonable number of meals sold. The least common denominator for these occupancies is the number of events per year. Meals per day cannot be calculated for this type of occupancy since they are not open every day. The most reasonable approach would be to establish meals sold for the entire year. This can be figure if the number of events is known and the total occupancy is known, however, consideration must also be given to the number of trips taken to the FSOs for each person per event. Based on personal experience, observations and discussion with many people, a reasonable number is assumed to be two trips, however, this number is just an assumption. In order to obtain a more specific/accurate number, arenas/stadiums will have to be willing to study these tendencies and share the data. The proposed calculation would be as follows:

- (Maximum certified occupancy x Total number of Events per year) x 2 = Total Meals/year.

*Banquet Hall, Fraternal Organizations, Churches, Golf/Country Clubs* are straightforward since typically they only serve 1 meal per event, however, it could be figured for an entire year since the FSOs in this category do not necessarily have daily events. The calculation would be as follows:

- Total occupancy x number of events per year = total meals/year

*Common Prep-Kitchen for Mobile FSO Units* will require the total number of Mobile FSOs that will be using the kitchen, and the number of service hours for each FSO. Additionally, research has shown that Mobile FSOs sell an average of 67 meals per service hour. The calculation for a common prep kitchen would be as follows.

- Total Mobile FSO Units using kitchen x 67 (meals sold per hour) = total meals per hour for Common Prep Kitchen (REF. 12)

*Strip Centers with Community Grease Interceptors* are a bad idea. Unfortunately, they are a reality and need to be dealt with appropriately. Since every tenant space will typically be provided with a tap to the community grease waste line, designers should consider every tenant space as a contributor to the grease load. Very few tenants are known when the design and construction begin; therefore, designs should be based on the industry average of 12 service hours per day, the number of tenant spaces, and the average meals per hour for full service restaurants. The calculation for Strip Centers with Community Grease Interceptors would be as follows.

- (12 x (x) tenant spaces) x 50 = total possible meals per day for the strip center

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