



PROPERLY SIZING GREASE INTERCEPTORS

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LEARNING OBJECTIVES

1. IDENTIFY THE INFORMATION REQUIRED TO PROPERLY SIZE A F.O.G. WASTE INTERCEPTOR.
2. IDENTIFY SHORTCOMINGS OF CURRENT METHODOLOGY IN THE IPC AND UPC FOR SIZING F.O.G. WASTE INTERCEPTORS.
3. COVER MAIN POINTS FROM 2027 IPC CODE CHANGE PROPOSAL P143-24 (ACCEPTED AS SUBMITTED AT CAH #1) AND WHAT THAT MEANS FOR SIZING F.O.G. WASTE INTERCEPTORS.
4. IDENTIFY HOW DESIGN VARIATIONS CAN SAVE YOUR CLIENT MONEY IN THE LONG RUN.

WHAT IS REQUIRED TO PROPERLY SIZE A F.O.G. WASTE INTERCEPTOR

1. FOOD SERVICE OPERATION (FSO)TYPE.
2. F.O.G. WASTE PER MEAL FOR THE FSO.
3. # OF MEALS PER HOUR FOR THE FSO.
4. # OF SERVICE HOURS PER DAYS FOR THE FSO.
5. FLOW RATES FOR CONNECTED DISCHARGES.

WHAT IS REQUIRED TO PROPERLY SIZE A F.O.G. WASTE INTERCEPTOR

6. SELECTING THE TYPE OF INTERCEPTOR, GRAVITY VS HYDROMECHANICAL OR GREASE REMOVAL DEVICE (GRD)
7. CALCULATED PEAK FLOW RATE FOR GRAVITY INTERCEPTOR, OR PEAK FLOW RATE FOR HYDROMECHANICAL INTERCEPTOR OR GRD.



IPC/UPC SHORTCOMINGS FOR SIZING F.O.G. WASTE INTERCEPTORS

1. BOTH CODES ONLY ADDRESS SIZING BASED ON FLOW RATE.
 2. NEITHER CODE ADDRESSES THE TYPES OF F.O.G. WASTE DISCHARGE FACILITIES AND QUANTITY OF F.O.G. WASTE ASSOCIATED WITH EACH.
 3. NEITHER CODE ADDRESSES AN ACTUAL STORAGE CAPACITY.
 4. NEITHER CODE REQUIRES DEFINING THE SERVICE INTERVAL BASED ON THE DESIGN AND THE F.S.O. TYPE.
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LET'S ANALYZE WHAT IS REQUIRED FOR SIZING A GRAVITY GREASE INTERCEPTOR IN THE 2021 IPC.

THE ONLY MENTION OF SIZING FOR GRAVITY FATS, OILS, AND GREASE INTERCEPTORS RESIDES IN SECTION 1003.3.7.

“1003.3.7 GRAVITY GREASE INTERCEPTORS AND GRAVITY GREASE INTERCEPTORS WITH FATS, OILS, AND GREASES DISPOSAL SYSTEMS.”

1003.3.7 GRAVITY GREASE INTERCEPTORS AND GRAVITY GREASE INTERCEPTORS WITH FATS, OILS, AND GREASES DISPOSAL SYSTEMS.

**“THE REQUIRED CAPACITY OF GRAVITY GREASE INTERCEPTORS
AND GRAVITY GREASE INTERCEPTORS WITH FATS, OILS, AND
GREASES DISPOSAL SYSTEMS SHALL BE DETERMINED BY
MULTIPLYING THE PEAK DRAIN FLOW INTO THE INTERCEPTOR IN
GALLONS PER MINUTE BY A RETENTION TIME OF 30 MINUTES.”**

HOW DOES THE 2021 IPC ADDRESS SIZING FOR HYDROMECHANICAL INTERCEPTORS AND GRDS?

IN TRUTH, IT REALLY DOESN'T. THERE ARE A TOTAL OF 4 CODE SECTIONS/SUB-SECTIONS THAT DEAL WITH HYDROMECHANICAL INTERCEPTORS AND GRDS.

1. 1003.3.5 HYDROMECHANICAL GREASE INTERCEPTORS, FATS, OILS AND GREASES DISPOSAL SYSTEMS AND AUTOMATIC GREASE REMOVAL DEVICES.
2. 1003.3.5.1 GREASE INTERCEPTOR CAPACITY.
3. 1003.3.5.2 RATE OF FLOW CONTROLS.
4. 1003.3.6 AUTOMATIC GREASE REMOVAL DEVICES.

1003.3.5 HYDROMECHANICAL GREASE INTERCEPTORS, FATS, OILS AND GREASES DISPOSAL SYSTEMS AND AUTOMATIC GREASE REMOVAL DEVICES.

THIS SECTION JUST DEALS WITH THE APPLICABLE REFERENCE STANDARDS THESE APPURTENANCES MUST BE LISTED AS COMPLYING WITH, UNLIKE GRAVITY INTERCEPTOR STANDARDS, THESE REFERENCE STANDARDS INCLUDE PERFORMANCE STANDARDS. HOWEVER, THIS CODE SECTION DOES NOT COVER SIZING. (CODE SECTION TOO LONG TO INCLUDE IN THIS TEXT)

1003.3.5.1 GREASE INTERCEPTOR CAPACITY.

YOU WOULD THINK THAT BASED ON THIS TITLE THAT THIS SECTION WOULD INCLUDE SOME SIZING THEOLOGY OR CALCULATIONS, HOWEVER, THAT IS DEFINITELY NOT THE CASE. THIS SECTION POINTS YOU TO A TABLE WITH THE MINIMUM CAPACITIES LISTED FOR INTERCEPTORS BASED ON THEIR FLOW THROUGH CAPACITY. IT DOES NOT ADDRESS HOW MUCH F.O.G WASTE IS DISCHARGED BY THE OCCUPANCY.



1003.3.5.1 GREASE INTERCEPTOR CAPACITY.

GREASE INTERCEPTORS SHALL HAVE THE GREASE RETENTION CAPACITY INDICATED IN TABLE 1003.3.5.1 FOR THE FLOW-THROUGH RATES INDICATED.



TABLE 1003.3.5.1
CAPACITY OF GREASE INTERCEPTORS^a

TOTAL FLOW-THROUGH RATING (gpm)	GREASE RETENTION CAPACITY (pounds)
4	8
6	12
7	14
9	18
10	20
12	24
14	28
15	30
18	36
20	40
25	50
35	70
50	100
75	150
100	200

For SI: 1 gallon per minute = 3.785 L/m, 1 pound = 0.454 kg.

a. For total flow-through ratings greater than 100 (gpm), double the flow-through rating to determine the grease retention capacity (pounds).

1003.3.5.2 RATE OF FLOW CONTROLS.

THIS CODE SECTION TECHNICALLY ADDRESSES ONLY TO HYDROMECHANICAL INTERCEPTORS WITH EXTERNAL FLOW CONTROL DEVICES; HOWEVER, IT IS INTENDED TO ADDRESS ALL HYDROMECHANICAL INTERCEPTORS. FURTHER, THE INTENT OF THIS SECTION IS TO ENSURE THE REQUIRED FLOW CONTROL METHOD IS INCLUDED IN THE INSTALLATION, BUT AGAIN, THERE IS NO SIZING REFERENCED.

1003.3.5.2 RATE OF FLOW CONTROLS.

GREASE INTERCEPTORS SHALL BE EQUIPPED WITH DEVICES TO CONTROL THE RATE OF WATER FLOW SO THAT THE WATER FLOW DOES NOT EXCEED THE RATED FLOW. THE FLOW-CONTROL DEVICE SHALL BE VENTED AND TERMINATE NOT LESS THAN 6 INCHES (152 MM) ABOVE THE FLOOD RIM LEVEL OR BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

1003.3.6 AUTOMATIC GREASE REMOVAL DEVICES.

THOUGH IT IS NOT MENTIONED IN THE TEXT, TYPICALLY THESE UNITS ARE ALSO CERTIFIED TO THE STANDARDS FOR HYDROMECHANICAL INTERCEPTORS. THE REASONING FOR THIS IS BECAUSE IF THERE IS A LOSS OF POWER, THE UNITS MUST STILL AT MINIMUM FUNCTION AS A HYDROMECHANICAL INTERCEPTOR AND REMOVE THE F.O.G. WASTE FROM THE DISCHARGE.

1003.3.6 AUTOMATIC GREASE REMOVAL DEVICES.

WHERE AUTOMATIC GREASE REMOVAL DEVICES ARE INSTALLED, SUCH DEVICES SHALL BE LOCATED DOWNSTREAM OF EACH FIXTURE OR MULTIPLE FIXTURES IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. THE AUTOMATIC GREASE REMOVAL DEVICE SHALL BE SIZED TO PRETREAT THE MEASURED OR CALCULATED FLOWS FOR ALL CONNECTED FIXTURES OR EQUIPMENT. READY ACCESS SHALL BE PROVIDED FOR INSPECTION AND MAINTENANCE.

SO, WHAT'S WRONG WITH THAT?

1. NOT ONLY DOES THIS NOT TAKE INTO ACCOUNT THAT THE VARIOUS TYPES OF FSO'S THAT ARE OUT THERE HAVE DIFFERING FATS, OILS, AND GREASE DISCHARGE RATES, IT DOESN'T SPEAK TO A REQUIRED STORAGE CAPACITY.
2. WHAT IS "PEAK DRAIN FLOW"? THIS WAS NEVER DEFINED SUCH AS WHAT SHOULD BE INCLUDED, AND AS I WILL SHOW YOU, IT ISN'T EVEN ACHIEVABLE.
3. IT DOESN'T TIE THE DESIGN INTO A TRACKABLE SERVICE INTERVAL.



2011 BROWN GREASE SUPPLY STUDY

THIS STUDY PROVIDED EVERYONE WITH THE ABILITY TO BEGIN PROPERLY SIZING FATS, OILS, AND GREASE INTERCEPTORS FOR THEIR INTENDED USE BASED ON THE FSO TYPE. IT ALSO PROVIDED THE DESIGN WORLD WITH TABLE 8-3 FROM THE ASPE PLUMBING ENGINEERING DESIGN MANUALS (MORE ON THIS LATER).



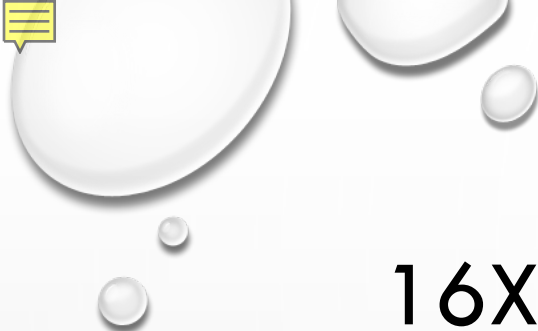


“PEAK DRAIN FLOW”

BASED ON WHAT THE 2021 IPC SAYS, YOU SIMPLY NEED TO MULTIPLY THE “PEAK DRAIN FLOW” RATE BY 30 MINUTES OF RETENTION TIME TO SIZE A GRAVITY INTERCEPTOR.

LETS TRY THAT...





16X16X12 3-COMP SINK VESSELS = 30 GPM

30 GPM X 30 MINUTES = 900 GALLONS

BUT WHAT DOES THAT REALLY REPRESENT?

IT WAS ESTABLISHED YEARS AGO THAT IT TAKES THE GREASE GLOBULES 30 MINUTES TO RISE 2 INCHES AND NOT BE CARRIED OUT IN THE DISCHARGE, HENCE, DISCHARGE IN GALLONS PER MINUTE MULTIPLIED BY THE TIME INTERVAL GIVES YOU THE CORRECT SIZE. RIGHT?





WRONG!

NOT ONLY DOES THAT NOT ACCOUNT FOR THE DIFFERENCES IN FSO DISCHARGES, IT ONLY ACCOUNTS FOR THE AMOUNT OF WATER VOLUME REQUIRED TO ALLOW THE GREASE GLOBULES TO RISE THE REQUIRED 2 INCHES. IT DOESN'T ADDRESS THE AMOUNT OF STORAGE SPACE REQUIRED, AND, THE PEAK FLOW RATE ISN'T EVEN REASONABLY ACHIEVABLE.





CONSIDER THIS...

WITHOUT EVEN CONSIDERING OTHER FIXTURE DISCHARGE BEYOND THE 3-COMP SINK, THE REAL PEAK FLOW RATE WOULD BE LESS THAN HALF OF THE 30 GPM, BECAUSE IT TAKES TIME TO FILL THE SINK AND THAT IS DRIVEN BY THE DISCHARGE RATE OF THE FAUCET.



ASSUME 10 GPM DISCHARGE RATE FOR THE FAUCET

GIVEN THE ABOVE STATEMENT AND USING THE 3-COMP SINK SIZE PREVIOUSLY MENTIONED, EACH SINK VESSEL WOULD HOLD 10 GALLONS. GIVEN THAT SCENARIO, EACH SINK VESSEL WOULD TAKE 1 MINUTE TO FILL, OR A TOTAL OF 3 MINUTES, PLUS 1 MINUTE TO DRAIN THE 3-COMP SINK.

$30 \text{ GALLONS} / 10 \text{ GPM} = 3 \text{ MINUTES} + 1 \text{ MINUTE DRAIN DOWN PERIOD}$

TOTAL TIME = 4 MINUTES



CALCULATED PEAK FLOW RATE

USING A CALCULATED PEAK FLOW IS MUCH MORE ACCURATE.

$60 \text{ MINUTES} / 4 \text{ MINUTES FOR FILL AND DRAIN CYCLE} = 15$
FILL/DRAIN CYCLES.

$15 \text{ CYCLES} \times 30 \text{ GALLONS} = 450 \text{ GALLONS IN 1 HOUR}$

$450 \text{ GALLONS} / 60 \text{ MINUTES} = 7.5 \text{ GPM}$

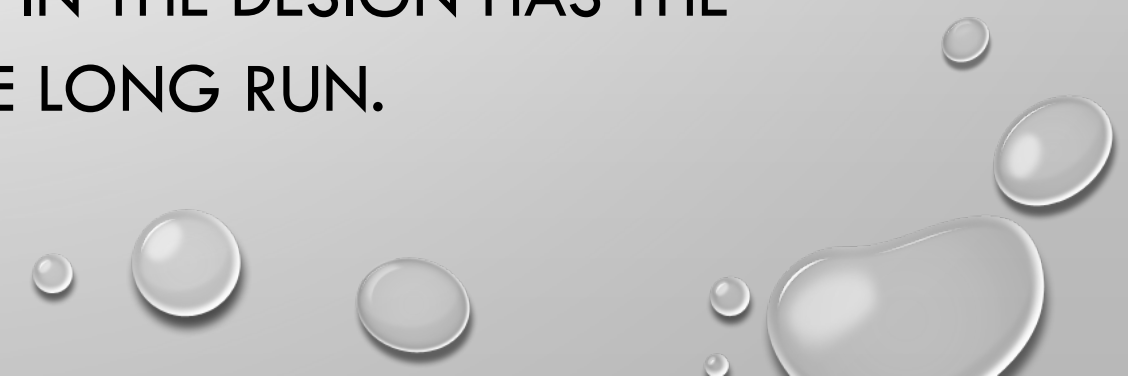




“BUT THE OTHER WAY HAS ALWAYS WORKED
BEFORE.”

MAYBE SOMETIMES, BUT EVEN THEN, ONLY BY ACCIDENT.

AS ENGINEERS, I ASSUME YOU HAVE ALWAYS HAD THE NEED TO
KNOW THE “WHY” OR “HOW TO”. FOLLOWING THE METHOD I WILL
COVER WILL PRODUCE REPEATABLE AND DEFENDABLE RESULTS EVERY
TIME. NOT ONLY THAT, BUT IT WILL ALSO GIVE YOU THE ABILITY TO
SHOW YOUR CLIENTS HOW VARIATIONS IN THE DESIGN HAS THE
POTENTIAL TO SAVE THEM MONEY IN THE LONG RUN.



NEW SIZING METHODOLOGY

THIS NEW SIZING METHODOLOGY HAS ALREADY BEEN SUBMITTED FOR THE 2027 IPC AND WAS ACCEPTED “AS SUBMITTED” AND THE FIRST CODE ACTION HEARINGS. IF NO COMMENT WERE MADE THAT BRING IT TO THE FLOOR FOR THE SECOND CODE ACTION HEARINGS, THEN IT WILL BE UP TO THE ICC MEMBERSHIP TO APPROVE THE ADOPTION IN CONSENSUS VOTING. YOU CAN VIEW IT IN ICC’S CDPACCESS, PROPOSAL P143-24.



NEW DEFINITIONS

1. CALCULATED PEAK FLOW RATE.
 2. DESIGNED SERVICE INTERVAL.
 3. FAST FOOD/QUICK SERVICE RESTAURANT.
 4. FULL SERVICE RESTAURANT.
 5. NONDOMESTIC WASTEWATER.
 6. PEAK FLOW RATE.
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CALCULATED PEAK FLOW RATE.

**MAXIMUM POSSIBLE GREASE LADEN WASTE DISCHARGE
INTO A FATS, OILS, AND GREASE INTERCEPTOR EXPRESSED IN
GALLONS PER MINUTE (GPM).**





DESIGNED SERVICE INTERVAL.

THE AMOUNT OF TIME THE DESIGN PROFESSIONAL HAS DESIGNATED AS THE MAXIMUM TIME BETWEEN GREASE INTERCEPTOR SERVICES FOR A SPECIFIC DESIGN. THIS TIME CAN BE IN DAYS, WEEKS, MONTHS, OR EVENTS, BUT SHALL NOT EXCEED 90 DAYS BETWEEN SERVICES.





FAST FOOD/QUICK SERVICE RESTAURANT.

ANY FOOD SERVICE OPERATION THAT SERVES FOOD
PRIMARILY WITH DISPOSABLE CONTAINERS AND FLATWARE
AND DISCHARGES NON-DOMESTIC WASTEWATER.





FULL SERVICE RESTAURANT.

ANY FOOD SERVICE OPERATION THAT SERVES FOOD ON PLATES OR SERVING TRAYS THAT REQUIRES WASHING, WITH OR WITHOUT FLATWARE THAT REQUIRES WASHING AND DISCHARGES NON-DOMESTIC WASTEWATER.





NONDOMESTIC WASTEWATER.

NOT REGULAR SEWAGE DUE TO VOLUME OR CHARACTER OF WATER. CAN CONTAIN SUBSTANCES LIKE INDUSTRIAL CHEMICALS, PESTICIDES, RAGS, PAINTS, EXCESSIVE OIL AND GREASE. PERMIT AND PRETREATMENT MAY BE REQUIRED BEFORE THIS TYPE OF WASTEWATER DISCHARGES INTO THE SANITARY DRAINAGE SYSTEM.





PEAK FLOW RATE.

ALL POTENTIAL GREASE LADEN WASTE DISCHARGE INTO A
FATS, OILS, AND GREASE INTERCEPTOR EXPRESSED IN
GALLONS PER MINUTE (GPM).





WHAT TO KNOW ABOUT SIZING METHODOLOGY

SIZING GRAVITY FATS, OILS AND GREASE INTERCEPTORS
REQUIRES DIFFERENT STEPS THAN SIZING HYDROMECHANICAL
FATS, OILS AND GREASE INTERCEPTORS AND GREASE REMOVAL
DEVICES.

THEY OPERATE DIFFERENTLY SO THEY SHOULD HAVE SOMEWHAT
DIFFERENT SIZING METHODOLOGIES.





GRAVITY FATS, OILS, AND GREASE INTERCEPTORS

AS WITH ANY OTHER SIZING PROCESS, THIS IS DONE IN STEPS. THE CHANGES TO CHAPTER 10 IN THE IPC HAVE BROKEN THIS DOWN FOR EVERYONE, HOPEFULLY IN AN EASY-TO-FOLLOW PROCESS, BUT ULTIMATELY IT WILL BE THE DESIGN PROFESSIONALS THAT CAN COMMENT ON THAT ONCE IT IS IMPLEMENTED.

IT IS WORTH NOTING THAT NOTHING STOPS DESIGN PROFESSIONAL'S FROM USING THIS PROCESS NOW AS AN ALTERNATIVE ENGINEERED DESIGN.





STEP 1

ESTABLISH DESIGN CONSIDERATIONS.



EXAMPLE DESIGN CONSIDERATIONS

- FSO TYPE = FULL SERVICE BBQ RESTAURANT
- SERVICE HRS. = 10
- KITCHEN EQUIPMENT RECEIVING F.O.G. WASTE DISCHARGE =
3-COMP SINK (18X18X14 VESSELS) WITH A 10 GPM FAUCET,
DISH MACHINE (56 RACKS PER HR. AT 2.51 GALLONS PER
CYCLE), PRE-RINSE SINK WITH A 7.58 GPM SPRAYER.



STEP 2 – ESTABLISH VOLUME REQUIRED TO ALLOW SEPARATION TO OCCUR.

IN ORDER TO DO THIS, WE MUST FIRST ESTABLISH THE CALCULATED PEAK FLOW RATE. THIS IS DONE BY ADDING UP ALL POSSIBLE DISCHARGE FOR 1 HOUR THEN DIVIDING THAT BY 60.



VESSEL SINK CALCULATION

$$(((L \times W \times D)/1728) \times .75) \times 7.47.$$

$$\text{SINK VESSELS} = 16 \times 16 \times 14 = 3,584 \text{ SQ.IN.}$$

$$3,584/1728 = 2.07 \text{ SQ. FT.}$$

$$2.07 \times .75 = 1.55 \text{ SQ. FT.}$$

$$1.55 \times 7.47 = 11.58$$

$$11.58 \times 3 = 34.74 \text{ GALLONS}$$

FILL/DRAIN CYCLE

$$34.74 \text{ G.} / 10 \text{ GPM} = 3.47 \text{ MIN.}$$

$$3.47 \text{ MIN} + 1 \text{ MIN. DRAIN CYCLE} = 4.47 \text{ MIN.}$$

3-COMP SINK TOTAL POSSIBLE DISCHARGE IN 1 HR.

$60 \text{ MINUTES} / 4.47 \text{ MINUTES} = 13.42 \text{ FILL/DRAIN CYCLES IN 1 HR. (ROUND UP TO 14 FOR A SAFETY FACTOR)}$

$14 \times 34.74 \text{ G.} = 486.36 \text{ GALLONS IN 1 HOUR}$

DISHWASHER DISCHARGE

56 RACKS X 2.51 GALLONS PER RACK = 140.56 GALLONS
IN 1 HOUR



PRERINSE SINK DISCHARGE

$60 \times 7.58 \text{ GPM} = 454.8 \text{ GALLONS IN 1 HOUR.}$



CALCULATED PEAK FLOW RATE

$(3\text{-COMP} + \text{DISHWASHER} + \text{PRERINSE})/60 = \text{CALCULATED PEAK FLOW}$

$486.36 + 140.56 + 454.8)/60 = 18.03 \text{ GPM}$

**THIS NUMBER REPRESENTS THE ACTUAL POSSIBLE
DISCHARGE IF ALL FUNCTIONS WERE RUN
SIMULTANEOUSLY FOR ALL SERVICE HOURS.**

STEP 2 – ESTABLISH VOLUME REQUIRED TO ALLOW
SEPARATION TO OCCUR.

$18.03 \times 30\text{-MINUTE RETENTION TIME} = 540.9$
GALLONS REQUIRED TO ALLOW SEPARATION
TO OCCUR.

STEP 3 - ESTABLISH MEALS SERVED PER DAY OR EVENT

FULL-SERVICE RESTAURANTS = 50 MEALS/SERVICE HOUR

10 SERVICE HOURS X 50 = 500 MEALS/DAY

STEP 4 - ESTABLISH F.O.G. WASTE STORAGE REQUIRE PER DAY.

FSO F.O.G DISCHARGE PER MEAL VALUE FROM TABLE 8-3 IN
THE ASPE PLUMBING DESIGN MANUAL X MEALS PER DAY =
FATS, OILS, AND GREASE STORAGE CAPACITY REQUIRED PER
DAY.

<u>Restaurant Type</u>	<u>Grease Production Values</u>	<u>Examples</u>
Low grease producer	0.005 lbs(2.268 g)/meal (no flatware)	Elementary cafeteria, grocery meat department, hotel breakfast bar, deli/sub shop, sushi, carryout pizza
	0.0065 lbs(2.268 g)/meal (with flatware)	
Medium grease producer	0.025 lbs(2.268 g)/meal (no flatware)	Cafe, coffee shop, Convenience store, Greek cuisine, Indian cuisine, Japanese cuisine, Korean cuisine, Vietnamese cuisine
	0.0325 lbs(2.268 g)/meal (with flatware)	
High grease producer	0.035 lbs(2.268 g)/meal (no flatware)	Full-fare family, fast-food hamburger, hamburger bar and grill, German cuisine, Italian cuisine, fast-food Mexican cuisine
	0.0455 lbs(2.268 g)/meal (with flatware)	
Very high grease producer	0.058 lbs(2.268 g)/meal (no flatware)	Full-fare BBQ, fast-food fried chicken, full-fare Mexican cuisine, steak and seafood restaurants, Chinese cuisine, Hawaiian cuisine
	0.075 lbs(2.268 g)/meal (with flatware)	

STORAGE/DAY CALCULATION

500 MEALS X 0.075 = 37.5 POUNDS
PER DAY

BUT WAIT... WE HAVE BEEN DEALING WITH
“GALLONS”

TRUE, WE WILL NEED TO CONVERT THE STORAGE NUMBER
TO GALLONS.

TO DO THIS WE WILL DIVIDE THE POUNDS BY 7.1.

$37.5 / 7.1 = 5.2$ GALLONS OF STORAGE REQUIRED PER DAY

WHAT DO WE KNOW SO FAR?

1. CALCULATED PEAK FLOW RATE = 18.03 GPM
2. MEALS PER DAY = 500
3. REQUIRED STORAGE PER DAY = 5.2 GAL.



STEP 4 - ESTABLISH A DESIGNED SERVICE INTERVAL.

THE DESIGNED SERVICE INTERVAL WILL DETERMINE THE STORAGE CAPACITY REQUIRED.

THIS COULD BE WEEKLY, MONTHLY, EVERY 2 MONTHS, OR EVERY 3 MONTHS DEPENDING ON THE TYPE OF INTERCEPTOR SPECIFIED AND THE STORAGE CAPACITY.

PERSONALLY, I LIKE TO RUN 3 SCENARIOS, 30-DAY, 60-DAY, AND 90-DAY.





30-DAY DESIGNED SERVICE INTERVAL

30 DAYS X 5.2 REQUIRED DAILY STORAGE = 156 GALLONS
OF STORAGE REQUIRED





60-DAY DESIGNED SERVICE INTERVAL

60 DAYS X 5.2 REQUIRED DAILY STORAGE = 312 GALLONS
OF STORAGE REQUIRED.





90-DAY DESIGNED SERVICE INTERVAL

90 DAYS X 5.2 REQUIRED DAILY STORAGE = 468 GALLONS
OF STORAGE REQUIRED.



STEP 5 - ADD REQUIRED VOLUME FOR SEPARATION TO REQUIRED VOLUME FOR STORAGE.

<u>30-DAY</u>	<u>60-DAY</u>	<u>90-DAY</u>
540.9	540.9	540.9
<u>+ 156</u>	<u>+ 312</u>	<u>+ 468</u>
696.9 GAL.	852.9 GAL.	1,008.9 GAL.

***YOU WILL HAVE TO SELECT AN INTERCEPTOR WITH THE MINIMUM
VOLUME INDICATED OR MORE TO ACCOMMODATE THE DESIGN.***



HYDROMECHANICAL OR GRD INTERCEPTOR SIZING

HYDROMECHANICAL INTERCEPTORS AND GREASE REMOVAL DEVICES ARE SIZED WITH IDENTICAL METHODOLOGY BECAUSE THEY ARE BOTH REQUIRED TO BE CERTIFIED TO THE SAME PERFORMANCE STANDARDS.

SINCE THESE DEVICE ALSO DO NOT REQUIRE A RETENTION TIME, THEY WILL USE ACTUAL DISCHARGE RATES OR A “PEAK FLOW” RATHER THAN A CALCULATED PEAK FLOW RATE.





HYDROMECHANICAL OR GRD INTERCEPTOR SIZING

THERE ARE A FEW DIFFERENCES IN SIZING REQUIREMENTS
BETWEEN THESE TWO TYPES OF INTERCEPTORS.

WE WILL START WITH HYDROMECHANICAL
INTERCEPTORS...



STEP 1 - ESTABLISH DESIGN CONSIDERATIONS.

1. FSO TYPE = FULL SERVICE BBQ RESTAURANT
2. SERVICE HRS. = 10
3. KITCHEN EQUIPMENT RECEIVING F.O.G. WASTE DISCHARGE =
3-COMP SINK (18X18X14 VESSELS) 34.74 GALLONS, DISH
MACHINE 2.51 GALLONS, PRE-RINSE SINK 7.58 GPM.

STEP 2 - ESTABLISH MEALS SERVED PER DAY OR EVENT

FULL SERVICE RESTAURANTS = 50 MEALS/SERVICE HOUR

10 SERVICE HOURS X 50 = 500 MEALS/DAY

STEP 3 - ESTABLISH FATS, OILS, AND GREASE
STORAGE REQUIRE PER DAY OR EVENT.

500 MEALS X 0.075 = 37.5 POUNDS PER
DAY



STEP 4 - ESTABLISH A DESIGNED SERVICE INTERVAL.

EXAMPLE, 30-DAY, 60-DAY, 90-DAY.





30-DAY DESIGNED SERVICE INTERVAL

30 DAYS X 37.5 REQUIRED DAILY STORAGE = 1,125
POUNDS OF STORAGE REQUIRED.



60-DAY DESIGNED SERVICE INTERVAL

60 DAYS X 37.5 REQUIRED DAILY STORAGE = 2,250
POUNDS OF STORAGE REQUIRED.

90-DAY DESIGNED SERVICE INTERVAL

90 DAYS X 37.5 REQUIRED DAILY STORAGE = 3,375
POUNDS OF STORAGE REQUIRED.

DESIGNED SERVICE INTERVAL OPTIONS

REQUIRED POUNDS OF STORAGE BASED ON DESIGNED
SERVICE INTERVAL OPTIONS.

30-DAY

60-DAY

90-DAY

1,125 POUNDS

2,250 POUNDS

3,375 POUNDS

STEP 5 - ESTABLISH THE INTERCEPTOR GPM FLOW THROUGH RATE.

3-COMP SINK 34.74 GPM +

DISH MACHINE 2.51 +

PRE-RINSE SINK 7.58 GPM

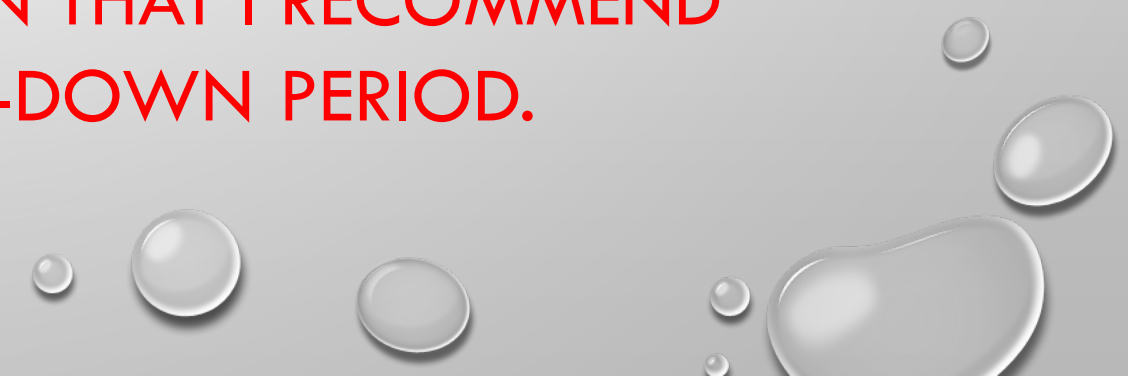
44.83 GPM



OTHER DESIGN CONSIDERATIONS

PDI AND ASME TYPICALLY RECOMMEND A 1-MINUTED DRAIN-DOWN PERIOD, THOUGH THEY ALLOW FOR UP TO A 2-MINUTE DRAIN-DOWN PERIOD.

THE LONGER IT TAKES TO DRAIN THE 3-COMP SINK, THE MORE LIKELY IT IS THAT THE FATS, OILS, AND GREASE WILL CONGEAL IN THE PIPING. IT IS FOR THIS REASON THAT I RECOMMEND STAYING WITH THE 1-MINUTE DRAIN-DOWN PERIOD.





STEP 6 - SELECT AN INTERCEPTOR WITH THE APPROPRIATE
STORAGE CAPACITY AND THE CORRECT FLOW THROUGH
RATE.

THIS WILL BE BASED ON THE MANUFACTURER'S DATA.
(RATED GPM FLOW RATE AND STORAGE CAPACITY)



PUTTING IT ALL TOGETHER FOR A 1-MINUTE FLOW THROUGH

<u>30-DAY</u>	<u>60-DAY</u>	<u>90-DAY</u>
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1,125 POUNDS	2,250 POUNDS	3,375 POUNDS
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WITH A 1-MINUTE DRAIN-DOWN PERIOD

MINIMUM FLOW THROUGH RATE = 44.83 GPM WILL MOST
LIKELY END UP BEING A 50 GPM OR HIGHER FLOW
THROUGH RATE.

PUTTING IT ALL TOGETHER FOR A 2-MINUTE FLOW THROUGH

<u>30-DAY</u>	<u>60-DAY</u>	<u>90-DAY</u>
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1,125 POUNDS	2,250 POUNDS	3,375 POUNDS
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WITH A 2-MINUTE DRAIN-DOWN PERIOD

THIS ISN'T SIMPLY DIVIDING THE PREVIOUS NUMBER IN
HALF....

2-MINUTE DRAIN DOWN

THE ONLY FIXTURE THAT CAN BE FIGURED WITH A 2-MINUTE DRAIN DOWN PERIOD IS THE 3-COMPARTMENT SINK. THE 2-MINUTE DRAIN DOWN PERIOD WILL BE ESTABLISHED BY SELECTING AN INTERCEPTOR WITH A FLOW THROUGH RATE THAT ALLOWS THE 3-COMP SINK TO COMPLETELY DRAIN WITHIN A 2-MINUTE TIME INTERVAL.

2-MINUTE DRAIN DOWN

3-COMP SINK (34.74 GPM/2) +

DISH MACHINE 2.51 +

PRE-RINSE SINK 7.58 GPM

= 18.87 GPM + 2.51 GPM + 7.58 GPM

28.96 GPM

PUTTING IT ALL TOGETHER FOR A 2-MINUTE FLOW THROUGH

<u>30-DAY</u>	<u>60-DAY</u>	<u>90-DAY</u>
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1,125 POUNDS	2,250 POUNDS	3,375 POUNDS
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WITH A 2-MINUTE DRAIN-DOWN PERIOD

MINIMUM FLOW THROUGH RATE = 28.96 GPM WILL MOST
LIKELY END UP BEING A 30 GPM OR HIGHER FLOW
THROUGH RATE.

NOTE

**THE FLOW THROUGH RATE CAN BE
HIGHER, IT JUST CANNOT BE ANY
LOWER THAN REQUIRED.**



GREASE REMOVAL DEVICE SIZING

THIS METHOD IS SOMEWHAT SIMILAR TO SIZING FOR HYDROMECHANICAL INTERCEPTOR IN THAT YOU WILL STILL USE A PEAK FLOW RATE.



STEP 1 - ESTABLISH DESIGN CONSIDERATIONS.

1. FSO TYPE = FULL SERVICE BBQ RESTAURANT
2. SERVICE HRS. = 10
3. KITCHEN EQUIPMENT RECEIVING F.O.G. WASTE DISCHARGE =
3-COMP SINK (18X18X14 VESSELS) 34.74 GALLONS, DISH
MACHINE 2.51 GALLONS, PRE-RINSE SINK 7.58 GPM.

STEP 2 - ESTABLISH MEALS SERVED PER DAY OR EVENT

FULL SERVICE RESTAURANTS = 50 MEALS/SERVICE HOUR

10 SERVICE HOURS X 50 = 500 MEALS/DAY



Step 3 - Establish total anticipated F.O.G. waste discharge per day

500 meals x 0.075 = 37.5 pounds per day



Step 4 - Establish GPM discharge.

3-comp sink (34.74 GPM/2) +
dish machine 2.51 +
pre-rinse sink 7.58 GPM

= 18.87 GPM + 2.51 GPM + 7.58 GPM

28.96 GPM



Step 5 – Select GRD interceptor based on GPM flow through rate.

30 GPM = minimum storage capacity of 60 pounds based on Table 1003.3.5.1.



Step 6 - Establish daily service intervals.

Interceptor rated storage capacity/ 37.5
pounds per day

$60/37.5 =$ Service required every 1.6 days

*I would always round this down to 1
time per day.*



**SO HOW CAN DESIGN
VARIATION SAVE THE CLIENT
MONEY?**

**YEARLY MAINTENANCE
COSTS**



CONSIDER THIS...

USING THE PREVIOUS EXAMPLE OF F.O.G. WASTE DISCHARGE,

30-DAY

60-DAY

90-DAY

1,125 POUNDS

2,250 POUNDS

3,375 POUNDS

30-DAY

60-DAY

90-DAY

1,125 POUNDS

2,250 POUNDS

3,375 POUNDS

A 30-DAY SERVICE INTERVAL = 12 SERVICES PER YEAR

A 60-DAY SERVICE INTERVAL = 6 SERVICES PER YEAR

A 90-DAY SERVICE INTERVAL = 4 SERVICES PER YEAR

IF THE AVERAGE COST OF A SERVICE FOR A HYDROMECHANICAL INTERCEPTOR IS SAY
\$400

<u>30-DAY</u>	<u>60-DAY</u>	<u>90-DAY</u>
12 SERVICES/YEAR	6 SERVICES/YEAR	4 SERVICES/YEAR
\$4800	\$2400	\$1600

THOUGH THE INITIAL INSTALLATION MAY COST MORE, A COMPLIANTLY DESIGN
INTERCEPTOR WITH A 90-DAY SERVICE INTERVAL WOULD SAVE THE CLIENT \$3200/YR.,
OR IN THEIR EYES, ENSURE AN ADDITIONAL PROFIT OF \$3200/YR.

WHAT DOES THAT LOOK LIKE FOR GRAVITY INTERCEPTORS?

30-DAY

60-DAY

90-DAY

156 GALLONS

312 GALLONS

468 GALLONS

A 30-DAY SERVICE INTERVAL = 12 SERVICES PER YEAR

A 60-DAY SERVICE INTERVAL = 6 SERVICES PER YEAR

A 90-DAY SERVICE INTERVAL = 4 SERVICES PER YEAR



GREAT QUESTION.

GRAVITY INTERCEPTORS TYPICALLY COST MORE TO MAINTAIN BECAUSE THE INTERCEPTOR CONTAIN A LARGER VOLUME OF WATER THE SERVICE PROVIDER HAS TO DEAL WITH WHEN PROVIDING THE SERVICE.

I DON'T HAVE AN EXACT NUMBER, BUT LET'S JUST ASSUME IT WOULD BE \$0.75 PER GALLON.



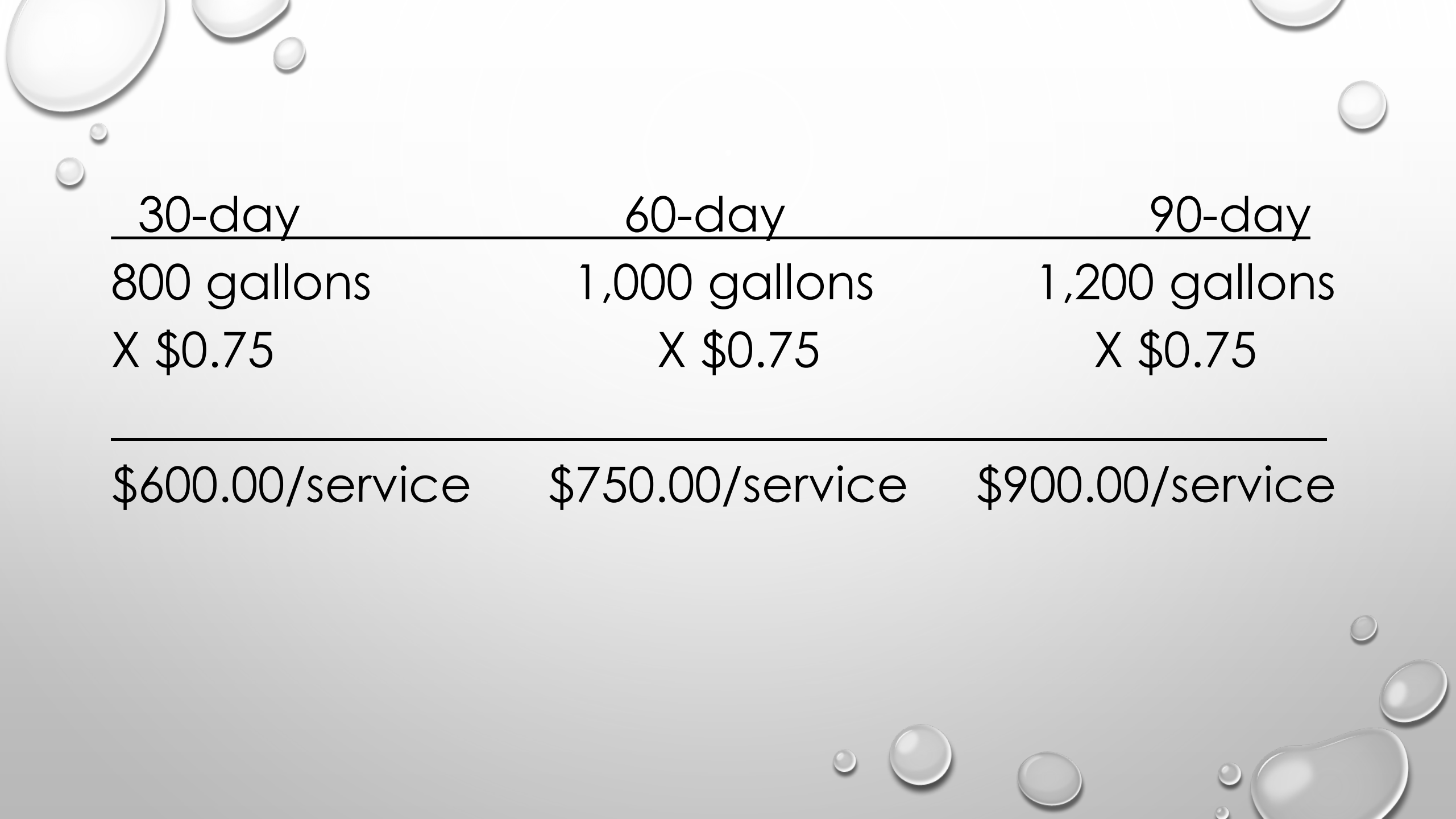


30-day - 696.9 gallons = 800-gallon tank

60-day - 852.9 gallons = 1,000-gallon tank

90-day - 1,008.9 gallons = 1,200-gallon tank





<u>30-day</u>	<u>60-day</u>	<u>90-day</u>
800 gallons	1,000 gallons	1,200 gallons
X \$0.75	X \$0.75	X \$0.75
\$600.00/service	\$750.00/service	\$900.00/service

IF THE AVERAGE COST OF A SERVICE FOR A GRAVITY
INTERCEPTOR IS \$0.75/GALLON -

<u>30-DAY</u>	<u>60-DAY</u>	<u>90-DAY</u>
800 GALLONS	1,000 GALLONS	1,200 GALLONS
X \$0.75	X \$0.75	X \$0.75
\$600.00/SERVICE	\$750.00/SERVICE	\$900.00/SERVICE

IF THE AVERAGE COST OF A SERVICE FOR A GRAVITY INTERCEPTOR IS \$0.75/GALLON -

<u>30-DAY</u>	<u>60-DAY</u>	<u>90-DAY</u>
12 SERVICES/YEAR	6 SERVICES/YEAR	4 SERVICES/YEAR
X \$600.00	X \$750.00	X \$900.00
\$7,200	\$4,500	\$3,600

THOUGH THE INITIAL INSTALLATION MAY COST MORE, A COMPLIANTLY DESIGN INTERCEPTOR WITH A 90-DAY SERVICE INTERVAL WOULD SAVE THE CLIENT \$3600/YR., OR IN THEIR EYES, ENSURE AN ADDITIONAL PROFIT OF \$3600/YR.

R.O.I.

THE ANTICIPATED RETURN ON INVESTMENT IS ENTIRELY DEPENDENT ON THE COST OF THE SERVICE, HOWEVER, THE NUMBERS I USED WERE FROM RESEARCH I PERFORMED IN 2015, THE COSTS ARE MOST LIKELY SIGNIFICANTLY HIGHER NOW.

THESE NUMBERS WILL GIVE YOUR CLIENT A WAY TO CALCULATE NOT ONLY THE ROI, BUT THEY WILL BE ABLE TO CALCULATE THE INCREASED PROFITS FOR ANY INVESTORS, AND THEY CAN CONSULT WITH THEIR SERVICE PROVIDER FOR ANTICIPATED COSTS IF THEY WANT TO PROVIDE DETAILS BASED ON THEIR SPECIFIC OPERATION.

The background of the slide is a light gray gradient. It is decorated with numerous realistic water droplets of various sizes. Some droplets are large and prominent, while others are small and subtle. They are scattered across the slide, with a higher concentration in the top-left and bottom-right corners. The droplets have a glossy, reflective surface with highlights and shadows, giving them a three-dimensional appearance.

QUESTIONS?



THANK YOU

IF YOU HAVE ANY QUESTIONS THAT WERE NOT ANSWERED TODAY, PLEASE CONTACT ME AT
PLUMBINGINFO@COLUMBUS.GOV

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