



**INFILTRATOR**  
water technologies



# Grease Interceptors: Function and Design

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# Grease Interceptor Executive Summary

- Grease interceptors capture fats, oils, and greases (FOG) from food service establishments to protect onsite systems (ATU or the drainfield) and sewer systems/pipes from clogging.
- Two Basic types:
  - Gravity Grease Interceptors (GGIs)
  - Hydromechanical Grease Interceptors (HGI)
- Has Grease Changed over the years?
- Have Codes kept up?
- Pumping Frequency: 90 day or as needed or as per local requirements



# Grease Trap vs. Grease Interceptor

**For our discussions:**

**Grease Trap = collection within the facility**

**Grease Interceptor = tank outside of facility**

# Questions

1. **What is the expected design life of a typical residential system?**
  - a. **0-5 years**
  - b. **5-10 years**
  - c. **10-20 years**
  - d. **Greater than 20 years** \*\*\*

# Questions

**2. What is the expected design life of a typical restaurant system?**

- a. 0-5 years\*\*\***
- b. 5-10 years**
- c. 10-20 years**
- d. Greater than 20 years**

# Questions

**3. For High Strength Waste systems, I design based upon:**

- a. Strictly Per code**
- b. Per code with extra considerations**
- c. Custom design per facility type**

# Grease and High Strength Waste

**Grease is considered HSW (no surprise)**

**What is most common commercial facility type designed for decentralized systems?**

**Restaurants**

**Grease interceptors are our #1 solution to deal with HSW**

- **Centralized Systems: GI's even more common**

# Literature: Restaurant BOD Strength

- A study performed by Lesikar in 2004 in Texas demonstrated:
  - 75% of wastewater samples from 28 different kinds of restaurants were 1400 mg/L or less with an average of 1000 mg/L.

Type of Restaurants	Number of Systems in Group	Average BOD mg/L
Fast Food/Burgers	6	974
Pizza	1	1856
Chinese	4	1364
Mexican	9	1254
American	1	1063
American Buffet	1	792
Steakhouse	2	601
Seafood	3	555



# Grease Production:

**Table 8-3 Example Grease Production Values for Restaurants**

Restaurant Type	Grease Production Values	Examples
Low Grease Producer	0.005 lbs/meal (no flatware) 0.0065 lbs/meal (with flatware)	Elementary Cafeteria, Grocery Meat Department, Hotel Breakfast Bar, Sub Shop, Sushi, Take & Bake Pizza
Medium Grease Producer	0.025 lbs/meal (no flatware) 0.0325 lbs/meal (with flatware)	Cafe, Coffee Shop, Convenience Store, Grocery Deli, Greek, Indian, Japanese, Korean, Thai, Vietnamese
High Grease Producer	0.035 lbs/meal (no flatware) 0.0455 lbs/meal (with flatware)	Full-Fare Family, Fast-Food Hamburger, Hamburger Bar & Grill, German, Italian, Fast-Food Mexican
Very High Grease	0.058 lbs/meal (no flatware) 0.075 lbs/meal (with flatware)	Full-Fare BBQ, Fast-Food Fried Chicken, Full-Fare Mexican, Steak & Seafood, Chinese, Hawaiian

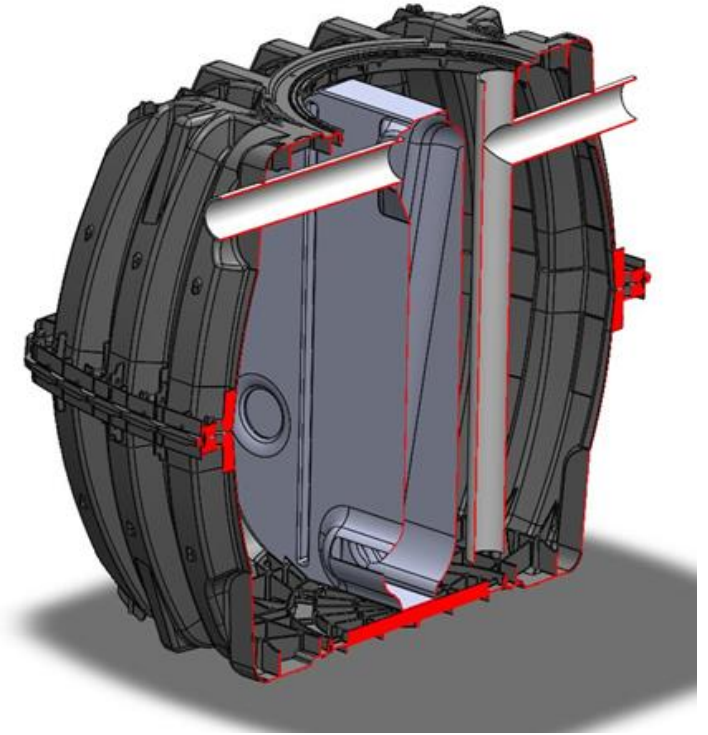
Source: ASPE Plumbing Engineering Design Handbook, Volume 4. (C) 2016, American Society of Plumbing Engineers.

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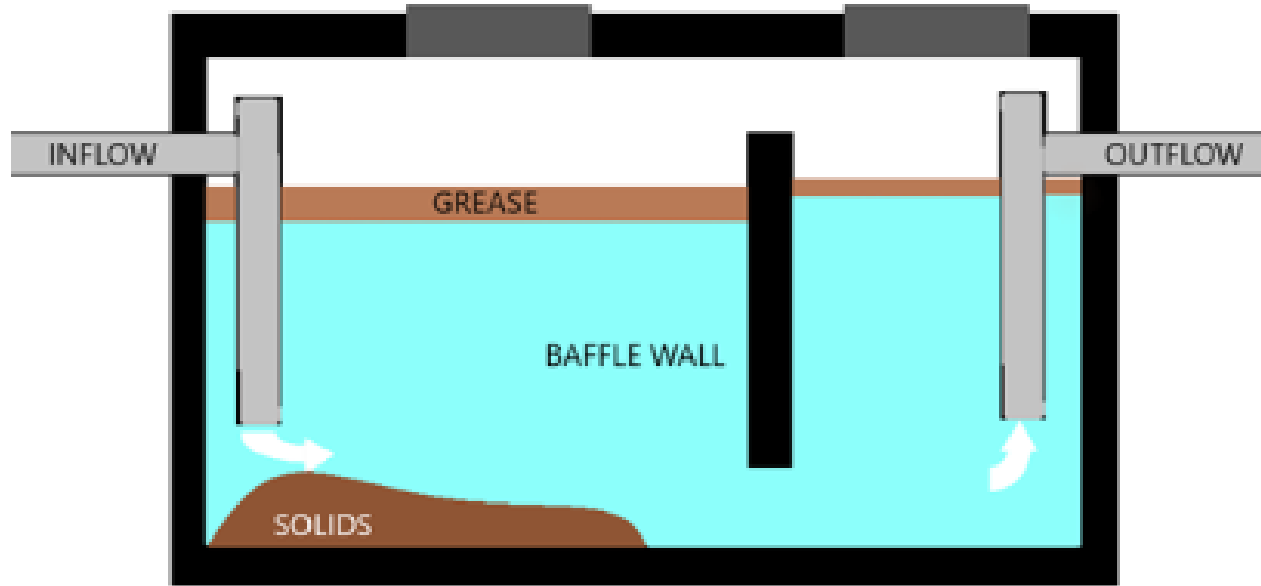
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# GGI and HGI Difference

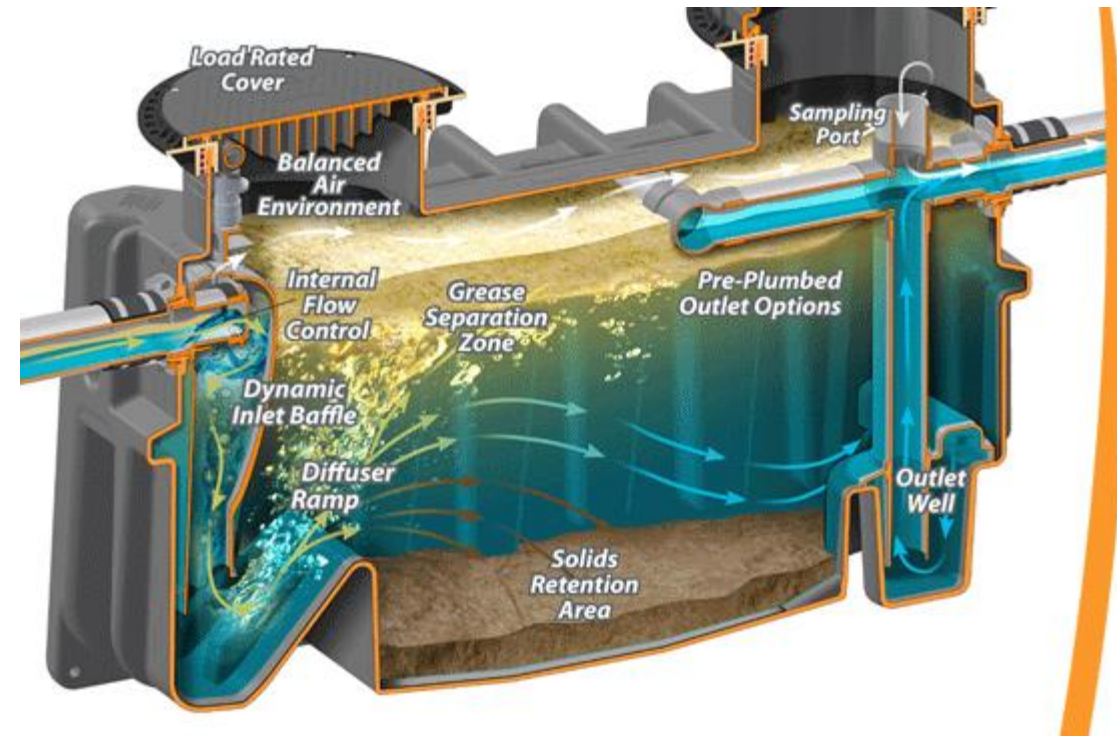
- Gravity Grease Interceptors (GGI) are specified by volume.
- Hydromechanical Grease Interceptors (HGI) increase separation performance through the use of flow control, air intake and baffles, which markedly decreases the time necessary to separate.



# Typical Grease Interceptor Types

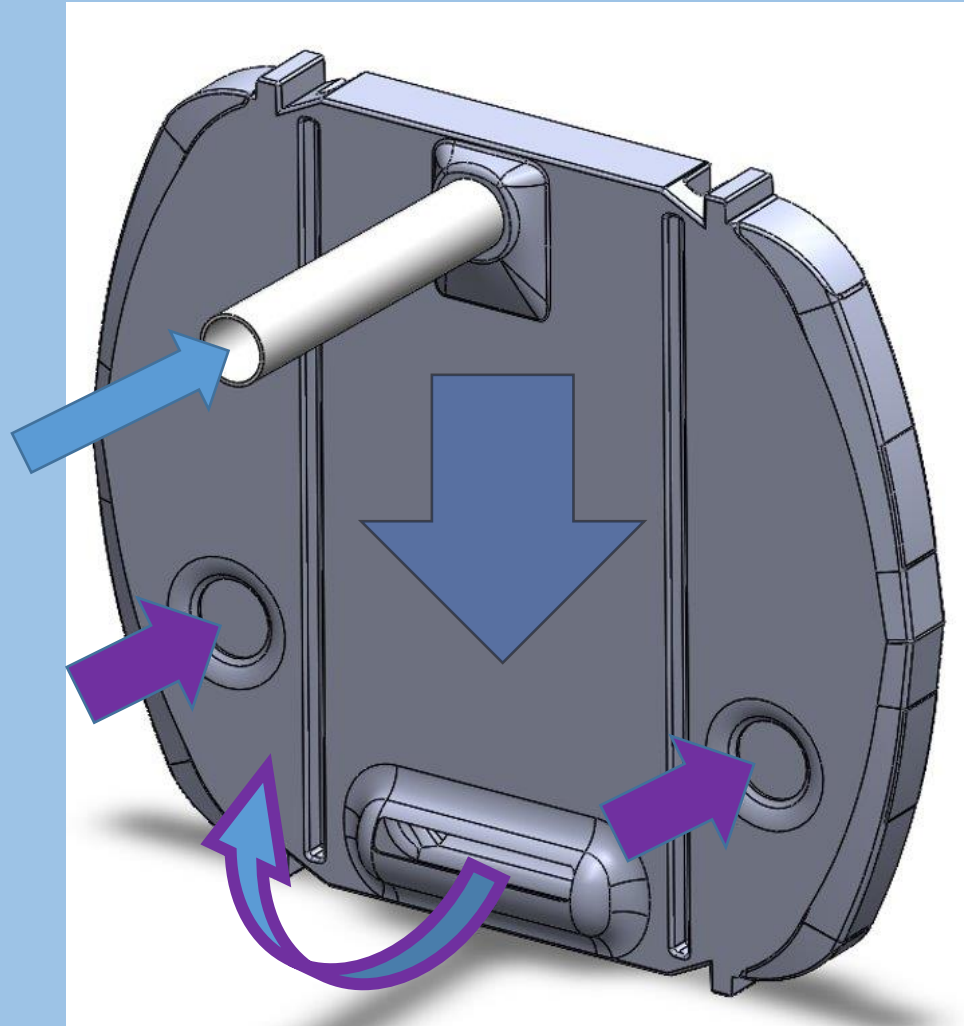


Gravity Grease Interceptor



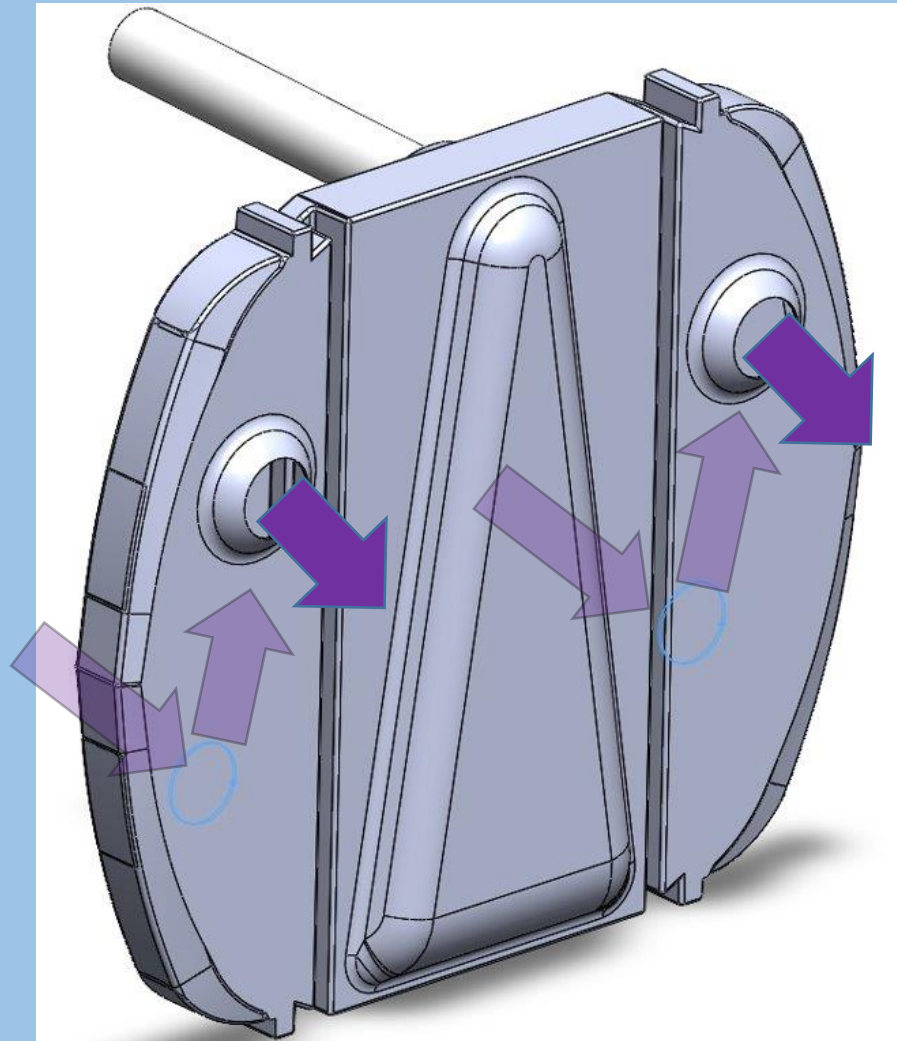
Typical Hydromechanical Grease Interceptor

# Hydromechanical Grease Interceptor





# Hydromechanical Grease Interceptor

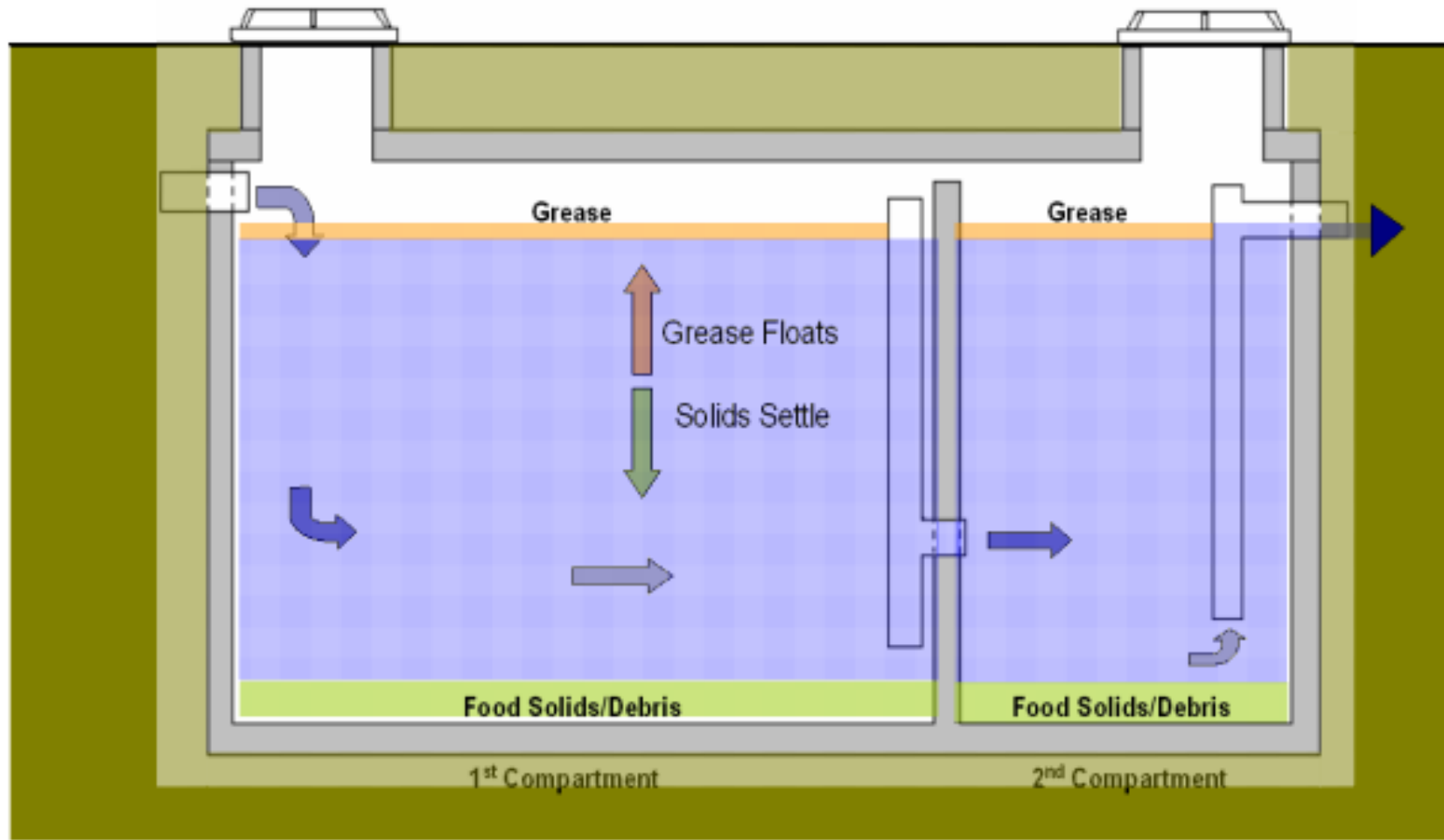


# Grease Interceptor – Design & Function

Hydromechanical grease interceptors incorporate air entrapment, the buoyancy of grease in water and hydromechanical separation with interior baffling for improved separation.

Hydromechanical Grease Interceptors allow the liquid capacity to be smaller than gravity interceptors – smaller tank, smaller footprint

# Gravity Grease Interceptor



**Figure 1-1. Standard Configuration of Grease Interceptor.**

Source: WERF: Assessment of Grease Interceptor Performance

# Changes in Grease

From NPCA:

- FOG has evolved over the years as animal fats such as lard have been replaced by vegetable oils, cleaning agents have changed, and hand-washing dishes has been replaced by dishwashers discharging effluent at a higher temperature. Each of these factors plays a key role in the type of grease globule that enters the interceptor
- Have codes changed?

# Effects of Temperature

What is the code required dishwasher temperature?

- FDA Food Code: the final sanitizing rinse temperature for mechanical dishwashers should be at least 180°F (82°C)
- Excessive heat impacts the efficiency of the grease trap by liquefying fats and oils, which could then pass through the trap and potentially cause issues downstream



# Operations and Maintenance

## 8.2.6 Operation and Maintenance

In order to be effective, grease traps must be operated properly and cleaned regularly to prevent the escape of appreciable quantities of grease. The frequency of cleaning at any given installation can best be determined by experience based on observation. Generally, cleaning should be done when 75% of the grease-retention capacity has been reached. At restaurants, pumping frequencies range from once a week to once every 2 or 3 months.

Source: US EPA Design Manual, Onsite Wastewater Treatment and Disposal Systems, 1980

# Grease Interceptor Resources

## Water Environment Federation (WEF)

- <https://decentralizedwater.waterrf.org/documents/03-CTS-16T/03CTS16TAweb.pdf>

## IAPMO

- <https://www.iapmo.org/media/28504/2021-10-20-ansi-can-iapmo-z1001.pdf>

## NPCA

- [https://precast.org/wp-content/uploads/2021/09/GGI\\_2021-1.pdf](https://precast.org/wp-content/uploads/2021/09/GGI_2021-1.pdf)

## University of Florida

- Determination of Properties and the LTAR of Effluents from Food Service Establishments that Employ Onsite Sewage Treatment

# Best Practices For Grease Interceptors

- Comply with local regulations
- Design with O&M in mind: location and access
- If located in traffic area, then specify H-20 tank or slab
  - Locate out traffic, frame and cover, close to building
- Understand the facility type and offer a size that is appropriate
  - Codes are...
- Cleaning Frequency: function of the facility, recommend a minimum of quarterly pump-out
- Material Construction: Specify materials that are resistant to corrosion and degradation from FOG and cleaning chemicals

# Grease Interceptor Summary

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- Grease and dishwashing practices have changed, codes have not
- Provide specific details – comply with code, contact the local precaster for CAD details
- Notes: include note to pump quarterly, other notes?
- Both GGI and HDI are good, but neither are good if undersized or not maintained properly (we can have the best of technologies...)
- Recommend code changes, change to what? Need a standardized test procedure