



Energy Efficient

Water Heating Solutions

Reference Guide to Products and Services

Presented by Dipesh Parekh and Rohan Scafe



Enhancing Lives By Changing The Way Water Is Heated

Rinnai



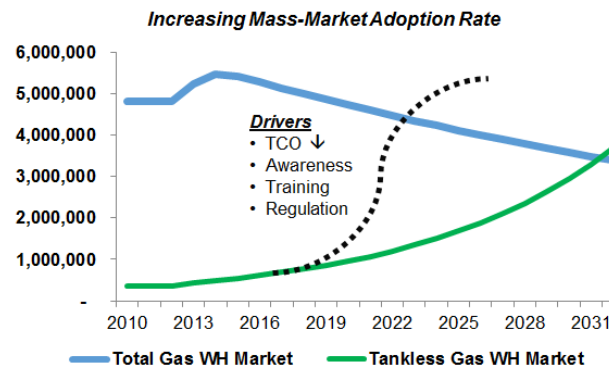
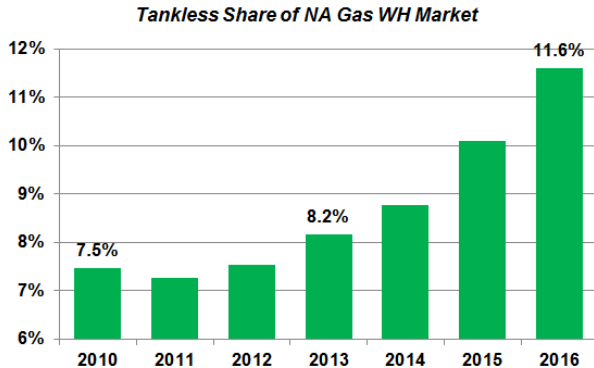
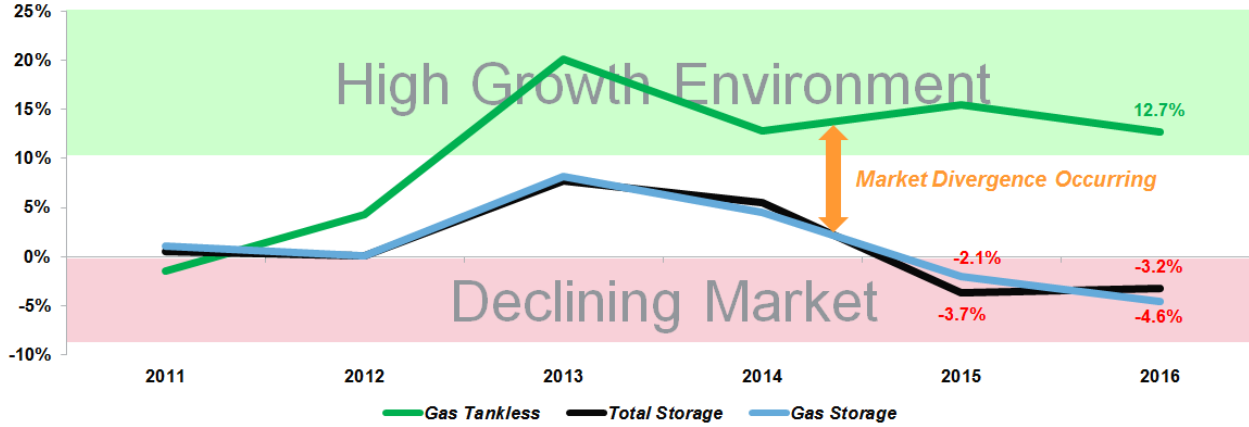
Rinnai Global Capabilities

Rinnai®

- Based in Nagoya, Japan with over 10,000 employees world-wide
- Over 29 Global Subsidiaries and Affiliates in 43 countries
- Established in 1920 - Tankless introduced to NA in 1999.
- Used in Japan's first "low carbon certified" building
- Certified CSA Testing Laboratory
- North American Headquarters located in Peachtree City, GA
- #1 Tankless Water Heater Manufacturer in U.S. and Canada



ENHANCING LIVES BY CHANGING THE WAY WATER IS HEATED



ENHANCING LIVES BY CHANGING THE WAY WATER IS HEATED

“Quality is our Destiny”

Rinnai®



20.0 %

6.9%

3.8%



1.0%



<.5%

Products for every application

Rinnai



ENHANCING LIVES BY CHANGING THE WAY WATER IS HEATED

Emergency Replacement



Planned Replacement
and New Construction



DuoSmart™
TANK TECHNOLOGY



ThermaCirc360™
Wait less. Waste less.

Transforming the way water is heated

Rinnai.



ENHANCING LIVES BY CHANGING THE WAY WATER IS HEATED

Products that change the way water is heated **Rinnai**

Existing Boiler Room



Same Boiler Room with Multiple Solutions



ENHANCING LIVES BY CHANGING THE WAY WATER IS HEATED

Example: 1,000,000 Btu System



**One Rinnai tankless disabled:
loss of 16% DHW**

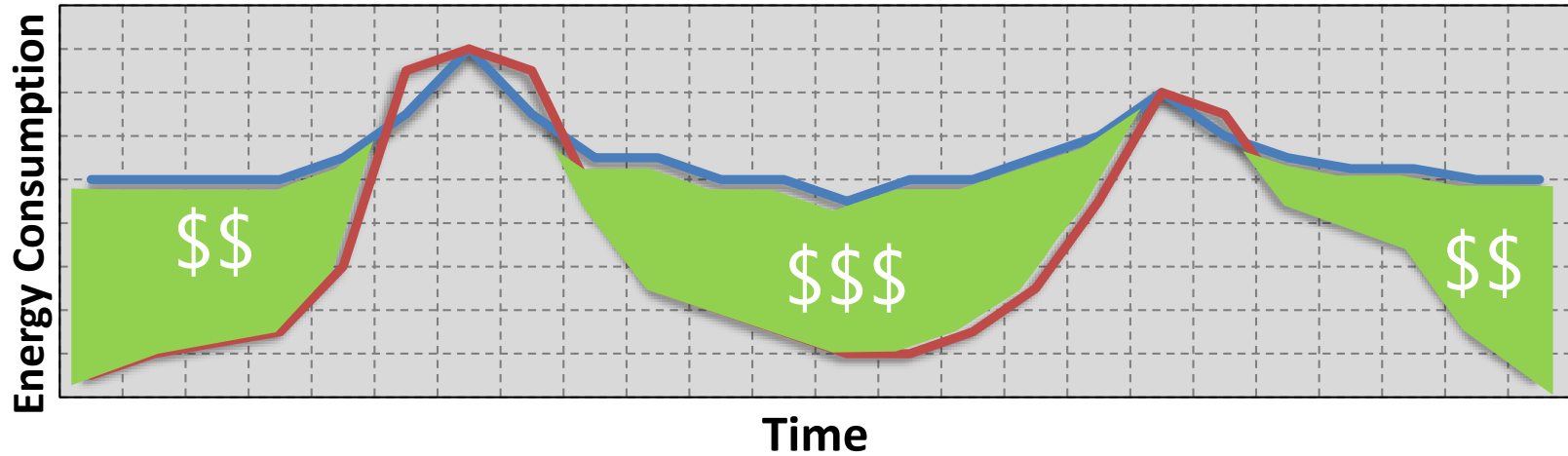


**Tank disabled:
100% loss of DHW**



**One unit disabled:
50% loss of DHW**

TRS can **Track the Load** from one fixture to the entire facility under peak demand



— Boiler

— TRS

Reduce Capital and Operating Costs

Multi-Zoned Installations provide VE opportunities

Eliminate large, complicated and expensive central systems

- Ability to separate DHW from high temp HW without expensive mixing valves
- Shorter recirculation loops reduces pump size and saves energy
- Space savings with smaller, wall-mount TRW
- Redundancy provides maximum uptime



Guest Rooms 120°F



Zoned Guest Rooms, 1 per floor or every other floor

Kitchen / Laundry 140°F



\$15 to \$25K Mixing Valve



Overall lower cost to install

S

2025 SUSTAINABILITY AND SOCIAL IMPACT GOALS: REDUCE ENVIRONMENTAL IMPACTS

GOAL Reduce environmental footprint by 15% | 30% | 45% across the portfolio by 2025
(from a 2016 baseline; for water | carbon | waste on an intensity basis)

SUPPORTING GOALS



WATER

Reduce water intensity by 15%



CARBON EMISSIONS

Reduce carbon intensity by 30%
Commit to analyze the opportunity to set a science-based target by 2018



WASTE

Reduce waste to landfill by 45%
Reduce food waste by 50%



RENEWABLE ENERGY

Achieve a minimum of 30% renewable energy use

- Zoned Water Heating
- Strategically Locate tankless,
- Integrated Recirculation

All can reduce waste by reducing time to purge cold water from lines

- High efficiency technology
- Superior load tracking
- Integrated recirculation control

All reduce energy usage and reduce carbon emissions

- Tankless technology has a longer expected life vs tanks
- Parts are field replaceable
- Parts are easily recyclable

Rinnai products reduce the impact to landfills

- Tankless technology is the preferred back-up to solar thermal water heating systems

Renewal systems such as solar thermal all require a back-up and method to handle peak demands

Rinnai Life Cycle Cost Analysis - Hospitality



(2) Tankless Racks TRS04 and TRS06	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total LCC	
Equipment Cost (Year 7 HX replacement)	\$ 28,500	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,000	\$ -	\$ -	\$ -	\$ 32,500	
Installation Cost (Year 7 HX replacement)	\$ 12,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,000	\$ -	\$ -	\$ -	\$ 13,000	
Utility Rebate(s)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Total Installed Cost	\$ 40,500	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,000	\$ -	\$ -	\$ -	\$ 45,500	
Annual Maintenance	\$ -	\$ 2,000	\$ -	\$ 2,000	\$ -	\$ 2,000	\$ -	\$ 2,000	\$ -	\$ 2,000	\$ 10,000	
Annual Energy Cost	\$ 11,670	\$ 11,670	\$ 11,670	\$ 11,670	\$ 11,670	\$ 11,670	\$ 11,670	\$ 11,670	\$ 11,670	\$ 11,670	\$ 116,700	
Total Operating	\$ 11,670	\$ 13,670	\$ 11,670	\$ 13,670	\$ 11,670	\$ 13,670	\$ 11,670	\$ 13,670	\$ 11,670	\$ 13,670	\$ 126,700	
Productivity Add Inputs (revPAR and ADR)	100	36,500	\$ 2,500,000	\$ 68	0.70	\$ 97.85	20					
	# OF RMS	AVAIL RMS/YR	GROSS RM REV YR	revPAR	OCCUP. %	ADR	"NO HOT" WATER COMPS PER YR					
Productivity Add Offset	\$1,957	\$1,957	\$1,957	\$1,957	\$1,957	\$1,957	\$1,957	\$1,957	\$1,957	\$1,957	\$19,569	
Total Cumulative A&M Cost	\$ 50,213	\$ 61,926	\$ 71,639	\$ 83,352	\$ 93,065	\$ 104,778	\$ 119,491	\$ 131,204	\$ 140,917	\$ 152,631	\$ 152,631	
Rebates may be available in some areas for tankless NG water heaters												
(4) NG Tank (100 Gal.)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total LCC	
Equipment Cost	\$ 24,000	\$ -	\$ -	\$ -	\$ 24,000	\$ -	\$ -	\$ -	\$ -	\$ 24,000	\$ 72,000	
Installation Cost	\$ 8,000	\$ -	\$ -	\$ -	\$ 8,000	\$ -	\$ -	\$ -	\$ -	\$ 8,000	\$ 24,000	
Utility Rebate(s)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Total Installed Cost	\$ 32,000	\$ -	\$ -	\$ -	\$ 32,000	\$ -	\$ -	\$ -	\$ -	\$ 32,000	\$ 96,000	
Annual Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Annual Energy Cost	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 136,700	
Total Operating	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 13,670	\$ 136,700	
Total Cumulative A&M Cost	\$ 45,670	\$ 59,340	\$ 73,010	\$ 86,680	\$ 132,350	\$ 146,020	\$ 159,690	\$ 173,360	\$ 187,030	\$ 232,700	\$ 232,700	



ENHANCING LIVES BY CHANGING THE WAY WATER IS HEATED

- Flexible installation options
 - (Interior/Exterior, Natural Gas/Propane)
- 97% Thermal Efficiency
- Common Vent up to 12 units/~2.4MMBTU (6" PVC)
- **Warranty**
 - **8 years or 12,000 operation hours heat exchanger**
 - **5 year parts**
 - **2 years labor***



SENSEI™

THE NEXT GENERATION IN TANKLESS WATER HEATING



Focused on 3 ideals to Captivate Customers:

- 1. Installation Ease**
- 2. Operational Performance**
- 3. Serviceability**

Every component was designed to be removed in under 10 minutes



Real-time Status
Remote diagnostics and alerts
Shorter maintenance time
Control and convenience



Tankless Rack System™
Up to 25 units working together
327:1 Turndown Ratio = Superior
Load Tracking



Demand Duo™ Commercial Family of Products

Rinnai



80 gal / 199K BTU
Standard Efficiency
Demand Duo 80
CHS19980HE (iN/iP)

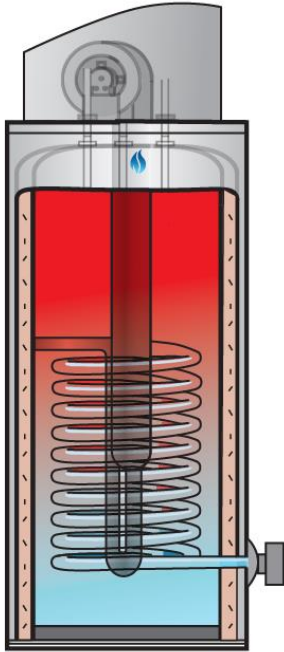


119 gal / 199K BTU
High Efficiency
Demand Duo 119
CHS199100CU (iN/iP)

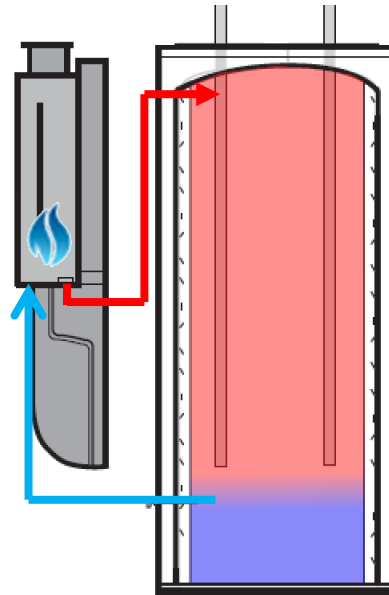


119 gal / 398K BTU
High Efficiency
Demand Duo 2
CHS398100CU (iN/iP)

HE Commercial Water heater



Rinnai Demand Duo Hybrid Commercial Water Heater



Removed the heat source from the tank

Larger tank + 90% utilization = more hot water

Benefits:

1. Reduced Thermal Stress on the Tank
2. Easily replaced components
3. More Hot Water Capacity
4. Consistent Hot Water Temperature

The Demand Duo™ Value Proposition

Rinnai.

So, would you rather
replace this at ~\$7000

Or this at ~\$400?



Heating occurs in the tankless
heat exchanger – not the tank

Set-point temperature water
delivered to the tank

Removes stress from tank

Extends the life of the
product



RESULT = 2x warranty (8 years
HEX / 6 years Tank)

2x warranty – similar cost - repair vs replace = lower cost of ownership

ENHANCING LIVES BY CHANGING THE WAY WATER IS HEATED

Demand Duo Warranty



	Demand Duo 119 Demand Duo 2		Demand Duo 80	
		Commercial		Commercial
		CHS199100CU CHS398100CU		CHS19980HE
Heat Exchanger		8 years		5 years
Storage Tank	6 years			
Parts and Components	5 years			
Reasonable Labor	2 years*			

*Limitations apply, see Rinnai Limited Warranty Terms and conditions located in the installation and operation manual.

How Rinnai National Accounts Started...

Rinnai



Rinnai Sales: *“What do you like about this water heater?”*

Customer: *“Nothing, it’s expensive and it has to be replaced every 3 years.”*

Rinnai Sales: *“Great, you should try our Demand Duo.”*

Customer: *“Ok, what’s your National Accounts 24/7 phone number?”*

Rinnai: *“We don’t have one...”*

Customer: *“Sorry Rinnai, I can’t live without 24/7 replacement service. I hate the product, but love the service.”*



Sizing, Energy and Space Savings using a Commercial Tankless Solution

Rinnai Corporation

Rinnai

Role

- Manage a Team Engineers serving North America
- Sizing, design and quotation
- Custom engineered solutions via Made-to-Order (MTO)
 - piping, pump, controls, tank, design drawings and more
- Return-on-investment (ROI) calculations: cost, savings, carbon emissions and life cycle cost analysis
- Commercial system installation and troubleshooting support
- Consultation: Owners, MEPs, Architects, Mechanical Contractors, Facilities Managers, Builders, Developers and more

Sizing Fundamentals – Important Factors

- Hot water demand: How much hot water is required during peak?
- Incoming ground water temperature: Ground water temperature could increase system size by up to 40% in northern regions
- Altitude: Air to gas ratio is affected at high altitude
- Existing distribution water line size
- Mechanical space
- Available gas load: Tankless systems require high input rate. Must ensure gas meter, regulator and lines are sized for maximum input rate of system

Sizing Fundamentals – Formulas

Rate of heat transfer:

$$\text{Btuh} = \text{GPH} \times \Delta T \times 8.33$$

$$\text{Btuh} = Q \times \Delta T \times 500$$

GPH: Gallons per hr

Q: Water flow rate (gpm)

ΔT : Temperature rise ($^{\circ}$ F)

Btuh: Defined as the quantity of energy necessary to raise the temperature of 1lb of water 1° F in 1 hour

Used to determine energy loads

Mixed water temperature:

$$P = (T_m - T_c) / (T_h - T_c)$$

P: Hot water multiplier

T_m : Temperature of mixed water ($^{\circ}$ F)

T_c : Temperature of cold water ($^{\circ}$ F)

T_h : Temperature of hot water ($^{\circ}$ F)

Hot Water Flow Rate (gpm) =

Mixed Temperature Flow Rate $\times P$

Max Flow Rate of Round Pipe (Q)

$$Q = 2.448d^2V$$

Q = flow rate (gpm)

D = pipe diameter (inches)

V = pipe velocity (ft/s)

Friction Head Loss (h):

$$h = 0.000623q^2 \times L/d^5$$

H = friction head (ft)

q = flow rate (gpm)

L = pipe length (ft)

d = pipe diameter (inch)

2.31 ft head = 1 PSI

Sizing Fundamentals – Ground Water Temperature Map

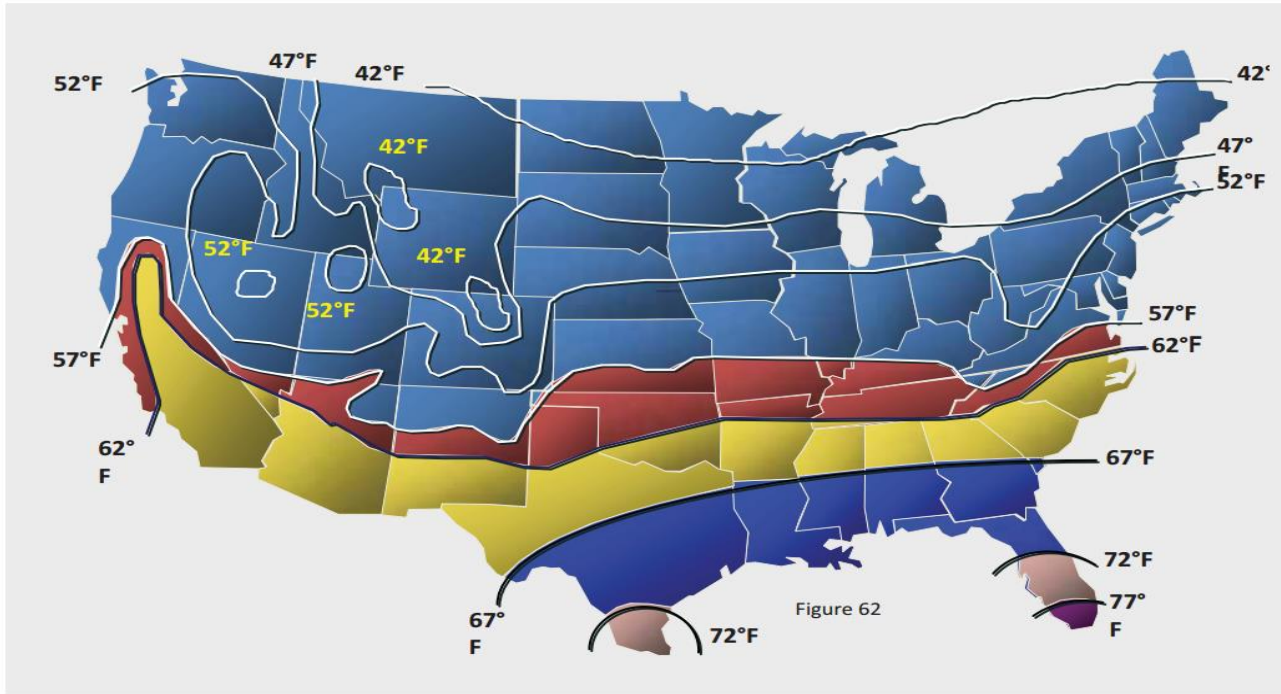


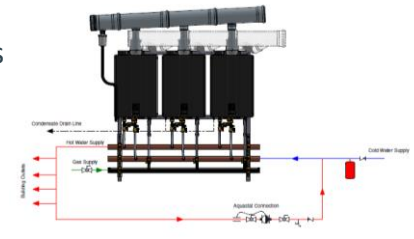
Fig. 40 Approx. ground water temperatures
Courtesy of epa.gov., accessed September 2012

Industry Sizing Methods – ASHRAE & ASPE

ASHRAE

Hot Water Fixture Units and the Modified Hunter's Curve:

- FU: An arbitrary unit assigned to different types of plumbing fixtures
- Most plumbing fixtures are assigned a FU
- Used when sizing tankless, instantaneous, on-demand water heaters (systems that do not incorporate storage)
- Used in conjunction with the Modified Hunter's Curve to estimate water flow rates
- The Modified Hunter's Curves are specific to the application
- Diversity is included in the curves



ASPE

GALLONS PER HOUR (GPH) REQUIREMENT: an estimated measure of the total gallons of hot water the building will use during peak periods. Fixture GPH is specified by technical publications such as American Society of Plumbing Engineers (ASPE) or the fixture manufacturer. This method is used for sizing storage water heating systems.

Determining design load (Btuh):

Design load (Btuh) = GPH X ΔT X 8.33

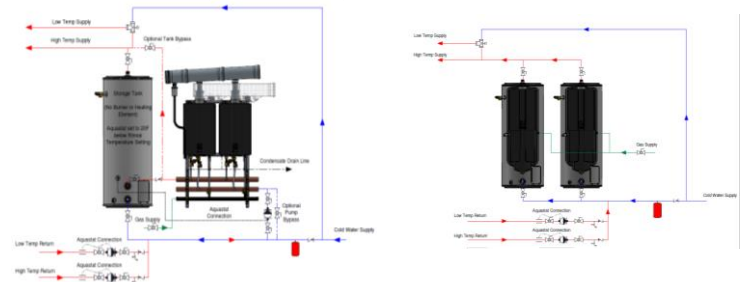
ΔT : temperature rise (F)

8.33: weight of water (8.33lb/gal)

Engines = Design load (Btuh)

Engine max. input (Btuh) x Engine TE.

Tank vol. (gals.) = Design GPH x 0.20



Sizing Example – Central Plant w/ Tankless Only

ASHRAE | 55 Suite Hotel | Location: Suburban Atlanta, GA | GWT: 65F | Supply temp: 120F | ΔT : 55F

50.28

2015 ASHRAE Handbook—HVAC Applications

Table 16 Hot-Water Demand in Fixture Units (140°F Water)

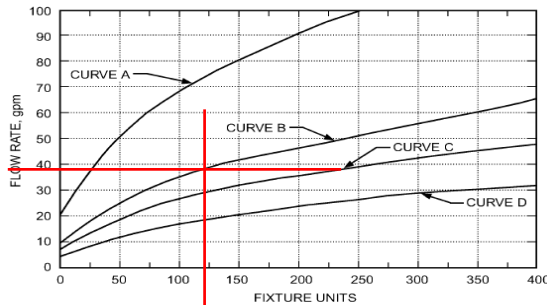
	Apartments	Club	Gymnasium	Hospitals	Hotels and Dormitories	Industrial Plant	Office Building	School	YMCA
Basin, private lavatory	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Basin, public lavatory	—	1	1	1	1	1	1	1	1
Bath tub	1.5	1.5	—	1.5	1.5	—	—	—	—
Dishwasher*	1.5	Five fixture units per 250 seating capacity			—	—	—	—	—
Therapeutic bath	—	—	—	5	—	—	—	—	—
Kitchen sink	0.75	1.5	—	3	1.5	3	—	0.75	3
Pantry sink	—	2.5	—	2.5	2.5	—	—	2.5	2.5
Service sink	1.5	2.5	—	2.5	2.5	2.5	2.5	2.5	2.5
Shower	1.5	1.5	1.5	1.5	1.5	3.5	—	1.5	1.5
Circular wash fountain	—	2.5	2.5	2.5	—	4	—	2.5	2.5
Semicircular wash fountain	—	1.5	1.5	1.5	—	3	—	1.5	1.5

HOT WATER FIXTURE LIST

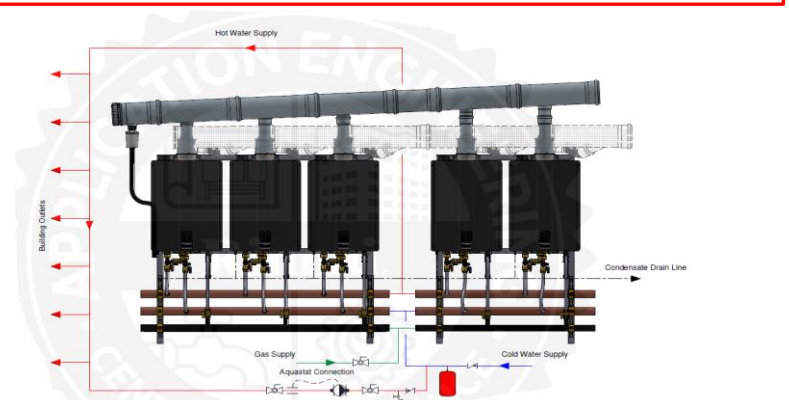
Fixtures	Qty.	FU	Total FU	GPH	Total GPH
Suites/rooms	55	—	—	12	660
Tab/showers	55	1.5	82.5	—	—
Lavatory/hand sinks	55	0.75	41.25	—	—
	Total WSFU		124	Total GPH	660
Design Flow Rate (gpm)	36.8		Design GPH		660

Flow rate/engine (CU199) @ 55F rise: 7 gpm

Engines :37/7 = 5 engines or 1-TRW03 + 1-TRW02



CURVE A: RESTAURANTS
 CURVE B: HOSPITALS, NURSING HOMES, NURSES' RESIDENCES, DORMITORIES, HOTELS, AND MOTELS
 CURVE C: APARTMENTS AND HOUSES
 CURVE D: OFFICE BUILDINGS, ELEMENTARY AND HIGH SCHOOLS



Sizing Example – Central Plant w/Storage

ASPE

Determine design load (Btuh):

Design load (Btuh) = GPH X ΔT X 8.33

ΔT : temperature rise (F)

8.33: weight of water (8.33lb/gal)

Engine qty. = Design load (Btuh)

Engine max. input (Btuh) x Engine TE.

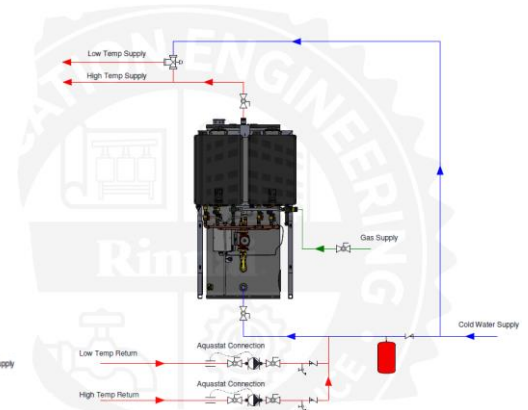
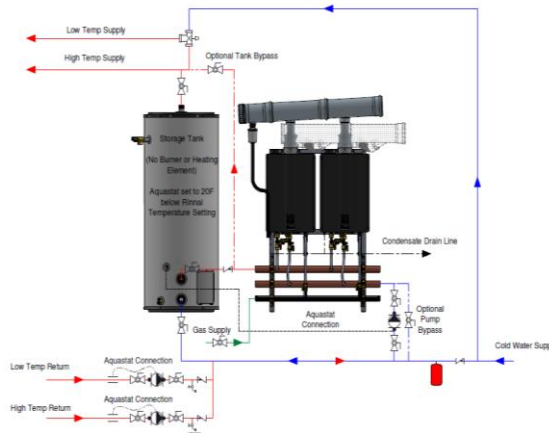
Tank vol. (gals.) = Design GPH x 0.2

Design load: $660 \times 55 \times 8.33 = 302,379$ Btuh

Engine qty. = $\frac{302,379}{199,000 \times .97} = 1.6 \sim 2$ engines

Tank vol. = $660 \times 0.2 = 130 \sim 119$ gal

HOT WATER FIXTURE LIST					
Fixtures	Qty.	FU	Total FU	GPH	Total GPH
Suites/rooms	55			12	660
Tub/showers	55	1.5	82.5		
Lavatory/hand sinks	55	0.75	41.25		
	Total WSFU		124	Total GPH	660
Design Flow Rate (gpm)		36.8		Design GPH	660



Energy Savings

Items needed:

- Job must be sized by Rinnai
- Make and model of spec'd or existing system
- Storage capacity
- Thermal efficiency
- Tank standby loss
- Age of tanks
- Utility rates

APPLICATION INFORMATION	
Application Type:	Hotel
Unit of Measure:	US
Rinnai Fuel Type:	Natural Gas
Tank Fuel Type:	Natural Gas
Location:	Indoor

DESIGN PARAMETERS	
Supply temp:	120 °F
Ground temp:	65 °F
Temperature rise:	55 °F
Age of existing WH	8 yrs

CALCULATION CONSTRAINTS		
	Rinnai TRS	2 Tank Water Heater
*Design peak demand (GPH)	660	660
*Temperature rise (*F)	55	55
Design Btuh	302,379	302,379
*Estimated peak demand duration (hr/day)	4	4
*Est. days per year of operation	365	365
*Est. water consumption/yr (gal.)	963,600	963,600
Average energy cost/ Therm	\$0.798	\$0.798

WATER HEATER DATA		
Model	Rinnai TRS	2 Tank Water Heater
Thermal efficiency (New)	97%	82%
Quantity	5	2
Max input rate/unit (Btuh)	199,000	199,000
Total system Btuh	995,000	398,000
Storage capacity/unit (gal.)		100
Total storage capacity (gal.)		200
*Standby loss (Btuh)		1,000
Total standby loss (Btuh)		2,000
*Annual standby loss (Btuh)		17,520,000
Annual energy consumption (Btuh)	455,127,155	614,105,595
Energy used per year (Therm)	4,551	6,141

ANNUAL COST/SAVINGS SUMMARY				
	Cost		Rinnai Savings	
Cost/Savings Rinnai Tank	Rinnai TRS	2 Tank Water Heater	Year 1	Year 10
*Estimated annual operating cost	\$3,631.91	\$4,900.56	\$1,268.65	\$12,686.48
		Total Rinnai savings	\$1,268.65	\$12,686.48
Percent savings over tank			26%	

ANNUAL CARBON EMISSIONS ESTIMATES		
	Rinnai TRS	2 Tank Water Heater
CO ₂ production (lbs)	54,948	74,142
Rinnai saves (lbs CO ₂)		19,194
**Trees saved		331

Space Savings

Rinnai 5 - Tankless



FLOOR SPACE = 0 SQFT

2-199/100 Water Heater



H: 75.75 in = 6.61 ft
Dia: 33.12" = 2.76 ft

FLOOR SPACE : 16+ SQFT
(includes space for clearances)

Value add to business owners:

1. Tighter mechanical room
2. Reduce material cost for new construction or major renovation
3. Saved space can be used to generate revenue for businesses
4. Low operational and maintenance cost
5. Longer life

System Comparison

Weigh advantages of each system to select option that is right for you

Tankless Rack Systems



Storage Water Heating Systems



No Standby Loss	Tank standby loss
No floor space (except Free Standing TRS)	Floor space required
Larger gas lines	Smaller gas line
Precise temperature control	Water temperature controlled by tank aquastat
Fully modulating system with Electronic Manifold Control (325:1 turn down ratio)	Modulation at higher Btuh input (25:1 turn down ratio)
Lower operating cost	Higher operating cost

Engineering Support



8:00AM – 8:00PM EST

***100% Sizing Guarantee**

24/7/365 Technical Support | 866.383.0707 | engineering@rinnai.us

* No change to original fixture list and design parameters

Questions?

Thank you

Rinnai

ENHANCING LIVES BY CHANGING THE WAY WATER IS HEATED

Group Discussion / Questions

COUNTRYSIDE HIGH SCHOOL, PINELLAS COUNTY SCHOOL SYSTEM



BREWERIES



endless
learning potential

less
stories

less
innovation

Brewing Company

IN LESS TIME WITH
WATER HEATERS

endless
success stories

Pinellas County Schools learns how Rinnai Demand Duo Hybrid Water Heaters can ensure a reliable supply of hot water, reduce operating costs, and provide long-lasting dependability.

SMARTER HOT WATER. QUICK AND EASY.

For years, the Pinellas County School System, located in the Tampa Bay area of Florida, relied on traditional tank-style water heaters. However, over time, those responsible for maintaining and servicing these units realized their lifespan was shorter than they'd expected – typically only six to eight years, at the most.

With the heat exchanger located on the inside of the unit, acidic condensate was consuming the tanks to rupture. "With such a short life span, I knew there had to be a better alternative," said Ty Crawford, in charge of maintenance for the school system. "We've been running Rinnai tankless products in other schools for about 10 years now, so we trust Rinnai."

"I'd heard about the Demand Duo," Crawford continued, "and I thought it sounded like it might be the ideal solution for us. So I started looking into it."

It wasn't long afterwards that TEMPACQ, an Orlando-based distributor of natural gas and propane products, installed three Rinnai Demand Duo hybrid units at Countryside High School. These direct-replacement solutions were a fast, straightforward upgrade from the school's tank-style units. And the successful installation has since led to more installations at other schools throughout the Pinellas County School System.

Like any other public school system, Pinellas County Schools in Florida operates on a tight budget and answers to a lot of vested parties, including a school board, parents and taxpayers. So, it's no surprise that they've always been looking for ways to function more efficiently and effectively, to better serve students, save money and reduce time spent on equipment upkeep.

When water heating units started failing in the county's Countryside High School, the county began searching for a dependable, efficient and serviceable solution for the school and its students and staff. What the county needed was a hot water source that didn't have the same fallibility and short service life as the units they currently used. Moreover, they needed a system that offered redundancy, to avoid a complete loss of hot water during the school day. What they found was Rinnai's Demand Duo Hybrid Water Heating System.

Rinnai SE+
or Hot-Water
Duo.

Efficient dairy ducts for stores assistantly set the bill and his son John is more efficient, while

visited the farm. or heater, the id help the farm class water heating knew that would

JC98 tankless water rnal tankless models, re than \$20,000.

ATURE
rm is heating water, itability. Since stringent health used for fluid ase, and other products, water must lid bacteria and milk fat stem only delivered resulting milk fat



nd two hangers for an his jail to save over ation increase.

WO—Any establishment istent, reliable hot haps most essential While tankless d university residence cl projects, like water for cooking.

ANCY
trose County Jail y of time, or it may revious water heating gs with inconsistent xpensive to repair, the change.

Installer Daniel Hutson), and during the viewed several different offer redundancy to r to power the facility's al kitchen. Additional efficiency, precise xpansion.



A Water Heater allowed Abide in its brewing process and enable of beer each week.

BY BREWERY TO INSTALL HEATER IN THEIR D EVAN, BIG OR SMALL, IT YOUR NEEDS."

Sparty in Newman, Ga. is the brainchild of brewing. When selecting equipment for the water heating options, knowing that the of hot water at extreme temperatures to

- ADVANTAGES FOR BREWERIES:**
- Offers precise temperature control, a requirement for achieving the perfect brew
 - Wall-mounted, compact design allows for more brewing space
 - Can be installed on the outside of a building in warmer climates, which requires no vent components and saves on installation costs
 - Longer life span than traditional tank-style water heaters
 - For larger breweries, units can be banked together as a single hot-water source to ensure peak-demand months are always met, while in redundancy of multiple units ensures the brewery can maintain its industrial brewing process
 - Minimal risk of property damage due to leaking water, unlike a traditional tank

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nd other vent hot water in especially is. However, also have long e and no hot ng technology nents because y that is isted heating boiler system

CONSISTENT HOT WATER, ONLY WHEN NEEDED
Located on 837 acres, Atlanta Motor Speedway hosts more than 150,000 attendees during NASCAR race weekend each spring. With approximately 20,000 people staying on the Speedway campus, it is not surprising that the facility's 84 showers require a significant amount of hot water. In addition to Atlanta Motor Speedway's four shower stations, the track features a banquet kitchen to serve the grandstand suites along with 20 concession stands – all of which require consistent hot water.

Although race attendees have been thankful for the AMS shower stations since their construction in 1995 and 2001; over the years racing fans learned that the AMS showers occasionally could run out of hot water during times of heavy use. Consequently, when Rinnai joined as a sponsor of the Rinnai 250 at AMS in 2017, it seemed like the natural time to replace the facility's existing boiler and traditional tank water heating units with a state-of-the-art Rinnai tankless system.

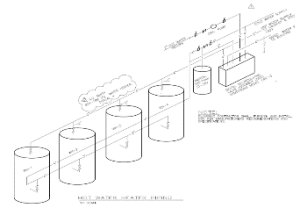
Rinnai's Application Engineering Center of Excellence evaluated AMS's water heating needs and designed a system that would be more efficient and reliable than its existing system. Soon two local Rinnai dealers, Houston Armour, Inc. and Action Plumbing Company, began the installation of 30 tankless units on the AMS campus.

84
WATERS



110-Room Courtyard

Application:	110-Room Full Service Hotel w/ kitchen, bar and laundry
Replaced:	Original spec was 4 AO Smith BTH 100/199
Install Date:	Winter 2015
Location:	Mid West / Canfield, OH
Equipment:	2 - TRW04iN + TRS06iN = (14 RUC98iN
Venting:	3 - Common Vent kits, Horizontal Terminations, Multiple
Accessories:	Extensions
Output:	2- REU-MSB-M, multiple MSB-C1 2.8M BTU, (2.0 for rooms and 800K for kitchen / laundry)
Comments:	TRS designed with split systems – 1 supplying the rooms; (10 units) and one supplying the kitchen, (4 units, not shown), bar and laundry.



183-Room Full Service Hotel

Application:	183-Room Full Service Hotel w/ kitchen, bar and laundry
Replaced:	7 AO Smith BTH 400A – 100 gallon
Install Date:	Spring 2014
Location:	Mid West / Perrysburg, OH
Equipment:	4 - TRW04iN + TRS04iN = (20 RUC98iN)
Venting:	3 - Common Vent kits, Horizontal Terminations, Multiple
Accessories:	Extensions
Output:	2 - MCC-91, 5 - REU-MSB-M, multiple
Comments:	3.2M BTU, 2500 GPH @ 140 F TRS designed with split systems – 1 supplying the rooms (16 units) and one supplying the kitchen (4 units, not shown), bar and laundry



112-Room Hotel

Application:	112-Room Hotel w/ small kitchen
Replaced:	New Construction
Install Date:	Summer 2013
Location:	Mid Atlantic / Virginia
Equipment:	2 – TRS06iN
Venting:	2 - Common vent kits, horizontal terminations, multiple extensions, elbows and 45s
Accessories:	2 - MCC-91, 3 - REU-MSB-M, multiple MSB-C1
Output:	3.2M BTU, 2500 GPH @ 140 F
Comments:	TRS designed with split systems – 1 supplying the rooms (16 units) and one supplying the kitchen (4 units, not shown), bar and laundry



Full Service Hotel

Application:	Full Service Hotel
Replaced:	6- 100Gal / 199K BTU high efficiency tanks
Install Date:	March 2016
Equipment:	6 – Demand Duo™ CHS199100iN
Venting:	8" PP Common Vent. Exhaust Only
Accessories:	None
Comments:	Provides hot water for hotel of 120 rooms



86-Room Full Service Hotel

Application:	Primary hot water for guest rooms, laundry and kitchen
Replaced:	New construction
Install Date:	September 2015
Location:	Oklahoma
Equipment:	2 TRS06 (12 units total) feeding a 300 gallon storage tank
Venting:	2 Common Vent kits, extension pieces, side wall termination
Accessories:	6-MCC91-2 commercial temperature controllers
Output:	1.2M BTU/ ~1400 GPH
Energy Info:	TBD
Comments:	This 4 star hotel is located just outside downtown OKC and Will Roger's International Airport. This project was specified for commercial tanks but went with Rinnai Tankless Rack System and storage



80-Room Full Service Hotel

Application:	80-Room Hotel w/ kitchen, bar and laundry 1.0M BTU with 500 gallons storage during renovation
Replaced:	Fall 2013
Install Date:	Tampa, FL
Location:	2 – TRW04eN wall rack system
Equipment:	External – no venting required
Venting:	1 - MCC-91, 1 - REU-MSB-M, multiple
Accessories:	MSB-C1 1.6M BTU delivering approximately 3300
Output:	GPH
Energy Info:	Roof units free up space utilized by large storage. TRS will effectively track the hot water demand of this hotel and deliver hot water only when needed. The energy savings is realized by using high efficiency 95% condensing tankless and 105:1 TDR which allows modulation from 15.2K BTU up to 1.6M BTU.
Comments:	

