

Technical Data Manual

Model Nos. and pricing: see Price List

VIESSMANN®

Vitocell 100-V CVAA and CVA Series

Indirect-fired domestic hot water storage tank
42 USG to 119 USG (160 L to 450 L) capacity



Indirect-fired domestic hot water storage tank steel construction, with Ceraprotect enamel coating.

Product may not be exactly as shown

⚠ CAUTION

This tank version is not suitable for steam heating applications.



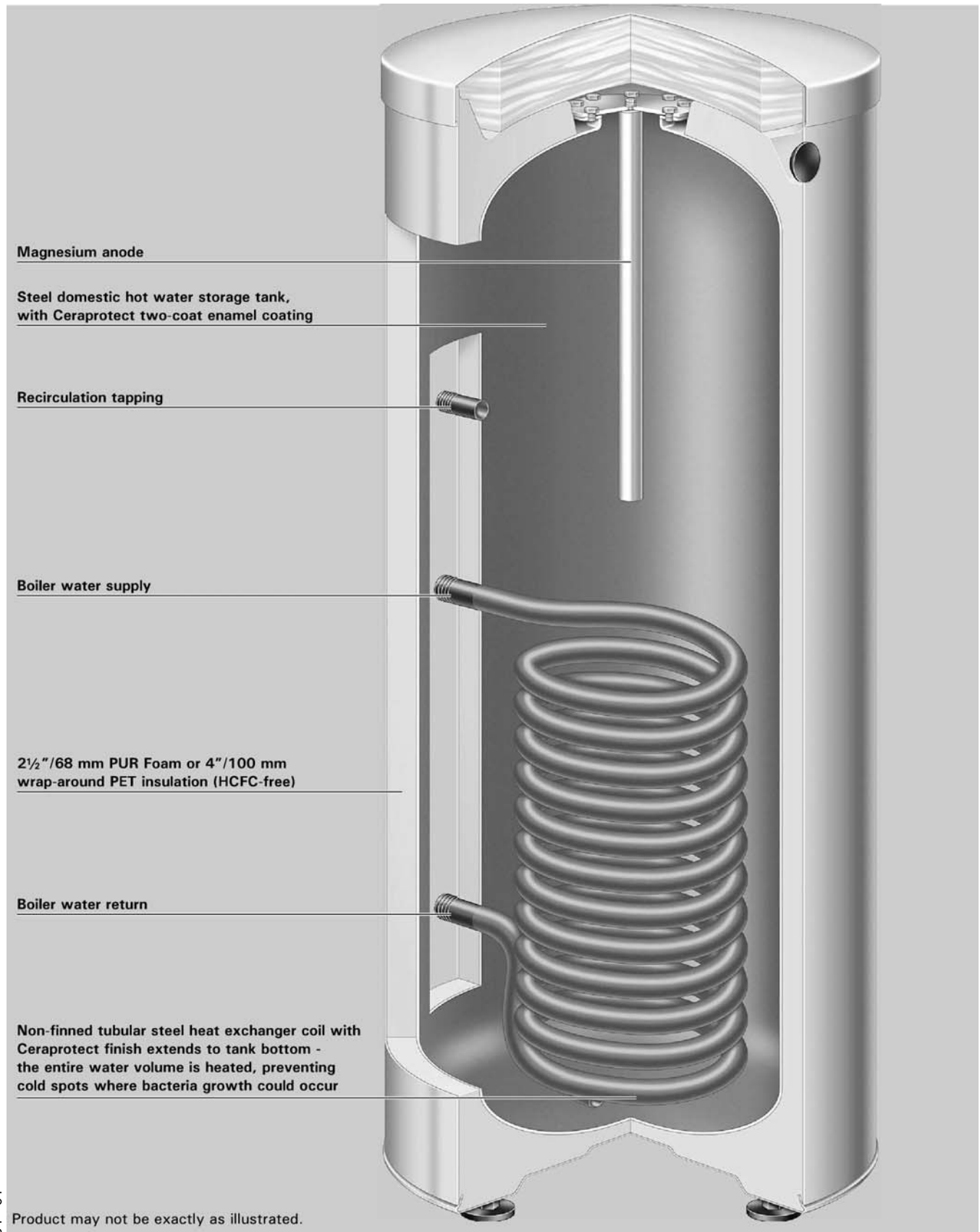
Benefits

The vertical tank solution for cost-efficient domestic hot water supply. The Vitocell 100-V DHW tank offers storage capacities of up to 119 USG (450 L).

Benefits at a glance:

- Corrosion-protected steel tank shell with Ceraprotect enamel coating. Magnesium anode provides additional cathodic tank protection.
- Heat exchanger coil extends to the bottom of the tank, thereby heating the entire water content.
- Extremely convenient domestic hot water supply assured by fast, uniform heating via generously sized heat exchanger surfaces.
- Certified to CSA Low Lead Content Certification Program; including US Safe Drinking Water Act, NSF/ANSI 372 as well as other applicable US State requirements.
- Universally suitable - for applications requiring larger quantities of hot water, multiple Vitocell 100-V tanks may be connected to a header to form a tank battery.
- Increased energy savings thanks to highly effective, foamed-in-place HCFC-free insulation keeping standby losses at a minimum.
- The vitocell-V 100 119 USG (450 L) capacity tank is supplied with removable soft PET insulation for easier handling.

Cross Section



5699 334 - 01

Product may not be exactly as illustrated.

Technical Data

For domestic hot water heating applications in conjunction with hot water heating boilers

Suitable for heating systems with:

- max. working pressure on the heat exchanger side of up to 150 psig (10 bar)
- max. working pressure on DHW side of up to 150 psig (10 bar)
- max. supply temperature on the heat exchanger side of up to 230°F (110°C)
- max. DHW supply temperature of up to 150°F (65.6°C)

Tank series		CVA	CVA	CVAA	CVA	
Storage capacity		42 (160)	53 (200)	79 (300)	119 (450)	
Recovery rates* 1						
with a DHW temperature increase from 50 to 113°F (10 to 45°C) and a supply water temperature of.....	194°F (90°C)	MBH (kW)	136 (40)	136 (40)	180 (53)	238 (70)
		GPH (L/h)	258 (982)	258 (982)	342 (1302)	456 (1720)
	176°F (80°C)	MBH (kW)	109 (32)	109 (32)	150 (44)	198 (58)
		GPH (L/h)	210 (786)	210 (786)	288 (1081)	378 (1425)
	158°F (70°C)	MBH (kW)	85 (25)	85 (25)	113 (33)	153 (45)
		GPH (L/h)	162 (614)	162 (614)	216 (811)	294 (1106)
	140°F (60°C)	MBH (kW)	58 (17)	58 (17)	78 (23)	109 (32)
		GPH (L/h)	108 (417)	108 (417)	149 (565)	210 (786)
	122°F (50°C)	MBH (kW)	31 (9)	31 (9)	61 (18)	82 (24)
		GPH (L/h)	60 (221)	60 (221)	114 (442)	156 (589)
	Recovery rates* 1					
	with a DHW temperature increase from 50 to 140°F (10 to 60°C) and a supply water temperature of.....	194°F (90°C)	MBH (kW)	123 (36)	123 (36)	153 (45)
GPH (L/h)			164 (619)	164 (619)	204 (774)	240 (911)
176°F (80°C)		MBH (kW)	95 (28)	95 (28)	116 (34)	150 (44)
		GPH (L/h)	120 (482)	120 (482)	156 (584)	198 (756)
158°F (70°C)		MBH (kW)	65 (19)	65 (19)	78 (23)	113 (33)
		GPH (L/h)	84 (327)	84 (327)	102 (395)	150 (567)
Supply flow rate						
for the recovery rates stated		GPM (m ³ /h)	13.2 (3.0)	13.2 (3.0)	13.2 (3.0)	13.2 (3.0)
Insulation			PUR Foam	PUR Foam	PUR Foam	Soft PET
Standby losses* 2		MBH/24 h	3.3	3.5	5.6	6.6
Dimensions * 3						
Tank length without insulation	in. (mm)	--	--	--	--	--
Overall length with insulation	in. (mm)	23 (581)	23 (581)	26¼ (667)	34 (859)	
Tank width without insulation	in. (mm)	--	--	--	33 (837)	
Overall width with insulation	in. (mm)	24 (605)	24 (605)	29¼ (744)	36¼ (923)	
Tank height without insulation	in. (mm)	--	--	--	76¾ (1948)	
Overall height with insulation* 4	in. (mm)	47 (1189)	55½ (1409)	68¼ (1734)	72½ (1844)	
Tilt height without insulation	in. (mm)	--	--	--	73¼ (1860)	
Tilt height with insulation	in. (mm)	50 (1260)	57½ (1460)	72 (1825)	--	
Weight						
Tank with insulation	lbs (kg)	190 (86)	214 (97)	333 (151)	399 (181)	
Heat exchanger coil liquid content		USG (L)	1.45 (5.5)	1.45 (5.5)	2.6 (10)	3.3 (12.5)
Heat exchanger surface area		ft. ² (m ²)	10.8 (1)	10.8 (1)	16.1 (1.5)	20.5 (1.9)
Connections						
Heating water supply/return	Ø in. (male NPT thread)	1	1	1	1	
Domestic cold/hot water	Ø in. (male NPT thread)	¾	¾	1	1¼	
T&P valve	Ø in. (female NPT thread)	¾	¾	¾	¾	
Recirculation	Ø in. (male NPT thread)	¾	¾	1	1	

*1 When planning for the recovery rate as stated or calculated, allow for the corresponding circulation pump.

The stated recovery rate is only achieved when the rated output of the boiler is equal to or greater than that stated under "Recovery rate". Please also refer to the corresponding sizing chart at the end of this manual.

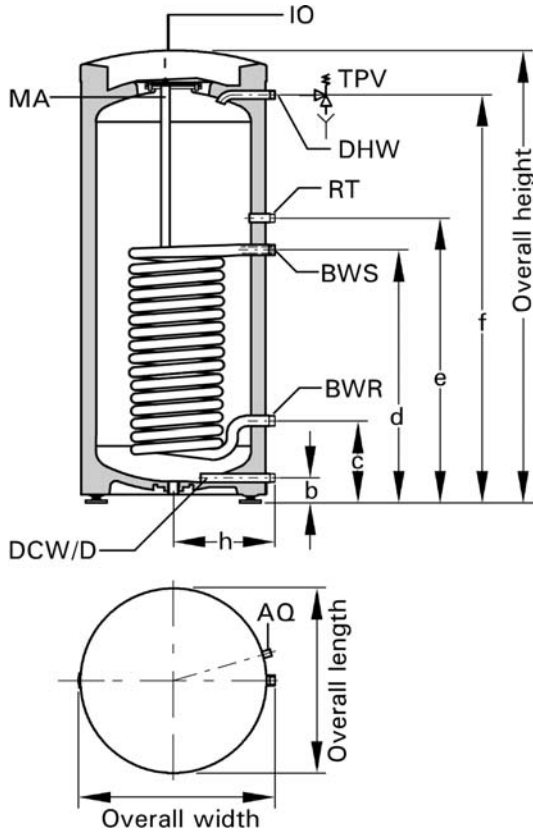
*2 Measured values are based on a room temp. of 68°F (20°C) and a domestic hot water temp. of 149°F (65°C) and can vary by 5%.

*3 For other dimensions, see illustration and table on page 5.

*4 Adjustable feet can be adjusted up to 2 in. (50 mm).

For information regarding other Viessmann System Technology componentry, please reference the documentation of the respective product.

CVA 42 and 53 USG (160 and 200 L) Tank Dimensions

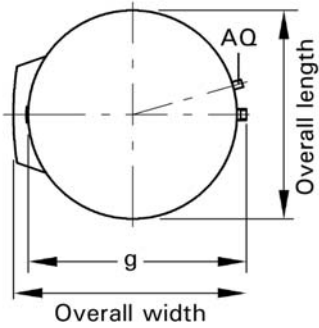
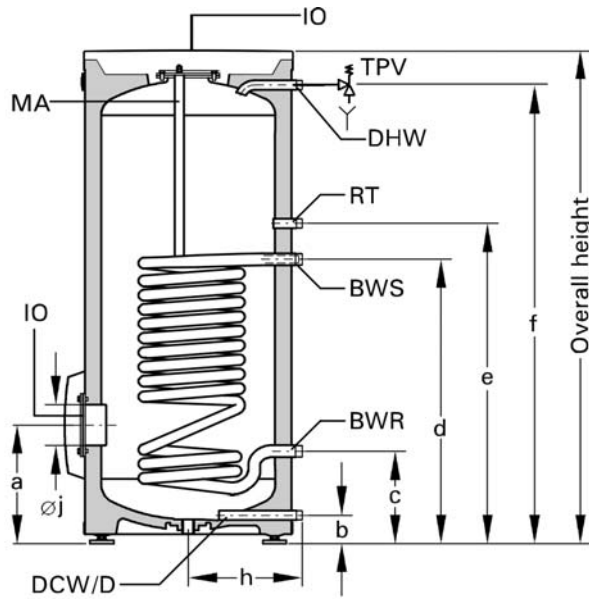


Dimensions			
Storage capacity	USG (L)	42 (160)	53 (200)
b	in. (mm)	2¾ (72)	2¾ (72)
c	in. (mm)	9¾ (249)	9¾ (249)
d	in. (mm)	25 (634)	25 (634)
e	in. (mm)	35 (884)	35 (884)
f	in. (mm)	41 (1050)	41 (1050)
h	in. (mm)	12½ (317)	12½ (317)

Legend

- IO Inspection and clean-out opening
- D Drain
- BWR Boiler water return (upper coil)
- BWS Boiler water supply (upper coil)
- DCW Domestic cold water
- AQ Aquastat well (at the same height as the boiler water supply connection)
- DHW Domestic hot water
- RT Recirculation tapping
- TPV Temperature and pressure relief valve
- MA Protective magnesium anode

CVAA 79 USG (300 L) Tank Dimensions

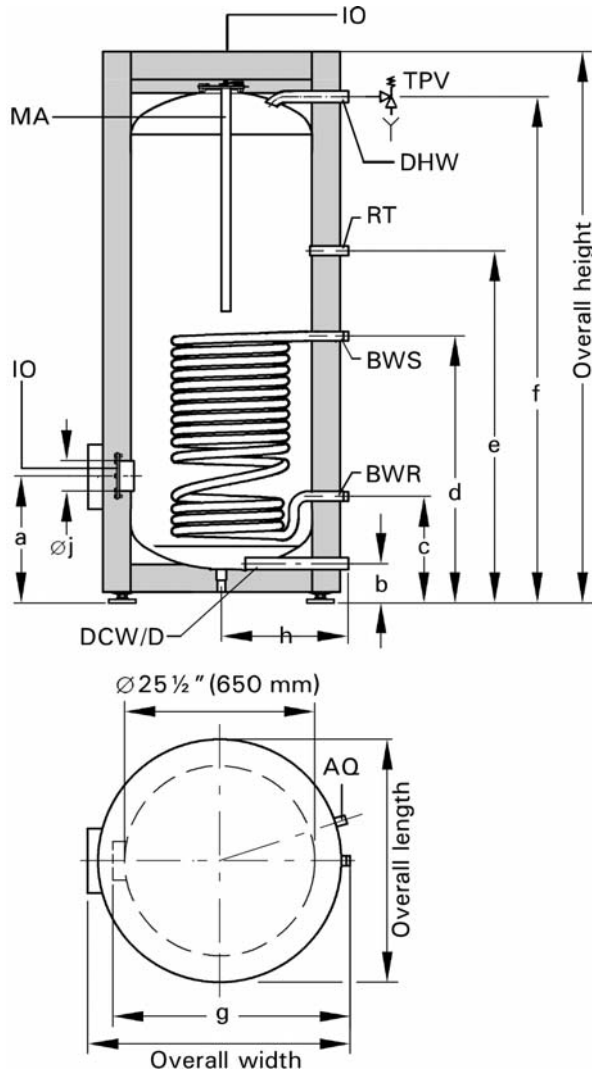


Dimensions		
Storage capacity	USG (L)	79 (300)
a	in. (mm)	13 (333)
b	in. (mm)	3 (76)
c	in. (mm)	10 (260)
d	in. (mm)	34½ (875)
e	in. (mm)	44 (1115)
f	in. (mm)	63 (1600)
g	in. (mm)	26 (660)
h	in. (mm)	14¼ (361)
j	in. (mm)	4 (100)

Legend

- IO Inspection and clean-out opening
- D Drain
- BWR Boiler water return (upper coil)
- BWS Boiler water supply (upper coil)
- DCW Domestic cold water
- AQ Aquastat well (at the same height as the boiler water supply connection)
- DHW Domestic hot water
- RT Recirculation tapping
- TPV Temperature and pressure relief valve
- MA Protective magnesium anode

CVA 119 USG (450 L) Tank Dimensions



Dimensions		
Storage capacity	USG (L)	119 (450)
a	in. (mm)	16½ (422)
b	in. (mm)	4 (100)
c	in. (mm)	13¾ (349)
d	in. (mm)	36¼ (924)
e	in. (mm)	48½ (1230)
f	in. (mm)	70¼ (1784)
g	in. (mm)	33 (837)
h	in. (mm)	18 (455)
j	in. (mm)	4 (100)

Legend

- IO Inspection and clean-out opening
- D Drain
- BWR Boiler water return (upper coil)
- BWS Boiler water supply (upper coil)
- DCW Domestic cold water
- AQ Aquastat well (at the same height as the boiler water supply connection)
- DHW Domestic hot water
- RT Recirculation tapping
- TPV Temperature and pressure relief valve
- MA Protective magnesium anode

Water Flow

Domestic hot water draw rate

Storage tank contents heated to 140°F (60°C), boiler not reheating

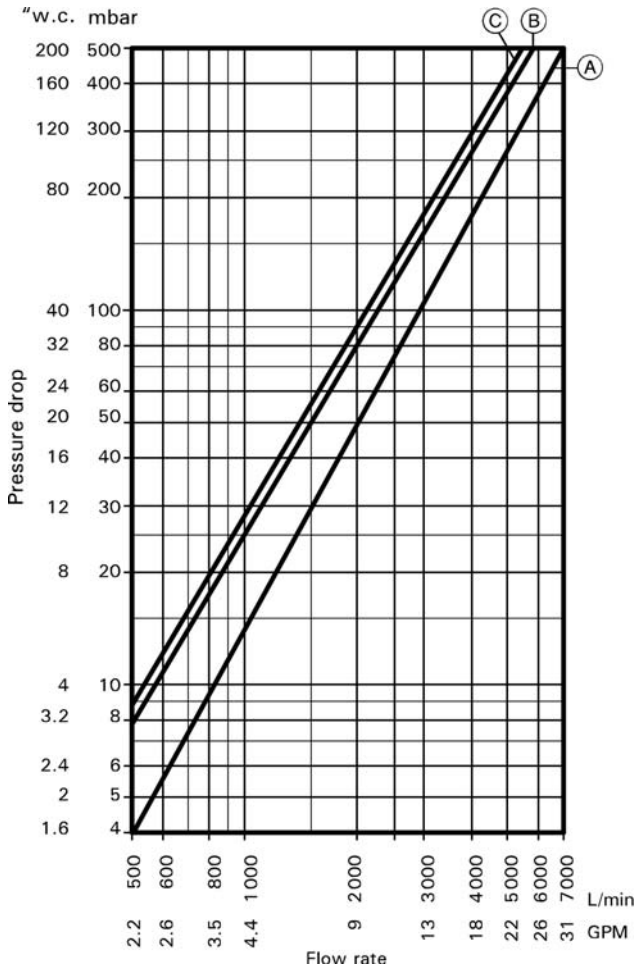
Storage capacity	USG (L)	42 (160)	53 (200)	79 (300)	119 (450)
Domestic draw rate	GPM (L/min)	2.6 (10)	2.6 (10)	4.0 (15)	4.0 (15)
Domestic hot water draw					
Water with t = 140°F (60°C) (constant)	USG (L)	32 (120)	38 (145)	63 (240)	111 (420)
Percentage tank volume	%	75	73	80	93

Heat-up time

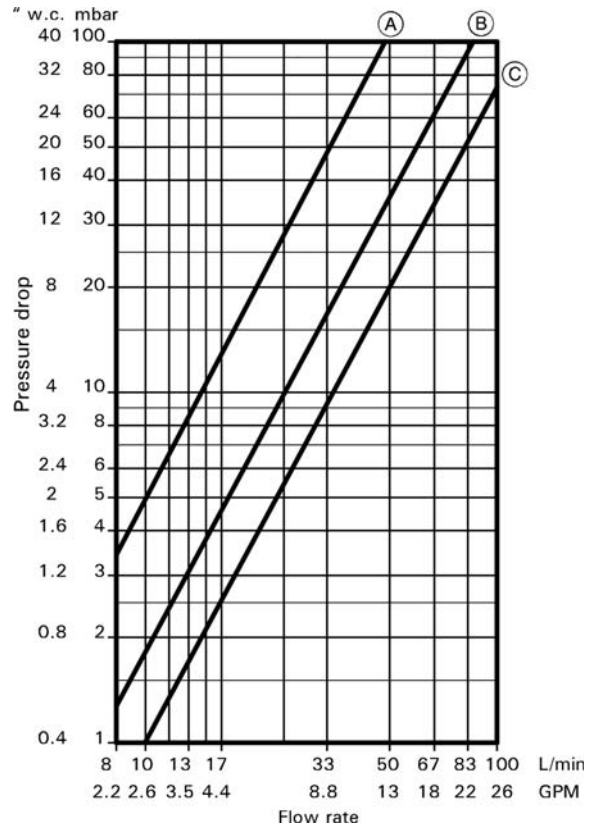
The stated heating times are achieved when the maximum recovery rate of the domestic hot water tank is made available at the respective supply temperature and with a domestic hot water rise from 50 to 140°F (10 to 60°C).

Storage capacity	USG (L)	42 (160)	53 (200)	79 (300)	119 (450)
Heating water supply temperature		Heat-up time (minutes)			
194°F (90°C)		19	19	23	28
176°F (80°C)		24	24	31	36
158°F (70°C)		34	37	45	50

Pressure drop on heating water side (primary circuit)



Pressure drop on domestic hot water side (secondary circuit)



Legend

- (A) 42 USG (160 L) and 53 USG (200 L) storage capacities
- (B) 79 USG (300 L) storage capacity
- (C) 119 USG (450 L) storage capacity

Multiple Tank Installation

Technical Data

The 79 and 119 USG (300 and 450 L) tank sizes may be combined into a battery consisting of between 2 and 3 tanks. Tank batteries consisting of more than 3 tanks can be installed by creating up to 4 batteries, each consisting of 3 tanks. The heating contractor is responsible to ensure proper piping on both the primary and secondary circuits.

Tank series		CVAA	CVA			
Storage capacity	USG (L)	79 (300)	119 (450)			
Total capacity of tank battery	USG (L)	159 (600)	238 (900)	357 (1350)		
Number of storage tanks		2 ● ●	2 ● ●	3 ● ● ●		
Recovery rates* 1 with a DHW temperature increase from 50 to 113°F (10 to 45°C) and a supply water temperature of.....	194°F (90°C)	MBH (kW)	361 (106)	477 (140)	716 (210)	
		GPH (L/h)	690 (2604)	906 (3440)	1362 (5160)	
	176°F (80°C)	MBH (kW)	300 (88)	396 (116)	593 (174)	
		GPH (L/h)	570 (2162)	750 (2850)	1128 (4275)	
	158°F (70°C)	MBH (kW)	225 (66)	307 (90)	460 (135)	
		GPH (L/h)	426 (1622)	582 (2212)	876 (3318)	
	140°F (60°C)	MBH (kW)	157 (46)	218 (64)	327 (96)	
		GPH (L/h)	300 (1130)	414 (1572)	624 (2358)	
	122°F (50°C)	MBH (kW)	123 (36)	164 (48)	246 (72)	
		GPH (L/h)	234 (884)	312 (1178)	468 (1767)	
	Recovery rates* 1 with a DHW temperature increase from 50 to 140°F (10 to 60°C) and a supply water temperature of.....	194°F (90°C)	MBH (kW)	307 (90)	361 (106)	542 (159)
			GPH (L/h)	408 (1548)	480 (1822)	720 (2733)
176°F (80°C)		MBH (kW)	232 (68)	300 (88)	450 (132)	
		GPH (L/h)	306 (1168)	402 (1512)	600 (2268)	
158°F (70°C)		MBH (kW)	157 (46)	225 (66)	338 (99)	
		GPH (L/h)	210 (790)	300 (1134)	450 (1701)	
Supply flow rate for the recovery rates stated	GPM (m ³ /h)	26.4 (6)	26.4 (6)	39.6 (9)		
Standby losses* 2	MBH/24 h	11.2	13.2	19.8		
Dimensions						
Tank length without insulation	in. (mm)					
Overall length with insulation	in. (mm)	57½ (1495)	72½ (1838)	111¼ (2826)		
Tank width without insulation	in. (mm)					
Overall width with insulation	in. (mm)	43½ (1148)	48 (1218)	48 (1218)		
Tank height without insulation	in. (mm)					
Overall height with insulation	in. (mm)	69 (1734)	77 (1955)	77 (1955)		
Weight						
Tank with insulation	lbs (kg)	736¼ (334)	932 (423)	1409 (639)		
Heating water content (heat exchanger pipe coil)	USG (L)	6½ (25)	8½ (32)	13¾ (50)		
Heat exchanger surface area	ft. ² (m ²)	32¼ (3.0)	42 (3.9)	62½ (5.8)		

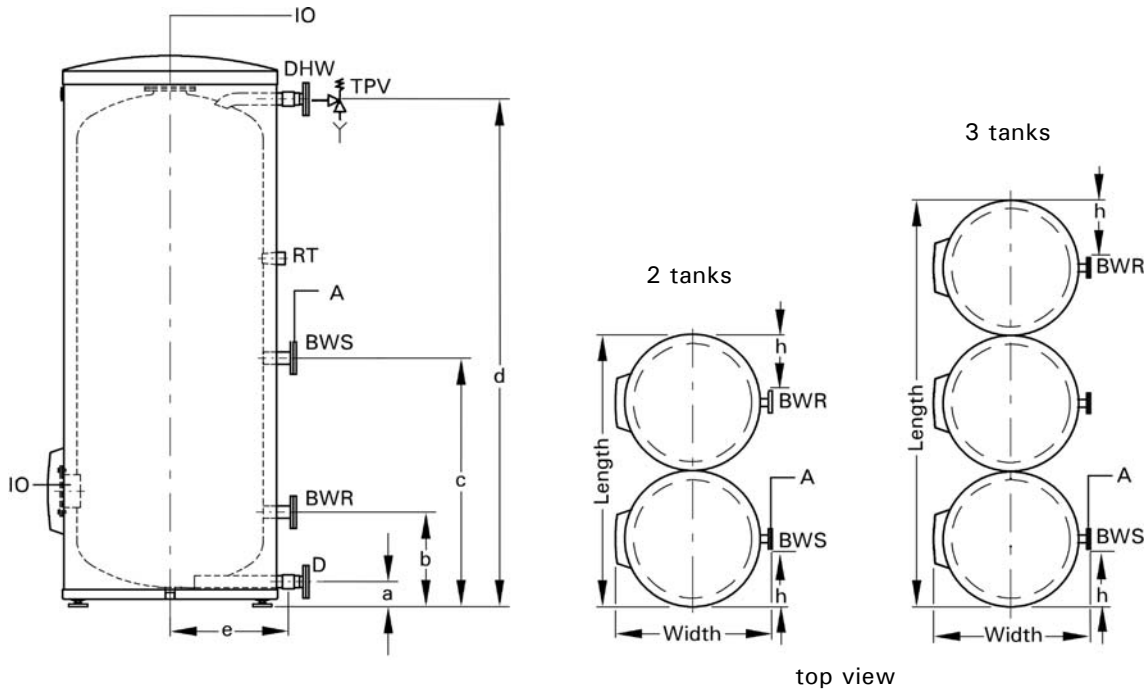
*1 When planning for the recovery rate as stated or calculated, allow for the corresponding circulation pump.

The stated recovery rate is only achieved when the rated output of the boiler is equal to or greater than that stated under "Recovery rate". Please also refer to the corresponding sizing chart at the end of this manual.

*2 Measured values are based on a room temperature of 68°F (20°C) and a domestic hot water temperature of 149°F (65°C) and can vary by 5%.

Multiple Tank Installation *(continued)*

For domestic hot water applications which utilize modulating and low temperature hot water heating boilers or remote heating plants.



Legend

- IO Inspection and clean-out opening
- D Drain
- A Air vent
- BWR Boiler water return
- BWS Boiler water supply
- DCW Domestic cold water
- DHW Domestic hot water
- RT Recirculation tapping
- TPV T&P valve

Dimensions

Tank series		CVAA	CVA	
Storage capacity		79 (300)	119 (450)	
Total capacity of battery	USG (L)	159 (600)	238 (900)	357 (1350)
Number of storage tanks	USG (L)	2	2	3
a	in. (mm)	3 (76)	4¼ (107)	4¼ (107)
b	in. (mm)	10¼ (260)	13¾ (349)	13¾ (349)
c	in. (mm)	34½ (875)	36¼ (924)	36¼ (924)
d	in. (mm)	68¼ (1734)	70¼ (1948)	70¼ (1948)
e	in. (mm)	14¼ (361)	18 (455)	18 (455)
f	in. (mm)	8 (206)	12½ (320)	12½ (320)

Multiple Tank Installation *(continued)*

Domestic hot water draw rate

Storage tank contents heated to 140°F (60°C)

Tank series		CVAA	CVA	
Storage capacity	USG (L)	79 (300)	119 (450)	
Battery storage capacity	USG (L)	159 (600)	238 (900)	357 (1350)
Number of storage tanks		2 ● ●	2 ● ●	3 ● ● ●
Domestic draw rate	GPM (L/min)	7.9 (30)	7.9 (30)	7.9 (30)
Domestic hot water draw Water with t = 140°F (60°C) (constant)	USG (L)	127 (480)	222 (840)	333 (1260)
Percentage tank volume	%	80	84	84

Quick recovery (over 10-minute period)

Domestic hot water rise from 50 to 113°F (10 to 45°C)

Tank series		CVAA	CVA	
Storage capacity	USG (L)	79 (300)	119 (450)	
Battery storage capacity	USG (L)	159 (600)	238 (900)	357 (1350)
Number of storage tanks		2 ● ●	2 ● ●	3 ● ● ●
Heating water supply temperature		Quick DHW recovery (over 10-minute period)		
194°F (90°C)	USG/10 min (L/10 min)	201 (759)	304 (1150)	425 (1610)
176°F (80°C)	USG/10 min (L/10 min)	197 (745)	287 (1088)	401 (1520)
158°F (70°C)	USG/10 min (L/10 min)	192 (728)	268 (1016)	370 (1400)

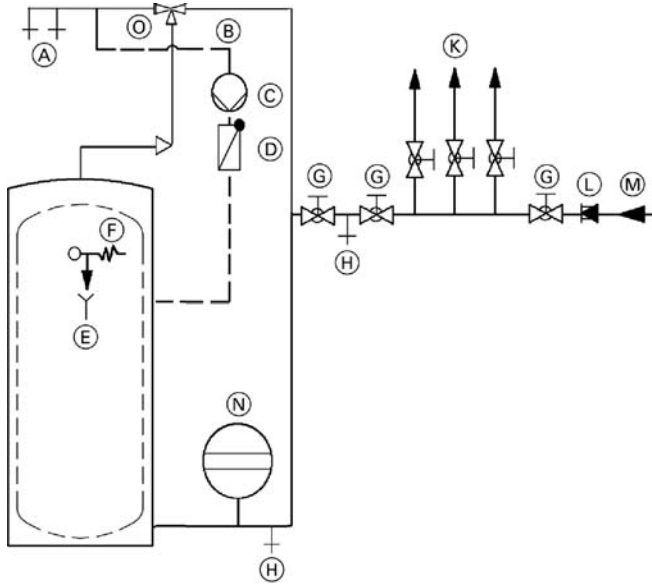
Max. domestic hot water draw rate (over 10-minute period)

Domestic hot water rise from 50 to 113°F (10 to 45°C)

Tank series		CVAA	CVA	
Storage capacity	USG (L)	79 (300)	119 (450)	
Battery storage capacity	USG (L)	159 (600)	238 (900)	357 (1350)
Number of storage tanks		2 ● ●	2 ● ●	3 ● ● ●
Heating water supply temperature		Max. DHW draw rate (over 10-minute period)		
194°F (90°C)	GPM (L/min)	20.1 (76)	30 (115)	43 (161)
176°F (80°C)	GPM (L/min)	20 (74)	29 (109)	40 (152)
158°F (70°C)	GPM (L/min)	19.3 (73)	27 (102)	37 (140)

Standard Equipment

This is a simplified conceptual drawing only! Piping and necessary componentry must be field verified. Proper installation and functionality in the field is the responsibility of the heating contractor.



Legend

- (A) Domestic hot water supply
- (B) DHW recirculation line
- (C) DHW recirculation pump
- (D) Spring-loaded flow check valve
- (E) Discharge pipe
- (F) Temperature and pressure relief valve (TPV)
- (G) Shut-off valve
- (H) Drain
- (K) Domestic cold water supply lines
- (L) Backflow preventer
- (M) Domestic cold water inlet
- (N) Precharged expansion tank (required where backflow preventer is installed; check local plumbing codes and requirements)
- (O) Thermostatic mixing valve/anti-scald valve for solar applications (field supplied)

Vitocell 100-V 42 to 79 USG (160 to 300 L) capacity

Domestic hot water storage tank of high-grade steel with PUR Foam insulation (HCFC-free) and Ceraprotect enamel coating with:

- thermometer
- adjustable leveling feet
- built-in aquastat well
- Magnesium anode

The following is packed separately and attached to the crate:

- installation fittings package: with the necessary hardware
- temperature and pressure relief valve.

Electrostatically powder-coated sheet metal enclosure panel in a Vitosilver finish.

Vitocell 100-V 119 USG (450 L) capacity

Domestic hot water storage tank of high-grade steel with wrap-around soft PET insulation (HCFC-free) and Ceraprotect enamel coating with:

- thermometer
- adjustable leveling feet
- built-in aquastat well
- Magnesium anode

The following is packed separately and attached to the crate:

- installation fittings package: with the necessary hardware
- temperature and pressure relief valve.

Synthetic wrap-around enclosure panel in a Vitosilver finish.

Standard Equipment *(continued)*

Backflow preventers

Where backflow preventers are required, a domestic water expansion tank installation is recommended in the cold water inlet piping before the cold water enters the Vitocell. For the backflow device, observe local plumbing codes and regulations.

Temperature and pressure relief valve

A temperature and pressure relief valve (T&P relief valve) is supplied with the tank. The heating contractor must install the valve on each tank in a method meeting code requirements. If local codes require a different relief valve, substitute the manufacturer’s supplied valve. The tank is approved for 150 psig. Maximum operating pressure is 150 psig.

The T&P relief valve supplied with the tank is tested under ANSI Z21.22 Code for Relief Valves and Automatic Gas Shut-off Devices for Hot Water Supply Systems.

Warranty

Our warranty for domestic hot water tanks states that the water heated must be of drinking (potable) water quality and that any water treatment equipment in use must function correctly.

Viessmann accepts no responsibility for damage howsoever caused and reserves the right to withdraw the product warranty if the product has been improperly installed or misapplied by the installer, contractor or final user. In order to qualify for product warranty, strict adherence to the installation and service manuals must be assured. In the event that Viessmann non-approved components are utilized, Viessmann reserves the right to withdraw all expressed or implied warranties without written notice.

The water to be heated with the Vitocell must be drinking (potable) water quality. If the tank is used to heat other media, the warranty will be null and void. Damage resulting from excessive pressure or temperature is clearly not the responsibility of Viessmann.

The amount of chloride and sulfate acceptable to the tank is limited. In areas where high concentrations of chloride and sulfate are present in drinking water, please consult Viessmann for directions.

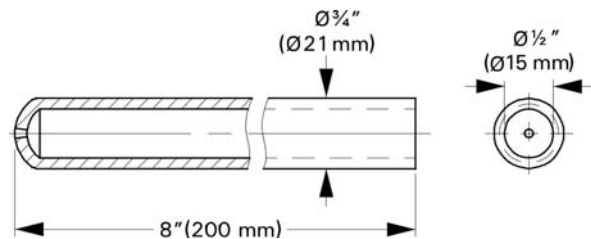
IMPORTANT

Since the heat exchanger coil allows for high MBH input (see Vitocell flow charts), confirmation that the appropriate and correct size pressure and temperature relief valve is used and installed, is necessary.

T&P Valve	100 psig (where CRN is required)	150 psig
ASME pressure steam rating	see ratings marked on T&P valve	
CSA temperature steam rating	205 MBH	
Relief temperature	210°F (99°C)	
Inlet thread	¾" male	
Outlet thread	¾" female	

Sensor Well

Vitocell 100-V, 42 to 119 USG (160 to 450 L) capacity
The sensor well is welded into the domestic hot water storage tank.



Continuous Flow Capacity Chart

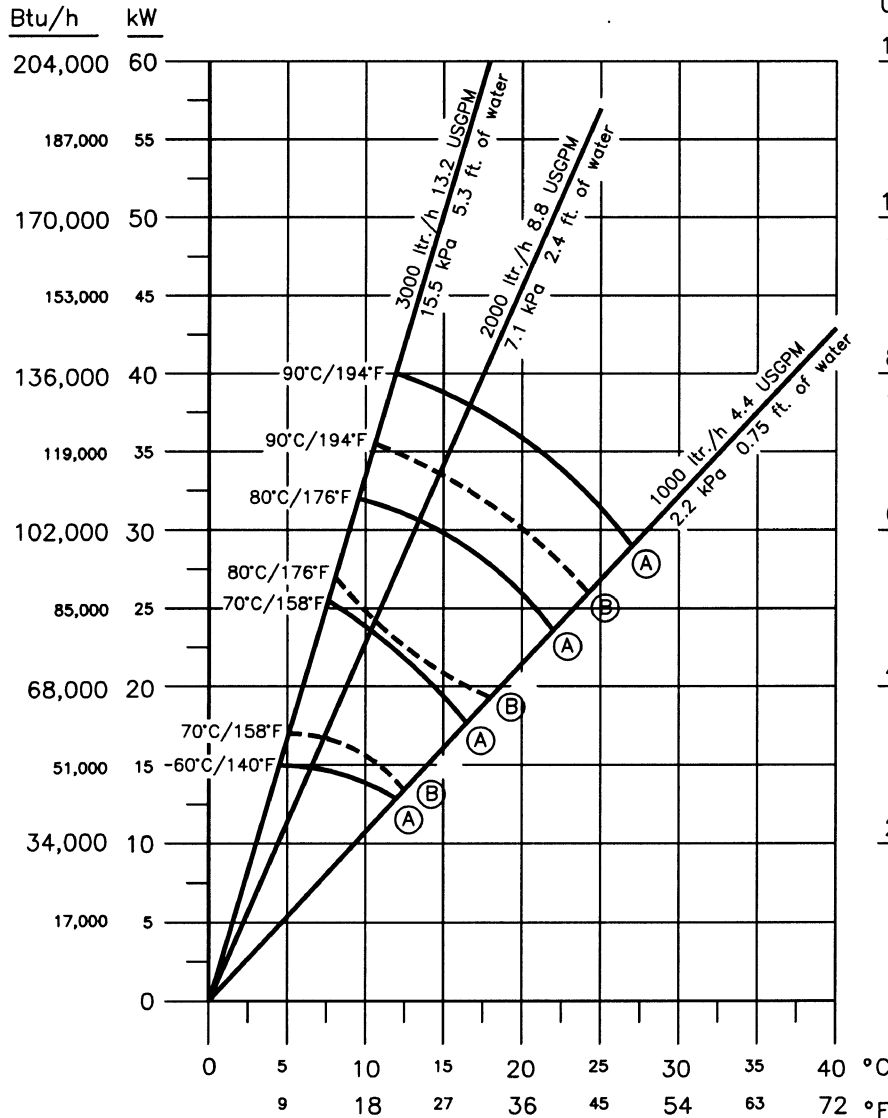
CVA, 42 and 53 USG (160 and 200 L) capacities

Curve (A) Domestic hot water 40 to 113°F (4 to 45°C)

Curve (B) Domestic hot water 40 to 140°F (4 to 60°C)

Domestic hot water delivery rate	
(A)	(B)
4°C–45°C 40°F–113°F	4°C–60°C 40°F–140°F

Heating input to storage tank heat exchanger coil (Boiler output)



Ltr/h USGH	Ltr/h USGH
1262 333	921 243
1052 278	768 203
841 222	614 162
631 167	461 122
420 111	307 81
211 56	154 41

Temperature difference (Boiler supply – Boiler return)

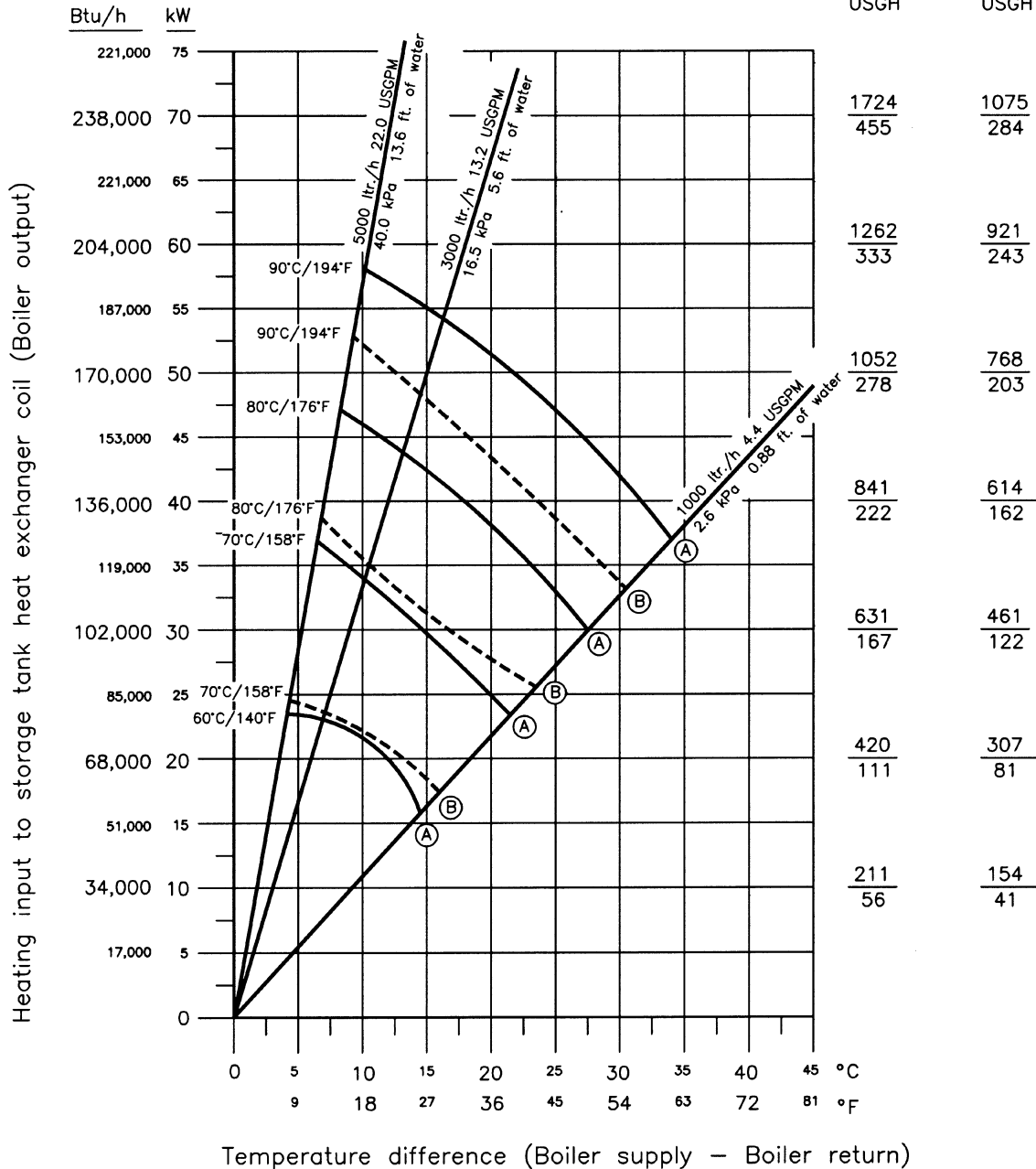
Continuous Flow Capacity Chart *(continued)*

CVAA, 79 USG (300 L) capacity

Curve **(A)** Domestic hot water 40 to 113°F (4 to 45°C)

Curve **(B)** Domestic hot water 40 to 140°F (4 to 60°C)

Domestic hot water delivery rate	
(A)	(B)
4°C–45°C 40°F–113°F	4°C–60°C 40°F–140°F
<u>Ltr/h</u> USGH	<u>Ltr/h</u> USGH

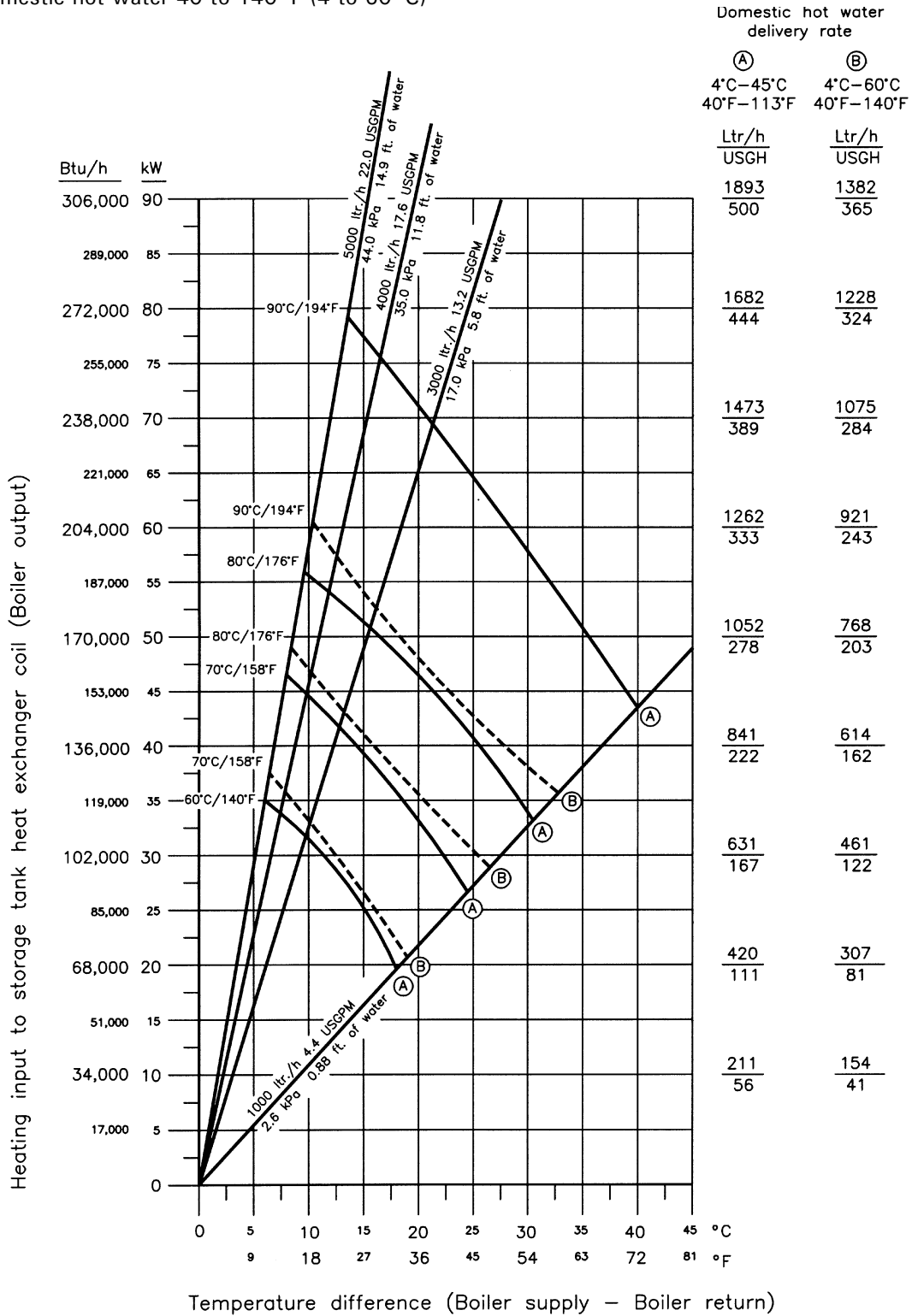


Continuous Flow Capacity Chart *(continued)*

CVA, 119 USG (450 L) capacity

Curve **(A)** Domestic hot water 40 to 113°F (4 to 45°C)

Curve **(B)** Domestic hot water 40 to 140°F (4 to 60°C)

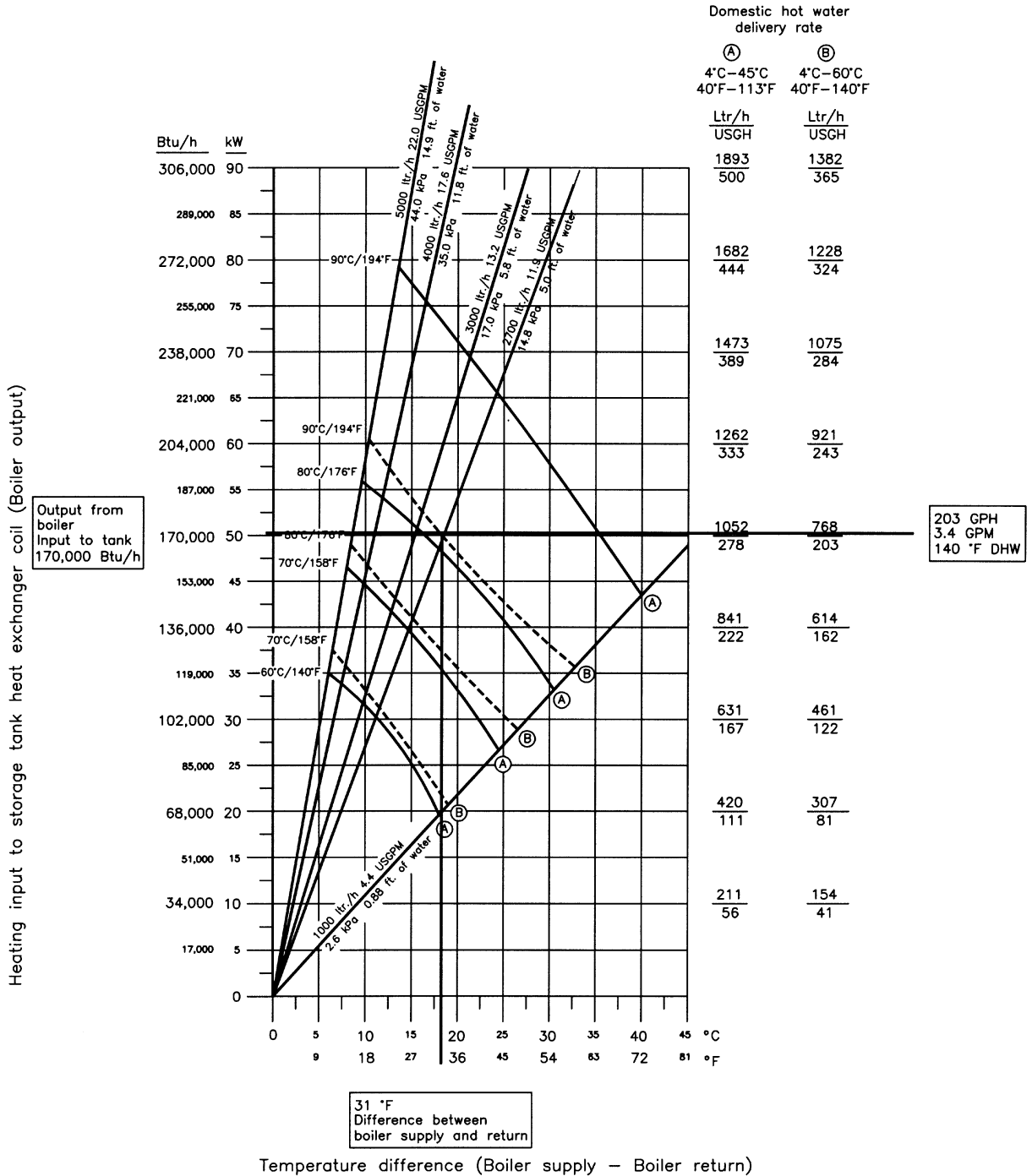


Continuous Flow Capacity Chart *(continued)*

Example: CVA, 119 USG (450 L) capacity

Assume the boiler output to the tank is 170 MBH. Enter chart at left and draw horizontal line across to recovery rate of 203 GPH or 3.4 GPM for 140°F (60°C) domestic hot water under column (B). Where the horizontal line intersects the 194°F (90°C) curve is the point of intersection for the diagonal line used to size the pump. The diagonal line begins at the origin and goes through the point of intersection extending up to the top of the chart. Read between the reference diagonal lines to get a pump specification of 11.9 GPM at 5 ft.

To summarize:
For a Vitocell-V 100 with 119 USG (450 L) capacity and 170 MBH input, the boiler water temperature is 194°F (90°C), difference between boiler return and supply water temperature is 31°F (17°C), recovery rate is 3.4 GPM of 140°F (60°C) DHW, and the pump required is 11.9 GPM, 5 ft. plus pressure drop in piping and boiler.



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