



Bosch Indirect Fired Domestic Hot Water Tanks

For S/SU Series, SM Series, LT Series and SST Series Tanks



BOSCH

Sizing Guide

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1 Key to Symbols and Safety Instructions

1.1 Key to Symbols

Warnings



Warnings in this document are identified by a warning triangle printed against a grey background.

Keywords at the start of a warning indicate the type and seriousness of the ensuing risk if measures to prevent the risk are not taken.

The following keywords are defined and can be used in this document:

- ▶ **DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.
- ▶ **WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- ▶ **CAUTION** indicates a hazardous situation which, if not avoided, could result in minor to moderate injury.
- ▶ **NOTICE** is used to address practices not related to personal injury.

Important information



This symbol indicates important information where there is no risk to people or property.

2 Introduction

Bosch domestic hot water tanks offer features that provide for ease of installation, simple maintenance and reliable operation. All Thermoglaze models are equipped with a replacement magnesium anode rod for protection against corrosion, a drain for easy maintenance, and have adjustable screw-on feet for leveling. An easy-access cover aids in cleaning and maintaining the coil and tank interior.

The following guide assists in the proper sizing of an indirect water heater in consideration with today's high efficiency, condensing boiler technology in order to fully meet the customer's expectations.

3 Models & Features

3.1 S and SU Series

These four single coil DHW storage tank models offer easy installation and simple maintenance with competitive pricing.

- ▶ All tanks feature an aesthetic white cover design, patented Thermoglaze® enamel interior and magnesium anode rod for optimal service life*
- ▶ Models SU80 and SU100 have a large front clean out port for easy maintenance and a second magnesium anode rod for extended tank life*
- ▶ Screw-on feet enable easy leveling of the tank
- ▶ Available capacities 30, 51, 77 and 98 gallons



Figure 1 S/SU Series

3.3 LT Series

These horizontal single coil DHW storage tanks are designed to fit under Buderus boilers resulting in a smaller footprint when installation space is limited.

- ▶ Horizontal design for small footprint
- ▶ Features patented Thermoglaze® enamel interior
- ▶ Quick recovery times
- ▶ Available capacities in 42, 52 and 76 gallons



Figure 2 LT Series

3.2 SM Series

These dual coil indirect DHW storage tanks, SM80 and SM100, are designed for solar and high performance applications.

- ▶ Two internal coils for connection to two heat sources; such as one solar thermal system and one boiler
- ▶ Features patented Thermoglaze® enamel interior
- ▶ Two magnesium anode rods for extended tank life*
- ▶ Large front clean out port for easy service*
- ▶ Screw-on feet enable easy leveling of the tank
- ▶ Available capacities 75 and 97 gallons



Figure 3 SM Series

3.4 SST Series

These stainless steel single-coil indirect hot water tanks have a welded and passivated 316L stainless steel interior and a 316L stainless steel single coil heat exchanger that provide durability and resistance to the corrosive tendencies of domestic water.

- ▶ Stainless steel heating coil efficiently transfers high volumes of BTU's
- ▶ Two inches of high density CFC/HCFC-free polyurethane foam with a tested value of 13.4 provide economical standby losses
- ▶ Available capacities 40, 67, 82 and 113 gallons



Figure 4 SST Series

4 Indirect Water Heater Sizing

Sizing an indirect water heater to meet a customer's expectations isn't the same as it used to be. Tanks haven't changed, rating procedures haven't changed, but boilers sure have changed. We aren't always dealing with a cast iron or steel boiler that maintains 190° F on all installations any longer. We see more and more condensing boilers being controlled by electronics that strive for maximum fuel efficiency, rather than fast DHW recovery. As long as we plan for the slower recovery, we can benefit from the increased efficiency.

4.1 Understanding Tank Ratings

Tank ratings are done under fixed conditions so that various tanks can be compared to each other. These conditions are usually stated as a footnote on the ratings page. The note will show the required temperature that the boiler will be up to before water is drawn from the tank. The first hour rating assumes that the burner and pump will be running the entire time the water is being drawn from the tank, beginning at the same time that the faucet is opened. Testing is achieved by using a flow switch to start the pump and burner with the water draw, from an already hot boiler. In addition, the pump capacity, pipe capacity, and minimum boiler firing rate will be stated in the notes on the spec sheet. If we don't move the right amount of hot boiler water through the tank coil, we won't see the results that we expect in DHW output.

4.2 Ratings Procedure

Understanding the ratings procedure points out that in real life, we won't see that much output in the first hour. We don't start the burner and pump with a flow switch, we use a tank temperature control that waits until the temperature at that location in the tank drops enough to trigger a call for DHW. This difference can mean many gallons of hot water can be drawn before the recovery time even begins, which reduces the actual first hour hot water available for use to the customer. Combine that with a boiler that is room temperature when the pump starts (which actually cools the tank until the boiler temperature reaches the tank temperature) and a smaller than maximum tank rating burner firing rate, and a "not always properly sized" circulator on the tank, and the actual first hour rating becomes literally almost nothing. In real life, at normal faucet flow rates, an undersized tank can run out of hot water in 20 minutes. Since we don't see it begin to recover in the first 10 or 20 minutes, when the cold and small boiler are figured in we are out of hot water in almost no time.

4.3 Adding Condensing Boilers

Add in condensing boilers that are controlled to maintain as much efficiency (read: very low outlet temperatures) for as long as possible, we need to rethink how we size a tank. A tank in standby can deliver about $\frac{3}{4}$ of its capacity before the output becomes too cool to consider "hot". A 40 gallon tank can supply a 30 gallon tub, or 30 minutes of shower time with a 1 GPM shower head. With a 2 GPM shower head, that time is reduced to 15 minutes. A first hour rating doesn't even come into play if the tank is out of hot water in 15 minutes and the condensing boiler doesn't start until 10 minutes into the shower and delays coming out of condensing mode (delivering 140° boiler water) for several more minutes. Knowing that this gives us great recovery efficiency, but terrible recovery time means that the tank needs to be sized to the actual load that the customers expect it to meet. If the customers expect 45 minute showers at 2 GPM on a condensing boiler fired at 100,000 BTUH, a 120 gallon

tank would be required to meet their expectations. Of course, alternately, they could buy a cast iron boiler and maintain 190° F all of the time and use a 60 gallon water heater. They still would need an accurately sized circulator and piping to the tank. Neither approach is wrong, but one size doesn't fit all customers.

4.4 Before Purchasing

If you don't have this discussion with your customers before they purchase a system, and it doesn't meet their expectations, it is very hard to remedy. There is no cheap fix for too little capacity in a system.

5 Specifications

5.1 S, SU, SM, LT Series Specification & Performance Data

Description	Unit	S32	SU54	SU80	SU100	SM80	SM100	LT160	LT200	LT300
Tank Capacity	gal	30.0	51.3	77.4	98.4	75.4	96.9	42.6	52.5	76.0
Diameter	in	21¾	21¾	263/8	263/8	263/8	263/8	25¾	25¾	25¾
Height	in	385/8	60¾	587/8	72¾	587/8	72¾	25¾	25¾	25¾
Length	in	–	–	–	–	–	–	36¾	421/4	57¾
Tank Orientation	–	Vertical	Vertical	Vertical	Vertical	Vertical	Vertical	Horizontal	Horizontal	Horizontal
Coil Type	–	Single	Single	Single	Single	Dual	Dual	Dual	Single	Single
Connection Heat Exchanger Coil	in	¾	1	1	1	1	1	1	1	1
Connection DHW outlet	in	¾	1	1	1	1	1	1	1	1
Connection Cold Water Inlet	in	¾	1	1	1	1	1	1¾	1¾	1¾
Connection Recirculation	in	¾	¾	¾	¾	¾	¾	¾	¾	¾
Approx. Dry Weight	lbs	160	170	231.5	282	260	298	220	247	364
Max. DHW Temperature	°F	203	203	203	203	203	203	203	203	203
Max. DHW Operating Pressure	psi	150	150	150	150	150	150	150	150	150
Max. Heat Exchanger Coil Water Temp.	°F	230	230	230	230	230	230	212	212	212
Max. Heat Exchanger Coil Pressure	psi	232	232	232	232	232	232	232	232	232

Table 1 Technical Specifications

Description	Unit	S32	SU54	SU80	SU100	SM80				SM100				LT160	LT200	LT300
						Lower Coil	Upper Coil	Dual Coil	Dual Coil Parallel	Lower Coil	Upper Coil	Dual Coil	Dual Coil Parallel			
Heat Input to Tank	MBH	88.0	84.9	119.2	143.9	112.4	78.2	178.8	156.7	169.1	87.9	235.4	202.9	76.1	83.0	126.3
Continuous Rating	GPH	137	130	189	218	185	135	298	278	265	153	376	344	122	128	208
First Hour Rating	GPH	165	180	264	312	257	135	363	345	356	153	462	434	163	176	276
Boiler Water Flow Rate	GPM	8.0	11.4	11.4	14.0	11.4	11.4	11.4	11.4	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Coil Pressure Drop	FT HD	1.9	2.4	2.7	3.8	2.5	1.8	3.2	1.4	5.8	3.5	10.2	2.1	2.4	2.8	3.3

Table 2 Performance Data*

* Performance data tested at 180°F (82.2°C) Boiler Supply Temperature, 58°F (14.4°C) Cold Water Inlet Temperature, 135°F (57.2°C) DHW Outlet Temp



- All AHRI Certified Ratings are in **Blackface** Type
- SM80/SM100 are UPC, USEC and Low-Lead Certified by IAPMO R & T
- S32, SU54, SU80, SU100, LT160, LT200, LT300 have UPC and Low-Lead Certification by IAPMO Research & Testing
- Ratings in **BLACK** are outside the scope of AHRI-IWH Certification Program

5.2 SST Series Specification & Performance Data

Description	Unit	SST150-40	SST250-65	SST300-80	SST450-119
Tank Capacity	gal	40	67	81.5	113.4
Diameter	in	20	24	24	28
Height	in	56	60	70	69
Length	in	–	–	–	–
Tank Orientation	–	Vertical	Vertical	Vertical	Vertical
Coil Type	–	Single	Single	Single	Single
Connection Heat Exchanger Coil	in	1	1	1	1
Connection DHW outlet	in	1	1.5	1.5	1.5
Connection Cold Water Inlet	in	1	1.5	1.5	1.5
Approx. Dry Weight	lbs	105	147	177	213
Max. DHW Temperature	°F	194	194	194	194
Max. DHW Operating Pressure	psi	150	150	150	150

Table 3 Technical Specifications

Description	Unit	SST150-40	SST250-65	SST300-80	SST450-119
Heat Input to Tank	MBH	115	154	171	216
Continuous Rating	gph	181	263	285	349
First Hour Rating	gph	208	327	358	459
Boiler Water Flow Rate	gpm	14	14	14	14
Coil Pressure Drop	Ft of Head	4.5	5.7	6.1	6.5

Table 4 Performance Data*

* Performance data tested at 180°F (82.2°C) Boiler Supply Temperature, 58°F (14.4°C) Cold Water Inlet Temperature, 135°F (57.2°C) DHW Outlet Temp



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