

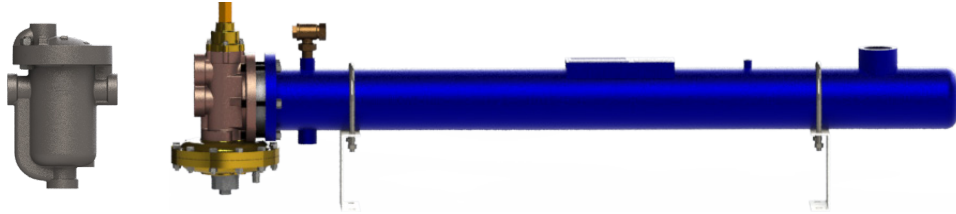
FLO-RITE-TEMP® 535 & 535DW

INSTANTANEOUS WATER HEATER

Flo-Rite-Temp® Instantaneous Steam/Water Heater is a shell & tube heat exchanger fitted with an integral control valve for water heating and temperature control.

The feed forward design instantly determines downstream system demand and directs cold water through the heat exchanger. Water is heated above legionella survival temperatures with constant pressure steam and then blended with a proportional amount of cold water to set point temperature.

Flo-Rite-Temp® Instantaneous Steam/Water Heaters are available with single wall or double wall heat exchangers in four standard sizes. A stainless steel construction option is available.



Flo-Rite-Temp® 535 Single Wall Instantaneous Water Heater



Flo-Rite-Temp® 535DW Double Wall Instantaneous Water Heater

Designs, materials, weights, and performance ratings are approximate and subject to change without notice. Visit armstronginternational.com for the most up-to-date information.

FLO-RITE-TEMP® 535 & 535DW

TECHNICAL SPECIFICATIONS - SIZING

FRT535 and FRT535DW Water and Steam Capacities - Imperial Units									
Inlet Temperature	Set Temperature	Hot Water Capacities in GPM				Steam Capacities in lb/hr			
		Steam Pressure				Steam Pressure			
		2 psig	5 psig	10 psig	15 psig	2 psig	5 psig	10 psig	15 psig
40°F	120°F	37	40	43	45	1,543	1,657	1,814	1,946
	130°F	32	34	37	39	1,472	1,587	1,743	1,876
	140°F	27	29	32	34	1,397	1,513	1,671	1,804
	160°F	20	22	24	26	1,235	1,355	1,517	1,652
	180°F	12	13	15	16	861	966	1,104	1,219
50°F	120°F	41	44	45	45	1,495	1,609	1,764	1,896
	130°F	34	37	40	45	1,425	1,539	1,695	1,827
	140°F	29	31	34	37	1,352	1,467	1,624	1,756
	160°F	21	23	25	28	1,194	1,313	1,473	1,607
	180°F	12	14	16	17	831	934	1,071	1,185
60°F	130°F	38	41	45	45	1,378	1,491	1,646	1,777
	140°F	32	34	38	40	1,307	1,421	1,576	1,708
	160°F	22	24	27	30	1,152	1,270	1,428	1,561
	180°F	13	14	16	18	800	902	1,037	1,150

FRT535 and FRT535DW Water and Steam Capacities - Metric Units									
Inlet Temperature	Set Temperature	Hot Water Capacities in m ³				Steam Capacities in kg/hr			
		Steam Pressure				Steam Pressure			
		0.14 bar	0.35 bar	0.7 bar	1 bar	0.14 bar	0.35 bar	0.7 bar	1 bar
4°C	49°C	8.4	9.1	9.8	10.2	697	749	820	880
	54°C	7.3	7.7	8.4	8.8	665	717	788	848
	60°C	6.1	6.6	7.3	7.7	631	684	755	815
	71°C	4.5	5.0	5.5	5.9	558	612	686	747
	82°C	2.7	3.0	3.4	3.6	390	438	501	553
50°C	49°C	9.3	10.0	10.2	10.2	676	727	797	857
	54°C	7.7	8.4	9.1	9.8	644	696	766	826
	60°C	6.6	7.0	7.7	8.4	611	663	734	794
	71°C	4.7	5.2	5.7	6.4	540	593	665	726
	82°C	2.7	3.2	3.6	3.9	377	424	486	537
60°C	54°C	8.7	9.3	10.2	10.2	623	674	744	803
	60°C	7.3	7.7	8.6	9.1	591	642	712	772
	71°C	5.0	5.5	6.1	6.8	521	574	645	706
	82°C	3.0	3.2	3.6	4.1	363	409	470	522

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FLO-RITE-TEMP® 535 & 535DW

TECHNICAL SPECIFICATIONS

General		
Ambient Temperature	Minimum Ambient Temperature: 35°F (2°C)	Maximum Ambient Temperature: 122°F (50°C)
Installation Environment	Suitable for indoor use only	
Materials		
FRT Control Valve	Bronze	
Heat Exchanger Shell	Carbon steel, ASTM SA-106, Gr. B, ASME "U" stamped with Type 316 stainless steel two-pass head	
Heat Exchanger Tube Bundle	Single Wall	Admiralty brass tubes; 5/8" OD x 16 BWG wall
	Double Wall	Copper tubes; 5/8" OD inner with 3/4" OD grooved outer
Heat Exchanger Tube Sheets	Single Wall	Lead-free brass
	Double Wall	Brass on water side; Steel on steam side
Tube Bundle End Cap (Single Wall ONLY)	Lead-free brass	
Connections		
Water Side	Cold Water Inlet	1-1/2" NPT Connection
	Mixed Water Outlet	1-1/2" NPT Connection
Steam Side	Steam Inlet	2-1/2" NPT Connection
	Condensate Outlet	1" NPT Connections (Armstrong Steam Trap 813)
Pressures		
Water Inlet Supply Pressures	Maximum Water Pressure: 150 psig (10 barg)	Minimum Pressure: 20 psig (1.5 barg)
Steam Inlet Supply Pressures	Maximum Allowable Steam Pressure: 150 psig (10 barg)	
	Maximum Operating Steam Pressure: 15 psig (1 barg)	
Temperatures		
Control Range	+ / - 4°F (within 25' downstream during demand)	

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FLO-RITE-TEMP® 535 & 535DW

WRITTEN SPECIFICATIONS

Category: Steam to Water Heater with Shell and Tube Heat Exchanger

Type: Flo-Rite-Temp®

Model: FRT535 and FRT535DW

Part 1 - GENERAL

1.0 Flo-Rite-Temp® FRT535 and FRT535DW Overview

- 1.1 The assembly shall be a steam to water shell and tube heater.
 - 1.1.1 FRT535 shall be of single wall construction with straight admiralty brass tubes expanded into naval brass tube sheets with a bolted end cover.
 - 1.1.2 FRT535DW shall be of double wall construction with 5/8" copper inner tube, 3/4" ID grooved copper outer tube expanded into steel (steam side) and brass (water side) tube sheets.

Heat exchanger will be fixed on one end of the shell and free-floating on the opposite end designed and manufactured in accordance with ASME Code Section VIII.

2.0 FRT535 and FRT535DW Assembly

- 2.1 The assembly shall comprise of a shell and tube heat exchanger with industrial grade enamel paint, a brass control valve, and a Model 813 steam trap.
- 2.2 Steam pressure on the system to be no more than 15 psig. Designed to generate 35 GPM with a 40°F entering cold water temperature, a 140°F mixed water set point utilizing 15 psig at a maximum of 1,750 lbs/hr.

3.0 FRT535 and FRT535DW shall have the following operational specifications:

- 3.1 + / - 4° F (2° C) water temperature control from zero-system demand to full system demand
- 3.2 Pressure drop not to exceed 10 psi at maximum flow
- 3.3 Operating steam pressure (constant) between 2-15 psig
- 3.4 Operating water pressure between 20-150 psig
- 3.5 Pressure-sensitive mixing valve is integrally mounted to shell and tube exchanger using feed-forward sensing
- 3.6 Pressure-sensitive mixing valve shall fail in the cold position in the event of diaphragm failures
- 3.7 1/4" domestic side pressure relief pop-off valve with 165 psig (11.4 barg) crack pressure, self-seating
- 3.8 Thermostatic air vent to vent the exchanger air on start-up
- 3.9 Inverted bucket steam trap for condensate return
- 3.10 Exchanger tubes:
 - 3.11.1 FRT535: 16-gauge, 5/8" OD admiralty brass straight tubes expanded into naval brass tube sheets
 - 3.11.2 FRT535DW: 5/8" copper inner tubes, 3/4" outer tubes expanded into steel / brass tube sheets
- 3.12 Carbon steel shell with 2-1/2" NPT steam inlet and 1" condensate outlet connections

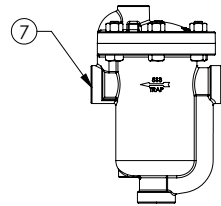
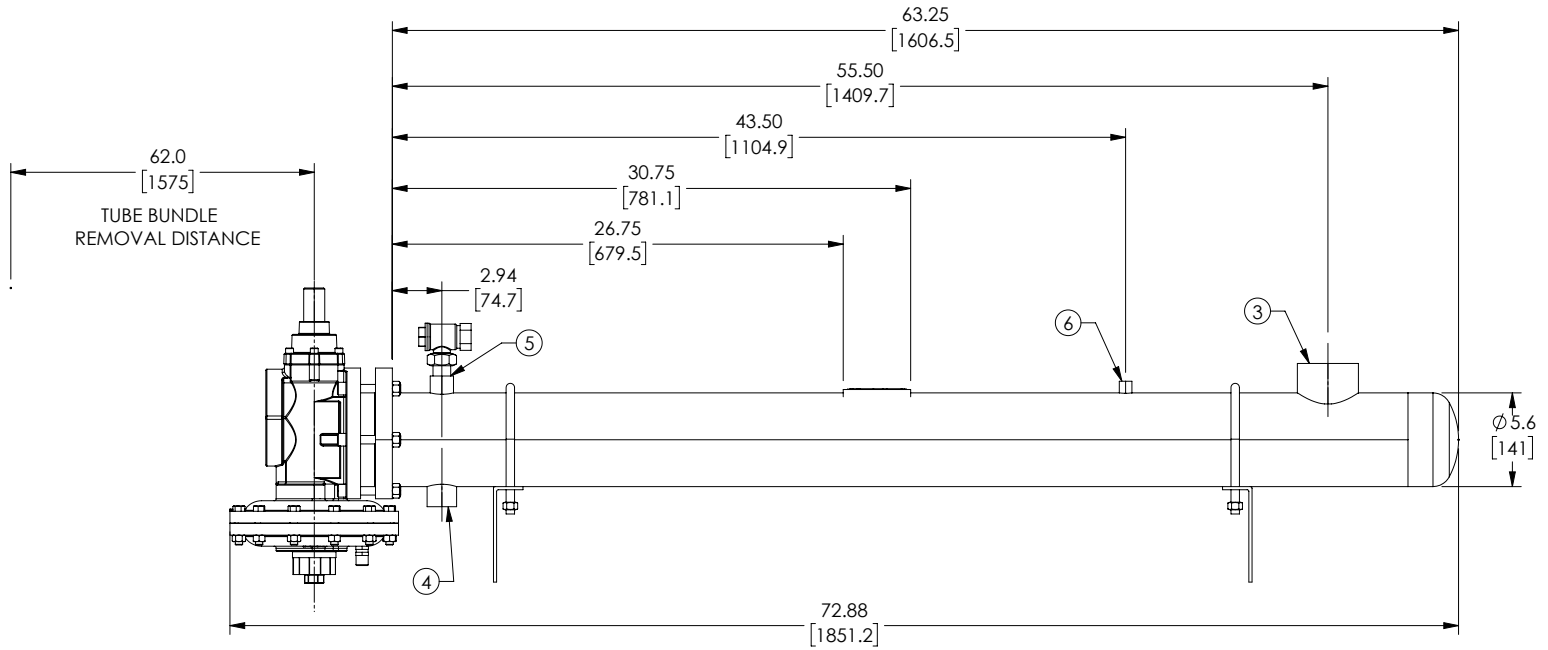
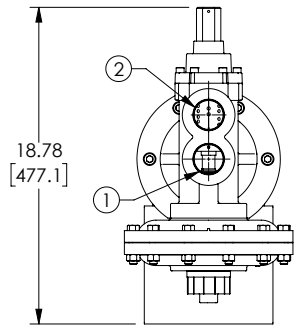
4.0 Warranty

- 4.1 Water heater assembly shall have a 2-year warranty from date of installation, but not longer than 27 months from date of shipment.
- 4.2 The tube bundle shall have a 10-year guarantee against failure caused by materials or workmanship provided by Armstrong but not against gasket failure or damage caused by corrosion, water hammer or lack of proper cleaning.

APPROVAL

BY: _____ DATE: _____

- APPROVED, PROCEED WITH FABRICATION
- APPROVED AS NOTED, PROCEED WITH FABRICATION IN ACCORDANCE WITH COMMENTS
- DISAPPROVED, DO NOT FABRICATE



PROJECT NAME:		
TAG:		
ITEM	DESCRIPTION	CONNECTION
1	COLD WATER INLET	1-1/2" NPT
2	HOT WATER OUTLET	1-1/2" NPT
3	STEAM INLET	2-1/2" NPT
4	CONDENSATE OUTLET	1" NPT
5	AIR VENT	3/4" NPT
6	PRESSURE GAUGE PORT	1/4" NPT
7	813 IB	1" NPT
ITEM		MATERIAL
EXCHANGER SHELL MATL		CARBON STEEL
EXCHANGER TUBE MATL		ADMIRALTY BRASS

NOTE(S):

1. ARMSTRONG PART NUMBER : D58651
2. COMPLETE ASSEMBLY LEAD FREE COMPLIANT - THE WETTED SURFACE OF THIS PRODUCT CONTACTED BY CONSUMABLE WATER CONTAINS LESS THAN ONE QUARTER OF ONE PERCENT (0.25%) OF LEAD BY WEIGHT.

DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED	
DIMENSIONING ENGLISH [mm]	
FRACTIONAL ± 1/64	
ANGULAR: ± 2	
DECIMAL	.XXXX ± .0005
	.XXX ± .005 .010
	.XX ± .015 .10
	.X ± .3

Armstrong

NAME	DATE
DRAWN RAJKUMAR	07/21/2015
RELEASED	

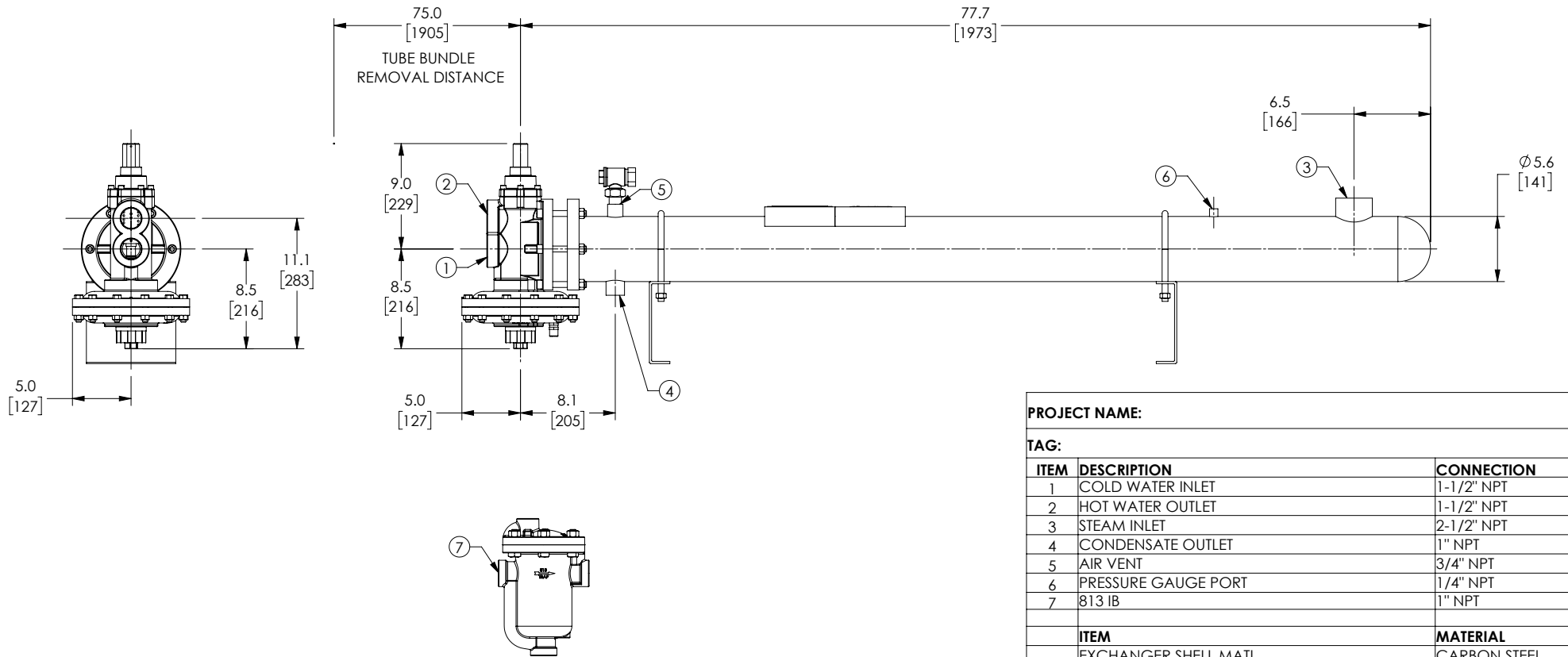
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FRT535 W/SS AND TRAP LF

MATERIAL	CN57167
REV D	DWG. SALES

APPROVAL

- BY: _____ DATE: _____
- APPROVED, PROCEED WITH FABRICATION
- APPROVED AS NOTED, PROCEED WITH FABRICATION IN ACCORDANCE WITH COMMENTS
- DISAPPROVED, DO NOT FABRICATE



PROJECT NAME:		
TAG:		
ITEM	DESCRIPTION	CONNECTION
1	COLD WATER INLET	1-1/2" NPT
2	HOT WATER OUTLET	1-1/2" NPT
3	STEAM INLET	2-1/2" NPT
4	CONDENSATE OUTLET	1" NPT
5	AIR VENT	3/4" NPT
6	PRESSURE GAUGE PORT	1/4" NPT
7	813 IB	1" NPT
ITEM		MATERIAL
EXCHANGER SHELL MATL		CARBON STEEL
EXCHANGER TUBE MATL		COPPER

NOTE(S):

1. ARMSTRONG PART NUMBER : D58652
2. COMPLETE ASSEMBLY LEAD FREE COMPLIANT - THE WETTED SURFACE OF THIS PRODUCT CONTACTED BY CONSUMABLE WATER CONTAINS LESS THAN ONE QUARTER OF ONE PERCENT (0.25%) OF LEAD BY WEIGHT.

DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED	
DIMENSIONING ENGLISH [mm]	
FRACTIONAL ± 1/64	
ANGULAR: ± 2	
DECIMAL	IN. MM
.XXX ± .0005	.10
.XX ± .015	.10
X	.3

NAME	DATE
RAJKUMAR	07/21/2015
RELEASED	

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FRT535DW W/SS AND TRAP LF

MATERIAL	CN59532
REV E	DWG. SALES

SHEET 1 OF 1