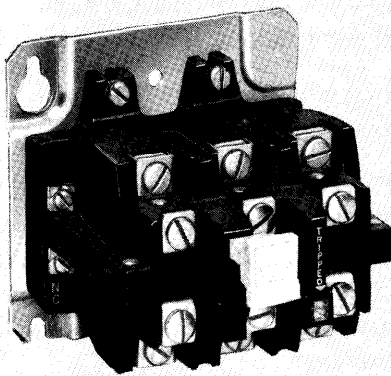


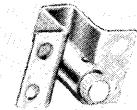
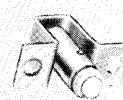
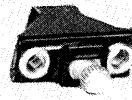


Bulletin 592 Type W and WL Eutectic Alloy Heater Elements For Application on Bulletin 500 Line Starters

Product Data



Bulletin 592



Type W Heater Elements

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Overload Relay Class Designation

Industry standards (NEMA Part ICS 2–222) designate an overload relay by a class number indicating the maximum time in seconds at which it will trip when carrying a current equal to 600 percent of its current rating.

- A Class 10 overload relay will trip in 10 seconds or less at a current equal to 600 percent of its rating.
- A Class 20 overload relay will trip in 20 seconds or less at a current equal to 600 percent of its rating.
- A Class 30 overload relay will trip in 30 seconds or less at a current equal to 600 percent of its rating.

Allen–Bradley standard Bulletin 592 overload relay protection is provided using Type W heater elements for the 500 Line. This provides Class 20 operation and is recommended for General Applications.

Type B heater equipment used in conjunction with Bulletin 593 Bi–metal Overload Relays also provide Class 20 protection.

Specific Applications may require Class 10 or Class 30 overload relays. Class 10 overload relays are often used with hermetic motors, submersible pumps, or motors with short locked rotor time capability. Class 30 overload relays should be used with motors driving high inertia loads where additional accelerating time is needed and the safe permissible locked rotor time of the motor is within Class 30 performance requirements.

For applications requiring Class 30 protection, Type WL heater elements are available. To order, use the applicable Type W selection table, follow the heater element selection instructions and change the “W” in the Heater Type Number to “WL”.

For applications requiring Class 10 overload relays, Type J elements are available. Refer to the appropriate tables.

Heater Element Selection

The “Full Load Amps.” listed in the tables are to be used for heater element selection. The rating of the relay in amperes at 40°C is 115% of the “Full Load Amps.” listed for the “Heater Type No.”

Refer to the motor nameplate for the full load current, the service factor, and/or the motor classification by application and temperature rise.

Use this motor nameplate information, the application rules, and the “Full Load Amps.” listed in the proper table (see index) to determine the “Heater Type No.”

MOTORS RATED FOR CONTINUOUS DUTY:

MOTORS WITH MARKED SERVICE FACTOR OF NOT LESS THAN 1.15 OR MOTORS WITH A MARKED TEMPERATURE RISE NOT OVER 40°C.

- 1. The Same Temperature at the Controller and the Motor** – Select the “Heater Type No.” with the listed “Full Load Amps.” nearest the full load value shown on the motor nameplate.
- 2. Higher Temperature at the Controller than at the Motor** ① – If the full load current value shown on the motor nameplate is between the listed “Full Load Amps.”, select the “Heater Type No.” with the higher value.
- 3. Lower Temperature at the Controller than at the Motor** ① – If the full load current value shown on the motor nameplate is between the listed “Full Load Amps.”, select the “Heater Type No.” with the lower value.

**ALL OTHER MOTORS RATED FOR CONTINUOUS DUTY
(INCLUDES MOTORS WITH MARKED SERVICE FACTOR OF 1.0):**

Select the “Heater Type No.” one rating smaller than determined by the rules in paragraphs 1, 2 and 3.

MOTORS RATED FOR INTERMITTENT DUTY;

Consult Local Allen–Bradley Office.

① Rules 2 and 3 apply when the temperature difference does not exceed 10°C (18°F). See page 4 when the temperature difference is greater.

Ambient Temperature Correction

The ambient temperature at the motor and controller is the same in most applications. Under this condition, the overload relay is designed to sense changes in ambient temperature and also protect the motor over a range of temperatures.

Output that a motor can safely deliver varies with temperature. The motor can deliver its full rated horsepower at an ambient temperature specified by the motor manufacturers, normally 40°C (104°F). At high temperatures (higher than 40°C) less than 100% of the normal rated current can be drawn from the motor without shortening the insulation life. At lower temperatures (less than 40°C) more than 100% of the normal rated current could be drawn from the motor without shortening the insulation life. Thus, there is an inverse relationship between motor ambient temperature and motor output. In any motor, allowable output decreases as the ambient temperature is raised and vice-versa.

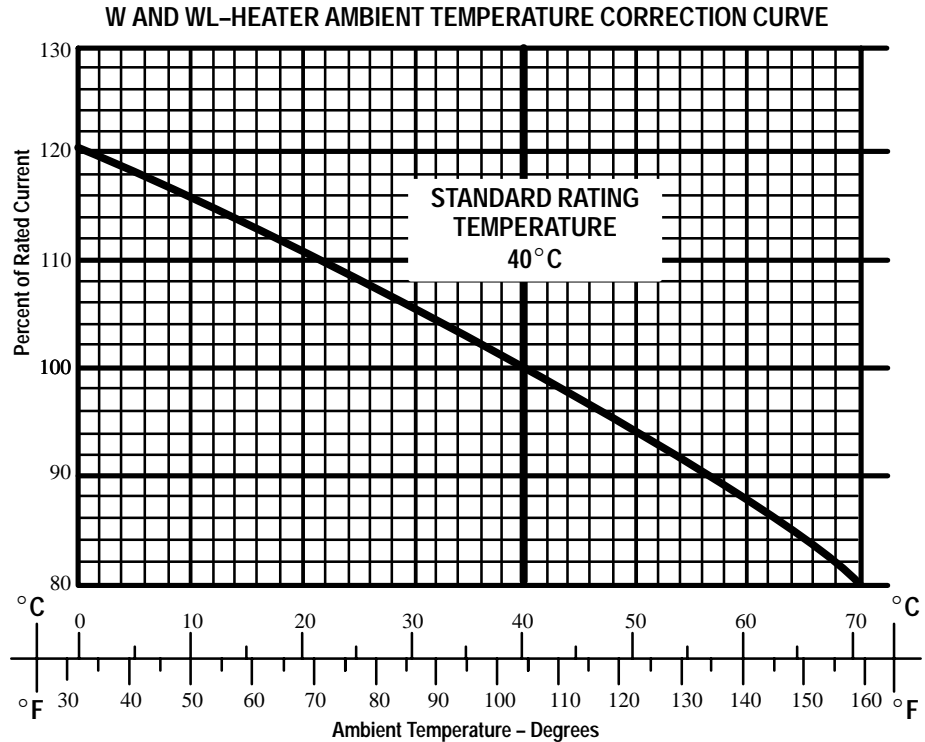
When the temperature difference between the motor and controller does not exceed 10°C the heater elements should be selected according to the directions given on the first page.

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Type W and WL Eutectic Alloy Heater Elements

When the temperature difference is more than 10°C an ambient temperature correction factor should be used as part of the process for selecting heater elements. The ambient temperature correction curve shown below shows the factor by which heater selection rating changes with ambient temperature changes.



Heater Element Selection Procedure

In solving problems where ambient temperature correction is necessary, the following simple procedure is recommended:

Step 1. First find the correction factor ratio (“C.F.R.”). This is the ratio of correction factor of the motor ambient temperature (C.F.m) to the correction factor for the controller ambient temperature (C.F.c). The formula for calculating the correction factor ratio is:

$$\text{C.F.R.} = \frac{\text{C.F.m}}{\text{C.F.c}}$$

Both correction factors are selected from the curve for the type of heater element to be used. The heater element selection tables are based on a 40°C ambient temperature. This means the correction factor for a 40°C is 1.00. In other words, there is no correction factor at 40°C

Step 2. Next in this heater element selection process is to adjust the motor nameplate full load current (FLC) by the C.F. Ratio. This readjusted value of motor nameplate full load current (FLC) is the yardstick in selecting the proper heater element.

Step 3. The last step is to refer to the suggested heater element table and pick the element whose rating for the given controller size is closest to FLC.

Examples – To become familiar with this heater element selection process, consider a few examples.

Example 1. Starter at Normal 40°C Ambient–Motor Lower. 3 Phase, AC, squirrel cage motor, 25 hp, 460 volts, 60 Hz, 1800 rpm, FLC of 34 amps, service factor 1.15, *Temperature at starter 40°C, Temperature at motor 25°C*, Type W heater elements will be used.

In Example 1, the motor is at a much cooler ambient temperature (25°C) compared to the controller which is at the normal 40°C. Because the motor is normally rated for use at 40°C, it will deliver a little more than its rated horsepower. This means that a heater element with a higher than normal motor nameplate full load current rating can be used.

Referring to the Type W ambient temperature correction curve (on page 4) for a motor at 25°C ambient, the motor correction factor (C.F. motor) is shown to be 108%. The correction factor for the starter ambient temperature is 100% since it is at 40°C. Thus,

$$\text{C.F. Ratio} = \frac{\text{C.F. motor}}{\text{C.F. controller}} = \frac{108\%}{100\%} = 1.08$$

Now, using this correction factor, the readjusted full load current value can be determined by:

$$\begin{aligned} \text{FLC} &= 34 \times 1.08 \\ &= 36.7 \text{ Amps} \end{aligned}$$

A Bulletin 512, Size 2, was specified for this application. The directions for heater element selection indicate that Table 153 should be used. The table shows that 36.7 amps falls between two values, 35.0 amps (W66) and 38.0 amps (W67). Because 38.0 amps is closer to FLC heater element, W67 should be used.

Example 2. Starter at Normal 40°C Ambient–Motor Higher. 3 Phase, AC, squirrel cage motor, 25 hp, 460 volts, 60 Hz, 1800 rpm. FLC of 34 Amps. service factor 1.15. Type W heater elements, *Temperature at starter 40°C, Temperature at motor 55°C*.

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This represents a situation where the motor ambient temperature is higher than 40°C. In this example, the motor is at 55°C ambient temperature and the controller is at 40°C. When the motor is functioning in a warmer environment than the controller it will not be able to deliver the normal horsepower. To protect it from damage, it becomes necessary to downsize the heater element compared to the same motor operating in a 40°C ambient temperature. Referring to the Type W ambient temperature correction curve (on Page 4), the correction factor would be:

$$\text{C.F. Ratio} = \frac{\text{C.F. motor}}{\text{C.F. controller}} = \frac{91\%}{100\%} = 0.91$$

Having determined the correction factor, the current rating to be used when selecting a heater element would be:

$$\begin{aligned}\text{FLC} &= 34.0 \times 0.91 \\ &= 30.9 \text{ Amps}\end{aligned}$$

For a Bulletin 512, Size 2, again refer to Table 153. The value of 30.9 amps falls between 30.0 amps (W64) and 32.5 amps (W66). Since 30.0 is closer to 30.9 specify the W64 heater element.

Example 3: Starter Lower than 40°C–Motor Higher. 3 Phase, AC, squirrel cage motor. 25 hp, 460 volts, 60 Hz, 1800 rpm. FLC of 34 amps, service factor 1.15 Type W heater elements, *Temperature at starter 25°C, Temperature at motor 55°C.*

Next, consider a case where both the controller and the motor are at ambient temperatures other than 40°C. In Example 3 the temperature of the controller is 25°C ambient (cooler) while the temperature of the motor is 55°C ambient (warmer). As stated earlier, a motor running in a warmer environment will deliver less than its normal horsepower. This requires downsizing the heater element rating. The controller in this case is in a cooler environment which prevents the heater element from heating up as much as in a 40°C ambient temperature. This also requires downsizing the heater element rating to provide adequate protection. Thus, the net effect of a warmer motor and a cooler controller is to further downsize the heater element. Using the Type W temperature correction curve (on page 4), the correction factor in this case is:

$$\text{C.F. Ratio} = \frac{\text{C.F. motor}}{\text{C.F. controller}} = \frac{91\%}{108\%} = 0.84$$

The readjusted value of current FLC for this example is:

$$\begin{aligned}\text{FLC} &= 34.0 \times 0.84 \\ &= 28.6 \text{ Amps}\end{aligned}$$

Table 153 shows that this value falls between 28.0 amps (W63) and 30.0 amps (W64). Because 28.0 amps is closer to the requirement, select the heater element W63.

Example 4: Starter Above 40°C –Motor Lower. 3 Phase, AC, squirrel cage motor, 25 hp, 460 volts, 60 Hz, 1800 rpm. FLC of 34 amps, service factor 1.15, Type W heater elements, *Temperature at starter 65°C. Temperature at motor 35°C.*

Now, consider the effect of a controller in a warmer environment and a motor in a cooler environment. In Example 4, the controller is at 65°C ambient (warmer) and the motor at 35°C ambient (cooler). As mentioned earlier, a motor at a cooler temperature can deliver more than its normal horsepower. The controller when in a warmer environment will heat up faster causing the eutectic alloy to melt before the normal overload condition. This requires upsizing the heater element rating. Referring to the Type W ambient temperature correction curve (on Page 4), the correction factor in this case is:

$$\text{C.F. Ratio} = \frac{\text{C.F. motor}}{\text{C.F. controller}} = \frac{103\%}{84.5\%} = 1.22$$

This correction factor allows a heater element with current rating of :

$$\begin{aligned} \text{FLC} &= 34.0 \times 1.22 \\ &= 41.48 \text{ Amps} \end{aligned}$$

Referring to Table 153, this value of 41.4 Amps falls between 40.5 amps (W68) and 43.5 amps (W69). Because 40.5 amps is closer to the requirement, select heater element W68.

Example 5: Starter Above 40°C –Motor Above. 3 Phase, AC, squirrel cage motor, 25 hp, 460 volts, 60 Hz, 1800 rpm. FLC of 35 amps, service factor 1.15, Type W heater elements. *Temperature at starter 45°C, Temperature at motor 60°C.*

Next, take an example where both the controller and the motor are both warmer than 40°C ambient temperature but their ambient temperatures are different. For instance, the controller could be at 45°C ambient and the motor is at 60°C ambient. Since the difference in their ambient temperatures is greater than 10°C an ambient temperature correction must be made. In Example 5 the correction factor is given by:

$$\text{C.F. Ratio} = \frac{\text{C.F. motor}}{\text{C.F. controller}} = \frac{88\%}{97\%} = 0.91$$

This means that the rating of the heater element should be 90% of the normal nameplate motor full load current or:

$$34.0 \times 0.91 = 30.9 \text{ Amps}$$

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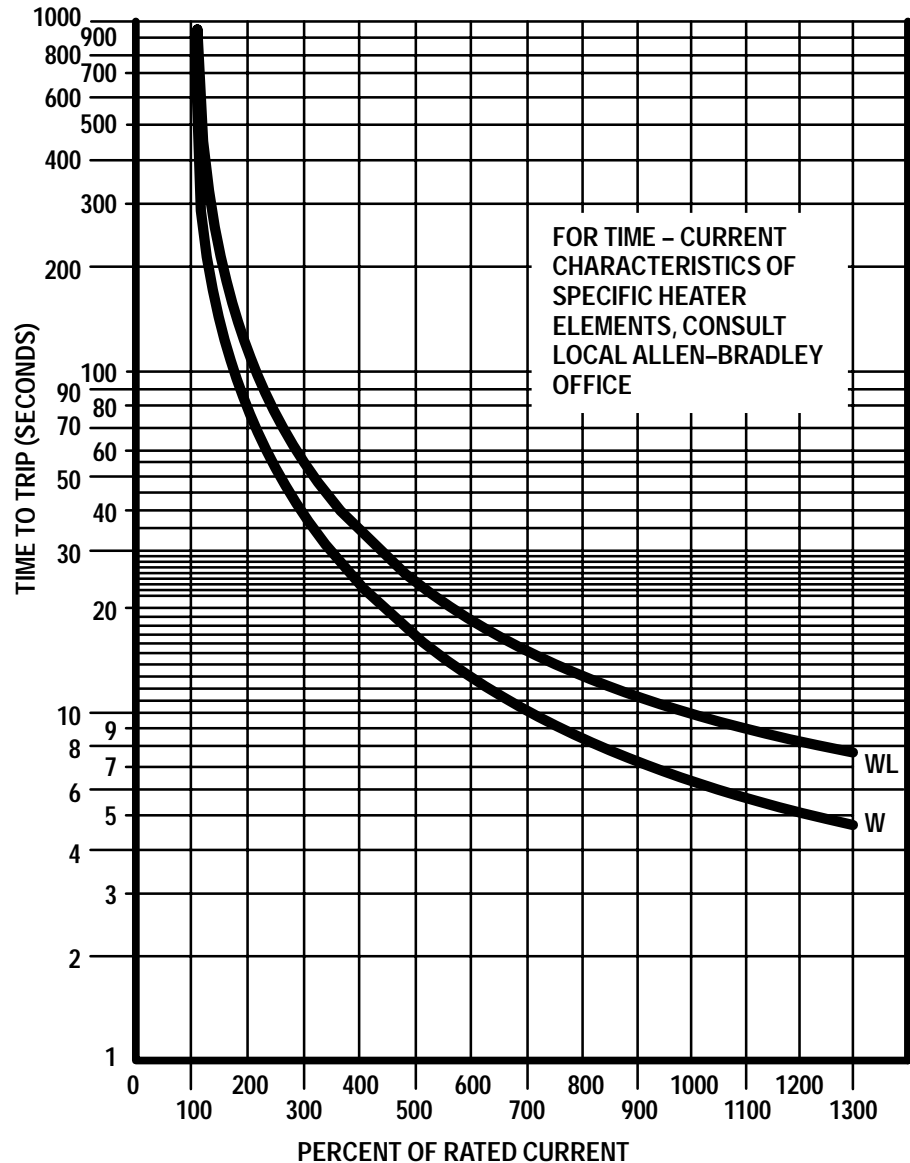
Bulletin 592

Type W and WL Eutectic Alloy Heater Elements

For a Bulletin 512, Size 2 controller, Table 153 shows this rating to fall between 30.0 amps (W64) and 32.5 amps (W65). Because 30.0 amps is closer, select heater element W64. Note here that the net effect has been to downsize the heater element rating compared to a normal 40°C ambient operation.

NOTE: The heater element selection tables are designed to accommodate motor service factors of 1.15 or greater, as given in all the preceding examples. If the service factor had been less than 1.15 (for example, S.F.=1.0) a heater element one rating smaller than selected in each example would have been the correct choice. This would provide protection at 10% lower current levels.

TIME -- CURRENT CHARACTERISTICS AT 40°C
(AVERAGE TRIP CURVES)



Index to Heater Element Selection Tables

Bulletin Number	Size	Table Numbers		Bulletin Number	Size	Table Numbers			
		1 Relay	3 Relay			1 Relay	3 Relay		
112	9-24A	---	180	513	(Unilock™)	0-4	---	167	
	30-300A	---	①			5	---	169	
505	Single Phase	00	127	513	3 Phase Bolted NEMA 3R, 7 & 9	0-3	---	168	
		0-1	156			4	---	168	
505	Single Phase Bolted NEMA 3R, 7 & 9	0-1	156	520	3 Phase	5	---	168	
		00	---			180	0-4	---	151
505	3 Phase	6	---	195	520	3 Phase	5	---	347
		7-8	---	133			6	---	195
		0-4	---	151			7	---	133
505	3 Phase Open NEMA 1, 12	5	---	347	520	3 Phase NEMA 4	0-4	---	146
		0-4	---	146	5	---	177		
505	3 Phase NEMA 4	5	---	177	520	3 Phase NEMA 4X	0-2	---	145
505	3 Phase NEMA 4X	0-2	---	145	520E	Bolted NEMA 3R, 7 & 9	0-3	---	171
505	3 Phase (Unilock™②)	0-1	---	166	520F & G	Bolted NEMA 3R, 7 & 9	4	---	168
		0-3	---	171			0-2	---	168
505	3 Phase Bolted NEMA 3R, 7 & 9	4	---	168	520V	Open Type	3	---	168
		0-4	---	154			0-4	---	154
505V	Open Type	0-4	---	149	522-523	3 Phase	0-4	---	149
		0-4	---	347			5	---	347
506		5	---	347	530	NOTE - When selecting heater elements for Bulletin 530, divide the motor nameplate full load amperes by 2.00—use this value to select the proper "Heater Type Number"	1PW-2PW	---	150
		0-4	---	149			3PW-4PW	---	148
5	---	347	5PW	---			347		
507		6	---	195			6PW	---	195
		7	---	134			7PW-8PW	---	133
507	3 Phase Bolted NEMA 3R, 7 & 9	0-2	---	168	540	NOTE - When selecting heater elements for Bulletin 540, divide the motor nameplate full load amperes by 1.73—use this value to select the proper "Heater Type Number"	1YD-4YD	---	152
		3	---	168			5YD	---	347
		4	---	171			6YD	---	195
00	127	---	7YD-8YD	---			133		
0-3	155	---	2-4	---			154		
509	Single Phase	0-3	155	---	5	---	347		
509	Single Phase Bolted NEMA 3R, 7 & 9	0-3	156	---	6	---	195		
		00	---	180	7-8-9	---	133		
509	3 Phase	7-8	---	133	570		24-165A	192	181
		0-4	155	150	592	Current Transformer Type	---	---	195
509	w/o Control Trans.	0-4	156	150	593		27-45A	---	---
509	3 Phase Open, NEMA 1, 12	5	---	347	600		---	---	---
		6	---	195	609, 609RS, 609TS, 609U, 609TU	0-1-1P	112	110	
509	3 Phase NEMA 1, 4, 12	0-4	---	144	1232X, 1233X	0-2	---	152	
		5	---	177		3, 4	---	149	
509	3 Phase NEMA 4	0-4	---	144		5	---	347	
509	NEMA 4X	0-2	156	146	2052B, 2053B, 2053H	All	---	①	
509	(Unilock™)	0-4	---	166	2106, 2107, 2112, 2113, 2122E, 2122F, 2123E, 2123F	1-4	---	143	
509	3 Phase (Unilock™)	5	---	177	2106, 2107, 2112, 2113, 2122E, 2123E, 2172, 2173, with Series L 509 Starter	5	---	347	
		0-3	---	171		2106, 2107, 2112, 2113, 2122E, 2123E, 2172, 2173, with Series A 509 Starter	5	---	147
		4	---	171	2112, 2113	6	---	147	
512		5	---	347	2162, 2163	1,3,5HP	---	143	
		6	---	195	2172, 2173	2-4	---	152	
		7	---	134					
512M		1-2	---	153					
513		0-4	---	148					
		5	---	347					
		6	---	195					
		7	---	134					

① See Heater Element Selection Tables for element listings
 ② Unilock is a trademark of the Allen Bradley Co.

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Type W and WL Eutectic Alloy Heater Elements

Table 110

Heater Type Number	Full Load Amps.	
	Size 0	Size 1
W10	0.18	0.18
W11	0.20	0.20
W12	0.22	0.22
W13	0.24	0.24
W14	0.27	0.27
W15	0.30	0.30
W16	0.33	0.33
W17	0.36	0.36
W18	0.40	0.40
W19	0.44	0.44
W20	0.48	0.48
W21	0.53	0.53
W22	0.59	0.59
W23	0.65	0.65
W24	0.71	0.71
W25	0.78	0.78
W26	0.86	0.86
W27	0.95	0.95
W28	1.05	1.05
W29	1.16	1.16
W30	1.27	1.27
W31	1.41	1.41
W32	1.55	1.55
W33	1.71	1.71
W34	1.89	1.89
W35	2.08	2.08
W36	2.30	2.30
W37	2.53	2.53
W38	2.79	2.79
W39	3.07	3.07
W40	3.38	3.38
W41	3.73	3.73
W42	4.11	4.11
W43	4.51	4.51
W44	4.96	4.96
W45	5.44	5.44
W46	5.98	5.98
W47	6.57	6.57
W48	7.21	7.21
W49	7.92	7.92
W50	8.70	8.70
W51	9.57	9.57
W52	10.5	10.5
W53	11.6	11.6
W54	12.7	12.7
W55	14.0	14.0
W56	15.4	15.4
W57	16.8	16.8
W58	18.3	18.3
W59	.....	19.9
W60	.....	21.7
W61	.....	23.6
W62	.....	25.7
W63	.....	28.0

Table 112

Heater Type Number	Full Load Amps.		
	Size 0	Size 1	Size 1P
W10	0.21	0.21	.....
W11	0.23	0.23	.....
W12	0.25	0.25	.....
W13	0.28	0.28	.....
W14	0.31	0.31	.....
W15	0.34	0.34	.....
W16	0.37	0.37	.....
W17	0.41	0.41	.....
W18	0.45	0.45	.....
W19	0.49	0.49	.....
W20	0.54	0.54	.....
W21	0.59	0.59	.....
W22	0.65	0.65	.....
W23	0.71	0.71	.....
W24	0.78	0.78	.....
W25	0.86	0.86	.....
W26	0.94	0.94	.....
W27	1.04	1.04	.....
W28	1.14	1.14	.....
W29	1.26	1.26	.....
W30	1.39	1.39	.....
W31	1.53	1.53	.....
W32	1.69	1.69	.....
W33	1.86	1.86	.....
W34	2.05	2.05	.....
W35	2.26	2.26	.....
W36	2.49	2.49	.....
W37	2.74	2.74	.....
W38	3.02	3.02	.....
W39	3.33	3.33	.....
W40	3.67	3.67	.....
W41	4.04	4.04	.....
W42	4.45	4.45	.....
W43	4.89	4.89	.....
W44	5.38	5.38	.....
W45	5.92	5.92	.....
W46	6.51	6.51	.....
W47	7.16	7.16	.....
W48	7.87	7.87	.....
W49	8.66	8.66	.....
W50	9.52	9.52	.....
W51	10.5	10.5	10.5
W52	11.5	11.5	11.5
W53	12.6	12.6	12.6
W54	13.9	13.9	13.9
W55	15.2	15.2	15.2
W56	16.7	16.7	16.7
W57	18.3	18.3	18.3
W58	.....	19.9	19.9
W59	.....	21.8	21.8
W60	.....	23.8	23.8
W61	.....	26.0	26.0
W62	.....	28.5	28.5
W63	.....	.....	31.0
W64	.....	.....	34.0
W65	.....	.....	37.0

Table 127

Heater Type Number	Full Load Amps.
	Size 00
W10	0.21
W11	0.23
W12	0.25
W13	0.27
W14	0.30
W15	0.34
W16	0.37
W17	0.41
W18	0.45
W19	0.50
W20	0.55
W21	0.60
W22	0.65
W23	0.71
W24	0.78
W25	0.86
W26	0.95
W27	1.04
W28	1.14
W29	1.25
W30	1.36
W31	1.50
W32	1.65
W33	1.82
W34	2.01
W35	2.21
W36	2.45
W37	2.67
W38	3.00
W39	3.31
W40	3.65
W41	4.06
W42	4.49
W43	4.98
W44	5.48
W45	6.06
W46	6.68
W47	7.35
W48	8.09
W49	8.90
W50	9.80

Table 133

Heater Type Numbers	Full Load Amps.	
	Size 7	Size 8
W29	....	....
W30	....	....
W31	230	345
W32	248	375
W33	272	410
W34	305	460
W35	325	485
W36	355	535
W37	390	585
W38	430	645
W39	475	710
W40	520	780
W41	575	860
W42	630	945
W43	690	1035
W44	755	1135
W45	835	1255

Table 134

Heater Type Number	Full Load Amps.
	Size 7
W29	240
W30	261
W31	285
W32	310
W33	340
W34	370
W35	405
W36	445
W37	490
W38	540
W39	590
W40	650
W41	710
W42	780
W43	860
W44	....

Table 143

Heater Type Number	Full Load Amperes			
	Size 1	Size 2	Size 3	Size 4
W10	0.19	....	....	....
W11	0.21	....	....	....
W12	0.23	....	....	....
W13	0.25	....	....	....
W14	0.28	....	....	....
W15	0.30	....	....	....
W16	0.33	....	....	....
W17	0.36	....	....	....
W18	0.40	....	....	....
W19	0.44	....	....	....
W20	0.49	....	....	....
W21	0.53	....	....	....
W22	0.58	....	....	....
W23	0.64	....	....	....
W24	0.70	....	....	....
W25	0.77	....	....	....
W26	0.85	....	....	....
W27	0.93	....	....	....
W28	1.02	....	....	....
W29	1.12	....	....	....
W30	1.23	....	....	....
W31	1.35	....	....	....
W32	1.48	....	....	....
W33	1.62	....	....	....
W34	1.79	....	....	....
W35	1.97	....	....	....
W36	2.18	....	....	....
W37	2.40	....	....	....
W38	2.65	....	....	....
W39	2.92	....	....	....
W40	3.23	....	....	....
W41	3.56	....	....	....
W42	3.93	....	....	....
W43	4.30	....	....	....
W44	4.71	....	....	....
W45	5.16	5.26	....	....
W46	5.66	5.81	....	....
W47	6.28	6.41	....	....
W48	6.94	7.09	....	....
W49	7.71	7.86	....	....
W50	8.45	8.56	....	....
W51	9.29	9.40	....	....
W52	10.3	10.4	11.0	....
W53	11.4	11.5	12.1	....
W54	12.5	12.6	13.2	....
W55	13.7	13.8	14.5	....
W56	15.0	15.1	15.9	....
W57	16.3	16.4	17.5	18.1
W58	17.7	17.9	19.2	19.9
W59	19.3	19.5	21.1	21.8
W60	20.9	21.2	23.1	24.0
W61	22.7	23.0	25.4	26.3
W62	24.7	25.1	27.8	28.9
W63	26.9	27.3	30.5	32.0
W64	29.2	29.7	33.5	35.0
W65	....	31.5	37.0	38.5
W66	....	34.5	40.5	42.0
W67	....	37.5	44.5	46.0
W68	....	41.0	48.5	51.0
W69	....	44.0	53.0	56.0
W70	....	47.0	59.0	61.0
W71	....	....	64.0	66.0
W72	....	....	69.0	71.0
W73	....	....	73.0	76.0
W74	....	....	77.0	82.0
W75	....	....	81.0	88.0
W76	....	....	85.0	94.0
W77	....	....	90.0	100.0
W78	....	....	....	106.0
W79	....	....	....	113.0
W80	....	....	....	120.0
W81	....	....	....	128.0
W82	....	....	....	135.0

Table 144

Heater Type Number	Full Load Amperes				
	Size 0	Size 1	Size 2	Size 3	Size 4
W10	0.18	0.18	....	....	....
W11	0.20	0.20	....	....	....
W12	0.22	0.22	....	....	....
W13	0.24	0.24	....	....	....
W14	0.26	0.26	....	....	....
W15	0.29	0.29	....	....	....
W16	0.32	0.32	....	....	....
W17	0.35	0.35	....	....	....
W18	0.38	0.38	....	....	....
W19	0.42	0.42	....	....	....
W20	0.46	0.46	....	....	....
W21	0.51	0.51	....	....	....
W22	0.56	0.56	....	....	....
W23	0.62	0.62	....	....	....
W24	0.68	0.68	....	....	....
W25	0.75	0.75	....	....	....
W26	0.82	0.82	....	....	....
W27	0.90	0.90	....	....	....
W28	0.99	0.99	....	....	....
W29	1.09	1.09	....	....	....
W30	1.20	1.20	....	....	....
W31	1.32	1.32	....	....	....
W32	1.45	1.45	....	....	....
W33	1.59	1.59	....	....	....
W34	1.75	1.75	....	....	....
W35	1.93	1.93	....	....	....
W36	2.12	2.12	....	....	....
W37	2.33	2.33	....	....	....
W38	2.56	2.56	....	....	....
W39	2.81	2.81	....	....	....
W40	3.09	3.09	....	....	....
W41	3.40	3.40	....	....	....
W42	3.74	3.74	....	....	....
W43	4.11	4.11	....	....	....
W44	4.52	4.52	....	....	....
W45	4.97	4.97	....	....	....
W46	5.46	5.46	5.60	....	....
W47	6.01	6.01	6.15	....	....
W48	6.60	6.60	6.76	....	....
W49	7.26	7.26	7.43	....	....
W50	7.98	7.98	8.17	....	....
W51	8.78	8.78	8.98	....	....
W52	9.65	9.65	9.87	....	....
W53	10.6	10.6	10.8	....	....
W54	11.7	11.7	11.9	....	....
W55	12.8	12.8	13.1	....	....
W56	14.1	14.1	14.4	....	....
W57	15.4	15.4	15.7	....	....
W58	16.8	16.8	17.1	....	....
W59	18.3	18.3	18.6	....	....
W60	....	19.8	20.1	....	....
W61	....	21.3	21.7	25.5	....
W62	....	22.7	23.1	28.1	....
W63	....	24.4	24.8	31.0	32.0
W64	....	26.2	28.6	34.0	35.0
W65	....	28.2	30.5	37.0	38.5
W66	....	....	33.0	40.0	42.5
W67	....	....	35.5	43.5	46.5
W68	....	....	38.0	47.0	51
W69	....	....	40.5	51	55
W70	....	....	43.5	55	59
W71	....	....	47.0	59	64
W72	....	....	....	63	69
W73	....	....	....	67	74
W74	....	....	....	71	79
W75	....	....	....	76	84
W76	....	....	....	80	90
W77	....	....	....	85	96
W78	....	....	....	90	102
W79	....	....	....	....	107
W80	....	....	....	....	113
W81	....	....	....	....	118
W82	....	....	....	....	124
W83	....	....	....	....	130
W84	....	....	....	....	135
W85	....	....	....	....	....

Table 145

Heater Type Number	Full Load Amperes		
	Size 0	Size 1	Size 2
W10	0.18	0.18	....
W11	0.20	0.20	....
W12	0.22	0.22	....
W13	0.24	0.24	....
W14	0.27	0.27	....
W15	0.30	0.30	....
W16	0.33	0.33	....
W17	0.36	0.36	....
W18	0.40	0.40	....
W19	0.44	0.44	....
W20	0.49	0.49	....
W21	0.54	0.54	....
W22	0.60	0.60	....
W23	0.66	0.66	....
W24	0.73	0.73	....
W25	0.80	0.80	....
W26	0.88	0.88	....
W27	0.97	0.97	....
W28	1.06	1.06	....
W29	1.17	1.17	....
W30	1.29	1.29	....
W31	1.42	1.42	....
W32	1.56	1.56	....
W33	1.71	1.71	....
W34	1.89	1.89	....
W35	2.08	2.08	....
W36	2.28	2.28	....
W37	2.51	2.51	....
W38	2.76	2.76	....
W39	3.04	3.04	....
W40	3.34	3.34	....
W41	3.68	3.68	....
W42	4.05	4.05	....
W43	4.45	4.45	....
W44	4.90	4.90	....
W45	5.39	5.39	5.58
W46	5.88	5.88	6.11
W47	6.41	6.41	6.70
W48	6.99	6.99	7.34
W49	7.63	7.63	7.97
W50	8.32	8.32	8.69
W51	9.07	9.07	9.52
W52	9.89	9.89	10.4
W53	10.8	10.8	11.4
W54	11.8	11.8	12.5
W55	12.9	12.9	13.6
W56	14.2	14.2	14.9
W57	15.5	15.5	16.2
W58	16.8	16.8	17.4
W59	18.5	18.5	19.3
W60	....	20.3	21.0
W61	....	22.2	23.0
W62	....	24.0	25.0
W63	....	26.1	27.1
W64	....	28.4	29.6
W65	....	....	32.0
W66	....	....	34.5
W67	....	....	38.0
W68	....	....	41.5
W69	....	....	45.0
W70	....	....	....
W71	....	....	....
W72	....	....	....
W73	....	....	....
W74	....	....	....
W75	....	....	....
W76	....	....	....
W77	....	....	....
W78	....	....	....
W79	....	....	....
W80	....	....	....
W81	....	....	....
W82	....	....	....
W83	....	....	....
W84	....	....	....
W85	....	....	....

Table 146

Heater Type Number	Full Load Amperes				
	Size 0	Size 1	Size 2	Size 3	Size 4
W10	0.18	0.18	....	....	....
W11	0.20	0.20	....	....	....
W12	0.22	0.22	....	....	....
W13	0.24	0.24	....	....	....
W14	0.27	0.27	....	....	....
W15	0.30	0.30	....	....	....
W16	0.33	0.33	....	....	....
W17	0.36	0.36	....	....	....
W18	0.40	0.40	....	....	....
W19	0.44	0.44	....	....	....
W20	0.49	0.49	....	....	....
W21	0.54	0.54	....	....	....
W22	0.60	0.60	....	....	....
W23	0.66	0.66	....	....	....
W24	0.73	0.73	....	....	....
W25	0.80	0.80	....	....	....
W26	0.88	0.88	....	....	....
W27	0.97	0.97	....	....	....
W28	1.06	1.06	....	....	....
W29	1.17	1.17	....	....	....
W30	1.29	1.29	....	....	....
W31	1.42	1.42	....	....	....
W32	1.56	1.56	....	....	....
W33	1.71	1.71	....	....	....
W34	1.89	1.89	....	....	....
W35	2.08	2.08	....	....	....
W36	2.28	2.28	....	....	....
W37	2.51	2.51	....	....	....
W38	2.76	2.76	....	....	....
W39	3.04	3.04	....	....	....
W40	3.34	3.34	....	....	....
W41	3.68	3.68	....	....	....
W42	4.05	4.05	....	....	....
W43	4.45	4.45	....	....	....
W44	4.90	4.90	....	....	....
W45	5.39	5.39	5.53	....	....
W46	5.88	5.88	6.04	....	....
W47	6.41	6.41	6.60	....	....
W48	6.99	6.99	7.21	....	....
W49	7.63	7.63	7.87	....	....
W50	8.32	8.32	8.60	....	....
W51	9.07	9.07	9.39	....	....
W52	9.89	9.89	10.3	....	....
W53	10.8	10.8	11.2	....	....
W54	11.8	11.8	12.2	....	....
W55	12.8	12.8	13.3	....	....
W56	14.0	14.0	14.6	....	....
W57	15.3	15.3	15.8	....	....
W58	16.7	16.7	17.3	....	....
W59	18.1	18.1	18.9	....	....
W60	....	19.7	20.6	....	....
W61	....	21.5	22.5	25.5	....
W62	....	23.5	24.6	28.1	....
W63	....	25.7	26.8	31.0	32.0
W64	....	27.5	29.4	34.0	35.0
W65	....	....	32.0	37.0	38.5
W66	....	....	34.5	40.0	42.5
W67	....	....	37.5	43.5	46.5
W68	....	....	41.0	47.0	51
W69	....	....	44.5	51	55
W70	....	....	47.0	55	59
W71	....	....	....	59	64
W72	....	....	....	63	69
W73	....	....	....	67	74
W74	....	....	....	71	79
W75	....	....	....	76	84
W76	....	....	....	80	90
W77	....	....	....	85	96
W78	....	....	....	90	102
W79	....	....	....	....	107
W80	....	....	....	....	113
W81	....	....	....	....	118
W82	....	....	....	....	124
W83	....	....	....	....	130
W84	....	....	....	....	135

Table 147

Heater Type Number	Full Load Amperes				
	Size 5	Size 6	Size 7	Size 8	Size 9
W29	74	144	240	360	600
W30	81	157	261	390	650
W31	88	171	285	430	710
W32	97	186	310	465	780
W33	106	209	340	510	850
W34	115	222	370	555	920
W35	126	242	405	610	1020
W36	138	268	445	670	1120
W37	151	294	490	740	1220
W38	165	325	540	810	1350
W39	180	355	590	890	1480
W40	197	390	650	970	1620
W41	215	430	710	1070	1780
W42	235	470	780	1170	1960
W43	256	515	860	1290	2150
W44	281	560	.....	.....	2360

Table 148

Heater Type Number	Full Load Amperes				
	Size 0	Size 1	Size 2	Size 3	Size 4
W10	0.19	0.19	.....	.....	.....
W11	0.21	0.21	.....	.....	.....
W12	0.23	0.23	.....	.....	.....
W13	0.25	0.25	.....	.....	.....
W14	0.28	0.28	.....	.....	.....
W15	0.30	0.30	.....	.....	.....
W16	0.33	0.33	.....	.....	.....
W17	0.36	0.36	.....	.....	.....
W18	0.39	0.39	.....	.....	.....
W19	0.43	0.43	.....	.....	.....
W20	0.48	0.48	.....	.....	.....
W21	0.52	0.52	.....	.....	.....
W22	0.57	0.57	.....	.....	.....
W23	0.62	0.62	.....	.....	.....
W24	0.69	0.69	.....	.....	.....
W25	0.76	0.76	.....	.....	.....
W26	0.83	0.83	.....	.....	.....
W27	0.91	0.91	.....	.....	.....
W28	1.01	1.01	.....	.....	.....
W29	1.12	1.12	.....	.....	.....
W30	1.22	1.22	.....	.....	.....
W31	1.34	1.34	.....	.....	.....
W32	1.47	1.47	.....	.....	.....
W33	1.62	1.62	.....	.....	.....
W34	1.78	1.78	.....	.....	.....
W35	1.96	1.96	.....	.....	.....
W36	2.15	2.15	.....	.....	.....
W37	2.36	2.36	.....	.....	.....
W38	2.60	2.60	.....	.....	.....
W39	2.86	2.86	.....	.....	.....
W40	3.16	3.16	.....	.....	.....
W41	3.48	3.48	.....	.....	.....
W42	3.84	3.84	.....	.....	.....
W43	4.22	4.22	.....	.....	.....
W44	4.65	4.65	.....	.....	.....
W45	5.12	5.12	5.13	.....	.....
W46	5.63	5.63	5.64	.....	.....
W47	6.20	6.20	6.22	.....	.....
W48	6.82	6.82	6.85	.....	.....
W49	7.51	7.51	7.56	.....	.....
W50	8.23	8.23	8.45	.....	.....
W51	9.07	9.07	9.32	.....	.....
W52	9.95	9.95	10.3	10.6	.....
W53	10.8	10.8	11.4	11.6	.....
W54	11.9	11.9	12.4	12.6	.....
W55	13.0	13.0	13.6	13.9	.....
W56	14.2	14.2	14.8	15.3	.....
W57	15.5	15.5	16.1	16.9	17.3
W58	16.4	16.4	17.3	18.7	19.0
W59	17.7	17.7	18.7	20.7	21.0
W60	19.7	19.7	20.6	22.8	23.1
W61	.....	21.7	22.7	25.1	25.5
W62	.....	24.2	25.2	27.5	28.0
W63	.....	27.0	28.0	30.5	31.0
W64	.....	.....	30.0	33.5	34.0
W65	.....	.....	32.5	36.5	37.0
W66	.....	.....	35.0	39.5	40.0
W67	.....	.....	38.0	42.5	44.0
W68	.....	.....	40.5	46.0	48.5
W69	.....	.....	43.5	50.0	53.0
W70	.....	.....	46.5	54.0	57.0
W71	.....	.....	.....	58.0	62.0
W72	.....	.....	.....	62.0	67.0
W73	.....	.....	.....	67.0	72.0
W74	.....	.....	.....	72.0	77.0
W75	.....	.....	.....	76.0	82.0
W76	.....	.....	.....	81.0	87.0
W77	.....	.....	.....	86.0	93.0
W78	.....	.....	.....	90.0	99.0
W79	.....	.....	.....	.....	105
W80	.....	.....	.....	.....	112
W81	.....	.....	.....	.....	117
W82	.....	.....	.....	.....	123
W83	.....	.....	.....	.....	129
W84	.....	.....	.....	.....	135
W85	.....	.....	.....	.....	.....

Product Data

Bulletin 592

Type W and WL Eutectic Alloy Heater Elements

Table 149

Heater Type Number	Full Load Amperes				
	Size 0	Size 1	Size 2	Size 3	Size 4
W10	0.18	0.18	....	....	....
W11	0.20	0.20	....	....	....
W12	0.22	0.22	....	....	....
W13	0.24	0.24	....	....	....
W14	0.27	0.27	....	....	....
W15	0.30	0.30	....	....	....
W16	0.33	0.33	....	....	....
W17	0.36	0.36	....	....	....
W18	0.40	0.40	....	....	....
W19	0.44	0.44	....	....	....
W20	0.49	0.49	....	....	....
W21	0.54	0.54	....	....	....
W22	0.60	0.60	....	....	....
W23	0.66	0.66	....	....	....
W24	0.73	0.73	....	....	....
W25	0.80	0.80	....	....	....
W26	0.88	0.88	....	....	....
W27	0.97	0.97	....	....	....
W28	1.06	1.06	....	....	....
W29	1.17	1.17	....	....	....
W30	1.29	1.29	....	....	....
W31	1.42	1.42	....	....	....
W32	1.56	1.56	....	....	....
W33	1.71	1.71	....	....	....
W34	1.89	1.89	....	....	....
W35	2.08	2.08	....	....	....
W36	2.28	2.28	....	....	....
W37	2.51	2.51	....	....	....
W38	2.76	2.76	....	....	....
W39	3.04	3.04	....	....	....
W40	3.34	3.34	....	....	....
W41	3.68	3.68	....	....	....
W42	4.05	4.05	....	....	....
W43	4.45	4.45	....	....	....
W44	4.90	4.90	....	....	....
W45	5.39	5.39	5.53	....	....
W46	5.88	5.88	6.00	....	....
W47	6.41	6.41	6.60	....	....
W48	6.99	6.99	7.20	....	....
W49	7.63	7.63	7.84	....	....
W50	8.32	8.32	8.53	....	....
W51	9.07	9.07	9.30	....	....
W52	9.89	9.89	10.2	10.6	....
W53	10.8	10.8	11.2	11.6	....
W54	11.8	11.8	12.2	12.6	....
W55	12.8	12.8	13.2	13.9	....
W56	14.0	14.0	14.4	15.3	....
W57	15.3	15.3	15.8	16.9	18.5
W58	16.2	16.2	16.8	18.7	20.5
W59	17.6	17.6	18.3	20.7	22.5
W60	19.5	19.5	20.3	22.8	25.0
W61	....	21.5	22.4	25.1	27.5
W62	....	23.4	24.4	27.5	30.0
W63	....	25.7	26.8	30.5	33.0
W64	....	27.5	28.7	33.5	36.0
W65	....	....	31.5	37.0	39.5
W66	....	....	34.0	41.0	43.0
W67	....	....	37.0	44.0	47.5
W68	....	....	40.5	47.5	52.0
W69	....	....	43.5	52.0	56.0
W70	....	....	46.5	57.0	61.0
W71	....	....	....	61.0	66.0
W72	....	....	....	66.0	71.0
W73	....	....	....	71.0	76.0
W74	....	....	....	75.0	81.0
W75	....	....	....	79.0	87.0
W76	....	....	....	83.0	93.0
W77	....	....	....	87.0	99.0
W78	....	....	....	91.0	105
W79	....	....	....	....	111
W80	....	....	....	....	118
W81	....	....	....	....	125
W82	....	....	....	....	132
W83	....	....	....	....	139
W84	....	....	....	....	....

Table 150

Heater Type Number	Full Load Amperes				
	Size 0	Size 1	Size 2	Size 3	Size 4
W10	0.18	0.18	....	....	....
W11	0.20	0.20	....	....	....
W12	0.22	0.22	....	....	....
W13	0.24	0.24	....	....	....
W14	0.26	0.26	....	....	....
W15	0.28	0.28	....	....	....
W16	0.31	0.31	....	....	....
W17	0.34	0.34	....	....	....
W18	0.37	0.37	....	....	....
W19	0.41	0.41	....	....	....
W20	0.46	0.46	....	....	....
W21	0.50	0.50	....	....	....
W22	0.55	0.55	....	....	....
W23	0.60	0.60	....	....	....
W24	0.67	0.67	....	....	....
W25	0.73	0.73	....	....	....
W26	0.80	0.80	....	....	....
W27	0.88	0.88	....	....	....
W28	0.97	0.97	....	....	....
W29	1.07	1.07	....	....	....
W30	1.17	1.17	....	....	....
W31	1.29	1.29	....	....	....
W32	1.42	1.42	....	....	....
W33	1.57	1.57	....	....	....
W34	1.73	1.73	....	....	....
W35	1.90	1.90	....	....	....
W36	2.08	2.08	....	....	....
W37	2.28	2.28	....	....	....
W38	2.51	2.51	....	....	....
W39	2.76	2.76	....	....	....
W40	3.04	3.04	....	....	....
W41	3.34	3.34	....	....	....
W42	3.68	3.68	....	....	....
W43	4.04	4.04	....	....	....
W44	4.46	4.46	....	....	....
W45	4.94	4.94	5.13	....	....
W46	5.46	5.46	5.64	....	....
W47	6.03	6.03	6.22	....	....
W48	6.65	6.65	6.85	....	....
W49	7.33	7.33	7.56	....	....
W50	8.13	8.13	8.45	....	....
W51	8.95	8.95	9.32	....	....
W52	9.90	9.90	10.3	10.4	....
W53	10.7	10.7	11.3	11.4	....
W54	11.7	11.7	12.3	12.5	....
W55	12.8	12.8	13.4	13.7	....
W56	14.0	14.0	14.5	15.1	....
W57	15.3	15.3	15.8	16.7	18.5
W58	16.2	16.2	16.7	18.4	20.5
W59	17.5	17.5	18.0	20.3	22.5
W60	19.4	19.4	19.9	22.5	25.0
W61	....	21.3	21.9	24.8	27.5
W62	....	23.3	24.2	27.2	30.0
W63	....	25.5	26.8	30.0	33.0
W64	....	27.2	28.7	33.0	36.0
W65	....	....	31.0	36.0	39.5
W66	....	....	33.5	39.5	43.0
W67	....	....	36.0	43.5	47.0
W68	....	....	38.5	47.5	51.0
W69	....	....	41.5	52.0	56.0
W70	....	....	45.0	56.0	61.0
W71	....	....	....	60.0	66.0
W72	....	....	....	65.0	71.0
W73	....	....	....	69.0	76.0
W74	....	....	....	74.0	82.0
W75	....	....	....	79.0	87.0
W76	....	....	....	85.0	93.0
W77	....	....	....	91.0	99.0
W78	....	....	....	....	105
W79	....	....	....	....	111
W80	....	....	....	....	118
W81	....	....	....	....	125
W82	....	....	....	....	132
W83	....	....	....	....	139
W84	....	....	....	....	....
W85	....	....	....	....	....

Product Data

Bulletin 592

Type W and WL Eutectic Alloy Heater Elements

Table 151

Heater Type Number	Full Load Amperes				
	Size 0	Size 1	Size 2	Size 3	Size 4
W10	0.19	0.19	....	....	....
W11	0.21	0.21	....	....	....
W12	0.23	0.23	....	....	....
W13	0.25	0.25	....	....	....
W14	0.28	0.28	....	....	....
W15	0.30	0.30	....	....	....
W16	0.33	0.33	....	....	....
W17	0.36	0.36	....	....	....
W18	0.39	0.39	....	....	....
W19	0.43	0.43	....	....	....
W20	0.48	0.48	....	....	....
W21	0.52	0.52	....	....	....
W22	0.57	0.57	....	....	....
W23	0.62	0.62	....	....	....
W24	0.69	0.69	....	....	....
W25	0.76	0.76	....	....	....
W26	0.83	0.83	....	....	....
W27	0.91	0.91	....	....	....
W28	1.01	1.01	....	....	....
W29	1.12	1.12	....	....	....
W30	1.22	1.22	....	....	....
W31	1.34	1.34	....	....	....
W32	1.47	1.47	....	....	....
W33	1.62	1.62	....	....	....
W34	1.78	1.78	....	....	....
W35	1.96	1.96	....	....	....
W36	2.15	2.15	....	....	....
W37	2.36	2.36	....	....	....
W38	2.60	2.60	....	....	....
W39	2.86	2.86	....	....	....
W40	3.16	3.16	....	....	....
W41	3.48	3.48	....	....	....
W42	3.84	3.84	....	....	....
W43	4.22	4.22	....	....	....
W44	4.65	4.65	....	....	....
W45	5.12	5.12	5.13	....	....
W46	5.63	5.63	5.64	....	....
W47	6.20	6.20	6.22	....	....
W48	6.82	6.82	6.85	....	....
W49	7.51	7.51	7.56	....	....
W50	8.23	8.23	8.45	....	....
W51	9.07	9.07	9.32	....	....
W52	9.95	9.95	10.3	10.6	....
W53	10.8	10.8	11.3	11.6	....
W54	11.9	11.9	12.3	12.6	....
W55	13.0	13.0	13.4	13.9	....
W56	14.2	14.2	14.5	15.3	....
W57	15.5	15.5	15.8	16.9	....
W58	16.4	16.4	16.7	18.7	....
W59	17.7	17.7	18.1	20.7	....
W60	19.7	19.7	20.0	22.8	....
W61	....	21.7	22.0	25.1	25.0
W62	....	24.2	24.5	27.5	27.7
W63	....	27.0	27.3	30.5	31.0
W64	....	....	29.2	33.5	34.0
W65	....	....	31.5	36.5	38.0
W66	....	....	34.5	40.0	41.5
W67	....	....	37.0	44.0	45.5
W68	....	....	39.5	48.0	49.0
W69	....	....	42.5	52.0	53.0
W70	....	....	46.0	57.0	57.0
W71	....	....	....	61.0	62.0
W72	....	....	....	66.0	67.0
W73	....	....	....	70.0	72.0
W74	....	....	....	75.0	77.0
W75	....	....	....	80.0	84.0
W76	....	....	....	86.0	92.0
W77	....	....	....	92.0	97.0
W78	....	....	....	....	102
W79	....	....	....	....	109
W80	....	....	....	....	117
W81	....	....	....	....	125
W82	....	....	....	....	130
W83	....	....	....	....	136
W84	....	....	....	....	....
W85	....	....	....	....	....

Table 152

Heater Type Number	Full Load Amperes				
	Size 0	Size 1	Size 2	Size 3	Size 4
W10	0.19	0.19	....	....	....
W11	0.21	0.21	....	....	....
W12	0.23	0.23	....	....	....
W13	0.25	0.25	....	....	....
W14	0.28	0.28	....	....	....
W15	0.31	0.31	....	....	....
W16	0.34	0.34	....	....	....
W17	0.37	0.37	....	....	....
W18	0.41	0.41	....	....	....
W19	0.45	0.45	....	....	....
W20	0.50	0.50	....	....	....
W21	0.55	0.55	....	....	....
W22	0.60	0.60	....	....	....
W23	0.66	0.66	....	....	....
W24	0.73	0.73	....	....	....
W25	0.80	0.80	....	....	....
W26	0.88	0.88	....	....	....
W27	0.97	0.97	....	....	....
W28	1.06	1.06	....	....	....
W29	1.16	1.16	....	....	....
W30	1.27	1.27	....	....	....
W31	1.39	1.39	....	....	....
W32	1.51	1.51	....	....	....
W33	1.65	1.65	....	....	....
W34	1.80	1.80	....	....	....
W35	1.96	1.96	....	....	....
W36	2.15	2.15	....	....	....
W37	2.36	2.36	....	....	....
W38	2.60	2.60	....	....	....
W39	2.86	2.86	....	....	....
W40	3.16	3.16	....	....	....
W41	3.48	3.48	....	....	....
W42	3.85	3.85	....	....	....
W43	4.23	4.23	....	....	....
W44	4.68	4.68	....	....	....
W45	5.18	5.18	5.25	....	....
W46	5.68	5.68	5.81	....	....
W47	6.28	6.28	6.41	....	....
W48	6.94	6.94	7.09	....	....
W49	7.71	7.71	7.86	....	....
W50	8.45	8.45	8.56	....	....
W51	9.29	9.29	9.40	....	....
W52	10.3	10.3	10.4	10.6	....
W53	11.4	11.4	11.5	11.6	....
W54	12.5	12.5	12.6	12.6	....
W55	13.7	13.7	13.8	13.9	....
W56	15.0	15.0	15.1	15.3	....
W57	16.3	16.3	16.4	16.9	18.5
W58	17.6	17.6	17.7	18.7	20.5
W59	18.9	18.9	19.1	20.7	22.5
W60	....	20.9	21.1	22.8	25.0
W61	....	22.9	23.2	25.1	27.5
W62	....	25.0	25.7	27.5	30.0
W63	....	27.6	28.5	30.5	33.0
W64	....	....	30.5	33.5	36.0
W65	....	....	33.0	36.5	39.5
W66	....	....	35.5	40.0	43.0
W67	....	....	38.5	44.0	47.0
W68	....	....	41.5	48.5	51.0
W69	....	....	45.0	53.0	56.0
W70	....	....	....	58.0	61.0
W71	....	....	....	62.0	66.0
W72	....	....	....	67.0	72.0
W73	....	....	....	72.0	77.0
W74	....	....	....	77.0	83.0
W75	....	....	....	82.0	89.0
W76	....	....	....	88.0	95.0
W77	....	....	....	94.0	102
W78	....	....	....	....	108
W79	....	....	....	....	116
W80	....	....	....	....	123
W81	....	....	....	....	130
W82	....	....	....	....	137
W83	....	....	....	....	....

Product Data

Bulletin 592

Type W and WL Eutectic Alloy Heater Elements

Table 153

Heater Type Number	Full Load Amperes				
	Size 0	Size 1	Size 2	Size 3	Size 4
W10	0.19	0.19	....	....	....
W11	0.21	0.21	....	....	....
W12	0.23	0.23	....	....	....
W13	0.25	0.25	....	....	....
W14	0.28	0.28	....	....	....
W15	0.31	0.31	....	....	....
W16	0.34	0.34	....	....	....
W17	0.37	0.37	....	....	....
W18	0.41	0.41	....	....	....
W19	0.45	0.45	....	....	....
W20	0.50	0.50	....	....	....
W21	0.55	0.55	....	....	....
W22	0.60	0.60	....	....	....
W23	0.66	0.66	....	....	....
W24	0.73	0.73	....	....	....
W25	0.80	0.80	....	....	....
W26	0.88	0.88	....	....	....
W27	0.97	0.97	....	....	....
W28	1.06	1.06	....	....	....
W29	1.16	1.16	....	....	....
W30	1.27	1.27	....	....	....
W31	1.39	1.39	....	....	....
W32	1.51	1.51	....	....	....
W33	1.65	1.65	....	....	....
W34	1.80	1.80	....	....	....
W35	1.98	1.98	....	....	....
W36	2.18	2.18	....	....	....
W37	2.39	2.39	....	....	....
W38	2.63	2.63	....	....	....
W39	2.90	2.90	....	....	....
W40	3.19	3.19	....	....	....
W41	3.50	3.50	....	....	....
W42	3.85	3.85	....	....	....
W43	4.24	4.24	....	....	....
W44	4.66	4.66	....	....	....
W45	5.13	5.13	5.25	....	....
W46	5.64	5.64	5.78	....	....
W47	6.20	6.20	6.35	....	....
W48	6.82	6.82	6.99	....	....
W49	7.51	7.51	7.69	....	....
W50	8.25	8.25	8.45	....	....
W51	9.07	9.07	9.32	....	....
W52	9.98	9.98	10.3	10.6	....
W53	11.0	11.0	11.4	11.6	....
W54	12.1	12.1	12.4	12.6	....
W55	13.3	13.3	13.6	13.9	....
W56	14.6	14.6	15.0	15.3	....
W57	16.0	16.0	16.4	16.9	18.5
W58	17.4	17.4	17.8	18.7	20.5
W59	19.0	19.0	19.5	20.7	22.5
W60	....	20.7	21.2	22.8	25.0
W61	....	22.7	23.3	25.1	27.5
W62	....	24.7	25.3	27.5	30.0
W63	....	27.0	28.0	30.5	33.0
W64	....	....	30.0	33.5	36.0
W65	....	....	32.5	36.5	39.5
W66	....	....	35.0	39.5	43.0
W67	....	....	38.0	42.5	47.0
W68	....	....	40.5	46.0	51.0
W69	....	....	43.5	50.0	56.0
W70	....	....	46.5	54.0	61.0
W71	....	....	....	58.0	66.0
W72	....	....	....	62.0	71.0
W73	....	....	....	67.0	76.0
W74	....	....	....	72.0	82.0
W75	....	....	....	76.0	87.0
W76	....	....	....	81.0	93.0
W77	....	....	....	86.0	99.0
W78	....	....	....	90.0	105
W79	....	....	....	....	111
W80	....	....	....	....	118
W81	....	....	....	....	125
W82	....	....	....	....	132
W83	....	....	....	....	139
W84	....	....	....	....	....

Table 154

Heater Type Number	Full Load Amperes				
	Size 0	Size 1	Size 2	Size 3	Size 4
W10	0.20	0.20	....	....	....
W11	0.22	0.22	....	....	....
W12	0.24	0.24	....	....	....
W13	0.26	0.26	....	....	....
W14	0.29	0.29	....	....	....
W15	0.32	0.32	....	....	....
W16	0.35	0.35	....	....	....
W17	0.38	0.38	....	....	....
W18	0.42	0.42	....	....	....
W19	0.47	0.47	....	....	....
W20	0.51	0.51	....	....	....
W21	0.56	0.56	....	....	....
W22	0.61	0.61	....	....	....
W23	0.67	0.67	....	....	....
W24	0.74	0.74	....	....	....
W25	0.81	0.81	....	....	....
W26	0.89	0.89	....	....	....
W27	0.98	0.98	....	....	....
W28	1.08	1.08	....	....	....
W29	1.19	1.19	....	....	....
W30	1.30	1.30	....	....	....
W31	1.43	1.43	....	....	....
W32	1.55	1.55	....	....	....
W33	1.70	1.70	....	....	....
W34	1.90	1.90	....	....	....
W35	2.02	2.02	....	....	....
W36	2.22	2.22	....	....	....
W37	2.43	2.43	....	....	....
W38	2.68	2.68	....	....	....
W39	2.96	2.96	....	....	....
W40	3.25	3.25	....	....	....
W41	3.58	3.58	....	....	....
W42	3.94	3.94	....	....	....
W43	4.30	4.30	....	....	....
W44	4.72	4.72	....	....	....
W45	5.22	5.22	5.25	....	....
W46	5.78	5.78	5.81	....	....
W47	6.38	6.38	6.41	....	....
W48	7.06	7.06	7.09	....	....
W49	7.83	7.83	7.86	....	....
W50	8.55	8.55	8.58	....	....
W51	9.41	9.41	9.48	....	....
W52	10.5	10.5	10.6	11.1	....
W53	11.6	11.6	11.7	12.2	....
W54	12.7	12.7	12.8	13.4	....
W55	14.0	14.0	14.1	14.7	....
W56	15.3	15.3	15.4	16.3	....
W57	16.7	16.7	16.9	17.9	19.5
W58	18.0	18.0	18.3	19.7	21.4
W59	....	19.3	19.9	21.7	23.7
W60	....	21.3	21.9	23.8	26.0
W61	....	23.3	24.2	26.1	28.7
W62	....	25.6	26.8	28.7	31.5
W63	....	28.1	29.6	31.5	34.5
W64	....	....	32.5	34.5	37.5
W65	....	....	35.0	38.0	41.0
W66	....	....	37.5	41.5	44.5
W67	....	....	41.0	45.5	48.5
W68	....	....	45.0	49.5	53
W69	....	....	....	54	58
W70	....	....	....	59	63
W71	....	....	....	64	68
W72	....	....	....	70	74
W73	....	....	....	76	80
W74	....	....	....	81	86
W75	....	....	....	87	92
W76	....	....	....	93	98
W77	....	....	....	....	105
W78	....	....	....	....	112
W79	....	....	....	....	120
W80	....	....	....	....	128
W81	....	....	....	....	136
W82	....	....	....	....	....
W83	....	....	....	....	....
W84	....	....	....	....	....
W85	....	....	....	....	....

Product Data

Bulletin 592

Type W and WL Eutectic Alloy Heater Elements

Table 155

Heater Type Number	Full Load Amperes				
	Size 0	Size 1	Size 1P	Size 2	Size 3
W10	0.20	0.20	....	....	....
W11	0.22	0.22	....	....	....
W12	0.24	0.24	....	....	....
W13	0.26	0.26	....	....	....
W14	0.29	0.29	....	....	....
W15	0.32	0.32	....	....	....
W16	0.35	0.35	....	....	....
W17	0.39	0.39	....	....	....
W18	0.43	0.43	....	....	....
W19	0.47	0.47	....	....	....
W20	0.51	0.51	....	....	....
W21	0.56	0.56	....	....	....
W22	0.61	0.61	....	....	....
W23	0.67	0.67	....	....	....
W24	0.74	0.74	....	....	....
W25	0.81	0.81	....	....	....
W26	0.89	0.89	....	....	....
W27	0.98	0.98	....	....	....
W28	1.08	1.08	....	....	....
W29	1.19	1.19	....	....	....
W30	1.30	1.30	....	....	....
W31	1.43	1.43	....	....	....
W32	1.56	1.56	....	....	....
W33	1.70	1.70	....	....	....
W34	1.88	1.88	....	....	....
W35	2.05	2.05	....	....	....
W36	2.24	2.24	....	....	....
W37	2.44	2.44	....	....	....
W38	2.69	2.69	....	....	....
W39	2.97	2.97	....	....	....
W40	3.30	3.30	....	....	....
W41	3.64	3.64	....	....	....
W42	4.10	4.10	....	....	....
W43	4.57	4.57	....	....	....
W44	5.01	5.01	....	....	....
W45	5.51	5.51	....	5.48	....
W46	6.06	6.06	....	6.09	....
W47	6.62	6.62	....	6.65	....
W48	7.22	7.22	....	7.26	....
W49	7.89	7.89	....	7.94	....
W50	8.62	8.62	....	8.68	....
W51	9.41	9.41	....	9.48	....
W52	10.5	10.5	....	10.6	11.5
W53	11.6	11.6	11.6	11.7	12.6
W54	12.7	12.7	12.7	12.8	13.8
W55	14.0	14.0	14.0	14.1	15.1
W56	15.3	15.3	15.3	15.4	16.7
W57	16.7	16.7	16.7	16.8	18.3
W58	18.0	18.0	18.0	18.1	20.1
W59	....	19.3	19.3	19.5	22.1
W60	....	21.3	21.3	21.5	24.4
W61	....	23.3	23.3	23.8	27.0
W62	....	25.6	25.6	26.4	29.5
W63	....	28.1	28.1	29.2	32.5
W64	....	....	30.5	31.5	35.0
W65	....	....	32.5	34.0	38.5
W66	....	....	34.0	36.5	42.0
W67	....	....	36.0	39.5	46.0
W68	....	....	....	42.5	50
W69	....	....	....	46.0	54
W70	....	....	....	....	59
W71	....	....	....	....	64
W72	....	....	....	....	70
W73	....	....	....	....	76
W74	....	....	....	....	81
W75	....	....	....	....	87
W76	....	....	....	....	93
W77	....	....	....	....	....
W78	....	....	....	....	....
W79	....	....	....	....	....
W80	....	....	....	....	....

Table 156

Heater Type Number	Full Load Amperes					
	Size 0	Size 1	Size 1P	Size 2	Size 3	Size 4
W10	0.20	0.20	....	....	....	....
W11	0.22	0.22	....	....	....	....
W12	0.24	0.24	....	....	....	....
W13	0.26	0.26	....	....	....	....
W14	0.29	0.29	....	....	....	....
W15	0.32	0.32	....	....	....	....
W16	0.35	0.35	....	....	....	....
W17	0.39	0.39	....	....	....	....
W18	0.43	0.43	....	....	....	....
W19	0.47	0.47	....	....	....	....
W20	0.51	0.51	....	....	....	....
W21	0.56	0.56	....	....	....	....
W22	0.61	0.61	....	....	....	....
W23	0.67	0.67	....	....	....	....
W24	0.74	0.74	....	....	....	....
W25	0.81	0.81	....	....	....	....
W26	0.89	0.89	....	....	....	....
W27	0.98	0.98	....	....	....	....
W28	1.08	1.08	....	....	....	....
W29	1.19	1.19	....	....	....	....
W30	1.30	1.30	....	....	....	....
W31	1.43	1.43	....	....	....	....
W32	1.57	1.57	....	....	....	....
W33	1.72	1.72	....	....	....	....
W34	1.90	1.90	....	....	....	....
W35	2.08	2.08	....	....	....	....
W36	2.28	2.28	....	....	....	....
W37	2.49	2.49	....	....	....	....
W38	2.74	2.74	....	....	....	....
W39	3.02	3.02	....	....	....	....
W40	3.33	3.33	....	....	....	....
W41	3.68	3.68	....	....	....	....
W42	4.14	4.14	....	....	....	....
W43	4.61	4.61	....	....	....	....
W44	5.06	5.06	....	....	....	....
W45	5.56	5.56	....	5.57	....	....
W46	6.11	6.11	....	6.12	....	....
W47	6.72	6.72	....	6.73	....	....
W48	7.40	7.40	....	7.38	....	....
W49	8.18	8.18	....	8.20	....	....
W50	8.88	8.88	....	8.92	....	....
W51	9.70	9.70	....	9.81	....	....
W52	10.8	10.8	....	10.9	11.7	....
W53	11.8	11.8	11.8	11.9	12.8	....
W54	12.9	12.9	12.9	13.0	13.9	....
W55	14.2	14.2	14.2	14.3	15.2	....
W56	15.5	15.5	15.5	15.6	16.8	....
W57	17.0	17.0	17.0	17.1	18.5	19.5
W58	18.3	18.3	18.3	18.5	20.2	21.4
W59	....	19.9	19.9	20.1	22.2	23.7
W60	....	22.0	22.0	22.2	24.5	26.0
W61	....	24.3	24.3	24.5	27.1	28.7
W62	....	27.0	27.0	27.2	29.9	31.5
W63	....	....	29.5	30.0	32.5	34.5
W64	....	....	32.0	33.0	35.5	37.5
W65	....	....	34.0	35.5	39.0	41.0
W66	....	....	36.0	38.0	42.5	44.5
W67	....	....	....	41.5	47.0	48.5
W68	....	....	....	45.0	52	53
W69	....	....	....	....	57	58
W70	....	....	....	....	62	63
W71	....	....	....	....	67	68.0
W72	....	....	....	....	73	74.0
W73	....	....	....	....	79	80.0
W74	....	....	....	....	85	86.0
W75	....	....	....	....	92	93.0
W76	....	....	....	....	....	100
W77	....	....	....	....	....	108
W78	....	....	....	....	....	116
W79	....	....	....	....	....	125
W80	....	....	....	....	....	135
W81	....	....	....	....	....	....
W82	....	....	....	....	....	....
W83	....	....	....	....	....	....
W84	....	....	....	....	....	....
W85	....	....	....	....	....	....

Table 166

Heater Type Number	Full Load Amperes					
	Size 0	Size 1	Size 2	Size 3	Size 4	Size 5
W10	.19	.19	....	....	....	....
W11	.21	.21	....	....	....	....
W12	.23	.23	....	....	....	....
W13	.25	.25	....	....	....	....
W14	.27	.27	....	....	....	....
W15	.30	.30	....	....	....	....
W16	.32	.32	....	....	....	....
W17	.36	.36	....	....	....	....
W18	.39	.39	....	....	....	....
W19	.43	.43	....	....	....	....
W20	.47	.47	....	....	....	....
W21	.52	.52	....	....	....	....
W22	.56	.56	....	....	....	....
W23	.62	.62	....	....	....	....
W24	.68	.68	....	....	....	....
W25	.74	.74	....	....	....	....
W26	.82	.82	....	....	....	....
W27	.90	.90	....	....	....	....
W28	.98	.98	....	....	....	....
W29	1.05	1.05	....	....	....	72
W30	1.16	1.16	....	....	....	78
W31	1.29	1.29	....	....	....	85
W32	1.40	1.40	....	....	....	92
W33	1.55	1.55	....	....	....	100
W34	1.70	1.70	....	....	....	109
W35	1.84	1.84	....	....	....	118
W36	2.02	2.02	....	....	....	128
W37	2.22	2.22	....	....	....	139
W38	2.45	2.45	....	....	....	151
W39	2.63	2.63	....	....	....	164
W40	2.89	2.89	....	....	....	181
W41	3.17	3.17	....	....	....	198
W42	3.48	3.48	....	....	....	218
W43	3.82	3.82	....	....	....	240
W44	4.19	4.19	....	....	....	....
W45	4.60	4.60	5.10	....	....	....
W46	5.05	5.05	5.60	....	....	....
W47	5.54	5.54	6.12	....	....	....
W48	6.08	6.08	6.65	....	....	....
W49	6.68	6.68	7.25	....	....	....
W50	7.33	7.33	7.90	....	....	....
W51	8.05	8.05	8.60	....	....	....
W52	8.83	8.83	9.40	....	....	....
W53	9.70	9.70	10.2	....	....	....
W54	10.6	10.6	11.2	....	....	....
W55	11.7	11.7	12.2	....	....	....
W56	12.8	12.8	13.4	....	....	....
W57	14.1	14.1	14.7	....	....	....
W58	15.5	15.5	16.2	....	....	....
W59	17.0	17.0	17.7	....	....	....
W60	18.6	18.6	19.4	....	....	....
W61	....	20.4	21.3	25.0	....	....
W62	....	22.4	23.4	27.3	....	....
W63	....	24.6	25.6	29.8	....	....
W64	....	27.0	28.1	32.5	33.5	....
W65	....	....	30.0	35.5	37.0	....
W66	....	....	32.5	39.0	40.5	....
W67	....	....	35.0	42.0	44.5	....
W68	....	....	37.5	46.0	49.0	....
W69	....	....	40.0	51.0	54.0	....
W70	....	....	42.0	55.0	59.0	....
W71	....	....	44.5	59.0	64.0	....
W72	....	....	47.0	64.0	69.0	....
W73	....	....	....	69.0	74.0	....
W74	....	....	....	74.0	79.0	....
W75	....	....	....	79.0	84.0	....
W76	....	....	....	83.0	90.0	....
W77	....	....	....	88.0	96.0	....
W78	....	....	....	93.0	102	....
W79	....	....	....	....	108	....
W80	....	....	....	....	116	....
W81	....	....	....	....	123	....
W82	....	....	....	....	131	....
W83	....	....	....	....	139	....
W84	....	....	....	....	....	....
W85	....	....	....	....	....	....

Table 167

Heater Type Number	Full Load Amperes					
	Size 0	Size 1	Size 2	Size 3	Size 4	Size 5
W10	0.20	0.20	....	....	....	....
W11	0.22	0.22	....	....	....	....
W12	0.24	0.24	....	....	....	....
W13	0.26	0.26	....	....	....	....
W14	0.28	0.28	....	....	....	....
W15	0.31	0.31	....	....	....	....
W16	0.34	0.34	....	....	....	....
W17	0.37	0.37	....	....	....	....
W18	0.41	0.41	....	....	....	....
W19	0.45	0.45	....	....	....	....
W20	0.49	0.49	....	....	....	....
W21	0.54	0.54	....	....	....	....
W22	0.59	0.59	....	....	....	....
W23	0.65	0.65	....	....	....	....
W24	0.71	0.71	....	....	....	....
W25	0.78	0.78	....	....	....	....
W26	0.85	0.85	....	....	....	....
W27	0.93	0.93	....	....	....	....
W28	1.01	1.01	....	....	....	....
W29	1.12	1.12	....	....	....	72
W30	1.22	1.22	....	....	....	78
W31	1.34	1.34	....	....	....	84
W32	1.47	1.47	....	....	....	91
W33	1.61	1.61	....	....	....	99
W34	1.76	1.76	....	....	....	107
W35	1.93	1.93	....	....	....	116
W36	2.11	2.11	....	....	....	125
W37	2.31	2.31	....	....	....	136
W38	2.53	2.53	....	....	....	147
W39	2.77	2.77	....	....	....	159
W40	3.03	3.03	....	....	....	174
W41	3.32	3.32	....	....	....	191
W42	3.63	3.63	....	....	....	210
W43	3.97	3.97	....	....	....	....
W44	4.35	4.35	4.58	....	....	....
W45	4.76	4.76	5.02	....	....	....
W46	5.21	5.21	5.50	....	....	....
W47	5.71	5.71	6.02	....	....	....
W48	6.25	6.25	6.60	....	....	....
W49	6.84	6.84	7.23	....	....	....
W50	7.48	7.48	7.92	....	....	....
W51	8.20	8.20	8.68	....	....	....
W52	8.83	8.83	9.51	....	....	....
W53	9.98	9.98	10.4	....	....	....
W54	10.8	10.8	11.4	....	....	....
W55	11.8	11.8	12.5	....	....	....
W56	12.9	12.9	13.7	....	....	....
W57	14.1	14.1	15.0	....	....	....
W58	15.5	15.5	16.4	....	....	....
W59	17.0	17.0	17.9	....	....	....
W60	18.7	18.7	19.5	....	....	....
W61	....	20.5	21.3	25.5	....	....
W62	....	22.4	23.3	28.0	....	....
W63	....	24.6	25.4	30.5	32.0	....
W64	....	27.0	27.4	33.5	35.0	....
W65	....	....	29.5	36.5	38.0	....
W66	....	....	32.0	40.0	41.5	....
W67	....	....	34.5	43.5	45.0	....
W68	....	....	37.0	47.5	49.0	....
W69	....	....	39.0	51.0	54.0	....
W70	....	....	41.0	55.0	58.0	....
W71	....	....	43.0	60.0	63.0	....
W72	....	....	45.0	65.0	68.0	....
W73	....	....	....	69.0	73.0	....
W74	....	....	....	74.0	79.0	....
W75	....	....	....	78.0	85.0	....
W76	....	....	....	83.0	90.0	....
W77	....	....	....	88.0	97.0	....
W78	....	....	....	93.0	103	....
W79	....	....	....	....	109	....
W80	....	....	....	....	115	....
W81	....	....	....	....	121	....
W82	....	....	....	....	126	....
W83	....	....	....	....	131	....
W84	....	....	....	....	137	....
W85	....	....	....	....	....	....

Table 168

Heater Type Number	Full Load Amperes					
	Size 0	Size 1	Size 2	Size 3	Size 4	Size 5
W10	.18	.18	....	....	....	....
W11	.20	.20	....	....	....	....
W12	.22	.22	....	....	....	....
W13	.24	.24	....	....	....	....
W14	.26	.26	....	....	....	....
W15	.29	.29	....	....	....	....
W16	.32	.32	....	....	....	....
W17	.35	.35	....	....	....	....
W18	.39	.39	....	....	....	....
W19	.43	.43	....	....	....	....
W20	.47	.47	....	....	....	....
W21	.51	.51	....	....	....	....
W22	.56	.56	....	....	....	....
W23	.61	.61	....	....	....	....
W24	.67	.67	....	....	....	....
W25	.74	.74	....	....	....	....
W26	.82	.82	....	....	....	....
W27	.94	.94	....	....	....	....
W28	1.02	1.02	....	....	....	....
W29	1.12	1.12	....	....	....	70
W30	1.23	1.23	....	....	....	76
W31	1.38	1.38	....	....	....	82
W32	1.50	1.50	....	....	....	90
W33	1.64	1.64	....	....	....	98
W34	1.78	1.78	....	....	....	106
W35	1.95	1.95	....	....	....	115
W36	2.10	2.10	....	....	....	125
W37	2.28	2.28	....	....	....	137
W38	2.57	2.57	....	....	....	150
W39	2.83	2.83	....	....	....	162
W40	3.12	3.12	....	....	....	176
W41	3.47	3.47	....	....	....	191
W42	3.84	3.84	....	....	....	210
W43	4.26	4.26	....	....	....	230
W44	4.68	4.68	4.78	....	....	249
W45	5.18	5.18	5.28	....	....	270
W46	5.71	5.71	5.79	....	....	....
W47	6.28	6.28	6.35	....	....	....
W48	6.90	6.90	6.97	....	....	....
W49	7.59	7.59	7.65	....	....	....
W50	8.35	8.35	8.40	....	....	....
W51	9.28	9.28	9.30	....	....	....
W52	10.2	10.2	10.2	....	....	....
W53	11.2	11.2	11.2	....	....	....
W54	12.1	12.1	12.2	....	....	....
W55	13.3	13.3	13.4	....	....	....
W56	14.5	14.5	14.7	....	....	....
W57	15.7	15.7	16.1	....	....	....
W58	16.6	16.6	17.6	....	....	....
W59	17.8	17.8	19.3	....	....	....
W60	19.6	19.6	21.1	....	....	....
W61	....	21.5	22.9	25.0	....	....
W62	....	23.5	25.0	27.7	....	....
W63	....	25.7	27.1	30.5	....	....
W64	....	28.2	29.5	34.0	34.0	....
W65	....	....	32.0	36.5	37.0	....
W66	....	....	34.5	39.5	40.0	....
W67	....	....	37.0	42.5	44.0	....
W68	....	....	40.0	46.0	48.5	....
W69	....	....	42.5	51	53	....
W70	....	....	45.0	55	57	....
W71	....	....	....	59	62	....
W72	....	....	....	64	67	....
W73	....	....	....	69	72	....
W74	....	....	....	74	77	....
W75	....	....	....	79	82	....
W76	....	....	....	83	87	....
W77	....	....	....	88	93	....
W78	....	....	....	93	99	....
W79	....	....	....	....	105	....
W80	....	....	....	....	112	....
W81	....	....	....	....	117	....
W82	....	....	....	....	123	....
W83	....	....	....	....	129	....
W84	....	....	....	....	135	....

Table 169

Heater Type Number	Full Load Amps.
	Size 5
W29	70
W30	77
W31	85
W32	89
W33	94
W34	100
W35	107
W36	118
W37	127
W38	140
W39	154
W40	167
W41	181
W42	194
W43	207
W44	221

Table 171

Heater Type Number	Full Load Amperes						
	Size 00	Size 0	Size 1	Size 2	Size 3	Size 4	Size 5
W10	.17	.17	.17	....	....	....	....
W11	.19	.19	.19	....	....	....	....
W12	.21	.21	.21	....	....	....	....
W13	.22	.22	.22	....	....	....	....
W14	.25	.25	.25	....	....	....	....
W15	.28	.28	.28	....	....	....	....
W16	.31	.31	.31	....	....	....	....
W17	.34	.34	.34	....	....	....	....
W18	.37	.37	.37	....	....	....	....
W19	.42	.42	.42	....	....	....	....
W20	.46	.46	.46	....	....	....	....
W21	.50	.50	.50	....	....	....	....
W22	.56	.56	.56	....	....	....	....
W23	.62	.62	.62	....	....	....	....
W24	.69	.69	.69	....	....	....	....
W25	.76	.76	.76	....	....	....	....
W26	.84	.84	.84	....	....	....	....
W27	.93	.93	.93	....	....	....	....
W28	1.02	1.02	1.02	....	....	....	....
W29	1.13	1.13	1.13	....	....	....	71
W30	1.25	1.25	1.25	....	....	....	78
W31	1.38	1.38	1.38	....	....	....	85
W32	1.49	1.49	1.49	....	....	....	92
W33	1.61	1.61	1.61	....	....	....	100
W34	1.74	1.74	1.74	....	....	....	109
W35	1.89	1.89	1.89	....	....	....	119
W36	2.04	2.04	2.04	....	....	....	130
W37	2.22	2.22	2.22	....	....	....	140
W38	2.49	2.49	2.49	....	....	....	153
W39	2.75	2.75	2.75	....	....	....	166
W40	3.03	3.03	3.03	....	....	....	180
W41	3.37	3.37	3.37	....	....	....	200
W42	3.73	3.73	3.73	....	....	....	222
W43	4.13	4.13	4.13	....	....	....	248
W44	4.55	4.55	4.55	....	....	....	267
W45	5.02	5.02	5.02	....	....	....	295
W46	5.53	5.53	5.53	....	....	....	....
W47	6.08	6.08	6.08	....	....	....	....
W48	6.68	6.68	6.68	....	....	....	....
W49	7.34	7.34	7.34	....	....	....	....
W50	8.07	8.07	8.07	8.31	....	....	....
W51	8.95	8.95	8.95	9.26	....	....	....
W52	9.83	9.83	9.83	10.2	....	....	....
W53	....	10.8	10.8	11.1	....	....	....
W54	....	11.6	11.6	12.1	12.5	....	....
W55	....	12.7	12.7	13.1	13.8	....	....
W56	....	13.8	13.8	14.5	15.2	....	....
W57	....	14.9	14.9	15.8	16.5	....	....
W58	....	15.7	15.7	16.9	17.9	....	....
W59	....	17.0	17.0	18.1	19.7	....	....
W60	....	18.4	18.4	19.8	21.8	....	....
W61	....	....	20.0	21.6	24.2	....	....
W62	....	....	21.8	23.7	26.5	....	....
W63	....	....	24.5	26.0	29.3	....	....
W64	....	....	27.8	28.6	32.0	33.5	....
W65	....	....	....	31.0	36.0	37.0	....
W66	....	....	....	34.0	38.0	40.5	....
W67	....	....	....	37.0	42.0	44.5	....
W68	....	....	....	40.0	46.0	49.0	....
W69	....	....	....	43.0	50.0	54	....
W70	....	....	....	46.0	53	59	....
W71	....	....	....	....	58	64	....
W72	....	....	....	....	62	69	....
W73	....	....	....	....	66	74	....
W74	....	....	....	....	70	79	....
W75	....	....	....	....	74	84	....
W76	....	....	....	....	80	90	....
W77	....	....	....	....	85	96	....
W78	....	....	....	....	89	102	....
W79	....	....	....	....	94	108	....
W80	....	....	....	....	....	116	....
W81	....	....	....	....	....	123	....
W82	....	....	....	....	....	131	....
W83	....	....	....	....	....	139	....

Product Data

Bulletin 592

Type W and WL Eutectic Alloy Heater Elements

Table 177

Heater Type Number	Full Load Amps.
	Size 5
W29	70
W30	76
W32	90
W33	98
W34	106
W35	115
W36	125
W37	137
W38	150
W39	162
W40	176
W41	191
W42	210
W43	230
W44	248
W45	270

Table 180

Heater Type Number	Full Load Amps.
	Size 00
W10	.19
W11	.20
W12	.23
W13	.25
W14	.28
W15	.31
W16	.34
W17	.37
W18	.40
W19	.44
W20	.49
W21	.55
W22	.61
W23	.69
W24	.77
W25	.86
W26	.93
W27	1.02
W28	1.11
W29	1.22
W30	1.33
W31	1.50
W32	1.60
W33	1.70
W34	1.90
W35	2.01
W36	2.28
W37	2.50
W38	2.72
W39	3.00
W40	3.34
W41	3.67
W42	4.00
W43	4.40
W44	5.00
W45	5.52
W46	5.95
W47	6.60
W48	7.20
W49	8.00
W50	8.76
W51	9.60
W52 ^①	10.7
W53 ^①	11.9
W54 ^①	13.0
W55 ^①	14.2
W56 ^①	15.5
W57 ^①	16.9
W58 ^①	18.0
W59 ^①	20.0
W60 ^①	21.7
W61 ^①	24.0
Heater Type Number Maximum	Catalog Number Prefix
W51	112-A
W54	112-B
W51	112-D

^① For applications with Catalog Number 112-A09 through 112-A24 only.

Table 181

Heater Type Number	Full Load Amperes					
	Size 24A	Size 32A	Size 40A	Size 62A	Size 125A	Size 165A
W10	.19	.19	.19	....	....	....
W11	.20	.20	.21	....	....	....
W12	.22	.22	.23	....	....	....
W13	.24	.24	.25	....	....	....
W14	.27	.27	.28	....	....	....
W15	.29	.29	.31	....	....	....
W16	.32	.32	.34	....	....	....
W17	.36	.36	.37	....	....	....
W18	.39	.39	.41	....	....	....
W19	.44	.44	.45	....	....	....
W20	.49	.49	.50	....	....	....
W21	.54	.54	.55	....	....	....
W22	.60	.60	.60	....	....	....
W23	.67	.67	.66	....	....	....
W24	.74	.74	.73	....	....	....
W25	.84	.84	.80	....	....	....
W26	.90	.90	.88	....	....	....
W27	1.00	1.00	.97	....	....	....
W28	1.10	1.10	1.06	....	....	....
W29	1.22	1.22	1.16	....	....	....
W30	1.31	1.31	1.27	....	....	....
W31	1.43	1.43	1.39	....	....	....
W32	1.55	1.55	1.51	....	....	....
W33	1.66	1.66	1.65	....	....	....
W34	1.80	1.80	1.80	....	....	....
W35	1.97	1.97	1.96	....	....	....
W36	2.12	2.12	2.15	....	....	....
W37	2.33	2.33	2.36	....	....	....
W38	2.59	2.59	2.60	....	....	....
W39	2.84	2.84	2.86	....	....	....
W40	3.15	3.15	3.16	....	....	....
W41	3.46	3.46	3.48	....	....	....
W42	3.84	3.84	3.85	....	....	....
W43	4.27	4.27	4.23	....	....	....
W44	4.73	4.73	4.68	....	....	....
W45	5.36	5.36	5.18	....	....	....
W46	5.82	5.82	5.68	....	....	....
W47	6.33	6.33	6.28	....	....	....
W48	6.97	6.97	6.94	....	....	....
W49	7.63	7.63	7.71	....	....	....
W50	8.49	8.49	8.45	....	....	....
W51	9.24	9.24	9.29	9.40	....	....
W52	10.1	10.1	10.3	10.4	....	....
W53	11.1	11.1	11.4	11.5	....	....
W54	12.2	12.2	12.5	12.6	....	....
W55	13.6	13.6	13.7	13.8	....	....
W56	14.6	14.6	15.0	15.1	....	....
W57	15.7	15.7	16.3	16.4	....	....
W58	17.2	17.2	17.6	17.7	....	....
W59	18.9	18.9	18.9	19.1	....	....
W60	20.5	20.5	20.9	21.1	....	....
W61	22.2	22.2	22.9	23.2	25.1	....
W62	24.3	24.3	25.0	25.7	27.5	....
W63	....	26.4	27.6	28.5	30.5	....
W64	....	28.5	30.0	30.5	33.5	....
W65	....	32.5	32.0	33.0	36.5	....
W66	....	....	34.0	35.5	40.0	43.0
W67	....	....	37.0	38.5	44.0	47.0
W68	....	....	39.0	41.5	48.5	51
W69	....	....	41.0	45.0	53	56
W70	....	....	....	48.5	58	61
W71	....	....	....	53	62	66
W72	....	....	....	56	67	72
W73	....	....	....	58	72	77
W74	....	....	....	60	77	83
W75	....	....	....	62	82	89
W76	....	....	....	....	88	95
W77	....	....	....	....	94	102
W78	....	....	....	....	98	108
W79	....	....	....	....	102	116
W80	....	....	....	....	108	123
W81	....	....	....	....	117	130
W82	....	....	....	....	125	137
W83	....	....	....	....	....	150
W84	....	....	....	....	....	160
W85	....	....	....	....	....	165

Table 192

Heater Type Number	Full Load Amps.	
	Size 40A	Size 62A
W10	.21	....
W11	.23	....
W12	.25	....
W13	.27	....
W14	.30	....
W15	.34	....
W16	.37	....
W17	.41	....
W18	.45	....
W19	.50	....
W20	.55	....
W21	.60	....
W22	.65	....
W23	.71	....
W24	.78	....
W25	.86	....
W26	.95	....
W27	1.04	....
W28	1.14	....
W29	1.25	....
W30	1.36	....
W31	1.50	....
W32	1.65	....
W33	1.82	....
W34	2.01	....
W35	2.21	....
W36	2.45	....
W37	2.67	....
W38	3.00	....
W39	3.31	....
W40	3.65	....
W41	4.06	....
W42	4.49	....
W43	4.98	....
W44	5.48	....
W45	6.06	....
W46	6.68	....
W47	7.35	....
W48	8.09	....
W49	8.90	9.03
W50	9.80	9.96
W51	10.9	11.1
W52	12.0	12.2
W53	13.2	13.3
W54	14.3	14.6
W55	15.7	15.8
W56	17.1	17.5
W57	18.6	19.1
W58	19.7	20.5
W59	21.4	21.9
W60	23.4	24.1
W61	25.8	26.4
W62	28.4	29.1
W63	31.0	32.0
W64	35.5	35.5
W65	38.5	39.0
W66	41.0	42.5
W67	....	47.5
W68	....	53.0
W69	....	57.0
W70	....	60.0
W71	....	65.0
W72	....	71.0
W73	....	....
W74	....	....

Table 195

Heater Type Number	Full Load Amperes			
	Catalog Number 592-TPD200	Catalog Number 592-TPD300	Catalog Number 592-TPD400	NEMA Size 6 Catalog Number 592-TPD630
W26	—	—	—	115
W27	43 ^①	—	78	125
W28	45 ^①	—	85	135
W29	50 ^①	—	94	147
W30	54 ^①	—	104	165
W31	59 ^①	—	114	179
W32	65 ^①	—	125	196
W33	70	—	139	216
W34	75	127	150	232
W35	81	138	160	260
W36	89	151	175	287
W37	98	166	195	315
W38	110	183	215	350
W39	120	198	235	385
W40	132	218	260	420
W41	143	239	293	465
W42	155	260	320	515
W43	170	285	350	570 ^②
W44	193	310	380	630
W45	—	—	415	—
W46	—	—	455	—
W47	—	—	500	—
W48	—	—	550	—

① Exceeds 20 seconds at six times rating, providing Class 30 protection.
 ② Maximum element for NEMA Size 6.

Product Data

Bulletin 592

Type W and WL Eutectic Alloy Heater Elements

Bulletin 2052B and 2053 B -- All Controllers^①

Bulletin 2053H Controllers With Fast-Acting SCR Fuse Option^①

200V 30, 40 HP		--		--		200V 50, 60 HP		200V 75 HP	
230V 40 HP		230V 50 HP		--		230V 60 HP		230V 75, 100 HP	
460V 60, 75 HP		--		460V 100 HP		460V 125, 150 HP		460V 200 HP	
575V 60, 75, 100 HP		--		--		575V 125, 150 HP		575V 200 HP	
Heater Type No.	Full Load Amps	Heater Type No.	Full Load Amps	Heater Type No.	Full Load Amps	Heater Type No.	Full Load Amps	Heater Type No.	Full Load Amps
W70 W71 W72 W73 W74	61 66 72 77 83	W75 W76 W77 W78 W79	81 86 93 98 106	W79 W80 W81 W82 W83	105 112 117 123 129	W36 W37 W38 W39 W40	126 137 150 164 179	W39 W40 W41 W42 W43	180 197 215 235 256
W75 W76 W77 W78 W79	89 95 102 108 116	W80 W81 W82	112 118 125	W84	135	W41 W42 W43 W44	196 214 233 256	W44	281
W80 W81 W82	123 130 137								

Bulletin 2053H Controllers -- Without Fast-Acting SCR Fuse Option^①

Heater Type No.	Full Load Amps	Heater Type No.	Full Load Amps
W69 W70 W71 W72 W73	56 61 66 72 77	W35 W36 W37 W38 W39	126 138 151 165 180
W74 W75 W76 W77 W78	83 89 95 102 108	W40 W41 W42 W43 W44	197 215 235 256 281
W79 W80 W81 W82	116 123 130 137		

^① These tables are to be used for standard enclosed devices listed in the Industrial Control Catalog. For devices not listed, consult the nearest Allen-Bradley District Office.

Product Data
Bulletin 592
Type W and WL Eutectic Alloy Heater Elements



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