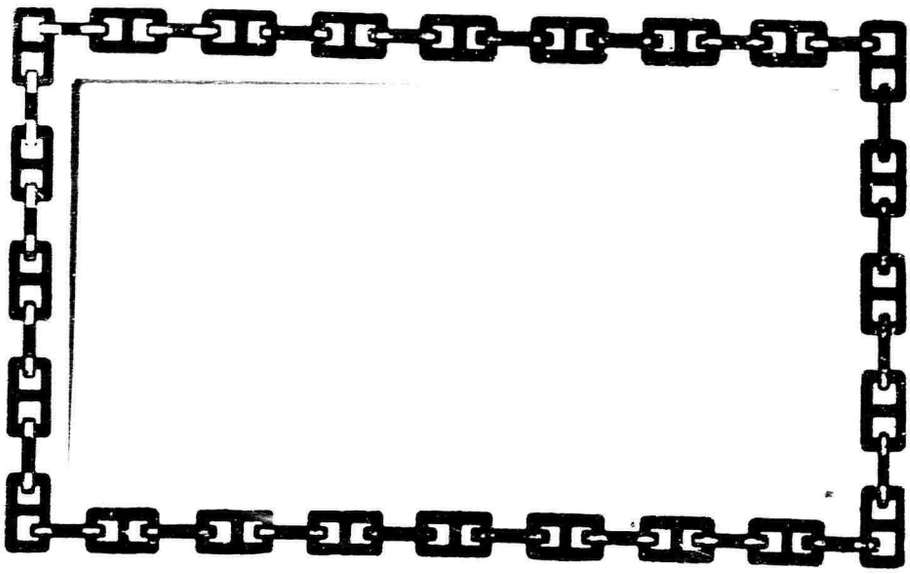

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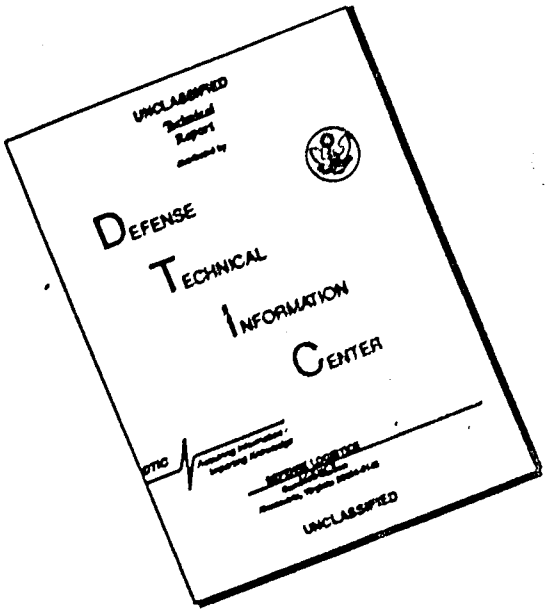

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TEST OF ELECTRICALLY HEATED CLOTHING

REPORT NO. 3-51

NAVY EXPERIMENTAL DIVING UNIT
WASHINGTON NAVY YARD
WASHINGTON, D.C. 20390

13 FEBRUARY 1951

TEST OF ELECTRICALLY HEATED CLOTHING

PREPARED BY:

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PROJECT NO. NS 186-012
TEST NO. 12

APPROVED

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OFFICER IN CHARGE

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13. ABSTRACT

The object of this experiment is to evaluate a set of electrically heated boots and gloves for underwater swimmers under conditions of various water temperatures.

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OBJECT

The object of this experiment is to evaluate a set of electrically heated boots and gloves for underwater swimmers under conditions of various water temperatures.

PROCEDURE

All of the tests were of 30 minute duration. The following types of batteries were used:

1. Burgess 2F4 6 volt radio "A" Battery, 2 1/2" X 4" X 5 1/2", Wt. 2.9 lbs.
2. Burgess No. 5156, 22.5 volts, 3 5/8" X 4 1/8" X 2 9/16", Wt. 1.7 lbs.
3. Everready No. 778, 22.5 volts, 4 1/8" X 2 1/4" X 3 7/16", Wt. 1.6 lbs.
4. Everready No. 768, 22.5 volts, 2 1/2" X 3 3/4" X 4", Wt. 1.6 lbs.
5. Ray-O-Vac Navy 6F4, 9 volt, 4" X 8" X 5 3/4", Wt. 8.1 lbs.
6. Burgess, 4F6H, 9 volt Ignition Battery, 4" X 8 1/2" X 6 3/8", Wt. 8.8 lbs.

A total of 59 tests were performed. The electrical heated boots and shoes were an adaptation of an electrical harness made for the Bureau of Aeronautics and was made by the Colvinex Corporation. The name plate indicated that it was made for 6 volts. The other name plate data was scratched out.

Test No. 1 through 8 were tests to determine the maximum temperature obtainable at room temperatures of 75 to 80 degrees F. Different numbers of batteries and hook-ups were used. Temperatures were taken at the end of the 30 minute period by means of laboratory thermometers which was inserted in the gloves and shoes. The same technique was followed in all tests where temperatures were recorded.

In tests 9 through 27 the gloves only were inserted in rubber gloves and then submerged in ice water for a period of 30 minutes. No subjects were used in test 9 through 14 and 17. Subjects were used for the remainder of this series. Temperatures were taken as before. In some tests with subjects, the gloves were preheated before immersion and current supplied throughout the run. In others, the gloves were heated prior to immersion and then the current was not used for the remainder of the run.

In tests 28 through 43 the subjects were placed in an ice bath up to the neck for a period of 30 minutes. The clothing worn was one pair of regulation socks, one pair diving socks, regular underwear and two suits of regulation Navy diving underwear and an underwater demolition team swim suit. The electrically heated gloves and boots were worn. Runs were made with and without current. The suits were preheated in some of these tests. The subjects were seated in this small bath and there was very little room left to move. The battery used in these tests was the Ray-O-Vac 6F4.

During tests 44 through 59 the subjects were submerged up to their necks in a tank where the water temperature ranged from 38 to 60 degrees F. The subjects were in a standing position and were free to move. The clothing was the same as in test 28 to 43. Various numbers of batteries indifferent hook-ups were used. The two types of batteries used were the Ray-O-Vac 6F4 and the Burgess 4F6H. There was no preheat of the gloves or boots in these tests. Readings of the voltage and current were made every five minutes for the duration of the run. In some of the runs the subjects did not require heat for the entire time.

The data sheets are made out in detail. It is suggested that they be examined further procedural information.

RESULTS AND DISCUSSION

Tests 1 through 8 indicate that the temperature obtained by two small batteries of the 2F4 Burgess type could heat the gloves and boots to a temperature of 84 to 99 degrees F. when the room temperature was from 75 to 80 degrees F. However, these tests are of little significance because they do not indicate whether these temperatures could be sustained in a colder ambient temperature.

When the electrically heated gloves were inserted in rubber gloves and immersed in an ice bath, the temperature did not rise to acceptable limits. With four batteries, as shown in tests No. 9 and 10, the maximum temperature obtained was only 59 degrees F. If both the gloves and boots were used, it is obvious that this temperature would be less. With one battery the maximum temperature was only about two degrees above that of the ice water. When the gloves were preheated before immersion, the results were much better. The above discussion refers to tests 9 through 14 and 17 where the gloves alone were used in these tests and no subjects were used.

The remainder of this series of tests (9 through 28) were made with the subjects wearing just the heated gloves in rubber gloves and submerging them in ice water. In most instances the hands were quite cold and it is doubtful that these batteries would do much good. When the gloves were preheated, the results were somewhat better. In general these tests were inconclusive since they did not approach actual conditions, and were made for the purpose of finding a battery or a series of batteries that would serve the purpose. It is obvious that none of the small batteries would suffice.

In the 30 minute submersion test in ice water (32°F) (tests 25 to 43) most of the subjects felt quite cold. Tests were made with the current on and off. When the current was off, the gloves and boots were worn until the subject felt his hand, and feet quite warm before entering the ice bath. The ice bath receptacle was quite small and the subjects were somewhat cramped and little movement was possible. Many of the subjects complained of a cold back and thighs in addition to cold hands and feet. They said they could feel no heat from the elements. One Ray-O-Vac 6F4 battery was used in these tests. This series of tests showed that the one battery was inadequate for providing heat when the water was at this temperature.

The results of tests 44 through 59 are of the greatest significance since they approach actual conditions. The subjects were standing upright in the tank and were able to move. This in itself has a considerable effect on the rate of heat transfer from the suit. Although the water was warmer than the ice water in the ice bath tests, all subjects unanimously agreed that they were considerably colder. Many were cold entirely, their teeth chattered and they had the chills.

Tests 44 through 52 were carried out in water at a temperature of about 45 degrees. These show that it takes a minimum of three batteries in series to keep the hands and feet from getting extremely cold. Four batteries in a series-parallel hookup were better. When six batteries were used in a series parallel combination, the elements became too hot and had to be turned off at this temperature. They were turned on when the subject became too cold.

Tests 53 and 54 were conducted with the water about 39 degrees F. Six batteries were used with wattage output of about 200 watts. This kept the hands and feet reasonably comfortable.

Tests 55 and 56 were conducted with the water about 60 degrees F. The subjects were comfortable with current turned off. This was turned on at 5 minute intervals to get the readings on the voltmeter and ammeter.

The remain three tests (57, 58 and 59) were made with the water 55 degrees F. In all three tests the subjects claimed they required no heat and the current was turned on intermittently to get readings.

From the results of these tests it is evident that heat is required below a water temperature of 45 to 55 degrees F. At 60 degrees the subject is definitely comfortable without a source of heat. The exact temperature would depend on the subject and his activity. This is true when the swimmer wears two suits of diving underwear and a pair of diving socks. It must be remembered that these tests were made with the subject at rest and swimming might make the subject too warm.

The most remarkable thing in this experiment is the sharp contrast between the comfort of the subjects at 55 and 45 degrees F. At 55 degrees the subjects were reasonably comfortable, but at 45 degrees they were literally freezing without heat. Evidently at this temperature the rate of heat transfer is greater than the body was capable of producing.

At temperature of 45 degrees and below a power output of 150 to 250 watts is necessary to keep the hands and feet warm. This would require from 4 to 6 batteries of the Burgess 4F6H type or a similar type. This is obviously completely impractical in the case of a swimmer because of weight and bulk considerations. The weight of a battery of this type in water is 2 lbs. 3 oz. The life of these batteries is about 2 to 2 1/2 hours. Obviously the wattage output would go down at the end and it is though that a rheostat would be necessary to make this unit flexible enough for the individual. Attention is invited to the fact that individual difference play a great part in the conclusions of this experiment. Subjects under identical conditions responded differently and only results of a unanimous nature can be relied on. Hence conclusions must be necessarily of a broad nature.

It is believed that water pressure and the snug fit of the UDT suit impeded circulation and contributed to making the subjects cold. Although two suits of diving underwear may seem excessive, all the subjects complained of chills in other parts of the body, especially the back and thighs. Therefore two suits of diving underwear are believed to be necessary in water below 45°F.

CONCLUSIONS

Heat is required to make a man comfortable and capable of doing work at water temperatures below approximately 45°F. with the swimmer using two suits of diving underwear. The exact temperature would depend on the individual and his activity.

Approximately 150 to 250 watts are required to keep the hands and feet comfortable temperatures below approximately 45 degrees F. This would require 6 batteries of a type similar to Burgess 4F6H or Ray-O-Vac 6F4 hooked up with a rheostat to control for individual requirement and pressure drop at the end of the life of the batteries.

It is not practical for a swimmer to carry this source of power in the form of batteries.

Batteries of a type smaller than the Ray-O-Vac or Burgess 4F6H are too small to be of any use for heating purposes.

The life of the batteries used in the tank test [illegible]out 2 1/2 hours.

It is believed that no heat would be required in water above 55 degrees F. if two suits of diving underwear were worn.

Two suits of diving underwear or equivalent are necessary to keep a swimmer from becoming unduly cold in water below approximately 45°F. when used in conjunction with electrically heated gloves and boots.

30 MINUTE TEST OF BOOTS AND GLOVES AT ROOM TEMPERATURE OF ABOUT 75 - 80°F FOR MAXIMUM TEMPERATURE. NO SUBJECTS USED

Test No.	Type of Battery	Voltage	No. of Batteries	Type of Hookup	30 Min. Temp.
1	#2 F4 Burgess 6V type	6	2	Parallel	87°
2	"	6	2	"	90
3	"	6	2	Series	84
4	"	6	2	"	95
5	"	6	2	Parallel	99
6	"	6	4	Series	103
7	"	6	4	Series Parallel	108
8	6V Everready 724	6	4	Series Parallel	84

30 MINUTE TESTS MADE WITH HEATED GLOVES ONLY INSERTED IN RUBBER GLOVES AND SUBMERSED IN AN ICE WATER MIXTURE OF 32°F. NOT WORN BY SUBJECTS IN TEST 9 - 14, 17.

Test No.	Type of Battery	No. of batteries	Type of Hookup	30 Min Temp.	Voltage	Preheat °F
9	Burgess 2 F4	4	Series Parallel	59°	6	-
10	"	4	"	52	6	-
11	Burgess #5156	1	Series	33	16.5	-
12	Everready #778	1	"	34	16.5	-
13	"	1	"	33	16.5	-
14	"	1	"	33	22.5	-
15	Burgess #5156	1	"	82	22.5	90°
16	None	None	-	59°	-	89°
17	Burgess #5156	1	Series	33	22.5	-
18	None	None	-	59	-	77°

(Continued)

Test No.	Type of Battery	No. of Batteries	Type of Hookup	30 Min Temp.	Voltage	Preheat °F
19	Everready #778	1	Series	62	22.5	82
20	None	None	-	51	-	80
21	None	-	-	64	-	95
22	Burgess #5156	1	Series	54	19.5	84
23	Everready #768	1	Series	86	22.5	88
24	"	1	"	94	19.5	90
25	Everready #778	2	"	53	3.9	-
26	Burgess #5156	1	"	63	19.5	91
27	Burgess 2 F4	1	"	70	6	85

30 MINUTE SUBMERSION TESTS OF SUBJECTS TO NECK IN ICE WATER. CLOTHING WORN: 1 PAIR REGULATION SOCKS, 1 PR. NAVY TYPE DIVING SOCKS AND 2 SUITS OF DIVING UNDERWEAR WITH UDT SUIT. ELECTRICALLY HEATED BOOTS AND GLOVES WORN.

28	None	-	-	75	-	93.1
29	None	-	-	75	-	91
30	None	-	-	45	-	95
31	None	-	-	54	-	95
32	6 F4	1	Series	65	9	84
33	"	1	Series	50	9	86
34	"	1	"	56	9	-
35	"	1	"	77	9	95°
36	"	1	"	72	9	87
37	"	1	"	82	9	-
38	None	-	-	55	-	93.2
39	None	-	-	54	-	86

(Continued)

Test No.	Type of Battery	No. of Batteries	Type of Hookup	30 Min Temp.	Voltage	Preheat °F
40	Ray-O-Vac 6 F4	1	Series	60	9	-
41	"	1	"	61	9	-
42	"	1	"	48	9	-
43	"	1	Series	46	9	-

30 MINUTE TANK RUNS WITH ELECTRICALLY HEATED BOOTS AND GLOVES

TEST NO: 44 TEMP. OF WATER: 45°F

NO. OF BATTERIES: 1 HOOKUP: Series

TYPE OF BATTERIES: Navy 6F4 - 9V Voltage Prior dive: 8.5

VOLTAGE AFTER DIVE: 6.0 SUBJECT: PLOOF

Time	0	5	10	15	20	25	30
Voltage	6	5.25	5.0	4.9	4.5	4.5	4.0
Amps	3.50	3.50	3.50	3.50	3.50	3.50	3.50
Watts	21.0	18.4	17.5	17.2	15.8	15.8	14.0

REMARKS

Hands, calves and thighs were cold. Cold all over the body, teeth chattering and chills.

TEST NO: 45 TEMP. OF WATER: 45°F

NO. OF BATTERIES: 2 HOOKUP: Series

TYPE OF BATTERIES: Navy 6F4 - 9V Voltage Prior Dive: 16

VOLTAGE AFTER DIVE: SUBJECT: PHILLIPS

Time	0	5	10	15	20	25	30
Voltage	9	8.25	7.0	7.0	7.0	7.0	7.0
Amps	6.4	6.0	5.5	5.3	5.10	4.90	4.90
Watts	57.6	49.5	38.6	37.1	36	34.4	34.4

REMARKS

Hands fairly cold. Cold all over body, teeth chattering and chills.

30 MINUTE TANK RUNS WITH ELECTRICALLY HEATED BOOTS AND GLOVES

TEST NO: 46 TEMP. OF WATER: 45°F

NO. OF BATTERIES: 3 HOOKUP: Series

TYPE OF BATTERIES: Navy 6F4 - 9V Voltage Prior dive: _____

VOLTAGE AFTER DIVE: _____ SUBJECT: WEISBROD

Time	0	5	10	15	20	25	30
Voltage	12	10	9.5	9.0	8.75	8.5	8.25
Amps	8.4	7.4	6.6	6.30	6.10	6.00	5.80
Watts	100	74	62.7	57.5	52.4	51	49.8

REMARKS

Hands not uncomfortable. Back and thighs cold. Last 5 minutes started to get chills.

TEST NO: 47 TEMP. OF WATER: 42°F

NO. OF BATTERIES: 3 HOOKUP: Parallel

TYPE OF BATTERIES: BA 207/U 6F4 - 9V Voltage Prior Dive: 7

VOLTAGE AFTER DIVE: 8 SUBJECT: HESLOP

Time	0	5	10	15	20	25	30
Voltage	8	6.5	6.5	6.5	6.5	6.25	6.25
Amps	4.70	4.70	4.60	4.60	4.60	4.50	4.50
Watts	37.5	30.6	29.8	29.8	29.8	28.0	28.0

REMARKS

Hands and tips of toes numb. Fairly comfortable in rest of body.
Time of battery use prior dive: 60 Minutes.

30 MINUTE TANK RUNS WITH ELECTRICALLY HEATED BOOTS AND GLOVES

TEST NO: 48 TEMP. OF WATER: 42°F

NO. OF BATTERIES: 3 HOOKUP: Series

TYPE OF BATTERIES: BA 207/U 6F4 - 9V Voltage Prior dive: 24.5

VOLTAGE AFTER DIVE: 19.5 SUBJECT: JONES

Time	0	5	10	15	20	25	30
Voltage	10.0	9	8.5	8.5	7.5	7.0	7.0
Amps	6.8	6.2	5.90	5.50	5.50	5.50	5.0
Watts	68.0	56	50	46.6	41.2	38.5	35

REMARKS

60 Minutes on battery at start. Hands were cold, rest of body was starting to get cold and toes were numb. Comfortable until last 10 minutes, then started getting chills.

TEST NO: 49 TEMP. OF WATER: 45°F

NO. OF BATTERIES: 4 HOOKUP: Series - Parallel

TYPE OF BATTERIES: 9V 4F6H Dry cell Burgess Voltage Prior Dive: 18 1/2

VOLTAGE AFTER DIVE: 14 1/2 SUBJECT: LAZAR

Time	0	5	10	15	20	25	30
Voltage	14	13	12	12	12	11.5	11.5
Amps	10	9.10	8.80	8.60	8.50	8.40	8.30
Watts	140	118.3	105.6	103.2	102.0	96.6	95.4

REMARKS

New Batteries. Back of hands and back of feet very warm until last 5 minutes. Then cool.

30 MINUTE TANK RUNS WITH ELECTRICALLY HEATED BOOTS AND GLOVES

TEST NO: 50 TEMP. OF WATER: 44°F

NO. OF BATTERIES: 4 HOOKUP: Series - Parallel

TYPE OF BATTERIES: 9V 4F6H Dry Cell Burgess Voltage Prior dive: 16

VOLTAGE AFTER DIVE: 14 SUBJECT: WEISBROD

Time	0	5	10	15	20	25	30
Voltage	12.5	12	11.5	11.5	11.25	11.0	11.0
Amps	9	8.5	8.25	8.0	8.0	8.0	8.0
Watts	112.5	102	94.8	92	90.0	88.0	88.0

REMARKS

Batteries used 30 minutes previously. Man did not feel any warmth. Hands did not become numb, thighs and back cold last 5 or 10 minutes. Prior to entering water felt plenty of heat in hands and feet, immediately upon entering water, felt none.

TEST NO: 51 TEMP. OF WATER: 45°F

NO. OF BATTERIES: 4 HOOKUP: Series - Parallel

TYPE OF BATTERIES: 9V 4F6H Dry Cell Burgess Voltage Prior Dive: 17.5

VOLTAGE AFTER DIVE: 15 SUBJECT: PLOOF

Time	0	5	10	15	20	25	30
Voltage	14	12.5	12.5	12.0	11.75	11.5	11.5
Amps	10	8.80	8.60	8.40	8.30	8.10	8.0
Watts	140	110.0	107.0	100.8	97.5	93.15	92.0

REMARKS

Batteries were used 60 minute before this test in same hookup. At 17 min. after entering water felt cold all over including back of hands. At 22 min. teeth started chattering intermittently. At 25 min. exessively cold. Upon coming out and undressing divers fingers felt very cold mainly in tips.

30 MINUTE TANK RUNS WITH ELECTRICALLY HEATED BOOTS AND GLOVES

TEST NO: 52 TEMP. OF WATER: 45°F

NO. OF BATTERIES: 6 HOOKUP: Series - Parallel

TYPE OF BATTERIES: 9V 4F6H Dry Cell Burgess Voltage Prior dive: 22.5

VOLTAGE AFTER DIVE: 23 SUBJECT: HESLOP

Time	0	5	10	15	20	25	30
Voltage	21	18.5	18	17.9	17.7	17.5	17.3
Amps	14.2	13.3	12.7	12.6	12.6	12.5	12.4
Watts	298.2	246.05	228.6	225.54	223.02	218.75	214.52

REMARKS

New Batteries. Had to turn switch off. Tends to heat arch of foot, back of hands and finger tips, tends to burn. Left switch off until hands and feet got cold. Turned switch on and felt heat immediately. At 15 sec. was warm. At 45 seconds felt very warm. At 3 min. had to turn switch off. Finger tips and back of hands were burning. Gloves and boots have no tendency to retain heat. 2 minutes later started to get cold.

TEST NO: 53 TEMP. OF WATER: 38 1/2°F

NO. OF BATTERIES: 6 HOOKUP: Series Parallel

TYPE OF BATTERIES: 9V 4F6H Dry Cell Burgess Voltage Prior Dive: 24.8

VOLTAGE AFTER DIVE: 22.5 SUBJECT: PHILLIPS

Time	0	5	10	15	20	25	30
Voltage	23	17.5	17.0	16.5	16	16	16
Amps	6	13.0	12.0	12.0	11.6	11.5	11.5
Watts	138	227.5	204	198	185.6	184	184

REMARKS

These batteries have been used 1 hr. and 30 min. Original reading made with rheostat. At 3 min. had to disconnect and reconnect 2 sets of 3 series and hooked up in parallel. Toes got very cold didn't seem to be able to get any heat to them. Hands arches and ankles were very comfortable. Thighs, back and arms cold.

30 MINUTE TANK RUNS WITH ELECTRICALLY HEATED BOOTS AND GLOVES

TEST NO: 54 TEMP. OF WATER: 39°F

NO. OF BATTERIES: 6 HOOKUP: Series Parallel

TYPE OF BATTERIES: 9V 4F6H Dry Cell Burgess Voltage Prior dive: 22.5

VOLTAGE AFTER DIVE: 18.5 SUBJECT: JONES

Time	0	5	10	15	20	25	30
Voltage	16	15.9	15.4	15	14.4	14	13.5
Amps	11.5	11.4	11.2	11	10.6	10.4	10.2
Watts	184	181.26	172.48	165	152.65	145.6	137.70

REMARKS

These batteries have been used 2 hrs. Felt comformtable until last 5 minutes. Tips of fingers and thighs, back got cold.

TEST NO: 55 TEMP. OF WATER: 60°F

NO. OF BATTERIES: 6 HOOKUP: Series Parallel

TYPE OF BATTERIES: 9V 4F6H Dry Cell Burgess Voltage Prior Dive: 24.0

VOLTAGE AFTER DIVE: 22.5 SUBJECT: LAZAR

Time	0	5	10	15	20	25	30
Voltage	17	16.5	16.4	16.4	16.4	16.4	16.4
Amps	12.4	12.2	12.1	12.1	12.1	12.1	12.1
Watts	210.8	201.30	198.44	198.44	198.44	198.44	198.44

REMARKS

These batteries have been used 2 hrs. 7 min. Immediately upon entering the water diver said it was hot. At 3 min. turned off switch. Turned switch on at 5 min. for reading, then off again. Subject still perspiring. Switch was on approximately 7 min. for readings only. Subject felt warm and comfortable at all times with switch off. When switch was on it grew too hot, and burned finger tips and archs.

30 MINUTE TANK RUNS WITH ELECTRICALLY HEATED BOOTS AND GLOVES

TEST NO: 56 TEMP. OF WATER: 60°F

NO. OF BATTERIES: 6 HOOKUP: Series Parallel

TYPE OF BATTERIES: 9V 4F6H Dry Cell Burgess Voltage Prior dive: 22.5

VOLTAGE AFTER DIVE: 21.6 SUBJECT: WEISBROD

Time	0	5	10	15	20	25	30
Voltage	16	16.5	16.5	16	16	16	16
Amps	12.5	12.5	12.5	12	12	12	12
Watts	200	206.25	206.25	192	192	192	192

REMARKS

Total life of batteries to date 2 hrs. 10 1/2 min. Subject claims he needed no heat. Turned heat on every 5 min. for readings, and instantly felt heat. Total time of battery in use on this dive 3 1/2 min.

TEST NO: 57 TEMP. OF WATER: 55°F

NO. OF BATTERIES: 6 HOOKUP: Series Parallel

TYPE OF BATTERIES: 9V 4F6H Dry Cell Burgess Voltage Prior Dive: 24.8

VOLTAGE AFTER DIVE: 23 SUBJECT: HESLOP

Time	0	5	10	15	20	25	30
Voltage	17			17			17
Amps	12.5			12.5			12.5
Watts	212.5			212.5			212.5

REMARKS

Total life of batteries to date 2 hrs. 15 min. Subjects hands felt cold at 15 min. Turned switch on for two min. Felt heat immediately. At 28 min. hands felt cold. Turned switch on till hands warmed up, 1 min. Total time switch was on, 3 1/2 min.

30 MINUTE TANK RUNS WITH ELECTRICALLY HEATED BOOTS AND GLOVES

TEST NO: 58 TEMP. OF WATER: 55°F

NO. OF BATTERIES: 6 HOOKUP: Series Parallel

TYPE OF BATTERIES: 9V 4F6H Dry Cell Burgess Voltage Prior Dive: 23

VOLTAGE AFTER DIVE: 22.5 SUBJECT: PHILLIPS

Time	0	5	10	15	20	25	30
Voltage	17						
Amps	12.5						
Watts	212.5						

REMARKS

2 hrs. 14 1/2 min. total life of batteries. Subject needed no heat, and was comfortable throughout.

TEST NO: 59 TEMP. OF WATER: 55°F

NO. OF BATTERIES: 6 HOOKUP: Series Parallel

TYPE OF BATTERIES: 9 V 4F6H Dry Cell Burgess Voltage Prior Dive: 22.5

VOLTAGE AFTER DIVE: 22.5 SUBJECT: JONES

Time	0	5	10	15	20	25	30
Voltage	17						
Amps	12.5						
Watts	212.5						

REMARKS

2 hrs. 15 min. total life of batteries. Subject comfortable throughout, no heat used.