Display and Controls.

1) Display: 16 x 2 alphanumeric display and six seven segments displays.
2) Input Temperature Range : 0 to 150 °C
3) Resolution : 1 °C
4) Accuracy : +/- 1°C
5) Temperature control setting: 0 to 150 °C in step of 1°C
6) Rate of Heating / Cooling is adjustable from: 0.5 to 9.5 °C/minutes in step of 0.5 °C
7) Process hold time display: 1 to 99 minutes in steps of 1 minute.
8) Stirrer Motor's Forward and Reverse time Display : 1 to 99 minutes in step of 1 minute.
9) Alarm time display: 0 to 180 seconds in steps of 1 second.
10) Power supply: Input range 160-260 VAC.
11) Size of the panel cutout: 184 x 92 mm.
12) Program memory: Up to 99 programs can be stored in the internal memory of DP-02.

a) Memory bank no. 1:

This memory bank contains 25 programs from 1 to 25. In each program the user can provide maximum of 25 steps. The parameter of the program can be changed as per the requirement of the user. programs are stored in the memory even when the power is switched OFF. They can also be altered as and when required.

b) Memory bank no. 2:

This memory bank contains 74 programs starting from 26 to 99. These are permanent programs which cannot be altered.

13) Output relays:

A) Heat In.
B) Cool In.
C) Cool Out.
D) Forward direction
E) Reverse direction.
F) Air In.
G) Depressurize.
H) Alarm.

14) Power Consumption: 7.2 Watts

15) WEIGHT: 1.5 kg:

16) Operating ambient temperature: 0 to 60 °C

17) Temperature sensing probe: PT 100:

18) Keys and It's Function:

a)

: This key is used to increase the value of the parameter whenever required or to check the temperature and its PT100 input when the instrument is in idle mode.

b)

: The function of this key is to decrease the value of the parameter whenever required and to check the serial number, logged data and last technical error when the instrument is in idle mode.

c)

: This key enables to make a new program and to change the position of the cursor while editing the parameter.

d)

: This key allows the user to enter the password while saving a program.

e)

: This key enables the user to read and edit the special setting no.1, read the program and to change the step while editing a program.

f)

: This key acknowledges the alarm.

g)

: This key is used to set the operator call whenever required and to acknowledge the same during the process.

h)

: This key is used to check the name of the supplier, date of manufacture and date of last servicing.

i)

: This key is used to select a program, acknowledge the password and operator call.

j)

: This key is used to delete a stage during the process and cancel the interrupted Program

k) EXC. HOLD : It is used to execute a new,previously executed or interrupted program and to put on hold the program being executed

l) RESET : It is used to cancel any mode and stop an executing program.

m) MOTOR ON/OFF : This key is used to start forward / reverse direction of the motor and also to stop the same.

n) F2 : Read and edit the special setting No.2.

19) Special setting No.1.

Special setting can be edited by pressing the READ NEXT key.

The following items can be set with the help of the same.

a) FORWARD TIME: 0-99 minutes.

PRO. STEP GRA. TIME TEMP.

Forward Time
03 Minutes (0-99)

b) REVERSE TIME: 0-99 minutes:

PRO. STEP GRA. TIME TEMP.

Reverse Time
03 Minutes (0-99)

c) MOTOR OFF TIME: 0-99 seconds.

PRO. STEP GRA. TIME TEMP.

Motor OFF Time
10 Seconds (0-99)

These three parameters control the direction of the motor such as forward, reverse and pause time in between the directions. It is also possible to run the motor in a single direction if the parameter of the opposite direction is set at zero.

d) DURATION OF THE ALARM : 0-180 seconds.

PRO. STEP GRA. TIME TEMP.

Alarm Time
010 Secs. (0-180)

This setting controls the duration of the alarm when the program advances to the next stage. The duration of the alarm for the operator call and the end of the program is fixed at 30 seconds.

e) AIR PRESSURE: 30-130 degree.

PRO. STEP GRA. TIME TEMP.

Air Pressure
080 Deg. (30-130)

This set parameter opens the air pressure valve when this parameter matches with the current temperature.

f) RESTART TIME: 0-180 Seconds.

PRO. STEP GRA. TIME TEMP.

Restart Time
0-10 Secs. (0-180)

This setting enables the automatic restart of the program in case of power failure. If the setting is kept at zero then the program has to be restarted manually after a power failure.

g) Cool outlet time: 10-30 seconds.

PRO. STEP GRA. TIME TEMP.

Cool outlet Time
20 Secs. (10-30)

h) Heater flush time: 0-10 seconds.

PRO. STEP GRA. TIME TEMP.

Heater Flush time
00 Seconds. (0-10)

Cool outlet and heater flush time are connected to each other. Cool outlet time controls the duration of Cool outlet relay whenever a program is started. This facility enables to remove the accumulated water from the heat exchanger before executing a program. Heater flush time opens the Heat In valve till the set time. Hence due to the pressure of the steam the accumulated water inside the heat exchanger comes out quickly. This facility will not function if the heater flush time is maintained at zero.

Special Setting No. 2. With help of F2 key.

a) PROPORTIONAL BAND: 0-20 °C

PRO. STEP GRA. TIME TEMP.

Proportional Band
00 (0-20) Degrees.

b) PROPORTIONAL TIME: 5-30 seconds.

PRO. STEP GRA. TIME TEMP.

Proportional Time
10 Seconds. (5-30)

This proportionate controller decreases the average power supplied to the heater as the temperature approaches set point. This ensures that it will not overshoot the set point and therefore will maintain a stable temperature.

For example, if the PB is set at 5 degrees and PT is fixed for 20 seconds and target temperature is 100 °C, the PB & PT will activate at 95 °C. At this point, the ON time of the heating is 60% of PT and OFF time is 40%. This means an ON period of 12 seconds and OFF time of 8 seconds. When the temperature reaches 99 °C, the ON time of the heating will be 40% and OFF time 60%.

C)4-20mA Scan rate: 1-15 Scan.

This facility is used only where the 4-20mA controls the Heat In valve. One scan period is around four seconds and it increases the output with set parameter. If you set two scan periods then in every eight seconds 4-20 mA output increases by 5% with respect to the gradient given in the program.

d)RS 485 address: 1-32.

This facility is used for the RS 485 communication with PC. This is an address code for the computer.

32 instruments can be connected to one computer. For example, if this parameter is set at five then the computer easily communicates with this instrument by selecting the same value set in the computer.

c) Over shoot control: (ON / OFF).

d) Over shoot Offset: 0-10.

This facility enables to control the temperature by switching ON the Cool In valve whenever overshoot takes place during the hold time. First select the overshoot control setting ON / OFF by pressing ▲ / ▼ key and then select the offset of the same which is the set parameter of the Cool In valve to be operated. For example if the over shoot control is ON and the offset is set at five then whenever the temperature overshoots the set point by 5 degree during the hold time , the Cool In valve is set ON and brings down the temperature.

20) Log parameter.

Log parameter can be read by pressing ▼ key.

a) Digital serial no: Each instrument has separate 16 digit serial number.

b) Total programs started: It indicates the total number of programs executed so far.

c) Total programs finished: It indicates the total number of programs finished.

d) Total exec.time: It indicates the total execution time of the programs.

e) Current ON time: This shows the ON time after currently switching ON this instrument.

f) Total ON time: This indicates the total ON time of the instrument.

g) Chip temperature: This enables to check the temperature inside the microcontroller.

h) Chip DC voltage: This enables to check the input DC voltage of the microcontroller.

i) Last program ended at: This indicates total time taken by the last executed program.

j) Last error: This indicates the last technical error during the program such as power failure, PT100 open and short.

k) Firmware: This shows the version number and the date of the same.

l) Total power fail: It displays the total number of power failures during the process.

21) How to make a new program.

Whenever a new program is to be fed, the CURSOR → key is to be pressed.

PRO. STEP GRA. TIME TEMP.

01	**0.0**	**00**	**000**	

Wherever the cursor is positioned that particular parameter is changeable. Edit the parameter by pressing CURSOR , ▲ / ▼ key.

PRO. STEP GRA. TIME TEMP.

01 0.0 05 060

After completing the first step press READ NEXT key to go to the next step. Change the parameter as mentioned at the first step .Complete the entire steps as per your program and press PRG.NO ENT key to save.

PRO. STEP GRA. TIME TEMP.

SELECT PROGRAM & **ENTER : 01**

Select the program no. through ▲ / ▼ key in between 1to 25 and press CODE key.

PRO. STEP GRA. TIME TEMP.

ENTER PASSWORD **996**

Password of this instrument is 999 and select the same value through ▲ / ▼ key and press PRG.NO ENT key to save.

PRO. STEP GRA. TIME TEMP.

PROGRAM [01] **SAVED.....**

22) How to read a program

Press PRG.NO ENT key and select the desired program through ▲ / ▼ key

PRO. STEP GRA. TIME TEMP.

SELECT PROGRAM & **ENTER : 05**

After selecting the program No. press PRG.NO ENT key again.

PRO. STEP GRA. TIME TEMP.

05 01 1.5 05 080

Read the parameter by pressing READ NEXT key one by one.

23) How to Execute a new program.

Press the PRG.NO ENT key and select the program through ▲ / ▼ key.

PRO. STEP GRA. TIME TEMP.

SELECT PROGRAM & **ENTER : 05**

After selecting the program No. press the PRG.NO ENT key. The display will be as shown below.

PRO. STEP GRA. TIME TEMP.

05 01 1.5 05 080

Then press EXC. HOLD key to start the program. It is also possible to start the previously executed program by pressing the EXC. HOLD key when instrument is in idle mode.

24) How to cancel an executing program:

Press the RESET key. The display will be as follows.

PRO. STEP GRA. TIME TEMP.

PROGRAM [05] WAS **HALTED AT 00:00**

Press the DELETE key to cancel the program

PRO. STEP GRA. TIME TEMP.

A.P.U ENTERPRISES **MODEL DP-02**

25) How to start the motor without a program:

Press the

key. It starts as per the forward/reverse timing set on special setting 1. Motor will stop only when the same key is pressed again.

26) Wiring Diagram:

SIX PINS CONNECTOR:

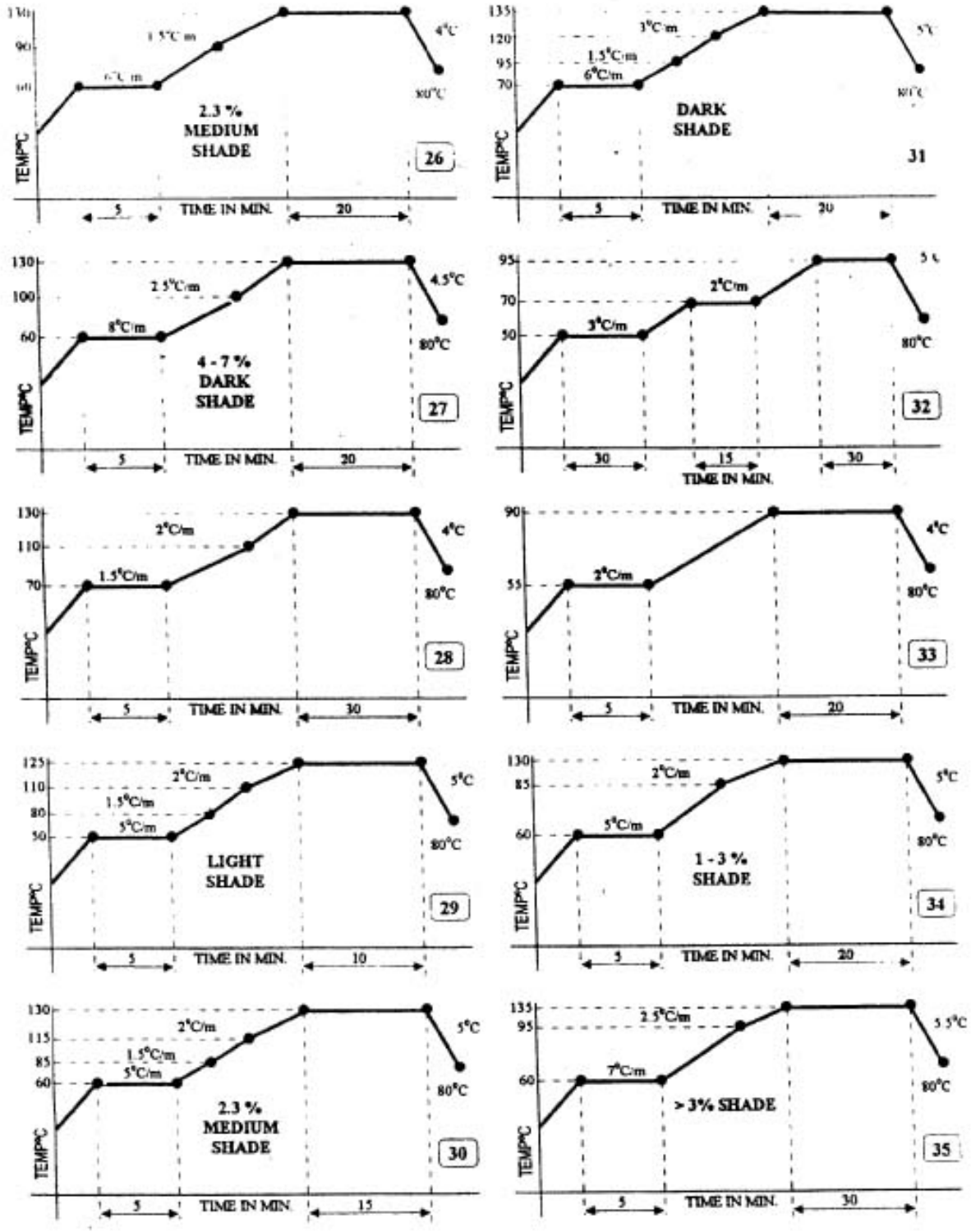
1) PHASE
2) NEUTRAL
3) EARTH
4) NIL
5) PT100 - SENSOR S1
6) PT100 - SENSOR S2

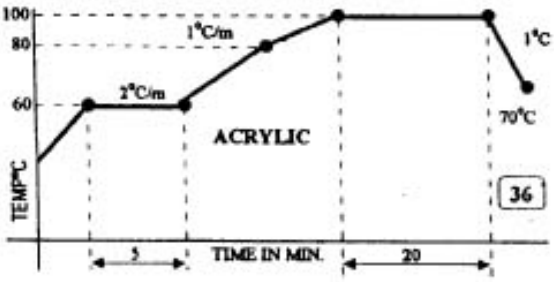
NINE PINS CONNECTOR:

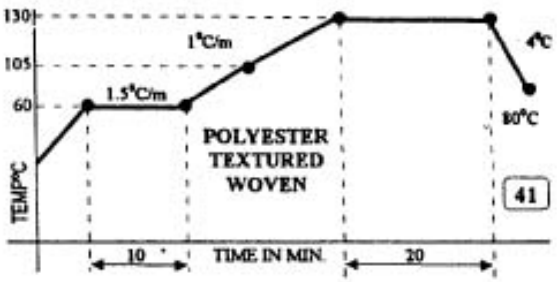
1) HEAT IN
2) COOL IN
3) COOL OUT
4) FORWARD
5) REVERSE
6) AIR IN
7) DEPRESSURE
8) ALARM
9) RELAY PHASE

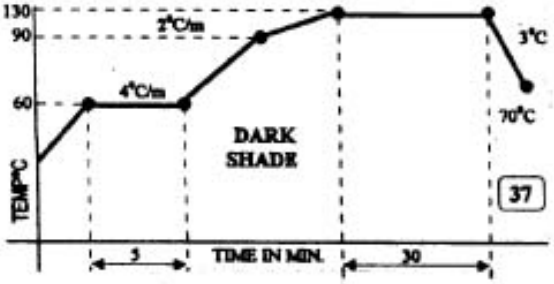
FUSE: 1 AMP.

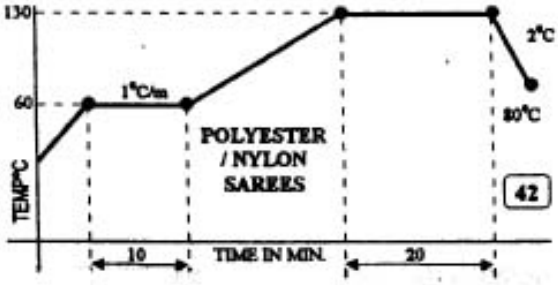
PROGRAM BANK (GRAPHS)

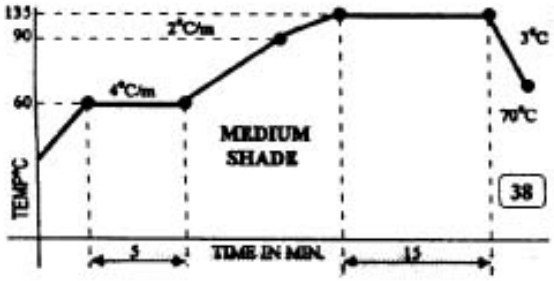


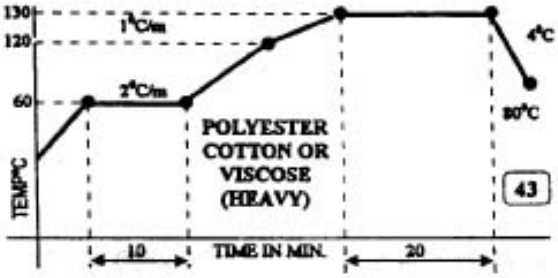

100
80
60
TEMP°C
1°C/m
2°C/m
1°C
70°C
ACRYLIC
36
5
TIME IN MIN.
20

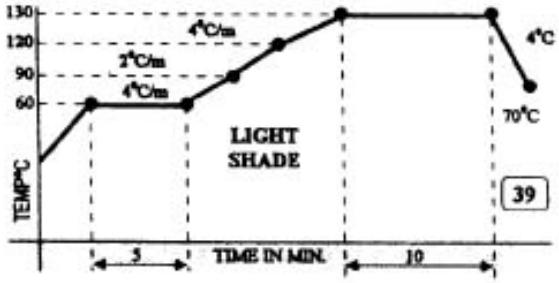

130
105
60
TEMP°C
1°C/m
1.5°C/m
4°C
80°C
POLYESTER TEXTURED WOVEN
41
10
TIME IN MIN.
20

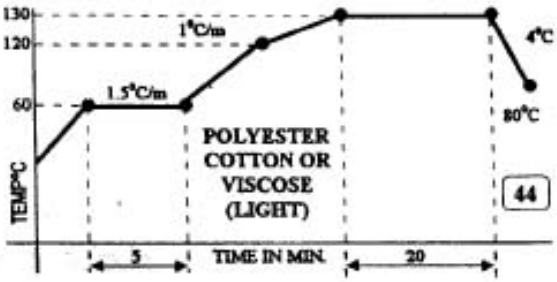

130
90
60
TEMP°C
2°C/m
4°C/m
3°C
70°C
DARK SHADE
37
5
TIME IN MIN.
30

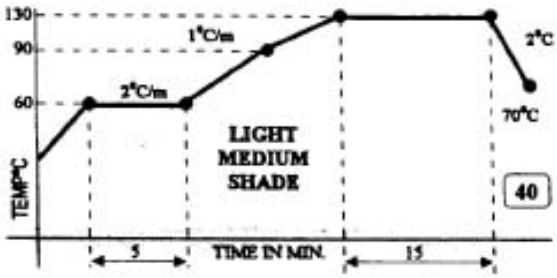

130
60
TEMP°C
1°C/m
2°C
80°C
POLYESTER / NYLON SAREES
42
10
TIME IN MIN.
20

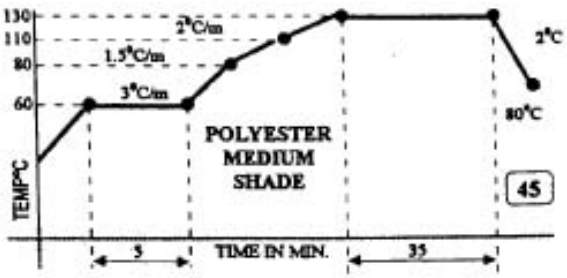

135
90
60
TEMP°C
2°C/m
4°C/m
3°C
70°C
MEDIUM SHADE
38
5
TIME IN MIN.
15

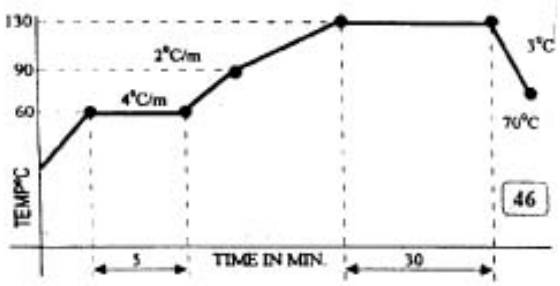

130
120
60
TEMP°C
1°C/m
2°C/m
4°C
80°C
POLYESTER COTTON OR VISCOSE (HEAVY)
43
10
TIME IN MIN.
20

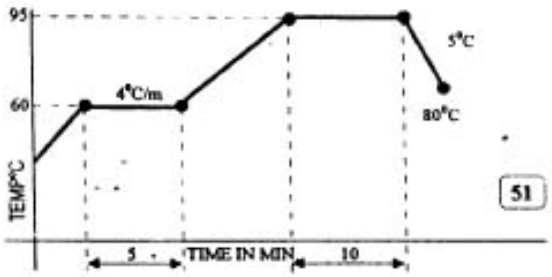

130
120
90
60
TEMP°C
4°C/m
2°C/m
4°C/m
4°C
70°C
LIGHT SHADE
39
5
TIME IN MIN.
10

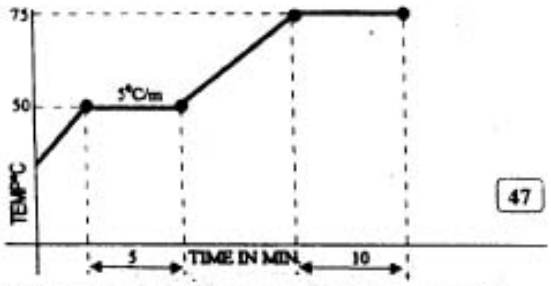

130
120
60
TEMP°C
1°C/m
1.5°C/m
4°C
80°C
POLYESTER COTTON OR VISCOSE (LIGHT)
44
5
TIME IN MIN.
20

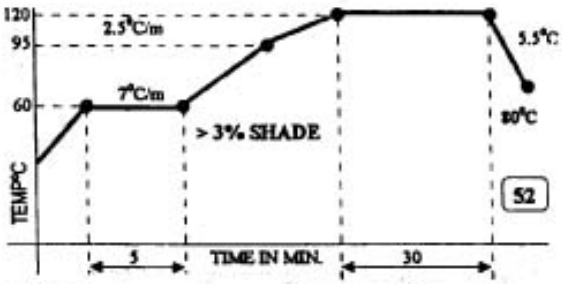

130
90
60
TEMP°C
1°C/m
2°C/m
2°C
70°C
LIGHT MEDIUM SHADE
40
5
TIME IN MIN.
15

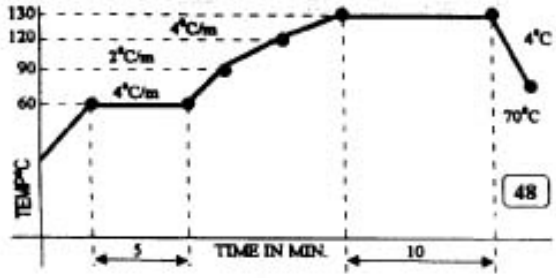

130
110
80
60
TEMP°C
2°C/m
1.5°C/m
3°C/m
2°C
80°C
POLYESTER MEDIUM SHADE
45
5
TIME IN MIN.
35

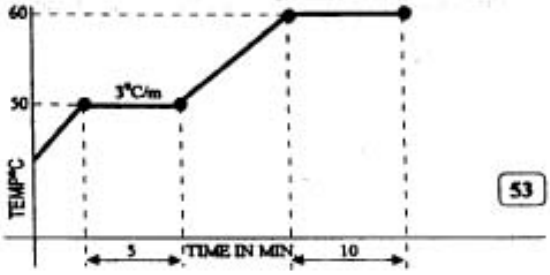

130
90
60
TEMP°C
2°C/m
4°C/m
3°C
70°C
5
TIME IN MIN.
30
46

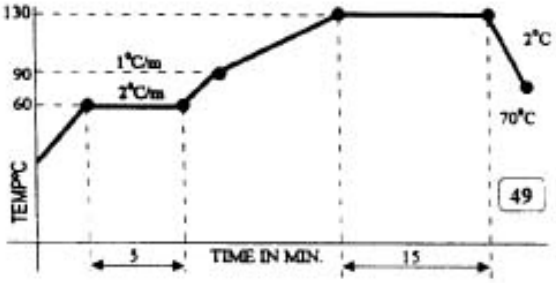

95
60
TEMP°C
4°C/m
5°C
80°C
5
TIME IN MIN.
10
51

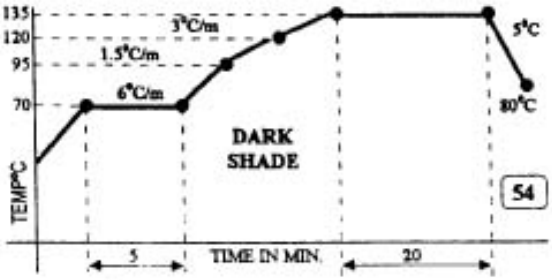

75
50
TEMP°C
5°C/m
5
TIME IN MIN.
10
47

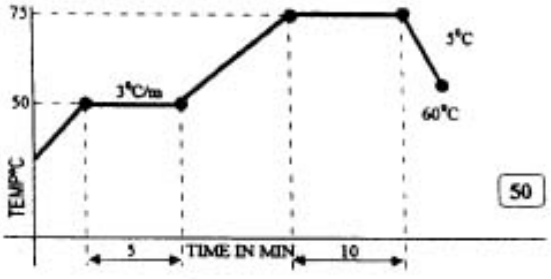

120
95
60
TEMP°C
2.5°C/m
7°C/m
> 3% SHADE
5.5°C
80°C
5
TIME IN MIN.
30
52

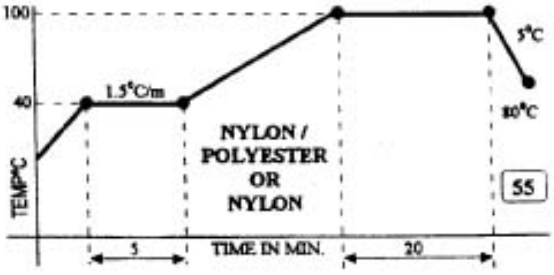

130
120
90
60
TEMP°C
4°C/m
2°C/m
4°C/m
4°C
70°C
5
TIME IN MIN.
10
48

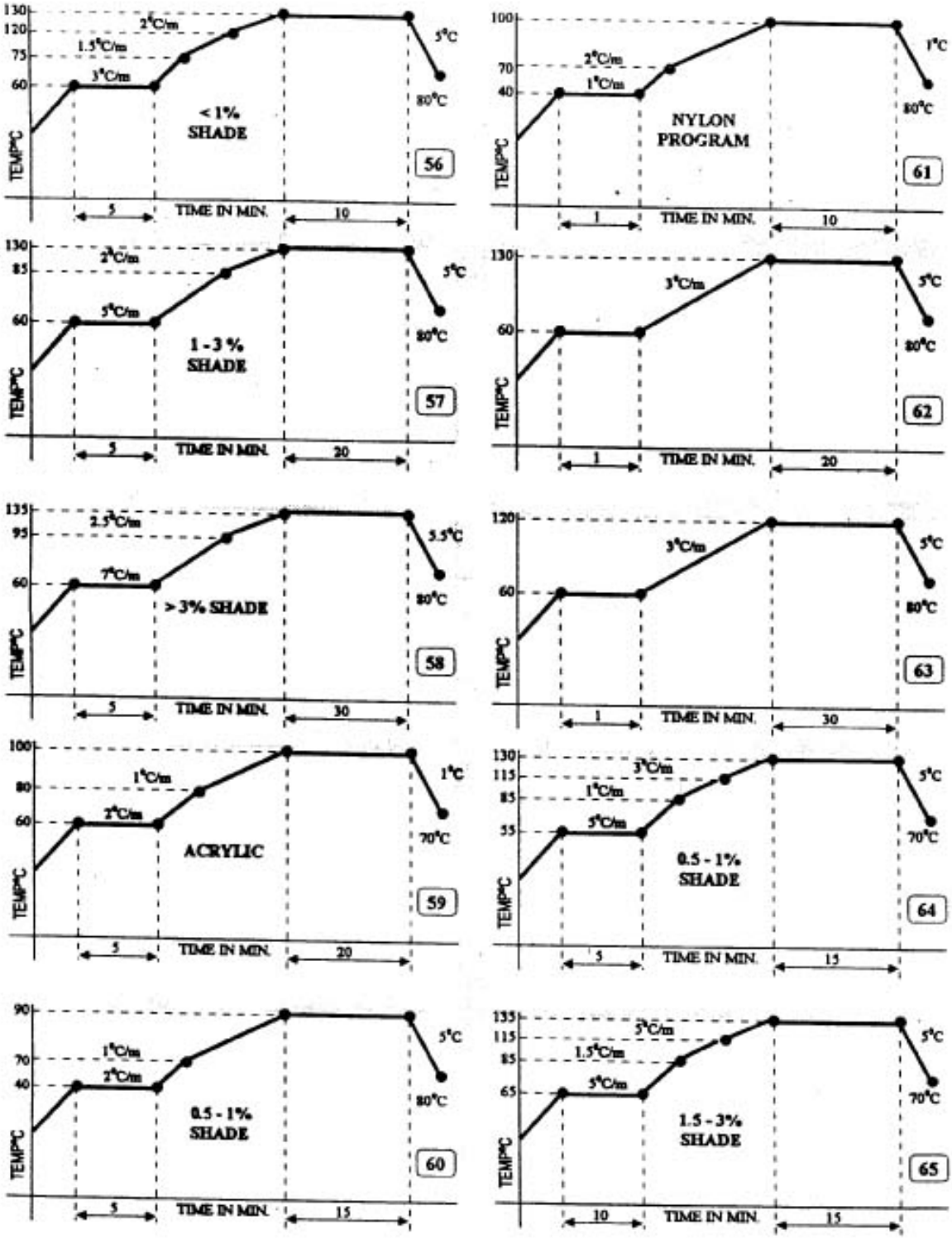

60
50
TEMP°C
3°C/m
5
TIME IN MIN.
10
53

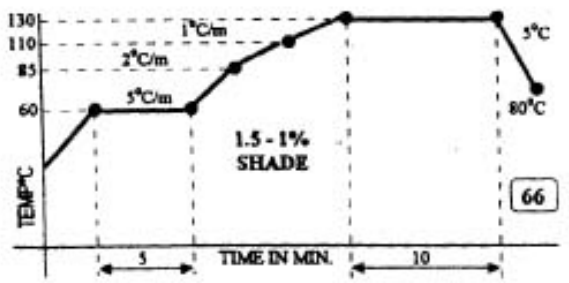

130
90
60
TEMP°C
1°C/m
2°C/m
2°C
70°C
5
TIME IN MIN.
15
49

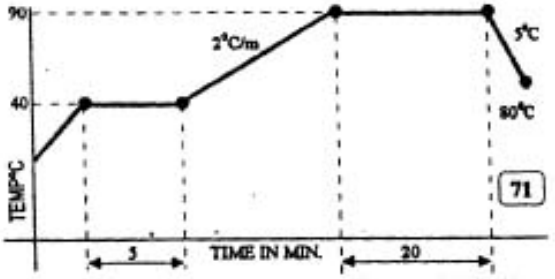

135
120
95
70
TEMP°C
3°C/m
1.5°C/m
6°C/m
DARK
SHADE
5°C
80°C
5
TIME IN MIN.
20
54

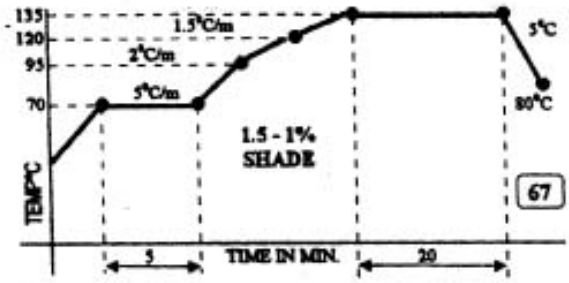

75
50
TEMP°C
3°C/m
5°C
60°C
5
TIME IN MIN.
10
50

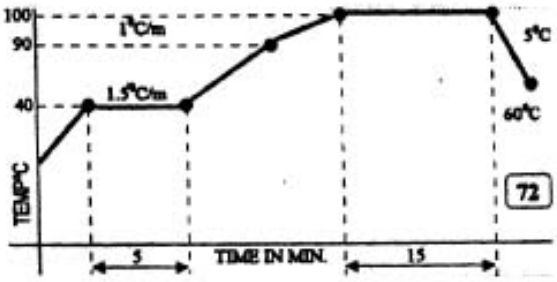

100
40
TEMP°C
1.5°C/m
NYLON /
POLYESTER
OR
NYLON
5°C
80°C
5
TIME IN MIN.
20
55

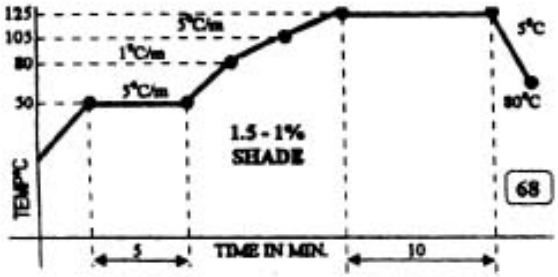

130
120
75
60
2°C/m
1.5°C/m
3°C/m
5°C
80°C
< 1% SHADE
56
TEMP°C
5
TIME IN MIN.
10
100
70
40
2°C/m
1°C/m
1°C
80°C
NYLON PROGRAM
61
1
TIME IN MIN.
10
130
85
60
2°C/m
5°C/m
5°C
80°C
1 - 3 % SHADE
57
5
TIME IN MIN.
20
130
60
3°C/m
5°C
80°C
62
1
TIME IN MIN.
20
135
95
60
2.5°C/m
7°C/m
5.5°C
80°C
> 3% SHADE
58
5
TIME IN MIN.
30
120
60
3°C/m
5°C
80°C
63
1
TIME IN MIN.
30
100
80
60
1°C/m
2°C/m
1°C
70°C
ACRYLIC
59
5
TIME IN MIN.
20
130
115
85
55
3°C/m
1°C/m
5°C/m
5°C
70°C
0.5 - 1% SHADE
64
5
TIME IN MIN.
15
90
70
40
1°C/m
2°C/m
5°C
80°C
0.5 - 1% SHADE
60
5
TIME IN MIN.
15
135
115
85
65
5°C/m
1.5°C/m
5°C/m
5°C
70°C
1.5 - 3% SHADE
65
10
TIME IN MIN.
15

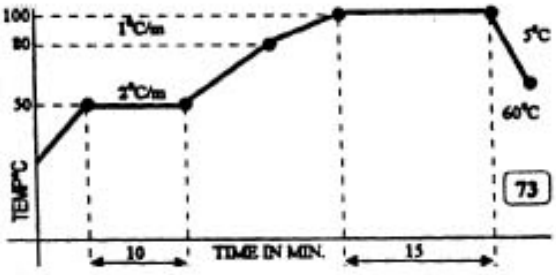

130
110
85
60
1°C/m
2°C/m
5°C/m
5°C
80°C
1.5 - 1%
SHADE
66
TEMP°C
5
TIME IN MIN.
10

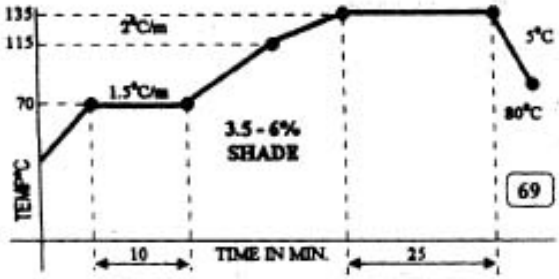

90
40
2°C/m
5°C
80°C
71
TEMP°C
5
TIME IN MIN.
20

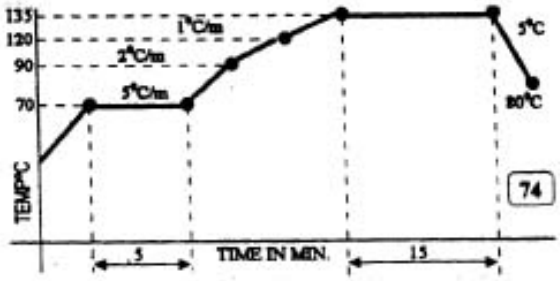

135
120
95
70
1.5°C/m
2°C/m
5°C/m
5°C
80°C
1.5 - 1%
SHADE
67
TEMP°C
5
TIME IN MIN.
20

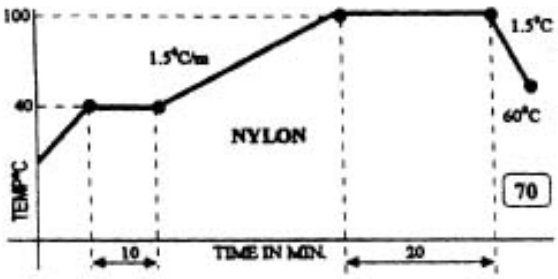

100
90
40
1°C/m
1.5°C/m
5°C
60°C
72
TEMP°C
5
TIME IN MIN.
15

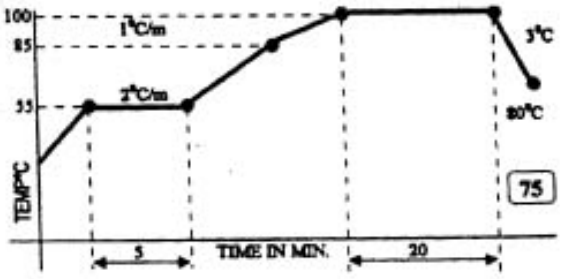

125
105
80
50
5°C/m
1°C/m
5°C/m
5°C
80°C
1.5 - 1%
SHADE
68
TEMP°C
5
TIME IN MIN.
10

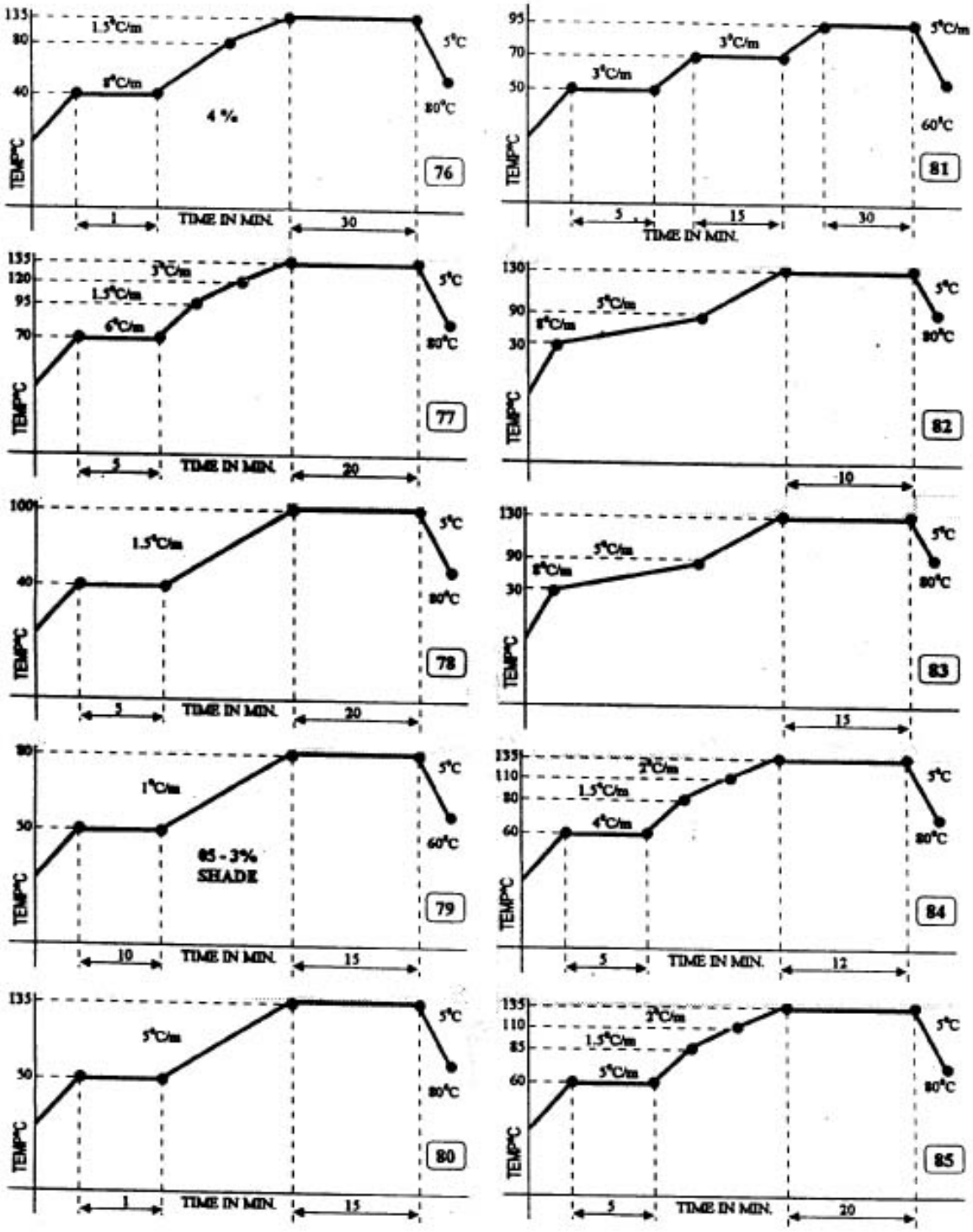

100
80
50
1°C/m
2°C/m
5°C
60°C
73
TEMP°C
10
TIME IN MIN.
15

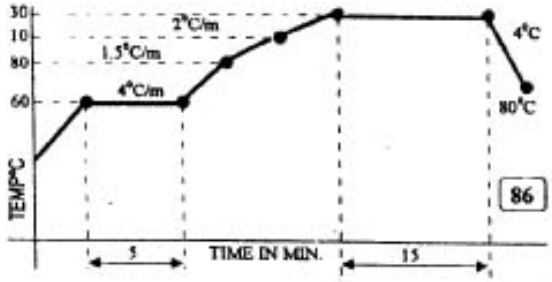

135
115
70
2°C/m
1.5°C/m
5°C
80°C
3.5 - 6%
SHADE
69
TEMP°C
10
TIME IN MIN.
25

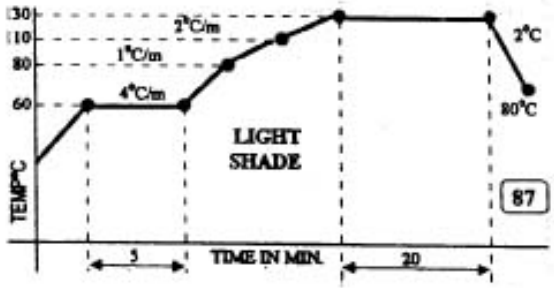

135
120
90
70
1°C/m
2°C/m
5°C/m
5°C
80°C
74
TEMP°C
5
TIME IN MIN.
15

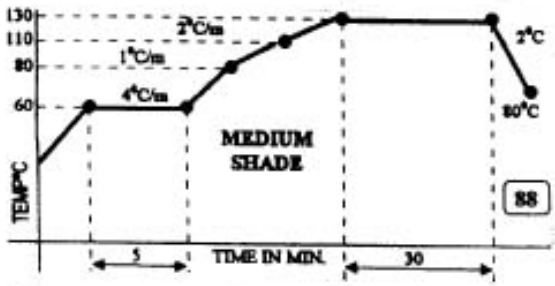

100
40
1.5°C/m
1.5°C
60°C
NYLON
70
TEMP°C
10
TIME IN MIN.
20

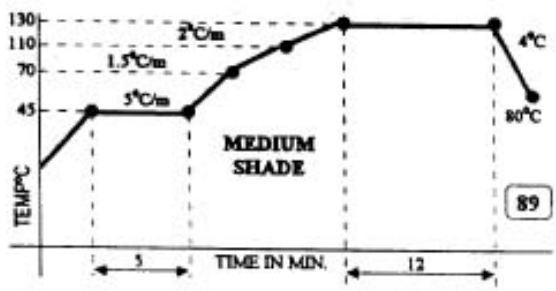

100
85
55
1°C/m
2°C/m
5°C
80°C
75
TEMP°C
5
TIME IN MIN.
20

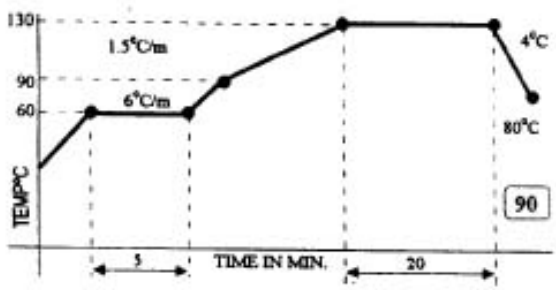

TEMP°C
TIME IN MIN.
1.5°C/m
8°C/m
4 %
5°C
80°C
76
3°C/m
6°C/m
77
1°C/m
65 - 3%
SHADE
60°C
79
5°C/m
80
2°C/m
81
82
83
84
85

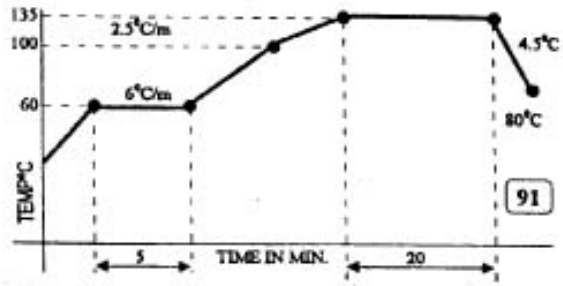

30
10
80
60
2°C/m
1.5°C/m
4°C/m
4°C
80°C
TEMP°C
86
5
TIME IN MIN.
15

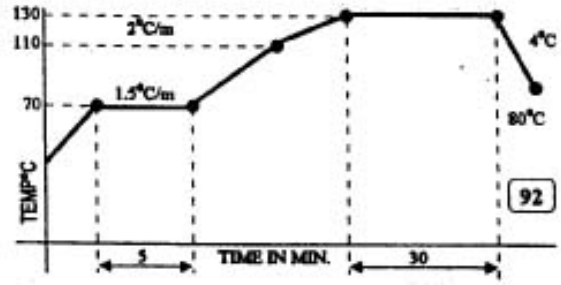

130
110
80
60
2°C/m
1°C/m
4°C/m
2°C
80°C
LIGHT
SHADE
TEMP°C
87
5
TIME IN MIN.
20

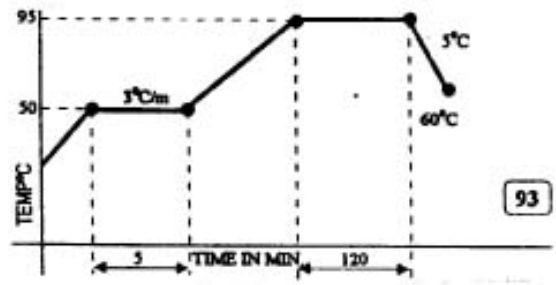

130
110
80
60
2°C/m
1°C/m
4°C/m
2°C
80°C
MEDIUM
SHADE
TEMP°C
88
5
TIME IN MIN.
30

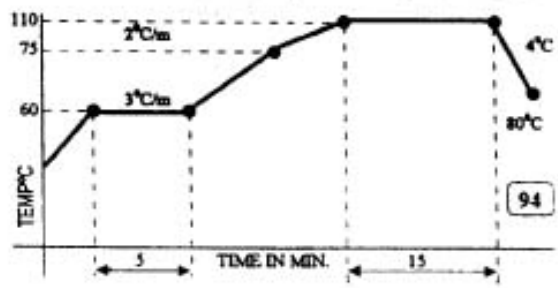

130
110
70
45
2°C/m
1.5°C/m
5°C/m
4°C
80°C
MEDIUM
SHADE
TEMP°C
89
5
TIME IN MIN.
12

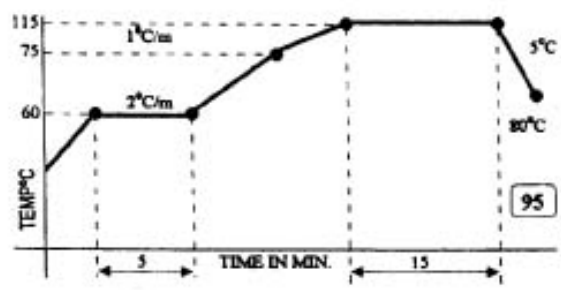

130
90
60
1.5°C/m
6°C/m
4°C
80°C
TEMP°C
90
5
TIME IN MIN.
20

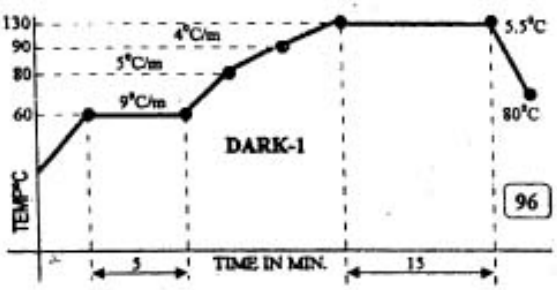

135
100
60
2.5°C/m
6°C/m
4.5°C
80°C
TEMP°C
91
5
TIME IN MIN.
20

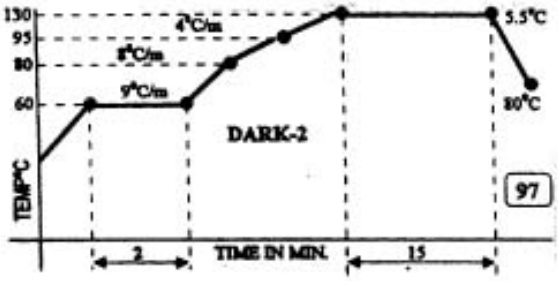

130
110
70
2°C/m
1.5°C/m
4°C
80°C
TEMP°C
92
5
TIME IN MIN.
30

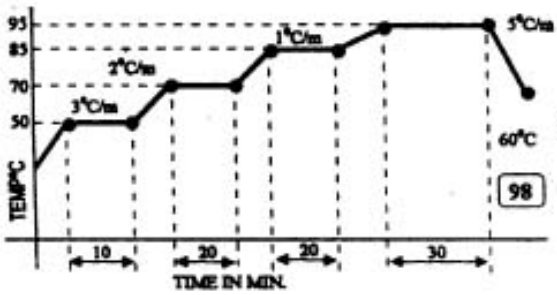

95
50
3°C/m
5°C
60°C
TEMP°C
93
5
TIME IN MIN.
120

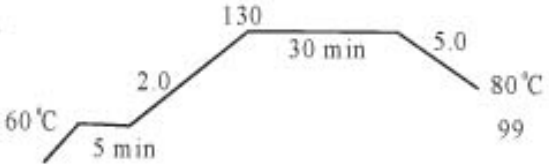

110
75
60
2°C/m
3°C/m
4°C
80°C
TEMP°C
94
5
TIME IN MIN.
15


115
75
60
1°C/m
2°C/m
5°C
80°C
TEMP°C
95
5
TIME IN MIN.
15


130
90
80
60
4°C/m
5°C/m
9°C/m
5.5°C
80°C
DARK-1
96
TEMP°C
5
TIME IN MIN.
15


130
95
80
60
4°C/m
8°C/m
9°C/m
5.5°C
80°C
DARK-2
97
TEMP°C
2
TIME IN MIN.
15


95
85
70
50
1°C/m
2°C/m
3°C/m
5°C/m
60°C
98
TEMP°C
10
20
20
30
TIME IN MIN.


130
30 min
5.0
2.0
80°C
60°C
5 min
99