

Charging batteries and boilers

Charging batteries and panels delivered dry formed and not dry formed.

Soaked batteries and panels with sulphuric acid as per instruction 5.

Connect battery through rectifier processor, cycled charging and discharging.

Battery and panel are processed through 3 cycles, which are in practice formed through electric charging $0.5I_N$ or $0.1 C_5$ in duration from 18-20h. Discharge with electricity $0.2xC_N$ where is:

I_N = named five hourly capacity

5

C_N = named five hourly capacity

Discharge is done to voltage of $1.7V/\text{Ä}$ cell. Completely charged battery is the one which through charging in the period of the last two hours is entering in a completely stable phase of all measurable parameters, voltage (U), electricity (I) and density of electrolytes.

After 3 cycles, battery should have at least 85% named five hourly capacity. At the diagram below you can see workout process of 400Ah panel. Picture 1.

Picture 2. seen conducting voltage through discharging with constant electricity.

Treatment of cycle charging and discharging could be done only on specialized equipment purposely built for.

Conventional maintenance is done by charging batteries with chargers on constant voltage or with continuous electricity as shown at the diagram reaction voltage in a time function seen on picture 3.

When charging, take care that temperature while charged doesn't pass max. 50°C. When temperature of electrolytes reaches value of 50°C, it is necessary to stop charging which will result in dropping in temperature up to 30-35°C. After reaching that temperature continue with same charging regime or with twice as weaker electricity than the initial one.

For battery to be normally charged can be said if in the process of charging is given minimum 120% of capacity.

Conventional charging of the batteries and panels is done in 2 phases and in following order:

I Phase: At the beginning of charging with electricity 0.15 C5 with time frame 5-10h. Charging is happening voltage per panel from 2.4V where is coming to initial gassing with more than 80% of panels.

II Phase: Charging is executed with electricity from 0.05C5 in which rises density of electrolytes and voltage. This charging is happening until stabilization or till the moment of reaching stable voltage and densit of electrolytes for the last 2-3 hours of measurement.

As seen in the below chart, electricity charges compared to capacity.

Type of Panels

Number of Panels

Capacity(Ah)

Discharge Regime(h)

Electricity Discharge(A)

Electricity Charge(A)

P55

3/4

165

5

33

IF-24.75

IIF-8.25

Dop-8.25

4/5

220

5

44

IF-33

IIF-11

Dop-11

5/6

275

5

55

IF-43.5

IIF-14.5

Dop-14.5

P70

3/4

210

5

42

IF-31.5

IIF-10.5

Dop-10.5

4/5

280

5

56

IF-42

IIF-14

Dop-14

5/6

350

5

70

IF-52.5

IIF-17.5

Dop-17.5

P80

3/4

240

5

48

IF-36

IIF-12

Dop-12

4/5

320

5

64

IF-48

IIF-16

Dop-16

5/6

400

5

80

IF-60

IIF-20

Dop-20

Voltage of each panel after charging is finished is 2.65-2.75V.

Reach density of electrolytes at the end of charging is $(1.28+0.02,-0.01)$ kg/l on 25°C for normal conditions and $(1.23+0.02,-0.01)$ kg/l on 25°C for tropical conditions.

After the end of charging and cooling of electrolytes below 30°C check the level of electrolytes, soak electrolytes to recommended level, extend charging for 1/2 to 1h for homogenization of electrolytes.zbog homogenizacije elektrolita.

If the density of electrolytes are not reached even after point 7.1.12., continue with correction soaking of electrolytes density 1.30kg/l or distilled water compare to density. After that, continue with charging for the next two hours with electricity IDOP=0.05C5 (A) until homogenization of the electrolytes.

After cooling of electrolytes to temperature $\pm 2^\circ\text{C}$ compare to outside temperature, close pocket openings, clean, wash, and dry battery, panels and all parts with dry cloth. Prepared and charged battery is ready for use.

If the battery or panel is not used they are kept in dry, aired room at the temperature from 0°C to + 40°C. Once a week batteries and panels are charged with electricity IDOP=0.05 C5 (A) until the beginning of separation of gases in all panels and reaching of stabilization.

While charging if its showing early signs of fullness in certain panels as well as unmissable temperature of electrolytes is showing bad signs of technical condition of the battery. To determine the reason, battery needs to be checked by qualified person. Beside the check of the battery to identify the fault also is important to analyze the books and record keeping.

Charging batteries and panels delivered with electrolytes or topped up with electrolytes.

When batteries and panels are delivered from factory topped up it means that they have passed through working phase and that 3 cycle's of charging and discharging has happened. This battery is worked capable and is ready to be used immediately without charging if there is not past more than a week of working charge or selling from factory.

If this kind of battery is stayed unused for some time, it is necessary to be extra charged.