



# DIAGNOSTIC OF FAULTS

## WITH THE ELEMENTS OF THE EVALUATION OF CLAIM JUSTIFICATION



### ITEM 1: VISUAL INSPECTION

	CHECK ITEM	PROCEDURE	OBSERVATIONS	MEASURES	CLAIM IS
F, MF, V	Lid, container	Conformity check	Shocks, cracks, deformations	<b>Change the battery</b>	<b>NOT JUSTIFIED</b>
F, MF, V	Terminals	Conformity check	Broken, burned, very deformed	<b>Change the battery</b>	<b>NOT JUSTIFIED</b>
F	Electrolyte level	Visual and/or level indicator	Normal	Go to item 2	/
			Too low	Add demineralized water up to correct level and additionally electric charge with 15-20A for about 15 min, go to item 2	/
			Of brown colour	<b>Change the battery, if necessary</b>	<b>NOT JUSTIFIED (overcharging)</b>

### ITEM 2: BATTERY CHARGE CHECK - ELECTROLYTE SPECIFIC WEIGHT / $O_{CV}$ (Open circuit voltage)

	CHECK ITEM	PROCEDURE	OBSERVATIONS	MEASURES	CLAIM IS
F	Specific weight in all cells	Measuring specific weight of electrolyte in all cells	> 1,260 kg/l in all cells	Go to item 3.	/
F			Under 1,260 kg/l deviation per cell < 0,05 kg/l	Additionally charge (all cells > 1,26 kg/l and deviation on cells < 0,05 kg/l) then go to item 3	/
F			Under 1,260 kg/l deviation per cell > 0,05 kg/l	Additional charging: In one or two cells remaining difference is > 0,05 kg/l	JUSTIFIED
				Additionally charge: (all cells > 1,26 kg/l and difference among them < 0,05 kg/l) – go to item 3	/

Additional charging: maximum initial current of charging  $C_{20}/10$  (for example: 6A for 60Ah battery). Battery is (fully) charged when within 2 hours specific weight of electrolyte and voltage are not growing.

	CHECK ITEM	PROCEDURE	OBSERVATIONS	MEASURES	CLAIM IS
F, MF, V	Open circuit voltage ( $O_{CV}$ )	$O_{CV}$ measuring 24 hours from disconnecting the battery	$O_{CV} > 13,2 V$	/	<b>NOT JUSTIFIED (overcharging)</b>
F, MF, V			$O_{CV} > 12,5V$	Go to item 3	/
F, MF, V			$O_{CV} < 12,5V$	Charge with: $U_{max} = 14,8V$ $I_{max} = C_{20}/10$  Voltage after 24 h: <b><math>O_{CV} &lt; 12,5 V</math></b>	<b>NOT JUSTIFIED</b>
				$O_{CV} > 12,5 V$ ; Go to item 3	

### Item 3: TEST OF STARTING PERFORMANCE

	PROCEDURE	OBSERVATIONS	MEASURES	CLAIM IS	Minimum voltage after 15 seconds discharge with a current $I = 0,5 I_{EN}$ (A)												
	1. Measure battery temperature 2. Adjust discharge current to $0,5 \times I_{EN}$ 3. Connect to tester 4. Load the battery for 15 seconds and towards the end read the voltage $U_{15 s}$	$U_{15s} > U_{min}(T)$ : (refer to temperature from the table on right side)	<b>Return battery to customer</b>	<b>NOT JUSTIFIED</b>	<table border="1"> <thead> <tr> <th>Temperature (°C)</th> <th><math>U_{min}</math> (V)</th> </tr> </thead> <tbody> <tr> <td>&gt; +20</td> <td>9,2</td> </tr> <tr> <td>+10</td> <td>9,0</td> </tr> <tr> <td>0</td> <td>8,8</td> </tr> <tr> <td>-10</td> <td>8,6</td> </tr> <tr> <td>-20</td> <td>8,4</td> </tr> </tbody> </table>	Temperature (°C)	$U_{min}$ (V)	> +20	9,2	+10	9,0	0	8,8	-10	8,6	-20	8,4
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-20	8,4																
	$U_{15s} < U_{min}(T)$ : (refer to temperature from the table on right side)	Change the battery	JUSTIFIED														

F = Standard Lead-acid battery | MF = Sealed cover | V = AGM or GEL battery