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No.: GJW2009-0667

# 检验报告

## TEST REPORT

NAME OF SAMPLE: Value Regulated Lead Acid Battery

CLIENT: Shenzhen Center Power Tech. Co., Ltd.

CLASSIFICATION OF TEST: Commission Test



**Guangzhou Vkan Certification and Testing Institute**  
**(CVC - former GTIHEA)**

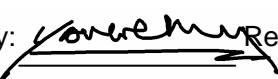
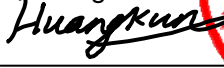

# 检 验 报 告

## TEST REPORT

No.: GJW2009-0667

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Name of product: Value Regulated Lead Acid Battery	Trade mark: Vision
Type/Model: 6FM40(6FM40X), 12V, 40Ah(20hr) CG12-120(CG12-120A), 12V, 120Ah(20hr) CG12-230(CG12-230A), 12V, 230Ah(20hr) 6FM150D(6FM150), 12V, 150Ah(20hr) 6FM100D(6FM100), 12V, 100Ah(20hr)	6FM65, 12V, 65Ah(20hr) CG12-175(CG12-175A), 12V, 175Ah(20hr) 6FM200D(6FM200), 12V, 200Ah(20hr) 6FM120D(6FM120), 12V, 120Ah(20hr) 6FM80D(6FM80), 12V, 80Ah(20hr)
Manufacturer: Shenzhen Center Power Tech. Co., Ltd.	Commissioned by: Shenzhen Center Power Tech. Co., Ltd.
Manufacturer address: Center Power Industrial Park, Tongfu Industrial District Dapeng Town, 518120, Shenzhen, P. R. China	Commissioner address: Center Power Industrial Park, Tongfu Industrial District Dapeng Town, 518120, Shenzhen, P. R. China
Quantity of sample: 23 pcs	Sampled by: —
Sample identification: 6FM40        3#        6FM65        3# CG12-120    3#        CG12-175    3# CG12-230    3#        CG12-230    3# 6FM200D    1#        6FM80D     1# 6FM100D    1#        6FM120D    1# 6FM150D    1#	Sampling at (place): —
Means of receiving: Submitted by Manufacturer	Means of sampling: —
Classification of test: Commission Test	Sampling date: —
Receiving date: 2009.05.12	Completing date: 2009.07.27
Tested according to: IEC 60896-21:2004, IEC 60896-22:2004	Test item: 14 items
<p>Test conclusion:</p> <p>The Value Regulated Lead Acid Batteries submitted by Shenzhen Center Power Tech. Co., Ltd. are tested according to IEC 60896-21:2004 Stationary lead-acid batteries- valve regulated types-methods of test and IEC 60896-22:2004 Stationary lead-acid batteries- valve regulated types-requirements.</p> <p>The tested items:</p> <p>Gas emission, High current tolerance, Short circuit current and d.c. internal resistance, Protection against internal ignition from external spark sources, Protection against ground short propensity, Content and durability of required markings, Material identification, Valve operation, Flammability rating of materials, Intercell connector performance, Discharge capacity, Recharge behavior, Abusive over-discharge, and Stability against mechanical abuse of units during installation.</p> <p>The results of the tested items comply with the relevant requirements of the standards.</p> <p style="text-align: right;">Seal of CVC Date of issue: 2009.07.29</p>	

Approved by:  Reviewed by: Huang Kun  Tested by: Zhang Siyao 



## Description and illustration of the sample:

The samples' status is good.

## Description of the sampling procedure:

/

## Description of the deviation from the standard, if any:

/

## Remarks:

Throughout this report a comma is used as the decimal separator.

The data of 6FM200D(6FM200), 6FM150D(6FM150), 6FM120D(6FM120), 6FM100D(6FM100) and 6FM80D(6FM80) refer to the report of No. GJW2008-0912.

The models of 6FM40(6FM40X), 6FM65, CG12-120(CG12-120A), CG12-175(CG12-175A) and CG12-230(CG12-230A) are newly tested and the model of 6FM40(6FM40X) is mainly tested.

ype	Test items
6FM200D(6FM200)	Gas emission, High current tolerance, Protection against internal ignition from external spark sources, Protection against ground short propensity, Content and durability of required markings, Material identification, Valve operation, Flammability rating of materials, Intercell connector performance, Discharge capacity, Recharge behavior, Abusive over-discharge, and Stability against mechanical abuse of units during installation.
6FM40(6FM40X) 6FM65 CG12-120(CG12-120A) CG12-175(CG12-175A) CG12-230(CG12-230A)	Gas emission, High current tolerance, Short circuit current and d.c. internal resistance, Protection against internal ignition from external spark sources, Protection against ground short propensity, Content and durability of required markings, Material identification, Valve operation, Flammability rating of materials, Intercell connector performance, Discharge capacity
6FM150D(6FM150) 6FM120D(6FM120) 6FM100D(6FM100) 6FM80D(6FM80)	Discharge capacity, Recharge behavior, Abusive over-discharge

Photos and markings

6FM200D(6FM200) (12V, 200Ah(20hr))



Photos and markings

6FM200D(6FM200) (12V, 200Ah(20hr))



Photos and markings

6FM150D(6FM150) (12V, 150Ah(20hr))



Photos and markings

6FM120D(6FM120) (12V, 120Ah(20hr))



Photos and markings

6FM100D(6FM100) (12V, 100Ah(20hr))





Photos and markings

6FM80D(6FM80) (12V, 80Ah(20hr))



Photos and markings

6FM40(6FM40X) (12V, 40Ah)



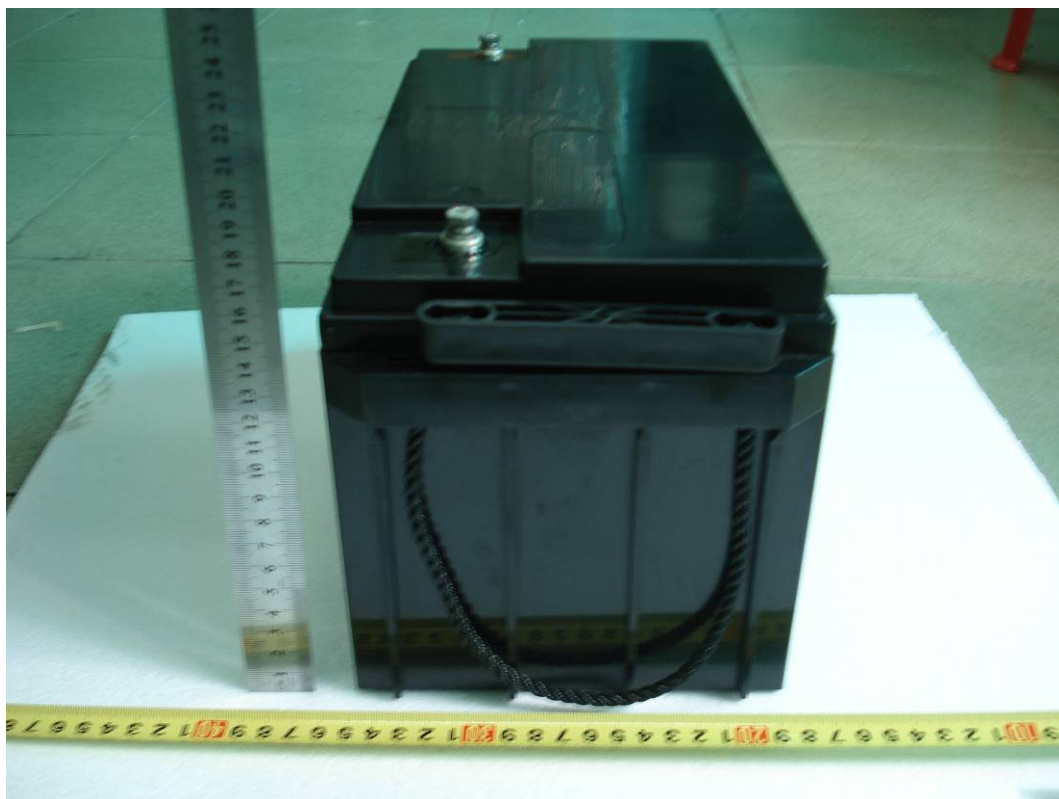
Photos and markings

6FM40(6FM40X) (12V, 40Ah)



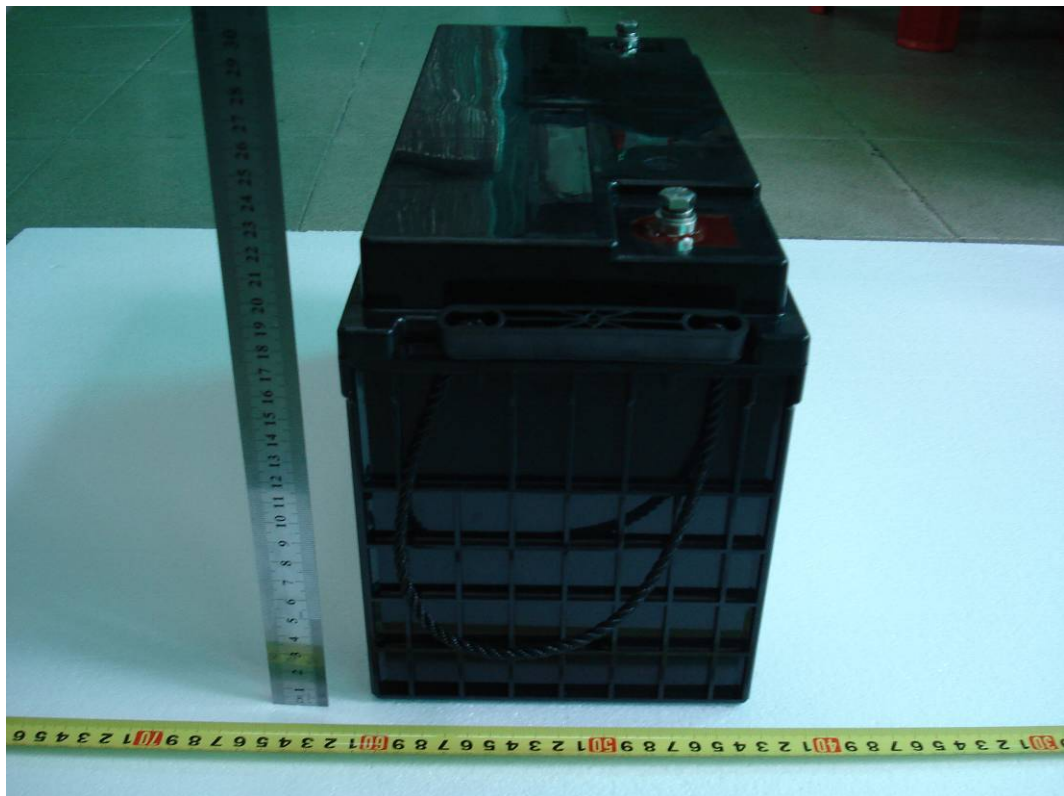
**Photos and markings**

6FM65, 12V, 65Ah(20hr)



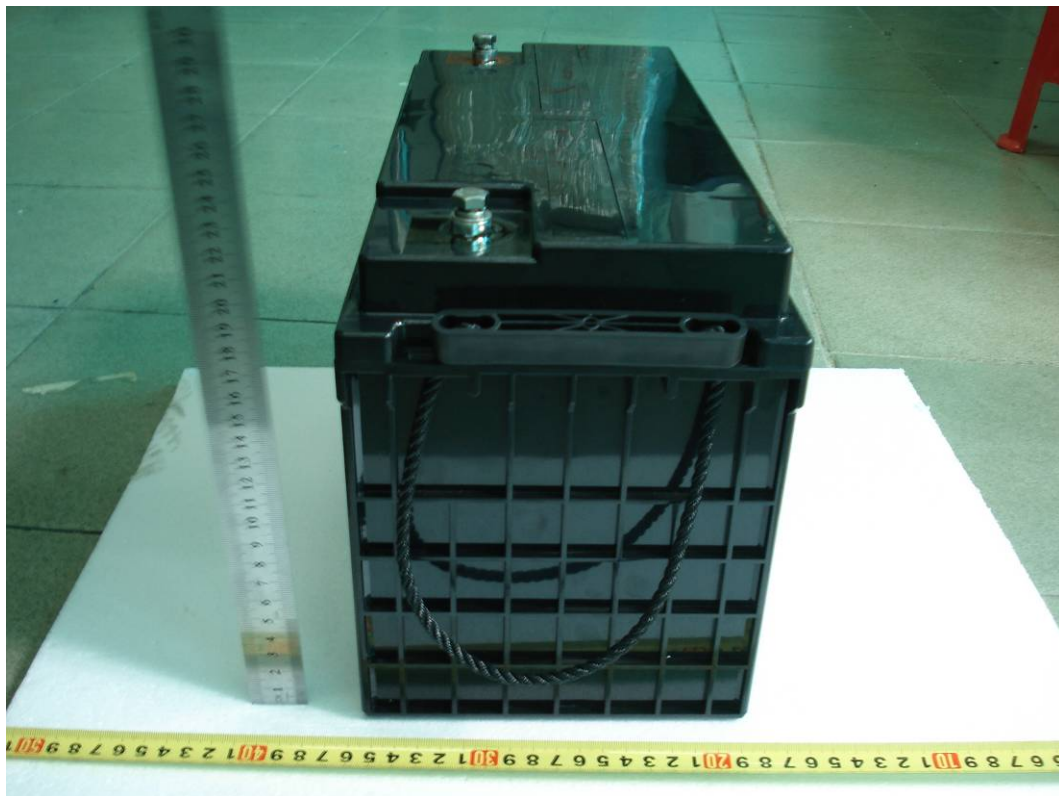
Photos and markings

CG12-120(CG12-120A), 12V, 120Ah(20hr)



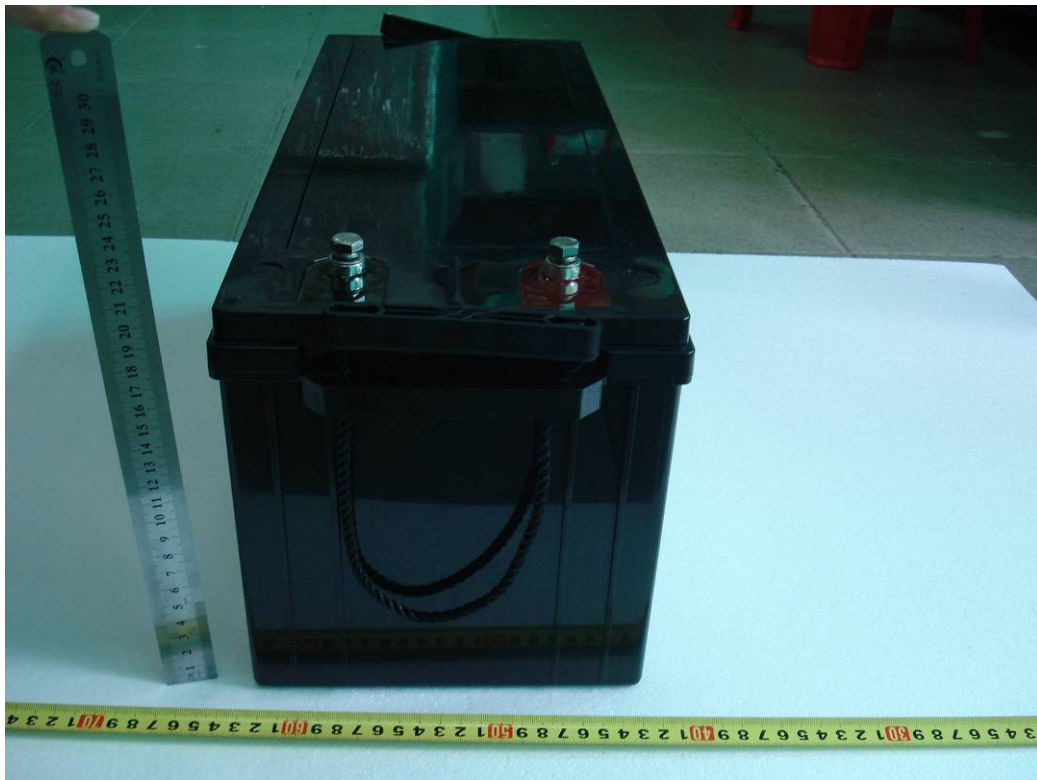
Photos and markings

CG12-120(CG12-120A), 12V, 120Ah(20hr)



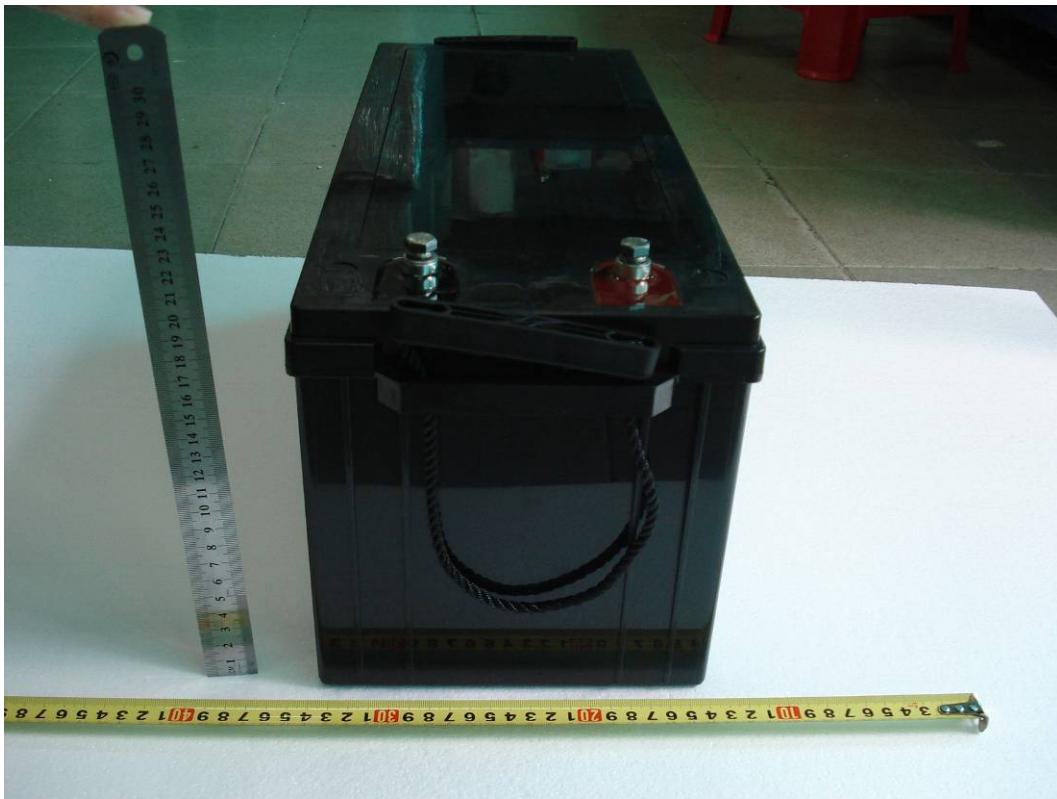
Photos and markings

CG12-175(CG12-175A), 12V, 175Ah(20hr)



Photos and markings

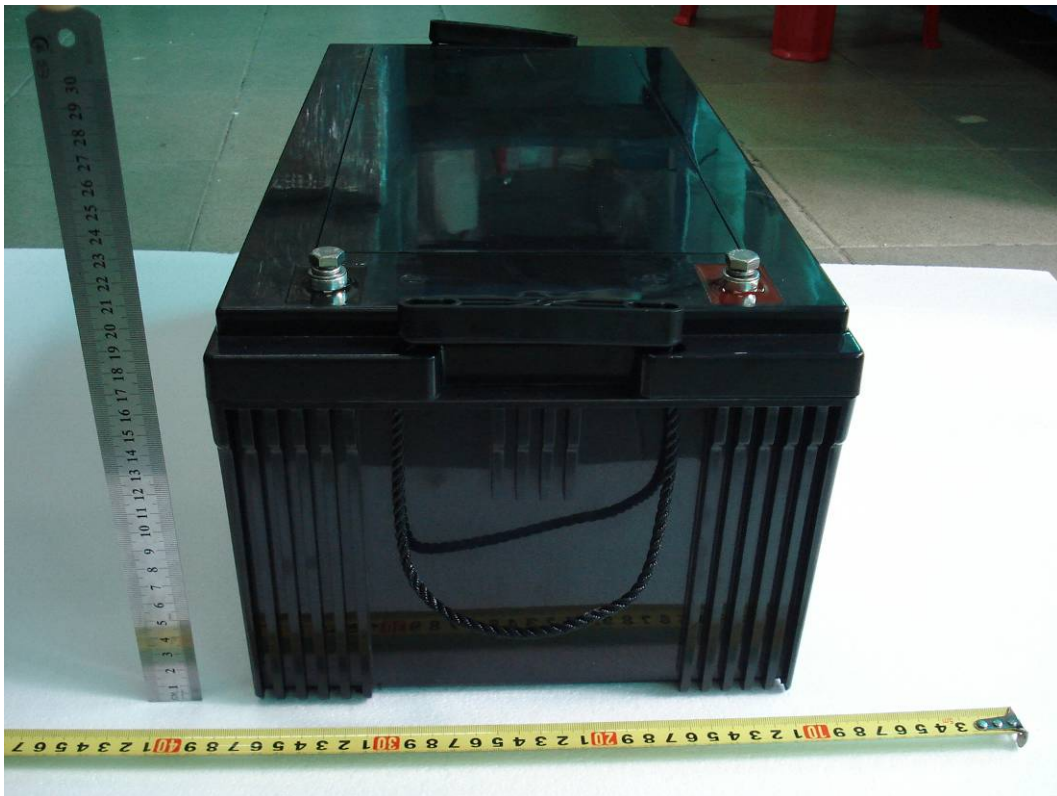
CG12-175(CG12-175A), 12V, 175Ah(20hr)





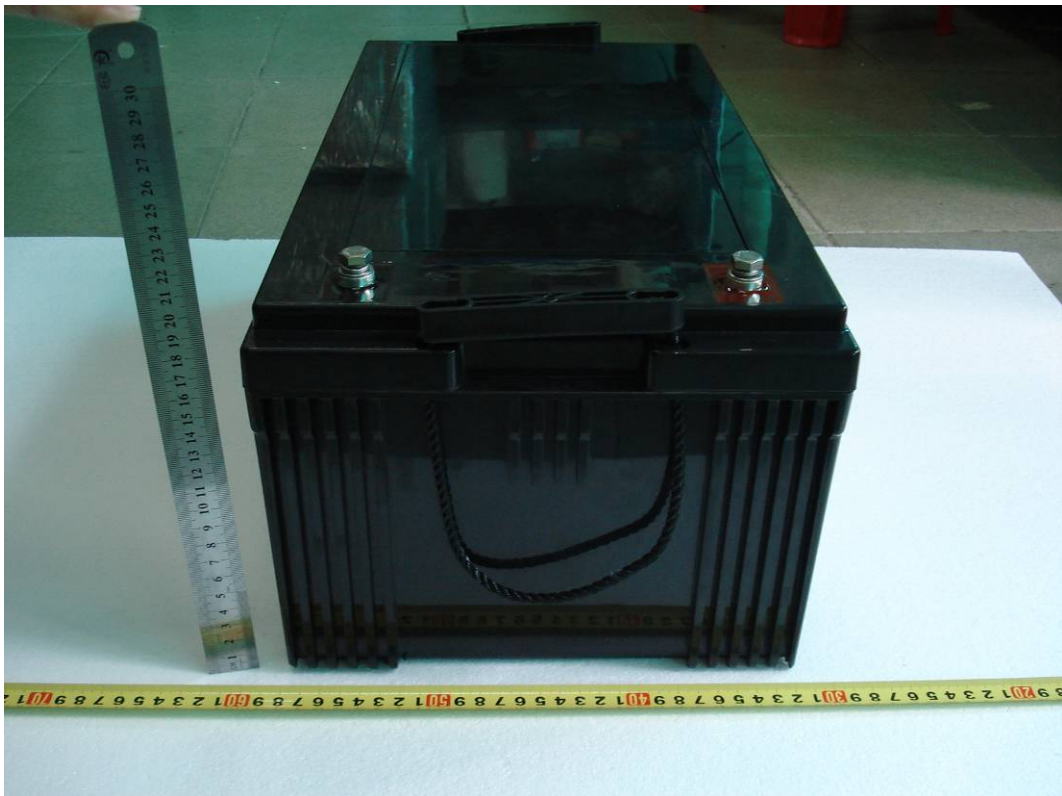
Photos and markings

CG12-230(CG12-230A), 12V, 230Ah(20hr)



Photos and markings

CG12-230(CG12-230A), 12V, 230Ah(20hr)



IEC 60896-21:2004 IEC 60896-22:2002			
Cl.	Requirement – Test	Result	Verdict
<b>6</b>	<b>Safe operation requirements</b>		
<b>6.1</b>	<b>Gas emission</b>		
	The test methods are according to clause 6.1.1 to 6.1.14 which are stated in the standard IEC 60896-21	See table 1.	State the value
	Requirement and application: At the rated float charge voltage; state data for all applications: ml gas per cell, h and Ah at 20°C; Requirement and application: at 2,40Vpc overcharge voltage conditions; state data for all applications: ml gas per cell, h and Ah at 20°C;		
<b>6.2</b>	<b>High current tolerance</b>		<b>P</b>
	The test methods are according to clause 6.2.1 to 6.2.6 which are stated in the standard IEC 60896-21	Maximum discharge current (which is specified by the manufacturer): 6FM200D(6FM200): 1000A; 6FM40(6FM40X): 400A; 6FM65: 650A ; CG12-120(CG12-120A): 500A; CG12-175(CG12-175A): 750A; CG12-230(CG12-230A): 1000A. After 30s of high current flow, samples show no incipient melting or no loss of electrical continuity.	<b>P</b>
	Requirement and application: Measure unit voltage, inspect and document the status of the top-lead and terminals of each unit after 30s current flow; Pass for all applications: Show evidence of no incipient melting or of no loss of electrical continuity after 30s of high current flow (value to be stated). After the completion of the specified discharge duration, the test shall stand for 5minutes in open circuit and their voltage measured and reported.		
<b>6.3</b>	<b>Short circuit current and d.c. internal resistance</b>		
	The test methods are according to clause 6.3.1 to 6.3.6 which are stated in the standard IEC 60896-21	See table 3.	State the value
	Define prospective short-circuit value $I_{sc}$ and internal resistance $R_i$ of all units of a type range		
<b>6.4</b>	<b>Protection against internal ignition from external spark sources</b>		<b>P</b>

IEC 60896-21:2004 IEC 60896-22:2002			
Cl.	Requirement – Test	Result	Verdict
	The test methods are according to clause 6.4.1 to 6.4.6 which are stated in the standard IEC 60896-21		P
	Requirement and application: induce sparks near representative valve/barrier assemblies during emission Pass for all application: no evidence of rapid combustion or explosion beyond valve/barrier assemblies		
<b>6.5</b>	<b>Protection against ground short propensity</b>		<b>P</b>
	The test methods are according to clause 6.5.1 to 6.5.9 which are stated in the standard IEC 60896-21	No evidence of ground short and leakage phenomena	P
	Requirement and application: Operate units in different orientations and apply d.c. gradient; Pass for all applications: No evidence of ground short and leakage phenomena;		
<b>6.6</b>	<b>Content and durability of required markings</b>		<b>P</b>
	the durability of the marking shall be tested, consistent with 1.7.13 of IEC 60950-1,	The markings and following information are readable after rubbed 15s with water, petroleum, solution of sodium carbonate, and 40% in weight of H <sub>2</sub> SO <sub>4</sub> in water respectively.	P
	Requirement and application: see table 9 and Table 10 in the standard IEC 60896-22		
<b>6.7</b>	<b>Material identification</b>		<b>P</b>
	The test methods are according to clause 6.7.1 to 6.7.4 which are stated in the standard IEC 60896-21		P
	Requirement and application: Inspect case and /or cover for ISO 1043-1 materials symbols. expose to chemicals. Pass for all applications: ISO symbols present on the outside of the cover or/and Case. Symbols shall remain readable after exposure to chemicals and remain in place		
<b>6.8</b>	<b>Valve operation</b>		<b>P</b>

IEC 60896-21:2004 IEC 60896-22:2002			
Cl.	Requirement – Test	Result	Verdict
	<p>The test methods are according to clause 6.8.1 to 6.8.3 which are stated in the standard IEC 60896-21</p> <p>Requirement and application: Overcharge units and detect gas flow from the valve; Pass for all applications: Gas release detected before and after stress temperature impact test.</p>	<p>Gas release detected before temperature impact test.</p> <p>The valve operated well.</p> <p>6FM200D (6FM200): Open valve pressure is 21,9Kpa Close valve pressure is 6Kpa</p> <p>6FM40(6FM40X)、 6FM65、 CG12-120(CG12-120A)、 CG12-175(CG12-175A)、 CG12-230(CG12-230A): Open valve pressure : 20-30Kpa Kpa Close valve pressure : <math>\geq</math> 15Kpa,</p>	P
<b>6.9</b>	<b>Flammability rating of materials</b>		P
<b>6.9.3</b>	<p>The test methods are according to clause 6.9.1 to 6.9.4 which are stated in the standard IEC 60896-21</p> <p>Requirement and application Determine flammability rating of case and cover material; State data for all applications: State the flammability rating level for samples of thickness equivalent to that of case and cover.</p>	Case and cover is ABS.	P
<b>6.10</b>	<b>Intercell connector performance</b>		
	<p>The test methods are according to clause 6.10.1 to 6.10.2 which are stated in the standard IEC 60896-21</p> <p>Requirement and application: Measure and report maximum intercell connector temperature reached; State data for all applications: State maximum temperature reached.</p>	<p>6FM40(6FM40X):Maximum temperature: 60°C 6FM65:Maximum temperature: 60°C CG12-120(CG12-120A): Maximum temperature: 60°C; CG12-175(CG12-175A): Maximum temperature: 60°C; CG12-230(CG12-230A): Maximum temperature: 60°C; 6FM200D (6FM200): Maximum temperature:48°C</p>	State the value
<b>6.11</b>	<b>Discharge capacity</b>		P

IEC 60896-21:2004 IEC 60896-22:2002			
Cl.	Requirement – Test	Result	Verdict
	The test methods are according to clause 6.11.1 to 6.11.12 which are stated in the standard IEC 60896-21		P
	Requirement and application: Determine actual capacity $C_a$ ; $C_a$ to be at least $\times$ % of $C_{rt}$ with all units at all rates shown below ; 10h \ 8h \ 3h \ 1h \ 0,25\ 1,80Vpc \ 1,75Vpc \ 1,70Vpc \ 1.60Vpc 1.60Vpc\ $C_a/C_{rt} \geq 95\%$	See table 4	P
<b>6.12</b>	<b>Charge retention during storage</b>		N
	The test methods are according to clause 6.12.1 to 6.12.7 which are stated in the standard IEC 60896-21		N
	Requirement and application: Determine charge retention factor $C_{rt}$ after 6 months of storage; Comply for all applications: $C_{rt} \geq 70\%$		
<b>6.13</b>	<b>Float service with daily discharges</b>		N
	The test methods are according to clause 6.13.1 to 6.13.5 which are stated in the standard IEC 60896-21		N
	Requirement and application: see table 9 and Table 17 in the standard IEC 60896-22		
<b>6.14</b>	<b>Recharge behavior</b>		P
	Requirement and application: Rbf24h 24h Recharge behavior factor $\geq 90\%$ Rbf168h 168h Recharge behavior factor $\geq 98\%$	6FM200D (6FM200): Rbf24h: 93% Rbf168h: 99%	P
		6FM100D(6FM100): Rbf24h: 93,5% Rbf168h: 99%	
		6FM150D(6FM150): Rbf24h: 92,5% Rbf168h: 98,9%	
		6FM80D(6FM80): Rbf24h: 91% Rbf168h: 98,5%	
		6FM120D(6FM120): Rbf24h: 91,5% Rbf168h: 99%	
<b>6.15</b>	<b>Service life at an operating temperature of 40 °C</b>		

IEC 60896-21:2004 IEC 60896-22:2002				
Cl.	Requirement – Test	Result		Verdict
	The test methods are according to clause 6.15.1 to 6.15.5 which are stated in the standard IEC 60896-21 Requirement and application: Brief duration exposure time: $\geq 500$ days; Medium duration exposure time: $\geq 750$ days; Long duration exposure time: $\geq 1100$ days Very long duration exposure time: $\geq 1700$ days.			N
<b>6.16</b>	<b>Impact of a stress temperature of 55 °C or 60 °C</b>			
	The test methods are according to clause 6.16.1 to 6.16.8 which are stated in the standard IEC 60896-21			N
	Requirement and application: At 55 °C Capacity monitored with 3h rate discharge test: Brief duration exposure time $\geq 150$ days; Medium duration exposure time $\geq 250$ days; Long duration exposure time $\geq 350$ days; Very long duration exposure time $\geq 500$ days.			
<b>6.17</b>	<b>Abusive over-discharge</b>			P
	The test methods are according to clause 6.17.1 to 6.17.15 which are stated in the standard IEC 60896-21 Requirement and application: determine capacity ration $Ca_{od}$ , unbalanced sting over-discharge $Co_{ad}$ , $Co_{ad} \geq 0,80$ (for the string)	6FM200D (6FM200): $Co_{ad}=0,838$ $Co_{aC}=0,925$	6FM100D (6FM100): $Co_{ad}=0,845$ $Co_{aC}=0,919$	P
	Requirement and application: determine capacity ration $Ca_{oc}$ , unbalanced sting over-discharge $Co_{ac}$ , $Co_{ac} \geq 0,90$ (for the string)	6FM150D (6FM150): $Co_{ad}=0,842$ $Co_{aC}=0,932$	6FM80D (6FM80): $Co_{ad}=0,843$ $Co_{aC}=0,915$	
		6FM120D (6FM120): $Co_{ad}=0,845$ $Co_{aC}=0,920$		
<b>6.18</b>	<b>Thermal runaway sensitivity</b>			N
	The test methods are according to clause 6.18.1 to 6.18.14 which are stated in the standard IEC 60896-21			N

IEC 60896-21:2004 IEC 60896-22:2002			
Cl.	Requirement – Test	Result	Verdict
	Requirement and application: Comply for all applications: Achieve at least 1 week below 60°C at 2,45Vpc and at least 24h below 60°C at 2,60Vpc; Show ultimate time to 60°C or ultimate temperature after 168h at 2,45Vpc and 2,60Vpc.		
<b>6.19</b>	<b>Low temperature sensitivity</b>		N
	The test methods are according to clause 6.19.1 to 6.19.13 which are stated in the standard IEC 60896-21		N
	Requirement and application: show abusive low temperature service capacity (Cals) of all unit and report eventual freezing induced damages.		
<b>6.20</b>	<b>Dimensional stability at elevated internal pressure and temperature</b>		N
	The test methods are according to clause 6.20.1 to 6.20.6 which are stated in the standard IEC 60896-21		N
	Requirement and application: Show dimensional change in percentage and in mm.		
<b>6.21</b>	<b>Stability against mechanical abuse of units during installation</b>		P
	The test methods are according to clause 6.21.1 to 6.21.6 which are stated in the standard IEC 60896-21	No leakage detectable after two times two drops.	P
	Requirement and application: Show leakage inspection results; No leakage detectable after two times two drops.		

**Table1**

No.	6FM200D (6FM200)	6FM40 (6FM40X)	6FM65	CG12-120 (CG12-120A)	CG12-175 (CG12-175A)	CG12-230 (CG12-230A)
Ge ( $U_{fio}=2,25V$ ) (ml/cell/hour/Ah)	0,02 ( $U_{fio}=2,25V$ )	0,0021 ( $U_{fio}=2,275V$ )	0,0023	0,0028	0,0028	0,0028
Ge ( $U_{overcharge}=2,4V$ ) (ml/cell/hour/Ah)	0,065	0,0167	0,0167	0,035	0,035	0,035

**Table2**

No.	6FM200D (6FM200)	6FM40 (6FM40X)	6FM65	CG12-120 (CG12-120A)	CG12-175 (CG12-175A)	CG12-230 (CG12-230A)
Voltage after the test(V)	13,201	12,89	12,89	12,96	12,96	12,95



IEC 60896-21:2004 IEC 60896-22:2002			
Cl.	Requirement – Test	Result	Verdict

**Table3**

<b>Table 3: 6.3 Short circuit current and d.c. internal resistance</b>				
Type	6FM40 (6FM40X)	CG12-120(CG12-1 20A)	CG12-175(CG12-1 75A)	CG12-230(CG12-2 30A)
No.	b1#	b1#	b1#	b1#
Short-circuit: (A)	920	2300	2700	3080
Resistance:(2 Ω)	0,0103	0,005	0,0041	0,0042
No.	6FM200D(6FM200)	6FM150D(6FM150)	6FM120D(6FM120)	6FM100D(6FM100)
Short-circuit: (A)	3217,23	2642,45	2176,52	2085,37
Resistance: (m Ω)	3,461	3,623	4,137	4,912
Type	6FM80D(6FM80)	6FM65	---	---
No.		b1#	---	---
Short-circuit: (A)	1892,84	2100	---	---
Resistance: (m Ω)	5,325	0,0058	---	---

**Table4 6.11 Discharge capacity**

No.	6FM200D (6FM200)	6FM150D(6FM150)	6FM120D(6FM120)	6FM100D(6FM100)	6FM80D(6FM80)
C <sub>10</sub> (Ah)	210,074	157,158	128,793	110,507	83,687
C <sub>10</sub> /C <sub>rt</sub> × 100%	112,33	109,90	113,97	116,32	110,69
C <sub>8</sub> (Ah)	175	132	106	88	70
C <sub>8</sub> /C <sub>rt</sub> × 100%	102,94	103,52	103,92	103,52	102,94
C <sub>3</sub> (Ah)	154,5	116,3	93,4	78	68,9
C <sub>3</sub> /C <sub>rt</sub> × 100%	103	103,37	103,77	104	114,83
C(Ah)	132	100	74	67	46,8
C/C <sub>rt</sub> × 100%	/	/	/	108,76	97,70
C <sub>0.25</sub> (Ah)	92,7	69,8	48,0	46,8	37,1
C <sub>0.25</sub> /C <sub>rt</sub> ×100%	/	/	/	/	/

IEC 60896-21:2004 IEC 60896-22:2002			
Cl.	Requirement – Test	Result	Verdict

Type	6FM40 (6FM40X)					CG12-120(CG12-120A)					CG12-175(CG12-175A)				
C No	C <sub>10</sub> (Ah)	C <sub>8</sub> (Ah)	C <sub>3</sub> (Ah)	C (Ah)	C <sub>0.2</sub> 5 (Ah)	C <sub>10</sub> (Ah)	C <sub>8</sub> (Ah)	C <sub>3</sub> (Ah)	C (Ah)	C <sub>0.2</sub> 5 (Ah)	C <sub>10</sub> (Ah)	C <sub>8</sub> (Ah)	C <sub>3</sub> (Ah)	C (Ah)	C <sub>0.2</sub> 5 (Ah)
Crt	40,7	38,48	30,6	25,9	18,32	100	92,8	71,1	63	41,75	150	139,5	124,8	106	77,25
1 #	41,4	39,5	31,4	26,7	19,1	97	91	69	61,8	41	145,5	137	123	104,3	76
2 #	41,5	39,4	31,5	26,8	19,2	96	91	69,4	61,8	41	145	136,8	122,5	104	76
3 #	41,3	39,3	31,6	26,9	19,2	98	90,8	69	62	41	146	136,8	123	104,1	76
%of Crt															
1 #	101,7	102,7	102,6	103,0	104,2	97	98	97	98	98,2	97	98,2	98,5	98,4	98,3
2 #	102,0	102,4	102,9	103,4	104,7	96	98	97,6	98	98,2	96,7	98	98,1	98,1	98,6
3 #	101,5	102,1	103,2	103,8	104,7	98	97,8	97	98,4	98,2	97,3	98	98,5	98,2	98,3
Type	CG12-230(CG12-230A)					6FM65					---				
C No	C <sub>10</sub> (Ah)	C <sub>8</sub> (Ah)	C <sub>3</sub> (Ah)	C (Ah)	C <sub>0.2</sub> 5 (Ah)	C <sub>10</sub> (Ah)	C <sub>8</sub> (Ah)	C <sub>3</sub> (Ah)	C (Ah)	C <sub>0.2</sub> 5 (Ah)	C <sub>10</sub> (Ah)	C <sub>8</sub> (Ah)	C <sub>3</sub> (Ah)	C (Ah)	C <sub>0.2</sub> 5 (Ah)
Crt	200	186	173,4	146,5	83	65,0	62,0	50,7	44,2	31,2	---	---	---	---	---
1 #	194	182	170,3	143,6	82	65,9	63,2	51,9	45,6	32,3	---	---	---	---	---
2 #	193	182,5	170,5	144	81,5	65,8	63,1	52,1	45,7	32,2	---	---	---	---	---
3 #	195	182,3	170	144,2	81,8	66,0	63,3	52,0	45,6	32,4	---	---	---	---	---
%of Crt															
1 #	97	97,8	98,2	98	98,7	101,4	101,9	102,4	103,2	103,5	---	---	---	---	---
2 #	96,5	98,1	98,3	98,3	98,2	101,2	101,8	102,7	103,4	103,2	---	---	---	---	---
3 #	97,5	98	98,2	98,4	98,5	101,5	102,1	102,5	103,2	103,8	---	---	---	---	---

## 注 意 事 项 Important

1. 报告无检验单位公章无效。  
The test report is invalid without the official stamp of CVC,
2. 未经本试验室书面同意, 不得部分地复制本报告。  
Any photocopies or part photocopies of the test report are forbidden without the written permission from CVC,
3. 报告无负责人、审核人签名无效。  
The test report is invalid without the signatures of Author and Reviewer,
4. 报告涂改无效。  
The test report is invalid if altered,
5. 对检验报告若有异议, 应于收到报告之日起十五天内向检验单位提出。  
Objections to the test report must be submitted to CVC within 15 days,
6. 一般情况, 委托检验仅对来样负责。  
Generally, commission test is responsible for the tested samples only,
7. 检验结果中“N”表示“不适用”, “P”表示“通过”, “F”表示“不通过”。  
As for the test result, “N” means “not applicable”, “P” means “pass” and “F” means “fail”,

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