

TEST REPORT IEC/EN 60896 Stationary lead-acid batteries — Part 21: Valve regulated types — Methods of test Part 22: Valve regulated types — Requirements	
Report Reference No	130800630SHA-001
Date of issue	2013-10-31 Amendment 2, 2020-07-31
Total number of pages	16
Testing Laboratory	Intertek Testing Services Shanghai
Address	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
Applicant's name	Shanghai C&D Battery Co., Ltd.
Address	No.55 LianDu Road, Fengxian, Shanghai 201419, P. R. China
Test specification:	
Standard	IEC/EN 60896-21:2004, IEC/EN 60896-22:2004
Test procedure	SONCVG.2137
Non-standard test method.....	N/A
Test Report Form No	TTRF_EN60896_A
Test Report Form(s) Originator	Intertek ETL SEMKO shanghai
Master TRF	Dated 2010-11
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Test item description	Lead acid battery
Trade Mark	
Manufacturer	Shanghai C&D Battery Co., Ltd.
Model/Type reference	TEL Series, LBT/MPS Series, DNT/MRX Series (See page 4 and 5 for detailed model names)
Ratings	12V, 7Ah~254Ah (C20)

Testing procedure and testing location:	
<input checked="" type="checkbox"/> Testing Laboratory:	Intertek Testing Services Shanghai
Testing location/ address	Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
Tested by (name + signature)	William Liu 
Approved by (+ signature).....	Sleif Sui 
<input type="checkbox"/> Testing procedure: TMP	
Tested by (name + signature)	
Approved by (+ signature).....	
Testing location/ address	
<input type="checkbox"/> Testing procedure: WMT	
Tested by (name + signature)	
Witnessed by (+ signature)	
Approved by (+ signature).....	
Testing location/ address	
<input type="checkbox"/> Testing procedure: SMT	
Tested by (name + signature)	
Approved by (+ signature).....	
Supervised by (+ signature)	
Testing location/ address	
<input type="checkbox"/> Testing procedure: RMT	
Tested by (name + signature)	
Approved by (+ signature).....	
Supervised by (+ signature)	
Testing location/ address	

Copy of marking plate

90x50mm

C&D[®] TECHNOLOGIES
C&D 12-7A LBT

== ISO 9001 ==



VRLA 12Volts 7Ah
(20 hour rate to 1.75VPC@25°C)

IEC Rating:6.5Ah
(10 hour rate to 1.80VPC@20°C)

Float Charge Voltage:
13.7 to 13.9VDC@25°C

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400-678-3721

== ISO 14001 ==



Pb



C&D TECHNOLOGIES, INC.®

C&D 12-100 LBT

== ISO9001 ==



VRLA 12Volts 100Ah
(20hour rate to 1.75VPC @ 25°C)

IEC Rating:86Ah
(10hour rate to 1.80VPC @ 20°C)

Float Charge Voltage:
13.5 to 13.8VDC @ 25°C

Terminal Hardware Torque:
65in.-lbs.(7.4N-m)

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== ISO14001 ==



Pb





TEL12-150TFA

QUALITY MANAGEMENT SYSTEM
CERTIFIED BY CQC
= ISO 9001/TL 9000 =
= ISO 14001 =



**PROPOSITION 65
WARNING**

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

**C&D TRUE
FRONT
ACCESS®**

C&D® TECHNOLOGIES **TEL**

TEL12-150TFA

12 Volts 150 Ah IEC Rating: 147 Ah
10 hour rate to 1.80VPC @77°F(25°C) 10 hour rate to 1.80VPC @68°F(20°C)

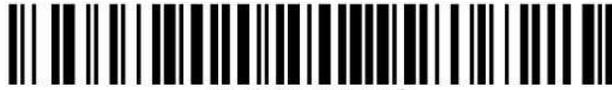
Terminal Hardware Torque: 160 in. - lbs. (18.0 N-m)
Float Charge Voltage 13.5 to 13.8 VDC @77°F(25°C)

Midtronics
1120 Mhos

**NON-SPILLABLE VRLA
C&D OHMIC RING®**

VENTILATE WELL WHEN IN AN ENCLOSED SPACE AND WHEN CHARGING.
SEE INSTALLATION, MAINTENANCE AND OPERATION INSTRUCTIONS FOR IMPORTANT SAFETY PRECAUTIONS.

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TEL12-170FG

QUALITY MANAGEMENT SYSTEM
CERTIFIED BY CQC
= ISO 9001/TL 9000 =
= ISO 14001 =



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WARNING**

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TEL12-170FG

Nominal 8 Hr Rate
12 Volts 169 Ah
1.75 VPC@77°F(25°C)

IEC Rating: 169 Ah
10 hour rate to 1.80VPC
@68°F(20°C)

Terminal Hardware Torque:
160 in. - lbs. (18.0 N-m)

Float Charge Voltage
13.5 to 13.8 VDC
@77°F(25°C)

Midtronics
1400 Mhos

**NON-SPILLABLE VRLA
C&D OHMIC RING®**

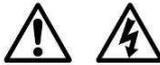
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SPH00065



TEL12-210FGC

QUALITY MANAGEMENT SYSTEM
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== ISO 9001 / TL 9000 ==
== ISO 14001 ==



**PROPOSITION 65
WARNING**

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TECHNOLOGY

C&D TECHNOLOGIES, INC.® TEL-C

TEL 12-210FGC

Nominal 8 Hr Rate 12 Volts 176 Ah 1.75 VPC@77°F(25°C)	IEC Rating: 176 Ah 10 hour rate to 1.80VPC @68°F(20°C)
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Terminal Hardware Torque: 160 in. - lbs. (18 N-m)	Cycle Charge Voltage 14.4 to 14.8 VDC @77°F(25°C)
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Midtronics 1500 Mhos	Float Charge Voltage 13.5 to 13.8 VDC @77°F(25°C)
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200x100mm

C&D TECHNOLOGIES, INC.®
C&D 12 - 242A LBT

==ISO9001==



VRLA 12Volts 242Ah
(20 hour rate to 1.75VPC@25°C)
IEC Rating: 225Ah
(10 hour rate to 1.80VPC@20°C)

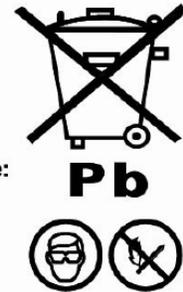
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Float Charge Voltage:
13.6 to 13.8VDC@25°C

Terminal Hardware Torque:
89in.- lbs.(10.0N-m)

Made in China
400-678-3721

==ISO14001==



C&D TECHNOLOGIES®
C&D 12-370 DNT

==ISO9001==



12Volts 102Ah
(20 hour rate to 1.75 VPC@25°C)
370 WPC
(15minuterate to 1.67VPC @25°C)
IEC Rating:90Ah
(10 hour rate to 1.80 VPC@20°C)
Float Charge Voltage:
13.5 to 13.8 VDC@25°C
Terminal Hardware Torque:
110in. -lbs.(12.4 N-m)
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400-678-3721

==ISO14001==



Note1: The first two digital in production code stand for production year, the third digital stands for production month which is from letter A (January) to M (December) and the forth and fifth digital stand for production day.

Note2: The labels listed in above are for example, other models have similar label but with different capacity and model name.

Model list:

TEL Series

Model 1	Model 2		AH, C8, 1.75V@ 25°C
TEL 12-100 TFA	<i>TEL 12-100F HT</i>		100
TEL 12-105 TFA	<i>TEL 12-105F HT</i>	<i>TEL 12-115FHT</i>	104
TEL 12-150 TFA	<i>TEL 12-150F HT</i>		148
TEL 12-165 TFA	<i>TEL 12-165F HT</i>	<i>TEL 12-155FHT</i>	162
TEL 12-185 TFA	<i>TEL 12-185F HT</i>	<i>TEL 12-180FHT</i>	183
TEL 12- 200 TFA	<i>TEL 12-200F HT</i>	<i>TEL 12-200FHT</i>	195
TEL 12-105FNSG	<i>TEL 12-105FG HT</i>	<i>TEL 12-105FHTG</i>	100
TEL 12-115FNG	<i>TEL 12-115 FG HT</i>		104
TEL 12-155FG	<i>TEL 12-150 FG HT</i>		148
TEL 12-170FG	<i>TEL 12-165 FG HT</i>	<i>TEL 12-170FGHT</i>	162
TEL 12-190FG	<i>TEL 12-185 FG HT</i>		183
TEL 12-210FG	<i>TEL 12-200 FG HT</i>		195
TEL 12-105 FNSGC			88
TEL 12-115 FNGC	<i>TEL12-100 FGC HT</i>		91
TEL 12-170 FGC	<i>TEL12-150 FGC HT</i>		139
TEL 12-210FGC	<i>TEL12-200 FGC HT</i>		169

LBT/MPS/TEL Series

Model 1	Model 2	Model 3	Model 4	AH, C20, 1.75V@ 25°C
C&D 12-7A LBT	MPS 12-7A			7
C&D 12-7 LBT	MPS 12-7			7
C&D 12-9A LBT	MPS 12-9A			9
C&D 12-9 LBT	MPS 12-9			9
C&D 12-12A LBT	MPS 12-12A			12
C&D 12-12 LBT	MPS 12-12			12
C&D 12-18A LBT	MPS 12-18A			18
C&D 12-18 LBT	MPS 12-18			18
C&D 12-26A LBT	MPS 12-26A			26
C&D 12-26 LBT	MPS 12-26			26
C&D 12-40N LBT	MPS 12-40N	<i>CPS 12-40</i>	<i>TEL 12-30 HT</i>	40
C&D 12-54 LBT	MPS 12-54	<i>CPS 12-54</i>	<i>TEL 12-45 HT</i>	54
C&D 12-65N LBT	MPS 12-65N	<i>CPS 12-65N</i>		65
C&D 12-76 LBT	MPS 12-76	<i>CPS 12-76</i>	<i>TEL 12-70 HT</i>	76
C&D 12-88 LBT	MPS 12-88	<i>CPS 12-88</i>	<i>TEL 12-80 HT</i>	88
C&D 12-100 LBT	MPS 12-100	<i>CPS 12-100</i>	<i>TEL 12-100 HT</i>	100
C&D 12-114 LBT	MPS 12-114	<i>CPS 12-114</i>	<i>TEL 12-110 HT</i>	114
C&D 12-120 LBT	MPS 12-120	<i>CPS 12-120</i>	<i>TEL 12-125HT</i>	120

LBT/MPS/TEL Series

Model 1	Model 2	Model 3	Model 4	AH, C20, 1.75V@ 25°C
C&D 12-127A LBT	MPS 12-127A			127
C&D 12-150 LBT	MPS 12-150	CPS 12-150		150
C&D 12-158A LBT	MPS 12-158A			158
C&D 12-200 LBT	MPS 12-200	CPS 12-200		200
C&D 12-211A LBT	MPS 12-211A			211
C&D 12-240 LBT	MPS 12-240	CPS 12-240		240
C&D 12-242A LBT	MPS 12-242A			242

DNT/MRX/PLP/CPHS Series

Model 1	Model 2	Model 3	Model 4	AH, C20, 1.75V @ 25°C
C&D 12-25A DNT				7
C&D 12-65A DNT				18
C&D 12-28 DNT	UPS 12-28 MRX			8
C&D 12-34 DNT	UPS 12-34 MRX			7.8
C&D 12-43 DNT	UPS 12-43 MRX			12
C&D 12-72 DNT	UPS 12-72 MRX			18.8
C&D 12-100S DNT	UPS 12-100S MRX			27
C&D 12-100 DNT	UPS 12-100 MRX		CPHS 12-100	34
C&D 12-130 DNT	UPS 12-130 MRX		CPHS 12-130	36
C&D 12-150 DNT	UPS 12-150 MRX		CPHS 12-150	36
C&D 12-200 DNT	UPS 12-200 MRX		CPHS 12-200	56
C&D 12-220 DNT	UPS 12-220 MRX		CPHS 12-220	56
C&D 12-280 DNT	UPS 12-280 MRX		CPHS 12-280	84
C&D 12-320 DNT	UPS 12-320 MRX	UPS 12-3300 PLP	CPHS 12-320	84
C&D 12-370 DNT	UPS 12-370 MRX	UPS 12-3800 PLP	CPHS 12-370	102
C&D 12-400 DNT	UPS 12-400 MRX	UPS 12-4000 PLP	CPHS 12-400	110
C&D 12-440 DNT	UPS 12-440 MRX	UPS 12-4300 PLP	CPHS 12-440	120
C&D 12-475 DNT	UPS 12-475 MRX	UPS 12-4700 PLP	CPHS 12-475	114
C&D 12-490 DNT	UPS 12-490 MRX	UPS 12-4800 PLP	CPHS 12-490	150
C&D 12-520 DNT	UPS 12-520 MRX	UPS 12-5300 PLP	CPHS 12-520	154
C&D 12-550 DNT	UPS 12-550 MRX	UPS 12-5400 PLP	CPHS 12-550	154
C&D 12-600 DNT	UPS 12-600 MRX	UPS 12-5800 PLP	CPHS 12-600	148
C&D 12-630 DNT	UPS 12-630 MRX	UPS 12-6300 PLP	CPHS 12-630	140
C&D 12-675A DNT				236
C&D 12-775A DNT				248
C&D 12-700 DNT	UPS 12-700 MRX			228
C&D 12-720 DNT	UPS 12-720 MRX			234
C&D 12-800 DNT	UPS 12-800 MRX			226

DNT/MRX/PLP/CPHS Series

Model 1	Model 2	Model 3	Model 4	AH, C20, 1.75V @ 25°C
C&D 12-830 DNT	UPS 12-830 MRX			236
	UPS 12-410 MRXF	UPS 12-4200F PLP		109
	UPS 12-515 MRXF			160
	UPS 12-615 MRXF	UPS 12-6200F PLP	CPHS 12-615	172
	UPS 12-700 MRXF	UPS 12-6800F PLP	CPHS 12-700	201
	UPS 12-830 MRXF	UPS 12-8000F PLP		251
	UPS 12-1000 MRXF	UPS 12-9200F PLP		254

<p>Possible test case verdicts:</p> <ul style="list-style-type: none"> - test case does not apply to the test object.....: N/A - test object does meet the requirement.....: P (Pass) - test object does not meet the requirement.....: F (Fail)
<p>Testing</p> <p>Date of receipt of test item: 2020-07-23</p> <p>Date (s) of performance of tests: 2020-07-23 to 2020-07-30</p>
<p>General remarks:</p> <p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a point is used as the decimal separator.</p> <p>Throughout this report, model C&D 12-7A LBT, C&D 12-100 LBT, TEL 12-150 TFA, TEL 12-170 FGC, TEL 12-210 FGC, C&D 12-242A LBT and C&D 12-370 DNT are tested as typical models according the construction and component of batteries.</p> <p>The tests covered by this report were performed according Nigeria safety standard SONCVG.2137. Only the clauses specified in this standard were considered.</p>
<p>General product information:</p> <p>The products are 12V valve regulated type stationary lead-acid batteries. All batteries are divided into TEL Series, LBT/MPS Series and DNT/MRX Series.</p>

Amendment 1:

The original Test Report Ref. No. 130800630SHA-001 dated on 2013-10-31 was modified on 2019-01-25 to include the following addition:

1. Add models, see page 9 to 11, remark with Bold
2. Do the testing 6.2 and 6.3 for typical model of UPS 12-830 MRXF and C&D 12-240 LBT

After review, no test was considered necessary.

Clauses concerned.....: 6.2 and 6.3

Amendment 2:

The original Test Report Ref. No. 130800630SHA-001 dated on 2013-10-31 was modified on 2020-07-23 to include the following addition:

1. Add models, see page 9 to 11, remark with Bold
2. Do the testing 6.2 and 6.3 for typical model of UPS 12-4700 PLP and TEL 12-185F HT

After review, no test was considered necessary.

Clauses concerned.....: 6.2 and 6.3

EC 60896-21:2004, IEC 60896-22:2004

Table 6.2	High current tolerance			Verdict:	Pass
Test method:					
<p>Each battery has an actual capacity $C_a \geq C_3$ and was fully charged.</p> <ol style="list-style-type: none"> The test units shall be discharged for 30 s with a current equal to 3 times the 5 min rate current (to U_{final} 1.80 V_{pc} at 20 °C or 25 °C) or with a current equal to the maximum allowable discharge current, both as specified by the manufacturer in the relevant technical documentation of the product range. After the completion of the specified discharge duration, the test units shall stand for 5 min in open circuit and their voltage measured and reported. 					
Test result:					
Sample NO.	10#	11#	12#	Remark	
Discharge current =(54.9 A、 607.2 A、 716.7A、 840.3A、 853.8 A、 1358.4A、 944.4 A) ($U_{final}=1.80V_{pc}$)				Discharge/30s	
The battery status after large current	No terminal melting; No stripe melting; Exterior appearance normal;	No terminal melting; No stripe melting; Exterior appearance normal;	No terminal melting; No stripe melting; Exterior appearance normal;		
Voltage after open circuit for 5min (V)	13.133	13.111	13.141	C&D 12-7A LBT	
Voltage after open circuit for 5min (V)	13.059	13.052	13.038	C&D 12-100 LBT	
Voltage after open circuit for 5min (V)	12.929	12.931	12.943	TEL 12-150 TFA	
Voltage after open circuit for 5min (V)	12.975	12.985	12.985	TEL 12-170 FGC	
Voltage after open circuit for 5min (V)	12.966	12.956	12.964	TEL 12-210 FGC	
Voltage after open circuit for 5min (V)	13.032	13.046	13.034	C&D 12-242A LBT	
Voltage after open circuit for 5min (V)	12.913	12.932	12.931	C&D 12-370 DNT	
Voltage after open circuit for 5min (V)	12.920	12.912	12.890	C&D 12-240 LBT	
Voltage after open circuit for 5min (V)	12.915	12.930	12.915	UPS 12-830 MRXF	
Voltage after open circuit for 5min (V)	12.926	12.930	12.935	TEL 12-185F HT	
Voltage after open circuit for 5min (V)	12.851	12.858	12.854	UPS 12-4700 PLP	

EC 60896-21:2004, IEC 60896-22:2004

Table 6.3	Short-circuit current and d.c. internal resistance	Verdict:	Pass
Test method:			
<p>Each battery has an actual capacity $C_a \geq C_3$ and was fully charged.</p> <p>1. The short circuit current shall be defined by determining two data pairs in the following way:</p> <p>a) First data pair (U_a, I_a) After 20 s of discharge at the current $I_a = 4 \times I_{10}$, the voltage and current shall be recorded to give the first data pair. The current shall be interrupted after 25 s maximum and, without recharge and after an open circuit stand of 5 min, the second data pair shall be determined.</p> <p>b) Second data pairs (U_b, I_b) After 5 s of discharge at the current $I_b = 20 \times I_{10}$, the voltage and current shall be recorded to give the second data pair.</p> <p>2. Short circuit current $I_{sc} = [(U_a \times I_b) - (U_b \times I_a)] / (U_a - U_b)$ in amperes</p> <p>Internal resistance $R_i = (U_a - U_b) / (I_b - I_a)$ in ohms</p>			

Test result:								
Model name:	Sample No:	I_a (A)	U_a (V)	I_b (A)	U_b (V)	Short circuit current I_{sc} (A)	Internal resistance R_i (m Ω)	Remark
C&D 12-7A LBT	1#	2.68	12.587	13.4	12.083	270.4	47.0	Actual capacity $C_a > C_3$
	2#	2.68	12.558	13.4	12.034	259.6	48.9	
	3#	2.68	12.603	13.4	12.089	265.5	47.9	
C&D 12-100 LBT	1#	35.52	12.197	177.6	11.455	2371.3	5.2	Actual capacity $C_a > C_3$
	2#	35.52	12.217	177.6	11.466	2347.1	5.3	
	3#	35.52	12.182	177.6	11.437	2359.1	5.2	
TEL 12-150 TFA	1#	60.0	12.163	300.0	10.815	2225.5	5.6	Actual capacity $C_a > C_3$
	2#	60.0	12.139	300.0	10.735	2135.0	5.8	
	3#	60.0	12.105	300.0	10.753	2208.8	5.6	
TEL 12-170 FGC	1#	66.4	12.426	332.0	11.006	2390.6	5.3	Actual capacity $C_a > C_3$
	2#	66.4	12.442	332.0	11.011	2375.7	5.4	

EC 60896-21:2004, IEC 60896-22:2004

Test result:								
Model name:	Sample No:	Ia (A)	Ua (V)	Ib (A)	Ub (V)	Short circuit current I _{sc} (A)	Internal resistance Ri (mΩ)	Remark
	3#	66.4	12.427	332.0	11.012	2399.0	5.3	
TEL 12-210 FGC	1#	68.8	12.387	344.0	11.074	2665.1	4.8	Actual capacity Ca > C ₃
	2#	68.8	12.354	344.0	11.045	2666.1	4.8	
	3#	68.8	12.337	344.0	11.030	2666.5	4.7	
C&D 12-242A LBT	1#	92.84	12.301	464.2	11.163	4107.4	3.1	Actual capacity Ca > C ₃
	2#	92.84	12.313	464.2	11.195	4185.2	3.0	
	3#	92.84	12.295	464.2	11.170	4151.8	3.0	
C&D 12-370 DNT	1#	36.96	12.382	184.8	11.771	3032.2	4.1	Actual capacity Ca > C ₃
	2#	36.96	12.379	184.8	11.759	2988.0	4.2	
	3#	36.96	12.368	184.8	11.749	2990.1	4.2	
C&D 12-240 LBT	1#	88.98	12.414	444.8	11.638	5781.5	2.2	Actual capacity Ca > C ₃
	2#	88.98	12.141	444.8	11.384	5796.0	2.1	
	3#	88.98	12.088	444.8	11.296	5520.0	2.2	
UPS 12-830 MRXF	1#	96.4	12.175	472	11.479	6699.7	1.8	Actual capacity Ca > C ₃
	2#	96.4	12.146	472	11.416	6377.0	1.9	
	3#	96.4	12.173	472	11.486	6785.1	1.8	

EC 60896-21:2004, IEC 60896-22:2004

Test result:								
Model name:	Sample No:	Ia (A)	Ua (V)	Ib (A)	Ub (V)	Short circuit current I _{sc} (A)	Internal resistance Ri (mΩ)	Remark
TEL 12-185F HT	1#	73.6	12.048	368	10.747	2800	4.42	Actual capacity Ca > C ₃
	2#	73.6	12.042	368	10.753	2824	4.38	
	3#	73.6	12.066	368	10.777	2829	4.38	
UPS 12-4700 PLP	1#	42.4	12.327	212	11.761	3736	3.34	Actual capacity Ca > C ₃
	2#	42.4	12.304	212	11.735	3710	3.35	
	3#	42.4	12.275	212	11.728	3848	3.23	