

ODYSSEY™
THE EXTREME BATTERY

The ODYSSEY® Advantage



An Introduction into TPPL
Technology



What is ODYSSEY[®]?

- Patented Pure Lead maintenance free technology
- Up to 3 x higher power than conventional lead acid batteries
- World's first high cranking and true deep cycle battery
- Low self discharge
- Long life

The ODYSSEY Advantage

- Technical Highlights
 - High purity system 99.99% pure lead
 - Unique manufacturing process
 - High surface area
 - Low internal resistance

The ODYSSEY Advantage

- Application benefits
 - Long shelf life (2 years at 20°C)
 - Extremely high energy and power density
 - Superb engine start performance – even at low state of charge
 - Deep discharge cycling and engine start
 - High resistance to vibration
 - Classified non spillable & non hazardous for transportation

The ODYSSEY Advantage

Where does the power come from?

- Battery power is a function of lead plate surface area
- Odyssey Batteries have more plates because of the thin plate pure lead technology
- ODYSSEY thin plate technology = more plates in each 2 Volt cell
- Result = more cranking Amps & superior power & energy density
- Terminals are designed to optimally pulled as much energy as possible; at the time of need.
 - Thicker posts with Brass inserts

The ODYSSEY Advantage

- ENERSYS
MANUFACTURING
PROCESS ALLOWS
PROCESSING OF
PURE LEAD
- GRID RESULT : 1mm
THIN



The ODYSSEY Advantage

- CONVENTIONAL BATTERY BOOKMOLD CASTING REQUIRES ARTIFICIAL HARDENERS TO PROCESS
- GRID RESULT : 2 - 4 mm **THICK**



Traditional PbCa

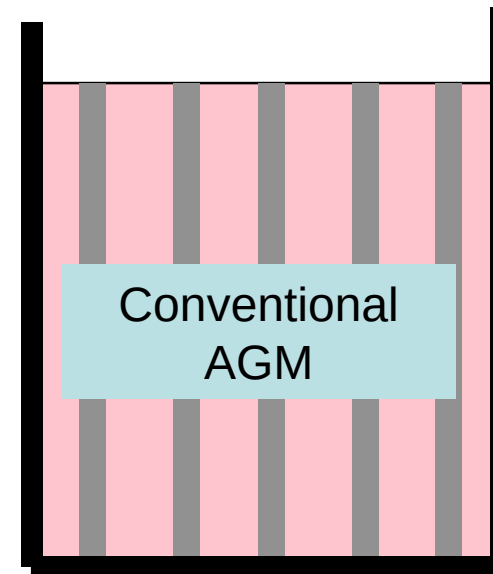
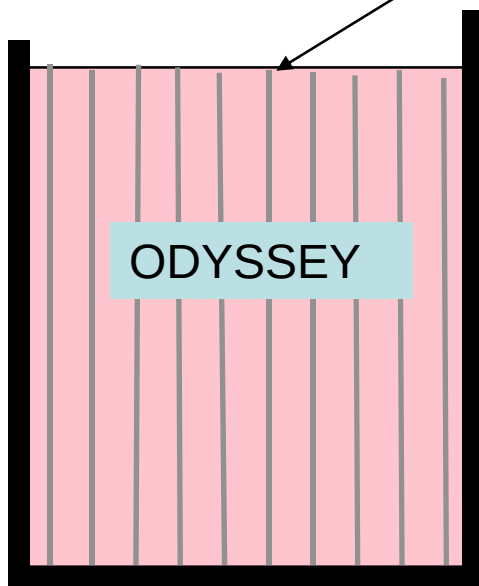
Odyssey the Advantages – State of the art design & manufacture

ENERSYS MANUFACTURING
PROCESS ALLOWS PROCESSING OF PURE
LEAD GRID RESULT : 1mm **THIN**

CONVENTIONAL BATTERY BOOKMOLD
CASTING REQUIRES ARTIFICIAL HARDENERS
TO PROCESS GRID

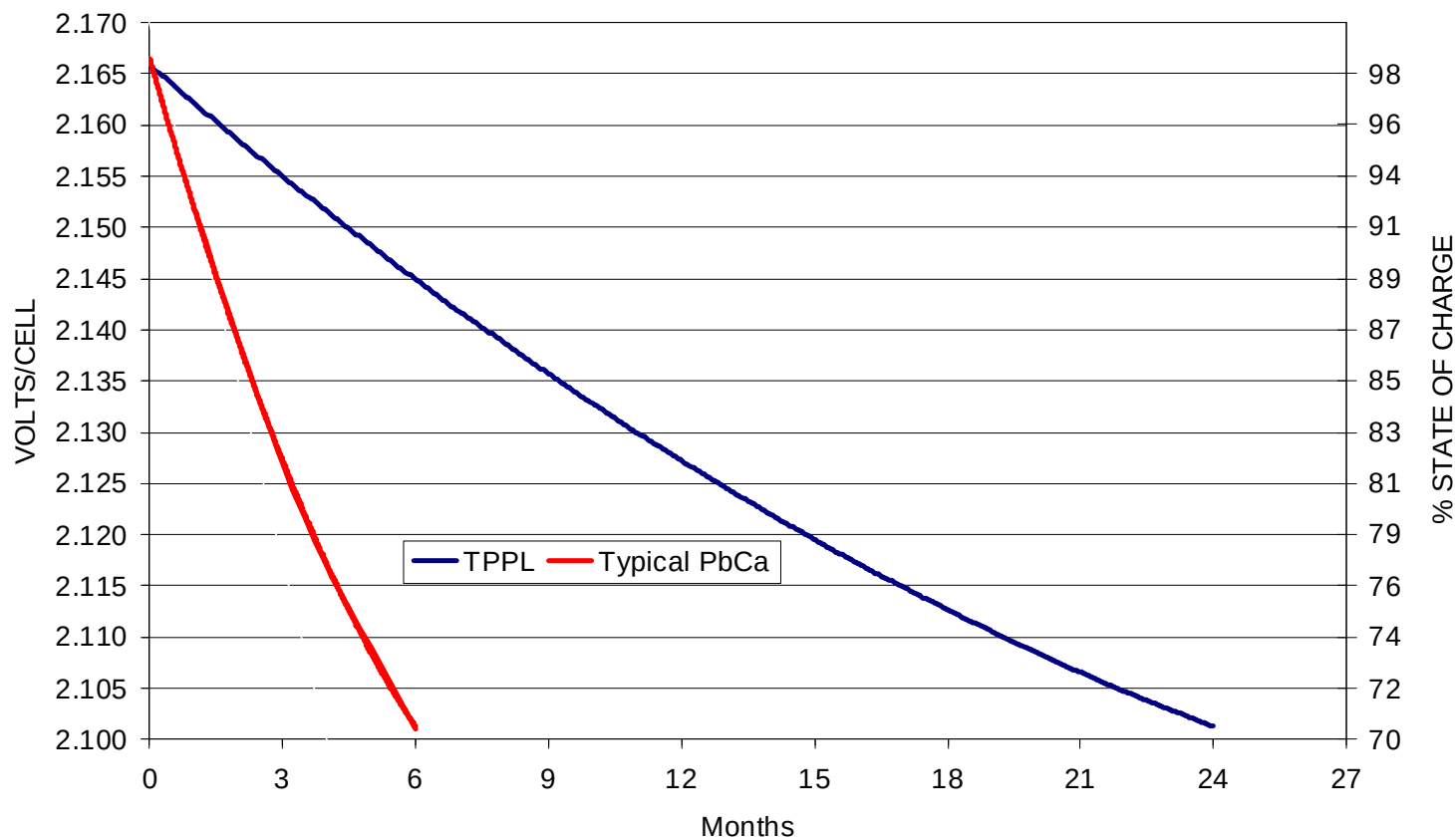
RESULT : 2 - 4 mm **THICK**

ODYSSEY THIN PLATE TECHNOLOGY = MORE PLATES IN EACH 2 VOLT CELL
RESULT = MORE CRANKING AMPS & SUPERIOR POWER & ENERGY DENSITY



The ODYSSEY Advantage – Long Storage

AVAILABLE CAPACITY AS A FUNCTION OF OPEN CIRCUIT VOLTAGE
DURING STORAGE @ 20 DEGREES CELSIUS



The ODYSSEY Advantage

More Power packed into a smaller design

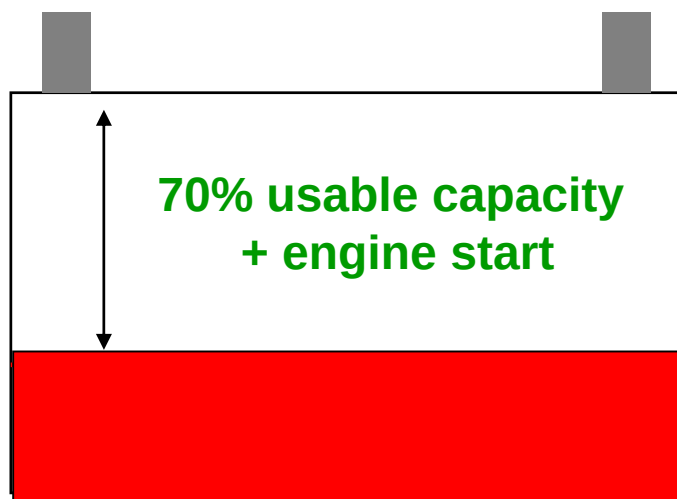
- Today's vehicles are not designed for 30 seconds of continuous cranking. Starter motors would overheat and fail.
- ODYSSEY'S thin flat-plate pure-lead grid system allows more plates per cell compartment and service life's up to three times that of conventional batteries.
- Thin plates provide 5 second cranking power that can be up to 60% greater than equally sized conventional batteries. For equivalent power, physically smaller ODYSSEY batteries can be used to reduce the size and weight.
- Battery model numbers represent the 5 second cranking rating, I.e., PC 1200MJT is 1200 cranking amps at 27°C.



Odyssey the Advantages – Usable capacity

Odyssey Battery

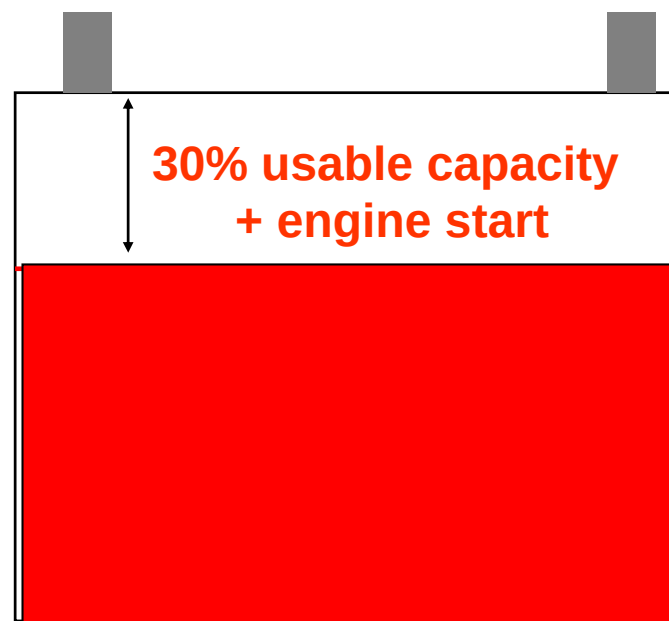
1200A 5 second PCA
92 min. reserve
64 min. usable reserve



Odyssey represents a 20% weight reduction like for like capacity

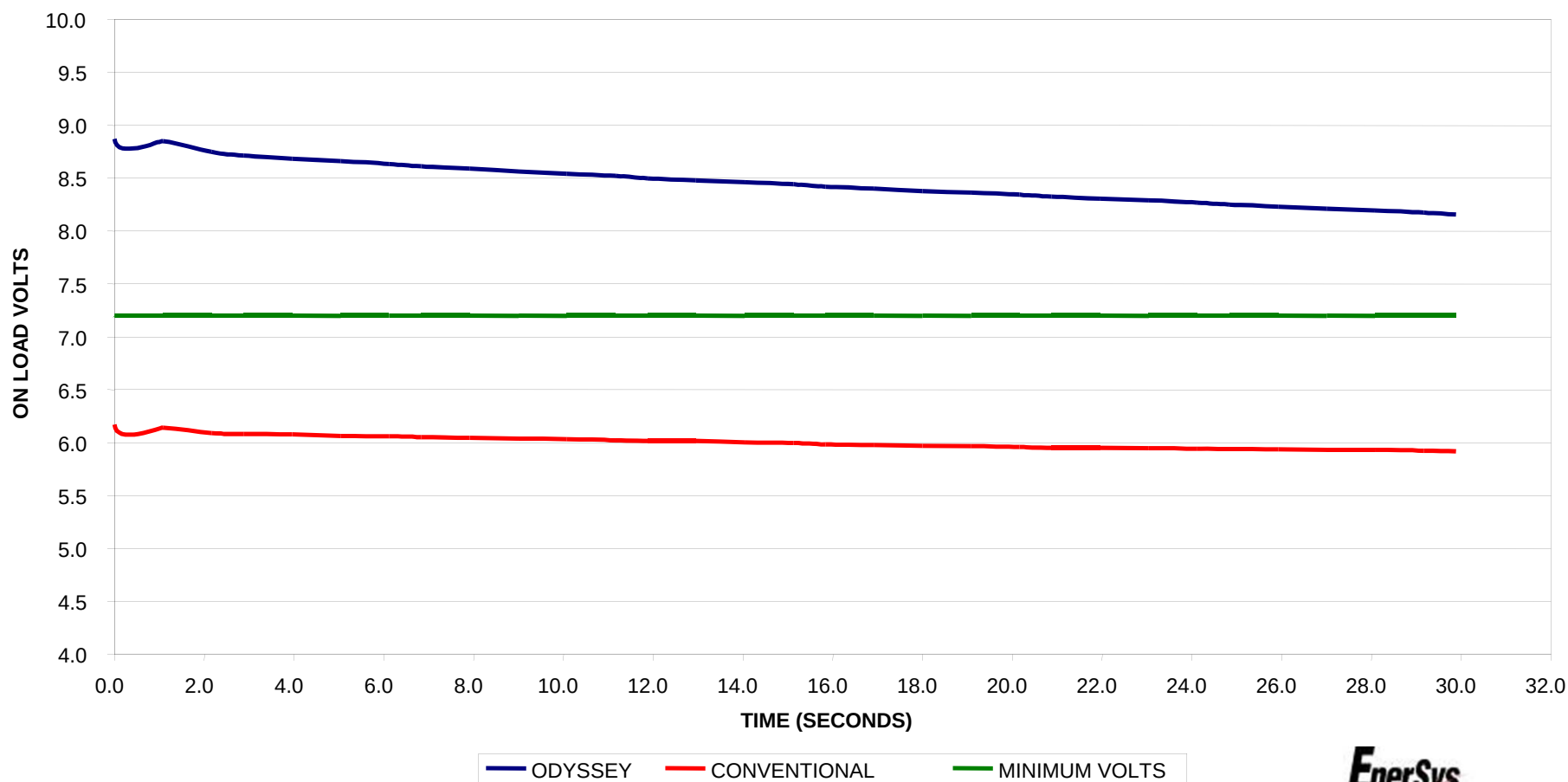
Conventional Battery

1180A 5 second PCA
94 minute reserve
28 min. usable reserve



The ODYSSEY Advantage – Engine Start

30 second crank @ -18°C
Compare Odyssey & Conventional AGM

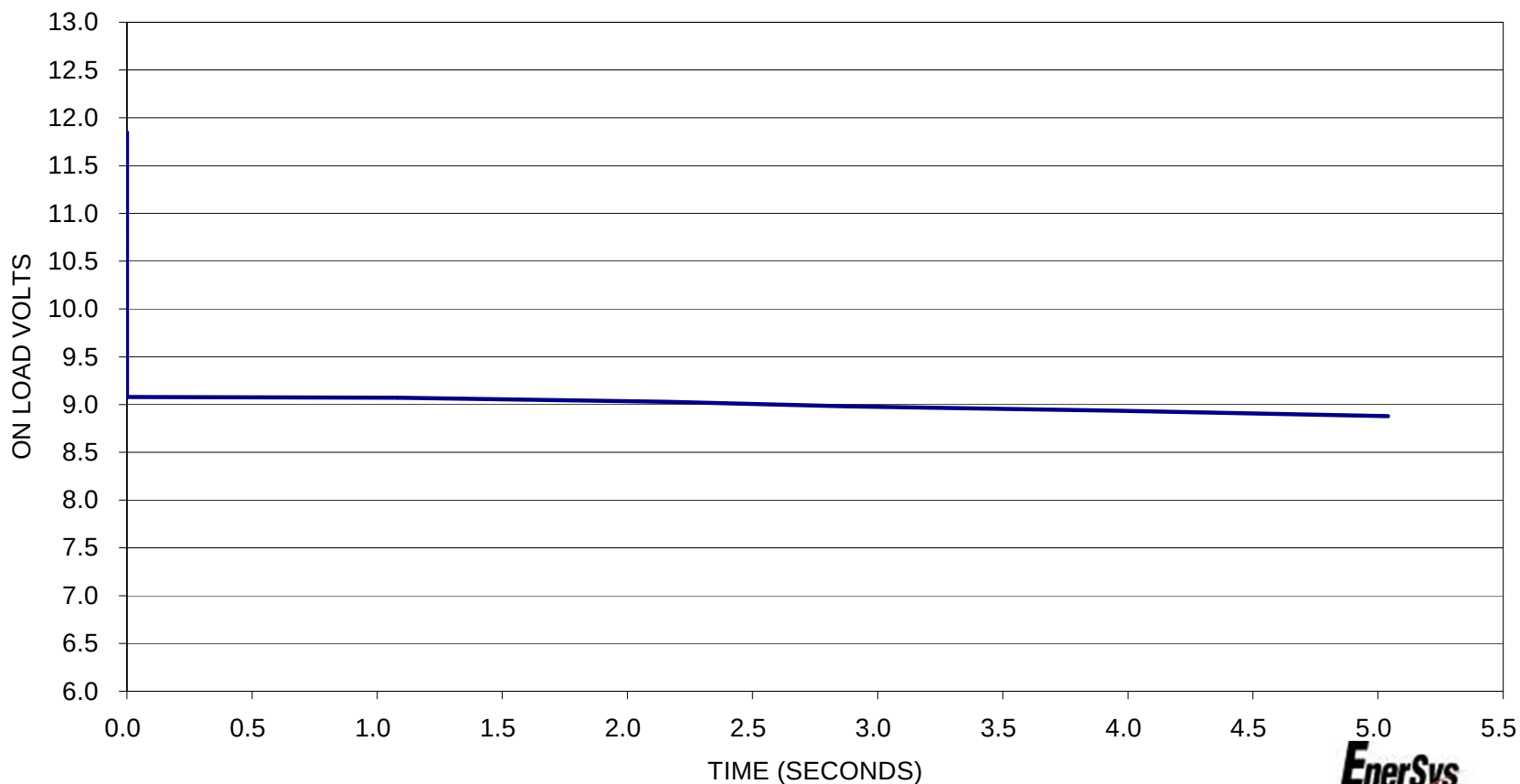




The ODYSSEY Advantage

Engine start at low state of charge

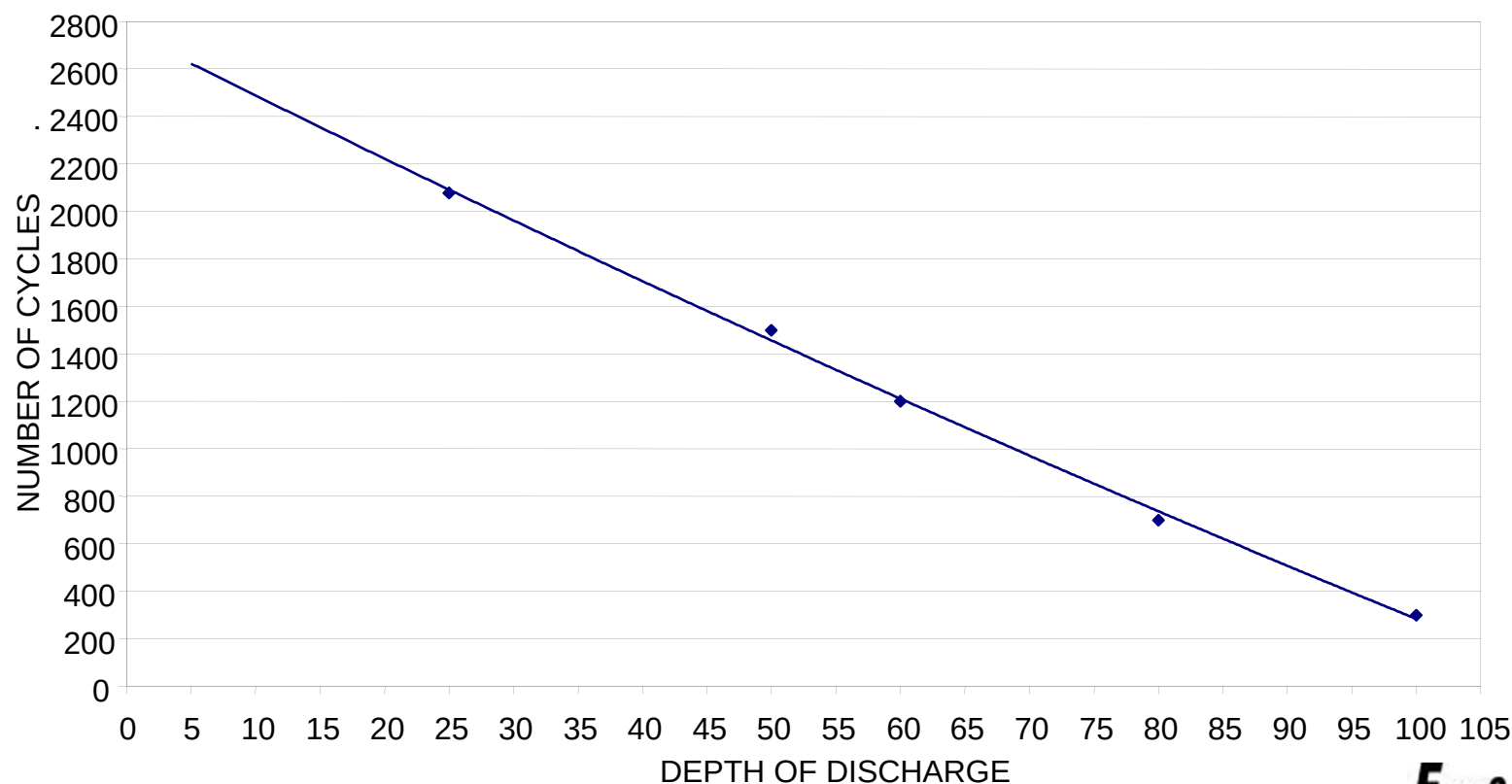
ODYSSEY BATTERY, CRANKING CAPABILITY @ LOW STATE OF CHARGE.
DISCHARGE 5 SECONDS AT 5 * C20 AMPS @ 30% STATE OF CHARGE



The ODYSSEY Advantage

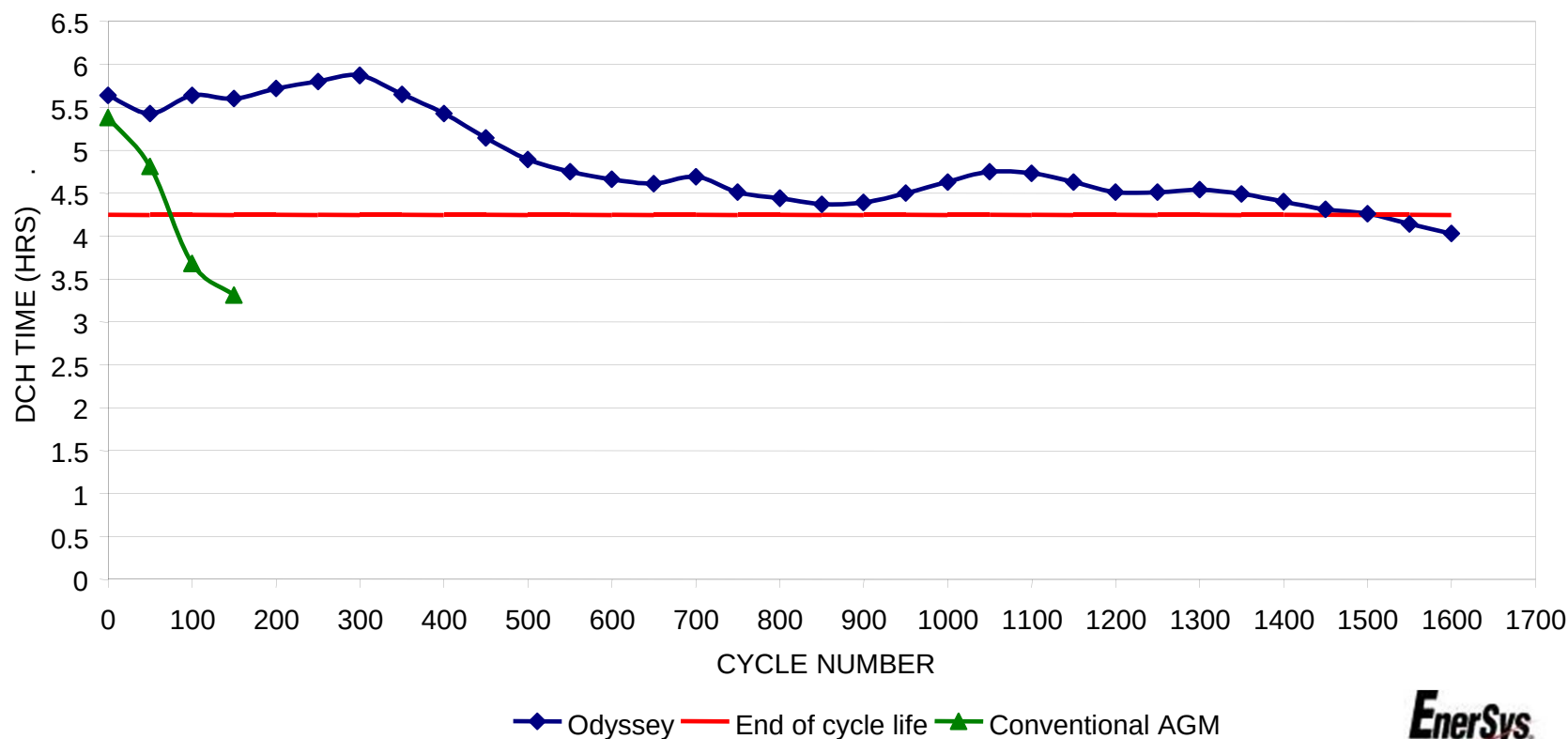
Cyclic capability

ODYSSEY CYCLE LIFE AS A FUNCTION OF DEPTH OF DISCHARGE



The ODYSSEY Advantage

Cyclic Capability
50% depth of discharge cyclic
capability,
Odyssey vs Conventional AGM



The ODYSSEY Advantage

A Technological Comparison

Characteristics	ODYSSEY®	Conventional
Electrolyte Design	Sealed Non-Spillable	Wet or AGM – Vented and Sealed
Performance	High Power and Deep Cycle	High Power – Shallow Cycle or Lower Power – Deep Cycle
Shelf Life at 25° C	2 years to 70% SOC	Typically 6 to 9 months to 70% SOC
Maintenance	No routine requirements	Watering – Terminal corrosion
Shipping	Non-Hazardous certified by USDOT and IATA	Hazardous - Restricted
Size	Smaller and Lighter	Conventional – large and heavy
Usable Storage	70% discharged and still start engine	30% discharged and still start engine
Recharging	High current fast charge	High current fast charging shortens life