

## 1. IDENTIFICATION




REVISION DATE: 2/13/15

<b>Product Name: Lead Acid Battery, Non-Spillable Wet</b> <b>Synonyms:</b> Industrial Battery, Traction Battery, Stationary Battery, Deep Cycle Battery	<b>Product Use:</b> Electric Storage Battery <b>Manufacturer/Supplier:</b> NorthStar Battery, Co., LLC <b>Address:</b> 4000 E. Continental Way, Springfield, MO 65803
<b>General Information Number:</b> 417.575.8200	<b>CAS Number:</b> Not Applicable <b>CHEMTREC:</b> 800-424-9300

## 2. GHS HAZARDS IDENTIFICATION

Health	Environmental	Physical
Acute Toxicity (Oral/Dermal/Inhalation) - Category 4 Skin Corrosion/Irritation - Category 1A Eye Damage - Category 1 Reproductive - Category 1A Carcinogenicity (lead) - Category 1B Carcinogenicity (arsenic) - Category 1A Carcinogenicity (acid mist) - Category 1A Specific Target Organ Toxicity (repeated exposure) - Category 2	Aquatic Chronic 1 Aquatic Acute 1	Explosive Chemical, Division 1.3

### GHS Label:

Health	Environmental	Physical
		
<b>Hazard Statements</b> <b>DANGER!</b> Causes severe skin burns and eye damage. Causes serious eye damage. May damage fertility or the unborn child if ingested or inhaled. May cause cancer if ingested or inhaled. Causes damage to central nervous system, blood and kidneys through prolonged or repeated exposure. May form explosive air/gas mixture during charging. Extremely flammable gas (hydrogen). Explosive, fire, blast or projection hazard.	<b>Precautionary Statements</b> Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Wear protective gloves/protective clothing, eye protection/face protection. Avoid breathing dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Causes skin irritation, serious eye damage. Contact with internal components may cause irritation or severe burns. Avoid contact with internal acid. Irritating to eyes, respiratory system, and skin.	



# Industrial Lead Acid Battery Safety Data Sheet

### 3. \*COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENTS (Chemical/Common Names):	CAS No.:	% by Wt:
Lead and Lead Compounds (inorganic)	7439-92-1	<b>50</b>
Electrolyte (H <sub>2</sub> SO <sub>4</sub> /H <sub>2</sub> O)	7664-93-9	<b>17</b>
Lead Oxide	1309-60-0	<b>20</b>
Tin	7440-31-5	<b>0.2</b>

### 4. FIRST AID MEASURES

#### INHALATION:

Sulfuric Acid: Remove to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Consult a physician.

Lead: Remove from exposure, gargle, wash nose and lips; consult physician.

#### INGESTION:

Sulfuric Acid: Give large quantities of water; Do NOT induce vomiting or aspiration into the lungs may occur and can cause permanent injury or death; consult physician.

Lead: Consult physician immediately.

#### SKIN:

Sulfuric Acid: Flush with large amounts of water for at least 15 minutes; remove contaminated clothing completely, including shoes. If symptoms persist, seek medical attention. Wash contaminated clothing before reuse. Discard contaminated shoes.

Lead: Wash immediately with soap and water.

#### EYES:

Sulfuric Acid and Lead: Flush immediately with large amounts of water for at least 15 minutes while lifting lids; Seek immediate medical attention if eyes have been exposed directly to acid.

### 5. FIRE FIGHTING MEASURES

**Flash Point:** Not Applicable

**Flammable Limits:** LEL = 4.1% (Hydrogen Gas in air); UEL = 74.2%

**Extinguishing media:** CO<sub>2</sub>; foam; dry chemical. Do not use carbon dioxide directly on cells. Avoid breathing vapors. Use appropriate media for surrounding fire.

#### Fire Fighting Procedures:

Use positive pressure, self-contained breathing apparatus. Beware of acid splatter during water application and wear acid-resistant clothing, gloves, face and eye protection. If batteries are on charge, shut off power to the charging equipment, but note that strings of series connected batteries may still pose risk of electric shock even when charging equipment is shut down.



# Industrial Lead Acid Battery Safety Data Sheet

## **Hazardous Combustion Products:**

Highly flammable hydrogen gas is generated during charging and operation of batteries. If ignited by burning cigarette, naked flame or spark, may cause battery explosion with dispersion of casing fragments and corrosive liquid electrolyte. Carefully follow manufacturer's instructions for installation and service. Keep away all sources of gas ignition and do not allow metallic articles to simultaneously contact the negative and positive terminals of a battery. Follow manufacturer's instructions for installation and service.

## **6: ACCIDENTAL RELEASE MEASURES**

Stop flow of material, contain/absorb small spills with dry sand, earth or vermiculite. Do not use combustible materials. If possible, carefully neutralize spilled electrolyte with soda ash, sodium bicarbonate, lime, etc. Wear acid-resistant clothing, boots, gloves, and face shield. Do not allow discharge of un-neutralized acid to sewer. Acid must be managed in accordance with approved local, state, and federal requirements. Consult state environmental agency and/or federal EPA.

## **7. HANDLING AND STORAGE**

### **Handling:**

Unless involved in recycling operations, do not breach the casing or empty the contents of the battery. Handle carefully and avoid tipping, which may allow electrolyte leakage. There may be increasing risk of electric shock from strings of connected batteries. Keep containers tightly closed when not in use. If battery case is broken, avoid contact with internal components. Keep vent caps on and cover terminals to prevent short circuits. Place cardboard between layers of stacked automotive batteries to avoid damage and short circuits. Keep away from combustible materials, organic chemicals, reducing substances, metals, strong oxidizers and water. Use banding or stretch wrap to secure items for shipping.

### **Storage:**

Store batteries under roof in cool, dry, well-ventilated areas separated from incompatible materials and from activities that may create flames, spark, or heat. Store on smooth, impervious surfaces provided with measures for liquid containment in the event of electrolyte spills. Keep away from metallic objects that could bridge the terminals on a battery and create a dangerous short-circuit.

### **Charging:**

There is a possible risk of electric shock from charging equipment and from strings of series connected batteries, whether or not being charged. Shut-off power to chargers whenever not in use and before detachment of any circuit connections. Batteries being charged will generate and release flammable hydrogen gas. Charging space should be ventilated. Keep battery vent caps in position. Prohibit smoking and avoid creation of flames and sparks nearby. Wear face and eye protection when near batteries being charged.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

### Exposure Limits (mg/m<sup>3</sup>) Note: N.E. = Not Established

INGREDIENTS (Chemical/Common Names):	OSHA PEL	ACGIH	US NIOSH	Quebec PEV	Ontario OEL	EU OEL
Lead and Lead Compounds (inorganic)	0.05	0.05	0.05	0.05	0.05	0.15 (b)
Electrolyte (H <sub>2</sub> SO <sub>4</sub> /H <sub>2</sub> O)	1	0.2	1	1	0.2	0.05 (c)
Tin	2	2	2			

- (a) As dusts/mists (b) As inhalable aerosol (c) Thoracic fraction (d) Potential occupational carcinogen  
 (e) Based on OEL's of Austria, Belgium, Denmark, France, Netherlands, Switzerland, & U.K.  
 (f) Based on OEL of Belgium (g) Based on OEL of Netherlands

### Engineering Controls (Ventilation):

Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant. Handle batteries cautiously, do not tip to avoid spills. Make certain vent caps are on securely. If battery case is damaged, avoid bodily contact with internal components. Wear protective clothing, eye and face protection, when filling, charging or handling batteries. Do not allow metallic materials to simultaneously contact both the positive and negative terminals of the batteries. Charge batteries in areas with adequate ventilation. General dilution ventilation is acceptable.

### Respiratory Protection (NIOSH/MSHA approved):

None required under normal conditions. When concentrations of sulfuric acid mist are known to exceed PEL, use NIOSH or MSHA-approved respiratory protection.

### Skin Protection:

If battery case is damaged, use rubber or plastic acid-resistant gloves with elbow-length gauntlet, acid-resistant apron, clothing and boots.

### Eye Protection:

If battery case is damaged, use chemical goggles or face shield.

### Other Protection:

In areas where water and sulfuric acid solutions are handled in concentrations greater than 1%, emergency eyewash stations and showers should be provided, with unlimited water supply. Chemically impervious apron and face shield recommended when adding water or electrolyte to batteries. Wash Hands after handling.



# Industrial Lead Acid Battery Safety Data Sheet

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Properties Listed Below are for Electrolyte:			
Boiling Point:	<b>203 - 240° F</b>		
Specific Gravity (H2O = 1)			
Silver Product	<b>1.331 +/- 0.01</b>		
Blue Product	<b>1.290 +/- 0.01</b>		
Red Product	<b>1.339 +/- 0.01</b>		
Blue +	<b>1.350 +/- 0.01</b>		
Boiling Point:	<b>203 – 204°F</b>		
Melting Point:	<b>N/A</b>	Vapor Pressure (mm Hg):	<b>10</b>
Solubility in Water:	<b>100%</b>	Vapor Density (AIR = 1):	<b>Greater than 1</b>
Evaporation Rate: (Butyl Acetate = 1)	<b>Less than 1</b>	% Volatile by Weight:	<b>N/A</b>
pH:	<b>~1 to 2</b>	Flash Point:	<b>Below room temperature (as hydrogen gas)</b>
LEL (Lower Explosive Limit)	<b>4% (Hydrogen)</b>	UEL (Upper Explosive Limit)	<b>74% (Hydrogen)</b>
Appearance and Odor:	<b>Manufactured article; no apparent odor. Electrolyte is a clear liquid with a sharp, penetrating, pungent odor.</b>		

## 10. STABILITY AND REACTIVITY

Stability: Stable X Unstable    

This product is stable under normal conditions at ambient temperature.

**Conditions to Avoid:** Prolonged overcharge at high current; sources of ignition.

### **Incompatibilities:** (materials to avoid)

Electrolyte: Contact with combustibles and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, sulfur trioxide gas, strong oxidizers, and water. Contact with metals may produce toxic sulfur dioxide fumes and may release flammable hydrogen gas.

Lead compounds: Avoid contact with strong acids, bases, halides, halogenates, potassium nitrate, permanganate, peroxides, nascent hydrogen, and reducing agents.

### **Hazardous Decomposition Products:**

Electrolyte: Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, hydrogen sulfide.

Lead compounds: Temperatures above the melting point are likely to produce toxic metal fume, vapor, or dust; contact with strong acid or base or presence of nascent hydrogen may generate highly toxic arsine gas.

### **Hazardous Polymerization:**

Will not occur

## 11. TOXICOLOGICAL INFORMATION

### **Routes of Entry:**

Sulfuric Acid: Harmful by all routes of entry.

Lead Compounds: Hazardous exposure can occur only when product is heated, oxidized or otherwise processed or damaged to create dust, vapor or fume. The presence of nascent hydrogen may generate highly toxic arsine gas.

### **Inhalation:**

Sulfuric Acid: Breathing of sulfuric acid vapors or mists may cause severe respiratory irritation.

Lead Compounds: Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs.

### **Ingestion:**

Sulfuric Acid: May cause severe irritation of mouth, throat, esophagus and stomach.

Lead Compounds: Acute ingestion may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping. This may lead rapidly to systemic toxicity and must be treated by a physician.

### **Skin Contact:**

Sulfuric Acid: Severe irritation, burns and ulceration.

Lead Compounds: Not absorbed through the skin.

### **Eye Contact:**

Sulfuric Acid: Severe irritation, burns, cornea damage, and blindness.

Lead Compounds: May cause eye irritation.

### **Effects of Overexposure - Acute:**

Sulfuric Acid: Severe skin irritation, damage to cornea, upper respiratory irritation.

Lead Compounds: Symptoms of toxicity include headache, fatigue, abdominal pain, loss of appetite, muscular aches and weakness, sleep disturbances and irritability.

### **Effects of Overexposure - Chronic:**

Sulfuric Acid: Possible erosion of tooth enamel, inflammation of nose, throat & bronchial tubes.

Lead Compounds: Anemia; neuropathy, particularly of the motor nerves, with wrist drop; kidney damage; reproductive changes in males and females. Repeated exposure to lead and lead compounds in the workplace may result in nervous system toxicity. Some toxicologists report abnormal conduction velocities in persons with blood lead levels of 50 µg/100 ml or higher. Heavy lead exposure may result in central nervous system damage, encephalopathy and damage to the blood-forming (hematopoietic) tissues.



# Industrial Lead Acid Battery Safety Data Sheet

## **Carcinogenicity:**

Sulfuric Acid: The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mist containing sulfuric acid" as a Category I carcinogen, a substance that is carcinogenic to humans. This classification does not apply to liquid forms of sulfuric acid or sulfuric acid solutions contained within a battery. Inorganic acid mist (sulfuric acid mist) is not generated under normal use of this product. Misuse of the product, such as overcharging, may result in the generation of sulfuric acid mist.

Lead Compounds: Lead is listed as a 2B carcinogen, likely in animals at extreme doses. Proof of carcinogenicity in humans is lacking at present.

## **Medical Conditions Generally Aggravated by Exposure:**

Overexposure to sulfuric acid mist may cause lung damage and aggravate pulmonary conditions. Contact of sulfuric acid with skin may aggravate diseases such as eczema and contact dermatitis. Lead and its compounds can aggravate some forms of kidney, liver and neurologic diseases.

## **Acute Toxicity:**

Inhalation LD50:

Electrolyte: LC50 rat: 375 mg/m<sup>3</sup>; LC50: guinea pig: 510 mg/m<sup>3</sup>

Elemental Lead: Acute Toxicity Point Estimate = 4500 ppmV (based on lead bullion)

Oral LD50:

Electrolyte: rat: 2140 mg/kg

Elemental lead: Acute Toxicity Estimate (ATE) = 500 mg/kg body weight (based on lead bullion)

## **Additional Health Data:**

All heavy metals, including the hazardous ingredients in this product, are taken into the body primarily by inhalation and ingestion. Most inhalation problems can be avoided by adequate precautions such as ventilation and respiratory protection covered in Section 8. Follow good personal hygiene to avoid inhalation and ingestion: wash hands, face, neck and arms thoroughly before eating, smoking or leaving the work site. Keep contaminated clothing out of non-contaminated areas, or wear cover clothing when in such areas. Restrict the use and presence of food, tobacco and cosmetics to non-contaminated areas. Work clothes and work equipment used in contaminated areas must remain in designated areas and never taken home or laundered with personal non-contaminated clothing. This product is intended for industrial use only and should be isolated from children and their environment.

The 19<sup>th</sup> Amendment to EC Directive 67/548/EEC classified lead compounds, but not lead in metal form, as possibly toxic to reproduction. Risk phrase 61: May cause harm to the unborn child, applies to lead compounds, especially soluble forms.

## 12. ECOLOGICAL INFORMATION

**Environmental Fate:** lead is very persistent in soil and sediments. No data on environmental degradation. Mobility of metallic lead between ecological compartments is slow. Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants but little bioaccumulation occurs through the food chain. Most studies include lead compounds and not elemental lead.

**Environmental Toxicity:** Aquatic Toxicity:

Sulfuric acid: 24-hr LC50, freshwater fish (*Brachydanio rerio*): 82 mg/L

96 hr- LOEC, freshwater fish (*Cyprinus carpio*): 22 mg/L

Lead: 48 hr LC50 (modeled for aquatic invertebrates): <1 mg/L, based on lead bullion

### Additional Information

- No known effects on stratospheric ozone depletion.
- Volatile organic compounds: 0% (by Volume)
- Water Endangering Class (WGK): NA

## 13. DISPOSAL CONSIDERATIONS (UNITED STATES)

Spent batteries: Send to secondary lead smelter for recycling. Spent lead-acid batteries are not regulated as hazardous waste when the requirements of 40 CFR Section 266.80 are met. Spilled sulfuric acid is a characteristic hazardous waste; EPA hazardous waste number D002 (corrosivity) and D008 (lead).

Electrolyte: Place neutralized slurry into sealed acid resistant containers and dispose of as hazardous waste, as applicable. Large water diluted spills, after neutralization and testing, should be managed in accordance with approved local, state, and federal requirements. Consult state environmental agency and/or federal EPA.

Following local, State/Provincial, and Federal/National regulations applicable to end-of-life characteristics will be the responsibility of the end-user.

## 14. TRANSPORT INFORMATION

### United States:

The U.S. Department of Transportation (DOT) hazardous materials regulations (49 CFR) applicable to lead acid batteries are specified in 49 CFR 173.159.

**Proper Shipping Name:** Batteries, wet, non-spillable, electric storage  
**Hazard Class:** 8  
**ID Number:** UN2800  
**Packing Group:** N/A  
**Labels:** Corrosive





## Industrial Lead Acid Battery Safety Data Sheet

49 CFR 173.159 (a) specifies that non-spillable batteries are excepted from all other requirements of this subchapter when offered for transportation and transported in accordance with paragraph (c) of this section that includes all of the following:

- (1) Non-spillable batteries must be securely packed in strong outer packaging.
- (2) The battery and outer packaging must be plainly and durably marked “NON-SPILLABLE” or “NON-SPILLABLE BATTERY.”
- (3) At a temperature of 55 °C (131 °F), the battery must not contain any unabsorbed free-flowing liquid and must be designed so that electrolyte will not flow from a ruptured or cracked case; and
- (4) For transport by aircraft, when contained in a battery-powered device, equipment or vehicle must be prepared and packaged for transport in a manner to prevent unintentional activation in conformance with § 173.159(b)(2) of this Subpart.

### Incident reporting requirements:

Non-spillable batteries offered for transportation or transported in accordance with this section are subject to the incident reporting requirements for fire, violent rupture, explosion or dangerous evolution of heat (i.e., an amount of heat sufficient to be dangerous to packaging or personal safety to include charring of packaging, melting of packaging, scorching of packaging, or other evidence) occurs as a direct result of a non-spillable battery.

### IATA Dangerous Goods Regulations (DGR):

The shipping information is as follows:

Proper Shipping Name: Batteries, wet, non-spillable, electric storage  
Packing Group: N/A  
Hazardous Class: 8  
Label/Placard Required: Corrosive  
UN Identification: UN2800  
Reference: Batteries must be packaged according to IATA Packing Instruction 872.  
They are not restricted as dangerous goods per Special Provision A67.  
No special placarding is required. (IATA DGR 56<sup>th</sup> Edition)

### IMDG Code:

The shipping information is as follows:

Proper Shipping Name: Batteries, wet, non-spillable, electric storage  
Packing Group: N/A  
Hazardous Class: 8  
Label/Placard Required: Corrosive



# Industrial Lead Acid Battery Safety Data Sheet

UN Identification: UN2800  
Reference: NorthStar Battery Company products have been submitted to a certified private lab for vibration testing and have been deemed to meet all requirements as specified in packing Special Provisions 238.1 and 238.2 for determination of "Non-Spillable" and are not subject to the provision of this code. No special placarding is required. (IMO IMDG Code, Amendment 37-14)

## 15. REGULATORY INFORMATION

### UNITED STATES:

#### EPA SARA Title III:

##### Section 302 EPCRA Extremely Hazardous Substances (EHS):

Sulfuric acid is a listed "Extremely Hazardous Substance" under EPCRA, with a Threshold Planning Quantity (TPQ) of 1,000 lbs. EPCRA Section 302 notification is required if 500 lbs or more of sulfuric acid is present at one site (40 CFR 370.10). For more information consult 40 CFR Part 355.

##### Section 304 CERCLA Hazardous Substances:

Reportable Quantity (RQ) for spilled 100% sulfuric acid under CERCLA (Superfund) and EPCRA (Emergency Planning and Community Right to Know Act) is 1,000 lbs. State and local reportable quantities for spilled sulfuric acid may vary.

##### Section 311/312 Hazard Categorization:

EPCRA Section 312 Tier Two reporting is required for non-automotive batteries if sulfuric acid is present in quantities of 500 lbs or more and/or if lead is present in quantities of 10,000 lbs or more. For more information consult 40 CFR 370.10 and 40 CFR 370.40

Section 313 EPCRA Toxic Substances: 40 CFR section 372.38 (b) states: If a toxic chemical is present in an article at a covered facility, a person is not required to consider the quantity of the toxic chemical present in such article when determining whether an applicable threshold has been met under § 372.25, § 372.27, or § 372.28 or determining the amount of release to be reported under § 372.30. This exemption applies whether the person received the article from another person or the person produced the article. However, this exemption applies only to the quantity of the toxic chemical present in the article.

Supplier Notification: This product contains toxic chemicals that may be reportable under EPCRA Section 313 Toxic Chemical Release Inventory (Form R) requirements. For a manufacturing facility under SIC codes 20 through 39, the following information is provided to enable you to complete the required reports:

Toxic Chemical	CAS Number	Approximate % by Weight
Lead	7439-92-1	50
Sulfuric Acid/Water Solution	7664-93-9	17
Lead Oxide	1360-60-0	20
Tin	7440-31-5	0.2



# Industrial Lead Acid Battery Safety Data Sheet

See 40 CFR Part 370 for more details.

## **TSCA:**

TSCA Section 8b – Inventory Status: All chemicals comprising this product are either exempt or listed on the TSCA Inventory.

TSCA Section 12b (40 CFR Part 707.60(b)) No notice of export will be required for articles, except PCB articles, unless the Agency so requires in the context of individual section 5, 6, or 7 actions.

TSCA Section 13 (40 CFR Part 707.20): No import certification required (EPA 305-B-99-001, June 1999, Introduction to the Chemical Import Requirements of the Toxic Substances Control Act, Section IV.A)

**RCRA:** Spent Lead Acid Batteries are subject to streamlined handling requirements when managed in compliance with 40 CFR section 266.80 or 40 CFR part 273. Waste sulfuric acid is a characteristic hazardous waste; EPA hazardous waste number D002 (corrosivity) and D008 (lead).

## **STATE REGULATIONS (US):**

### **STATE REGULATIONS (US):**

#### **\*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.**

\*Battery companies not party to the 1999 consent judgment with Mateel Environmental Justice Foundation should include a Proposition 65 Warning that complies with the current version of Proposition 65.

## **INTERNATIONAL REGULATIONS:**

Distribution into Quebec to follow Canadian Controlled Product Regulations (CPR) 24(1) and 24(2).

Distribution into the EU to follow applicable Directives to the Use, Import/Export of the product as-sold.

## ***16. OTHER INFORMATION***

NFPA Hazard Rating for sulfuric acid:

Flammability (Red) = 0

Health (Blue) = 3

Reactivity (Yellow) = 2

Sulfuric acid is water-reactive if concentrated.



### NorthStar Battery Lead and Acid Weights per 12-Volt Module

Battery Type			NSB13 Silver	NSB40 Silver	NSB70 Silver	NSB75 Silver	NSB90 Silver	NSB125 Silver	NSB40FT Silver	NSB60FT Silver	NSB90FT Silver	NSB92FT Silver	NSB100FT Silver	NSB110FT Silver	NSB130FT Silver	NSB155FT Silver	NSB170FT Silver
Electrolyte	Weight	/kg	0.8	2.7	4.5	4.5	6.2	8.5	2.4	3.8	5.3	5.2	6.1	6.8	8.1	9.9	10.5
		/lbs	1.8	5.9	9.9	9.9	13.8	18.6	5.3	8.3	11.6	11.4	13.4	14.9	17.8	21.8	23.2
	Volume	/litres	0.6	2.0	3.4	3.4	4.7	6.3	1.8	2.8	3.9	3.9	4.5	5.0	6.0	7.4	7.8
		/gallons	0.2	0.5	0.9	0.9	1.2	1.7	0.5	0.7	1.0	1.0	1.2	1.3	1.6	2.0	2.08
Acid	Weight	/kg	0.4	1.2	2.0	2.0	2.8	3.8	1.1	1.7	2.4	2.8	2.8	3.0	3.6	4.4	4.8
		/lbs	0.8	2.6	4.3	4.4	6.2	8.4	2.4	3.7	5.2	6.1	6.1	6.7	8.0	9.7	10.5
	Volume	/litres	0.2	0.6	1.1	1.1	1.5	2.1	0.6	0.9	1.3	2.1	1.5	1.7	2.0	2.4	2.6
		/gallons	0.1	0.2	0.3	0.3	0.4	0.6	0.2	0.2	0.3	0.5	0.4	0.4	0.5	0.6	0.7
Lead	Weight	/kg	2.3	8.9	14.9	14.6	19.7	22.0	7.2	9.8	13.6	10.6	15.6	18.4	20.5	23.2	26.6
		/lbs	6.4	19.7	32.9	32.2	43.5	48.4	15.8	21.7	30.0	23.3	34.5	40.6	45.1	51.1	58.7
Lead Oxide	Weight	/kg	1.7	3.2	4.7	5.3	7.5	10.4	3.0	4.7	6.3	11.6	8.0	8.4	10.1	11.4	13.6
		/lbs	2.3	7.0	10.4	11.7	16.5	23.0	6.5	10.3	13.9	25.5	17.7	18.6	22.2	25.2	29.9
Cells	# of Cells		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Total Weight	Weight	/kg	5.1	16.3	26.8	26.7	35.4	44.3	14.1	21.6	30.5	30.4	33.5	38.7	43.4	51.9	58.2
		/lbs	11.2	36.0	59.0	59.0	78.0	98.0	31.0	48.0	67.0	66.9	74.0	85.0	96.0	114.0	128.0



**NorthStar Battery Lead and Acid Weights per 12-Volt Module**

Battery Type			NSB13 Red	NSB90 Red	NSB125 Red	NSB40FT Red	NSB60FT Red	NSB92FT Red	NSB100FT Red	NSB110FT Red	NSB155FT Red	NSB170FT Red	NSB180FT Red	NSB190FT Red	NSB210FT Red
Electrolyte	Weight	/kg	0.8	6.2	8.0	2.6	3.9	5.7	6.1	7.1	9.6	10.5	10.5	10.5	12.1
		/lbs	1.7	13.6	17.6	5.8	8.6	12.5	13.5	15.6	21.1	23.2	23.2	23.2	26.5
	Volume	/litres	0.6	4.6	6.0	2.0	2.9	4.3	4.6	5.3	7.1	7.8	7.8	7.8	9.0
		/gallons	0.1	1.2	1.6	0.5	0.8	1.1	1.2	1.4	1.9	2.08	2.08	2.08	2.4
Acid	Weight	/kg	0.4	3.4	4.4	1.4	2.1	3.1	3.4	4.0	5.4	4.8	4.8	4.8	6.8
		/lbs	0.9	7.5	9.6	3.2	4.7	6.9	7.5	8.7	11.8	10.5	10.5	10.5	14.9
	Volume	/litres	0.2	1.8	2.4	0.8	1.2	1.7	1.8	2.2	2.9	2.6	2.6	2.6	3.7
		/gallons	0.1	0.5	0.6	0.2	0.3	0.5	0.5	0.6	0.8	0.7	0.7	0.7	1.0
Lead	Weight	/kg	1.7	11.4	14.7	4.4	6.3	9.1	9.6	12.2	15.7	15.4	17.3	17.9	19.8
		/lbs	3.7	25.0	32.3	9.7	13.9	20.0	21.2	26.8	34.5	33.9	38.1	39.4	43.6
Lead Oxide	Weight	/kg	1.6	12.4	16.0	5.3	7.8	11.6	12.7	15.2	20.8	20.3	24.2	23.3	25.7
		/lbs	3.5	27.2	35.2	11.7	17.1	25.5	27.9	33.4	45.9	44.8	53.3	51.2	56.6
Cells	# of Cells		6	6	6	6	6	6	6	6	6	6	6	6	6
Total Weight	Weight	/kg	4.9	34.4	44.5	14.2	20.6	30.2	32.5	39.2	52.9	55.0	60.8	59.7	66.0
		/lbs	10.8	75.8	97.9	31.3	45.2	66.3	71.6	86.3	116.4	121.2	133.7	131.6	145.5



**NorthStar Battery Lead and Acid Weights per 12-Volt Module**

Battery Type			NSB100FT Blue	NSB170FT Blue	NSB40FT Blue+	NSB92FT Blue+	NSB100FT Blue+	NSB170FT Blue+	NSB210FT Blue+
Electrolyte	Weight	/kg	6.1	10.5	2.2	5.2	5.5	9.9	11.2
		/lbs	13.4	23.1	4.9	11.4	12.2	21.7	24.5
	Volume	/litres	4.5	7.8	1.6	3.8	4.1	7.3	8.2
		/gallons	1.2	2.06	0.4	1.0	1.1	1.9	2.2
Acid	Weight	/kg	2.8	4.8	1.3	3.0	3.2	5.7	6.4
		/lbs	6.2	10.5	2.8	6.5	7.0	12.5	14.1
	Volume	/litres	1.5	2.6	0.7	1.6	1.7	3.1	3.5
		/gallons	0.4	0.7	0.2	0.4	0.5	0.8	0.9
Lead	Weight	/kg	15.6	26.6	3.8	10.2	10.8	19.2	21.8
		/lbs	34.3	58.6	8.3	22.5	23.8	42.3	47.9
Lead Oxide	Weight	/kg	8.0	13.6	5.9	12.4	13.5	23.9	27.0
		/lbs	17.6	29.9	12.9	27.3	29.6	52.5	59.5
Cells	# of Cells		6	6	6	6	6	6	6
Total Weight	Weight	/kg	33.5	58.2	13.9	31.4	33.7	59.8	67.7
		/lbs	73.7	128.0	30.7	69.2	74.1	131.6	149.0

## NorthStar Battery Lead and Acid Weights per 2-Volt Module

Battery Type			NSB2-400 Blue	NSB2-450 Blue+	NSB2-470 Red
Electrolyte	Weight	/kg	5.0	4.4	4.7
		/lbs	11.0	9.7	10.3
	Volume	/litres	3.9	3.4	3.6
		/gallons	1.0	0.9	1.0
Acid	Weight	/kg	2.5	1.9	2.1
		/lbs	5.4	4.3	4.5
	Volume	/litres	1.8	1.5	1.5
		/gallons	0.5	0.4	0.4
Lead	Weight	/kg	7.9	8.3	7.8
		/lbs	17.3	18.3	17.2
Lead Oxide	Weight	/kg	9.8	11.3	10.2
		/lbs	21.6	25.0	22.3
Cells	# of Cells		1	1	1
Total Weight	Weight	/kg	25.5	27.7	26.0
		/lbs	56.1	60.9	57.3



**NorthStar UPS Battery Lead and Acid Weights per 12-Volt Module**

Battery Type			NSB12-60	NSB12-425	NSB12-570	NSB12-170RT	NSB12-245RT	NSB12-365RT	NSB12-425RT	NSB12-450RT	NSB12-650RT	NSB12-730RT
Electrolyte	Weight	/kg	1.1	6.2	8.0	2.6	3.9	5.7	6.1	7.1	9.6	10.5
		/lbs	2.5	13.6	17.6	5.8	8.6	12.5	13.5	15.6	21.1	23.2
	Volume	/litres	0.9	4.6	6.0	2.0	2.9	4.3	4.6	5.3	7.1	7.8
		/gallons	0.2	1.2	1.6	0.5	0.8	1.1	1.2	1.4	1.9	2.08
Acid	Weight	/kg	0.6	3.4	4.4	1.4	2.1	3.1	3.4	4.0	5.4	4.8
		/lbs	1.4	7.5	9.6	3.2	4.7	6.9	7.5	8.7	11.8	10.5
	Volume	/litres	0.3	1.8	2.4	0.8	1.2	1.7	1.8	2.2	2.9	2.6
		/gallons	0.1	0.5	0.6	0.2	0.3	0.5	0.5	0.6	0.8	0.7
Lead	Weight	/kg	2.5	11.4	14.7	4.4	6.3	9.1	9.6	12.2	15.7	17.9
		/lbs	5.5	25.0	32.3	9.7	13.9	20.0	21.2	26.8	34.5	39.4
Lead Oxide	Weight	/kg	2.4	12.4	16.0	5.3	7.8	11.6	12.7	15.2	20.8	23.3
		/lbs	5.3	27.2	35.2	11.7	17.1	25.5	27.9	33.4	45.9	51.2
Cells	# of Cells		6	6	6	6	6	6	6	6	6	6
Total Weight	Weight	/kg	7.4	34.4	44.5	14.2	20.6	30.2	32.5	39.2	52.9	59.7
		/lbs	16.3	75.8	98.1	31.3	45.2	66.3	71.6	86.3	116.4	131.6



Battery Type			NSB 12-300	NSB 12-400	NSB 12-150FT	NSB 12-225FT	NSB 12-330FT	NSB 12-380FT	NSB 12-420FT	NSB 12-450FT	NSB 12-590FT	NSB 12-600FT
Electrolyte	Weight	/kg	4.5	6.2	2.4	3.8	5.3	6.1	5.2	6.8	9.9	10.5
		/lbs	9.9	13.8	5.3	8.3	11.6	13.4	11.4	14.9	21.8	23.2
	Volume	/litres	3.4	4.7	1.8	2.8	3.9	4.5	3.9	5.0	7.4	7.8
		/gallons	0.9	1.2	0.5	0.7	1.0	1.2	1.0	1.3	2.0	2.08
Acid	Weight	/kg	2.0	2.8	1.1	1.7	2.4	2.8	2.8	3.0	4.4	4.8
		/lbs	4.3	6.2	2.4	3.7	5.2	6.1	6.1	6.7	9.7	10.5
	Volume	/litres	1.1	1.5	0.6	0.9	1.3	1.5	2.1	1.7	2.4	2.6
		/gallons	0.3	0.4	0.2	0.2	0.3	0.4	0.5	0.4	0.6	0.7
Lead	Weight	/kg	14.9	19.7	7.2	9.8	13.6	15.6	10.6	18.4	23.2	26.6
		/lbs	32.9	43.5	15.8	21.7	30.0	34.5	23.3	40.6	51.1	58.7
Lead Oxide	Weight	/kg	4.7	7.5	3.0	4.7	6.3	8.0	11.6	8.4	11.4	13.6
		/lbs	10.4	16.5	6.5	10.3	13.9	17.7	25.5	18.6	25.2	29.9
Cells	# of Cells		6	6	6	6	6	6	6	6	6	6
Total Weight	Weight	/kg	26.8	35.4	14.1	21.6	30.5	33.5	30.4	38.7	51.9	58.2
		/lbs	59.0	78.0	31.0	48.0	67.0	74.0	66.9	85.0	114.0	128.0



**NorthStar Marine Battery Lead and Acid Weights per 12-Volt Module**

Battery Type			NSBM 12-70	NSBM 12-100	NSBM 12-115	NSBM 12-130	NSBM 12-210
Electrolyte	Weight	/kg	3.8	5.3	6.1	6.8	10.5
		/lbs	8.3	11.6	13.4	14.9	23.2
	Volume	/litres	2.8	3.9	4.5	5.0	7.8
		/gallons	0.7	1.0	1.2	1.3	2.08
Acid	Weight	/kg	1.7	2.4	2.8	3.0	4.8
		/lbs	3.7	5.2	6.1	6.7	10.5
	Volume	/litres	0.9	1.3	1.5	1.7	2.6
		/gallons	0.2	0.3	0.4	0.4	0.7
Lead	Weight	/kg	9.8	13.6	15.6	18.4	26.6
		/lbs	21.7	30.0	34.5	40.6	58.7
Lead Oxide	Weight	/kg	4.7	6.3	8.0	8.4	13.6
		/lbs	10.3	13.9	17.7	18.6	29.9
Cells	# of Cells		6	6	6	6	6
Total Weight	Weight	/kg	21.6	30.5	33.5	38.7	58.2
		/lbs	48.0	67.0	74.0	85.0	128.0



**NorthStar Engine Start Battery Lead and Acid Weights per 12-Volt Module**

Battery Type			NSBG-2200	NSBG-2700	NSBG-2400	NSBG-3100	NSBG-24	NSBG-27	NSBG-31	NSBG-34	NSBG-35	NSBG-65
Electrolyte	Weight	/kg	2.7	4.5	4.5	6.2	4.2	4.8	5.9	3.6	3.6	4.0
		/lbs	5.9	9.9	9.9	13.8	9.3	10.7	12.9	8.0	7.9	8.9
	Volume	/litres	2.0	3.4	3.4	4.7	3.2	3.6	4.4	2.7	2.7	3.0
		/gallons	0.5	0.9	0.9	1.2	0.8	0.9	1.2	0.7	0.7	0.8
Acid	Weight	/kg	1.2	2.0	2.0	2.8	2.4	2.7	3.2	2.0	2.0	2.2
		/lbs	2.6	4.3	4.4	6.2	5.2	6.0	7.1	4.5	4.3	4.9
	Volume	/litres	0.6	1.1	1.1	1.5	1.3	1.5	1.8	1.1	1.1	1.2
		/gallons	0.2	0.3	0.3	0.4	0.3	0.4	0.5	0.3	0.3	0.3
Lead	Weight	/kg	8.9	14.9	14.6	19.7	8.8	10.0	10.8	7.8	7.3	8.5
		/lbs	19.7	32.9	32.2	43.5	19.3	22.0	23.7	17.2	16.1	18.7
Lead Oxide	Weight	/kg	3.2	4.7	5.3	7.5	9.7	11.9	12.9	8.3	7.9	8.7
		/lbs	7.0	10.4	11.7	16.5	21.4	26.2	28.3	18.2	17.4	19.1
Cells	# of Cells		6	6	6	6	6	6	6	6	6	6
Total Weight	Weight	/kg	16.3	26.8	26.7	35.4	25.7	30.1	33.5	22.3	21.3	24.0
		/lbs	36.0	59.0	59.0	78.0	56.5	66.3	73.6	49.0	46.8	52.7