

Battery Cleaning

- A guide for users



Philadelphia Scientific®
industrial battery innovation

Battery Cleaning – A Guide for Users

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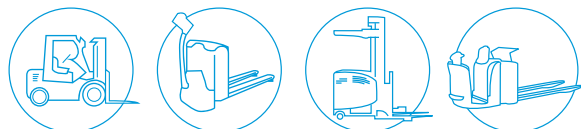
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Why do you need to clean your battery?

Surfaces in industrial settings are dirty, that's a fact of life, dust from concrete and forklift tyres, oil from machinery, dirt from outside blowing straight in through doors and vents. With batteries the problem is magnified due to film of moisture from the gas given off during the battery operation, particularly at the end of the charge, or during equalise charges, which attracts filth.

Much of the water in the gas given off by the battery evaporates but the electrolyte remains posing a safety hazard to operators. Any dirt on the battery sticks to the film of moisture creating a layer of grime. Electricity from the battery leaks as it 'tracks' across the grime, which reduces run time and leads to increased battery changes, therefore reducing forklift productivity. Even more seriously electricity tracking across a battery has been known to ignite the gasses and cause the battery to explode.

Electricity always wants to track to earth so with the help of moisture and grime the electricity continues to track across the top of the battery until it finds 'earth' in the form of the steel battery case. This poor electrical connection causes a build-up of white and yellow highly corrosive substance all around the battery case. If left untreated this corrosion expands, crushing cell walls, corroding the steel case away, but also robbing the battery of power and causing cells to become very uneven in output and prematurely fail. It should be noted that the Philadelphia Scientific Water Injector system has an ingenious gas path to prevent the moisture film from occurring. Using the Water Injectors therefore reduces



the 'tracking' and the cleaning burden for industrial batteries. This feature is unique to the Water Injectors and not found with generic watering systems.

In summary dirty batteries are a safety hazard and reduce the productivity of the forklifts.

Cautions about battery cleaning

If water is used in the cleaning process then it should be removed from the battery tray as it will corrode it, eventually leading to the tray needing to be replaced and an expensive rebuild. It is common practise in some parts of the world to put holes in the tray to enable the water to drain out, however this practise is banned in many regions as the run off will often pose a danger to operators or damage equipment.

Corrosion will require extra attention with a liberal application of 7Clean and a wire brush. If corrosion is a common occurrence in the application a terminal protector should be applied to any bare metal, including inter-cell connectors and accessories.

Vent caps or single point watering systems should be in place to seal the vent hole in the cell so no cleaning materials can get into it.

The dirt and corrosion on batteries has a high electrolyte content and should not come into contact with skin or clothes. Goggles, gloves and aprons should always be worn when working on batteries and showers and eye washes need to on hand in the immediate vicinity.

The materials used in battery cleaning, such as the liquids, rags and cloths will have large quantities of electrolyte on/in them and they should be disposed of accordingly. Care should be taken to ensure that no water runs off into unfiltered drainage.

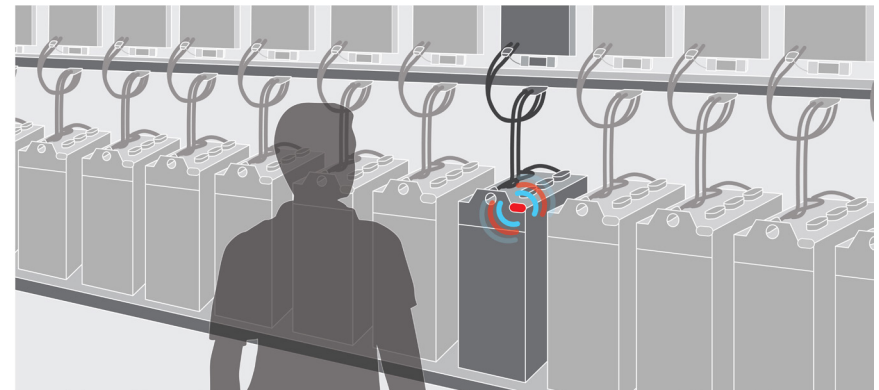
Avoid expensive damage to battery electronics such as battery monitors, cover these devices during cleaning and never aim water jets directly at them.

When to clean



1. If the battery has had a 'boil over', whereby it has been watered prior to charge and the electrolyte levels have risen so the cells overflow.
2. When the battery has been overfilled.
3. When dirt is beginning to accumulate up on the battery. This can be as frequently as fortnightly or as infrequently as every six months, it depends on the environment and use of the battery.

In the case of 1 and 2 liquid may have got into the tray. In which case there is really no way of knowing unless it was witnessed. A liquid in tray monitor will indicate if the battery tray has liquid in it and needs draining.



The Smart Blinky Battery Tray Monitor will indicate if the battery tray has electrolyte in the tray and it needs draining before it corrodes.

Moisture from small spills and overflows and be simply removed with rags and towels. Do this as soon as it is seen and it will stop the build-up of dirt.

Battery Cleaning Options

There are some basic methods of battery cleaning using common items found in a supermarket, such as baking soda or window cleaner. Whilst cheap and readily available they are not efficient at either neutralising or degreasing. Baking soda forms a paste that needs to be removed, furthermore, as it has no degreasing properties. Household cleaners do not neutralise the battery electrolyte. What's worse many 'off the shelf' products actually leave a residue on the battery that adds to the tracking you are trying to prevent. It also should be noted that these options lack a colour change indicator which shows if electrolyte is present.

As this guide is for professional operations it is focusing on the two main battery cleaning options, battery wash machines and manual cleaning.

Battery Wash Machines

Battery wash machines are dedicated enclosed cabinets, with hoses, and sometimes brushes, that automatically clean the battery. They are 'closed loop' when combined with a recirculation unit, and therefore eliminate any environmental issues for battery cleaning.

Pros

- Operators do not have to manually clean the battery which takes time and requires provision of safety equipment.
- Being a closed loop system the water is cleaned and neutralised and therefore does not pose a pollution threat.
- Batteries are 'air dried' as part of the operation.

Cons

- Batteries have to be regularly cleaned as the wash machines are not effective with excessive amounts of dirt. Where dirt has been allowed to build up the battery will benefit from a pre-treatment with 7Clean.
- Water goes into the tray therefore the tray will require drainage holes. The battery will need to stand until all the water is drained.
- Floor space is taken up by the wash and recirculation machine.
- Air, water and power need to be supplied to the wash area.
- The price of battery wash and recirculation machine equals approximately 1200 to 1500 labour hours.
- Filters need to be removed and replaced.

Manually with a Neutraliser and Degreaser

There are products specifically designed for industrial batteries, such as 7Clean, which both neutralise the battery electrolyte and include an industrial degreaser to remove the grime. They are applied directly to the battery and then absorbed with rags or rinsed off.

Pros

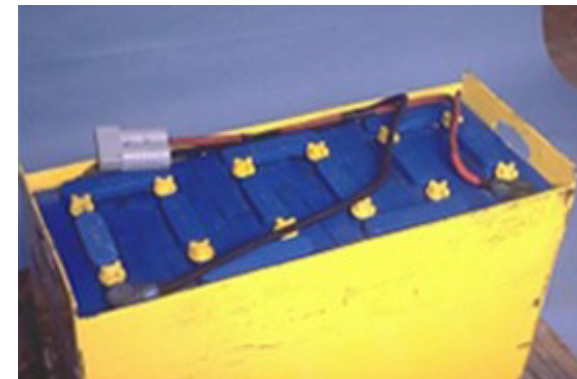
- The neutralisers remove any safety or environmental hazards from the battery electrolyte.
- There are colour indicators that change when electrolyte is present so the technician can ensure all the electrolyte is removed.
- The degreasers effectively remove the grime.
- Relatively cheap and simple to use.
- Batteries can be cleaned 'in-situ' in the charging stands.
- They can also be used on floors and battery racks.
- Tested on battery materials to ensure it doesn't damage the battery.

Cons

- The operator is handling the battery and the cleaning materials, therefore they will need protective clothing, goggles, gloves and apron. The appropriate safety gear, showers, eye wash and spill kits will need to be provided.
- The task of battery cleaning takes time.

Battery Cleaning Checklist:

- ☐ **7Clean** – Neutraliser and Degreaser especially formulated for forklift batteries. Includes colour change to indicate if electrolyte is present.
- ☐ **Stiff Brush** – For removing stubborn materials, especially corrosion.
- ☐ **Smart Blinky Battery Tray Monitor** – Indicates if any liquid is in the tray that, if left, would corrode it and lead to expensive repairs.
- ☐ **Terminal Protector** – A cover to protect any battery electronics.
- ☐ **Manual Drain Pump** – To remove liquid from the bottom of the tray.
- ☐ **Safety Equipment** – Gloves, apron, safety goggles, safety shower, spill kit.
- ☐ **Rags**
- ☐ **Waste Disposal**



Battery Cleaning Instructions - Battery Wash Machine

1. Identify the battery to be cleaned.
2. Pre-treat the battery by spraying directly with 7Clean, focus on any particularly dirty areas, brushing any corrosion.
3. Follow battery wash machine manufacturer's instructions.
4. Stand the battery over a drip tray or keep it in the battery washer until water no longer comes out of the bottom.



Battery Cleaning – 7Clean Battery Neutraliser and Degreaser

1. Identify the battery to be cleaned.
2. Liberally spray onto the battery cells, cables and casings while keeping cell caps tightly closed. 7Clean will change colours in the presence of electrolyte and will change to a different colour when neutralised.
3. Agitate with a brush and wipe clean with a cloth, rinse with water or allow to air dry.

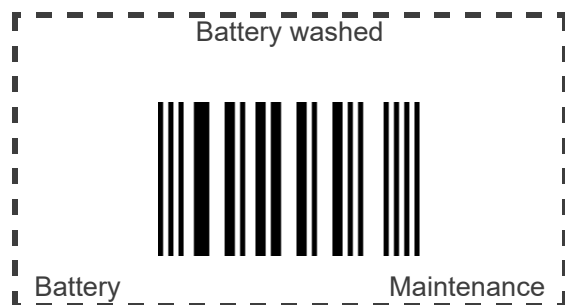


iTAG TIP

Easily record the Battery Wash History in your paperless battery asset record to track if the batteries are getting the TLC they need.

Scanner:

1. Scan the iTAG on the battery with the scanner.
2. Scan the 'battery washed' activity barcode.



iTAG App:

1. Scan the iTAG on the battery with the iTAG app.
2. Go to 'Scheduled'> press 'Battery Washed'> press 'Save'

7Clean MSDS

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HAZARD RATING

1= Slight

2= Moderate

3= High

4= Extreme

0= Insignificant

DATE PREPARED: 6/8/09

DATE REVISED: 1/09/11

DATE OF ORIGINATION: 11/12/02

HEALTH	1
FIRE	0
REACTIVITY	0
P.P.E	B

I. PRODUCT IDENTIFICATION:

ACID EATER NEUTRALIZER & DEGREASER

COMMON NAME:

CLEANING COMPOUND

GENERIC NAME:

CLEANER

CHEMICAL:

MIXTURE

II. HAZARDOUS INGREDIENTS:

Ingredients	CAS	%	OSHA PEL	ACGIH TLV
Thermonatite	6381-79-9	(20%)	-	-
Polyethoxylated Alcohol	25322-69-4	(20%)	-	-
Water	7732-18-5	(60%)	-	-

III. PHYSICAL/CHEMICAL CHARACTERISTICS:

BOILING POINT:	212	APPEARANCE:	BEIGE
SPECIFIC GRAVITY:	1.0072	FORM:	LIQUID
MELTING POINT:	N/D	ODOR:	BLAND
EVAPORATION RATE:	N/D	VAPOR DENSITY:	N/D
SOLUBILITY (H2O, 25C)	SOLUBLE	pH:	9.5
VOLATIZES CONTENT:	0	VOC (g/L)	0

IV. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT:	DEGREES	More than 300F
LEL:	N/D	
UEL:	N/D	
Auto ignition Temperature:	N/D	
Extinguishing Media:	Product is water-based and will not support flames.	
Unusual Fire/Explosion Hazards:	Closed containers exposed to heat may rupture due to pressure buildup.	
HAZARDOUS DECOMPOSITION PRODUCTS:	Carbon oxides, hydrocarbons, steam.	

V. REACTIVITY:

STABILITY:	Stable
CONDITIONS TO AVOID:	None known

VI. HEALTH HAZARDS:

ROUTES AND INDICATIONS OF EXPOSURE

EYES:	May cause irritation to eyes.
SKIN:	Good industrial hygiene recommended.
INHALATION:	N/A
INGESTION:	May cause irritation.
TOXICITY DATA:	None as listed by OSHA, NTP, IARC or EPA

EMERGENCY FIRST AID:

EYES:	Flush eyes for fifteen minutes with water.
SKIN:	Wash exposed areas with soap and water.
INHALATION:	Move to fresh air.
INGESTION:	Drink two glasses of water to dilute ingested material. Do not induce vomiting.

VII. SPILL, DISPOSAL PROCEDURES AND PRECAUTIONS:

HANDLING: Keep closed when not in use. Store at room temperature. Prevent product from freezing. Follow MSDS and Label warnings even after package is empty.

Material Spillage: Contain, retrieve spilled materials (absorb, pump, and vacuum)

WASTE DISPOSAL: This material is NOT defined as hazardous by the Resource Conservation and Recovery Act. It is the product users responsibility to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 FR 261020-40). Spill and releases of this material are not reportable under S.A.R.A. (III) Sec. 313.

VIII. PERSONAL PROTECTIVE EQUIPMENT (P.P.E.):
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PROTECTIVE EQUIPMENT:	Wear safety glasses and gloves.
RESPIRATORY PROTECTION:	General ventilation recommended.
ENGINEERING CONTROLS:	Keep containers closed when not in use. Do not handle or store near strong oxidants.
PERSONAL HYGIENE:	Cleanse skin thoroughly after contact.

IX. REGULATORY INFORMATION:

D.O.T. SHIPPING NAME:	NON-REGULATED
D.O.T. HAZARD CLASSIFICATION:	N/A
S.A.R.A. III Sec. 311 & 312:	N/A
S.A.R.A. III Sec. 313:	NOT covered under Sara 313
R.C.R.A.:	NO
TSCA Registry:	YES

