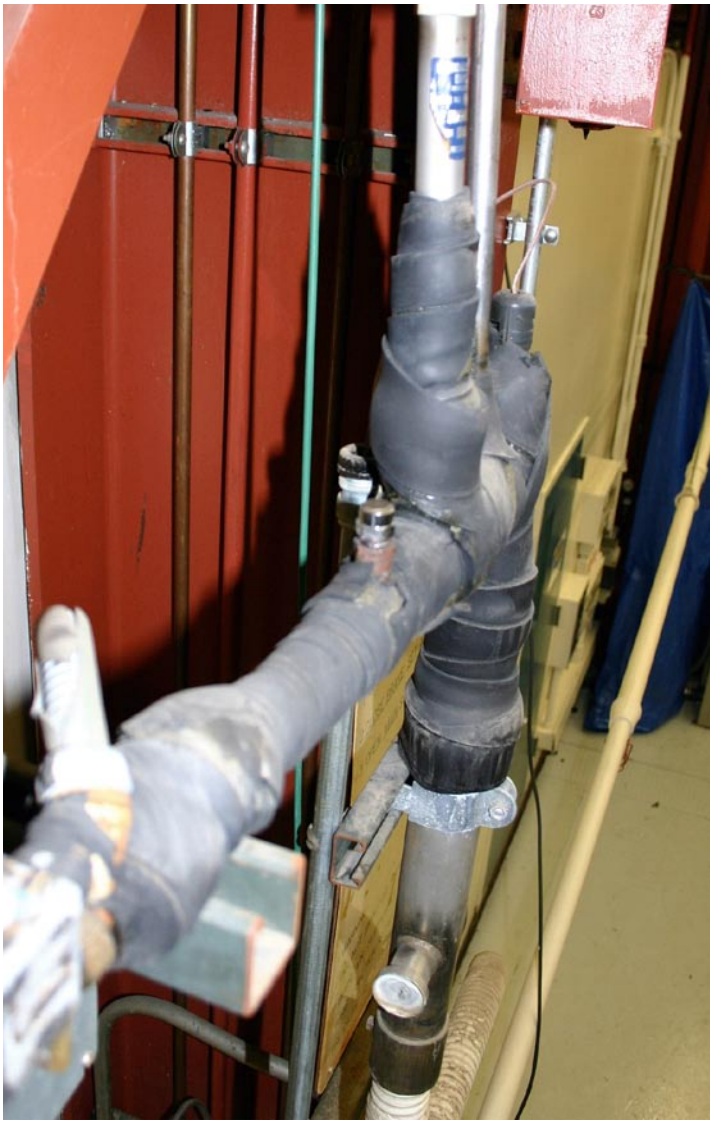
OPERATING EXPERIENCE SUMMARY

Inside This Issue



U.S. Department of Energy
Office of Environment, Safety and Health
OE Summary 2005-02
January 24, 2005

The Office of Environment, Safety and Health, Office of Corporate Performance Assessment publishes the Operating Experience Summary to promote safety throughout the Department of Energy complex by encouraging the exchange of lessons-learned information among DOE facilities.

To issue the Summary in a timely manner, EH relies on preliminary information such as daily operations reports, notification reports, and conversations with cognizant facility or DOE field office staff. If you have additional pertinent information or identify inaccurate statements in the Summary, please bring this to the attention of Frank Russo, 301-903-8008, or Internet address Frank.Russo@eh.doe.gov, so we may issue a correction. If you have difficulty accessing the Summary on the Web (URL http://www.eh.doe.gov/paa), please contact the ES&H Information Center, (800) 473-4375, for assistance. We would like to hear from you regarding how we can make our products better and more useful. Please forward any comments to Frank.Russo@eh.doe.gov.

The process for receiving e-mail notification when a new edition of the OE Summary is published is simple and fast. New subscribers can sign up at the following URL: http://www.eh.doe.gov/paa/oesummary/subscribe.html. If you have any questions or problems signing up for the e-mail notification, please contact Richard Lasky at (301) 903-2916, or e-mail address Richard.Lasky@eh.doe.gov.

EH Publishes "Just-In-Time" Reports

The Office of Environment, Safety and Health has published a series of "Just-In-Time" reports. These two-page reports inform work planners and workers about specific safety issues related to work they are about to perform. The format of the Just-In-Time reports was adapted from the highly successful format used by the Institute of Nuclear Power Operations (INPO). Each report presents brief examples of problems and mistakes actually encountered in reported cases, then presents points to consider to help avoid such pitfalls.

1. Deficiencies in identification and control of electrical hazards during excavation have resulted in hazardous working conditions.
2. Deficiencies in work planning and hazards identification have resulted in electrical near misses when performing blind penetrations and core drilling.
3. Working near energized circuits has resulted in electrical near misses.
4. Deficiencies in control and identification of electrical hazards during facility demolition have resulted in hazardous working conditions.
5. Electrical wiring mistakes have resulted in electrical shocks and near misses.
6. Deficiencies in planning and use of spotters contributed to vehicles striking overhead power lines.

The first six Just-in-Time reports were prepared as part of the 2004 Electrical Safety Campaign. In April, the Office of Environment, Safety and Health published a Special Report on Electrical Safety. The purpose of this report is to describe commonly made electrical safety errors and to identify lessons learned and specific actions that should be taken to prevent similar occurrences. This report can be accessed at http://www.eh.doe.gov/paa/reports/Electrical_Safety_Report-Final.pdf.

EH plans to issue more Just-in-Times soon on other safety issues, such as lockout and tagout, fall protection, and freeze protection. All of the Just-in-Times can be accessed at http://www.eh.doe.gov/paa/jit.html.

EVENTS

1. USE THE RIGHT FILTER WITH YOUR RESPIRATOR

On November 22, 2004, at the Idaho Nuclear Technology and Engineering Center, a Radiological Control Technician (RCT) inadvertently wore an unapproved respirator/filter while performing a survey in a high-radiation room. Before entering the room, the RCT had sent another employee to the Issue Room to obtain the required Powered Air-Purifying Respirator (PAPR) and High-Efficiency Particulate Air (HEPA) filter. The attendant in the Issue Room unknowingly issued a PAPR with an incorrect HEPA filter. (ORPS Report ID--BBWI-LANDLORD-2004-0017; final report filed December 23, 2004)

The attendant on duty in the Issue Room had completed the required issuer training but had not previously issued a PAPR. Although two attendants usually staff the Issue Room, the other staff members were elsewhere, leaving only the one attendant. The attendant verified the RCT's PAPR and respirator qualifications and issued what he believed was the correct full-face respirator (an MSA Optimair® MM2K), blower, cable, battery pack, and compatible HEPA filter to the employee. However, the attendant later learned that he had inadvertently issued an MSA P100 Ultra Filter® instead of an MSA Optifilter XL® Filter, which is the National Institute for Occupational Safety and Health (NIOSH)-approved filter for the MSA Optimair® MM2K PAPR.

The P100 Ultra Filter has a smaller diameter threaded connector than the Optifilter XL. However, the employee managed to assemble the PAPR and filter issued by the attendant. Figures 1a and 1b illustrate that although the filters have a similar appearance, their orientation is different.

Mine Safety Appliances Company, the manufacturer of the PAPR, requires users to perform an airflow test when the PAPR is issued. After assembling the PAPR and filter, the employee conducted what he believed was the manufacturer-approved flow test. He then gave the PAPR to the RCT, who assembled

Figures 1a and 1b. MSA Optifilter (left) and Ultra Filter (right)

the components, verified a snug fit, performed positive and negative leak checks, and wore the PAPR to perform the survey.

When the attendant questioned a more experienced attendant about the respirator and assembly he had issued, the experienced attendant realized that the incorrect HEPA filter had been issued. He immediately notified personnel at the high-radiation room. However, by this time, the RCT had finished surveying and had left the area.

The attendant informed his manager, who contacted an industrial hygienist to evaluate the PAPR configuration. The industrial hygienist consulted the MSA web site to determine the NIOSH-approved PAPR/filter configuration. Unable to find the Ultra Filter on the list for the Optimair PAPR, the attendant contacted MSA directly. The MSA representative was unaware that the Ultra Filter would fit the Optimair and stated that MSA had not received NIOSH approval for this configuration.

No detectable contamination was found on either the RCT or the PAPR. This result was verified with a whole-body count; no internal contamination was detected. A formal critique was held on the day after the incident. The following causal factors arose from information learned at the critique and from personnel interviews.

- The Issue Room attendant was inadequately trained to select the appropriate respirator filters. He did not understand proper respiratory equipment configuration and did not know the PAPR requirements. Training on flow tests and respirator assembly for attendants did not have the same level of rigor as user training.

- The Issue Room did not have any readily available visual or written aids to assist attendants in selecting filters, configuring respirators, and performing flow testing.

- The issuer was not only new to the issue room, but had not previously issued a PAPR, and the RCT had not used a PAPR except during training. Both should have had experienced workers assigned to assist them. Also, supervisors provided no direction that considered frequency of use (i.e., if respiratory equipment is used infrequently or for the first time in the field, assign more experienced employee to assist).

- The issuer was uncertain about the required HEPA filter canister number, but issued the PAPR anyway. The employee picking up the equipment did not know how to perform the flow test and was unsure of the configuration, but assumed he had done it correctly. Also, the RCT failed to recognize that the respirator parts were incorrectly assembled. All three were unsure of their actions and all had sufficient warning to stop using the equipment, but used it anyway.

Corrective actions are still underway. They include revising issuer training to provide more specific guidance on issuing PAPRs and filters, developing visual aids for Issue Rooms, and providing refresher training on this event to all qualified issuers. Managers and supervisors will also receive training on the potential for inexperienced issuers to make errors when selecting equipment, and both issuers and RCTs will receive reinforcing training on the need to stop work if in doubt about proper respirator assembly.

ANSI Standard Z88.2, *American National Standard for Respiratory Protection*, provides recommendations for establishing and implementing an effective respiratory protection program. The standard covers such topics as management and employee responsibilities, training requirements, and respirator selection.

This event demonstrates the importance of verifying correct configuration when using respiratory protection. Personnel who issue and use personal protective equipment need to ensure that the components are approved for use together. Simply putting together pieces that fit but that are not approved for use by NIOSH undermines the purpose for which they were designed, and voids the NIOSH certification for the respirator. If there is doubt, personnel should check with more senior or experienced personnel.

KEYWORDS: *Respiratory protection, radiological, respirator, PAPR, filter, training*

ISM CORE FUNCTIONS: *Perform Work within Controls, Provide Feedback and Improvement*

2. FOLLOW SAFETY PRECAUTIONS WHEN USING GRINDING EQUIPMENT

In October 2004, the Occupational Safety and Health Service of the New Zealand Department of Labour issued an Accident Alert describing the death of a welder who was using a portable angle grinder with a 9-inch wheel on an excavator bucket when the wheel disintegrated and pieces penetrated his chest and abdomen (Figure 2-1).

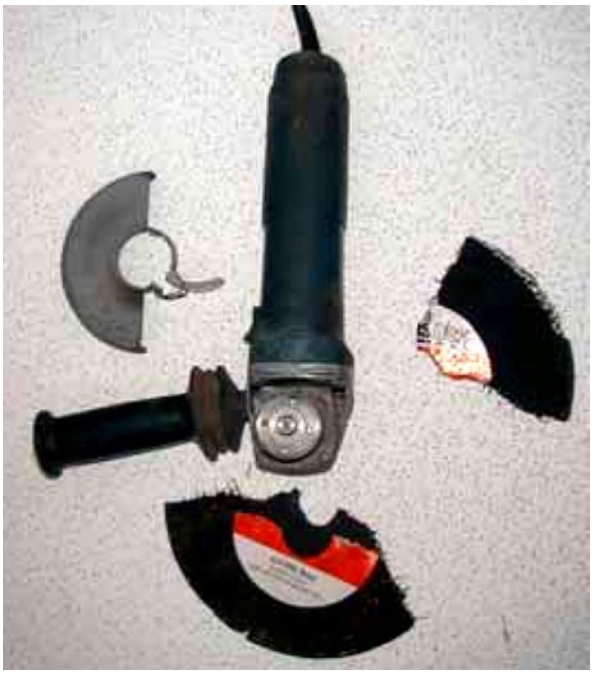


Figure 2-1. Disintegrated grinding wheel

An initial investigation revealed that the grinder and wheel were incompatible and that the grinder was not fitted with a guard. The Alert emphasized that grinders and abrasive wheels should always be used in accordance with the manufacturer's instructions and offered the following tips:

- Always ensure the maximum speed (the no-load rpm) marked on the abrasive wheel is greater than the rated speed of the grinder.
- Do not use grinding wheels that are larger than the maximum recommended size or worn-down wheels from other grinders.
- Never use grinding wheel power tools without the wheel guard attached to the tool and positioned for maximum safety.
- Store and handle abrasive wheels with care and inspect them for chips or cracks before installing. Do not use a wheel that may be damaged.

In December 2004, a worker in Brazil was seriously injured when the grinding disc on his angle grinder disintegrated (Figure 2-2) and pieces struck his legs, resulting in heavy loss of blood. The worker ultimately suffered amputation of his right leg and damage to his left leg. Investigators determined that the grinding wheel was too large for the grinder.

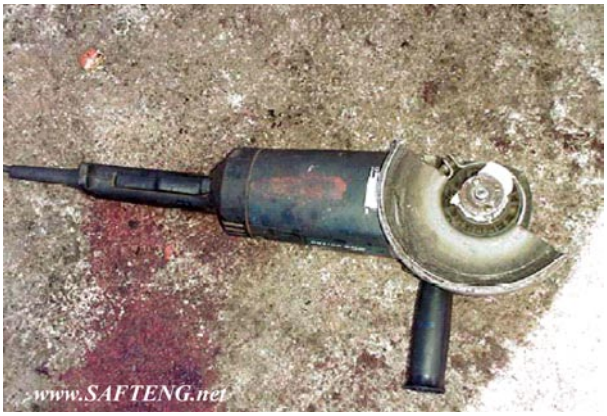


Figure 2-2. Grinder missing the disk

Last summer, a worker in British Columbia was using a hand-held 5-inch angle grinder while working on a wrought iron gate when the abrasive wheel broke and pieces flew off. One piece cut into the worker's thigh, severing a large artery. The worker collapsed from the blood loss and later died.

The accident investigation found that the abrasive wheel that broke was rated for a maximum of 6,110 rpm but the angle grinder was rated at 10,000 rpm. Also, the abrasive wheel was larger than 5 inches in diameter, making it impossible for the guard to be installed.

The Workers Compensation Board of British Columbia distributed a Hazard Alert poster that listed the following safe work practices for using grinders.

- Only use abrasive wheels that match the diameter and speed rating of the grinder.
- Before using a grinder, always make sure the guard is installed.
- Ensure that workers are adequately trained in the safe use of grinders and that they know about rpm limitations.
- Always wear adequate eye and face protection when using a grinder. Hearing protection and flame-resistant clothing must also be worn.

Near-misses involving grinders have occurred at DOE sites. For example, on June 13, 2002, a worker using a 4-inch side grinder with a cutoff wheel was nearly struck when the outer rim of

Ring Test

(courtesy Construction Safety Association of Ontario)

- Make sure the wheel is clean and dry.
- Tap wheel with something nonmetallic such as a screwdriver handle.
- Tap one-half inch from the outside rim.
- Rotate wheel 45 degrees and repeat test.
- A sound, undamaged wheel will give off a clear metallic ring. A cracked wheel will give off a dull sound with little or no ring.

NOTE: This test is for vitrified bonded wheels only

the wheel suddenly separated from the center, causing the outer rim to fly off the grinder and across the room. Fortunately, the grinder's safety guard was in place and no one was injured. (ORPS Report ORO--ORNL-X10CENTRAL-2002-0007; discussed further in OE Summary 2002-25)

OE Weekly Summary 1999-05 reported a similar event that occurred on January 26, 1999, at the Hanford Site. A pipefitter was grinding slag from the flame-cut edge of a ⅜-inch-thick metal plate when the grinding wheel disintegrated. The guard protected the pipefitter and deflected the broken pieces away and down to the floor. The largest piece traveled approximately 15 feet and struck a metal garbage can, penetrating one side of the can and propelling it approximately 15 feet. Other fragments were distributed over an area within a 12-foot radius. Figure 2-3 shows the grinder and pieces of the cup stone. There were no injuries. (ORPS Report RL--PHMC-FSS-1999-0006)

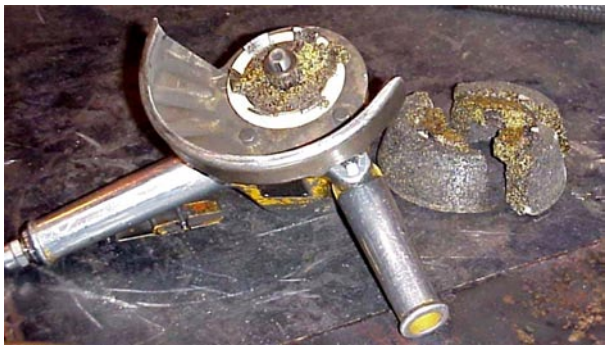


Figure 2-3. Damaged grinder and cup stone

The pipefitter stopped work and notified his immediate supervisor. The facility manager directed all grinding operations to stop until personnel had inspected all grinding wheels for visible damage and verified that no wheels were mounted in grinders with a greater speed rating.

The following references provide safety-related information on grinding wheels.

- 29 CFR 1910.243, *Guarding of Portable Power Tools*, and 29 CFR 1910.215, *Abrasive Wheel Machinery*, both state that "immediately before mounting, all wheels shall be closely inspected and sounded by the user…to make sure they have not been damaged in transit, storage, or otherwise. The spindle speed of the machine shall be checked before mounting of the wheel to be certain that it does not exceed the maximum operating speed marked on the wheel."
- ANSI B7.1-1988, *American National Standard Safety Requirements for the Use, Care, and Protection of Abrasive Wheels*, also requires the user to visually inspect abrasive wheels before mounting them and to apply suitable crack detection tests such as the ring test. It states that the maximum speed is the "speed which the tool can achieve under the most adverse condition of possible misadjustment or malfunction of any of its speed control devices, when supplied with compressed air at 90 psig." The standard further states that "it is of special importance that portable air grinders should be checked to be sure that proper air pressure is maintained and that the machine governor mechanism is clean, in good operating condition, and functioning properly." The standard recommends measuring the speed of portable air-driven grinders every 20 hours of actual use or once per week, whichever comes first.

Use Grinders Safely

(Construction Safety Association of Ontario)

- Use light pressure when starting to grind, especially with a cold wheel. Too much pressure may cause a cold wheel to crack and fly apart.
- Hold the grinder firmly with both hands and grind with moderate pressure.
- To avoid kickback, hold the grinder so that the rotating wheel pulls away from you.
- Always unplug the tool before replacing or installing stones, disks, and cutters.
- Let the grinder come to a complete stop before laying it down.
- Handle portable grinders with care to prevent dropping. Inspect dropped grinders carefully for cracked or broken wheels.

It also recommends measuring the speed of all types of grinders after maintenance or repair, whenever a grinder is issued from the tool crib, and at each wheel change.

These accidents illustrate the importance of following safety precautions when using grinders. A grinding wheel that disintegrates while in use contains stored energy that can propel pieces of the wheel or the grinder itself at great speeds, injuring the user or bystanders or causing property damage. Facility managers should ensure that workers who use grinders do not exceed the maximum operating speed of the wheel and that wheels are inspected and tested at appropriate intervals.

KEYWORDS: *Grinder, injury, near miss; abrasive wheel*

ISM CORE FUNCTIONS: *Analyze the Hazards, Perform Work within Controls*

3. REPLACING OLD SYSTEMS REQUIRES CAREFUL PLANNING

On June 8, 2004, at Lawrence Livermore National Laboratory, personnel informed the facility manager that liquid nitrogen was leaking from a pressure relief valve inside a building. The facility manager observed the leak, shut down the main supply valve at a recently installed tank, and placed an administrative lock on the valve. Because the building is large and well ventilated, the leaking nitrogen did not create an oxygen-deficient atmosphere. (ORPS Report OAK--LLNL-LLNL-2004-0023)

The 1,500-gallon tank was installed in April 2004 to replace a 40-year-old, 2,400-gallon tank and is designed to supply both gaseous and liquid nitrogen through separate piping systems into the building. About a week after the new tank was installed, the facility manager noticed that the tank level was falling faster than expected. He questioned building occupants about their nitrogen usage and determined that the tank was being depleted by other than normal usage. Although he suspected a leak, he was unable to find one. However, the leak was finally located, and the facility manager was able to investigate its cause.

The following facts were revealed in the course of the investigation.

- Design engineers were unable to find the original design documents and drawings for the old tank when planning the tank replacement project. As a result, facility personnel did not know the exact settings to use for the new tank. After the leak was found, original drawings were finally located. The drawings showed that the old system was designed to operate at 35 psig with a final delivery relief valve pressure of 50 psig.
- The pressure setting for relief valves (illustrated in Figure 3-1) on the liquid line coming into the building was 150 psig.

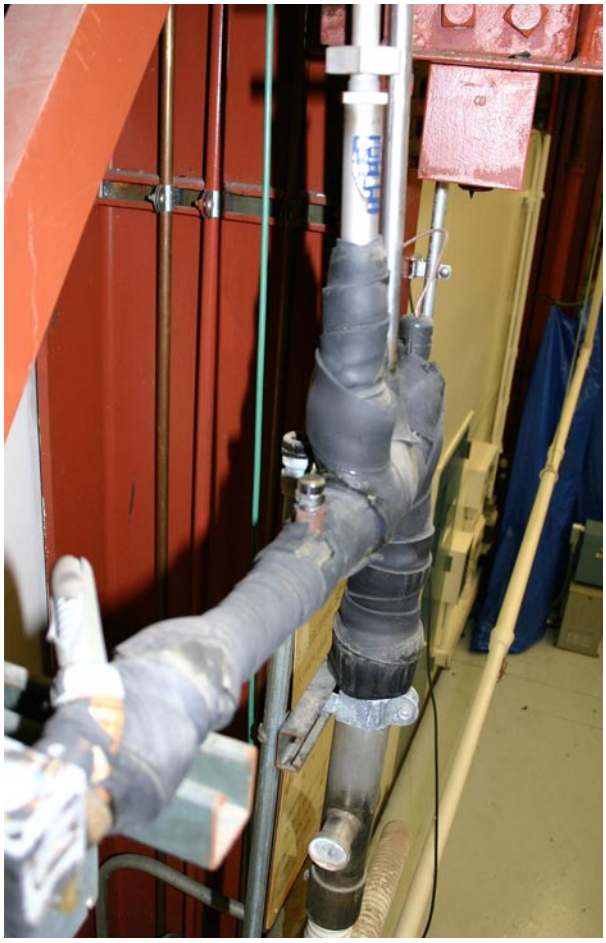


Figure 3-1. Pressure relief valve

However, several other smaller relief valves inside the building, which were untagged and difficult to find and read, were set at 50 psig, the same as the operating pressure. This, in effect, created a series of small distributed gas leaks that made it difficult to detect any single leak until liquid finally flowed from one of them.

Following the investigation, the facility prepared and distributed an internal lessons-learned document that included the following recommended actions.

1. Facility personnel should thoroughly research proposed changes to any pressure system, even if they seem to be insignificant. It is especially important to locate the original documentation, inspect the entire existing system, and compare it to the as-built drawings, noting the original design intent.

2. Design engineers should always conduct a system design review before replacing components with those of different specifications, especially when replacing an aging system where identical components may not be available and compatibility issues may exist between replaced and new components. This is particularly important when installing new cryogenic delivery systems.

3. The responsible environment, safety, and health team should review pressure systems to identify and address safety and health concerns.

4. Facility personnel should perform a systems test to ensure that operating parameters remain within the design limits.

5. Users should follow all applicable site procedures for handling pressure systems containing cryogenic material.

This event demonstrates the importance of planning system replacements. Design engineers should use every possible means of obtaining and reviewing the original documentation so that new operating parameters can be set correctly. After installation, the system should be thoroughly tested. It is also a good idea to clearly tag pressure relief valves so that discrepancies can be easily identified and resolved prior to operation.

KEYWORDS: *Pressurized system, nitrogen, tank, relief valve*

ISM CORE FUNCTIONS: *Define the Scope of Work, Analyze the Hazards, Provide Feedback and Continuous Improvement*

4. ALERT: CPSC RECALLS CELL PHONE BATTERIES

The Consumer Product Safety Commission (CPSC) (http://www.cpsc.gov) has made three announcements of voluntary recalls of counterfeit and defective cell phone batteries. These recalls involve batteries manufactured for Kyocera and Verizon wireless cell phones. Model numbers and identifying information for each of the recalls is given below. Consumers should stop using recalled products immediately and take the actions specified.

KYOCERA SMARTPHONE CELL PHONE BATTERY RECALL: 1/23/04

Name of product: Batteries in Kyocera Cell Phones (Model 7135 Smartphone)

Units: 140,000

Hazard: The recalled batteries can short-circuit and erupt with force or emit excessive heat, posing a burn hazard to consumers.

Incidents/Injuries: Kyocera Wireless Corp. has received four reports of battery failures, including one minor burn injury.

Description: The recalled batteries are included in Kyocera model 7135 Smartphone cell phones. The black and silver flip-up phones say "Kyocera" at the top of the screen. The recalled batteries have the red and white Kyocera name printed on the front and a product code ending with **-05** printed on the underside. Figure 4-1 illustrates an identified defective Smartphone battery.

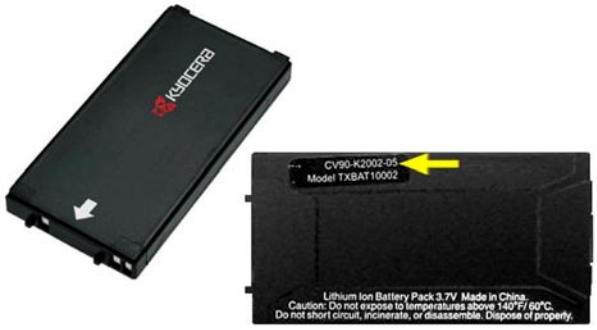


Figure 4-1. An identified defective Smartphone battery

Sold at: Verizon Wireless, U.S. Cellular, and ALLTEL Corporation stores, in addition to Web site and telemarketing retailers nationwide, from September 2003 through December 2003 for about $500. The batteries also were sold separately during this time for about $21.

Consumer Contact: Call Kyocera Wireless Corp. at (800) 349-4478 between 6 a.m. and 6 p.m. PT, Monday through Friday.

KYOCERA CELL PHONE BATTERY RECALL: 10/28/04

Name of Product: Batteries in Kyocera Wireless Corp. Cell Phones

Units: About 1,000,000

Hazard: Some of the cell phone batteries supplied by the battery manufacturer may be counterfeit. This can cause the batteries to short-circuit, overheat, and pose a burn hazard to consumers.

Incidents/Injuries: Kyocera has received 14 reports of battery failures, resulting in smoke and minor property damage. Two minor burn injuries have been reported.

Description: The recalled batteries are included in Kyocera Slider, K400, and 3200 Series cell phones. Table 4-1 (next page) lists additional information about the cell phones and recalled batteries. Figures 4-2 and 4-3 illustrate confirmed counterfeit batteries.

Sold at: ALLTEL, Virgin Mobile, Cricket Communications, MetroPCS, U.S. Cellular, and Verizon Wireless stores nationwide; telemarketing retailers; various Web sites, and regional phone carriers sold the cell phones with the recalled batteries. The 3200 Series and K400 Series phones were sold from December 2003 to September 2004 for between $30 and $100. Slider Series phones were sold from May 2004 to September 2004 for between $30 and $170. The recalled batteries were also sold separately during the same periods for between $30 and $60.

Consumer Contact: Call Kyocera Wireless Corp. toll-free at (866) 559-3882 between 6 a.m. and 6 p.m. PT, Monday through Friday, or request a replacement battery online at www.kyocera-wireless.com.

VERIZON WIRELESS COUNTERFEIT CELL PHONE BATTERIES: 6/24/04

Name of Product: Counterfeit LG-branded TM-510 Cell Phone Batteries

Units: About 50,000

Hazard: Some LG-branded TM-510 batteries may be counterfeit and susceptible to overcharging, especially if used with a non-LG charger. LG Infocomm U.S.A., Inc. states that these are counterfeit LG-branded batteries that do not contain a safety device in the circuitry to prevent overcharging. In turn, the counterfeit batteries can overheat, posing a fire and burn hazard to users.

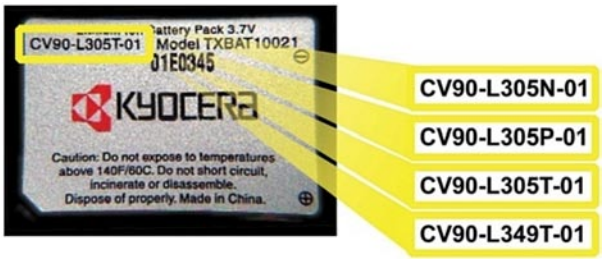


Figure 4-2. Slider series product codes

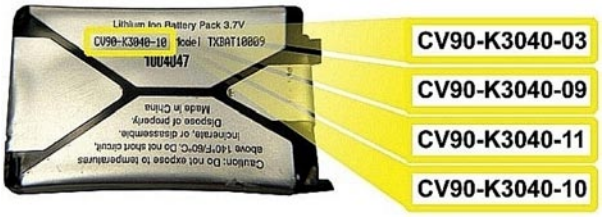


Figure 4-3. 3200/K400 series product codes

Incidents/Injuries: Verizon Wireless has received 18 reports of incidents involving counterfeit batteries, including injuries to users and property damage.

Description: The recalled batteries can be found in LG TM-510 model cell phones, have a manufacturer/date code of "AEMLLL 02220," AEMMHH 02220," "AEMLLL 02X25H" or "AEMMHH 02725" and were distributed by Verizon Wireless. The manufacturer/date code can be found on the battery, below the words, "Model/Modelo" or "LG" (Figure 4-4). The phone's model number appears on the back side of the phone beneath the battery. The cell phones, which come in black or silver, may have the Verizon Wireless name on the front.

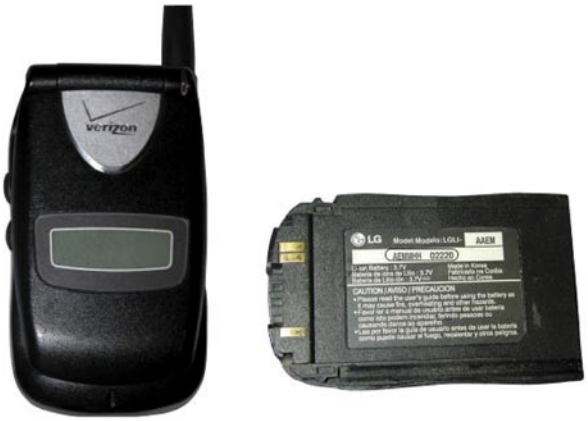


Figure 4-4. Verizon product codes

Sold at: The phones were sold at Verizon Wireless retail locations nationwide and on the Verizon Wireless Web site from April 2001 through December 2002 for between $150 and $200. The batteries were sold from August 2002 to November 2003 for between $40 and $60.

Consumer Contact: Call Verizon Wireless at (800) 922-0204 between 9 a.m. and 8 p.m. ET, Monday through Friday.

Cell Phone Model Name	Cell Phone Model Number	Battery Model Numbers	Battery Description
Slider Series	SE44/SE47	CV90 - L305N - 01 CV90 - L305P - 01 CV90 - L305T - 01 CV90 - L349T - 01	Battery has the Kyocera name printed in red and black along with the model number
K400 Series "Phantom" "Blade" "Rave"	KE413 KE433 KE/KX414 KE/KX424 KE/KX434	CV90 - K3040 - 03 CV90 - K3040 - 09 CV90 - K3040 - 10 CV90 - K3040 - 11	Battery has the Kyocera name printed in red and white along with the model number
3200 Series	3225 3250 *(Appears above or below phone display)*	CV90 - K3040 - 03 CV90 - K3040 - 09 CV90 - K3040 - 10 CV90 - K3040 - 11	Battery has the Kyocera name printed in red and white along with the model number

Table 4-1. Affected Kyocera phones and batteries

Commonly Used Acronyms and Initialisms

Agencies/Organizations	
ACGIH	American Conference of Governmental Industrial Hygienists
ANSI	American National Standards Institute
CPSC	Consumer Product Safety Commission
DOE	Department of Energy
DOT	Department of Transportation
EPA	Environmental Protection Agency
INPO	Institute for Nuclear Power Operations
NIOSH	National Institute for Occupational Safety and Health
NNSA	National Nuclear Security Administration
NRC	Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
SELLS	Society for Effective Lessons Learned

Authorization Basis/Documents	
JHA	Job Hazards Analysis
NOV	Notice of Violation
SAR	Safety Analysis Report
TSR	Technical Safety Requirement
USQ	Unreviewed Safety Question

Regulations/Acts	
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
RCRA	Resource Conservation and Recovery Act
D&D	Decontamination and Decommissioning
DD&D	Decontamination, Decommissioning, and Dismantlement

Units of Measure	
AC	alternating current
DC	direct current
psi (a)(d)(g)	pounds per square inch (absolute) (differential) (gauge)
RAD	Radiation Absorbed Dose
REM	Roentgen Equivalent Man
v/kv	volt/kilovolt

Job Titles/Positions	
RCT	Radiological Control Technician

Miscellaneous	
ALARA	As low as reasonably achievable
HVAC	Heating, Ventilation, and Air Conditioning
ISM	Integrated Safety Management
MSDS	Material Safety Data Sheet
ORPS	Occurrence Reporting and Processing System
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control