Combustible Dust Housekeeping Guide

- ***An aid in the prevention of combustible dust explosions.***

This guide belongs to:

_____

Date received: _____

Date reviewed: _____

Supervisor signature:

_____

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Dear Manufacturer,

After Imperial Sugar's Port Wentworth sugar refinery exploded, the company willfully refused to remedy similar conditions at their Grammercy plant, resulting in more than $8.7 million of proposed penalties for both plants, the third highest proposed penalty in OSHA's history. The relative cost of even the most elaborate central vacuum system is minute compared to the loss of life that occurs from secondary explosions or the fines levied against a company that fails to pro-actively protect their workers.

"According to media accounts there were 102 combustible dust related fires and explosions [in 2009]. 17% of these ComDust incidents were dust explosions with the majority of all incidents occurring in national industries (NAICS) not recognized in Appendix D-1 & D-2 of the OSHA Combustible Dust NEP." - John Astad, Director/ Research Analyst at Combustible Dust Policy Institute. No company executive wants to be responsible for allowing the makeup of a catastrophic explosion.

Ruwac is proud to present this guide as a synopsis of necessary steps manufacturers should take to remedy non-compliance and improve housekeeping procedures for combustible dust. This guide will only deal with housekeeping concepts and procedures. We highly recommend every company research the OSHA and NFPA documentation to determine the proper procedures that need to be met for your hazardous situations.

Sincerely,

Ruwac

Combustible Dust Makers

Agricultural Products

Egg white
Milk, powdered
Milk, nonfat, dry
Soy flour
Starch, corn
Starch, rice
Starch, wheat
Sugar
Sugar, milk
Sugar, beet
Tapioca
Whey
Wood flour

Agricultural Dusts

Alfalfa
Apple
Beet root
Carrageen
Carrot
Cocoa bean dust
Cocoa powder
Coconut shell dust
Coffee dust
Corn meal
Cornstarch
Cotton
Cottonseed
Garlic powder
Gluten
Grass dust
Green coffee
Hops (malted)
Lemon peel dust
Lemon pulp
Linseed
Locust bean gum
Malt
Oat flour
Oat grain dust
Olive pellets
Onion powder
Parsley (dehydrated)
Peach
Peanut meal and skins
Peat
Potato
Potato flour
Potato starch
Raw yucca seed dust
Rice dust
Rice flour
Rice starch
Rye flour
Semolina
Soybean dust
Spice dust
Spice powder
Sugar (10x)
Sunflower
Sunflower seed dust
Tea
Tobacco blend
Tomato
Walnut dust
Wheat flour
Wheat grain dust
Wheat starch
Xanthan gum

Carbonaceous Dusts

Charcoal, activated
Charcoal, wood
Coal, bituminous
Coke, petroleum
Lampblack
Lignite
Peat, 22%H20
Soot, pine

Chemical Dusts

Adipic acid
Anthraquinone
Ascorbic acid
Calcium acetate
Calcium stearate
Carboxy-methylcellulose
Dextrin
Lactose
Lead stearate
Methyl-cellulose
Paraformaldehyde
Sodium ascorbate
Sodium stearate
Sulfur

Metal Dusts

Aluminum
Bronze
Iron carbonyl
Magnesium
Zinc

Plastic Dusts

(poly) Acrylamide
(poly) Acrylonitrile
(poly) Ethylene (low-pressure process)
Epoxy resin
Melamine resin
Melamine, molded (phenol-cellulose)
Melamine, molded (wood flour and mineral filled phenol-formaldehyde)
(poly) Methyl acrylate
(poly) Methyl acrylate, emulsion polymer
Phenolic resin
(poly) Propylene
Terpene-phenol resin
Urea-formaldehyde/ cellulose, molded
(poly) Vinyl acetate/ ethylene copolymer
(poly) Vinyl alcohol
(poly) Vinyl butyral
(poly) Vinyl chloride/ ethylene/vinyl acetylene suspension copolymer
(poly) Vinyl chloride/ vinyl acetylene emulsion copolymer

Industries at Risk

Combustible dust explosion hazards exist in a variety of industries, including: agriculture, chemicals, food (e.g., candy, sugar, spice, starch, flour, feed), grain, fertilizer, tobacco, plastics, wood, forest, paper, pulp, rubber, furniture, textiles, pesticides, pharmaceuticals, tire and rubber manufacturing, dyes, coal, metal processing (e.g., aluminum, chromium, iron, magnesium, and zinc), recycling operations, and fossil fuel power generation (coal).

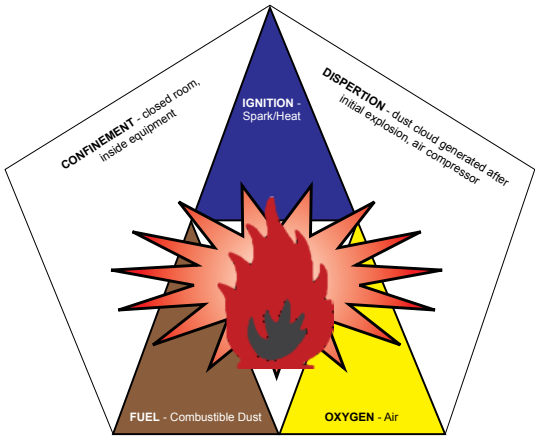
Combustible Dust: What is it and why should I care?

Who would have thought that dust can be a cause of an explosion? Most people probably think dust is inert and a sign of laziness. In reality though, some types of dust can actually cause explosions under certain conditions – leading to injury, death and destruction.

There are different kinds of dust so it is important to recognize what type of dust is found in your facility and whether it is listed as an explosive dust by OSHA. There are agricultural, carbonaceous, metal, chemical and plastic dusts. Some require more serious management than others. The previous page lists dust makers as provided by OSHA.

How does dust cause explosions?

You may wonder how dust can cause explosions. For a fire to start there must be three elements - oxygen, heat and fuel. A simple spark in a confined area like a building, room, vessel or process equipment where explosive dust particles are dispersed in sufficient quantity and concentration can lead to rapid combustion. "These five factors (oxygen, heat, fuel, dispersion, and confinement) are known as the "Dust Explosion Pentagon". If one element of the pentagon is missing, an explosion cannot occur." – OSHA Fact Sheet, March, 2008.



An initial explosion may dislodge additional dust and lead to larger, more destructive explosions. Activated sprinkler systems may also stir up additional dust and carry the particles to other areas, thus actually spreading the threat of further explosions.

It's hiding from you

Some of the explosive dust located in your facility may not be easily visible to you. One deadly pharmaceutical plant explosion was contributed to a build up of explosive dust above a suspended ceiling. It is important to identify the areas in you facility that dust may accumulate and hide, like beams, ducts, pipes, ledges and hoods.

NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, also recommends:

- Minimize the escape of dust from process equipment or ventilation systems;
- Use dust collection systems and filters;
- Utilize surfaces that minimize dust accumulation and facilitate cleaning;
- Provide access to all hidden areas to permit inspection;
- Inspect for dust residues in open and hidden areas, at regular intervals;
- Clean dust residues at regular intervals;
- Use cleaning methods that do not generate dust clouds, if ignition sources are present;
- Only use vacuum cleaners approved for dust collection and certified for use in your facility's specific environmental classification;
- Locate relief valves away from dust hazard areas; and
- Develop and implement a hazardous dust inspection, testing, housekeeping, and control program (preferably in writing with established frequency and methods).

How much dust is too much?

This is a tough question to answer and currently being considered by OSHA. They state, "The amount of dust accumulation necessary to cause an explosive concentration can vary greatly. This is because there are so many variables – the particle size of the dust, the method of dispersion, ventilation system modes, air currents, physical barriers, and the volume of the area in which the dust cloud exists or may exist. As a result, simple rules of thumb regarding accumulation (such as writing in the dust or visibility in a dust cloud) can be subjective and misleading. The hazard analysis should be tailored to the specific circumstances in each facility and the full range of variables affecting the hazard." – OSHA. (July 31, 2005). Combustible dust in industry: preventing and mitigating the effects of fire and explosions.

Training Your Staff

It is critical to develop an employee training program for operating, maintenance and emergency response procedures. Employees involved in operating, maintaining and supervising areas where combustible dust is present must be included in the training and annual refresher courses.

Some things to include in your training are:

- Hazards of the workplace
- Plant safety rules
- Procedures for safely operating machines and other processes
- Proper use of fire and explosion protection systems
- Equipment maintenance
- Housekeeping schedule and duties
- Emergency response plan

You must certify in writing that this training has been completed annually and after process changes.

Housekeeping Procedures

Establish a cleaning schedule that will minimize dust accumulation on walls, floors, equipment, ledges, beams, rafters, hanging lights, above suspended ceilings, and other concealed surfaces. OSHA standards require vacuuming of these surfaces to avoid creating dust clouds through sweeping or blowing with compressed air. Compressed air should only be used after the area has been vacuumed.

Vacuum cleaners must be certified for use in Class II hazards locations or shall be a fixed pipe suction system with a remotely located exhauster and dust collector. When flammable gasses are present, vacuum cleaners need to be listed for Class I and Class II hazardous locations. Combustible metals dust and particles must be cleaned with non conductive scoops or soft natural brushes or brooms before the dust is vacuumed. Blowing combustible metal dust with air compressors is not permitted. For clean-up of truly explosive materials, such as gun powder, rocket propellant, sodium azide, aluminum powder, and others, which can explode if collected in dry form, the use of an immersion separation system is necessary.

Record Keeping

Keep and maintain records of inspections of the following:

- Fire and explosion protection and prevention equipment
- Dust control equipment
- Housekeeping schedules and completed duties
- Potential ignition sources
- Electrical process and mechanical equipment
- Process changes
- Lubrication of bearings.

Tips for Controlling Combustible Dust

Dust Control Measures

- Design and implement non-leaking dust-containment systems that meet your facility needs and hazardous dust requirements.
- Utilize a housekeeping program that includes regular cleaning of floors and horizontal surfaces, such as ducts, pipes, hoods, ledges, and beams.
- Use surfaces that minimize dust accumulation and facilitate cleaning.
- Provide access to all hidden areas to permit inspection and cleaning.
- Inspect open and hidden areas regularly for dust accumulation.

Ignition Control Measures

- Only use approved vacuum cleaners and other equipment that meet the need for your hazard situation.
- If ignition sources are present, use cleaning methods that do not generate dust clouds.
- Dust control equipment must be grounded and bonded to dissipate electrostatic charge.
- Implement a Hot Work permit program.
- Post "No Smoking" signs in prohibited areas.
- Use industrial trucks that are approved for combustible dust locations.
- Maintain processing equipment to control sparks and friction.
- Separate heated surfaces and heating systems from dust.

Prevention Measures

- Use separator devices to remove foreign materials capable of igniting combustible dusts.
- Make available MSDS(s) for the chemical(s) which could become explosive.
- Train employees on the risks of combustible dusts.
- Execute an emergency action plan.
- Vent hazard areas over exterior walls and enclosures and away from employees.
- Minimize the escape of dust from process equipment or ventilation systems.
- Install spark detection and explosion/ deflagration suppression systems.
- Maintain emergency exit routes.
- Invest in appropriate fire suppression systems.

Review Applicable OSHA Requirements:

- §1910.22 Housekeeping
- §1910.307 Hazardous Locations
- §1910.1200 Hazard Communication
- §1910.269 Electric Power Generation, Transmission and Distribution (coal handling)
- §1910.272 Grain Handling Facilities
- General Duty Clause, Section 5(a)(1) of the

Occupational Safety and Health Act (Employers must keep workplaces free from recognized hazards likely to cause death or serious physical harm).

Frequently Asked Questions

When shopping for an explosion proof vacuum consider these questions:

- Is it legally certified? *(Ruwac vacuums are certified by ETL for use in Class 1, Division II, Group D, Class II, Division I, Group F & G for explosive situations)*.
- Can it be considered dustless? *(Ruwac vacuums utilize a MicroClean filter that is 99.9% efficient at 0.5 microns. Add a HEPA filter that is tested and certified to be 99.997% efficient at collecting and containing particles down to 0.3 microns. Ruwac vacuums are certified dustless).*
- How durable is the equipment? Will it dent? *(Ruwac constructs each machine with compression cast composite housing that will not dent, break or rust).*
- What warranty is available? *(Ruwac guarantees the vacuum housing for life, the MicroClean filter for three years and the electrical components for one year).*
- Is the vacuum designed for continuous duty? *(Ruwac builds explosion proof vacuums with a continuous duty motor rated at 100,000 hours! Our innovative filter system will allow you to run the vacuum longer and requires less maintenance.)*
- Is it made in USA? *(Every Ruwac machine is designed and built in the United States at our ISO 9001 registered manufacturing facility. When your machine is ready to ship three employees inspect and test the unit with the accessories you have purchased to make sure everything is running smooth before it is packaged at our plant. We want you to be able to start using the machine immediately upon receipt).*
- Are the accessories certified for explosive hazards? *(You cannot use just any hose or wand when using a vacuum in a combustible dust area. Ruwac explosion proof vacuum accessories are certified).*
- Is the machine top heavy? *(The last thing you need is for your explosive proof vacuum to be accidentally knocked over. We design our vacuums with a low center of gravity and a counter-balanced base to avoid tipping).*
- Does the filter clog prematurely? *(Ruwac vacuums utilize a unique filter system to prevent premature clogging and increased filter life. Visit our website, www.explosionproofvacuums.com to learn more about Ruwac's innovative filter system).*
- Does the supplier have the experience to recommend the correct equipment? *(Ruwac has 30+ years of experience in recommending the proper vacuum for your needs. We have a full line of vacuums from portable to central systems along with a variety of accessories to simplify the task. We require safety above all, so we will only recommend the right equipment - not what we have on the shelf to sell that day. Some companies only sell one model and try to apply it everywhere).*
- Do you have a documented housekeeping program? *(Pages 8 and 9 provide you with an outline for your documented housekeeping program).*
- Do you have a buildup of dust over head? *(Ruwac offers fully grounded overhead cleaning tools for all explosion proof vacuums).*

Definitions

Combustible Dust – A combustible particulate solid that presents a fire or deflagration hazard when suspended in air or some other oxidizing medium over a range of concentrations, regardless of particle size or shape.

Combustible Particulate Solid – Any combustible solid material, composed of distinct particles or pieces, regardless of size, shape, or chemical composition.

Deflagration - to burn, esp. suddenly and violently with great heat and intense light. In the case of combustible dust, the dust would be suspended in the air and fuel a fire or explosion that would potentially cause lose of life and property.

Resources

- NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
- NFPA 664, Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities
- NFPA 61, Standard for the Prevention of Fires and Explosions in Agricultural and Food Processing Facilities
- NFPA 484, Standard for Combustible Metals
- NFPA 655, Standard for the Prevention of Fires and Explosions
- OSHA. Safety and Health Topics - Combustible Dust. http://www.osha.gov/dsg/combustibledust/index.html
- U.S. Chemical and Safety Board. Combustible Dust: An Insidious Hazard. http://www.csb.gov/videoroom/detail.aspx?VID=30
- Combustible Dust Policy Institue. http://www.linkedin.com/groups?home=&gid=1184577&trk=anet_ug_hm or http://dustexplosions.blogspot.com/

Affected SIC Codes

SIC	INDUSTRY	NAICS
2046	Wet Corn Milling	311221
4911	Electric Services - Establishments engaged in the generation, transmission, &/or distribution of electric energy for sale	221112
2041	Flour and Other Grain Mill Products	311211
2493	Reconstituted Wood Products	321219
2899	Chemicals and Chemical Preparations, Not Elsewhere Classified	325510, 325998
2099	Prepared foods and miscellaneous food specialties, not elsewhere classified	311212
3471	Electroplating, Plating, Polishing, Anodizing, and Coloring	332813
3341	Secondary Smelting and Refining of Nonferrous Metals	331314
2834	Pharmaceutical Preparations	325412
2499	Wood Products, Not Elsewhere Classified	321920, 321219
2421	Sawmills and Planing Mills, General	321113
2062	Cane Sugar Refining	311312
2063	Beet Sugar (Establishments primarily engaged in manufacturing sugar from sugar beets.	311313
3061	Molded, Extruded, and Lathe-Cut Mechanical Rubber Goods	326291
3714	Motor Vehicle Parts and Accessories	336322
3365	Aluminum Foundries	331524
0723	Crop Preparation Services for Market, Except Cotton Ginning	115114, 115111
2052	Fresh cookies, crackers, pretzels, and similar "dry" bakery products	311821
2087	Flavoring extracts, syrups, powders, and related products, not elsewhere classified	311930
2221	Broadwoven Fabric Mills, Manmade Fiber and Silk	313210
2262	Finishers of Broadwoven Fabrics of Manmade Fiber and Silk	313311
2299	Textile Goods, Not Elsewhere Classified	313111
2431	Millwork	321911
2434	Wood Kitchen Cabinets	33711
2439	Structural Wood Members, Not Elsewhere Classified	321213, 321214
2452	Prefabricated Wood Buildings and Components	321992
2511	Wood Household Furniture, Except Upholstered	337122
2591	Drapery Hardware and Window Blinds and Shades	337920
2819	Industrial Inorganic Chemicals, Not Elsewhere Classified	325188, 325998, 331311
2821	Plastic Materials, Synthetic Resins, and Nonvulcanizable Elastomers	325211
2823	Cellulosic Manmade Fibers	325221
2841	Soap and Other Detergents, Except Specialty Cleaners	325611
2851	Paints, Varnishes, Lacquers, Enamels, and Allied Products	32551
2861	Gum and Wood Chemicals	325191
3011	Tires And Inner Tubes	326211
3069	Fabricated Rubber Products, Not Elsewhere Classified	326299
3081	Unsupported Plastics Film and Sheet	326113
3082	Unsupported Plastics Profile Shapes	326121
3086	Plastics Foam Products	326140, 326150
3087	Custom Compounding of Purchased Plastics Resins	325991
3089	Plastics Products, Not Elsewhere Classified	326199
3291	Abrasive Products	327910
3313	Alumina and Aluminum Production and Processing	331312
3334	Primary Production of Aluminum	331312
3354	Aluminum Extruded Products	331316
3363	Aluminum Die-Castings	331521
3369	Nonferrous Foundries, Except Aluminum and Copper	331528
3398	Metal Heat Treating	332811
3441	Metal Cans	332431
3469	Metal Stampings, Not Elsewhere Classified	332116
3479	Coating, Engraving, and Allied Services, Not Elsewhere Classified	332812
3496	Miscellaneous Fabricated Wire Products	332618
3499	Fabricated Metal Products, Not Elsewhere Classified	332999
3548	Electric and Gas Welding and Soldering Equipment	335129
3644	Noncurrent-Carrying Wiring Devices	335932
3761	Guided Missiles and Space Vehicles	336414
3799	Transportation Equipment, Not Elsewhere Classified	333924
3995	Burial Caskets	339995
3999	Manufacturing Industries, Not Elsewhere Classified	321999, 325998, 326199
4221	Farm product warehousing and storage	493130
4952	Sanitary treatment facilities	221320
4953	Refuse Systems	562920
5093	Scrap and waste materials	423930
5162	Plastics materials and basic forms and shapes	424610

Housekeeping Checklist

(Mark dates and initial when completed or checked)

- ❑ Are all work sites clean and orderly?
- ❑ Are work surfaces kept dry or appropriate means taken to assure that surfaces are slip-resistant?
- ❑ Are all spilled materials or liquids cleaned up immediately?
- ❑ Are combustible scrap, debris and waste stored safely and removed from the work site promptly?
- ❑ Are accumulations of combustible dust routinely removed from elevated surfaces including the overhead structure of buildings?
- ❑ Is combustible dust cleaned up with an approved explosion proof vacuum system before the dust reaches 1/32" thickness (paperclip)?
- ❑ Is metallic or conductive dust prevented from entering or accumulating on or around electrical enclosures or equipment?
- ❑ Are covered metal waste cans used for oily and paint-soaked waste?
- ❑ Are all oil and gas fired devices equipped with flame failure controls that will prevent flow of fuel if pilots or main burners are not working?
- ❑ Are paint spray booths, dip tanks, etc., cleaned regularly?
- ❑ Are the minimum number of toilets and washing facilities provided?
- ❑ Are all toilets and washing facilities clean and sanitary?
- ❑ Are all work areas adequately illuminated and ventilated?
- ❑ Are all pits and floor openings covered or otherwise guarded?
- ❑ Are tools and materials adequately stored?
- ❑ Are flammable liquids stored in approved containers?
- ❑ Are all flammable wastes disposed of promptly?
- ❑ Are vacuum cleaners, floor polishers and other equipment in good repair?
- ❑ Are electrical tools properly grounded?
- ❑ Is broken glass properly handled and disposed of?
- ❑ Is protective clothing used when required?
- ❑ Are waste materials deposited in metal containers and emptied on a regular basis?
- ❑ Are floor areas roped off when being mopped, waxed, etc.?
- ❑ Are proper tools used on each job?
- ❑ Are ladders and stools equipped with safety treads?
- ❑ Are employees regularly warned of hazards in certain areas?
- ❑ Are employees instructed on proper use and handling of acids, poisons, insecticide, etc.?
- ❑ Are required dust hazard warning signs properly posted?
- ❑ Are smoking and no smoking areas posted?

Vacuum Application for Combustible Dust

Describe the intended use of the vacuum: _____

Material(s): *(Please include all the materials that the vacuum may be used with)*

MSDS Sheets: (*List names and attach a copy to this checklist for future reference)*

Has a "Determination of Combustion Characteristics" been conducted? *(If so, please include copy of the report for each material.)* _____

Kst ,bar-m/s: _____ Explosion Severity(ES): _____

Pmax, bar-g: _____ Rmax, bar/s: _____

Is your material impact sensitive: _____

Atmosphere Classification: _____

Material Micron Size: _____ Quantity : _____

Material Specific Gravity (lbs/cubic feet): _____

Length of hose required: _____ Diameter of Hose: _____

Vacuum Usage

- Never suck up an ignition source or glowing ember into the vacuum.
- Review the instruction manual for complete operating instructions.
- Use only Ruwac approved accessories with Ruwac vacuums.
- Shake the vacuum filter before and after each use and every time you empty the vacuum
- Empty the vacuum before and after each use.
- Inspect the filter pleats on a regular basis to insure that an excessive buildup of material is not present.
- Inspect all power cables for damage. If there are any excessive signs of wear then replace immediately.
- Only use the vacuum in accordance to local codes. For a complete list of your local codes contact your insurance carrier. Report any findings to your Ruwac representative.
- Review the vacuums application twice annually and any time a new material is introduced to the housekeeping procedure.
- Only allow properly trained employees to use the Ruwac vacuum system.
- Never use a dry explosion proof vacuum for use on conductive metals such as aluminum, magnesium, titanium or zirconium.
- Hose lengths longer than 25' in length must meet proper resistance. Your sales representative will assist you with this. Use only certified hoses and tools as discussed with your local Ruwac representative.

As an employee of _____ I take my obligation and responsibility of maintaining a safe working environment for myself and others seriously. Therefore, to the best of my ability I will comply with the instructions and guidelines found in this Combustible Dust Guide.

Name: _____ Date: _____

Approved Accessories
to Complete Your Combustible Dust Vacuum

Fully-Conductive Rubber Tools

Rubber tools utilize 1.5″ and 2″ connections, are non-scratching and non-denting.

1. 12″ Flexible Rubber Nozzle w/ 90 degree bend
2. Bulk Pickup Tool
3. 5″ Utility Tool
4. 8″ Bent Rubber Nozzle
5. 6″ Crevice Tool
6. 4″ Round Brush with Brass and Nylon Bristles

Overhead Pipe Cleaning Tools

- Aluminum body
- Nylon bristles
- Available in three sizes that will remove combustible dust from 1″ - 6″ pipes
- Anti-static
- 1-1/2″ connection
- Overhead extension wands are available in 23″, 54″ and 60″ lengths

Hoses for Every Job

- Flexible Vinyl, Grounded Hoses in 10', 15' and 25' lengths
- Heavy-duty Vinyl, Grounded Hoses in 10', 15', and 25' lengths
- Metal, Stainless Steel Hoses in 10', 15' and 25' lengths
- Heavy-duty, Food Grade, Clear Urethane Hoses, Grounded in 10', 15' and 25' lengths.
- Static Conductive Urethane Hoses in 10', 15', and 25' lengths

At Ruwac, each accessory is tested with your vacuum before shipping to your facility. This certifies the vacuum and accessories as Explosion Proof. Never use non-Ruwac accessories with your Ruwac vacuum.

Portable Electric & Pneumatic Explosion Proof Vacuums

Manufactured under strict quality control in Ruwac's ISO 9001 registered plant, our explosion-proof vacuums are made in the U.S.A. and are intrinsically safe, with all parts and components fully grounded, static dissipating and guaranteed to be spark-free. Every one of our explosion-proof vacuums conforms to Class I, Division 1&2, Group D and Class II, Division 1&2, Groups F&G requirements for use in hazardous locations. Electric models are ETL third party certified to UL and CSA and our air models are built to these same high standards.

- Continuous duty TEFC explosion proof motor
- Multi-stage centrifugal, high performance turbine with relief valve
- Rated for continuous duty operation 24/7
- Grounded hoses and tools
- Certified dustless filtration system
- Fully grounded filter
- External filter shaker
- Upgradable to HEPA filter
- Foot lever actuated dustpan
- Dust free emptying

Immersion Separators & WET Collection

Ruwac's portable immersion separation systems are designed to safely collect explosive or glowing media by capturing the hazardous material and completely submerging it in liquid. The chance of an outside ignition source entering the vacuum, is safely ruled out.

Mist filters remove contaminated water from the airstream. The dust, as sludge, settles on the bottom for easy removal. The liquid is reused.

All of Ruwac NA series Immersion Separation Systems meet OSHA and NFPA regulations for explosive dust removal located inside buildings.

Some materials that may require an immersion separator include but are not limited to: aluminum, magnesium, titanium, zirconimum, lithium, sodium azide, glowing embers, TNT, high explosives, impact sensitive dusts, etc.

Meeting Combustible Dust Housekeeping Needs

From *PORTABLE* Vacuum Cleaners

to *CENTRAL* Vacuum Systems

For over 30 years, Ruwac has been manufacturing explosion proof portable vacuum cleaners and central industrial vacuum systems ranging from 2 to 250 horse power. Our legally certified explosion proof vacuums are available for use in Class I and Class II atmospheres and are used around the world to collect and contain combustible dusts.

Specializing in safe collection of conductive metals such as Aluminum, Magnesium, Titanium and Zirconium, Ruwac's Immersion Separation Wet Collectors have become the industry standard for the safe collection of conductive metals and high explosives.

If your application requires more than 8 cubic feet of collection OSHA mandates exterior equipment location with explosion venting and possibly isolation dampers. Ruwac's in-house engineering department is experienced at custom designing central vacuum systems for your individual needs. We build our own PLC's and controls to provide you with a 100% customer satisfaction guarantee.

Ruwac's industrial vacuums are known for their reliability, innovative design and superb filtration. Whether it be a housekeeping application or point of source extraction, let Ruwac be your solution for your industrial vacuum requirements.

Built in the USA, our explosion proof vacuums offer more filtration, increased vacuum, and custom hoses and accessories, all at the most competitive pricing. No matter how many vacuums have failed you, we guarantee that our state-of-the-art filtration system will return only clean air to the workplace, creating a true dust-free environment!

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