



## Relationship between dirtiness and hazardous zones

Let's first fix some milestone concerning ATEX environments as critical, dangerous or classified workzone areas

### Norms

US and EU issued norms ( have a look to this link <http://www.safetyworkingareas.org/index-uk.asp>) to be followed regarding hazardous zones/areas that involves floorings as well as personnel protection garments, furniture finishing, specific tools like vacuum cleaners / scrubbers for example , antistatic forklift and trolleys or even cell phones ...

We will focus here on floorings as Dycem CCM has related to the floor and to the actions and operations that on it are normally taking places.

Could be due to my personal experience in EPA area but in work places everything begins from the floor and cleanliness level and this to us Dycem + AC Supply) is a good point to start from in in this analysis



First of all ATEX zones might involve DUST and or GASES, do not forget. Well, in this analysis we are considering dust residues only.

### Definition of a Potential Explosive Atmosphere

The definition consider a potential explosive atmosphere as generated by a **dust cloud** (closed or restricted environment) as well by a dust layer on the floor (unrestricted zone). The second one is able to generate a spark and a fire while the first one can explode: this is the main difference and a good risk analysis have to take really care of this detail.

ATEX zones are dangerous due to the concentration of dust residues that could be generate by ordinary production first and secondly by extraordinary or unattended problems or happenings and latest but not the last in importance the cleanliness of the environment

Please have a look to these two pictures

| Customer : chemical production plant all AtEx zone  |  |
|---|--|
| AtEx zone : floor clean and dissipative   | AtEx zone: dirty after six month of "no ordinary maintenance and cleaning" of the floor, it changed color from blue to grey.<br>Customer was then force to buy an AtEx scrubber to remove the thin dust layer that was insulating the high quality flooring. |
|                                      |    |
| Now customer is budgeting CCM to protect the access of forklift to easy the ordinary maintenance of the entire flooring |  |

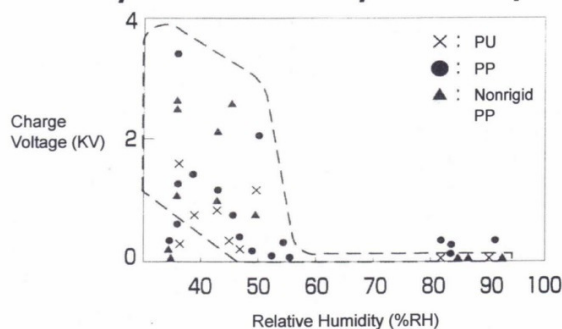


ATEX zone are risky due to high concentration of flammable dust and powders into a closed or restricted environment in combination with reduced Humidity Rates (HR) and high or low temperature level (T°). These two parameters are very common in acclimatized environments.

Generally, but commonly unknown to the most, very low HR rate is highly dangerous even in open air environment ( think about oil and gas plants) that are expose to high ( oil plant in middle east) or very low (gas extraction in Russian countries )T° values

--- *Cooling as Effective as Four Packaged Air Conditioners* ---

**1. Maintaining Humidity at 55-60%RH Reduces Troubles caused by Static Electricity drastically**



Relationship between the humidity and the charge voltage

**Real words...**

ATEX zones generally “should offer” dissipative flooring all over. This is the main point of our analysis as a good dissipation (passive means to ground) is mandatory for safety reason in critical zone (consider surgery operation rooms , E.P.A. area, pharma cleanroom with vinyl ESD tiles, etc..

Please have a look to this link: <http://www.acsupply.it/?q=node/1033> where CCM has connected to ground due to its dissipative properties. This can be consider a detail but into a hazardous zone, it is a safe draining to ground system for static charges generated and/or cumulated by a body in movement.

Therefore, it is clear that operators as well as trolleys or forklifts should be always “grounded” when operating into an ATEX zone.

Dissipative safety shoes are consider now a safety garment or personnel protection as dissipative casters or wheel should equip all trolleys and forklift.

**Kind of “dust barrier” to a proper draining**

In fact, you could face low dust level or higher residues on the floor and these two problems have to be handle separately.

Low Dust Level as well as Fine Dust Level (pharma or food) can be controlled and or localized in advance by means of CCM.

Higher Dust Residues should be recover by means of more radical system as ATEX vacuum cleaner equipped with adequate high efficiency exhaust filtering system.

These two “cleaning” systems should always work together, always ready to use in case of need and integrated to keep contamination under control in critical zones



### **Given these basic data our analysis should focus on the following main points**

When operators as well as forklifts or trolleys run into an ATEX zone the only means to ground is the sole of the shoe or the casters/ wheels that, for safety reason have to be dissipative, drain the static charges.

So what happen if dust residues might interpose between the floor and the sole or wheel?

A very thin and most of time is an unattended barrier to “ground” for static charges.

This a potential but dangerous obstacle to a correct draining of the static charges to go to ground that into an ATEX zone is consider a real weak point of a safety chain.

In other word, **what Dycem CCM could offer to these restricted and risky zones?**

Dycem CCM is offering an invisible barrier where both soles and caster/wheels can be clean to keep the correct connection to ensure a safe and continuous drainage of static charges cumulated.

### **Fields of application**

Topic. Fine dust as flour can be worst that general dirty because is so lightweight in the air that can cover up all surfaces and even hidden point (like a cloud dust)... and this is important to know because enlarges the fields of applications that are involved: Pharma, Chemical, Food, metallurgy, compounds etc...

Primary ATEX sections are:

Pharma and Food active principle manufacturer

Aerospace and automotive using conductive powders and alloys

Medical where the presence of oxygen and sterilization systems is need

Explosives manufacturers for civil and military applications

### **Peel-off mat vs CCM**

In this case, we are not taking in consideration the “cost” analysis but the “risky” analysis

The daily peeling of action is the easiest and uncontrolled way to generate an intense static discharge, insulated with no way to dissipate the energy but in the surrounding atmosphere.

Let’s consider this situation: a contractor’s cleaning operator that time to time, but daily, has to remove a sheet from a peel off mat. This is a potential risky of ignition operation. Daily.

For example, look to this link: <http://www.acsupply.it/?q=node/825>

This case study shows customer’s needs to protect the access, directly out of an elevator for forklift from ground level. Forklift and trolleys were continuously accessing a restricted area with very dirty wheels as well operators doing the same using the stairs.

In the pictures you can see that 3 unit of CCM were placed as invisible barriers impossible to miss cross so both operators and forklift were decontaminating themselves before moving inside a critical zone.

A “clean” contact is the main and safer system for a body to drain static charges generated and accumulated.

Uncontrolled sparkles definitely generated by “insulated” and uncontrolled body meeting each other are the most common causes of ignition to not to say the only one.

When uncontrolled sparkle happen inside and restricted environment with high concentration of flammable dust, low HR rates and very low or high temp level the risk of ignition is at the door.

This is mainly the reason why high level of cleanliness is required more than useful no matter if for biological or general dust/powder collection needs.



Take a view to the case study in this link and you will better comprehend <http://www.acsupply.it/?q=node/822>

This case shows how the dirtiness of the access, floors and shoes sole were affecting the ESD Shoes TEST that operators had to do before entering the E.P.A. Electronic Protected Areas (ISO 7) where fine electronic assembly process, SMT technology etc., were taking place. (Look at the metal plate, left in the third picture)

Before installing the CCM WZone onto the access ramp, the TEST was giving FAIL when soles were very dirty.

The solution was to place the CCM that was cleaning both soles and wheel's forklift and results was very clear as in the picture the white floor was very shining even with the orange manual forklift was in.

Last picture is showing the dirty retained by the CCM mat after 4 hours of a normal working day: is fully dirty, not only in the traces. Customer was hard to believe this was happening daily.

## **FINAL**

An unsafe drainage for an ESD component may cause a problem on the PCB but it is easy to think to the kind of risk and damage could be inside and ATEX environments if operators and forklift are not correctly ground.