FLOW line = ACTIVE storage with approval!

The storage of hazardous materials has been defined for decades and is specified in various legal tests such as the Occupational Safety Regulations (BetrSichV) or the Technical Regulations for Flammable Liquids (TRbF). Clearly formulated definitions of active and passive storage exist. However, the solutions implemented in practice often differ from the legal requirements. Standardized solutions are difficult to find, especially for the active storage of smaller quantities in the working space, e.g. a 200 litre drum of flammable liquid.

There are renowned manufacturers of safety cabinets on the market who offer tested products for passive storage of 200 litre drums according to TRbF 20 Annex L or EN 14470-1. However, passive storage presupposes the following requirement:

- Safety cabinets in the sense of this TRbF are used for the storage of flammable liquids in sealed containers within a working space. *(Extract from TRbF 20, Annex L – Item 1.1)*

But there are extremely few cases in which a 200 litre drum of flammable liquids is stored sealed (= passive) at the workplace. Practice shows that in general active storage exists:

- Active storage is the storage of flammable liquids in mobile containers, which are used in the place in which they are stored as a stationary discharge or collection container or are opened for other purposes. *(Extract from TRbF 20 – Item 2.1.6)*

So the question remains, what can be used if active storage is required?

The company DÜPERTHAL located at the Bavarian Untermain region took up this question and, in collaboration with the experts of the TÜV Süd, developed products which solve these problems. In the first step the focus was on a safety cabinet according to EN 14470-1, which was already approved for passive storage of a 200 litre drum. But how does a passive safety cabinet become a cabinet approved for active storage?

Prevention of the danger of ignition

An important aspect of active storage is continuous earthing in accordance with the TRbF 30 requirements for "filling stations" and the Guidelines of the employer's liability insurance associations BGR 132 "Avoidance of danger of ignition". This requirement is solved in DÜPERTHAL cabinets in that all metal components inside the cabinet, e.g. collection trays and grating are conductively connected with each other. Further, the safety cabinet is equipped with two earthing terminals, one each for the drum and for the drum pump. There are prepared earthing connections on the top of the cabinet which enable the user to connect the system to the earthing and therefore to prevent static charging.

Ventilation and ex-zones

According to TRbF 20, Annex L, safety cabinets for passive storage do not necessarily have to be connected to the ventilation. A substantial reason for this is that closed containers only may be stored in conventional safety cabinets. In the case of active storage on the other hand, critical ex-zones (hazardous area zones) in accordance with TRbF 30 occur due to the open container. As a consequence, the drum cabinet must be ventilated with at least ten-fold air exchange per hour. Further, the ventilation must become active in each cabinet level, which is achieved in a drum cabinet with exhaust and air supply roses in each cabinet level. It is also necessary to monitor the function of the

ventilation and to comply with the legal requirements for fans. DÜPERTHAL therefore offers a ready to plug in ventilation unit with integrated exhaust monitoring unit which conforms to ATEX.

Pipe penetration

The doors of safety cabinets according to EN 14470-1 or TRbF 20, Annex L, are self-closing in the event of a fire. But for active storage with drum pumps, this means that the media and energy lines cannot be "simply" passed through the open doors. The ideal solution is a tested and approved pipe penetration for stainless steel pipes. If this pipe penetration is used, up to four stainless steel pipes with a maximum diameter of 20 mm, or optionally one pipe with 28 mm diameter, can be laid so that it emerges out of the side panel or the top of the cabinet. The pipe penetration has been successfully tested in a fire chamber test with the drum cabinet by an independent materials testing institute. The safety cabinet was classified as being Type 90 (= fire resistance for at least 90 minutes). In this way, the optimum solution has been created for connecting an explosion-proof compressed-air drum pump inside the cabinet.

Practical use

GE Global Research Europe is the European research centre of the global company General Electric. The corporation is present in more than one hundred countries and has a clear focus: to transform inventiveness into tangible concepts and products.
Mr. Frey and Mr. Ast of GE Global Research were among the first to use the new DÜPERTHAL system tested by the TÜV (German technical inspectorate). Global Research integrated the new solution into its practical processes a year ago – enough time to ask what their experience has been to date:

What are the main tasks of GE Global Research in its Munich location?

Mr. Frey: GE Global Research is specialised in environmental technologies and alternative energy systems as well as sensor technology, fibrous composite materials and highly-developed medical imaging technologies.

What was it that made you decide to procure the solution used by you?

Mr. Frey: We have developed a new test set-up in which a highly inflammable solvent was used. At the same time it was necessary to take the solvent from a 200 litre drum, to integrate it in the test set-up and then to safely collect it again. During the course of this, we looked for a safe storage system.

How did you become aware of DÜPERTHAL or rather its solutions?

Mr. Ast: We had already developed our own concepts when planning the test set-up. We then looked for a competent partner for the implementation. At this time we were already using DÜPERTHAL safety cabinets in various laboratories. The obvious thing to do was therefore to contact Düperthal.

Did your planned concepts identical with the DÜPERTHAL solutions straight away?

Mr. Ast: The concept did, yes, i.e. we were looking for a safe storage system. However, to date we had only been familiar with storage cabinets for passive storage. The solution proposed by DÜPERTHAL with the system for active storage was then new to us in practice.

How is the design of the new solution?

Mr. Ast: We received two drum cabinets with pipe penetration according to DIN EN 14470-1 and with TÜV-GS approval from DÜPERTHAL. One safety cabinet is used as a supply unit. Using an explosion-proof compressed-air pump, the medium is pumped from a 200 litre drum in this cabinet via the pipe penetration into the test set-up. In the second safety cabinet we have integrated another collection tank in which, after use, the solvent is collected by means of gravity feed.

How were the cabinets delivered?
Mr. Ast: The two drum cabinets were delivered free direct to site by a specialist shipper. The pump components were already fitted. Installation and integration in our system was easy as the interfaces were clearly defined in advance. We also found it very good that the exhaust system with monitoring was delivered, ready to pug in, at the same time as the cabinets. This meant there was no need for time-consuming adjustment by a ventilation firm when the ventilation was connected. A very good package solution!

Apart from storage conforming to the regulations, what other advantages has new solution?
Mr. Frey: Thanks to the new solution we were able to reduce transport distances and integrate the solvent directly into the 200 litre drum in the test set-up. That saves time and increases efficiency. Furthermore, small residual quantities of medium only remain in the pipes and can be easily returned.

What was the support from DÜPERTHAL like with regard to advice before and after the order was placed or rather putting into service?
Mr. Frey: Due to the advice we received, we now have a better solution than was originally planned. The support was optimally organised from the planning phase, putting into service and the after-sales support.

DÜPERTHAL rates quality very highly and has received the high-quality seal from the TÜV. How satisfied are you with the quality?
Mr. Frey: We were already satisfied with the "old" safety cabinets otherwise we would not have sought direct contact with DÜPERTHAL. We are also more than satisfied with the "new" units.

The new concept of the active drum cabinet is now a product in a complete cabinet line; the FLOW line. The FLOW line safety cabinets are all approved for active storage of flammable liquids. Apart from the drum cabinet, the FLOW line also includes:

- XXL drum station:
  With its standard fittings, the filling and transfer station is the solution for safe storage and transfer from 200 litre drums with flammable and water-polluting liquids.
  The drum station consists of two Type 90 classified safety cabinets, including self-closing tap with object extraction, explosion-proof compressed air pump with automatic emergency stop in the event of a fire, collection volume of 2 x 220 litres and exhaust monitoring unit with fan conforming to ATEX.
- Canister cabinet:
  Optimum storage of canisters according to ADR/RID and for safe filling of hazardous materials into smaller containers and exhaust monitoring unit with fan conforming to ATEX.

Safety without compromises

Tested and certified products simplify the necessary documentation for ISO 9000 quality management and the environmental standard ISO 14000. Modern risk management also enables fire and environmental insurance premiums to be reduced.

DÜPERTHAL's standards include having safety products such as the FLOW line tested by an accredited testing institute such as TÜV Süd and to have this confirmed in the form of the GS mark. Each customer receives a GS certificate and declaration of conformity according to DIN EN 14470-1 and DIN EN 14727 with the operating instructions.

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Illustrations:

Image 1.) Drum cabinet 1
Discharge station for supplying the test set-up with solvent.

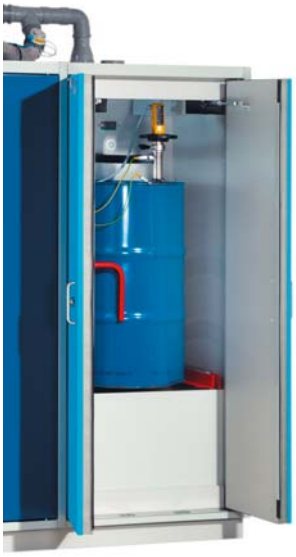

Image 2.) Industrial ventilation:
Exhaust monitoring with integrated fan – easy to install.

Image 3.) DÜPERTHAL concept
Safe and TÜV-tested supply of machines or systems, directly from the storage unit.

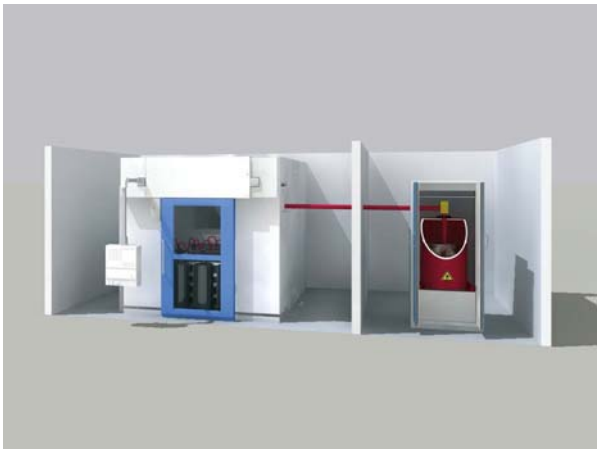

Image 4.) Pipe penetration
Reclosable pipe penetration with fire safety approval.