

Overhead material handling equipment for Zone 2

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Figure 1: Explosion protected crane installation for Zone 2 (SHexn)

Hazardous areas are classified into zones on the basis of the frequency and duration of occurrence of a hazardous explosive atmosphere. Appendix I of EC Directive 94/9/EC (ATEX) defines the criteria for classifying the equipment groups into categories. It also describes the Zone for which equipment belonging to a certain category is intended. Table 1 gives a general view of the allocation of areas/zones to equipment categories for group II.

Hazardous areas in which cranes and hoists are used are nowadays frequently classified Zone 2.

In the absence of dedicated Zone 2 equip-

ment, users previously generally had no alternative to cranes and hoists designed for use in Zone 1.

On the basis of the legal foundation pro-

vided by the EU (EC Directive 94/9/EC, (ATEX), R. STAHL Fördertechnik GmbH has developed a complete programme adapted for Zone 2 of explosion protected cranes, wire rope hoists and crane components – the first complete programme complying with ATEX-Directive.

In Zone 2, electrical apparatus which meets the essential-health and safety requirements of the Directive 94/9/EC and which is furnished with a Manufacturer's Declaration of Conformity can be used.

Electrical equipment for -Zone 2, Category 3G, must be designed and constructed in such a way that it ensures a normal level of protection – com-

plying with type of protection 'n' to EN 50021 / IEC 60079-15. These standards requires that electrical equipment may not cause the ignition of a surrounding explosive atmosphere during normal operation.

Both hoist and travel motors, equipped with directly attached, extremely long-life, low maintenance, twin disc, spring operated brakes, are classified as standard in Ex II 3G EEX nA IIT3. The motors are temperature-controlled and feature a duty cycle (% DC) and number of permissible switching operating cycles (c/h) specifically suited to hoist operation.

Hoist operation is to be classified as duty type S4 to EN 600034 / IEC 60034. It is important that the permissible number of switching operations be specified. If this is not the case,

Table 1: Selection of equipment categories for equipment group II to Zones		
Gases (G), Vapours, Mists	Dusts (D)	Definition (94/9/EC) explosive atmosphere is present:
Zone 0 - Category 1G	Zone 20 - Category 1D	Continuously, long-periods, or frequently
Zone 1 - Category 2G	Zone 21 - Category 2D	Occasionally
Zone 2 - Category 3G	Zone 22 - Category 3D	Rarely and for short periods

the user has no opportunity of reviewing during the project stage whether the hoist considered suits the application profile; under certain circumstances, unscheduled downtimes during operation might result.

As regards controls, the proven and customer-friendly division into Ex d and Ex e enclosures has been maintained. The electrical apparatus is in a flameproof enclosure (Ex d); the connection terminals in a directly adjoining connection box in increased safety (Ex e). Thanks to this indirect cable entry, both installation and maintenance of the hoist in this regard are much less costly for the user than if the cables led directly into the flameproof enclosure.

The explosion protected manual control pendant switch has been developed further and is now 2-step. The advantage for the user is that he can control hoist, trolley and crane motions with only 3 rockers, and switching over to the opposite direction, or to the second speed in each direction, is possible without adjusting one's grip. To permit precise and subtle positioning, we supply an additional creep speed as standard (1:6 or 1:4).

In contrast to its predecessor, EC Directive 94/9/EC requires the inclusion of all hazards. As regards hoists and cranes, among other things the dangers caused by mechanical sparks must be considered (also temperature rises due to friction).

The hazard assessment (EN 13463-1) resulted in a list of the occurrences and hazards to be avoided. It was important to find if possible the optimum compromise between feasible design changes and the alternative of requiring the user to take additional actions stipulated in the operating instructions of the equipment. The cooperation with one of our company's key customers was of great assistance in the search for the optimum solution.

When equipment is purchased indirectly by way of system manufacturers and as a result of the division of responsibility within companies, in many cases nowadays subsequent costs for monitoring, difficulties in handling,



Figure 2: Travel drive (exn) fitted to a crane end carriage

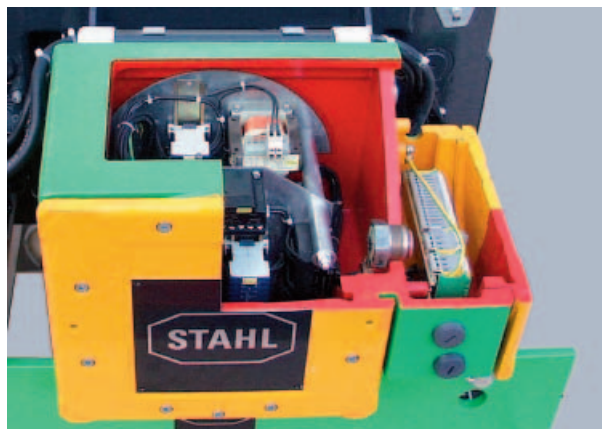


Figure 3: Section picture (K-A ex) with controls and separate terminal box



Figure 4: Explosion protected hand control pendant station (SWH 5 exn)

maintenance, etc. receive insufficient or no consideration when purchasing decisions are taken.

Despite the user friendliness of this new equipment, it is nevertheless obligatory that the user always strictly observes the operating instructions pertaining to the product. This is particularly true in this context as the explosion protection too is dependent upon it (cf. also EC Directive 99/92/EC).

Main technical data:

- The safe working load ranges up to 25.000 kg in the standard programme
- Degree of protection to EN/IEC is IP 54, IP 66 as an option
- Permissible ambient temperature -20 to $+40^{\circ}\text{C}$, $+60^{\circ}\text{C}$ as an option
- Supply voltages 50/60Hz: 220 to 690 V
- Control voltages: 48 VAC, 42 VAC, 230 VAC

Additional special customer requirements such as wheels in non-standard material or bronze-coated load hooks can of course be met with these components too.

In the cranes, crane components and SH exn wire rope hoists to category 3G for Zone 2, the user obtains equipment which enables him further to optimise his capital expenditure on explosion protected overhead material handling equipment as regards productivity and economy.