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TECHNICAL INFORMATION SHEET 48

GAS EQUIPMENT – SECURITY CAGES

The general requirements for cylinder storage are detailed in BCGA CP 44, *The storage of gas cylinders*. Specific requirements for security are detailed in BCGA CP 40, *Security requirements for the industrial, medical and food gases industry*. This document provides additional information to enhance security where cages are used to store gas equipment.

Where only small quantities (10 or less) of gas cylinders, dewars, etc., are present then a security enclosure (cage) may be used.

Example of a basic cage

DESIGN CONSIDERATIONS

The cage design shall incorporate health and safety requirements for gas storage, in line with BCGA CP 44. A security cage shall incorporate design features to deter and delay criminals (even secure cages are unlikely to thwart a determined criminal) intent on stealing equipment. The cage design shall take into account:

- size. Ascertain the quantity and dimensions of the equipment you wish to secure. A single cage should hold no more than ten cylinders, ten dewars or one bundle. If equipment quantities exceed these numbers, then either install additional cages or create a permanent secure compound (refer to BCGA CP 44);

- product value. Understand how attractive specific inventory is to theft and misuse. Design for security accordingly;

- space. Provide sufficient space for the safe handling and storage of equipment, avoid creating extra space which may encourage the casual storage of other items;

- protection. Incorporate features to resist external attack as well as from accidental damage, for example, from a vehicle;

- double protection. Consider the use of layers of protection, for example, a security cage within a security cage, providing additional and, preferably, increasing layers of security;

- access. All entry points shall be securely lockable to prevent unauthorised access;

- safety signs and warning notices. Limit the visibility of signage (for example, only to those in close proximity to the cage) but ensure this can be done without compromising site operators' safety information needs. Be aware that signs and notices contain information which

may provide target reconnaissance and assistance to criminals. It is poor practice to have signage located such that it is readable for those outside the site perimeter.

Base:

There shall be a solid base, and preferably an adjoining wall, to which a cage can be permanently secured. The floor should be constructed of reinforced concrete or other rigid, permanent, non-combustible, non-porous material. Bricks, slabs or flags should be avoided.

The floor shall be of sufficient strength to support the cage (including contents) and provide adequate security, for example, protection from deliberate damage and penetration including sufficient depth for cage ground-anchors, supports for structural members, etc.

Cage structure:

The cage shall be constructed of ferrous metal to ensure the cage is adequately protected. Its design features including:

- resistance to corrosion. Unless naturally protected, such as stainless steel, a protective finish should be applied, for example, galvanization, powder coated, painted, etc.;

- a robust structure. Structural section sizes, gauge or thickness, panels, etc., shall be sized to meet the needs of the design in respect of being robust, with an adequate level of security integrity. Proprietary security fence material may be considered, with interlocked bars, rings, other elements, etc., but not arranged such that failure of one element compromises another (often the case with general non-security fencing). Definitive guidance on minimum element sizing is not possible, but if mesh elements are used, it is unlikely that any mesh that does not provide a maximum 50 mm x 50 mm aperture, minimum thickness 3 mm (≈10 swg), welded mesh (refer to BS 4102, *Specification for steel wire for general fencing purposes*) will be adequate. Fencing that is not designated as security fencing shall generally be avoided; the only exception to this is bespoke welded steel bars. Loose side-wall material, such as mesh which can flex, shall be avoided, as it provides a potential foot-hold;

- cage walls, roofs and especially fasteners that shall be non-attackable from outside (for example, no bolted palisades, no externally accessible screwed clips, exposed bolt heads, etc.);

- access. Gates (doors) shall be suitably-sized and no larger than is necessary. A single gate, not a double gate, is preferred. Gates shall be of at least equivalent mechanical integrity as the rest of the cage, preferably with additional bracing to prevent buckling if attacked;

- the use of multi-point of support and restraint for gates to prevent over-reliance on a single latch or on non-secured secondary features such as a staple or floor-bolt, should be considered;

- fittings tolerance. Ensure the closeness of fit of gates / hinges etc., which shall be configured so that the gates cannot be used to lever, prise open or stress the security locks, hinges or latches. No gaps shall be left between cage sides and floor, between gate-posts and walls, gates or hinges, between sides, gates and roof, between gate leaves, around bolts, security brackets, etc.;

- fasteners shall be ‘permanently’ attached (for example, welded) rather than bolted, screwed, etc. This will help prevent penetration by disassembly;

- hinges shall be non-defeatable (i.e. cannot be prised open, or the gates lifted off), strong, welded and inaccessible;

- arrange bolts, latches, hasps, etc., so as not to be accessible from outside the cage. Design for protection from blunt force or shear impact, for example, by the provision of lock shields or security shrouds;

- consider anti-scaling for overhead protection: a high fence with spikes or wires, etc. if a secure roof or other adequate overhead security is not included in the cage design;

- ensure all fence supports, lock assemblies, gates and hinges, etc. are located and arranged internally to the cage (not externally) to prevent their being used as climbing aids.

Locks:

Security locks shall be of suitable integrity, designed to appropriate standards and meet the specific security needs of each location. For each security cage:

- locks shall be capable of withstanding blunt trauma. Protection of padlocks and latches from blunt-force attack, (ability to withstand attack by hammer, axe, chisels, hand-held angle-grinders, etc.) shall be provided. Consider close-fitting shielding, to physically limit access and accessibility and the use of hardened or high-integrity components and construction methods;

- use security padlock(s) of an appropriate size and standard, refer to BS EN 12320, *Building hardware. Padlocks and padlock fittings. Requirements and test methods*. This standard grades padlocks from 1 to 6, with 6 being the highest security grade. Operators shall select a grade as determined by their security vulnerability risk assessment;

- the use of electronic locks may be considered, instead of or in addition to mechanical locks. It is possible to predetermine who has access, when they have access and where exactly they can have access to. Such electronic systems can be incorporated into an IT-assisted security system;

- the use of securing chains is inferior to padlocks alone. The use of ‘contractor’ multi-lock-and-chain arrangements is not recommended as the system will only be as strong as its weakest link (even when used on a temporary basis).

Internal structure:

Means shall be provided to secure individual equipment in their designated location and to prevent them falling over, using, for example, chains, lashing, etc. More secure methods (for example, security locks) may be considered for high value or high consequence inventory (for example, toxic gas cylinders, inventory which may be misused as illegal narcotics, etc.).

Infrastructure close to the cage:

Consider the use of fencing, barriers, bollards, protectors, etc., to protect the cage from accidental damage and, where feasible and beneficial, to minimise its visibility. These additional features shall not create additional security vulnerabilities (for example, by providing ‘leg up’ assistance).

Where there is infrastructure close to the cage:

- install protective measures to protect the cage from damage, for example, from the manoeuvring of vehicles, fork lift trucks, etc. Consider the proximity of vehicle accesses, site boundaries, non-secured areas which provide 'ram raid' possibilities on gates and walls, etc.;

- remove or disable objects, for example, tie-downs and ratchets, vehicle lifting jacks, items which could be used as battering rams, cranes and hoists, etc.;

- identify and eliminate any nearby 'hard points' or 'tie-down points';

- do not allow structures or features which may assist in climbing a cage (a 'no leg ups philosophy'). When not in use, remove equipment such as unsecured ladders, steps, etc., but also less obvious items such as bundles, barriers, fork lift trucks and other climbable items;

- use good housekeeping practices to ensure that no assistance is inadvertently given to the criminal by leaving 'useful' items on-site which may facilitate theft, for example, tie-downs, ratchets, levers, rams, etc.

IN SERVICE

There shall be a clear, risk assessed local policy on when cages are to be locked, when they may be left unlocked and who is authorised for access.

Good housekeeping, including a cage inspection and maintenance regime shall be in place and enforced, with an emphasis on ensuring cage security remains intact.

For more information:
British Compressed Gases Association (BCGA) www.bcga.co.uk

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