

## SHAW BOX 防爆及防火花吊車

### EXPLOSION PROOF AND SPARK RESISTANT

#### 爆炸的三要素：

1. 易燃物(氣體,煙霧,粉塵等)
2. 氧氣
3. 電能或熱能(充分值)

以上任何之一不存在,爆炸就不會發生,任何危險區域之保護方法是在於防止不同情況的存在。無論如何,本身的安全是在防止充分之電能和熱能的出現。

#### 危險區域的定義：

##### CLASS

CLASS I	區域	可燃性氣體或蒸氣也許出現在空氣中而且足以產生爆炸,或可點火之混合。
CLASS II	區域	由於可燃性粉塵的存在。
CLASS III	區域	由於容易點燃之纖維或飄浮物的存在,但如果纖維或飄浮物不像是懸吊在空中而產生可點燃之混合。

##### DIVISION

DIVISION I	在正常的操作情況,危險會連續地,間歇地或定期地存在空氣中。
DIVISION II	危險集中是被處理或產生在密閉的容器或密閉系統,萬一意外破裂,而逃出造成危險。

##### GROUP

GROUP A	大氣中含有乙炔(ACELYLENE)(SHAW BOX)產品不適合。
GROUP B	大氣中含有氫氣氣體,或是相當危險的蒸氣(諸如製造氣體)。
GROUP C	大氣中含有二乙醚(ETHYL-ETHER)氣體,乙烯(ETHYLENE)-環丙烷(CYCLO PROPANE)。
GROUP D	大氣中含有汽油,己烷(HEXANE),石油精(NAPHTHA),輕油精(BENZINE),丁烷(BUTANE),酒精(ALCOHOL),丙酮(ACETONE),笨(BENZOL),去漆有溶液蒸氣(LACQUER SOLVENT VAPORS)或天然氣(NATURAL GAS)。
GROUP E	大氣中含有灰塵材質,包括:鋁鎂和鋁鎂化合物和其他附有危險特性金屬。
GROUP F	大氣中含有黑炭,煤或焦炭粉塵。
GROUP G	大氣中含有粉末(FLOUR),漿糊(STARCH),糧粒灰塵(GRAIN DUST)。

<b>Single &amp; Double Reeved</b>	<b>Industrial User Price List</b>	<b>ELECTRIC HOIST OPTIONS</b>	<b>Y80 - 800 Series</b>
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**EXPLOSION PROOF CONTROL**

**Options for Hazardous Environments**

Y80 and 800 Series Hoist and Trolleys can be provided to operate in most hazardous environments. Following in this electrical options section are price adds for motors, brakes, limit switches, pendant stations and control enclosures required to operate in hazardous environments.

Before pricing out the required options you must know the Class, Group and Division of Hazardous environment, as defined by the National Electrical Code. Below are definitions and example sheets to aid in the determination of the environment the hoist will operate in.

**Definitions**

**Class**

- Class I**      Locations: Are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.
- Class II**      Locations: Are those which are hazardous due to the presence of combustible dust.
- Class III**     Locations: Are those which are hazardous due to the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in the air in quantities to produce ignitable mixtures.

**Division**

- Division I**    Locations in which hazardous concentrations in the air exist continuously, intermittently, or periodically under normal operating conditions.
- Division II**   Locations in which hazardous concentrations are handled, processed, or used but are normally within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown.

**Group**

- |                 |                |   |
|-----------------|----------------|---|
| <b>CLASS I</b>  | <b>Group A</b> | Atmospheres containing acetylene. (not available on Shaw-Box products)  |
|                 | <b>Group B</b> | Atmospheres containing hydrogen, or gases or vapors of equivalent hazard, such as manufactured gas. (not available in Division 1 design)              |
|                 | <b>Group C</b> | Atmospheres containing ethyl-ether vapors, ethylene or cyclo propane.   |
|                 | <b>Group D</b> | Atmospheres containing gasoline, hexane, naphtha, benzine, butane, alcohol, acetone, benzol, lacquer solvent vapors, or natural gas.                  |
| <b>CLASS II</b> | <b>Group E</b> | Atmospheres containing metal dust, including aluminum, magnesium and their commercial alloys and other metals of similarly hazardous characteristics. |
|                 | <b>Group F</b> | Atmospheres containing carbon black, coal or coke dust.   |
|                 | <b>Group G</b> | Atmospheres containing flour, starch, or grain dust.  |

# Single & Double Reeved

# Industrial User Price List

# ELECTRIC HOIST OPTIONS

# Y80 - 800 Series

## **EXPLOSION PROOF CONTROL** **Options for Hazardous Environments**

Below is a chart detailing the motors, enclosures and electrical modifications provided by the price adders in this section for the various classes, groups and divisions of hazardous environments the Y80 and 800 series are available for.

### **Hazardous Locations**

#### **Electrical Standards\***

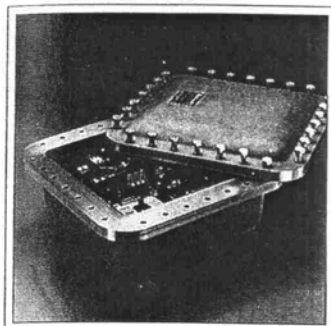
Hazardous Location Equipment	Class I Group C & D	Class I Group B, C & D	Class II, Div. 1 Group E, F & G	Class II, Div 2 Group F & G
	Division 1	Division 2		
<b>Motors</b>	"Explosion-Proof" approved for Class I, Group C or D (as applicable)  <b>With TAS</b>	TENV or TEFC squirrel cage only  <b>No TAS</b>	"Dust-Ignition-Proof", approved for Class II  <b>With TAS</b>	TENV or TEFC dust-tight, squirrel cage, B insulation rise  <b>With TAS</b>
<b>Brakes</b>	Approved for Class I, Group C or D (as applicable)	Enclosed Std. disc type	Approved for Class II & applicable group	Enclosed dust-tight disc type
<b>Control Enclosure</b>	NEMA type 7	NEMA type 7	NEMA type 9	NEMA type 4/12
<b>Limit Switch Enclosures</b>	NEMA type 7 or ISR	NEMA type 7 or ISR	NEMA type 9 or ISR	NEMA type 4/12
<b>PB Station Enclosures</b>	NEMA type 7 or ISR	NEMA type 7 or ISR	NEMA type 9 or ISR	NEMA type 4/12
<b>Main Disconnect Device</b>	Circuit breaker only in NEMA type 7 enclosure	Circuit breaker only in NEMA type 7 enclosure	Circuit breaker only in NEMA type 9 enclosure	Circuit breaker or fusible switch in NEMA type 4/12 enclosure
<b>Runway &amp; Cross Conductors</b>	Cable Reel	Cable Reel	Cable Reel	Cable Reel

\*NOTE: The National Electric Code does not refer to Spark Resistant features. These must be user specified.

## SHAW BOX

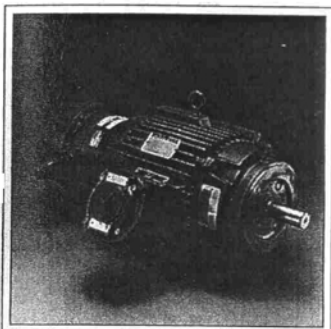
### 防爆電氣零件

### 防火花機械零件



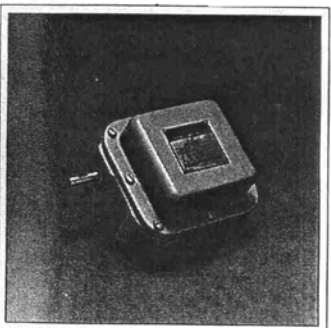
#### NEMA 7/9 封閉性的控制

NEMA 封閉性的控制,設計來減少或消除在危險環境爆炸的危險,NEMA 7 封閉性防止氣體延伸到儀盤之內部而造成火花之危險,NEMA 9 封閉性是有墊片來防止危險粉塵之爆炸量的進入而造成危險。



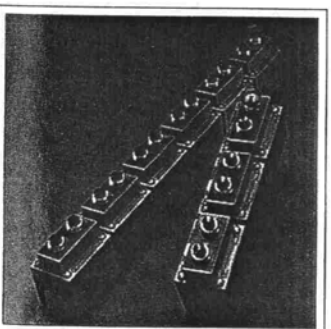
#### 防爆炸或防粉塵,火花馬達

防爆馬達和剎車和 NEMA 7 封閉性控制一樣的作用,在於防止在馬達和剎車內產生爆炸,不論氣體或粉塵,使它的操作在危險物質的閃火點以內,圖示為一種防爆馬達和剎車使用在 CLASS 2 GROUP F DIVISION I。



#### 防爆極限開關

未經保護的極限開關也能造成在危險環境爆炸的危險,防爆和防塵,火花之齒輪或滑塊型極限開關也都提供了 NEMA 7 和 9 之設備,圖示為一種 NEMA 7 封閉性齒輪極限開關。



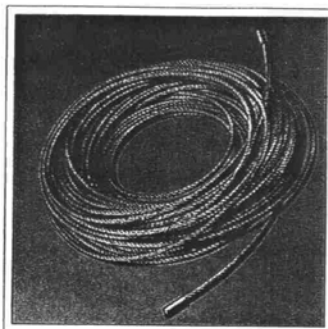
#### NEMA 7/9 押扣開關

NEMA 7/9 押扣開關在於防爆封閉性來防止爆炸材料產生之火花,本封閉性可以防止可燃性粉塵浸入而造成爆炸,使用標準控制零件。



#### 本身的安全控制押扣開關

本身固有的安全系統,裝有一個移動接觸器附有電氣零件操作使電壓太低而不會造成氣體或粉塵閃點,本移動控制,必需裝在 NEMA 7 或 9 的封閉性外殼,本押扣開關較小,較輕和標準封閉性(圖示)減少操作之疲乏,允許較容易的操作本設備。



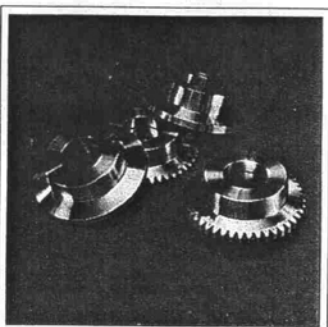
#### 不銹鋼鋼索

作為危險使用,可以防止火花,吊車用不銹鋼索取代標準的鋼索,不銹鋼索在使之和鋼索滾筒接觸,可以減少火花產生的可能性。



#### 銅鉤頭和下滑車

整體鑄銅鉤頭,即使鉤頭撞鋼鐵物,或其他鐵金屬物,也能減少火花產生的可能性,鉤頭提供不銹鋼彈簧安全舌片,為標準特性:整個下滑車本體:由整體銅板焊接而成整體銅用來取代電鍍鋼,因電鍍能被剝除或磨耗,整體銅則不會。



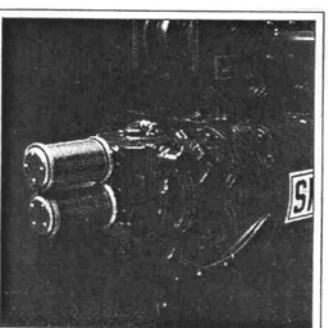
#### 銅製小車輪

小車輪由錳銅製造而成,減少火花的可能性,當接觸到鋼軌,橋樑或縱行樑或驅動小齒輪,均可減少危險環境產生火花的可能性圖示為懸吊單軌小車。



#### 銅製大車輪

頂上或懸吊大車輪由銅錳製作而成,作為防火花用,銅輪接觸到鋼軌,走行樑或驅動小齒輪,故可減少危險環境火花的可能性,(圖示)為輪子和小齒輪作為懸吊大車用。



#### 氣動操作吊車

氣動操作吊車是一種理想作為危險環境使用,氣動可以消除電氣馬達和電弧等因素,另外氣動操作提供可變速度控制,作為精密定位(圖示為一種氣動氣缸馬達驅動 700 系列吊車)。



## EXPLOSION PROOF ELECTRICAL COMPONENTS



### Nema 7/9 Control Enclosures

*Nema control enclosures are designed to reduce or eliminate the risk of explosion in hazardous environments. Nema 7 enclosures prevent ignition of gas external to the enclosure by containing the explosion within the panel. Nema 9 enclosures are sealed to prevent an explosion by excluding the entry of explosive amounts of hazardous dust.*



### Explosion or Dust Ignition Proof Motors

*Explosion proof motors and brakes perform in the same way as Nema 7 control enclosures, preventing the ignition of external gas by containing the explosion within the motor and brake. Dust-ignition proof motors prevent ignition of the dust in the atmosphere, or which has built-up on the motor and brake, by operating at temperatures below the ignition point of the hazardous materials. Illustrated is an explosion proof motor and brake for use in a Class 2, Group F, Division 1 atmosphere.*



### Explosion Proof Limit Switch Enclosures

*Unprotected limit switches can also pose an explosion risk in hazardous environments. Explosion proof and dust ignition proof geared or block type limit switches are provided for Nema 7 and 9 equipment. Illustrated is a Nema 7 geared limit switch enclosure.*



### Nema 7/9 Pendant Stations

*Nema 7/9 pendant stations use standard control components in an explosion proof enclosure to prevent ignition of explosive materials outside the pendant station. The enclosure prevents ignitable dust from seeping in, and contains any explosion.*



### Intrinsically Safe Controls & Pendants

*Intrinsically safe systems engage a motion's contactors with electrical components operating at voltages too low to cause ignition of gases or dusts. While the motion's controls must be housed in a Nema 7 or 9 enclosure, the pendant station can use a smaller, lighter, standard enclosure (as shown) reducing operator fatigue and permitting easier operation of the equipment.*

## SPARK RESISTANT MECHANICAL COMPONENTS



### Stainless Steel Wire Rope

*For hazardous applications that require spark resistant features, the hoists are reeved with stainless wire rope instead of the standard plow steel. Stainless steel rope reduces the possibility of sparking when making contact with the rope drum, sheaves, or external objects with which it may come in contact with.*



### Bronze Hooks & Lower Blocks

*Solid, cast bronze hooks reduce the possibility of sparking in the event the hook strikes steel or other ferrous metal objects. Hooks are provided with stainless steel, spring-loaded safety latches as a standard feature. The entire lower block body is fabricated from solid bronze plate. Solid bronze is used instead of coated steel because coating can chip or wear off—solid bronze does not.*



### Bronze Trolley Wheels

*Trolley wheels manufactured from Manganese bronze reduce the possibility of sparking when in contact with steel rails, bridge or runway beams, or drive pinions, thereby also reducing the possibility of igniting the hazardous atmosphere. Illustrated are wheels for under-running monorail hoists.*



### Bronze Bridge Wheels

*Top or under-running bridge crane wheels are manufactured from manganese bronze for spark-resistant requirements. Bronze wheels contacting a steel rail, runway beam or drive pinion reduces the possibility of hazardous sparks. Illustrated are wheels and pinions for under-running bridge cranes.*



### Air Operated Hoists

*Air operated hoists are ideal for hazardous environments. Air power eliminates electric motors and controls and the sparking and arcing associated with them. Plus, air operation inherently provides variable speed control for precise spotting. (Illustrated is an air-piston motor driven 700 series hoist.)*



## ENGINEERED FOR EXPLOSIVE ATMOSPHERES

For over 100 years, Shaw-Box cranes and hoists have set industry standards for performance and durability. Using state-of-the-art technology, they have met the most rigorous industry demands. The same commitment to excellence that made Shaw-Box an industry leader is evident in our materials handling equipment for critical applications in hazardous environments.

All Shaw-Box products are designed and built to rigid design and manufacturing standards. Our crane components and hoists meet or exceed the requirements of article 500 of the National Electrical Code. Shaw-Box also produces hoists and crane components in a wide range of capacities and lifts for duty in more demanding conditions. These components are specially designed to work safely and efficiently in the most hazardous environments.



Only the finest parts and materials are used to provide the maximum in safety, quality, and ease of maintenance. Explosive environments are safer with Shaw-Box explosion proof motors, brakes, and electrical components, including fittings, seals, enclosures, and limit switches. Shaw-Box also makes intrinsically safe electrical components which

operate at voltages too low to cause ignition. Shaw-Box provides the industry's finest spark-resistant components, including stainless steel wire rope, solid manganese bronze or stamped beryllium copper wheels, duronze bronze hooks and lower block bodies constructed

entirely from solid bronze plate.

Shaw-Box explosion proof and spark resistant hoists and crane components have been industry tested and proven in hazardous environments around the world. They are designed to meet the requirements for these applications as defined by the National Electrical Code for: Class 1, Groups C & D, Division 1 and 2 and Class II, Groups E, F & G, Division 1 and 2 environments.