GUIDE TO HAZARDOUS LOCATIONS

Explosive Gas & Dust Atmospheres

Ex

SHYAAM

SHYAAM SWITCHGEAR (P) LIMITED

Manufacturer Of Flameproof & Weatherproof Electrical Equipment, LED Light Fittings & Air Conditioners

Address : 36, Sumtinath Industrial Estate, Behind In Orbit Mall, Off Link Road, Next To Tangent Furniture, Malad (W), Mumbai - 400064

Phone : Mr. Baljinder singh kumar (+919967536753)
Mr. Sunil Agarwaal (+919324670143)
Mr. Nilesh Agarwaal (+919324789171)

Email : sales@activacontrols.com
ssplflp@gmail.com
sunil@shyaamswitchgears.com

Web : www.shyaamswitchgears.com

Ignition Protection Concepts for Electrical Equipments

Explosive Atmosphere		Relevant Code		Protection Concept	EPL & Suitable for use in Zone	
Gas	Dust	Gas	Dust		Gas	Dust
		IS/IEC60079-0		General Requirements		
Ex da Ex db Ex dc	X	IS/IEC60079-1	X	Flameproof	Ga (0, 1, 2) Gb (1, 2) Gc (2)	X
Ex pxb Ex pyb Ex pzc		IEC60079-2		Purge Protected	Gb (1, 2) Gb (1, 2) Gc (2)	Db (21, 22) Db (21, 22) Dc (22)
Ex q	X	IS/IEC60079-5	X	Powder Filled	Gb (1, 2)	X
Ex ob Ex oc	X	IS/IEC60079-6	X	Oil Immersed	Gb (1, 2) Gc (2)	X
Ex eb Ex ec	X	IS/IEC60079-7	X	Increased Safety	Gb (1, 2) Gc (2)	X
Ex ia Ex ib Ex ic		IS/IEC60079-11		Intrinsically Safe	Ga (0, 1, 2) Gb (1, 2) Gc (2)	Da (20,21,22) Db (21, 22) Dc (22)
Ex nC Ex nR	X	IS/IEC60079-15	X	Sealed / non-incendive Restricted Breathing	Gc (2) Gc (2)	X
Ex ma Ex mb Ex mc		IS/IEC60079-18		Encapsulation	Ga (0, 1, 2) Gb (1, 2) Gc (2)	Da (20,21,22) Db (21,22) Dc (22)
Ex op is Ex op pr Ex op sh		IS/IEC60079-28		Optical radiation protected	Ga (0, 1, 2) Gb (1, 2) Gc (2)	Da (20,21,22) Db (21,22) Dc (22)
X	Ex ta Ex tb Ex tc	X	IS/IEC60079-31	Dust Ignition Protected	X	Da (20,21,22) Db (21,22) Dc (22)
Ex sa Ex sb Ex sc		IEC60079-33		Special protection 's'	Ga (0, 1, 2) Gb (1, 2) Gc (2)	Da (20,21,22) Db (21,22) Dc (22)

Temperature Class

T Class	Maximum Surface Temperature
T1	450°C
T2	300°C
T3	200°C
T4	135°C
T5	100°C
T6	85°C

Equipment Protection Level

Symbol	Suitable For Zone
Ga	0
Gb	1
Gc	2
Da	20
Db	21
Dc	22
Ma	Energized
Mb	De-Energized*

G=Gas, D=Dust, M=Mining
*in presence of explosive atmosphere

Ingress Protection (IP)

Hazardous area equipment generally requires IP rating of IP54 to IP66. Higher rating is not recommended.

DUST :
IP 5x - Dust Protected
IP 6x - Dust Tight

WATER :
Protected Against
IP x4 - Splashing Water
IP x5 - Water Jets
IP x6 - Powered Water Jets
IP x7 - Temporary Immersion
IP x8 - Continuous Immersion

See IEC/EN/IS60529 for full definition of IP ratings.

NEMA v/s IP Enclosure

NEMA Type	3,3S & 13	4 & 4X	6 & 6P
Equivalent IP	IP 54	IP 56	IP 67

Area Classification

Gas	Dust	Hazardous Area
Zone 0	Zone 20	Frequently Present
Zone 1	Zone 21	Present in Normal Condition
Zone 2	Zone 22	Present in Abnormal Condition

Gas Group

Gas Group	Representative Gas
I	Methane (Mining only)
IIA	Propane
IIB	Ethylene
IIC	Hydrogen

Gases are classified according to Ignitability of gas-air mixture. Refer IS/ISO/IEC 80079-20-1.

Dust Group

Dust Group	Type of Combustible Dust
IIIA	Combustible Flying
IIIB	Non-conductive Dust
IIIC	Conductive Dust

Code for Users

Subject	Gas	Dust
Flammable Data	IS/ISO/IEC 80079-20-1	IS/ISO/IEC 80079-20-2
Area Classification	IS5572	IEC 60079-10-2
Selection & Installation	IS16724/IEC 60079-14	
Inspection & Maintenance	IS/IEC 60079-17	
Repair & Overhaul	IS/IEC 60079-19	

Marking

