Always check that the ambient temperature certification is applicable to your relevant choice of product as maximum ambient performances are often quoted and may only be applicable to certain product variants.

If the environment will subject the equipment to any dust/fibres/liquids, ensure it is certified to an appropriate level of ingress protection. This can be done using the table below.

INDEX OF PROTECTION (IP XX)

IP** degree of protection of enclosures of electrical equipment in accordance with standards IEC 529, BS EN 60529 and NF C 20-010

1st figure: Protection against solid bodies							
IP	0	1	2	3	4	5	6
TESTS		Ø50mm	Ø12.5mm	Ø2.5mm	Ø1mm		
	No Protection	Protected against solid bodies of 50 mm and greater (e.g. accidental contact with the hand)	Protected against solid bodies of 12.5 mm and greater (e.g. finger)	Protected against solid bodies of 2.5mm and greater (e.g. tools, wires)	Protected against solid bodies larger than 1 mm (e.g. thin tools and fine wires)	Protected against dust (no harmful deposit)	Completely protected against dust

2nd figure: Protection against liquids									
IP	0	1	2	3	4	5	6	7	8
TESTS								1m 15cm 30min	Ø50mm
	No Protection	Protected against vertically falling drops of water (condensation)	Protected against drops of water falling up to 15° from the vertical	Protected against drops of water falling up to 60° from the vertical	Protected against splashing water from all directions	Protected against jets of water from all directions	Protected against powerful jets of water from all directions	Protected against the effects of temporary immersion in water	Protected against the continuous effects of immersion in water having regard to specific conditions

FIG 1.6

Example Floodlight 150 VL65
Ingress protection to IP66 and IP67 (See page 126).

STEP 7... FINALLY

Having covered all the rules and safety considerations of the operation of electrical equipment in a hazardous area it is now possible to select a safe and appropriate product.

ATEX DIRECTIVE

The **ATEX** directive is a new directive issued by the european community covering both electrical and mechanical ignition hazards of equipment designed for use in hazardous areas.

ATEX requires all equipment designed for use in Zone O, Zone 20, Zone 1 and Zone 21 must have an EC type examination certificate issued against title ESR or Essential Safety Requirements listed in annex II of the directive. This is in addition to certificates being issued against the relevant CENELEC standards. While the CENELEC standards cover the majority of the technical detail of the ESR's however there are additional requirements to be met relating to;

- Labelling information
- The provision of installation information
- Possible limitations of use of the equipment in relation to its intended environment.

From 30 June 2003 an EC type examination certificate will be mandatory for **ATEX** classified categories I and II as listed below, but not for category III.

Equipment Group I

Mining apparatus

Equipment Group II

ATEX CATEGORY	LEVEL OF SAFETY	DESIGN REQUIREMENT	APPLICATION AREA	ANTICIPATED ZONE OF OPERATION
I	Very high level	Two independent means of protection or safe in use with two separate faults.	Where explosive atmospheres are continuously present or present for long periods	Zone 0 Zone 20
II	High level	Safe in use with a fault or with frequently occurring disturbances	Where an explosive atmosphere is likely to occur	Zone 1 Zone 21
III	Normal level	Safe during normal operation	Where explosive atmospheres are likely to occur infrequently and be for short period only	Zone 2 Zone 22

FIG 1.7

The third party testing houses mentioned earlier will carry out the type examinations.

- BASEEFA
- SIRA etc.

Most of the provision of installation information should be covered in the manufacturers installation and maintenance instructions supplied with each piece of equipment. If the design requirements are met then there will only need to be a change to the labelling marks. While labelling currently contains the equipment's individual protection standards, under the **ATEX** directive it will need to show the **ATEX** group and category the apparatus conforms to.

STEP 4

Now having defined the explosive gas/dust/fibres present, the nature of their presence, their ignition temperature and the classification of the hazardous area we, need to determine the temperature classifications to ensure the selection of equipment which will be safe in operation.

The classifications, which are similar to Europe, are further subdivided as follows

NORTH AMERICAN TEMPERATURE CLASSIFICATIONS

Temperature in Fahrenheit	Temperature in Celsius	North American Temperature code
842	450	T1
572	300	T2
536	280	T2A
500	260	T2B
446	230	T2C
419	215	T2D
392	200	T3
356	180	T3A
329	165	T3B
320	160	T3C
275	135	T4
248	120	T4A
212	100	T5
185	85	T6

FIG 2.0

Product markings will often show the actual rated temperature in brackets next to the temperature code to make judgement and selection easier.

STEP 5

Finally we need to take cognisance of the environment in which the equipment will be operating with respect to the concentration of liquids/gas/dust/fibres and ambient temperature.

On establishing these operating conditions we can establish the desired ingress protection required of the equipment by using the table below.

INDEX OF INGRESS PROTECTION

1st figure: Protection against solid bodies

IP	0	1	2	3	4	5	6
TESTS		Ø50mm	Ø12.5mm	Ø2.5mm	Ø1mm		
	No Protection	Protected against solid bodies of 50 mm and greater (e.g. accidental contact with the hand)	Protected against solid bodies of 12.5 mm and greater (e.g. finger)	Protected against solid bodies of 2.5mm and greater (e.g. tools, wires)	Protected against solid bodies larger than 1 mm (e.g. thin tools and fine wires)	Protected against dust (no harmful deposit)	Completely protected against dust

2nd figure: Protection against liquids

IP	0	1	2	3	4	5	6	7	8
TESTS								1m, 30 min	
	No Protection	Protected against vertically falling drops of water (condensation)	Protected against drops of water falling up to 15° from the vertical	Protected against drops of water falling up to 60° from the vertical	Protected against splashing water from all directions	Protected against jets of water from all directions	Protected against powerful jets of water from all directions	Protected against the effects of temporary immersion in water	Protected against the continuous effects of immersion in water having regard to specific conditions

FIG 2.1

The ingress protection level is found by putting the first and second figure together e.g. IP67

A third figure is sometimes used in the index of protection. This relates to the degree of mechanical protection the **equipment** has been certified as having. This relates to the degree of impact energy the equipment will stand before its **hazardous** area and ingress protection certification is compromised. FIG 2.2 below details the levels of protection.

INDEX OF MECHANICAL PROTECTION

3rd figure: Mechanical Protection

IP	0	1	3	5	7	8
TESTS		150g 15cm	200g 20cm	500g 40cm	1.5kg 40cm	5kg 40cm
	No Protection	Impact energy 0.225 joule	Impact energy 0.500 joule	Impact energy 2.00 joules	Impact energy 6.00 joules	Impact energy 20.00 joules

FIG 2.2

Many manufactures do not display this protection figure so if no information is provided please contact the manufacturer direct. This is a valuable form of protection measurement if the equipment may be subject to any significant impact either accidental or during normal operation.

The environment will also be subject to ambient temperature fluctuations for both seasonal and day and night time variations. It is therefore important to establish what ambient temperatures the equipment is certified for use in. Ambient temperature operation is usually stated as the maximum temperature the equipment is certified for use in.

Example Floodlight NHID
+40°C (See page 212).