AGBIZ SHEQ FORUM WORKSHOP

FIRE PROTECTION COMPLIANCY

PROFESSIONAL BACKGROUND
LIEBRECHT SWANEPOEL

- **Qualifications**
- National Diploma – Fire Technology
- Professional Registration – ECSA
- **Experience**
- Over 37 years of experience in fire protection
- 19 years forming part of a professional firefighter as well as forming part of Fire Protection Division in Fire Department functioning as the Local Authority
- 18 years forming part of consulting services in the private sector relating to fire designs, practical implementation and closeout thereof

PROFESSIONAL BACKGROUND
JOHAN NEL

- **Qualifications**
- Institution of Fire Engineers (SA) – IFE Level 1 & 2
- Professional Registration – ECSA (In progress)
- **Experience**
- Over 15 years of experience in fire protection services
- Compiling of fire designs
- Specialising in drafting programs in completion of fire protection drawing layouts
- Experience obtained in technical part of fire designs relating to fire protection systems, ie: Fire Detection, Smoke Control & Suppression Systems

WHAT IS FIRE PROTECTION

Study of Fire: To learn the causes of fire, fire extinguishing techniques, detection and extinguishing equipment and their uses, and the rules and regulations related to building construction.

Active Fire Protection: Includes manual or automatic detection of fire, the use of fire and smoke alarms, firefighting, and first aid.

Passive Fire Protection: Design of building and infrastructures, use of fire resistance material in construction, provision of isolating fire, fire walls and doors, smoke doors, training of firefighting, signage, markings, and evacuation plans.

Fire protection is an everyday action. The fire regulations in force must be implemented in factories, living areas, public places and transportation. Education on fire and regular fire drills are also major compliance issues.

APPLICABLE LEGISLATION – ACTS

ACTS:

- National Building Regulations Act No. 103 of 1977
- Occupational Health & Safety Act No. 85 of 1993
- Fire Brigade Act No. 99 van 1987

APPLICABLE LEGISLATION – CODES OF PRACTICE

NATIONAL BUILDING REGULATIONS - CODES OF PRACTICE

- SANS 10400-A, The application of the National Building Regulations – Part A: General principles & requirements
- SANS 10400-M, The application of the National Building Regulations – Part M: Stairways
- SANS 10400-S, The application of the National Building Regulations Part S: Facilities for persons with disabilities
- SANS 10400-T, The application of the national building regulations, Part T: Fire Protection
- SANS 10400-V, The application of the national building regulations, Part V: Space Heating
- SANS 10400-W, The application of the national building regulations, Part W: Fire Installation

APPLICABLE LEGISLATION – INTERNATIONAL CODES OF PRACTICE

NATIONAL BUILDING REGULATIONS – INTERNATIONAL CODES OF PRACTICE

British Standards

NFPA Codes of Practice

APPLICABLE LEGISLATION – BY LAWS

NATIONAL BUILDING REGULATIONS – BY LAWS

By laws applicable and varies from local authority to local authority.

FIRE PROTECTION DESIGN MEASURES

BASIC PRINCIPLES OF FIRE SAFETY DESIGNS

Rational Fire Design: Deviation from Fire Protection rules and regulations as stipulated in codes of practice

Deemed to Satisfy: Apply Fire Protection rules and regulations as stipulated in codes of practice

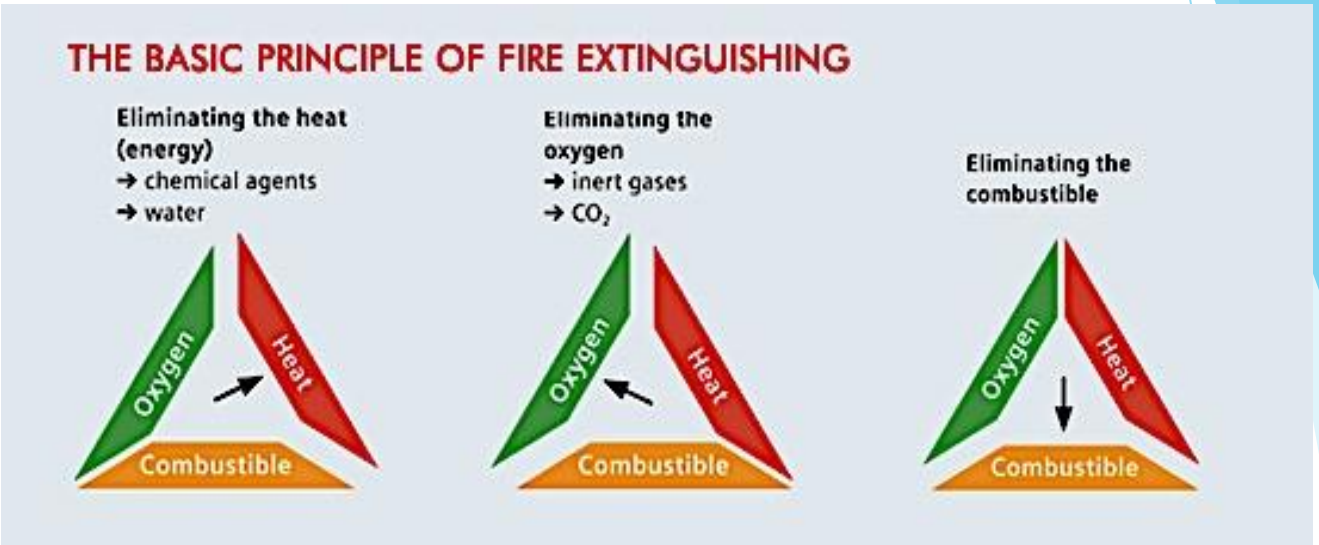
FIRE PROTECTION DESIGN MEASURES

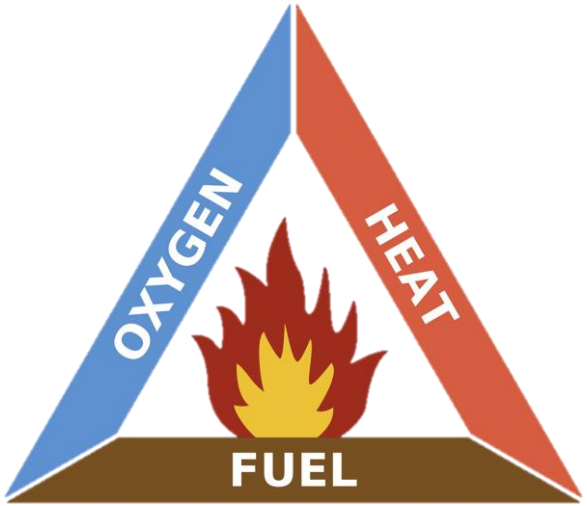
BASIC PRINCIPLES OF FIRE SAFETY DESIGNS

- Ensure life safety of occupants
- Minimise the spread and intensity of fire
- Minimise and control the generation and spread of smoke
- Ensure sufficient building stability in a fire, and to
- Provide adequate fire detection, fire extinguishing equipment and fire department access.

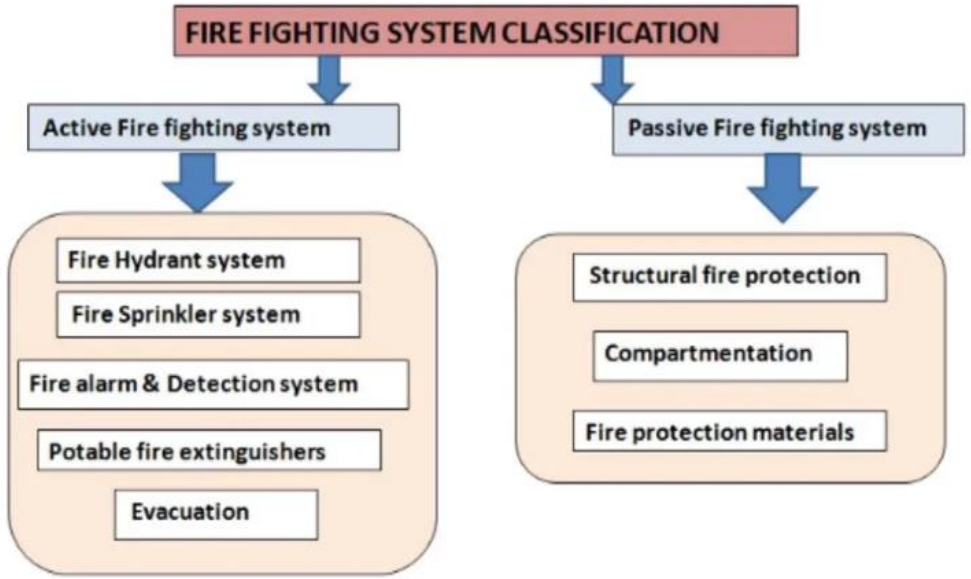
FIRE PROTECTION DESIGN MEASURES

- **What does a fire need?**





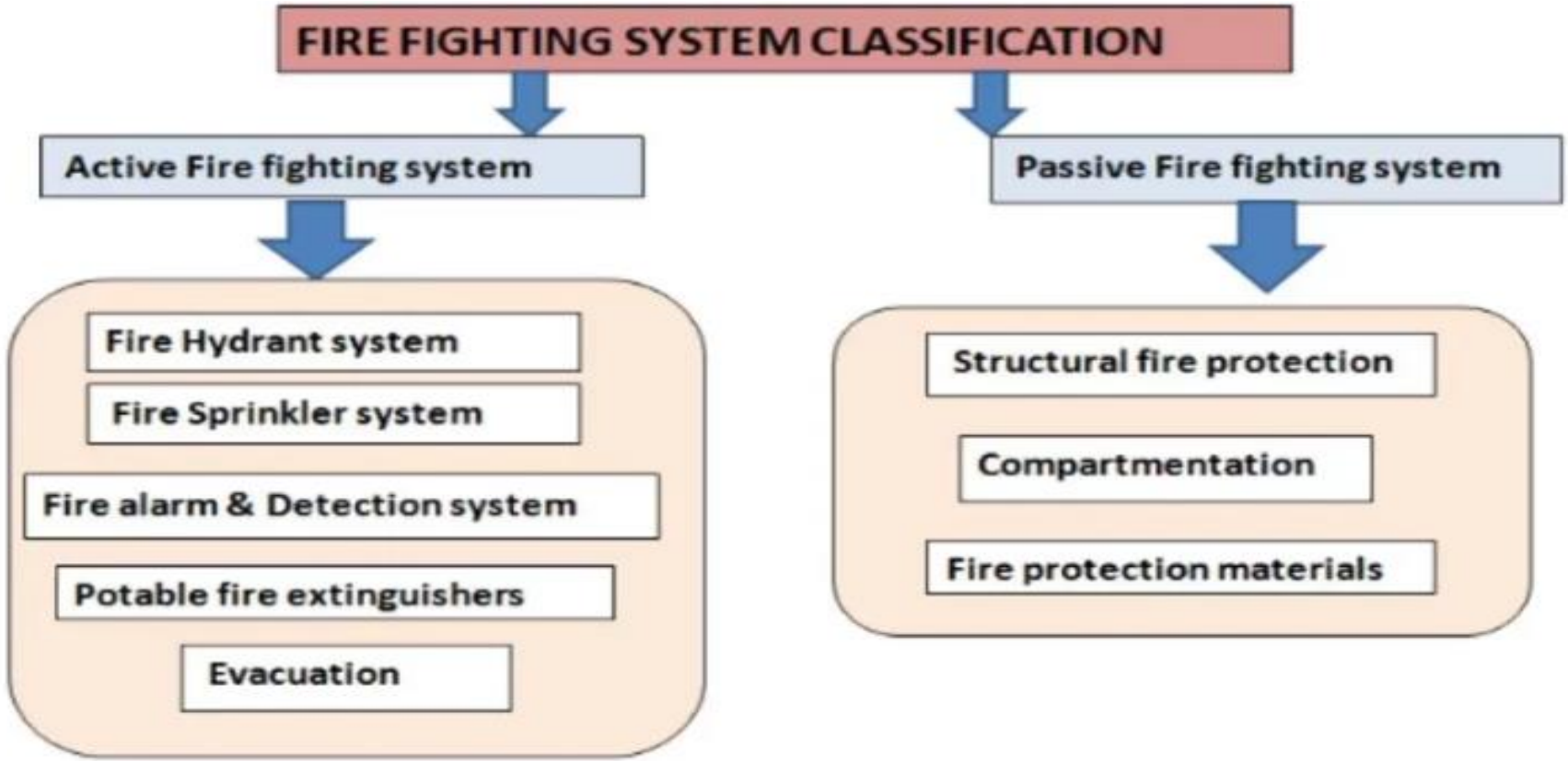
FIRE PROTECTION DESIGN MEASURES



- **Passive Fire Protection**
- Fire walls
- Fire doors
- Fire stopping / sealing

- **Active Fire Protection**
- Fire Protection Systems

FIRE PROTECTION DESIGN MEASURES



FIRE PROTECTION DESIGN MEASURES

What equipment?

- **Extinguishers & type**
- * 1/200 m^2
- * within 23m
- * 4,5kg DCP – offices, retail, etc.
- * 5kg CO_2 –Electrical
- * 5kg DCP – plant, industrial
- * 9kg – Storage Facilities
- **Hydrants**
- * 1/1000 m^2

FIRE PROTECTION DESIGN MEASURES

What equipment?

- Hose Reels
- * 1/500 m^2 or 30m coverage

- To check
- * Service lables and yearly service dates
- * Service seals

Type (Fire / Extinguisher)	CLASS A **Combustible materials** (e.g. paper & wood)	CLASS B **Flammable liquids** (e.g. paint & petrol)	CLASS C **Flammable gases** (e.g. butane and methane)	CLASS D **Flammable metals** (e.g. lithium & potassium)	Electrical **Electrical equipment** (e.g. computers & generators)	CLASS F **Deep fat fryers** (e.g. chip pans)	Comments
Water	✓	✗	✗	✗	✗	✗	Do not use on liquid or electric fires
Foam	✓	✓	✗	✗	✗	✗	Not suited to domestic use
Dry Powder	✓	✓	✓	✓	✓	✗	Can be used safely up to 1000 volts
CO2	✗	✓	✗	✗	✓	✗	Safe on both high and low voltage
Wet Chemical	✓	✗	✗	✗	✗	✓	Use on extremely high temperatures

FIRE PROTECTION DESIGN MEASURES

Classes of different fires

FIRE PROTECTION DESIGN MEASURES

Gas Suppression Systems

- INERT GASSES
  - Combination of inert gasses
  - Reducing oxygen content to 10-15%
  - Replacing 50% of air within the room
  - Pressure Relief vents needed
  - Larger storage needed than chemical gas
  - 100% green

CHEMICAL GASSES

- Reducing temperature and stopping the chemical reaction
- Smaller storage requirements

GENERAL

- Room integrity is critical – minimum 10 minutes
- HVAC shutdowns required
- Room to be a fire compartment

FIRE PROTECTION DESIGN MEASURES

Smoke Control

NATURAL SMOKE VENTILATION

- Any area over 500m^2
- 3% of floor area based on free vent area
- Windows, louvres, vents all included
- Fusible link, motorised or pneumatic

FIRE PROTECTION DESIGN MEASURES

Smoke Control

MECHANICAL SMOKE EXTRACTION

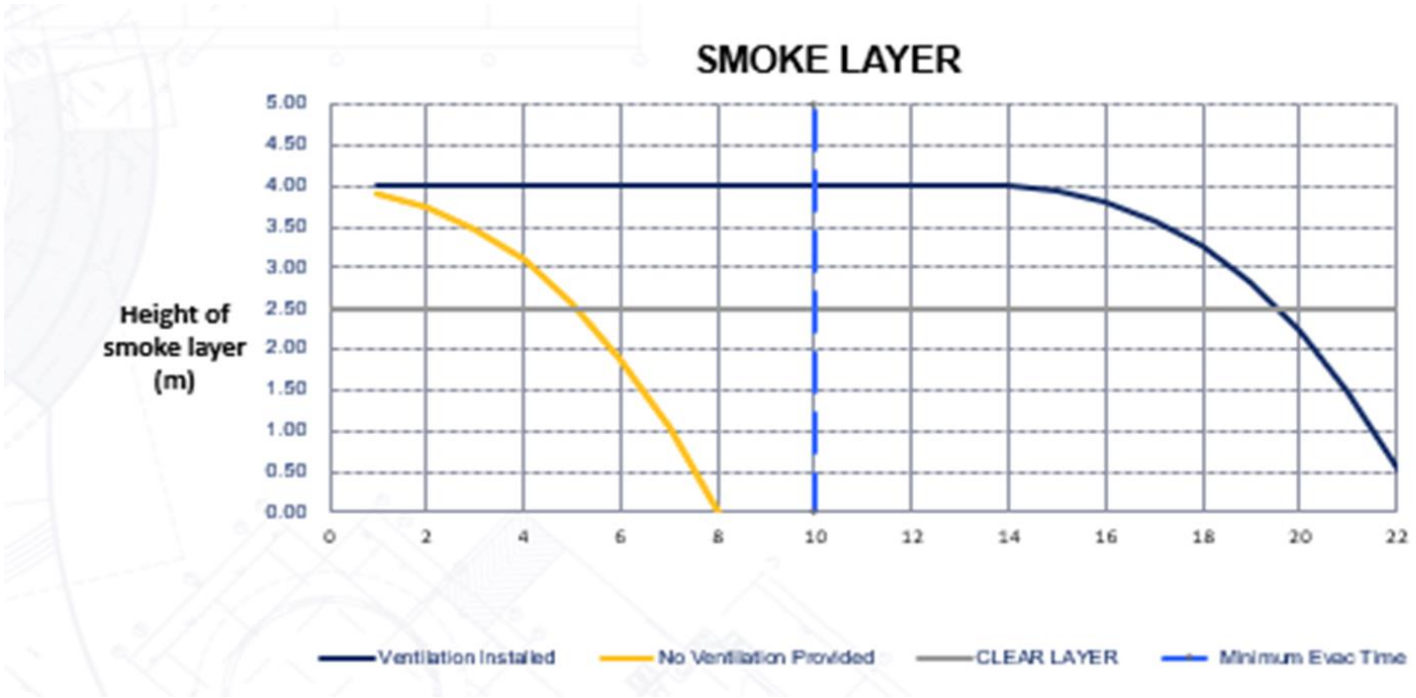
- Extract rates based on calculation
- Clear layer of 2500mm for minimum 10 minutes
- Smoke rated fans and ducting to 300°C
- Fire rated power supply on emergency back up and interfaced with smoke detection or sprinklers

FIRE PROTECTION DESIGN MEASURES

Smoke Baffles

- From roof to bottom of truss in warehouses
- Smoke rated curtain or steel sheeting
- Maximum 60m between baffles
- Max smoke zone 2500 m^2

- Normally tempered glass in retail or offices
- Depth is calculation dependant
- Maximum 60m between baffles
- Max smoke zone 2500 m^2

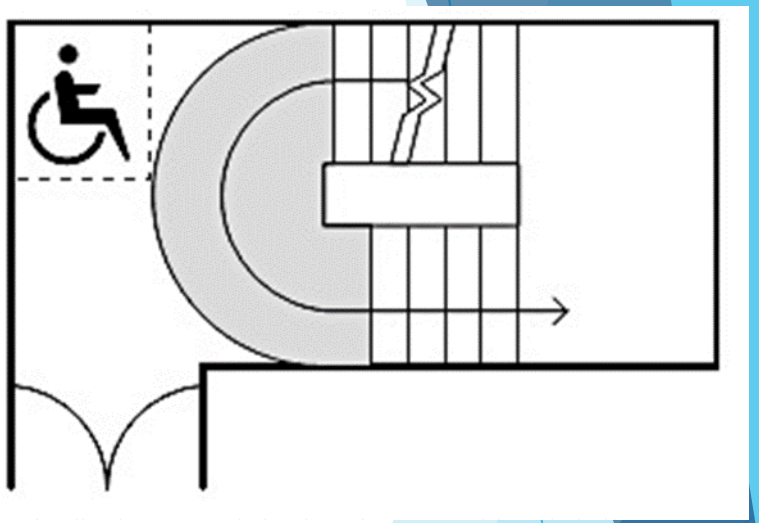


FIRE PROTECTION DESIGN MEASURES

Smoke Control Calculations

FIRE PROTECTION DESIGN MEASURES

- Disabled Refuge
- Clear distance equal to width of stair



- Doors to be recessed when entering into escape routes where they can interfere with the path of travel

Natural Ventilation

- 1m^2 opening per level
- OR 25% footprint opening at top and bottom of stairs
- If not possible then mechanical ventilation required

Evacuation & Safe Escape

- Continuous handrails on both sides for stairs 1100mm or wider
- Rails at 900-1000mm height
- Min 1500mm width
- Landings same depth as stair width

FIRE PROTECTION DESIGN MEASURES

Evacuation & Escape

- ACCEPTABLE LOCKS
  - Push bars
  - Thumb turns
  - Access control overrides

- **NOT ACCEPTABLE LOCKS**
  - Key boxes

FIRE PROTECTION DESIGN MEASURES

Construction Elements Related to Fire Rating

The Fire Rating of a structural element is determined by 3 properties:

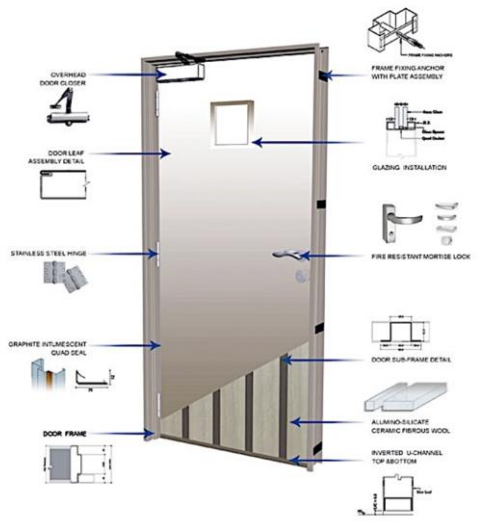
- STABILITY is the door's ability to fulfill its design function of keeping an opening closed in the face of fire so that no fissure or opening wider than 25mm develops.
- INTEGRITY enables the door to resist fire without the development of perpendicular through openings wider than 6mm and longer in total than the largest dimension of the door.
- INSULATION refers to the door's ability to prevent the transmission of enough heat to raise the mean unexposed face temperature by more than 140°C above the initial temperature.

FIRE PROTECTION DESIGN MEASURES

Construction Elements Related to Fire Rating Cont.

CLASS	STABILITY	INTEGRITY	INSULATION
A	60 min	30 min	30 min
B	120 min	60 min	60 min
D	120 min	120 min	120 min
E	30 min	30 min	30 min

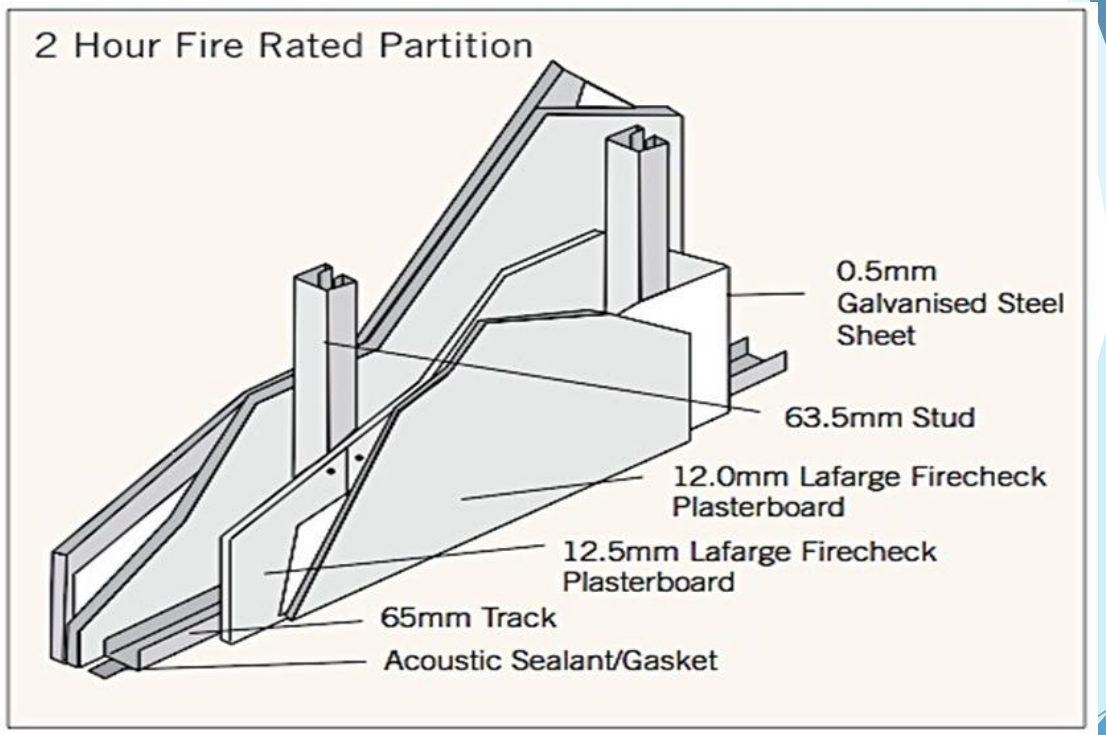
- **FIRE DOORS**



- Minimum 3 steel hinges
- Door closer on all door leaf’s
- Steel door frame with min 25mm rebate certified with the door
- Max window 100 x 300mm

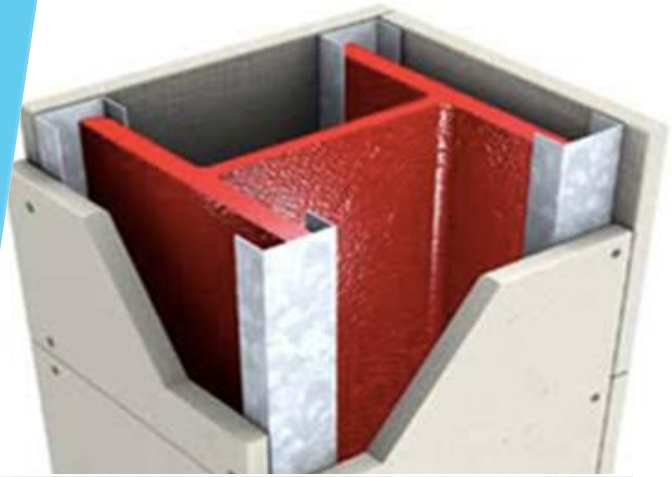
FIRE PROTECTION DESIGN MEASURES

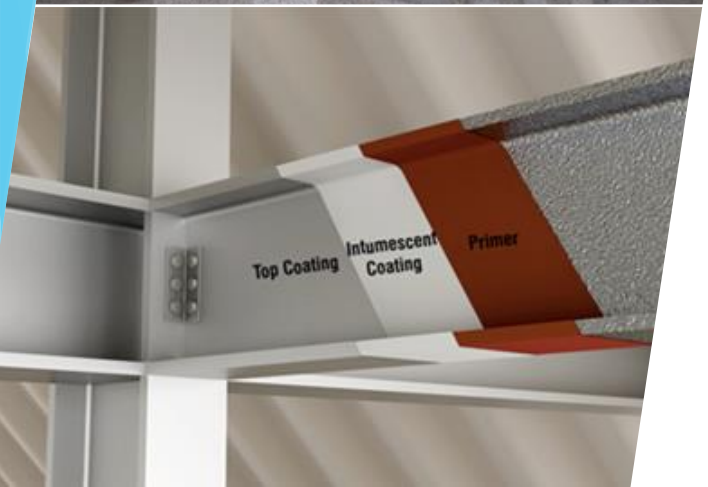
Construction Elements Related to Fire Rating



STANDARD VS FIRE RATED DRY WALLS

- Decreased stud spacing i.e. more supports
- Fire rated boards, doubling up standard boards does not comply.
- Fire rated boards are normally pink and are marked as fire rated
- Steel sheet between boards
- Joints in boards must be staggered between layers





FIRE PROTECTION DESIGN MEASURES

Construction Elements Related to Fire Rating

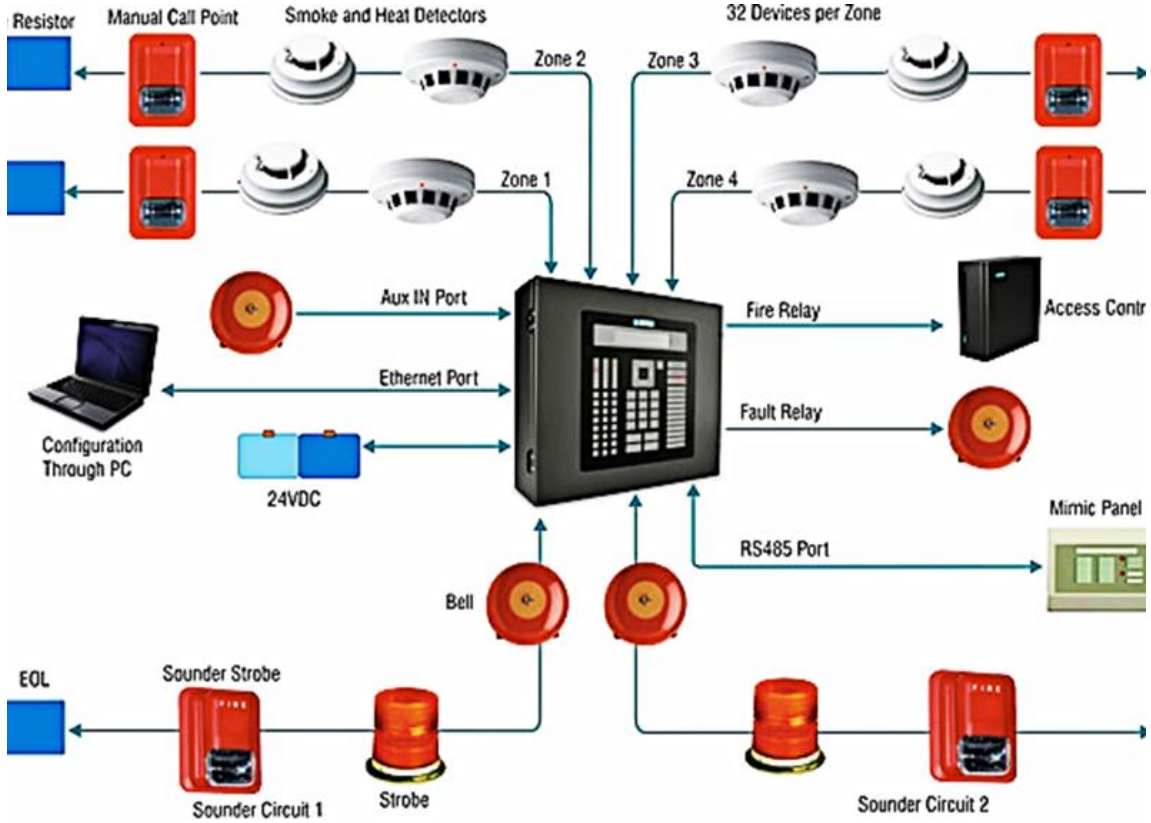
▶Fire protection to exposed steel construction Related to Fire Rating Cont.

STEEL PROTECTION

- Intumescent Cement Coating
- Intumescent Paint
- Fire Rated Enclosures
- Masonry Infill

FIRE PROTECTION DESIGN MEASURES

Fire Detection & Alarm Systems



- All retail over 500m^2
- All hotels, dormitories, hospitals and medical institutions
- All buildings over 30m high
- Any building with any floor over 5000m^2
- Recommend for all public and commercial buildings

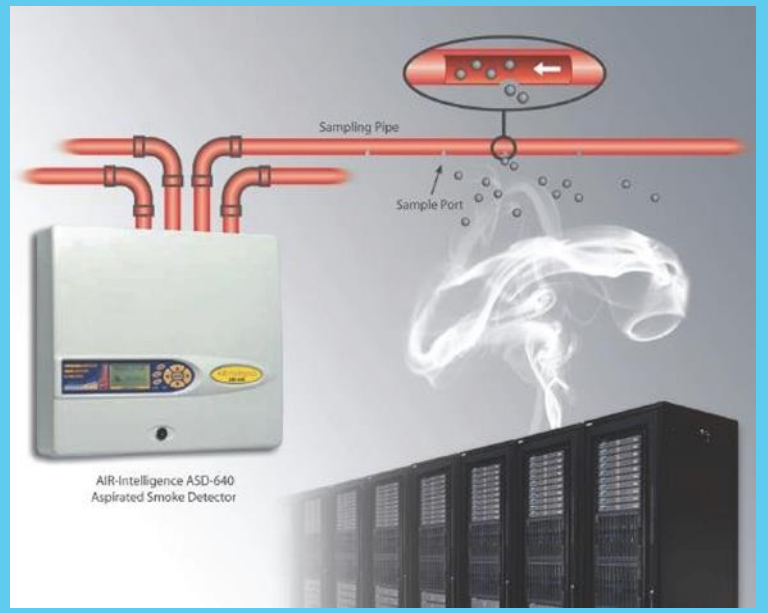
FIRE PROTECTION DESIGN MEASURES

Fire Detection & Alarm Systems Cont.

1. Smoke Detectors
    1. Optical
    2. Ionisation
    3. Heat
    4. Beam

2. Manual call points
3. Sounders and Strobes for the hearing and visually impaired
4. Cushion devices / Vibration pads

5. Aspirating Detection - VESDA
    - Piped sampling points
    - Most sensitive detection
    - Ideal for data centres, high airflow environments



FIRE PROTECTION DESIGN MEASURES

Fire Detection & Alarm Systems Cont.

The smoke detection and alarm systems will be interfaced with the following services:

- Smoke ventilation and extraction systems
- Kitchen extract hoods
- Fresh air system shutdown
- Magnetic door hold-open devices
- Music system shut down
- Door locking systems/ magnetic lock release
- Lift homing
- Escalator shut down
- Monitoring of fire pumps and tanks
- Monitoring of sprinkler flow switches and valves

FIRE PROTECTION DESIGN MEASURES

Automatic Sprinkler Installations – Suppression Systems

- **Requirements**
- Automatic sprinkler systems will be mandatory in structures referring to the following items:
- Exceeding the maximum division areas – 1250 / 2500 / 5000m² reference to medical institutions / warehousing storage / offices respectively
- Exceeding of Storage Heights
- Mixed use – shopping malls
- High Rise Buildings
- Special Risks

FIRE PROTECTION DESIGN MEASURES

Automatic Sprinkler Installations – Suppression Systems Cont.

- **<u>Water Supply Requirements</u>**
- Water storage supply will also be mandatory under the following conditions:

- When water supply from council infra structure is insufficient or nonexistent
- High Hazard Installations where duplicate water supplies are proposed
- * Duplicate pump sets

FIRE PROTECTION DESIGN MEASURES

Statutory Emergency Signage

- Statutory Emergency Escape and Fire Signage will form part of the completed new structure designed to SANS 1186 Part 1 & 5. Signage will be of the photoluminescent type and fixed mechanically to the wall.

APPROVAL PROCESS & CERTIFICATION

A2 Plans and Particulars to be Furnished

(1) Any person intending to erect any building, shall submit to the local authority the following plans and particulars, together with the application:

(a) a site plan;

(b) layout drawings;

(c) a fire installation drawing;

(2) The owner of a building shall appoint and retain the services of the person responsible for submitting the declaration required in subregulation **(1)(g)** and shall advise such person after such declaration has been submitted to the local authority of any changes made in the manner in which any functional regulation shall be satisfied or if the services of the competent person are for whatever reason terminated prior to the conclusion of his obligations in terms of these Regulations, or the appointment of any other competent person. Such person shall within one month of being notified by the owner or becoming aware of any change submit an amended declaration to the local authority.

https://www.ecsa.co.za

ECSA: Home

APPROVAL PROCESS & CERTIFICATION Cont.

RATIONAL FIRE DESIGN REPORT

for

GRAIN FIELD CHICKENS

on

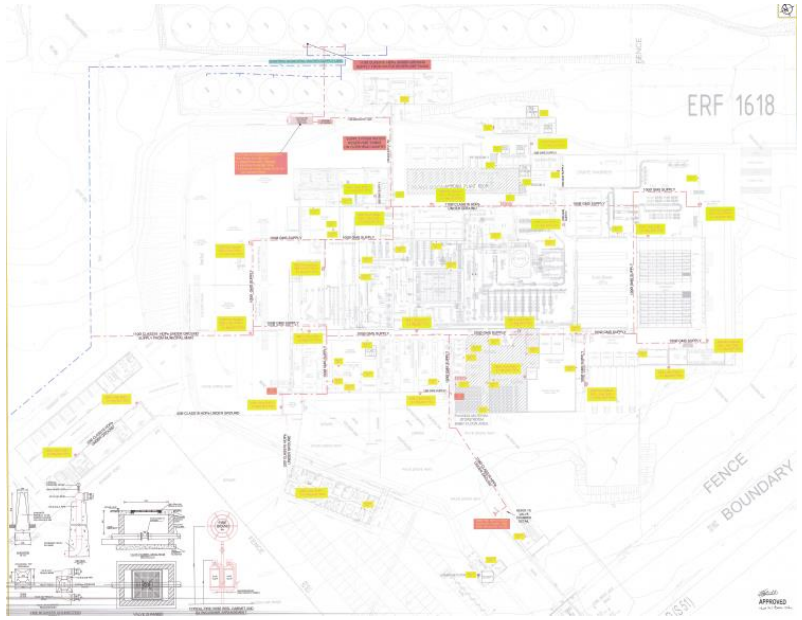
31 PRESIDENT C.R. SWART STR
ERF 1618
REITZ
FREE STATE

Prepared for

REITZ EMERGENCY SERVICES
FIRE DEPARTMENT

APPROVED

02 Dec 2021



APPROVED
2021 Dec 02

INTERNAL LAYOUT ONLY

City of Johannesburg
Emergency Management Services
THIS DEPARTMENT HAS NO OBJECTION TO THIS PLAN BEING APPROVED BY BUILDING CONTROL
21 JUN 2022
SIGN:

THIRD FLOOR TENANT FITOUT
Scale: 1:800

APPROVAL PROCESS & CERTIFICATION Cont.

- GOAL!!!

SUBJECT: FIRE SAFETY COMPLIANCE INSPECTION AT XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (OCCUPANCY CLASSES J2, D2 AND G1)

1. An inspection was carried out at the abovementioned premises on 6 December 2022.

2. The Fire Protection installations were completed in accordance with the approved Fire Protection Plan and in accordance with the Fire Safety Regulations in terms of Section T and Section W of SANS 10400: 2011.

3. We support the issue of a Certificate of Occupancy in terms of Section 14 of the National Building Regulations Act.

4. This department reserves the right to reconsider any previous requirements under the following conditions:-

    a) Change of occupational class;
    b) Change of fire risk;
    c) Change of ownership;
    d) Any structural change

5. All fire extinguishers shall be maintained and serviced in accordance with SABS 0105 and 1475 Codes of Practice.

6. All fire hose reels shall be maintained and serviced in accordance with SABS codes of practice 0105 and 543 respectively

7. Should any of the above-mentioned points need explanation do not hesitate to contact this department for clarification

FIRE PROTECTION DESIGN MEASURES

Ending…….

FIRE PROTECTION DESIGN MEASURES

Any other questions?