ULTIMATE FIRE DESIGNS

6 Granaat Ave
Greenhills
Randfontein
PO Box 1242
Krugersdorp
1740

Tel: 011-693-1324
Fax: 011-412-4586
Cell: 082-573-1385
E-Mail: ultifire@telkomsa.net
Skype: lukehartog

WEST RAND DISTRICT MUNICIPALITY
FIRE RISK MANAGEMENT
Plan approved for submission.
This approval is valid for 12 months.
2019 -07- 25
SIGNATURE
8921
REF NO.

Project No: 517-01-2018

10 July 2019

The Chief Emergency Services
West Rand District Municipality
Private Bag X033
Randfontein
1760

Attention: Mr. JW BOTHA

FIRE SAFETY DESIGN FOR ALTERATIONS AND ADDITIONS TO EXISTING WAREHOUSE ON ERF 41, AUREUS, RANDFONTEIN

We have been retained by our clients to compile and submit for your approval, the fire safety design of proposes alterations and additions to an existing warehouse on erf 41, Bussing Str, Aureus, Randfontein, and occupied by Select PPE.

Originally, the plans were submitted and approved on 2 March 2018 under reference number 8921, and consisted of the warehouse, in two parts, an office component of the warehouse, and a freestanding office building on the western side of the building.

The warehouse portion remains unchanged, and is shown on the plan for information purposes. The office component previously adjoining the warehouse has been changed, and is now as shown on the new plans.

The summary details of the proposed additions are as follows:

Floor	Type	Occupancy	Floor Area	Design Population	Total People
Ground	Offices	G1	427.5m²	1 person per 15m²	28
First	Offices	G1	360.6m²	1 person per 15m²	24
Second	Offices	G1	360.6m²	1 person per 15m²	24
Total			**1148.7m²**		**76 People**

As previously approved, the proposed office building was of two storey design, with a total floor area of 980m², and also adjoining the main warehouse.

The occupant is Select PPE (Pty) Ltd, and the building will be used for the bulk storage of products within the personal protective equipment category, such as safety clothing, and will therefore fall overall within the category of J2 – Moderate Risk Storage, due to the presence of combustible goods.

On our clients instructions we wish to present the following Fire Safety Design as indicated in section T1 of SANS Code of Practice 10400-2011.

REGULATION T1(1)(a)

Regulation T1(1)(a) states as follows:

> **"(a) the protection of occupants or users therein is ensured and that provision is made for the safe evacuation of such occupants or users"**

In terms hereof, the primary concern would revolve around the provision of escape and emergency routes and the protection thereof against the effects of fire and smoke to allow sufficient time for occupants to safely escape from the building.

As designed, the building will be accomodating about 76 persons, spread over 3 floors.

The design of the building is such that numerous exit doors exist on the periphery of the building in the positions as indicated, and there are 3 stairways from the upper levels, two external and one internal. Nowhere is the total travel distance limit of 60m before a person is either outside the building or in a place of safety, exceeded. As it is intended to provide an automatic sprinkler system within the building, this travel distance will be compliant with the requirements of rule 4.16.

Stairways will comply overall with the requirements of Part M of SANS 10400-2011, and will be provided with suitable balustrades and handrails along their entire length.

As the building is only three storeys in height, and is provided with 3 stairways, it can be reasonably assumed that at least one of these stairways will remain available in the event of a fire, and therefore emergency routes are not required, and therefore not provided.

All exits will be designated and indicated as such, and will be fitted only with approved locking devices such as thumb turn locks or panic bars. Security gates might be installed as an additional security measure, but these gates will be kept in an open and unlocked state at all times during operating hours.

All escape routes shall be indicated by means of photoluminescent safety signs with minimum dimensions of 290mm x 290mm in the J2 areas, and 190mm x 190mm for the remaining areas.

In terms of the above, and in conjunction with SANS 10400-2011, we submit that the intentions of regulation T1(1)(a) have been complied with.

REGULATION T1(1)(b)

Regulation T1(1)(b) states as follows:

> **"(b) the spread and intensity of such fire within such building and the spread of fire to any other building will be minimised"**

To prevent the spread of a fire within the building or to adjoining/adjacent buildings, we will be implementing the following measures:

- 4.8 – Occupancy separating elements

  This building has a single tenant, and therefore tenancy separating elements are not required. Furthermore, the G1 occupancies in this building are directly related to the day to day functioning of the J2 occupancy, and albeit that members of the public are not normally present in the J2 occupancy areas, no undue risk or exposure to fire or smoke would otherwise be experienced by any occupants of the building in the absence of such separating elements. As per rule A20(2) of SANS 10400, the offices are therefore deemed not to be a separate occupancy.

- 4.10 – Protection of openings

  There is only one occupancy and one division within the building, and therefore safety distances between openings as determined in rule 4.10 are not required.

The external walls of the building are of steel portal construction with traditional masonry with infills, and will therefore provide in excess of 2 hours fire resistance in terms of tables 12 and 14 of TT56.

The building will be fully sprinkler protected as detailed further on in this document, and therefore the safety distances required in terms of rule 4.2, can be halved as per rule 4.2.7.

There are some openings on the southern boundary, amounting to 63.6m² for windows and 7.3m² for doors, for a total of 70.0m². In terms of table 2 of rule 4.2.4, the required safety distance should therefore be 6.0m, and half of this is 3.0m, and this has been achieved.

The eastern boundary has no openings and is a type "F" wall as defined in rule 4.2, and the minimum distance required is 2.2m, whereas we are providing 3.5m. The western boundary is a street frontage, and the northern boundary is used for personnel parking, with a safety distance well in excess of 9m to adjacent property, and these are therefore in line with the regulations.

In terms of the above, and in conjunction with SANS 10400-2011, we submit that the intentions of regulation T1(1)(b) have been complied with.

REGULATION T1(1)(c)

Regulation T1(1)(c) states as follows:

> **"(c) sufficient stability will be retained to ensure that such building will not endanger any other building: Provided that in the case of any multi-storey building no major failure of the structural system shall occur"**

The fire loading within the building remains within the moderate category (between 25kg/m² and 50kg/m² timber equivalent). The building is only of single storey construction, albeit of double volume design and layout. We are required to achieve stability of at least 30min for this building, and the design and construction of the building, together with the provision of a sprinkler system will easily exceed this requirement.

The re-inforced concrete slabs are designed and certified by a professional engineer and will thus adhere to the requirements for these structures.

Additionally, steel portal type building tend to collapse inwards and onto themselves in the event of a major structural failure, and it is thus extremely unlikely that a complete collapse would result in any damage to adjoining properties.

The safety distances achieved will also ensure that surrounding properties are unlikely to suffer damage by any debris that might be projected in the unlikely event of a complete structural failure and subsequent collapse of the building.

As such, we submit that the intentions of the requirements of regulation T1(1)(c) have been complied with.

REGULATION T1(1)(d)

Regulation T1(1)(d) states as follows:

> **"(d) the generation and spread of smoke will be minimised or controlled to the greatest extent reasonably practicable"**

The finished area of that portion of the warehouse adjoining the offices, is approximately 3551m², and accordingly we will be required to ventilate this area. There are no other areas within the development where a single room has an area of more than 500m², so smoke control measures in the remainder of the development are not required.

To determine the amount of ventilation required for the purposes of smoke extraction, we will use the formulas commonly applied to ventilation solutions.

DESIGN BASES

REFERENCE DOCUMENTS

A. Technical Papers 7 & 10 by the Ministry of Technology and FOC Joint Fire Research in the UK.
B. Smoke control methods in enclosed shopping complexes of one or more storeys: a design summary by H P Morgan
C. Fans in Fire Safety, JA Wild, Woods of Colchester 1995

For a typical fire, as this area is a storage facility with a large quantity of combustible materials present, primarily class A products, a total heat flux of 160kW/m² into the smoke layer for the room must be provided for. (This is the minimum quantity that can be used) The fire size will typically be 20.25m². The fire growth will be fast at 0.147kJ/s³ due to the presence of combustible goods.

The fire size and heat output stated above is the internationally accepted standard for fire venting in a room.

Even though the building will be fully sprinkler protected, we will base our calculations on the assumption that the sprinkler system has not been activated, and that therefore larger amounts of smoke than would normally be expected, will be generated.

Even with a ventilation system present, it is accepted that a layer of smoke and hot gasses will form beneath the roof covering but by doing so the discharge of smoke through the vent is increased. Since the hot layer develops a pressure load to drive out the smoke, at the same time the rate of production of smoke will decrease as the clear height above the fire becomes smaller.

Equilibrium will be reached when the smoke venting is equal to the smoke production and this is our basis for our design of the ventilation.

Estimating the rate of smoke produced by a fire without ventilation

m = 0,188 x þ x Y to the power of three divided by 2
= 0,188 x 18 x 2.5 to the power of three divided by 2
= 13.38 kg/sec

Determine the energy output of the fire:

Q = q x Af
= 160 x 20.25
= 3240Kw

Determine the average gas layer temperature above ambient:

$$\theta = \frac{Q}{m \times e \times 1{,}005}$$

$$= \frac{3240}{13.38 \times 0.96 \times 1.005}$$

= **251.05°C**

Determine the ambient air temperature in absolute

$T_o = T + 273$
= 20 + 273
= **293K**

Determine the average gas layer temperature of the smoke plume in ambient

$Tc = To + \theta$
= 293 + 251.05
= 544.05K

The client wishes to install fire rated turbine ventilators on the roof, for reasons of assisting with general climate control within the building. As these ventilators are wind powered, and actually increase their efficiency with an increase in temperature, to determine the quantity of ventilators requires becomes a simple calculation of determining the volume of smoke produced in a fire, and then dividing this by the rated flow of the ventilator.

We have already calculated the amount of smoke generated about, at about 13.38m³/s, and the temperature of the smoke layer has been calculated to be approximately 251°C or 544°K. At this temperature, the density of the smoke layer can be calculated by:

D = To/Tc

Where:

D = Density of smoke layer in kg/m³
To = Ambient air temperature in absolute = 293K
Tc = Smoke layer temperature in absolute = 544K

Therefore:

D = To/Tc
D = 293/544
D = 0.54kg/m³

We can now calculate the volume of smoke produced as follows:

$V = m \div D$

Where:

V = Volume of smoke in m^3
m = Mass of smoke in kg/s = 13.38kg/s
D = Density of smoke = $0.54kg/m^3$

Therefore:

$V = m \div D$
$V = 13.38 \div 0.54$
$V = 24.8m^3/s$

We propose to install the 610mm Backdraft fire rated turbine ventilator, and the specifications of this unit are shown in the attached unit. As each of the units has a flow rate of at least $1.9m^3/s$, we will therefore require at least 13 units to be provided in the roof of the building.

The combined flow of these units will be $28.5m^3/s$, which is more than what is required as per our calculations.

It is also important to remember that the smoke generated figures as used above, are based on a developed fire, whereas these ventilators will be operating almost permanently. Furthermore these ventilators will not be subject to any time delay before commencing with ventilation, as would be the case with fusible link type ventilators set to open at a pre-determined temperature.

Summary of calculated values

DESCRIPTION	SYMBOLS	VALUE	UNIT
Area of smoke zone	A	3551	m^2
Height from floor to centre of window/vent	h	13.5	m
Depth of smoke layer	db	11	m
Size of fire	Af	20.25	m^2
Perimeter of fire	p	18	m
Distance between floor and smoke layer under roof	Y	2.5	m
Heat output of fire	q	160	Kw/m^2
Energy output of fire	Q	3240	Kw
Absolute temperature	Ta	273	K
Ambient Air Temperature	T	20	°C
Ambient Air Temp in Absolute	To	293	K
Sprinkler activation temp (no sprinklers = 0)	Ts	72	°C
Ambient Air Density	e	0.96	kg/m^3
Average gas temp of smoke plume in absolute	Tc	544.05	K
Acceleration due to gravity	g	9.81	m/sec^2
Mass flow of gas into smoke layer	m	13.38	kg/sec
Density of smoke layer	D	0.54	Kg/m^3
Throughput of ventilator	m^3/s	1.8	m^3/s
Quantity of ventilators		15	

The ventilation design will cater for a $20,25m^2$ fire generating 13.38kg/sec of smoke. The smoke will not build down lower than 2.5 meters with a smoke layer temperature above ambient of air (θ) 251.05K.

In terms of the above, and in conjunction with SANS 10400-2011, we submit that the intentions of regulation T1(1)(d) have been complied with.

REGULATION T1(1)(e)

Regulation T1(1)(e) states as follows:

> **"(e) adequate means of access, and equipment for detecting, fighting, controlling and extinguishing such fire, is provided"**

Ample provision is made on two of the four elevations of the building for the purposes of access to the site by fire fighting vehicles from the street, and that portion of the building that is above ground level is only three storeys in height, and therefore aerial fire fighting vehicles would not normally be required to attend to such a fire.

Due to the layout of the proposed internal roads, there are no resulting areas within which an emergency vehicle might have to maneuvre to exit the site, and accordingly no maneuvering areas are provided.

a) FIRE HOSE REELS

In terms of rule 4.34, fire hose reels must be provided at a ratio of 1 hose reel for every 500m² of floor area. Additionally the building is to be fully fitted with high bay racking (±6.5m), which therefore means that traditional hose reel placement methods cannot be applied.

As shown on the attached plans, a total of 48 fire hose reels will be installed within the warehouse area, thereby ensuring proper coverage between and along the proposed racks. The ratio for fire hose reels will effectively be 1:154m².

These hose reels will be provided and installed as per the fire protection plan, and will be maintained in accordance with SABS Code of Practice 543.

b) FIRE EXTINGUISHERS

Fire extinguishers are required at a ratio of one 9kg DCP type fire extinguisher for every 100m² of floor space or part thereof for the warehouse areas, and one 4.5kg unit for every 200m² in the office areas. Accordingly, we will be providing two (2) units of the appropriate size and type in the various areas, co-located with the fire hose reels, thereby creating fire points for easy access in an emergency.

These units will be manufactured, installed and maintained in accordance with SABS Codes of Practice, 0105, 810 or 1475 as the case may be.

c) FIRE HYDRANTS

We will provide a 65mm pillar type fire hydrant close to the entrance to the premises in the position as indicated, as well as three 65mm pillar type fire hydrants located within the premises.

This fire hydrant will be supplied via a 80mm diameter pipe which in turn will be connected to the existing 80mm reticulation on the other portions of the premises.

d) SPRINKLER SYSTEM

A sprinkler system complying with the requirements for an Extra High Category system will be provided within the entire building and will cover the roof as well as the racks to be installed. A dedicated tank and pump installation will be provided for the exclusive use of the sprinkler system. This system will be designed, manufactured, installed and certified by a competent person as required in terms of SANS 10287.

The category of goods stored will be primarily in Category 1 – Combustible Goods, and the storage class will be S1 and/or S4. Stack height will not exceed 7.5m at its highest point.

Accordingly The sprinkler system can be summarised as follows:

ITEM	QUANTITY	UNIT
Density of discharge	17.5	mm/min
Area of operation	260	m²
Pump delivery	±6400	l/m
Storage tank capacity	425	m³
Protected area	3551	m²

No of Installation Control Valves	7 (±7000 sprinkler heads)	
Size of water main	150	mm
Sprinkler operating temperature	72	°C

WW5.4 Water Supply

SECTION WW5.4 (A)(B) OF THE NATIONAL BUILDING REGULATIONS SABS 0400 1990 STATES AS FOLLOWS:

Any fire installation shall be connected

(a) directly to the communication pipe where the local authority's water supply is capable of providing the pressure and rate of flow required for hose reels contemplated in sub-rule WW5.1; or

(b) to a storage tank of adequate capacity where so required by the local authority or where the local authority's water supply is not capable of providing such pressure and rate of flow, provided that where any fire installation is connected to such storage tank a pump shall be fitted between such tank and any hose reel and provided further that such pump shall be capable of supplying water at the topmost hose reel at a pressure of 300kPa and a rate of 0,5 l/s and shall function automatically with the opening of any hose reel nozzle.

OUR PROPOSAL AND MOTIVATION IN REPLACEMENT OF WW5.4 (a)(b) ARE AS FOLLOWS:

WATER SUPPLY AND STORAGE

Our water reticulation system will be designed and calculated on 200 kPa. The reason for this figure of 200kPa is that this is the only maximum pressure the Randfontein Local Council can guarantee.

The hose reels will be connected to a common pipe network of 50mm diameter (SABS 62)

A non-return valve will be installed in the hose reel supply pipe to prevent hose reel water from returning to the domestic supply.

Although it is known that the municipal water pressure in the greater Randfontein area is adequate for fire installations, we are required to base our calculations on an available pressure of 200 kPa.

FIGURES AND FORMULAS NEEDED TO CALCULATE AVAILABLE WATER PRESSURE AT THE HOSE NOZZLE:

P = Municipal Pressure = 200 kPa
PI = Pressure loss in pipe and fittings = 1,2 kPa
H = Height of connection above mains = 9.3 m
P_s = Static Pressure = 91 kPa (g=9.81)
L = Length of Hose-reel = 30 m
P_{lh} = Pressure loss through hose = 34,80 kPa
P_n = Pressure available at nozzle

Pn = 200 - (1,2 + 91 + 34,80)

= 104.3kPa

DISCHARGE FROM NOZZLE:
FLOW THROUGH ORIFICE of the NOZZLE

L = 0,067 x d^2 x √ Pn
L = Flow Rate = liters per minute
Dn = diameter of nozzle = 6,4 mm
Pn = available pressure of nozzle = 96 kPa

L = 0,067 x d^2 x √ Pn
= 0,067 x $(6,4)^2$ x √104.3
= 0,067 x 40,96 x 10.20
= 27.99 liters per minute
= 0,47 liters per second

This is only 0.03 litres/second less than required in terms of rule WW5.2, and we submit that this would have no material effect on the efficiency with which an incipient or small fire could be attacked.

THE HORIZONTAL DISTANCE REACHED BY A SOLID WATER STREAM FROM A NOZZLE IS GIVEN AS FOLLOWS:

$$HD = \frac{Pn}{50} + \frac{(9 + (dn - 19)}{3} 1,5$$

HD = Horisontal distance covered - m
Pn = Nozzle pressure - kPa
dn = Nozzle diameter - mm
(Reference = Shepherds Fire service Hydraulics)

$$HD = \frac{Pn}{50} + \frac{(9 + (dn - 19)}{3} 1,5$$

$$HD = \frac{104.3}{50} + \frac{(9 + (6,4 - 19)}{3} 1,5$$

$$HD = [2,08 + (9 - 4,2)] 1,5$$

= **10.32 meters**

FIRE LOAD

The fire load in this occupancy is equivalent to less than 50kg per m² in terms of SABS 0400 1990. The fire load is thus moderate.

We calculate the calorific value in MJ/m². This is done as follows:

Fire load = Timber equivalent x 18

= 50kg/m² x 18
= **900 MJ/m²**

If an area of 10m² is involved and wood char at a rate of 0,8mm/minute we can accept only 10% of the energy would be released to sustain combustion.

Time taken to extinguish a class A fire with a fire hose reel

Specific heat capacity of water	0,0042 Mj/kg/°C
Temperature raises	80°C
Heat for 20°C to 100°C raise in temperature	0,336 Mj/kg
Latent heat of vaporization	2,257 Mj/kg
Total heat absorption (water to steam)	2,593 Mj/kg
Discharge in kg per minute (per Fire Hose Reel)	27.99 kg
Energy Absorbed per minute	72.6 Mj/min
Total Energy to be absorbed (18Mj/kg x 25kg/m²)	900MW

Time to extinguish the fire = 900 ÷ 72.6

= 12.4 minutes

SUMMARY:

- If the water mains maintain a pressure of 200 kPa the expected flow out of the hose reel will reach approximately 10.32 meters. With the classified low fire load of 900Mj the fire can be extinguished in 6.2 minutes.
- Taking all these factors into consideration we can see that the flow pressure availability at the nozzle is sufficient to extinguish this type of fire load.
- The above figures are based on a developed fire, whereas we can in reality expect a fire to be attacked whilst still in the incipient or smouldering stage, which will greatly reduce the time required to achieve extinguishment.

In view of the above calculations we feel the installation of a 9000-liter storage tank and accompanying pump on site to supply the hose reel installation is not necessary.

The Hose Reels will be installed to provide total coverage of the floor areas. The Hose Reels will comply with the requirements contained in SABS 543.

The Hose Reels will comply with the requirements contained in SABS 543. These hose reels will bear in a prominent position on the reel disc, the mark of standardisation relative to the requirement contained in SABS 543.

- The feed pipe of the hose reel will be combined of the domestic water main and the nominal diameter will be as stated in sub rule WW5.2. (a)(iii)
- The nominal diameter of the communication pipe will not be less than 25mm.
- The fire hose reels shall be connected to a combined domestic/fire metered water connection provided by the local authority with a minimum diameter of 80mm

As the municipal main serving this property is only 80mm in diameter, it is not possible to provide a 100mm fire hydrant to be used as a draw-off fire hydrant for the purposes of boosting, and we will have to rely on a 65mm pillar type hydrant for this purpose. The discharge from an open fire hydrant or open pipe can be calculated as follows:

$$F = \frac{d^2 \times \sqrt{p}}{15}$$

Where: F = Flow (Litres/min)
d = diameter of hydrant or pipe (mm)
p = pressure (kPa)

Assuming therefore a supply pressure of 200kPa, which is the highest that the Rand West City Local Municipality can guarantee, and further assuming that we need to determine the maximum amount of water that can flow through a 65mm fire hydrant, we can calculate as follows:

$$F = \frac{d^2 \times \sqrt{p}}{15}$$ (Source: Sheppards Hydraulics for the Fire Service)

$= ((65 \times 65) \times \sqrt{200})/15$

$= (4225 \times 14.14) / 15$

$= 59741 / 15$

$= 3983$litres/min

This is more than three times the quantity typically required from a fire hydrant. Furthermore, as a booster connection is provided, it is not necessary to calculate any further losses in the pipe system as otherwise required in terms of SANS 10400-2011: Part W.

WW5.2 Fire and Domestic Water

SECTION WW5.2 OF THE NATIONAL BUILDING REGULATIONS SABS 0400 1990 STATES AS FOLLOWS:

In any fire installation

(a) The nominal diameter of

(i) any communication pipe serving such installation shall be not less than 75mm.

(ii) Any pipe supplying water to any fire hydrant shall be not less than 75mm provided that where the length of such pipe is more than 50m the nominal diameter of such pipe and of the communication pipe to which the installation is connected shall be not less than 100mm.

(iii) Any service pipe supplying water to any hose reel on any one storey of a building shall be not less than

(aa) 25mm, if it serves 1 or 2 hose reels;

(bb) 32mm, if it serves 3 reels

(cc) 40mm, if it serves 4 or 5 hose reels; and

(dd) 50mm, if it serves more than 5 hose reels.

(b) Any pipe which serves any hydrant and hose reel installation or an automatic sprinkler installation, shall be provided with a twin pumping connection.

(c) Any pipe serving only hose reels shall be provided with a single pumping connection.

(d) Any pipe fitted with one or more fire pump connections shall be fitted with a pressure gauge reading up to 2 500 kPa and a reflux valve so located as to shut off automatically the direct supply of water from the local authority system to such installation whenever and for so long as any such fire pump connection is in use.

OUR PROPOSAL AND MOTIVATION IN REPLACEMENT OF SUB-RULE WW5.2 ARE AS FOLLOWS:

We propose to combine the domestic and fire fighting reticulation. The connection will be a minimum 80mm connection and will supply the fire hydrant, fire hose reels, sprinkler tank fill line, and domestic consumption requirements.

SABS 0252-1 OF 1994 STATES THAT REGARDING THE INSTALLATION OF COMBINED DOMESTIC AND FIRE WATER REGULATIONS:

6.8.1.1.1. A fire installation in a building is essentially an extension of the reticulation in the street reserve and is normally necessary to augment the fire brigade's special equipment.

6.8.1.1.2. It is recommended that water be used only to extinguish Class A fires e.g. fire loads of wood textiles and paper and all goods manufactured there from.

6.8.1.1.3. Hose reels in a building are mainly intended for use by the occupants of a building as a first-aid measure at the time of the outbreak of a fire and until such time as the brigade arrives.

We submit therefore that the intentions of regulation T1(1)(e) have been complied with.

GENERAL FIRE SAFETY REQUIREMENTS

The following is a summary of the general fire safety requirements to be implemented within the building, excluding those items already discussed above.

1. All fire protection equipment and emergency exits will be sign posted by means of symbolic safety signs, which will comply with SABS 1186 to indicate the position or direction of exit. Emergency exits shall be demarcated by means of photo luminescent and/or illuminated signs. Signage dimensions as stated in this document.

2. Summary of fire fighting equipment:

   - 30m x 20mm fire hose reels within the building.
   - 9kg & 4.5kg ABC dry chemical powder fire extinguishers in the building.
   - Four (4) 65mm pillar type fire hydrant with British Instantaneous coupling on the site as indicated on a 80mm main.
   - Double headed booster connection as indicated.
   - Extra high hazard sprinkler system, together with dedicated tank and pump installation in accordance with SANS 10287:2005

3. Access to the site by emergency vehicles is as per this document.

4. There are no suspended ceilings with a resulting ceiling void in excess of 300m². Ceilings shall comply overall with rule 4.13.

5. Floor coverings in the G1 occupancy to comply with 4.14 and to be class 4 or better when tested in accordance with SABS 0177: Part IV.

6. Wall finishes to comply with 4.15 and to be class 2 or better when tested in accordance with SABS 0177: Part III.

7. Smoke ventilation measures will be implemented as per the calculations contained in this document.

8. A final inspection must be done at the completion of the project with the local Fire Safety Official as well as the Fire Consultant present.

9. If the quantity, pressure and rate of flow of water become inadequate for the supply of any hose reel or hydrant, the owner of the building or property must make suitable alternative arrangements to ensure compliance with part W of SABS 0400-1990.

THE OWNER/DEVELOPER IS AWARE OF THE ABOVE REQUIREMENTS AND UNDERTAKES TO COMPLY WITH THE PRESCRIBED FIRE NOTES PERTAINING TO THIS PROJECT.

In view of the above we are satisfied that the occupants of this building can safely escape to a safe area and that the intention of the regulations as contemplated in T1 and W1 of SANS 10400-2011 has been met by this design.

We trust that this design will meet your professional approval.

Yours sincerely

LUKE HARTOG
FIRE SAFETY CONSULTANT
AMSAESI

NATIONAL BUILDING REGULATIONS (ACT 103 OF 1977) SECTION A19

FORM 2	APPLICATION FOR ACCEPTANCE AS AN APPROVED COMPETENT PERSON IN TERMS OF REGULATION A19

(To be completed and submitted for all appointments in terms of regulation A19)

To: Randwest City (Name of Local Authority)

Erf/Holding/Portion No: 41

Township/Agricultural Holding/Farm Name: Aureus

Street Address: PPE Select, Bussing Str, Aureus

Nature of Project: Additions

(Insert proposed new building(s), or building alteration, building addition, re-erection of building, refurbishment of building, or structural repair to existing building, as relevant.)

SECTION 1 : DECLARATION BY OWNER

I / We: P Pretorius *(Name of owner)*

Of PPE Select, Bussing Str, Aureus, Randfontein

(Address)

Tel. No : 011-296-3600

Hereby confirm that I / We have appointed

LUCAS IGNATIUS HARTOG of **ULTIMATE FIRE DESIGNS**

Professional Registration Number: **Pending**

Registration Council: **Engineering Council of South Africa (ECSA)**

In terms of Regulation A19(1) as the Competent Person for the work, duties and responsibilities set out herein, and I / we understand that the onus is on me / us to –

i) Inform the competent person when the work is due to start on site; and

ii) Notify the local authority in writing should the appointment be terminated before the work for which this person was appointed is completed; and to make another appointment in terms of Regulation A19(2);

iii) Extend the above appointment to meet the requirements of Regulations A19(7) and A19(8) where applicable.

Signature of Owner: Date: 8 July 2019

SECTION 2: DECLARATION BY APPOINTED COMPETENT PERSON

I, Lucas Ignatius Hartog, of 6 Granaat Ave, Greenhills, Randfontein, and representing Ultimate Fire Designs

Tel No: 082-573-1385 Fax No: 011-412-4586 E-mail: ultifire@telkomsa.net

accept the appointment made in section 1 and undertake and accept full responsibility for

i) The rational design in respect of the above project and in accordance with the rational design requirements of the National Building Regulations for the applicable work described herein, and,where relevant, for the inspection, in respect of work contemplated in section 3 of this Form, and accept that the provisions of Regulations **A19(6)**, **(7)** and **(8)**, and, where applicable, Regulation **A14** shall apply to the duties and responsibilities of any appointment;

ii) providing the local authority with such drawings, details and particulars as are and may be required by the National Building Regulations;

iii) notifying the local authority in writing should

a) it appear that any work is being carried out in a manner which might endanger the strength, stability or serviceability of the building or any adjoining building, structure or property; and

b) my appointment be terminated before the work for which I was appointed is complete;

iv) submitting to the local authority in terms of section 14(2A) of the National Building Regulations and Building Standards Act, Form 4 on completion of the relevant work, where required, and

v) maintaining contact with the owner of the project as to when my services may be required,

and declare that –

i) I am competent to undertake the rational design and any associated inspection work in relation to the applicable work(s) contemplated in section 3 of this Form and in support of my declaration of competence submit that (tick appropriate option)

☐ I satisfy the relevant definition for competent person contained SANS 10400 in all respects in relation to the works contemplated; or

☒ I have the necessary qualifications, experience and contextual knowledge to undertake such work as set out in the attached declaration;

ii) I shall satisfy Regulation **AZ4** by (tick appropriate option)

☒ complying with all the relevant requirements of SANS 10400; or

☐ reliably demonstrating, or predicting with certainty, to the satisfaction of the appropriate local authority, that an adopted building solution has an equivalent or superior performance to a solution that complies with the relevant requirements of SANS 10400;

iii) I am an not an employee of the owner and do have professional indemnity cover;

iv) my professional registration is current and is not suspended or terminated and is appropriate in relation to the services required; and

v) all the information given is, to the best of my knowledge and belief, true and correct.

Signature of Competent Person ..... Date 8 July 2019

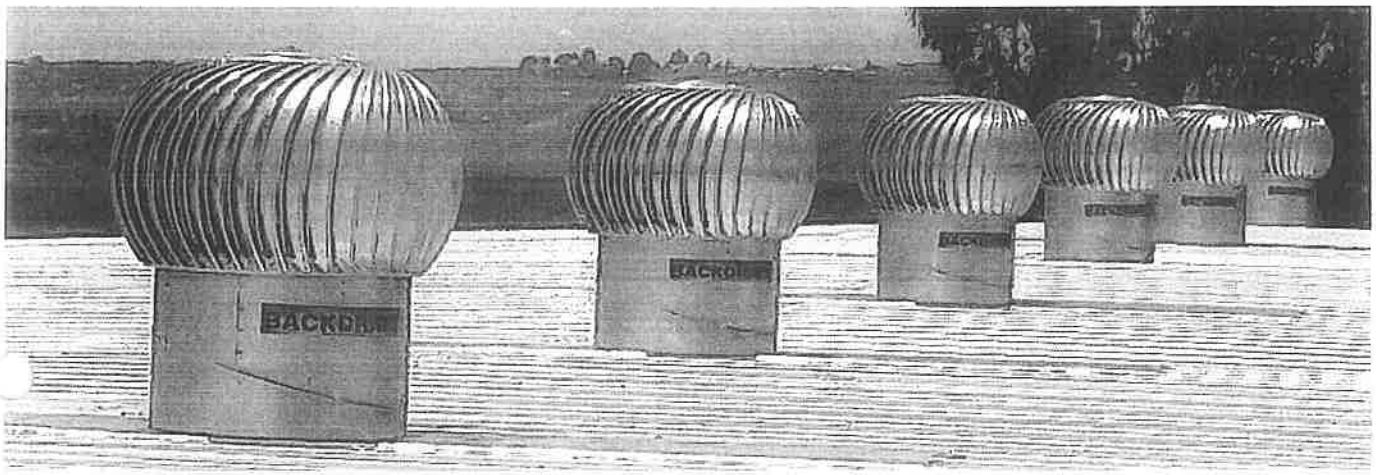
Professional registration number: **PENDING** Registration council: **ECSA**

WINDMASTER®

BACKDRAFT

FIRE RATED TURBINE VENTILATOR

- **Approved Fire rated natural ventilator**
- **Tested extraction**
- **3 Year Warranty***
- **Limited maintenance**
- **Positive continuous extraction**
- **Low cost solution**
- **Proven reliability**
- **Water and dust resistant**
- **Bird proof**
- **Full benefit of constant natural and smoke ventilation**
- **ISO 9001 quality certification**



The '**Backdraft**" range is Windmaster International's latest addition of progressive innovation.

"**Backdraft**" is a fire rated Turbine Ventilator designed and tested to extract excessive smoke from a building in case of fire. It will contain the fire and maintain a safe smoke level in accordance to the EN standards. This ensures that people will escape the disastrous effect of suffocation by smoke inhalation during fire in a building.

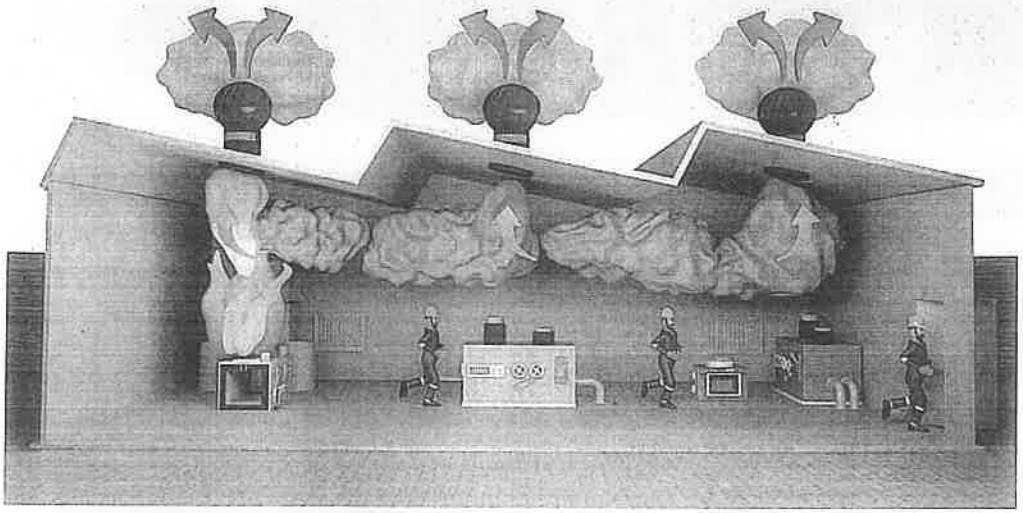
The **Backdraft** turbine ventilator is not only a lifesaving safety devise but also a natural ventilator that ensures positive airflow for day to day ventilation in your building.

A major benefit of the **Backdraft** turbine ventilator is that it carries a *3-year warrantee, limiting maintenance, unlike other smoke ventilators. It is a low cost solution and provides more advantages than standard static smoke ventilators.

The unique patented design of the bearing system withstand temperature of 300 degrees Celsius for a period of 30min, as per fire regulations code. Tested and proven the **Backdraft** range of turbine ventilators will suit your needs for effective positive day to day ventilation and at the same time provide you the peace of mind of a reliable lifesaving devise that you can depend on.

*Terms and conditions apply

KEEPING YOU COOL & SAFE



The ventilator is activated by natural convection (rising heat) from the inside of the building, and enhanced performance by the wind outside. More importantly in case of fire, the rising heat and smoke caused by the fire, will substantially enhance the rotation of the ventilator, resulting in high performance extraction

The rotating action of the Backdraft smoke ventilator ensures continuous extraction of heat and smoke in case of fire, maintaining a clear safe smoke layer

CALCULATION:
As per regulation, mechanical ventilation requirements for smoke ventilation should be calculated to maintain a minimum of 10 air changes per hour. Due to the variation of extraction capacity, the **Backdraft** ventilator is calculated to maintain 10-15 air changes per hour. The below extraction table is to be used at an average of 25km/h to determine the quantity of ventilators required.

Note: The **Backdraft** ventilator is not designed for Zone-controlled alarm activation smoke ventilation and only to be used as free-standing ventilators similar to fusible link smoke ventilators.

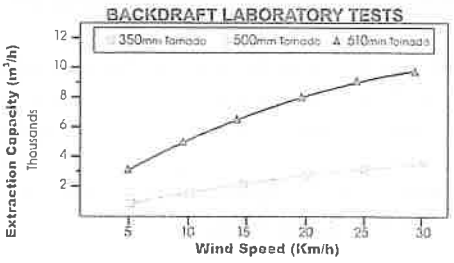
FEATURES AND SPECIFICATIONS

- Special patented fire and heat resistant bearing system
- Durable construction of ventilator
- Manufactured in a choice of Galvanised, Aluminium, Zincalume or Chromadec material
- Various models available: 610mm, 500mm, 350mm and 300mm
- Adjustable throat section
- *3-year warranty
- Changeable bearing system
- Tested extraction capacity
- Fire rated certification

TURBINE SPECIFICATIONS

Specifications	300mm Backdraft	350mm Backdraft	500mm Backdraft	610mm Backdraft
Tested Air removing capacity at				
15km/h windspeed	1489m³/h	1863m³/h	4495m³/h	6807m³/h
25km/h windspeed	2184m³/h	2731m³/h	5757m³/h	8512m³/h
Sealed Bearings	2	2	2	2
No. of blades	20	21	32	40
Box Sizes				
Height	500mm	600mm	850mm	900mm
Width	450mm	530mm	700mm	850mm
Length	450mm	530mm	700mm	935mm
Approximate mass:				
Galvanised units	6.2kg	7.2kg	14.0kg	17.4kg
Zincalume weights	6.6kg	8.8kg	15.6kg	19.2kg
Aluminium unitsg	3.4kg	4.4kg	10kg	11.2kg

NOTE: The air removing capacity figures shown have been calculated at a average height (heat stack) of five meters above working level. Average windspeed = 15km/h. Higher stack effect = better exctraction



DISTRIBUTOR CONTACT DETAILS

Manufactured by

Windmaster

WINDMASTER INTERNATIONAL (PTY) LTD

Specialists in Turbine RoofVentilators and Evaporative Coolers

www.windmaster.co.za