

FIRE SAFETY INSPECTION REPORT

MULTIFABS LTD KASHIMPUR, NAYAPARA

Other Factories: None



April 9, 2014

Fire Safety Inspection Report Multifabs Ltd

Introduction

Multifabs Ltd manufacturing complex was surveyed for fire safety on 4/9/2014 by Hughes Associates, Inc.

The purpose of the survey was to identify significant fire safety issues and to provide recommendations for remediation based on applicable standards specified by the Accord. The scope of this initial fire safety inspection was limited to the review and identification of major fire safety issues. The inspection did not include identification of minor deficiencies, which will be further addressed as part of follow-up inspections.

Limitations

The information in this fire safety inspection report was obtained during a visit to the facility and during interviews with local factory management. It has not been possible to provide independent verification for all the information and data collected, and, therefore, Hughes cannot accept general responsibility for omissions or errors arising from inaccuracies in this report from the information obtained.

The findings and recommendations in this report are not intended to imply, guarantee, ensure or warrant compliance with any government regulations. Additionally, the results do not imply in any way that compliance with the findings or recommendations as stated in this report will eliminate all hazards, risks or exposures or that hazards, risks or exposures not referred to in this report do not exist. Compliance with the findings and recommendations stated in this report does not relieve the factory owner from obligation to comply with specific project requirements, industry standards, or the provisions of any local government regulations.

General Factory Information

Factory name(s):

Dyeing Shed
Production Building

Factory Address:

Kashimpur, Nayapara

Points of Contact:

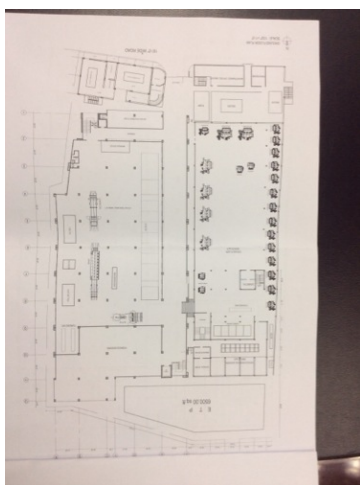
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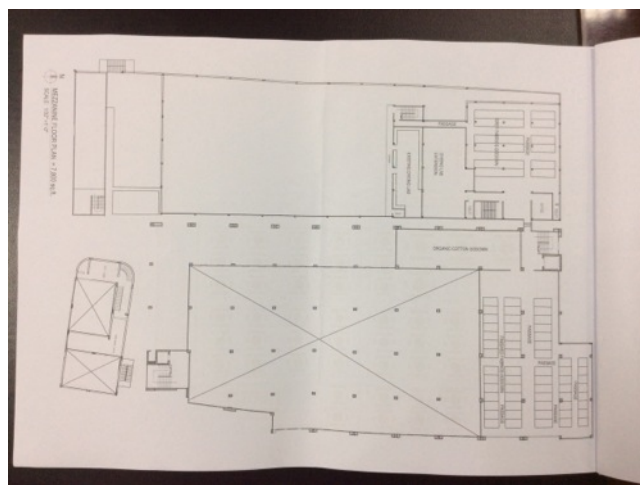
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General Building Information - Dyeing Shed

No. of Stories Below / Above Grade	0 / 1
High Rise	No
Occupancy Classification	G2 Industrial
Floor Plans Available	Yes



Ground floor layout



Mezzanine layout

Date Of Construction	1996
Major Renovations	No
Other Tenants	No
Floors Occupied By Factory	All

Floor	Use	Occupant Load
G	Dyeing	163
M	Laboratory	15

Construction Features

Non-Combustible	Yes
Fire-Resistive	Yes

Building Surroundings

North	Approximately 30 foot separation
South	Approximately 30 foot separation
East	Covered alley to Production Building
West	Approximately 30 foot separation

Egress Features

Two (2) exits serve the building. Egress from the mezzanine is provided by two (2) exit stairs. Each floor had an adequate number of exits with sufficient exit capacity based on occupant load. All exits were remotely located. All exits discharge to the exterior of the building. Egress doors with locking features were present at building exits. All doors were open and unlocked during the inspection. Emergency evacuation plans were located at building entrances. Fire drills are conducted monthly, records were provided during the inspection.

Floor	Occupant Load	No. Exits	Exit Capacity
G	163	2	437
M	15	2	233

General

Number of Exits Adequate Yes

Exits Remote Yes

Exit Doors

Sliding Gates/Doors Used? No

Egress Doors Swing Correctly? Yes

Egress Doors Lockable? Yes

Exit Stairs

All Stairs Discharge to the Exterior? Yes

Handrails on at least One Side? Yes

Storage Located in Stairs? No

Exit Access From Factory Areas

Storage in Egress Paths? No

Egress Paths of Adequate Width? Yes

Excessive Travel Distances, CPT, DE's No

Emergency Planning

Emergency Evacuation Plans Provided?	Yes
Fire Drills Conducted	Yes
Records Maintained	Yes



Exemplar emergency plans

Fire Protection Features

Sprinkler System

There is no sprinkler system installed. One is not required because the height of the floor of the highest occupied story is less than 23 meters.

Fire Hose System

Two (2) fire hose reels are provided in the building, one at each building exit.

Hose Size(s) Provided 1 in.

Locations At each exit



Exemplar hose reel

Fire Water Supply

The water supplying the standpipes comes from a deep well. The water is pumped into an underground reservoir with a reported capacity of 500,000 liters. It is then piped to a cistern of a reported 100,000 liter capacity on the roof. This tank provides fire water for the main building in addition to the two sheds. There is no fire pump and pressure is supplied solely by gravity. A new centralized, automatic fire pump has been planned.

Source(s) Cistern

Location Roof of Production Building

Capacity 100,000 liters

Fire Pump No

Fire Alarm System

A fire alarm system was provided in the factory building. It consists of manual alarm switches, sirens and beacon units installed near the entrances to each floor. The activation switches on each floor reportedly trigger the fire alarm for the entire building, but are not connected between all buildings in the complex. No functional test was conducted on the system during the inspection. There is no fire alarm panel or system supervision.

Type of System Manual Fire Alarm (Audible and Visible)

Fire Panel Location None

Visible Notification Appliances? Yes

Audible Notification Appliances? Yes

Alarm Annunciation Manual
Whole Building

Functional Test Conducted No

Regular Inspection, Testing, & Maintenance? No



Exemplar fire alarm



Exemplar fire alarm switch

Fire Detection System

There are no smoke detectors installed in the shed. Heat detectors, interconnected to the fire alarms and an addressable fire panel have been planned.

**Regular Inspection,
Testing, & Maintenance?** Yes



Exemplar smoke alarm

Portable Fire Extinguishers

CO2 and dry chemical fire extinguishers are sufficient in number and spacing.

Types Provided CO2, dry chemical

Adequate Number/Spacing? Yes



Exemplar fire extinguisher

Manual Fire Fighting Equipment

The manual fire fighting equipment was conveniently located and well maintained.

Types of Equipment Provided Beaters, hooks, buckets, gloves, gumboots, fire blankets, hard hats, rope

Location of Equipment 2 locations on open factory floor.

Other Features

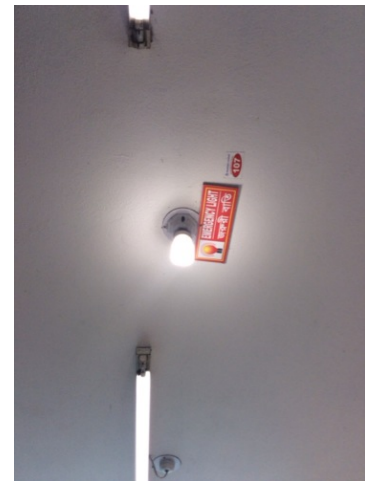
Emergency Lighting & Exit Signs

There were multiple fluorescent lights that are serviced by either an alternate “Instant Power Supply” (IPS) or battery backup located inside and outside the exit enclosure walls as well as throughout the factory floor on each floor. Each floor had a number of illuminated exit signs (a mix of directional and nondirectional) located along the exit access and at exits. The factory reports that these are all serviced by normal electricity as well as by an “Instant Power Supply” (IPS) unit. There were no records or assertions of regular testing or maintenance of the emergency lighting system.

Exits and Exit Access Properly Marked with Exit Signage	Yes
Emergency Power	IPS Battery
Emergency Lighting for Exits & Exit Access	Yes
Regular Inspection, Testing, & Maintenance?	No



Exemplar emergency exit sign



Exemplar emergency lighting

Elevators

There are no elevators installed in the dyeing Shed.

Generators

The generator is located on the ground floor of the Production Building. It does not require fire rated separations. Sprinklers and heat detectors, interconnected with a centralized fire panel, have been planned.

Location(s) Ground floor of Production Building.

Inside Fuel Storage No

Fire Rated Separations Provided? No



Boilers

The boiler is located on the ground floor adjacent to the Dyeing Shed. It does not have the required fire rated separations. It has an insufficient number of smoke alarms. Sprinklers and heat detectors, interconnected with a centralized fire panel, have been planned.

Location(s) Ground floor adjacent to dyeing shed

Fire Rated Separations Provided? No



Main boiler



Boiler room unprotected opening

Transformers

No transformers are present at this factory. All power comes from the generators.

Storage Areas

Process areas larger than 250 square feet and more than 8 feet in height do not have the required fire rated separations.

Fire Rated Separations Provided? No

Open to Factory Floors? Yes

Open to Exit Discharge? No

Additional Information

In addition to the buildings listed in this report, there is a 4-story support structure, which contains a chemical store. There was not adequate separation between incompatible materials, specifically oxidizers and flammables. The child care was located on floor 1 of the admin building and had direct access to an exit stair.

General Building Information - Production Building

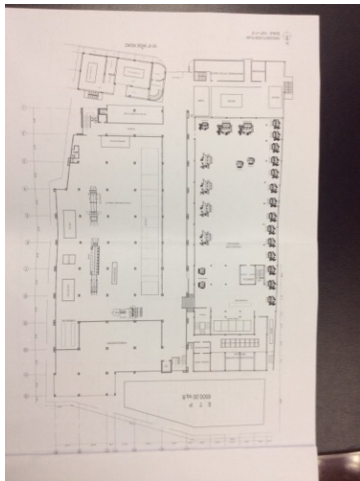
No. of Stories Below / Above Grade 0 / 7

High Rise Yes

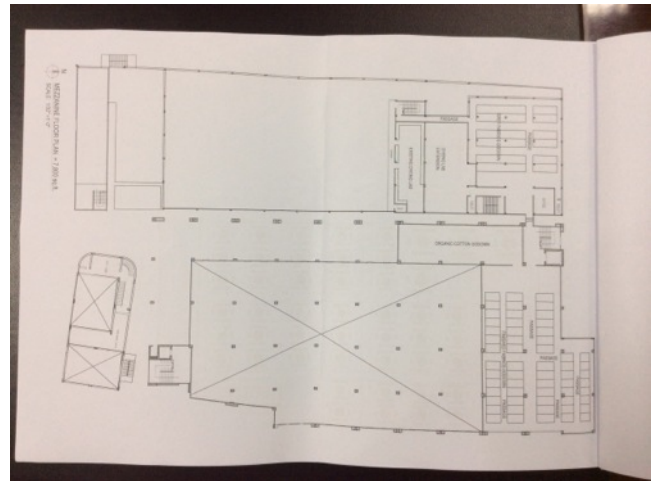
High Rise Comments: The height of the floor of the highest occupiable floor is 79 feet.

Occupancy Classification G2 Industrial

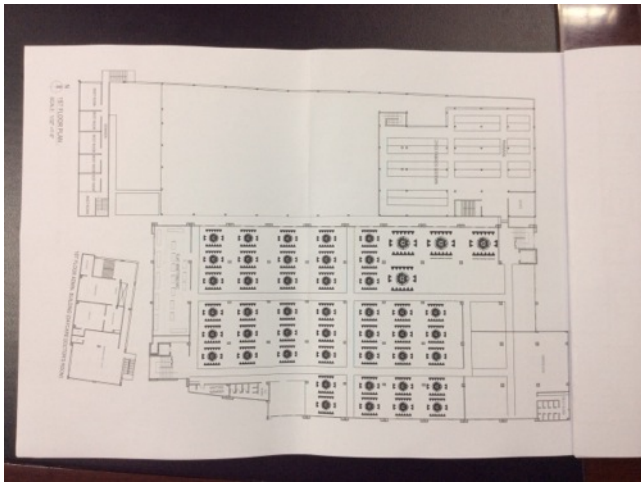
Floor Plans Available Yes



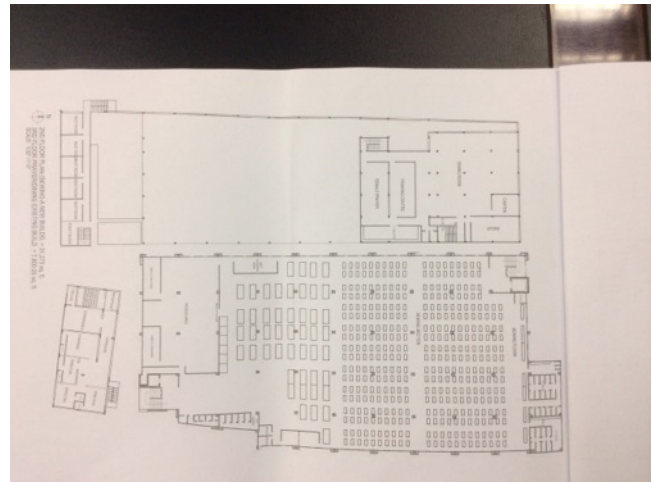
Ground floor layout



Mezzanine layout



Floor 1 layout



Floor 2, 3, 4 layout

Date Of Construction 2006

Major Renovations No

Other Tenants No

Floors Occupied By Factory All

Floor	Use	Occupant Load
G	Dyeing/Finishing	315
1	Knitting	190
2	Sewing/Finishing	650
3	Sewing/Finishing	710
4	Sewing/Finishing	830
5	Cutting	410
6	Printing/Store	250

Construction Features

Non-Combustible Yes

Fire-Resistive Yes

Building Surroundings

North Approximately 30 foot separation

South Approximately 10 foot separation to 5 story admin building

East No separation at ground floor

West Covered alley to Dyeing shed, 4 story godown

Vertical Openings

Stairs Enclosed in Fire-Rated Construction? Yes

Unsealed Penetrations in Stairs No

Unprotected Openings From Stairs Yes

Shafts Enclosed in Fire-Rated Construction No

Floors with Openings/Penetrations No

Other Vertical Openings No

Egress Features

Two (2) exit stairs serve the building. Egress from the ground floor is provided by two (2) exits. Floors 2, 3, and 4 had an inadequate number of exits and insufficient exit capacity (493) based on occupant load (650, 710, and 830, respectively). All other floors had an adequate number of exits with sufficient exit capacity based on occupant load. All exits were remotely located. All exits discharge to the exterior of the building except the East stair, which discharges inside the building at the ground floor. All exit stairs were open on all floors due to unprotected openings.

Sliding gates were used at building exits, exit stairs, and exit discharge. Egress doors with locking features were present at building exits, exit stairs, and exit discharge. All gates were open and unlocked during the inspection. On the ground floor, in the North stairwell, combustible materials were stored. Emergency evacuation plans were located at floor entrances. Fire drills are conducted monthly, records were provided during the inspection. There was a shaft connecting multiple floors that was not enclosed in fire rated construction.

Floor	Occupant Load	No. Exits	Exit Capacity
G	315	2	493
1	190	2	493
2	650	2	493
3	710	2	493
4	830	2	493
5	410	2	493
6	250	2	493

General

Number of Exits Adequate	No
Exits Remote	Yes

Exit Doors

Sliding Gates/Doors Used?	Yes
Egress Doors Swing Correctly?	Yes

Egress Doors Lockable? Yes

Exit Stairs

All Stairs Discharge to the Exterior? Yes

Handrails on at least One Side? Yes

Storage Located in Stairs? Yes

Exit Access From Factory Areas

Storage in Egress Paths? No

Egress Paths of Adequate Width? Yes

Excessive Travel Distances, CPT, DE's No

Emergency Planning

Emergency Evacuation Plans Provided? Yes

Fire Drills Conducted Yes

Records Maintained Yes



Exemplar emergency plans

Fire Protection Features

Sprinkler System

There is no sprinkler system installed. One is required because the height of the floor of the highest occupiable story is 79 feet. A fire system has been designed that provides detection throughout the factory, sprinklers in the store rooms and offices, and a fire pump.

Fire Hose System

Four (4) fire hoses are provided on each floor of the building, with one located at each stairwell and additional ones throughout the floor.

Hose Size(s) Provided 1 in.

Locations At least 4 locations per floor.



Exemplar hose reel

Fire Water Supply

The water supplying the standpipes comes from a deep well. The water is pumped into an underground reservoir with a reported capacity of 500,000 liters. It is then piped to a cistern of a reported 100,000 liter capacity on the roof. This tank provides fire water for the main building in addition to the two sheds. There is no fire pump and pressure is supplied solely by gravity. A new centralized, automatic fire pump has been planned.

Source(s)	Cistern
Location	Roof
Capacity	100,000 liters
Fire Pump	No

Fire Alarm System

A fire alarm system was provided in the factory building. It consists of manual alarm switches, sirens and beacon units installed near the entrances to each floor. The activation switches on each floor reportedly trigger the fire alarm for the entire building, but are not connected between all buildings in the complex. No functional test was conducted on the system during the inspection. There is no fire alarm panel or system supervision.

Type of System	Manual Fire Alarm (Audible and Visible)
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Fire Panel Location	None
Visible Notification Appliances?	Yes
Audible Notification Appliances?	Yes
Alarm Annunciation	Manual Whole Building
Functional Test Conducted	No
Regular Inspection, Testing, & Maintenance?	No



Exemplar fire alarm



Exemplar fire alarm switch

Fire Detection System

Single station smoke alarms are provided above each electrical distribution board. There are an insufficient number smoke alarms elsewhere. Heat detectors, interconnected to the fire alarms and an addressable fire panel have been planned.

Type of Detectors Single Station Smoke Alarms

**Regular Inspection,
Testing, & Maintenance?** Yes



Exemplar smoke alarm

Portable Fire Extinguishers

CO2 and dry chemical fire extinguishers are sufficient in number and spacing.

Types Provided CO2, dry chemical

**Adequate
Number/Spacing?** Yes



Exemplar fire extinguisher

Manual Fire Fighting Equipment

The manual fire fighting equipment was conveniently located and well maintained.

Types of Equipment Provided Beaters, hooks, buckets, gloves, gumboots, fire blankets, hard hats, rope

Location of Equipment At each stairwell on each floor.

Other Features

Emergency Lighting & Exit Signs

There were multiple fluorescent lights that are serviced by either an alternate “Instant Power Supply” (IPS) or battery backup located inside and outside the exit enclosure walls as well as throughout the factory floor on each floor. Based on the quantity and placement of emergency lighting on the ground floor, adequate illumination levels are not anticipated along egress routes. Each floor had a number of illuminated exit signs (a mix of directional and nondirectional) located along the exit access and at exits. The factory reports that these are all serviced by normal electricity as well as by an “Instant Power Supply” (IPS) unit. There were no records or assertions of regular testing or maintenance of the emergency lighting system.

Exits and Exit Access Properly Marked with Exit Signage Yes

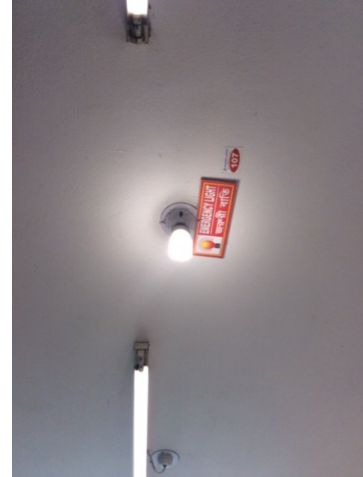
Emergency Power IPS
Battery

Emergency Lighting for Exits & Exit Access Yes

Regular Inspection, Testing, & Maintenance? No



Exemplar emergency exit sign



Exemplar emergency lighting

Elevators

Two elevator are installed on opposite sides of the building. They have neither fire controls nor automatic recall.

Automatic Recall No

Fire Fighter Features No

Elevator Lobby No



Elevator

Generators

The generator is located on the ground floor. Sprinklers and heat detectors, interconnected with a centralized fire panel, have been planned.

Location(s) Ground floor

Inside Fuel Storage No

Fire Rated Separations Provided? No



Boilers

The boiler is located on the ground floor adjacent to the Dyeing Shed. It does not have the required fire rated separations. It has an insufficient number of smoke alarms. Sprinklers and heat detectors, interconnected with a centralized fire panel, have been planned.

Location(s) Ground floor adjacent to dyeing shed

Fire Rated Separations Provided? No



Main boiler



Boiler room unprotected opening

Transformers

No transformers are present at this factory. All power comes from the generators.

Storage Areas

Storage rooms and process areas larger than 250 square feet and more than 8 feet in height located on multiple floors do not have the required fire rated separations.

Fire Rated Separations Provided? No

Open to Factory Floors? Yes

Open to Exit Discharge? No

Additional Information

In addition to the buildings listed in this report, there is a 4-story support structure, which contains a chemical store. There was not adequate separation between incompatible materials, specifically oxidizers and flammables. The child care was located on floor 1 of the admin building and had direct access to an exit stair.

Findings & Recommendations

Tables 1 - 2 summarizes the major fire safety issues identified during the inspection. Recommendations have been provided to address each issue.

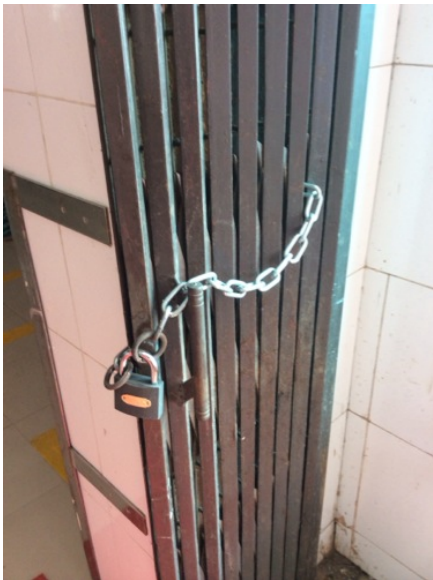
An implementation schedule shall be developed by the factory to remediate each of the findings. The specific timing of improvements, including any requested extensions due to design / installation constraints, shall be submitted to the Accord for approval.

Table 1. Findings And Recommendations - Dyeing Shed

No.	Category	Finding	Recommendation	Remediation Timeframe
F-1	Fire Rated Construction	Process areas throughout the building used for combustible storage are not separated by fire-rated construction.	<p>Provide dedicated storage rooms separated by minimum 1-hr fire-rated construction.</p> <p>Where separate storage rooms are not feasible, provide defined storage areas and limit the storage arrangement as follows:</p> <ul style="list-style-type: none"> - Maximum height of 2.4m and maximum area of 23m² - If sprinkler protected: maximum height of 3.66m and maximum area of 93m² <p>Separate areas of unenclosed combustible storage by a minimum clear distance of 3m.</p>	Within 3 months



F-2	Egress	Egress doors and gates with locking features are provided throughout the stairwells.	<p>Remove locking features from all egress doors / gates.</p> <p>If locks are required for security reasons, utilize special door locking features complying with NFPA 101.</p>	Immediate
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F-3	Egress	Collapsible gates and sliding doors are provided throughout the building.	<p>Replace all gates and sliding doors along the means of egress with side-hinged, swinging egress doors.</p> <p>If locks are required for security reasons, utilize special door locking features complying with NFPA 101.</p>	Within 1 month
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F-4	Fire Protection	The fire alarm system is antiquated, not a listed system, and does not provide alarm and notification features consistent with acceptable standards.	Replace the fire alarm system with a new, listed addressable fire alarm system in accordance with NFPA 72.	Design within 4 months, install within 9 months
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F-5	Fire Protection	Inspection, testing, and maintenance for the fire alarm system was not in accordance with NFPA 72.	Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.	Within 3 months
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F-6	Fire Protection	The building is not equipped with smoke alarms.	Provide automatic smoke detection throughout the building in accordance with NFPA 72.	Within 6 months
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F-7	Egress Lighting	Inspection, testing, and maintenance records for the emergency lighting system were not available.	Inspect, test and maintain the emergency lighting system in accordance with The ACCORD standard. Keep written records on-site.	Within 3 months
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Table 2. Findings And Recommendations - Production Building

No.	Category	Finding	Recommendation	Remediation Timeframe
F-1	Fire Rated Construction	Storage rooms and process areas throughout the building used for combustible storage are not separated by fire-rated construction.	<p>Provide dedicated storage rooms separated by minimum 1-hr fire-rated construction.</p> <p>Where separate storage rooms are not feasible, provide defined storage areas and limit the storage arrangement as follows:</p> <ul style="list-style-type: none"> - Maximum height of 2.4m and maximum area of 23m² - If sprinkler protected: maximum height of 3.66m and maximum area of 93m² <p>Separate areas of unenclosed combustible storage by a minimum clear distance of 3m.</p>	Within 3 months



F-2	Fire Rated Construction	The exit stairs are not separated from work areas on each floor by fire-rated construction.	Provide minimum 1.5-hr fire rated doors and seal all unprotected openings to separate the exit stairs from work areas and other building spaces on all floor levels. Ensure that the fire doors are self-closing and positive latching and that they are provided with fire exit (panic) hardware where serving production floors.	Within 3 months
			If fire doors are required to be held open for functional reasons, provide automatic-closing devices tied to the fire alarm system.	



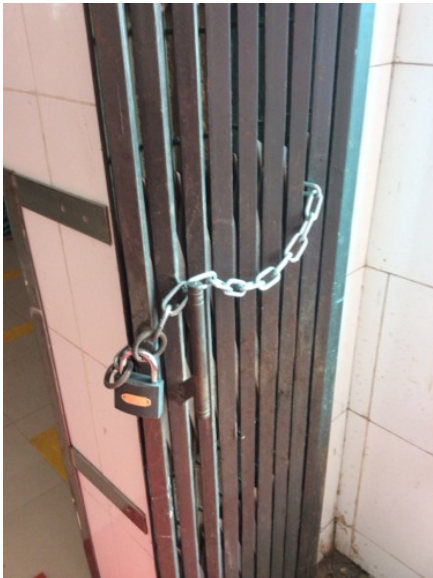
F-3	Fire Rated Construction	The boiler room is not separated by fire-rated construction from the Dyeing Shed.	Separate the boiler room by a minimum 2-hr fire-rated construction. Seal and/or protected all openings to maintain the required fire separations	Within 3 months
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F-4	Fire Rated Construction	Unsealed penetrations and openings are located in the fire-rated floor/ceiling assemblies, specifically the electrical shaft, which connects all floors.	Provide a minimum 2-hr fire-rated shaft to separate the utility risers from each floor level. Seal all penetrations and openings in floor/ceiling assemblies to maintain the fire separation.	Within 3 months
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F-5	Egress	The exit capacity of 493 is not adequate for the occupant loads on floors 2, 3, and 4 (650, 710, and 830, respectively).	Immediately reduce occupant load to not more than available exit capacity. If possible, provide additional exits in the future to provide additional exit capacity.	Immediate
F-6	Egress	Egress doors and gates with locking features are provided throughout the stairwells.	Remove locking features from all egress doors / gates. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.	Immediate



F-7	Egress	Collapsible gates and sliding doors are provided throughout the building.	Replace all gates and sliding doors along the means of egress with side-hinged, swinging egress doors. If locks are required for security reasons, utilize special door locking features complying with NFPA 101.	Within 1 month
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F-8	Fire Protection	The fire alarm system is antiquated, not a listed system, and does not provide alarm and notification features consistent with acceptable standards.	Replace the fire alarm system with a new, listed addressable fire alarm system in accordance with NFPA 72.	Design within 4 months, install within 9 months
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F-9	Fire Protection	Inspection, testing, and maintenance for the fire alarm system it was not in accordance with NFPA 72.	Inspect, test and maintain the fire alarm system, and keep written records on-site, in accordance with NFPA 72.	Within 3 months
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F-10	Fire Protection	The high-rise building has an occupied floor greater than 23m (75 ft) and is not provided with automatic sprinkler protection. The large occupant loads, heavy fuel loading, and anticipated extended egress times warrant sprinkler protection.	Provide automatic sprinkler protection throughout the building in accordance with NFPA 13.	Within 3 months
F-11	Fire Protection	The building is equipped with single-station smoke alarms. Smoke alarm activation sounds only a local alarm and does not provide automatic fire alarm notification of occupants.	Remove single-station smoke alarms. Provide automatic smoke detection throughout the building in accordance with NFPA 72.	Within 6 months

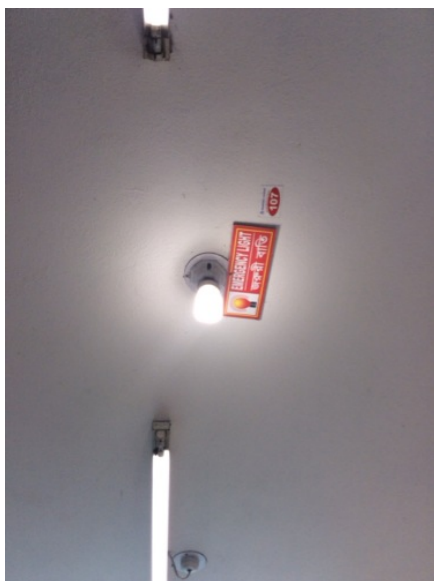


F-12 Egress Lighting

Based on the number and location of emergency lights observed, adequate illumination levels are not anticipated along egress routes on the ground floor.

Test the emergency lighting system on each floor and provide additional emergency fixtures to provide adequate illumination along the means of egress. Provide a minimum illumination of 10 lux at the floor level within exit stairs and exit discharge paths and minimum 2.5 lux along exit access aisles.

Within 3 months



F-13	Egress Lighting	Inspection, testing, and maintenance records for the emergency lighting system were not available.	Inspect, test and maintain the emergency lighting system in accordance with The ACCORD standard. Keep written records on-site.	Within 3 months
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