



11 August, 2026

Test Report Reference: 3148844



Fire Resistance Test of Door Assembly

According to UL 10C

“Double Swinging leaves Metal Door Assembly”

Test Report



Prepared by: Advanced Construction Technology Services KSA -
Fire Testing Division

Client: ABDULLAH ALI ABDULLAH AL-AHMARI Co.

Test Assembly: Double-leaf metal door assembly.

 ACTS ADVANCED CONSTRUCTION TECHNOLOGY SERVICES Build on our credentials	Test Report		
acts@acts-int.com www.acts-int.com	Positive Pressure Fire tests of door assemblies according to UL10C		
 المركز السعودي للاعتماد Saudi Accreditation Center  IAS ACCREDITED Testing Laboratory TL-1185  SASO-Approved Lab	Revision: 0	Date: 02 August 2026	Author: Mahmoud Mokhtar
	Client: ABDULLAH ALI ABDULLAH AL-AHMARI Co. Mr. Lalith kumara +966 53 239 3134 +966 13 361 8394 aae.lalith@gmail.com P.O. Box 4924, Al Oraifi, unit no.: 2, Al Jubail 35526, KSA.		Project:
			Test Sample: Double-leaf metal door assembly.
			Project Reference: 3148844
			Sample Reference: 002
Test Laboratory: Advanced Construction Technology Services (ACTS) Fire Testing Laboratory, Dammam, Saudi Arabia Tel: 00966565097257	Number of Pages: 16		
	Test Program: UL 10C, 2016		
	Sample Received: 26 July, 2026		
Testing Date: 29 July, 2026			
Executive summary			
The fire resistance test was conducted on a double-swinging leaves metal door assembly fabricated by ABDULLAH ALI ABDULLAH AL-AHMARI Co according to the UL 10C standard. The overall door dimensions were 2000 mm wide x 2300 mm high, the door assembly consisted of two identical leaves; each of thickness 45 mm, with 30 mm overlapping astragal. The tested door assembly was installed in an opening in a brick wall, nominally 3000 mm wide, 3000 mm high, and 200 mm thick. The metal door leaves were installed in the frame with five hinges for each leaf (Brand: BIN MRSHAN) and secured by a latch bolt (Brand: AKADA). A door closer (Dream) was installed for each leaf. The door's landing side faced the furnace. The door assembly has been exposed to a fire scenario in accordance with UL 10C – fire endurance test, followed by a hose stream test. The tested door remained in its original opening during the fire exposure without flame penetration or significant structural deformation for up to 120 minutes. The maximum temperature recorded on the unexposed surface after 30 minutes of fire exposure was about 197 °C. The tested door assembly successfully passed a 2-h (120-minute) fire-resistance rating test.			
Remarks			
- The test results are only valid for the tested door assembly.			
- The report shall not be reproduced except in full without the written approval of ACTS.			
- ACTS recommends that the significance of this report be considered for one (1) year from the date of testing.			

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Summary of Test Results

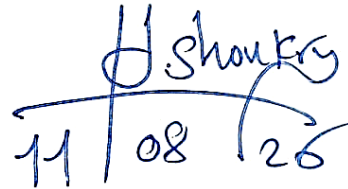
Test	Rating	Result
Fire Resistance	2-h “120-minute”	Pass
Performance Acceptance Criteria:	The tested door assembly fulfilled the fire endurance and hose stream acceptance criteria of UL 10C <u>for 120 minutes.</u>	
<u>Remarks:</u>		
This report details the method of construction, the test conditions, and the results obtained when the specific element of construction described herein was tested following the procedure outlined in UL10C-2016. Any significant deviation with respect to size, constructional details, loads, stresses, edge, or end conditions other than those allowed under the field of direct application in the relevant test method is not covered in this report”.		
The test was terminated after 120 th minutes of fire exposure according to the client’s request.		

Prepared by:



Dr. Mahmoud Mokhtar

Reviewed and approved by:



Dr. Hamada Shoukry



1. Introduction

The performance of walls, columns, floors, doors, and other building components under fire-exposure conditions is a major concern in ensuring that constructions are safe and do not pose a threat to neighboring structures or the public. So that the fire-resistive properties of materials and assemblies must be measured and specified according to a common standard expressed in terms that apply alike to a wide variety of materials, situations, and conditions of exposure. Performance is defined as the period of resistance to standard exposure elapsing before the first critical point in behavior is observed.

The test exposes a test specimen to a standard fire exposure controlled to achieve specified temperatures and pressure conditions throughout a specified period. The exposure, however, is not representative of all fire conditions, which vary with changes in the amount, nature, and distribution of fire loading, ventilation, compartment size and configuration, and heat sink characteristics of the compartment.

2. Scope

The test exposes a specimen to a standard fire exposure controlled to achieve specified temperatures throughout a specified period, followed by the application of a specified standard fire hose stream. Major variations from the construction or conditions that are tested are capable of substantially changing the performance characteristics of the assembly. This method does not provide the following:

- Full information as to the performance of all door assemblies in walls constructed of materials other than those tested.
- Evaluation of the degree by which the door assembly contributes to the risk of fire by the generation of smoke, toxic gases, or other products of combustion.
- A temperature limit on the unexposed side of the door assembly.
- Measurement of the degree of control or limitation of the passage of smoke or products of combustion through the door assembly.

3. General Description of the Test Specimen

- The tested specimen was a double-swinging metal door assembly. The photos of the exposed and unexposed faces of the door assembly and its hardware/accessories (hinges, lock, and door closer) are presented in **Figures 1** and **2**.
- The tested door details are included in **Tables 1**, and **2**. The description of the test specimen below has been prepared based on the available information provided by the client and partially verified by ACTS.
- **Figure 3** depicts the tested door shop drawing as provided by the client.

Table 1: Test Sample Description – Door

Component	Dimensions	Material/sheet thickness
Door leaves	double identical hinged leaves, each of 942 mm wide, 2240 mm high, and 45 mm thick, with 30 mm overlapping astragal	Steel - 1.2 mm
Frame	2000 mm wide, 2300 mm high, and 200 mm deep.	Steel - 1.5 mm

Table 2: Ironmongery

Hinges	
Material	Stainless Steel
Brand	BIN MRSHAN
Quantity	Five
Size, mm	100 × 114
Number of knuckles	Five knuckles
Fixing Method	Fixed onto the door leaf and frame using four screws from each side.

**Figure 1:** Photos of the door assembly, (A) Exposed face, (B) Unexposed face



Figure 2: Photos of the hardware and accessories.

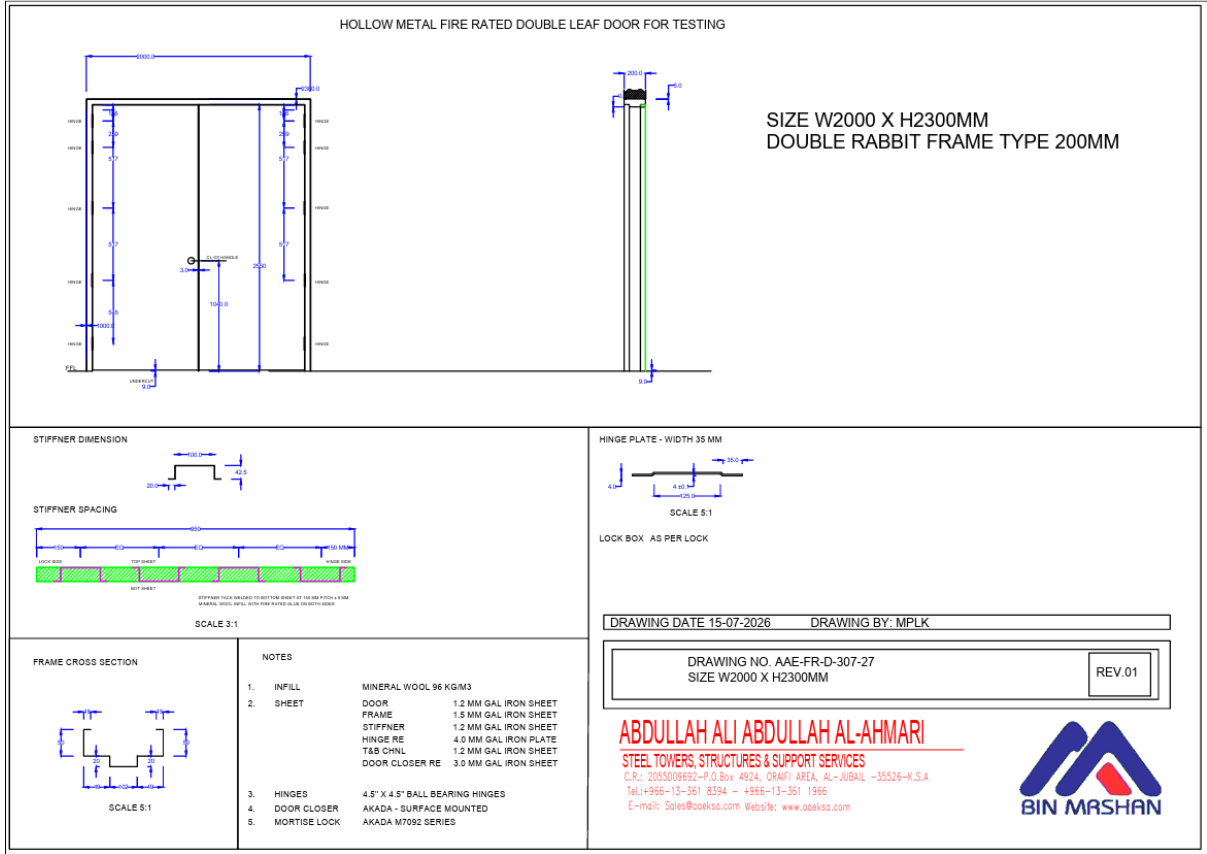


Figure 3: The tested door shop drawing as provided by the client.

4. Method of Test

- The specimen was installed vertically in a supporting construction with the landing direction into the furnace.
- The gap between the frame and the supporting construction was filled with cement mortar.
- The gaps/clearances between the doors' leaves and the frame were measured as presented in **Figure 4**.
- Three thermocouples were fixed on the unexposed face of each leaf to monitor and assess the thermal insulation capability of the sample, as shown in **Figure 4**.
- The sample was exposed to a controlled fire scenario as per UL 10C standard.
- The initial average temperature of the unexposed surface of the specimen was 42 °C, and the ambient temperature in the Lab was 41 °C.
- The commencement of the test was considered the moment when the program to follow the heating curve was initiated (igniting the burners).
- The elapsed time was measured from this point, and all automatic systems for measurement and observation began at this time. The furnace was controlled to meet the temperature requirements.
- From the commencement of the test, the following measurements and observations were recorded during the test period, where appropriate.
- Monitor and record temperatures both inside the furnace and the unexposed surface temperature
- Monitor and record flame penetration, openings, or cracks

Observations were made on the general behavior of the test specimen during the course of the test, and notes concerning phenomena such as smoke emission, cracking, melting, softening, spalling, or charring, etc. of materials of the test specimen were made.

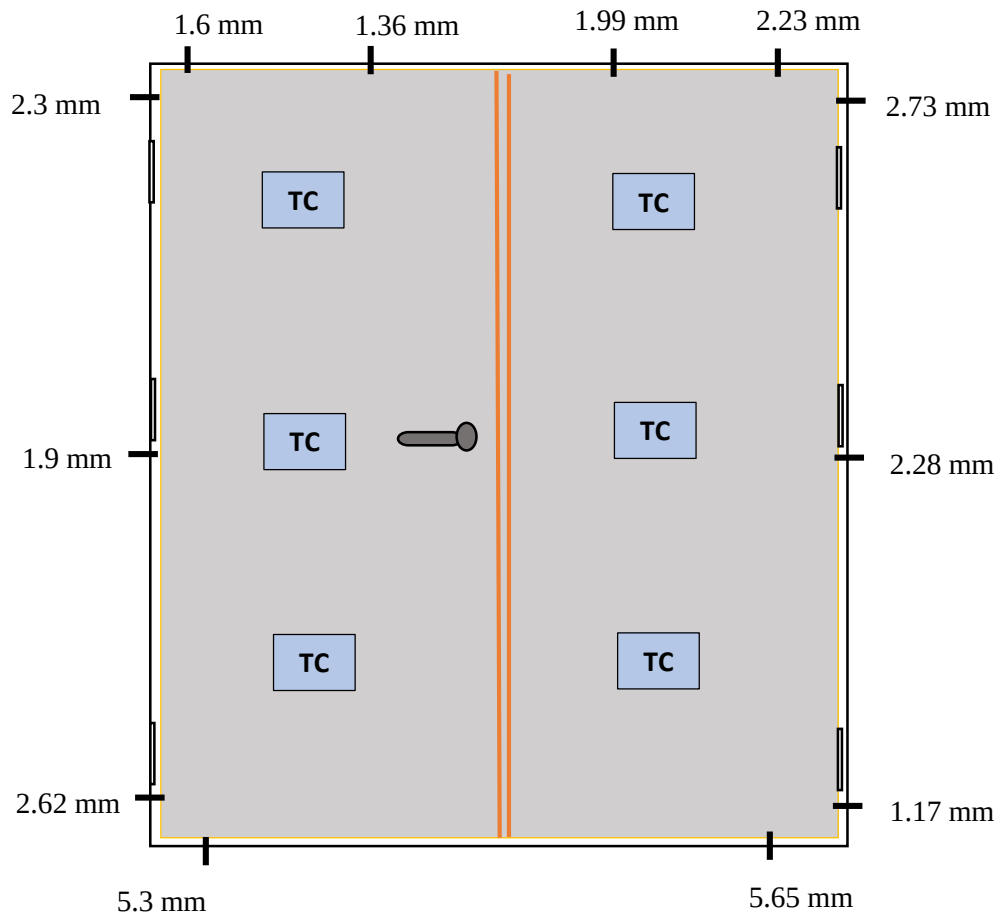


Figure 4: Gaps Measurement, and unexposed thermocouple locations

5. Summary of Visual Observations during the Test

During the Test

Table 3 summarizes the visual observations witnessed during the fire test.

Table 3: Visual observations during the fire test

Time, minutes	Observations (from the Unexposed Side)
0	Test commenced
09	Light/insignificant smoke
17	Door closers fell down
45	Slight deflection
50	decolorization
75	Separation between leaves (within acceptable limits)
90	Deflection increased
100	Application of cotton pad test (pass)
120	Test termination

Figures 5:7 show the door assembly at different periods during the test.



Figure 5: Test started.



Figure 6: Application of cotton bad after 100 minutes of fire exposure (no ignition).



Figure 7: The end of the fire endurance test after 120 minutes.

6. Hose Stream

Within three minutes after the termination of the fire endurance test, the test assembly was subjected to the impact, erosion, and cooling effects of a hose stream directed first at the bottom center of the assembly and then at all parts of the exposed surface. The hose stream was applied with a smooth, steady movement of the hose at a rate to ensure that all parts of the test assembly are impacted by the hose stream. When all parts of the test assembly have been impacted by the hose stream, the application pattern was reversed as shown in **Figures 8 and 9**. The minimum water pressure at the base of the nozzle was 30 psi and applied for 75 seconds.

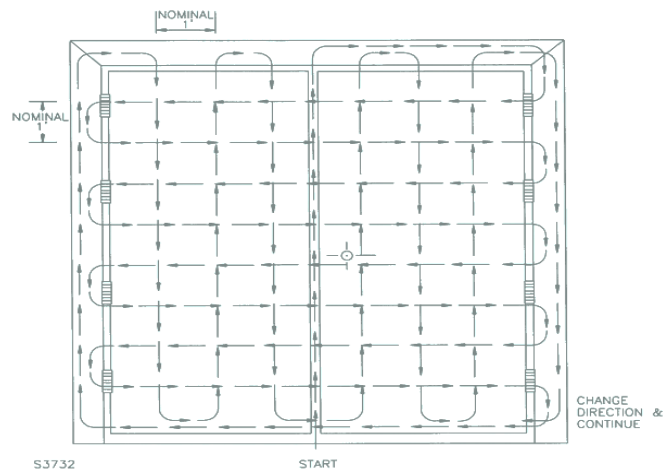


Figure 8: Hose stream pattern



Figure 9: Hose stream test after 120 minutes of fire endurance

7. Acceptance criteria according to UL10C-2016

The following conditions of acceptance apply according to UL10C-2016:

- A door assembly is considered to meet the requirements for intended performance when it remains in the opening during the fire endurance test and hose stream test within the following limitations:
 - The test assembly shall withstand the fire endurance test and hose stream test without developing openings anywhere through the assembly.
 - No flaming shall occur on the unexposed surface of a door assembly, nor shall the sample permit the passage of hot gases sufficient to ignite the cotton pad.
 - **Exception No. 1:** Sustained flaming of less than 10 seconds duration is permitted.
 - **Exception No. 2:** After 30 minutes, intermittent light flaming [not greater than 152 mm long, nor burning for periods exceeding 5-minute intervals] along the edges of doors is permitted.
 - **Exception No. 3:** Light flaming during the last 15 minutes of the classification period of 45 minutes or greater, is permitted on the unexposed surface area of the door, when it is contained within a distance of 38.1 mm from a vertical door edge, and within 76.2 mm from the top edge of the door and within 76.2 mm from the top edge of the frame of a vision panel.
- When hardware is to be evaluated for use on fire doors, it shall hold the door closed following the conditions of acceptance for the intended door assembly classification

period, and, in addition, the latch bolt shall remain projected and shall be intact after the test. The hardware is not required to be operable after the test.

- In addition to the above, for swinging doors, the following applies:
 - The movement of swinging doors mounted in pairs shall not result in any portion of the meeting edges moving more than the thickness of the door away from the adjacent door edge in a direction perpendicular to the plane of the doors during the entire classification period nor more than 1-1/2 times the door thickness as a result of the Hose Stream Test.
 - An assembly consisting of a pair of swinging doors incorporating an astragal shall not separate in a direction parallel to the plane of the doors more than 19.1 mm nor a distance equal to the throw of a latch bolt at the latch location.
 - An assembly consisting of a pair of swinging doors without an overlapping astragal, with or without a resilient astragal, for a fire and hose stream exposure of 3 hours or less, shall not separate along the meeting edges more than 9.5 mm, including the initial clearance between doors.
 - A resilient astragal, when provided without an overlapping metal astragal, shall not deteriorate to result in through openings during the Fire Endurance Test, Section 11. Small portions, less than 10 percent, are permitted to be dislodged during the Hose Stream.
 - **Exception:** The whole astragal is permitted to be dislodged during the hose stream test when separation of the meeting edges of the doors is within 9.5 mm.
 - Door frames to be evaluated with doors shall remain securely fastened to the wall on all sides and shall not permit through openings between the frame and doors or between the frame and adjacent wall.

8. Furnace and unexposed temperatures

The furnace thermocouples employed to measure the temperature of the furnace were distributed to give a reliable indication of the average temperature in the vicinity of the test specimen. These thermocouples were positioned so that they were not in contact with the flames from the furnace burners; nine thermocouples were provided in an area of 9 m². The average temperature of the furnace, as derived from the thermocouples specified, was monitored and controlled such that it complied with the standard temperatures. For the unexposed surface temperature, three thermocouples were attached to the unexposed surface of each leaf of the door to monitor the temperature rise, following standard requirements. The thermocouples were fixed using a thermocouple pad and heat-resistant adhesive. The temperature records are presented in **Figure 10**. The average temperature was compared to the requirements above.

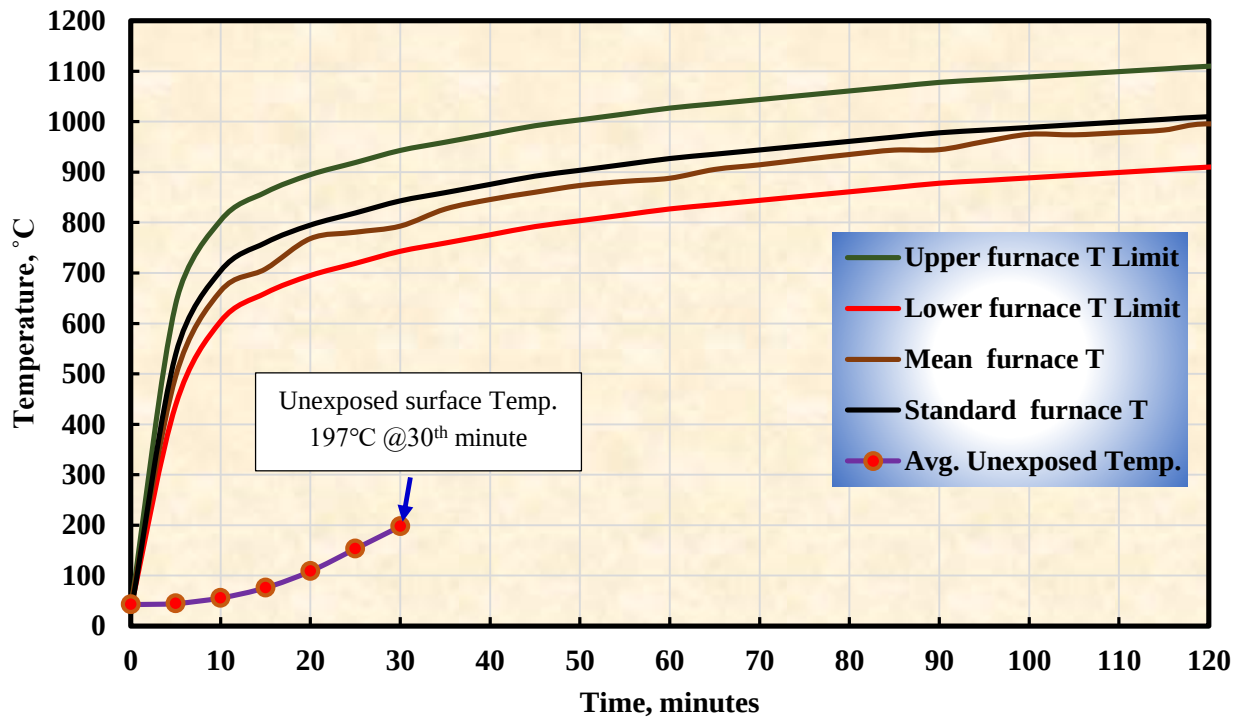


Figure 10: Furnace and unexposed surface temperatures

9. Furnace Pressure

- The neutral plane within the test furnace shall be established before the initiation of the fire test. Such pressure shall remain constant or increase to maintain the neutral plane upon initiation of the fire test. Control of the furnace pressure is to be established beginning no later than 5 minutes after the start of the test and is to be maintained throughout the remainder of the fire test.
- Pressures are to be read at intervals not exceeding 1 minute.
- The pressure that is maintained over the top one-third of the door assembly is not to exceed 20 Pa over any portion of the test sample. The pressure recorded at the top third of the door is presented in **Figure 11**.

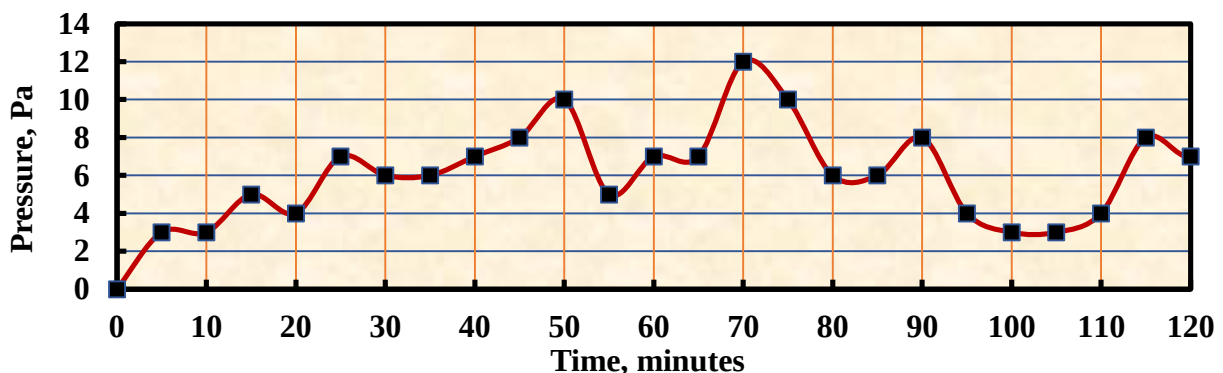


Figure 11: Furnace Pressure at neutral plane

Observations after the fire endurance test

- After the fire and hose-stream tests, the door assembly maintained its original position without through penetration of water;
- The door closers partially melted.
- **Figures 12 and 13** show the exposed and unexposed face of the door after both tests, respectively.



Figure 12: The exposed face after the test.



Figure 13: The unexposed face after the test.

10. Conclusions

- The test of the door assembly was conducted according to UL10C-2016.
- The samples were provided by the client to the ACTS laboratory. ACTS did not interfere with the sample selection except for the sample's test requirements.
- The test results were evaluated according to the performance criteria referred to in UL10C-2016.
- The test results were valid for the test configuration only and do not imply any product certification and/or classification.
- **The swinging/ hinged double-leaf metal door assembly met the requirements of the UL10C standard fire endurance and hose stream tests for 2 hours (120 minutes).**

****End of Report****

