

CLIENT: **NELCOS DISTRIBUTION INC.**
5401 Eglinton Ave. W, Unit 107A
Toronto, Ontario
M9C 5K6

Test Report No: BUR0357-FT-1

Report Date: July 23, 2024

SAMPLE ID: Bodaq General Type Vinyl Films, Super White Wood ZSW04 and Concrete NS401, applied to a 90-minute steel door.

SAMPLING DETAIL: The test samples were submitted directly by the client. The material was not independently selected for testing.

DATE OF RECEIPT: The door was received at the QAI Burnaby laboratory on June 7, 2024. The Vinyl films were applied by the client.

TESTING PERIOD: July 18, 2024

AUTHORIZATION: QAI Test Proposal Number 24MV0403-01, dated April 12, 2024 and signed by James Carpenter.

TEST PROCEDURE: Testing was conducted to the following requirements:

- UL 10c (2021) Standard for Positive Pressure Fire Tests of Door Assemblies (UL 10c).
- UL 10b (2020) Standard for Fire Tests of Door Assemblies (UL 10b).
- CAN/ULC S104-15 – Standard Method for Fire Tests of Door Assemblies (ULC S104).

TEST RESULTS: The Bodaq General Type Vinyl Films when applied on a steel 90-minute rated door met the requirements of the test standards for a 90-minute fire-resistance rating with hose stream when applied as described in this test report.

Prepared By

Signed for and on behalf of
QAI Laboratories, Ltd.

Matt Chursinoff
Technician – Fire Laboratory

Matt Lansdowne
VP – Certification and Engineering



Table of Contents

Introduction:	3
Assembly Description:	3
Test Apparatus:.....	4
Test Conditions:	5
Test Results:	5
Conclusions:	6
APPENDIX A	7
APPENDIX B	10

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED. UNLESS SPECIFICALLY STATED OR IDENTIFIED OTHERWISE, QAI HAS UTILIZED A SIMPLE ACCEPTANCE RULE TO MAKE CONFORMITY DECISIONS ON TESTING RESULTS CONTAINED IN THIS REPORT, AS APPLICABLE.

Introduction:

This report documents the fire testing conducted by QAI Laboratories Ltd. for Nelcos Distribution Inc. on 2 Bodaq Vinyl Films in accordance with UL 10c, UL 10b and ULC S104. The Bodaq Vinyl Film was applied by the client to both faces of a listed 90-minute steel door to determine if the film would have any detrimental effects on the listed doors performance in accordance with the noted test procedures.

Assembly Description:

Table 1: Test Assembly Description

COMPONENT	DESCRIPTION	
Door	Type:	90-minute UL listed steel door
	Manufacturer:	Daybar
	Construction:	18-gauge steel type door with honeycomb core
	Dimensions:	36 in. (914 mm) x 80 in. (2032 mm) x 1.75 in. (44 mm)
Frame	Type:	16-gauge knockdown steel frame.
	Frame Dimensions:	5.75 in. (146 mm) deep by 2 in. (51 mm) frame with a 0.625 in. (16 mm) stop.
	Opening Dimensions:	36 in. (914 mm) wide by 80 in. (2032 mm) high.
	Installation:	The steel frame was installed in a concrete block wall. The frame was mounted using 8 wire anchors to secure the sides of the frame to the concrete block wall.
Vinyl Covering	Product Type:	Bodaq General Type Vinyl Film
	Model:	Super White Wood ZSW04, Concrete NS401
	Description:	Decorative vinyl film with adhesive backing.
	Dimensions:	The vinyl covering was packaged in a 48 in. wide roll and 0.2 mm thick.
	Installation:	Both vinyl types were installed on the door face split vertically down the middle on the unexposed side and split horizontally on the exposed side
Hardware	Latch:	Door was fixed to frame with 2 self drilling screws located 40 in from the sill ¹
	Hinges:	Three 4-1/2 in. by 4 in. steel butt hinges.

¹ The purpose of the test was to test if the addition of the vinyl coverings had negative impacts on the rated door, not to test the door for a rating.

Test Apparatus:

The furnace used in the test is a mid-scale fire burning apparatus with interior dimensions of 10 ft. 4 in. (1.78 m) in height, 5 ft. 5 in. (1.65 m) in width, and 52 in. (1.32 m) in depth.

Temperatures within the furnace were monitored using eight thermocouples. The temperatures are controlled by adjusting fuel to the furnace burners to conform to the time/temperature curve specified by the test standards. Temperature measurements are recorded by a Agilent 34970A data acquisition unit (ID# ConeDAQ02) which passes the readings to a computer for graphical display and storage.

The door and frame assemblies were mounted in a vertical steel test frame. The test frame is then rolled up to the furnace and secured by chain and straps to the furnace opening.

Two pressure taps are installed along the longitudinal center line of the test assembly. The pressure taps are each attached and monitored by Setra model 264 pressure transducers (ID# Pressure T4 and Pressure T7). The furnace pressure is controlled by adjusting a damper in the furnace exhaust stack.



Figure 1: Test Furnace



Test Conditions:

The Nelcos Distribution Inc. assembly was constructed in a mid-scale moveable steel restraint frame. The space between the furnace and test assemblies was comprised of ceramic fiber batt to prevent air movement.

The pressure was continuously monitored using calibrated pressure transducers. After the first 5 minutes of the test the pressure 40 in. from the sill was set to zero for the remainder of the test. This pressure condition is required by UL 10c and is considered a higher requirement than the pressure conditions required for UL 10b and CAN/ULC S104 hence by testing to UL 10c the product can show compliance to all 3 standards.

Prior to the fire endurance test the test assembly was fastened to the front of the furnace, and the burners were ignited. The fire endurance test was initiated after igniting the burners. The temperature inside the furnace was controlled to follow the time/temperature curve within the limits described in the test standards.

Test Results:

Observations

Table 2: Test Observations

Test Time (h:min:sec)	Unexposed	Exposed
2:10		Top grey vinyl darkening
2:35		All vinyl has ignited
3:02		Vinyl extinguished
3:40		Re-igniting traveling across surface
4:10	Door warping	
4:25	Small bubbles forming on white vinyl	Flaming stopped
6:11	Heavy venting from head and latch side of door	
7:06	Darkening in middle of door	
7:55	Whole door face smoking	
8:40	Popping noises from door	
10:15	Door surface 90% burned off	
16:00	Left vinyl is all black, right vinyl small spot left near bottom	
19:26	Flaking off door surface	
1:30:00	Test Discontinued	

Flaming and Penetration

There was no flaming of the vinyl coverings on the unexposed surface of the doors. There was no flaming of the test assemblies for the duration of the tests.

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED. UNLESS SPECIFICALLY STATED OR IDENTIFIED OTHERWISE, QAI HAS UTILIZED A SIMPLE ACCEPTANCE RULE TO MAKE CONFORMITY DECISIONS ON TESTING RESULTS CONTAINED IN THIS REPORT, AS APPLICABLE.

Hose Stream Test

Immediately after the fire tests, a hose stream test was conducted for 34 seconds after the fire endurance test. The test assemblies successfully met the conditions of acceptance for the hose stream test: no through openings were developed that would allow a projection of water from the stream beyond the unexposed face during the time of the hose stream test.

Conclusions:

QAI performed testing in accordance with UL 10c, UL 10b and CAN/ULC S104 for Nelcos Distribution Inc. on Bodaq Vinyl Films, Super White Wood ZSW04 and Concrete NS401 tested on a 90-minute steel door assembly.

The assemblies did not experience flaming on the unexposed face of the doors and no through openings formed on the test assembly. The Bodaq Vinyl Films applied to a listed 90-minute assembly met the requirements of UL 10c, UL 10b and ULC S104 for a 90-minute fire-resistance rating with hose stream.

APPENDIX A

Page	Title
8	Furnace Time Temperature Curve
9	Furnace Time Pressure Curves

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED. UNLESS SPECIFICALLY STATED OR IDENTIFIED OTHERWISE, QAI HAS UTILIZED A SIMPLE ACCEPTANCE RULE TO MAKE CONFORMITY DECISIONS ON TESTING RESULTS CONTAINED IN THIS REPORT, AS APPLICABLE.

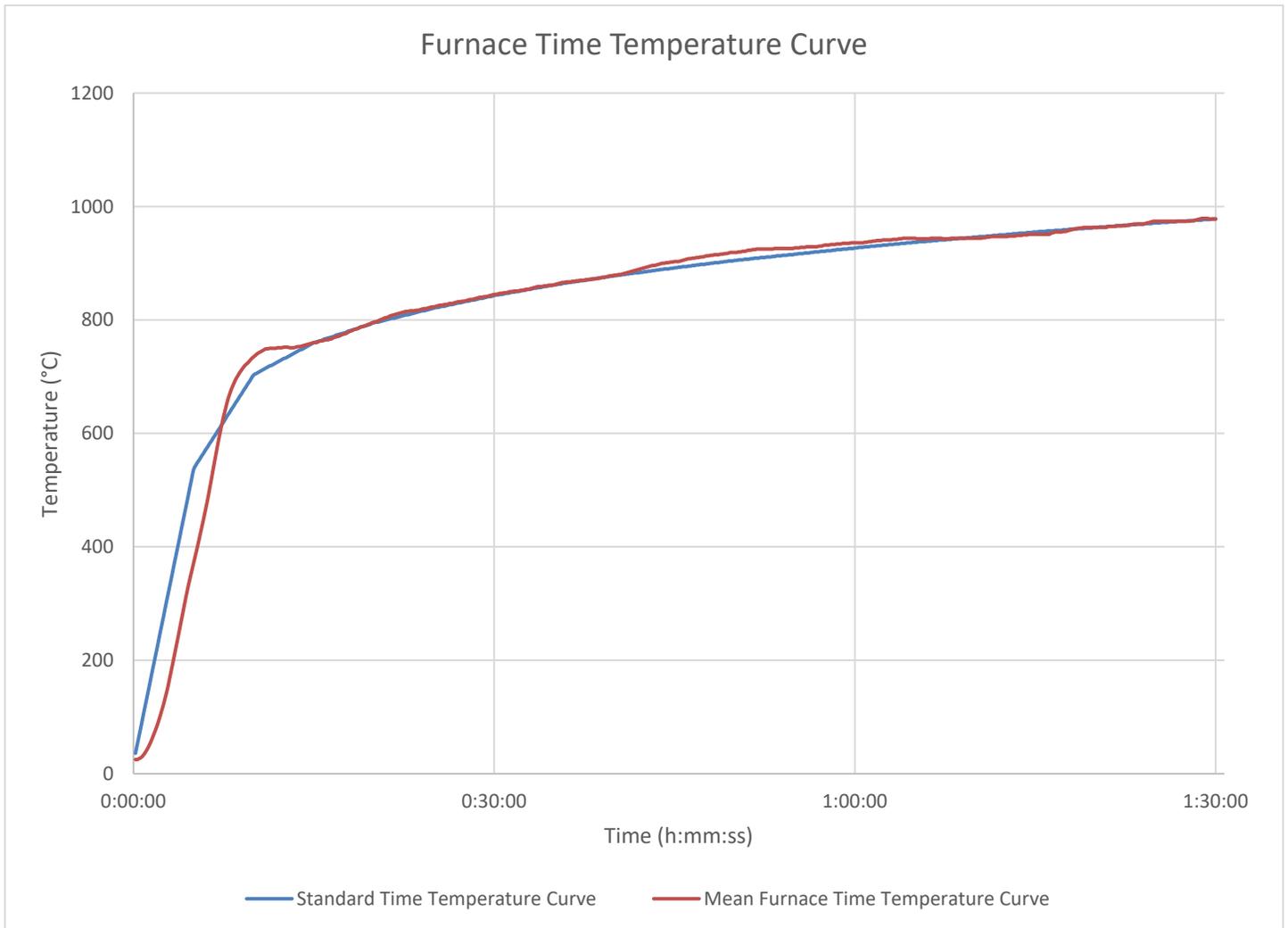


Figure 2: Furnace Time Temperature Curve.

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED. UNLESS SPECIFICALLY STATED OR IDENTIFIED OTHERWISE, QAI HAS UTILIZED A SIMPLE ACCEPTANCE RULE TO MAKE CONFORMITY DECISIONS ON TESTING RESULTS CONTAINED IN THIS REPORT, AS APPLICABLE.

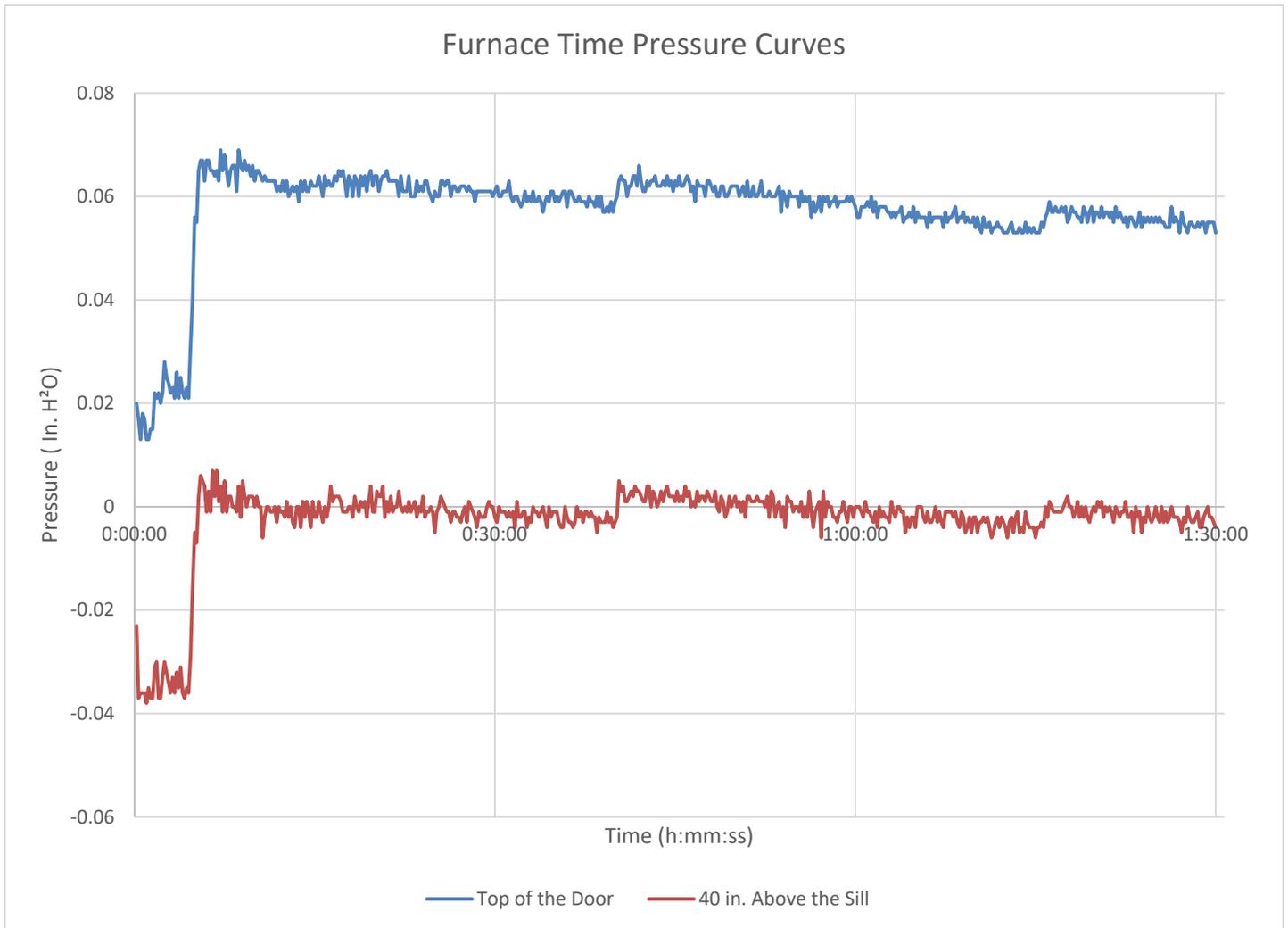


Figure 3: Furnace Time Pressure Curves.

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED. UNLESS SPECIFICALLY STATED OR IDENTIFIED OTHERWISE, QAI HAS UTILIZED A SIMPLE ACCEPTANCE RULE TO MAKE CONFORMITY DECISIONS ON TESTING RESULTS CONTAINED IN THIS REPORT, AS APPLICABLE.

APPENDIX B

Page	Title
11-13	Test Photos

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED. UNLESS SPECIFICALLY STATED OR IDENTIFIED OTHERWISE, QAI HAS UTILIZED A SIMPLE ACCEPTANCE RULE TO MAKE CONFORMITY DECISIONS ON TESTING RESULTS CONTAINED IN THIS REPORT, AS APPLICABLE.



Figure 4: The exposed side prior to the fire test.



Figure 5: The unexposed side prior to the fire test.

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED. UNLESS SPECIFICALLY STATED OR IDENTIFIED OTHERWISE, QAI HAS UTILIZED A SIMPLE ACCEPTANCE RULE TO MAKE CONFORMITY DECISIONS ON TESTING RESULTS CONTAINED IN THIS REPORT, AS APPLICABLE.



Figure 6: The unexposed side 7 min into test



Figure 7: The unexposed side 16 min into test

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED. UNLESS SPECIFICALLY STATED OR IDENTIFIED OTHERWISE, QAI HAS UTILIZED A SIMPLE ACCEPTANCE RULE TO MAKE CONFORMITY DECISIONS ON TESTING RESULTS CONTAINED IN THIS REPORT, AS APPLICABLE.



Figure 8: The exposed face at the end of the fire test.



Figure 9: The exposed side after the hose stream test.

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED. UNLESS SPECIFICALLY STATED OR IDENTIFIED OTHERWISE, QAI HAS UTILIZED A SIMPLE ACCEPTANCE RULE TO MAKE CONFORMITY DECISIONS ON TESTING RESULTS CONTAINED IN THIS REPORT, AS APPLICABLE.