BUREAU OF ENGRAVING AND PRINTING
ELEVATOR ASSESSMENT

FINAL SUBMISSION

Location
301 14th St SW,
Washington, DC 20250

[redacted]

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SECTION I

EXECUTIVE SUMMARY

A. Scope

1. [redacted] evaluated the condition of 17 electric elevators within the Bureau of Engraving and Printing (BEP) DCF facility.

2. The team review the project parameters with Bureau of Engraving and Printing (BEP) representatives. The team obtained field information regarding the BEP's elevators 3 – 8, 10, 11, 13, 14, 16, 18, 19, 22, 24, 26, 31. The team observed the condition of the equipment and are providing three recommendations for BEP consideration regarding elevator repair or replacement due to obsolescence, code, performance and reliability issues.

3. Elevators

   a. Complete a review of the equipment on the elevator. Identify any areas of deviation of installed equipment from applicable code requirements.
   b. Examine the elevator equipment to determine condition, need for replacement and functionality.
   c. Review SCADA integration options for each elevator to provide similar monitoring as Elevator 2.

4. Provide a written report. The report will include the findings of our examination of the documents, equipment and three recommendations for repair or replacement.

5. Provide an energy savings estimate for improved efficiency of new machines and controllers.

B. General – Executive Summary

The observations, analysis, and recommendations for the elevators and associated areas were made to meet compliance with the requirements and industry standards outlined in the following documents:

- ANSI/NEMA Elevators 3-8 do not have compliant machine room access - Enclosures for Electrical Equipment
- ANSI/NEMA 250 - Enclosures for Electrical Equipment
- IEC 62040-1-1 General and Safety requirements
- NFPA 70 National Electrical Code
- 29 CFR 1910 Subpart S
- International Building Code (IBC)
- National Fire Protection Association (NFPA 1) Fire Code
- National Fire Protection Association (NFPA 101) Life Safety Code
- National Fire Protection Association (NFPA 72) National Fire Alarm and Signaling Code

- National Fire Protection Association (NFPA 92) Standard for Smoke Control Systems
- American Society of Mechanical Engineers (ASME A17) Safety Code for Elevators and Escalators.
- Americans with Disabilities Act (ADA) Standards for Accessible Design
- Bureau of Engraving and Printing, EHS Contractor Requirements 75D-07.0-04.
- National Elevator Industry, Inc. NEII-1 – 2013

Details of specific elevator equipment are outlined in **SECTION II** of the report. Photographs for each specific area (cab, machine room, pit, etc.) in **SECTION II** are listed after their respective descriptive paragraphs. The elevator equipment, machine room access and hoistways have areas that must be addressed for code compliance, i.e., machine room humidity and temperature control, sprinkler, Firefighters' Service operation, as well as obsolescence, etc.

Notable Observations

- Elevators 3-8 do not have compliant machine room access
- Elevator machine rooms do not have dedicated temperature and humidity controls
- Passenger elevators have original machines with DC motors
- Elevator controls throughout the facility are nearing end of life
- Elevator 19 is the only elevator in the scope of work that is completely original (controls, machine, cab, etc.) – 1930s installation based on code year
- All of the upgraded elevators have MCE controls with SCR drives
- Significant cab interior finish wear
- Mixed finishes throughout elevator systems (stainless-steel and bronze)
- Signage in altered high-capacity elevators indicates C2 loading but elevators are C1 loading
- Upgraded elevators have emergency brakes but do not have 48" car aprons
- Low lighting levels in pits, elevator lobbies, hoistways, and some machine rooms
- Elevator 19 does not have dedicated, enclosed machine room
- Non-elevator related piping, ductwork, wiring throughout multiple machine rooms and hoistways
- Hollow clay tile hoistway wall construction. Damaged tiles in various locations
- Significant bowing of hoistway wall (hollow clay tiles) in elevator 18 hoistway.
- SCADA connectivity has failed for all the elevators within the scope of the study.

Passenger Elevator Performance Summary

The elevators were operating at a combined 85.0% (average) relative elevator motion control efficiency. Elevator efficiency rating is explained further in the section below under **E. PERFORMANCE**. The elevators have average performance ratings for elevators of this type and operation.

Well-adjusted elevators with premium maintenance should operate in the 80-90% range for motion control efficiency. A majority of the elevators were in this range, with half of the passenger elevators approaching the 90% efficiency rating. Elevator 4 was the lowest performing elevator at 79.4% efficiency.

Elevator speeds were within the standard 10% variance in the up and down directions.

Acceleration and deceleration should be adjusted to the standards listed.

Floor to floor times do not meet the standard and should be adjusted.

The elevators have door open times and door close times longer than the NEII industry standards. Building management should be consulted before setting times since building conditions and special passenger needs should be taken into consideration. If times are decreased, closer to industry standards, the overall efficiency of the elevators will significantly increase.

Accessibility Summary

Elevators 22, 24, 26, and 31 have hall call dwell times and car call dwell times that do not have the minimum access times and need their times increased. The running clearances (distance between car sill and hoistway sill) exceed 1-¼" for several elevators at various floors.

See comments in **SECTION III** for more details for the passenger elevators. Freight elevators do not have to comply with ABA requirements.

Maintenance Summary
The overall elevator maintenance of the facility is excellent. Many of the components in the elevator systems have exceeded their normal life expectancy and are operating at top levels. Despite the age of the existing equipment and the continual heavy traffic on the elevator systems, these elevators are performing excellently for their age. The elevator hoistways, pits and machine rooms were neat and tidy. Aging bearings and leaking machines are clean and preventative measures have been taken to keep the equipment clean. The elevator maintenance contractor was knowledgeable, helpful and cooperative during the course of our week-long survey.

More detailed information is in SECTION II and SECTION III of this report for all items listed above and other items are also detailed in those sections.

C. OPTIONS AND BUDGET

The building needs safe, dependable and efficient elevator performance available from modern controls, updated Firefighters' Service, and automatic operation features. Adopting certain life safety features that have become code items since the original installations would also bring the elevators to an improved era of code compliance. Typical traction geared machines have a life cycle of approximately 25-50 years. Typical traction gearless machines of this vintage have a life cycle of approximately 50-75 years. These elevators have served their useful life.

The options presented below were categorized into four elevator categories and two support categories. The four elevator options were broken into four categories; The first three include the minimum alterations to be completed, the recommended alterations to be completed, and a complete alteration within the exceptions noted for each option. These cover the upgrade of the elevators and all connections to the elevators, including fire alarm, electric service, and SCADA monitoring. The fourth option, indicated as Option 6, is only to address the freight elevator door controls to provide an immediate safety improvement to the operation of those doors. At the request of BEP, this has been broken out as a separate option. If these four options are not implemented, it is suggested that freight elevator operators be deployed for manual operation of the cabs, to improve safety. Note that Freight elevators are not to be used by regular passengers, regardless of implementing Option 6 or having full time operators. Only trained freight elevator operators and freight handlers should be using those elevators.

The support options are estimates to correct supporting items deficiencies noted in the report. The first option is covering supporting MEP systems upgrades and possible ACM abatement required to comply with code. This would include adding supplemental HVAC units dedicated to the machine rooms, sprinkler adjustments required, proper lighting at landings, machine rooms and hoistways to meet required lighting levels, or proper receptacles in hoistways and pits. The second option covers much larger compliance issues found. These are existing conditions which could be worked around, but are identified since they are not currently code compliant. The ROM cost estimate for these modifications requires more in depth investigation than the scope of this study and estimated costs are truly rough assumptions. The true magnitude of work involved requires specific investigation and would require design charrettes, NCPC/CFA review, SHPO coordination, structural analysis and space planning to offer viable solutions to the issues found. These include items such as relocating, creating new, or modifying machine rooms for overhead access, clearances, and proper facility personnel access, analyzing structural issues noted within shafts, and creating required sumps within hoistway pits.

Below are terms and definitions for the references used in the below options.

From the International Building Code (IBC):

- **ALTERATION**. Any construction or renovation to an existing structure other than repair or addition.
- **REPAIR**. The reconstruction, replacement or renewal of any part of an existing building for the purpose of its maintenance or to correct damage.

From ASME A17.1

- ***Repair*** – reconditioning or renewal of parts, components and/or subsystems necessary to keep equipment in compliance with applicable Code requirements
- ***Replacement*** – the substitution of a device or component and/or subsystems, in its entirety, with a unit that is basically the same as the original for the purpose of ensuring performance in accordance with applicable Code requirements
- ***Maintenance*** – a process of routine examination, lubrication, cleaning, and adjustments of parts, components, and/or subsystems for the purpose of ensuring performance in accordance with the applicable Code requirements
- ***Alteration*** – any change to equipment, including its parts, components and/or subsystems, other than maintenance, repair, or replacement.

For clarity terms from the IBC will be CAPITALIZED and **bolded** in the below section. The first word of each option will have the IBC term.

For clarity terms from A17.1 will be *italicized* in the below section. The second word of each option will have the A17.1 term.

Recommendations:

1. **Option 1 – Minimum Alteration –** this scope of work includes the minimal work required to keep elevators operational and extend life of existing equipment. Replacement of minimal components that are obsolete and/or have reached end-of-life. This option assumes maintenance of retained components will be performed by the onsite O&M contractor.

- **Elevators 3, 4, 7, 8, 11, 13, 18, 22, 24, 26**
    - **(*Alteration)*** Replace: elevator controls with new controls with SCR drives, fixtures in lobbies and cab, limits and switches, cab interiors and finishes (including cab doors), safeties (elevators 22, 24, 26 only), hoist ropes
    - **(*Repair*)** Recondition: machines and motors, hoistway doors (rollers, interlocks, hangers, gibs, etc.), door operators and cab doors (rollers, hangers, clutches, etc.), guide assemblies (car and counterweight)
    - Retain: machines, motors, emergency brakes, car platforms and slings, sheaves (overhead, deflectors, 2:1 on cartop and counterweight), compensation (elevators 3, 4, 7, 8), counterweights and frames, cab shells, hoistway doors and frames, guide rails (car and counterweight), governors, safeties (elevators 3, 4, 7, 8, 11, 13, 18), buffers

- **Elevators 5 and 6**
    - **(*Alteration)*** Replace: elevator controls with new controls with SCR drives, replace door controls with PLC door controls, fixtures in lobbies and cab, limits and switches, hoist ropes
    - **(*Repair*)** Recondition: machines and motors, hoistway doors (guides, interlocks, tracks, etc.), cab gates (rollers, hangers, retiring cams, etc.), guide assemblies (car and counterweight)
    - Retain: machines, motors, emergency brakes, car platforms and slings, sheaves (overhead, deflectors, 2:1 on cartop and counterweight), compensation, counterweights and frames, cab shells, hoistway doors and frames, guide rails (car and counterweight), governors, safeties, buffers

- **Elevators 10 and 31**
    - **(*Alteration)*** Replace: elevator controls with new controls (SCR drives for elevator 10, VVVF for 31), fixtures in lobbies and cab, limits and switches, hoist ropes
    - **(*Repair*)** Recondition: machines and motors, hoistway doors (rollers, interlocks, hangers, gibs, etc.), door operators and cab doors (rollers, hangers, clutches, etc.), guide assemblies (car and counterweight)
    - Retain: machines, motors, emergency brakes, car platforms and slings, sheaves (overhead, deflectors, 2:1 on cartop and counterweight), compensation (elevators 10), counterweights and

frames, cab shells, hoistway doors and frames, guide rails (car and counterweight), governors, safeties, buffers

- **Elevators 14 and 16**
  - **(*Alteration)*** Replace: elevator controls with new controls with SCR drives, replace door controls with PLC door controls, fixtures in lobbies and cab, limits and switches, add swing car operation and fixtures for independent risers, hoist ropes
  - **(*Repair*)** Recondition: machines and motors, hoistway doors (guides, interlocks, tracks, etc.), cab gates (rollers, hangers, retiring cams, etc.), guide assemblies (car and counterweight)
  - Retain: machines, motors, emergency brakes, car platforms and slings, sheaves (overhead, deflectors, 2:1 on cartop and counterweight), compensation, counterweights and frames, cab shells, hoistway doors and frames, guide rails (car and counterweight), governors, safeties, buffers

- **Elevator 19**
  - **(*Alteration)*** Replace: Complete elevator system. Due to original design and age of equipment, the existing equipment cannot be reused as it does not comply with structural and loading requirements.
  - **(*Repair*)** Recondition: Bi-parting hoistway doors
  - Retain: guide rails (car and counterweight) *NOTE* due to increased load on the system, additional rail brackets and/or rail reinforcement may be required
- **SCADA**
  - ***(Repair)*** Replace: Remove existing BaCNet interface device with new ethernet gateway from manufacturer selected for each elevator controller. Include 120V power connection and extend ethernet to gateway and to building network switch. SCADA Integration
  - Provide all network connections, I/O modules, and other components to tie in the new elevator controllers' output points with the BEP SCADA.
    - Connection will be via BaCNet protocol. Some manufacturers may provide Modbus output, which would require a converter.
    - Each manufacturer will provide a points list for each elevator, but at minimum the following output options are generally available which are similar to the 450 points integrated from the recently upgraded Elevator 2 connection:
      - Real time monitoring of all elevator cars
      - Firefighter Operation
      - Out of Service
      - Location
      - Doors Open/Closed
      - Elevator Reports

- Call, Waiting Times, and Operation summaries
- Elevator Statistics
- Start/Stop/Run Times
- Operational Times

2. **Option 2 – Recommended Alteration –** this scope of work includes recommended work required to keep elevators operational and extend life of existing equipment. Replacement of recommended components that are obsolete and/or have reached end-of-life.
    - **Elevators 3, 4, 7, 8, 11, 13, 18, 22, 24, 26, 31**
        - **(*Alteration)*** Replace: elevator controls with new controls with VVVF drives, machines and motors (except elevator 31), safeties (elevators 3, 4, 7, 8, 22, 24, 26, 31 only) fixtures in lobbies and cab, limits and switches, cab interiors and finishes (including cab doors and sills), provide all new bearings for sheaves (deflectors, 2:1 sheaves, compensation, etc.), door operators, buffers, new rope compensation (elevators 3, 4, 7, 8), emergency brakes, hoist ropes
            - Replace hoistway doors
            - Replace door operators
        - **(*Repair*)** Recondition: hoistway doors (rollers, interlocks, hangers, gibs, etc.), cab doors (rollers, hangers, gibs, etc.), guide assemblies (car and counterweight)
        - Retain: machine (elevator 31 only), car platforms and slings, sheaves (overhead, deflectors, 2:1 on cartop and counterweight), counterweights and frames, cab shells, hoistway doors and frames, guide rails (car and counterweight), governors, safeties (elevators 11, 13, 18 only)
    - **Elevators 5 and 6**
        - **(*Alteration)*** Replace: elevator controls with new controls with SCR drives, replace door controls with PLC door controls, fixtures in lobbies and cab, limits and switches, machine motors (retain old for spares), provide new bearings for sheaves (overhead, deflectors, 2:1 on cartop and counterweight), hoist ropes
            - Replace hoistway doors
        - **(*Repair*)** Recondition: machines, hoistway doors (guides, interlocks, hangers, tracks, etc.), cab gates (rollers, hangers, retiring cams, etc.), guide assemblies (car and counterweight)
        - Retain: machines, emergency brakes, car platforms and slings, sheaves (overhead, deflectors, 2:1 on cartop and counterweight), compensation, counterweights and frames, cab shells, hoistway doors and frames, guide rails (car and counterweight), governors, safeties, buffers

- **Elevator 10**
  - **(*Alteration)*** Replace: elevator controls with new controls with SCR drives, fixtures in lobbies and cab, limits and switches, machine motor (retain old for spare), door operators, provide new bearings for sheaves (overhead, deflectors, 2:1 on cartop and counterweight), hoist ropes
    - Replace hoistway doors
    - Replace door operators
  - **(*Repair*)** Recondition: machine, hoistway doors (rollers, interlocks, hangers, gibs, etc.), cab doors (rollers, hangers, gibs, etc.), guide assemblies (car and counterweight)
  - Retain: machines, emergency brakes, car platform and sling, sheaves (overhead, deflectors, 2:1 on cartop and counterweight), compensation, counterweight and frames, cab shell, hoistway doors and frames, guide rails (car and counterweight), governor, safeties, buffers
- **Elevators 14 and 16**
  - **(*Alteration)*** Replace: elevator controls with new controls with SCR drives, replace door controls with PLC door controls, fixtures in lobbies and cab, limits and switches, add swing car operation and fixtures for independent risers, hoist ropes
    - Replace hoistway doors
  - **(*Repair*)** Recondition: machines and motors, hoistway doors (guides, interlocks, tracks, etc.), cab gates (rollers, hangers, retiring cams, etc.), guide assemblies (car and counterweight)
  - Retain: machines, motors, emergency brakes, car platforms and slings, sheaves (overhead, deflectors, 2:1 on cartop and counterweight), compensation, counterweights and frames, cab shells, hoistway doors and frames, guide rails (car and counterweight), governors, safeties, buffers
- **Elevator 19**
  - **(*Alteration)*** Replace: Complete elevator system. Due to original design and age of equipment, the existing equipment cannot be reused as it does not comply with structural and loading requirements. Include new bi-parting hoistway doors in conjunction with new elevator equipment. New doors will allow same equipment to be used across all freight elevators.
  - **(*Repair*)** Recondition: N/A
  - Retain: guide rails (car and counterweight) *NOTE* due to increased load on the system, additional rail brackets and/or rail reinforcement may be required
- **SCADA**

- ***(Repair)*** Replace: Remove existing BaCNet interface device with new ethernet gateway from manufacturer selected for each elevator controller. Include 120V power connection and extend ethernet to gateway and to building network switch. See additional requirements in OPTION 1.

3. **Option 3 – Complete Alteration –** this scope of work includes the complete scope of work, replacing all components that are obsolete and/or have reached end-of-life.

- **Elevators 3, 4, 7, 8, 10, 11, 13, 18, 22, 24, 26, 31**
  - **(*Alteration)*** Replace: elevator controls with new controls with VVVF drives, machines and motors, fixtures in lobbies and cab, limits and switches, cab interiors and finishes (including cab doors and sills), complete sheaves and bearings (deflectors, 2:1 sheaves, compensation, etc.), emergency brakes, compensation (elevators 3, 4, 7, 8), cab shells, counterweights and frames, hoistway doors, governors, safeties, buffers, door operators, hoist ropes
    - In lieu of replacing elevator 31 components, replace entire elevator 31 system with a holeless hydraulic system. This would require a complete redesign of elevator 31
  - **(*Repair*)** Recondition: N/A
  - Retain: car platforms and slings, hoistway door frames, guide rails (car and counterweight)
- **Elevators 5, 6, 14, 16**
  - **(*Alteration)*** Replace: elevator controls with new controls with VVVF drives, replace door controls with PLC door controls, fixtures in lobbies and cab, limits and switches, machines and motors, provide new sheaves and bearings (overhead, deflectors, 2:1 on cartop and counterweight), cab gates, emergency brakes, compensation, guide assemblies, governors, hoist ropes
    - Replace hoistway doors
  - Recondition: hoistway doors (guides, interlocks, tracks, etc.)
  - Retain: car platforms and slings, counterweights and frames, cab shells, hoistway doors and frames, guide rails (car and counterweight), safeties
- **Elevators 10**
  - **(*Alteration)*** Replace: elevator controls with new controls with VVVF drives, fixtures in lobbies and cab, limits and switches, machine and motor, provide new sheaves and bearings (overhead, deflectors, 2:1 on cartop and counterweight),

emergency brake, door operators, compensation, guide assemblies, governor, hoist ropes
    - **(*Repair*)** Recondition: hoistway doors (guides, interlocks, tracks, etc.)
    - Retain: car platform and sling, counterweights and frames, cab shell, hoistway doors and frames, guide rails (car and counterweight), safeties

- **Elevator 19**
    - **(*Alteration)*** Replace: Complete elevator system. Due to original design and age of equipment, the existing equipment cannot be reused as it does not comply with structural and loading requirements. Include new bi-parting hoistway doors in conjunction with new elevator equipment. New doors will allow same equipment to be used across all freight elevators.
    - **(*Repair*)** Recondition: N/A
    - Retain: guide rails (car and counterweight) *NOTE* due to increased load on the system, additional rail brackets and/or rail reinforcement may be required

- **SCADA**
    - ***(Repair)*** Replace: Remove existing BACNET interface device with new ethernet gateway from manufacturer selected for each elevator controller. Include 120V power connection and extend ethernet to gateway and to building network switch. See additional requirements in OPTION 1.

4. **Option 4 – Additional MEP/Abatement Work –** this scope of work includes the repairs and upgrades for MEP supporting elements of the elevators.

    - Life Safety Concerns
        - Adjust deficiencies with existing sprinkler system in hoistways and pits.
    - Lighting:
        - Elevator Pits: Foot candle (fc) levels associated with all elevator pits are deficient. New light fixture(s) are needed to meet minimum required foot candle fc levels.
        - Lobbies: With the exception of the lobby on level 1G for elevators 3, 4, 7, and 8 (tour guide path) and level 5 for elevators 3-6, the fc levels measured at the elevator sills are deficient throughout the building. New lighting fixtures and mounting locations are required for these lobbies to meet the minimum lighting fc requirements.
        - Elevator Machine Rooms: Elevator 10 machine room currently has very low lighting. New lighting fixtures and locations will be required to meet the minimum lighting levels. Elevator 31 equipment is open to the mechanical penthouse, tucked behind

elevator 19 equipment. Additional lighting should be installed to raise the lighting levels to code mandated levels.

- HVAC
  - Dedicated machine room temperature and humidity controls per code requirements.
- ACM/Lead Abatement
  - Allowance for possible ACM or Lead Paint abatement within machine rooms, if present.

5. **Option 5 – Additional Structural/Architectural Work –** this scope of work includes major repairs and renovations required to support of the elevator alterations and bring the existing machine rooms and hoistways up to code.

   - Building modifications:
     - The locations for several of the elevator machine rooms and elevator pits do not allow for legal access. This includes, but not limited to, requiring crawling through steam tunnels for pit access or very narrow and steep ships ladder access to elevator machine rooms.
       - Due to the age and construction of the building, these are not simple corrections. These machine room and pit access concerns should be evaluated to determine mitigation solutions.
     - Sump pumps are not present in any of the elevator pits. These are a requirement for the elevators with Firefighter Emergency Operation. Installing pits in structure may require additional evaluation.
     - Structural analysis will be required for several areas depending on selected scope of work
       - Some hoistway walls area showing signs of damage and bowing. An in depth study required to determine cause and proposed solution.
       - The structural support needs to be evaluated for elevator 31 replacement to hydraulic.
       - Elevator 19 requires further investigation to determine requirements to bolster supports (additional rail brackets and/or reinforcement of rails)
     - Provide a machine room enclosure around elevator 19 in lieu of existing handrailing
     - Modify elevator 19 and 31 area to allow proper sheave area for elevator 31.

6. **Option 6 – Freight Elevator Door Controls**
   (REPAIR – *Alteration*) – selective replacement of existing freight door controls with new door controls, door reversal devices, gates and tracks. Retain existing motion controllers.

     - Prior to ASME A17.1a-2008 edition, freight door reversal was not initiated until there was physical contact with an obstruction. During the scenarios analyzed for the re-writing of this section of

the code it was determined that operation by a designated attendant did not sufficiently mitigate risks sufficiently to prevent the need for protective devices. The reasoning was that an inattentive operator might not be aware that a person is entering or leaving the elevator.
    - Elevator freight door systems installed under ASME A17.1a-2008 and later editions require immediate initiation of door reversal after an obstruction is detected by a detection means, not physical contact. Door reversal devices are required on all new freight elevators (even those with attendant operation). Due to the inertia and mass present within the freight door system, there is a slight time delay before the doors physically reverse. It was determined during the rewriting of this section of the code that the best way to mitigate the risk was to add a detection means that would not allow the doors to start closing and once the door starts to close, monitor zones in front and behind the car gate to limit hazards from the closing gate(s).
    - Current elevator door controls systems are working as designed under the ASME A17.1–2000 edition of the code. ASME A17.1-2000 is prior to the requirements for detection means.

- **Elevators 5, 6, 14, 16**
    - ***(Alteration)*** Replace: elevator door controls with new door controls with new PLC door controllers, elevator car gates, tracks, gate motors, new infrared detection devices
    - Retain: existing motion controls, machines, motors, emergency brakes, car platforms and slings, sheaves (overhead, deflectors, 2:1 on cartop and counterweight), compensation, counterweights and frames, cab shells, hoistway doors and frames, guide rails (car and counterweight), governors, safeties, buffers, hoistway doors (guides, interlocks, tracks, etc.), guide assemblies

- **Elevators 19**
    - **(**Alteration) Replace: elevator door controls with new door controls with new PLC door controller, elevator car gates, tracks, gate motors, new infrared detection devices
    - Note: tie-in to existing 1930s vintage controls may be difficult due to limited outputs on original motion controller
    - Retain: existing motion controls, machine, motors, emergency brakes, car platforms and slings, sheaves (overhead, deflectors, 2:1 on cartop and counterweight), compensation, counterweights and frames, cab shells, hoistway doors and frames, guide rails (car and counterweight), governors, safeties, buffers, hoistway doors (guides, interlocks, tracks, etc.), guide assemblies
    -

7. **General Elevator Requirements**.

Requirements listed below are general code requirements for elements supporting the elevators. These are provided for reference to describe the scope of itemized deficient items herein with code references. The AHJ may determine some items would not need to be completed in accordance with the International

Existing Building Code or NFPA 101 when treated as a repair or a certain level of alteration.

MACHINE ROOM

- A fused disconnect switch or circuit breaker shall be provided for each elevator in the machine room (NFPA 70, Section 620-51).
- Enclosed and protected machine room and/or machinery space (A17.1, Sections 2.7.1 and 3.7). Rated and fully enclosed machine room/space.
- Access to machine room and/or machinery space (A 17.1, Section 2.7.3).
- Lighting, and convenience outlets of machine room and/or machinery space (A 17.1, Section 2.7.5.1 and NFPA 70, Section 620-23).
- Machine room and/or machinery space environment to be maintained between 70° F and 90° F and 35% to 60% relative humidity at all times and in all weather conditions. HVAC design to include BTU heat load generated by the operation of the elevator equipment.
- HVAC not to be located above elevator equipment
- HVAC not to be within 18” horizontally of any elevator drive machine and any mechanical or electrical equipment
- HVAC to be above 7’ from machine room floor
- AC condensate to drain to location outside machine room and hoistway
- A car light disconnecting means shall be provided for each elevator in the machine room (NFPA 70, Section 620-53). Wiring from source to disconnect required and to new controls.
- For freight elevators with power operated hoistway doors, a separate branch circuit of adequate size and a fused disconnect switch or circuit breaker shall be provided in the machine room or machinery space.

HOISTWAY

- Beveled guards or screening are required for projections, recesses and setbacks in the hoistway that project more than 4 in. inside the hoistway on sides not used for loading or unloading. (A 17.1, Section 2.1.6).
- Supports for guide rail fastening at each floor and/or intermediate supports as required by A 17.1, Section 2.23.9.
- Recesses, supports, fireproofing and patching, as required, to accommodate hall button boxes, signal fixtures, hoistway entrance frames, etc..
- Convenience outlet and light fixture in pit with switch located adjacent to the access door (A 17.1, Section 2.2.5 and NFPA 70, Section 620-24).
- Provide a separate branch circuit supplying the hoistway pit lighting and a minimum of one duplex GFCI receptacles in the pit. Locate receptacle on side wall of the hoistway, at least 3 feet (915 mm) above pit floor.
- Vertical, noncombustible ladder for each elevator extending 48 in. above the sill of the access door where the pit extends more than 35 in. below the sill of the access door (A17.1, Section 2.2.4).
- Supports for vertical wireways (NFPA 70, Section 620- 34).
- Provide a dry pit, and permanent provisions to prevent accumulation of water. Provide Sump and pit sump pump with wiring and piping (A 17.1, Section 2.2.2) Must be 3000/gal per hour.

- Provide a dedicated simplex receptacle, with GFI protection, to supply the permanently installed sump pump. Mount sump pump receptacle 5 feet (1524 mm) above elevator pit floor.
- Pit reinforced to sustain vertical forces from guide rails and buffers.
- Remove or relocated all non-elevator related pipes, ducts, and conduit from hoistways.
- Hoistway pit lighting to provide a minimum of 10 fc at the pit floor in all areas of the pit. Hoistway lighting design must include a minimum of two lighting fixtures for lighting of the elevator hoistway pit. The fixtures must have a one piece, molded, high-impact clear acrylic diffuser with a secure seal against dust and moisture. A similar fixture must be provided at a minimum of every 10 feet (3 m) vertically up the hoistway. The fixture at the top of the hoistway must be mounted on the ceiling. For control of the hoistway lighting circuit, provide two 3-way switches inside the elevator hoistway, at a height of 4 feet (1.2 m) above the top and bottom elevator landings. Mount the switches on the hoistway wall, adjacent to the hoistway entrance strike jamb. The lower-level lighting switch must be located adjacent to the hoistway pit access ladder.
- Provide a separate branch circuit supplying the hoistway pit lighting and a duplex GFCI receptacle in the pits.

HOISTWAY ENTRANCES

- Support for sills the full width of door opening.
- Furnishing, installing and maintaining the required fire rating of elevator hoistway walls, including the penetration of fire wall by elevator fixture boxes.

MONITORING AND LIFE SAFETY REQUIREMENTS

- Fire alarm initiating devices (NFPA 72) in the elevator lobbies and machine room(s) including wiring to the terminals of the elevator controllers for firefighters' service, (A 17.1, Section 2.27.3.2).
- Where sprinklers are provided, shunt trip disconnects required for each elevator main power and emergency power, if provided.
- Where sprinklers are provided, sprinkler line flow control switches required to activate shunt trip disconnect.
- Telephone, visual monitoring system or means within the car for communications with or signaling to an accessible point outside the hoistway, or central exchange system, or an approved emergency service (A17.1, Section 2.27.1, A 117.1 and ABA).
- Emergency communications systems. Provide dedicated elevator communication service line for each elevator adjacent to each elevator controller. Indicate outlets on telephone riser
- All necessary wiring, conduit and labor from the elevator hoistways for elevator monitoring panels that are required for security, life safety, or fire requirements that are provided for the elevator

ELECTRIC ELEVATOR ADDITIONAL REQUIREMENTS

- Hoisting beam, trap doors or other means of access to machine room of adequate size for maintenance and equipment removal purposes (A 17.1, Section 2.7.3.4)

- Supports for machinery and/or sheave beams (A 17.1, Section 2.9).
- Wall pockets and patching after beams are in place, if needed.
- Construction of machine room and/or machinery space floors (A 17.1, Section 2.1.3)

[redacted]

[redacted]

[redacted]

[redacted]M

6. [redacted]

D. COST ANALYSIS0

The Elevator Cost Analysis table below breaks down the potential utility operational cost savings with the new elevator equipment efficiency improvements implemented.

[redacted] COST ANALYSIS											
ELEV. #	EXISTING			NEW				PEPCO KWH RATE [1]	EXISTING ANNUAL COST	NEW ANNUAL COST	ANNUAL SAVINGS
	HP	kW	kWH [2]	HP	kW	% EFF.	kWH [2]				
[redacted]											
[redacted]											
[redacted]											
[redacted]											
[redacted]											
[redacted]											
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[redacted]											
[redacted]											

[redacted] 1 - KWH rate based on average Pepco 2024 rates. This rate does not include peak demand

2 - Elevator kWH base on estimated operation: 50% usage during business hours and 10% usage after

Total Usage Cost	[redacted]
Total Projected Savings	[redacted]

SECTION II

EQUIPMENT REVIEW

A. Survey Observations

Examination of the elevator equipment was performed on May 13 – 17, 2024. The summary of our findings is included in this section.

General Information
We examined seventeen electric elevators, passenger elevators # 3, 4, 7, 8, 10, 11, 13, 18, 22, 24, 26, 31 and freight elevators # 5, 6, 14, 16, 19. This included the machine room equipment as well as hoistways, hoistway doors, interlocks, landing control systems, controller, cab and fixtures to determine condition, operation, code compliance, performance, need for modernization and general appearance.

Passenger elevators 3, 4, 7, 8, 11, 13, 18, 22, 24, and 26 are gearless Otis machines. Passenger elevator 31 is a geared Hollister-Whitney (H-W) machine. Passenger elevator 10 and freight elevators 5, 6, 14, and 16 are geared Thyssen machines. Freight elevator 19 is the original Otis geared machine.

Elevators 3, 4, 7, and 8 have 74D machines and elevators 11, 13, 18, 22, 24, and 26 have 72 machines. The machines have what appears to be the original brakes, motors, windings, and commutators. The original motor generator sets were removed in upgrades in the early 2000s and replaced with silicon-controlled rectifier (SCR) drives. The original elevators were manufactured by Otis Elevator around the 1930s based on information on the Elevator 19 code year. Otis Elevator Company was bought out by United Technologies in 1976. In April of 2020 the company was spun off from United Technologies into its own company, Otis Worldwide Corporation and is still in business.

Passenger elevator 10 and freight elevators 5, 6, 14, and 16 have Thyssen 450 machines. For a short time, Dover Elevator, a U.S. company that was bought out by ThyssenKrupp Elevator (Germany) in 1999, was called Thyssen Elevator. ThyssenKrupp Elevator was recently acquired by Advent International and Cinven in 2020. February 2021, ThyssenKrupp was rebranded as TK Elevator. TK Elevator is still in business, however limited parts for these machines are available.

Passenger elevator 31 has a geared H-W 44-OD machine. This is a basement type machine that protrudes into the hoistway in lieu of being an overhead machine. In 2017, Hollister-Whitney became part of the GGC portfolio and the group brand Vantage was formed. Hollister-Whitney is still in business and operates under the Vantage Elevator Solutions family of brands.

The passenger elevators only have front openings. The freight elevators have both front and rear openings. Specific landings served and entrances are in the table below for clarity (Table 2.1).

Most of the elevator controls except for Elevator 19 were manufactured by Motion Control Engineering (MCE). Elevator 19 has the original Otis relay logic controls. The manufacture date of each elevator controller is listed on Table 2.1. The freight door controls for Elevators 5, 6, 14 and 16 were manufactured by Peelle and the freight door controls for Elevator 19 were manufactured by Security. Security was bought out in the 1970's and is now owned by Courion, a Vantage Elevator Solutions company.

The elevators, except for Elevators 19 and 31 have various MCE – IMC series controllers with silicon-controlled rectifier (SCR) drives. Elevator 19 controls have the now more than 100-year-old technology Ward–Leonard Machine – Generator set, or "MG set" for short. It provides smooth voltage to DC machines with loud, separate, constantly running MG sets. Elevator 31 has MCE – VFMC – 1000 series controls with a variable frequency drive.

There are three primary technologies that have been used to control elevator motors for the last 100+ years. The MG set, SCR drives (also known as thyristor-based drives), and VVVF drives (Variable Voltage, Variable Frequency drives) which is the newest technology.

The MG set first developed in 1893 was used in elevator technology for almost 100 years. In the 1980s, replacement of the MG sets with SCR drives became popular across the industry. The SCR drive allowed removal of the constantly running (and noisy) MG sets. With an SCR drive, the original machine motor (at that time, typically a DC motor) could be retained and reused without changing the machine motor. In the early 1990s the VVVF drive was introduced. The VVVF drive is used in conjunction with AC motors, allowing a finer control of motion of the elevator. In the mid-2000s, the VVVF became the drive of choice and most elevator machines now have AC motors.

With the exception of Elevator 31, most the existing elevators have DC motors. Elevator 31 has an AC motor.

The typical life cycle of electric elevator machines is 25-50 years. Typical life cycle for elevator controls is 20-25 years. Typical life cycle for elevator drive systems is 8-15 years.

Due to the age of the equipment, limited parts are still available but the drives and drive units are obsolete. The existing controls do not have features such as a phone line monitoring, door monitoring, ascending car overspeed (Elevator 19), unintended car movement (Elevator 19), or modern Firefighters' Emergency Operation features.

The elevator upgrades performed from 2000 through 2007 were selective upgrades. Not all elevator groups received the same number of upgrades. Elevators 3, 4, 7, 8, 22, 24, 26, and 31 all retained the original safety devices but did receive new overspeed governors in their respective machine rooms.

See the below diagram (Figure 2.1 and Figure 2.2) for reference to select components.

Table 2.1

Elevator Number	Capacity (pounds)	Speed (FPM)	Classification	Landings Served	Controller Mfr. / Year	Entrances (Front/Rear)
3	3,000	500	Passenger	7	MCE - 2004	7 Front with 3 additional locked out floors
4	3,000	500	Passenger	7	MCE - 2004	7 Front with 3 additional locked out floors
5	15,000	200	Freight (C1)	7	MCE/Peelle - 2001	6 Front / 3 Rear
6	15,000	200	Freight (C1)	7	MCE/Peelle - 2000	6 Front / 3 Rear
7	3,000	500	Passenger	7	MCE - 2005	7 Front with 3 additional locked out floors
8	3,000	500	Passenger	7	MCE - 2005	7 Front with 3 additional locked out floors
10	15,000	200	Passenger (C1)	5	MCE - 2002	5 Front
11	3,000	500	Passenger	8	MCE - 2005	8 Front
13	3,000	500	Passenger	8	MCE - 2005	8 Front
14	15,000	200	Freight (C1)	9	MCE/Peelle - 2001	8 Front / 4 Rear
16	15,000	200	Freight (C1)	9	MCE/Peelle - 2001	8 Front / 4 Rear
18	3,000	500	Passenger	7	MCE - 2005	7 Front with 1 additional locked out floor
19	10,000	200	Freight	8	Otis/Security - 1931/1960	8 Front / 3 Rear locked out floors
22	3,000	500	Passenger	8	MCE - 2004	8 Front
24	3,000	500	Passenger	8	MCE - 2004	8 Front
26	3,000	500	Passenger	8	MCE - 2004	8 Front
31	3,000	50	Passenger	2	MCE - 2005	2 Front

FIGURE 2.1 (Geared Passenger)

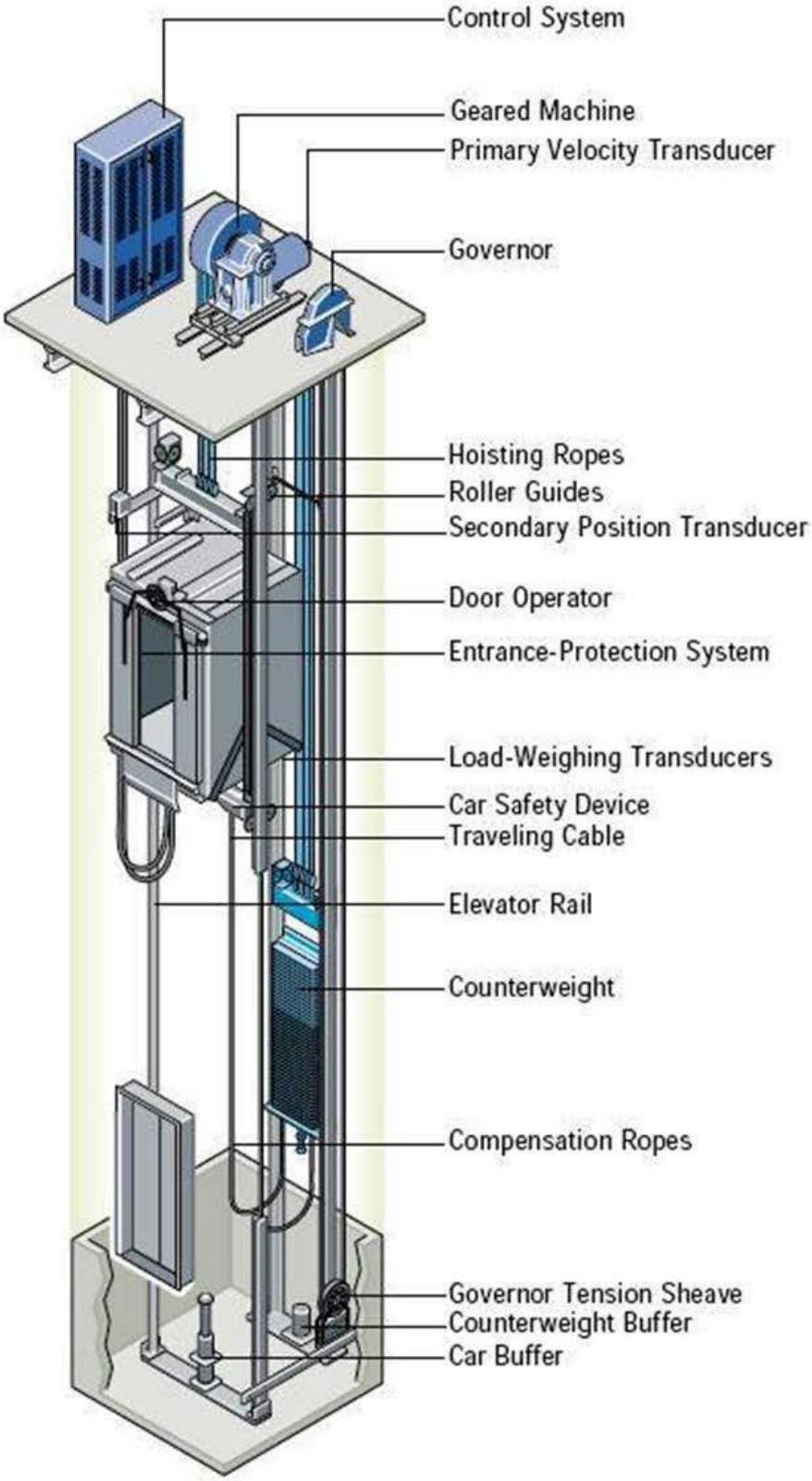
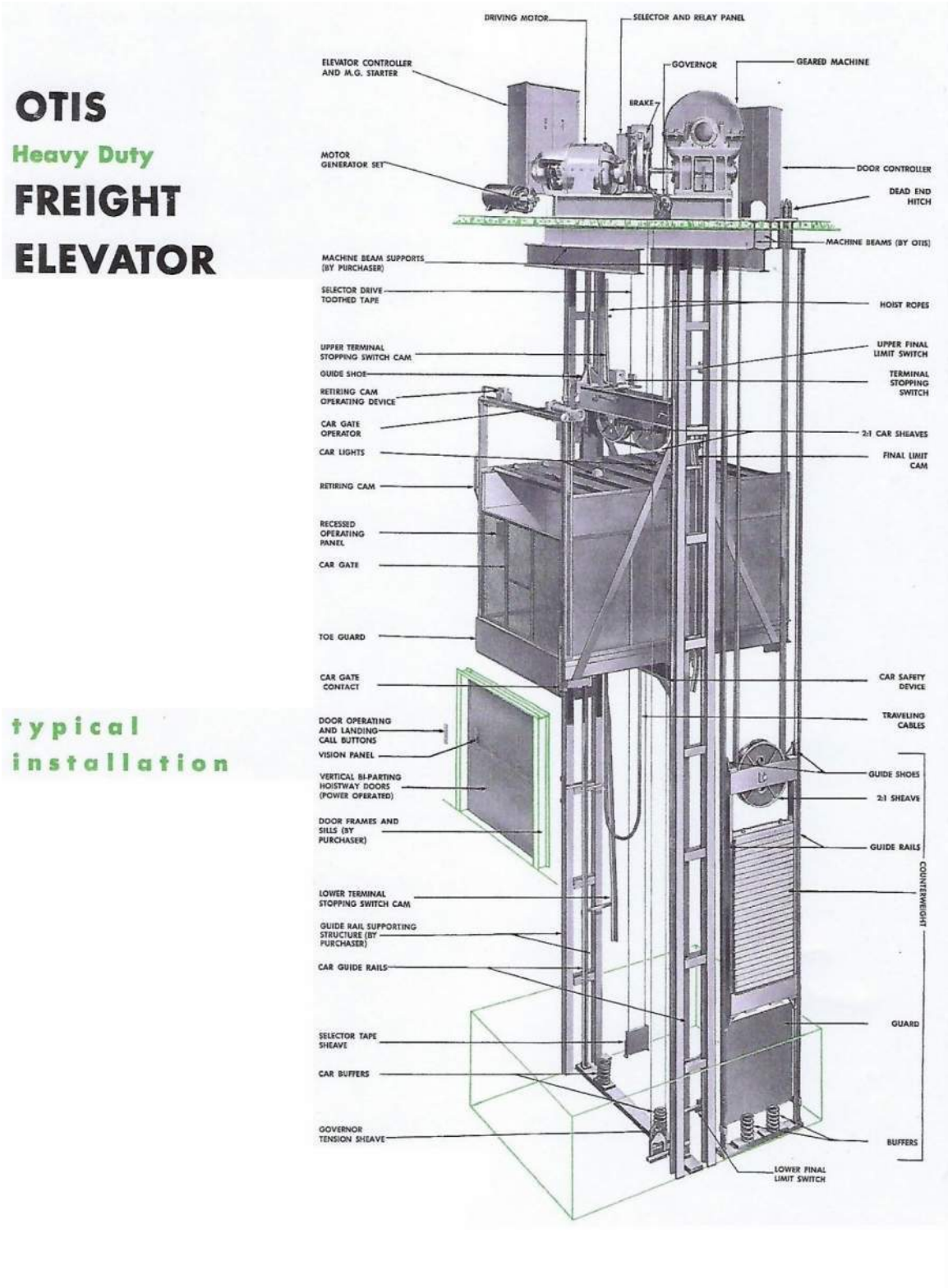


Figure 2.2 (1960s Freight)



1. Cab Interiors

a. Passenger elevators 3, 4, 7, 8, 11, 13, 18, 22, 24, and 26

The elevators have what appears to be the platforms, car slings, and cab shells from the original installations. Cab interiors finishes and fixtures have been upgraded. Similar materials and finishes have been used throughout. Dimensions vary slightly. See Table 2.2 below for specific dimensions. The metal finishes appear to be commercial bronze finishes. Each cab has return panels of #4 commercial bronze finish. Cleaning and wear have degraded the finishes on all elevators. The flooring appears to be a rubber tile type flooring. Elevators 22, 24, and 26 have access plates in the cab floors for manually resetting the safeties after the application of the safety devices to stop the car.

The cabs have light fixtures mounted in suspended ceilings. Cab lighting exceeds the minimum 5 ft candles requirement. The suspended ceilings appear to be a #4 bronze finish. The adhesive that holds the bronze panels to the suspended ceiling frame is failing on all passenger elevators. Panels are hanging loosely and have fallen off of one elevator and in one case the loose panels are being held up with clamps. Above the suspended ceiling there are reveals around the edges of the true ceiling. All reveals on the ceiling and side walls are bronze.

The passenger elevators have handrails on the rear of each cab and the side walls. The cab interior has hung panels on the rear and sides of each elevator cab. The panels appear to be plastic laminate. Above the hung panels in each cab there is a decorative brass frieze. Below the bottom hung panels there are bronze toe-kicks that appear to have concealed ventilation. Elevator 3 and 4 return jambs are damaged and doors show wear from previous rubbing. Elevator 4 has trim damage.

The hoistway doors are two-speed, side-slide doors operated in conjunction with the powered, two-speed, side-slide cab doors. The cab doors are powered by GAL MOVFR door operators. The car doors are power operated with non-contact infrared reversal devices. With infrared reversal devices, there are approximately 200 beams cross the door opening for its entire height. Any time one of these beams is broken the door reverses and reopens.

There are car operating panels (COP) on the return jamb of the front walls. The COPs have buttons that are dated in form, function and appearance. The COPs have capacity in pounds engraved in the top portion of the COPs and have the engraved elevator identification. The COPs have call buttons for each front opening, alarm bell button, door open button, and door close button. There are key switches for the following in each COP: stop switch, light on/off switch, test on/off switch, fan on/off switch, independent service on/off switch, hospital on/off switch, access operation on/off switch. There are car position and direction indicators in the upper portion of each COP.

Each COP has an autodial “hands-free” ADA style telephone. The button is located in the bottom of each COP.

The elevator capacities are 3,000# class A loading elevator. This means the rails, platform, machine and car sling can handle a loading of 750# and can carry no more than 3,000# total. Meaning that no single item (including loaded hand cart) to be loaded can weigh more than 750# and the total 3,000# must be evenly spread across the 4 quadrants of the elevator cab, 750# in each corner of the elevator cab.

b. Passenger elevators 10 and 31

Elevator 10 has a platform, car sling, and cab shell from the 2002 installation. Elevator 31 has what appears to be the platform, car sling, and cab shell from the original installations. Cab interiors finishes and fixture have been upgraded. Similar materials and finishes have been used for elevators 10 and 31. Dimensions vary. See Table 2.2 below for specific dimensions. The metal finishes appear to be textured stainless-steel finishes for the cab walls and brushed stainless-steel for the return panels. The flooring is steel diamond plate.

Elevator 10 cab has light fixtures mounted on each side wall in coves. Elevator 31 has light fixtures mounted in a suspended ceiling. Cab lighting exceeds the minimum 5 ft candles requirement for elevator 10. Cab lighting was measured below 5 ft candles at the time of our survey. Elevator 10 does not have a suspended ceiling; the ceiling is a matte white color. Elevator 31 has a suspended ceilings with indirect lighting. Elevator 31 has reveals on the side walls that are brushed stainless-steel.

Elevator 10 has upper and lower wooden bumpers on the side walls, the rear wall, and on the return jamb that does not have the COP. Below the bumpers, on the floor there are welded steel plates to protect the bottom 6” of the cab walls. These plates are approximately 3-4” from the walls. On the rear wall, there is an additional 2” x 2” tube steel rail that runs the length of the rear wall and connects to the elevator floor by three posts. Elevator 10 does not have hung panels, but has a steel shell that is the cab interior that was constructed with textured stainless-steel panels.

Elevator 31 has handrails on the rear of each cab and the side walls. Below the handrails, there is also a bumper on the rear and side walls. The cab interior has hung panels on the rear and sides of each elevator cab. The panels are texture stainless-steel. Below the bottom hung panels there are brushed stainless-steel toe-kicks that appear to have concealed ventilation.

Elevator 10 hoistway doors are two-speed, center-opening doors operated in conjunction with the powered, two-speed, center-opening cab doors. The cab doors are powered by two GAL MOVFR door operators. Elevator 31 hoistway doors are two-speed, side-slide doors operated in conjunction with the powered, two-speed, side-slide cab doors. The cab doors are powered by GAL MOVFR door operator. Both elevator cab doors are power operated with non-contact infrared reversal devices. With infrared reversal devices, there

are approximately 200 beams cross the door opening for its entire height. Any time one of these beams is broken the door reverses and reopens.

There are car operating panels (COP) on the return jamb of the front walls. The COPs have buttons that are dated in form, function and appearance. The COPs have capacity in pounds engraved in the top portion of the COPs and have the engraved elevator identification. The COPs have call buttons for each front opening, alarm bell button, door open button, and door close button. There are key switches for the following in each COP: stop switch, light on/off switch, 2-speed fan 3 position switch (elevator 10), independent service (attendant for elevator 10) on/off switch, access operation on/off switch, test on/off switch (elevator 31). There are car position and direction indicators in the upper portion of each COP. The COP fixtures have brushed stainless-steel finishes.

Each COP has an autodial “hands-free” ADA style telephone. The button is located at the top of the call buttons for elevator 10 and in the bottom of the COP for elevator 31.

Elevator 10 capacity is 15,000# class C-1 loading elevator. This means the rails, platform, machine and car sling can handle a loading of 15,000# and can carry no more than 15,000# total. Meaning that no single item (including loaded hand cart) to be loaded can weigh more than 15,000#. The data tag on the rear wall of the elevator states C-2 loading but then states that the loading capacity is the same as the full capacity. C-2 loading would allow a 50% increase in loading weight while the elevator is parked at a floor. The elevator cannot move the extra 50% weight, but the brake and machine would be designed for the extra 50% weight which in Elevator 10’s case would be an extra 7,500#. The current system is not designed for C-2 loading. The COP is engraved with C-1 loading but the applied sign at the rear of the elevator states C-2. Proper signage should be installed.

Elevator 31 capacity is 3,000# class A loading elevator. This means the rails, platform, machine and car sling can handle a loading of 750# and can carry no more than 3,000# total. Meaning that no single item (including loaded hand cart) to be loaded can weigh more than 750# and the total 3,000# must be evenly spread across the 4 quadrants of the elevator cab, 750# in each corner of the elevator cab.

c. Freight elevators 5, 6, 14, 16

Elevators 5, 6, 14, and 16 have platforms, car slings, and cab shells from the 2000-2005 installations. Cab interiors finishes and fixture have been upgraded. Similar materials and finishes have been used for elevators 5, 6, 14, and 16. Dimensions vary. See Table 2.2 below for specific dimensions. The metal finishes appear to be textured stainless-steel finishes for the cab walls and brushed stainless-steel for the return panels. The flooring is steel diamond plate.

Elevators 5, 6, 14, and 16 have full-height, two-section cab gates. The hoistway doors are power-operated, bi-parting freight doors. The cabs have

recessed down light fixtures. Lighting exceeds the minimum 5 ft candles requirement.

Elevators 5, 6, 14, and 16 have upper and lower wooden bumpers on the side walls. Below the bumpers, on the floor there are welded steel plates to protect the bottom 6” of the cab walls. These plates are approximately 3-4” from the walls. These elevators have a steel shell that is the cab interior that was constructed with textured stainless-steel panels.

Elevators 5 and 6 have only a car operating panel (COP) adjacent to the front entrances of the elevator. Elevator 14 and 16 have a COP adjacent to the front entrance for the front landings call buttons and another COP adjacent to the rear for the rear entrances. The stainless-steel COPs are slightly recessed inside of the side wall.

The COPs have buttons that are dated in form, function and appearance. The COPs have capacity in pounds engraved in the top portion of the COPs and have the engraved elevator identification. The COPs have call buttons for each opening, up button, down button, alarm bell button, door open button, and door close button. There are key switches for the following in each COP: stop switch, light on/off switch, 2-speed fan 3 position switch (elevator 10), attendant on/off switch, inspection operation on/off switch. There are car position and direction indicators in the upper portion of each COP. The COP fixtures have brushed stainless-steel finishes.

Each COP has an autodial “hands-free” ADA style telephone. The button is located at the top of the call buttons. The emergency lighting is mounted to the top of the COP and is integral to the COPs.

Elevator 5, 6, 14, and 16 capacities are 15,000# class C-1 loading elevator. This means the rails, platform, machine and car sling can handle a loading of 15,000# and can carry no more than 15,000# total. Meaning that no single item (including loaded truck) weighs no more than the rated capacity. As an example, the car sling, platform, and rails are not designed to handle more than a 10,000# fork truck with no more than a 5,000# load at one time.

Elevators 14 and 16 have data tags on the side walls of the elevators stating C-2 loading but then states that the loading capacity is the same as the full capacity. C-2 loading would allow a 50% increase in loading weight while the elevator is parked at a floor. The elevator cannot move the extra 50% weight, but the brake and machine would be designed for the extra 50% weight which would be an extra 7,500#. The current system is not designed for C-2 loading. The COP is engraved with C-1 loading but the applied sign on the side wall of the elevator states C-2. Proper signage should be installed.

Elevators 5 and 6 do not have any applied signage indicating loading type as is required by A17.1.

The car gates and hoistway doors are power operated. Gates and hoistway doors close automatically. We did not observe any infrared devices that have been added to the car gates for the elevator that stop the door closing and

reverse operation to reopen the doors. New A17.1 requirements since the time of the previous alterations mandate devices to detect objects on either side of the car gate, between the car gate and hoistway door and at the floor level of the cab from the inside of the car gate to the edge of the hoistway door.

The elevators do have audible and visual signals to sound prior to beginning closing operation of the car gates.

Elevators 14 and 16 have had ramps installed at various floors throughout the life of the original hoistway doors. Some of the landings have had the ramps removed. New hoistway doors are recommended for all entrances with new hardware which would include removal of the ramps from the entrances.

Elevators 14 and 16 have damage to rear gates and side walls from loading/unloading.

c. Freight elevators 19

Elevator 19 has the original Otis platform, sling, and cab shell. The buttons, including the manual car switch are from the original installation. The flooring appears to be the original wood flooring, typically this was a hard rock maple.

The enclosure cab ceiling is painted, perforated metal. There is one set of bumpers in the cab. Although there are front and rear doors on the elevator, there is only a car operating panel (COP) at the front of the elevator.

The elevator is operated by car switch operation, where the attendant moves the lever to drive the elevator at various speeds.

The car gates and hoistway doors are power operated. Gates and hoistway doors do not close automatically. We did not observe any infrared devices that have been added to the car gates for the elevator that stop the door closing and reverse operation to reopen the doors. New A17.1 requirements mandate devices to detect objects on either side of the car gate, between the car gate and hoistway door and at the floor level of the cab from the inside of the car gate to the edge of the hoistway door. The elevator does not have audible and visual signals to sound prior to beginning closing operation of the car gates.

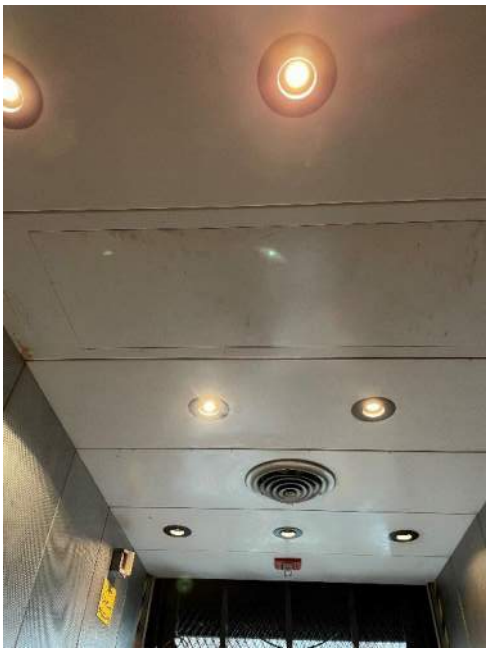
Table 2.2

Elevator Number	Clear Inside Dimensions (Width x Depth x Height)	Jamb Return Depth (Inside Cab)	Suspended Ceiling (height below overall height)	Door Opening (Width x Height)
3	72" x 96" x 93"	5”	5.5”	44" x 84"
4	72" x 96" x 93"	5”	5.5”	44" x 84"
5	62.5" x 148" x 108"	N/A	N/A	61" x *Varies*
6	62.5" x 148" x 108"	N/A	N/A	61" x *Varies*
7	72" x 96" x 93"	5”	5.5”	44" x 84"
8	72" x 96" x 93"	5”	5.5”	44" x 84"
10	121" x 97" x 96"	4”	N/A	84" x 84"
11	80" x 60" x 98"	4.5”	8”	48" x 84"
13	80" x 60" x 98"	4.5”	8”	48" x 84"
14	96" x 151" x 99"	N/A	N/A	96" x 99"
16	96" x 151" x 99"	N/A	N/A	96" x 99"
18	80" x 60" x 98"	4.5”	8”	48" x 84"
19	96” x 151” x 99”	N/A	N/A	96" x 99"
22	80" x 60" x 98"	4.5”	6”	48" x 84"
24	80" x 60" x 98"	4.5”	6”	48" x 84"
26	80" x 60" x 98"	4.5”	6”	48" x 84"
31	74" x 66.5" x 92"	4.5”	6”	48" x 84"

ELEVATOR CAB PHOTOGRAPHS

Elevator 4 Car Operating Panel (COP)

Elevator 4 Cab Interior



Elevator 5 Cab Ceiling

Elevator 5 Side Wall

ELEVATOR CAB PHOTOGRAPHS

Elevator 6 Cab Floor and Rear Gate

Elevator 6 COP

Elevator 10 Cab Interior

Elevator 10 Side Wall and Front Return

ELEVATOR CAB PHOTOGRAPHS

Elevator 10 Upper Portion COP

Elevator 10 Lower Portion COP

Elevator 10 Ceiling and Cove Lighting

Elevator 10 Incorrect Loading Signage (states C2 and should be C1)

ELEVATOR CAB PHOTOGRAPHS

Elevator 13 Cab Interior

Elevator 13 COP with Finish Deterioration

Elevator 13 Suspended Ceiling Missing Bronze Panel

Elevator 13 with Bronze Reveals above Suspended Ceiling and Emergency Light

ELEVATOR CAB PHOTOGRAPHS

Elevator 14 Cab Interior with Blocking Plate Down (Front Gate Shown)

Elevator 14 Front Entrance COP

Elevator 14 Rear Entrance COP

Elevator 14 Cab Ceiling

ELEVATOR CAB PHOTOGRAPHS

Elevator 18 Interior, Suspended Ceiling Panels Loose

Elevator 19 COP

Elevator 19 Safety Gear Access Panel in Cab Floor

Elevator 26, Safety Gear Access in Floor and Broken Hung Panel Below Handrail on Rear

ELEVATOR CAB PHOTOGRAPHS

Elevator 26 Frieze above Hung Panels

Elevator 31 Cab Interior

Elevator 31 Lower Portion COP

Elevator 31 Upper Portion COP

2. Pit (Bottom of Hoistway)

Elevators 3, 4, 5, 6, 7, 8, 10, 11, 13, 14, 16, 18, 19, 22, 24, 26, and 31

Elevators 3-8 have walk in pits. The elevator pits are reached through the mechanical area under the main building. However, access to these pits requires traversal through mechanical areas and climbing over piping for the building. Elevators 3-5 have walk-in pits that are separated by expanded metal walls. Elevators 6-8 have walk-in pits that are separated by expanded metal walls. In both walk-in pits each elevator is illuminated by one compact fluorescent light (CFL) bulb in its respective pit, delivering far below the required 10 foot-candles (fc) in any area of the pit.

Elevator 10 pit is accessed by a ladder from its bottom landing. The pit is illuminated by one fluorescent light fixture mounted on the front wall of the pit. This light fixture provides lighting in the front of the pit but does not provide acceptable lighting levels throughout the full pit.

Elevators 11, 13, 18, 22, 24, and 26 have walk in pits. These pits are accessed via stairwells adjacent to each set of elevators that lead to the lower level. The lighting for the lower level used to access to elevators 11 and 13 pits was not working at the time of our survey. In each walk-in pit, each elevator is illuminated by one CFL light fixture in its respective pit, delivering far below the required 10fc in any area of the pit.

Elevators 14 and 16 pits are accessed by ladders from the lowest rear landing. Each elevator has two light fixtures in each pit. Elevator 16 has both light fixtures on one wall, while elevator 14 has the light fixtures on a side wall and the front wall. Each light fixture is a single-bulb, “jelly jar” incandescent fixture. Lighting levels are below the required 10fc.

Elevator 19 pit is accessed by a ladder from the lowest front landing. There is a single “jelly jar” incandescent light fixture in the side wall of the pit. The required 10fc lighting level is not achieved.

Elevator 31 has a walk-in pit accessed on the 6th floor. The lighting is an incandescent light fixture, providing less than 10fc.

It is recommended that all the existing lighting fixtures located in the elevator pits be upgraded with LED light fixture(s) to provide required 10fc levels throughout the elevator pit.

The pit depth for each elevator was measured during our survey. See Table 2.3 for details. During our survey we did not observe any sump pits or sump pumps in any elevator pit.

Most of the elevators, except for elevators 19 and 31, have oil buffers. Elevators 19 and 31 have spring buffers.

Spring buffers are used where the contract (rated) speed is not in excess of 200 fpm. Spring buffers are rated according to load and number of spring

buffers required depends on the load to be stopped. Due to the number of springs required to stop the larger loads, when elevators 5, 6, 10, 12, and 14 were upgraded it appears as though the original spring buffers were replaced with oil buffers.

For car speeds over 200 fpm, oil buffers are required. Oil buffers are designed to stop the car or counterweight at an average retardation of less than 32.2 ft/sec^2 based on 115% of rate speed for buffers. Oil buffers consist of a piston and cylinder. The piston is pressed down into the cylinder by the descending car and oil beneath the piston is forced into the outer cylinder through small holes drilled in the inner cylinder. The pressure required to discharge the oil through these holes acts to retard the car.

The car buffers are mounted on a channel assembly that is typically embedded in the pit floor.

Elevators 3, 4, 7, 8, 11, 13, 18, 22, 24, and 26 have gravity return counterweight oil buffers which are mounted to the counterweight frame. This was an older approach that utilized the weight of the buffer assembly as part of the counterbalance to the car weight.

Elevators 5, 6, 10, 14 and 16 have oil buffers for the car and counterweight that are mounted to the channel assembly on the pit floor.

In each pit there is a stop switch and light switch adjacent to the entrance to each respective pit. Elevator 10 has an additional, lower stop switch due to the pit depth and access from the tall ladder.

Elevators 3, 4, 7, and 8 have tie down compensation. This means that there are wire ropes with babbitted shackles that connect from the underside of the car frame, run down to the pit, around a sheave and back to the underside of the counterweight and connect to the counterweight with babbitted shackles.

Elevators 5, 6, 10, 14, and 16 have jacketed chain compensation. This means that there is a chain that is hung from the bottom of the bottom of the counterweight assembly and hangs down below the counterweight, then runs to the bottom of the car frame assembly. The chain is jacketed to reduce noise.

During the survey, we did not observe any elevator with the required 4’0” car aprons (also referred to as platform guards) on each entrance side. ASME A17.1 requires a longer 4’0” car aprons in conjunction with the emergency brakes. Due to pit depths this can be an issue, especially with the larger capacity freight elevators.

Current code requires 10 ft candles of light in any area of the pit. New light fixtures and GFCI outlets will be required. Pit ladder requirements are 48” above finished floor at the landing accessing the elevator pit. Current elevator code for new construction requires elevators with Firefighters’ Emergency Operation to have sump pumps able to pump 3000 gal/hour.

Elevators 3, 4, 7, 8, 22, 24, 26 appear to have original Otis Type B safeties. Elevators 22, 24, and 26 safeties are not self-resetting and require an elevator technician to be lowered into the elevator with a geared “key” to reset the safety gear after application. See **Cab Interior Photographs** for access plate photo.

Elevators 5, 6, 10, 14, and 16 have had the original safeties replaced with what appears to be Payne B40 safeties. Note that during our survey we did not see the data tags for the safeties mounted to the car sling with safety device information, include gross load maximums.

Elevators 11, 13, 18 have had the original safeties replaced with Hollister-Whitney Type B, self-resetting safeties.

Elevators 19 has the original Otis roll-type safeties. These safeties are not self-resetting and require an elevator technician to be lowered into the car to manually release the safeties after application.

Elevator 31 has the original Otis Type A safeties.

We recommend, at a minimum, the safeties for elevators 22, 24, and 26 be replaced with self-resetting safeties that do not require a technician to enter the elevator to reset the safeties. Elevator 19 will need new safeties in conjunction with any upgrades.

Table 2.3

Elevator Number	Pit Depth	Car Rail Size (lb per foot)	Counterweight Rail Size (lb per foot)	Pit Lighting (foot candles)
3	107"	15	8	3
4	107"	15	8	3
5	107"	30	15	2.9
6	107"	30	15	2.7
7	107"	15	8	2.8
8	107"	15	8	2.8
10	107"	30	15	8.9
11	114"	15	8	6.5
13	114"	15	8	6.7
14	66"*	30*	16*	4.2
16	66"*	30*	16*	4.4
18	114"	15	8	6.5
19	63"	30	15	6.6
22	115"	15	8	4.5
24	115"	15	8	4.5
26	115"	15	8	4.5
31	156"	15	8	6.8
* Denotes information obtained from Fujitec Shop Drawings				

ELEVATOR PIT PHOTOGRAPHS

Elevator 4 Original Otis Oil Buffer

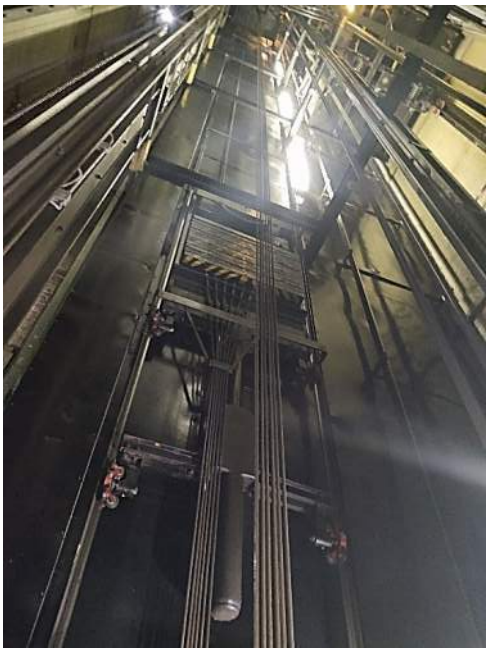
Elevator 5 Oil Buffers from 2000s Alterations

Elevator 7 Stop Switch in Walk-In Pit and Fencing between Pits

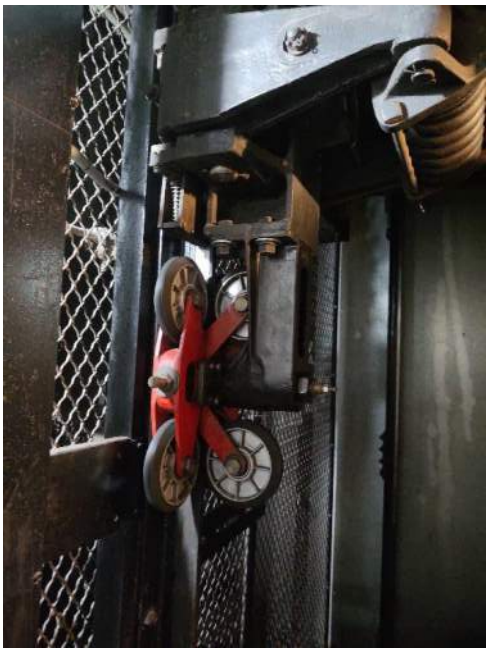
Elevator 7 Otis 14D Safeties

ELEVATOR PIT PHOTOGRAPHS

Elevator 7 Tie Down Compensation Pit Sheave



Elevator 4 Counterweight with Compensation



Elevator 7 Roller Guide Assembly below Safeties

Elevator 7 Otis 14D Safeties

ELEVATOR PIT PHOTOGRAPHS

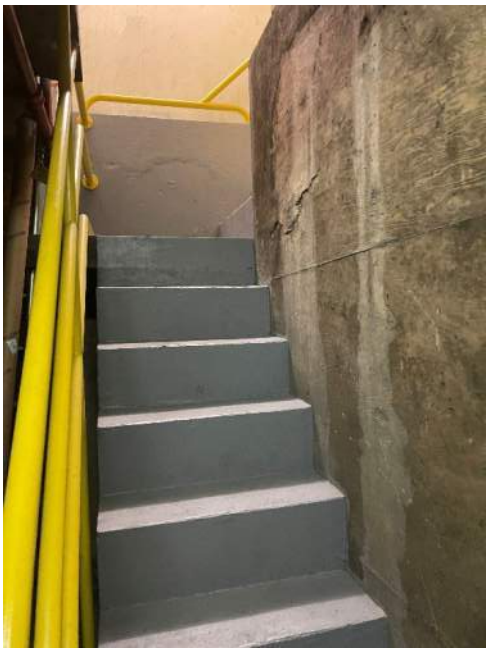
Elevator 13 Walk-In Pit Light by Door

Elevator 13 Hollister-Whitney Safeties

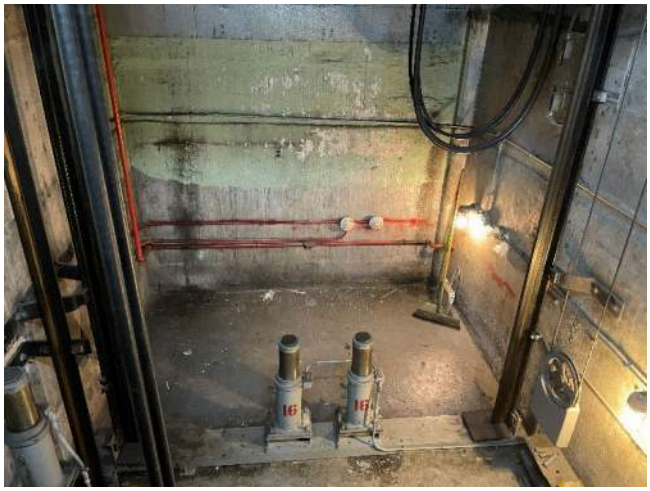
Elevator 13 Car Apron – Not 48” long

Elevator 11, 13 Walk-in Pit entry – Lights Not working

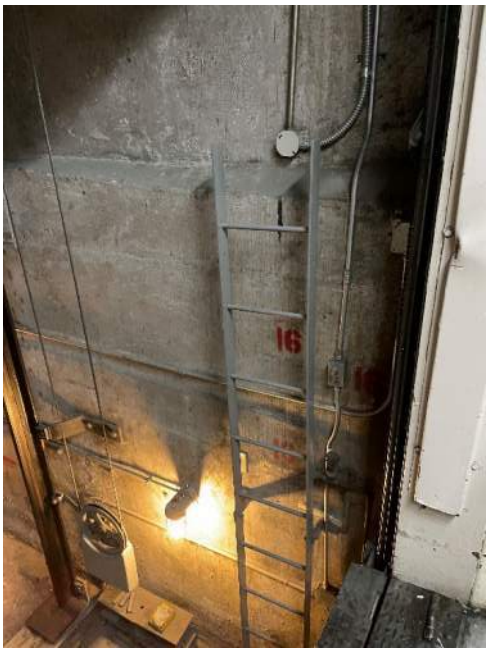
ELEVATOR PIT PHOTOGRAPHS



Stairs Down to Elevator 11, 13 Pits



Elevator 16 Pit – two Light Fixtures, No Sump/Pump



Elevator 16 Pit Access Ladder

Elevator 14 Short Car Apron (toe guard)

ELEVATOR PIT PHOTOGRAPHS

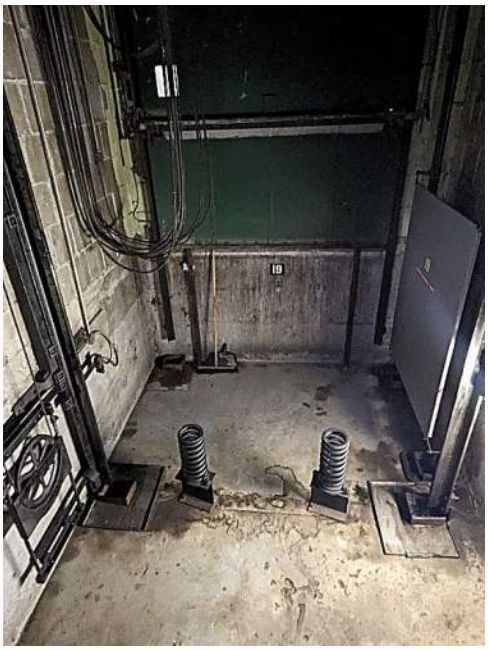
Elevator 14 Underside of Sling and Platform with B40 Safeties (dark blue) and Guides

Elevator 18 Hollister-Whitney Safeties and Pit Light

Elevator 18 Original Otis Oil Buffer

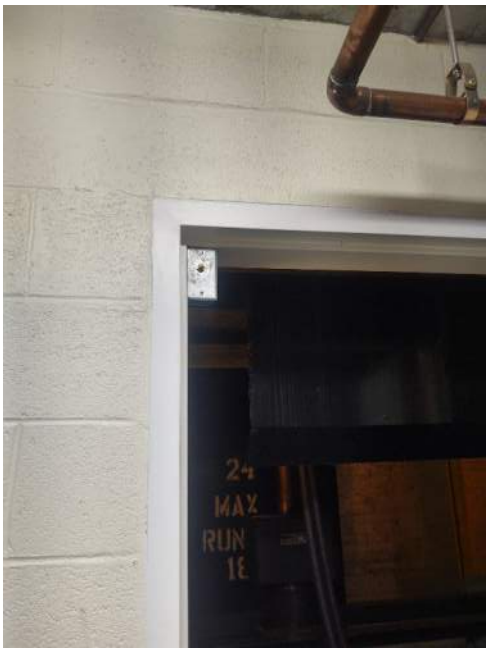
Elevator 18 Walk-in Pit Access

ELEVATOR PIT PHOTOGRAPHS

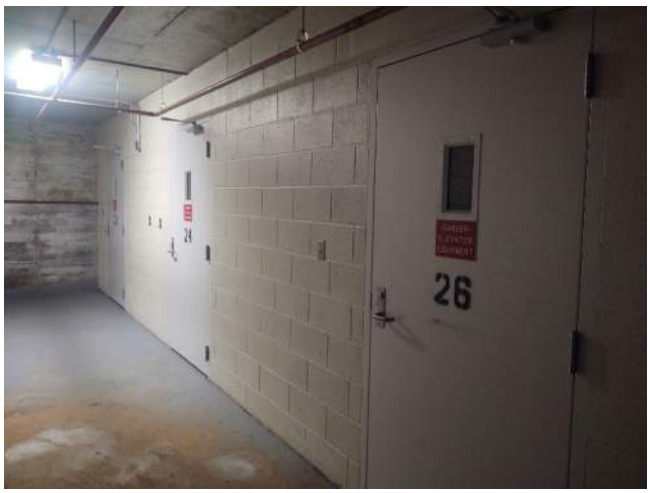


Elevator 19 Pit – Original Equipment/Spring Buffers

Elevator 19 Original Otis Safeties

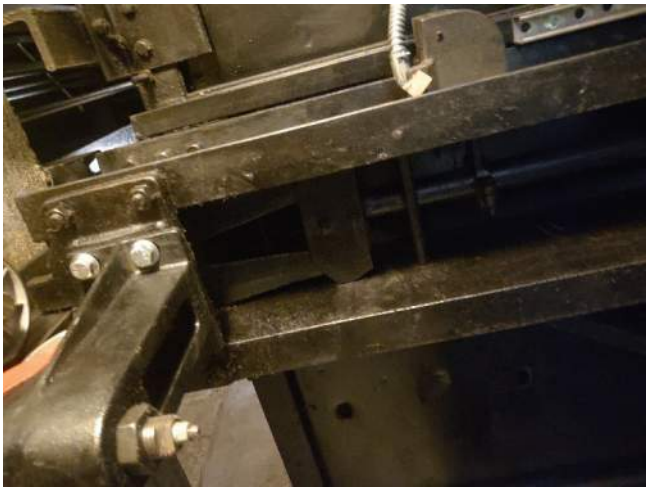


Elevator 24 Walk-in Pit Door Switch



Elevators 22, 24, 26 Walk-In Pit Access

ELEVATOR PIT PHOTOGRAPHS



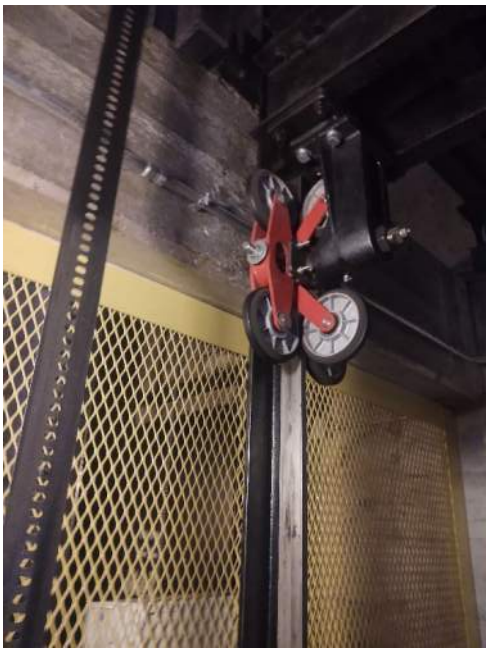
Elevator 24 Original Otis Safety

Elevator 24 Original Otis Safety Gear Reset Under Platform

Elevator 24 Complete View of Safeties

Elevator 24 Safety Reset Access in Cab Floor

ELEVATOR PIT PHOTOGRAPHS



Elevator 24 Guides, Landing Control Device Tape, and Fencing Between Pits

Elevator 31 Counterweight Governor Tension Sheave

Elevator 31 Spring Buffers on Tall Stands

Elevator 31 View of Underside of Platform

3. Machine Room

Elevator 3, 4, 5 machine room space is reached via the 5th floor. The elevator machine room is located on the roof. The elevator machine room is above the elevator hoistway. There is a small service door that leads to a “stairway” through the mechanical level to the overhead machine room. The “stairway” does not have railings and is approximately 18” wide. The “stairway” leads up to a small landing in the machine room. To get to the elevator equipment, a hatch must be lowered over the stairway and then walked back across to get to the elevator machines and controls. Elevator machinery spaces and machinery rooms must have a permanent and unobstructed means of access per ASME A17.1. This includes stairs with a maximum 60 degree from the horizontal incline and a permanent railing. Landings also shall comply. See ASME A17.1 (2.7.2 through 2.7.3.4) excerpt below. There is a trap door in the machine room floor that allows access to the landing below.

Elevator 6, 7, 8 machine room space is reached via the 5th floor. The elevator machine room is located on the roof. The elevator machine room is located above the elevator hoistway. There is a small service door that leads to a “stairway” through the mechanical level to the overhead machine room. The “stairway” does not have railings and is approximately 18” wide. The “stairway” leads up to a small landing in the machine room. To get to the elevator equipment, a hatch must be lowered over the stairway and then walked back across to get to the elevator machines and controls. Elevator machinery spaces and machinery rooms must have a permanent and unobstructed means of access per ASME A17.1. This includes stairs with a maximum 60 degree from the horizontal incline and a permanent railing. Landings also shall comply. See ASME A17.1 (2.7.2 through 2.7.3.4) excerpt below. There is a trap door in the machine room floor that allows access to the landing below.

Elevator 10 machine room space is reached via the locker room on the 5th floor. There is a swing door in the locker room that leads to the elevator machine room. The elevator controls are on a lower level in this space and the machine and governor are on an upper level. The risers leading to the upper level are not compliant and there is a large duct that runs through the machine room that reduces the clear headroom below the 84” clear minimum height.

Elevators 11, 13, 14, 16, 18, 19, 22, 24, 26, and 31 (governors and overhead sheaves only) are reached on the mechanical level (9th Floor). Elevators 11 and 13 have an enclosed machine room with swing door. Elevators 14 and 16 share an enclosed machine room. Elevator 18 has an enclosed machine room. Elevator 19 machinery is not enclosed but has a guardrail barrier around the equipment area. Elevator 31 overhead sheaves and governors are reached through the Elevator 19 machinery area. Elevators 22, 24, and 26 share an enclosed machine room.

Elevator 31 has an enclosed machine room that is accessed via a swing door on the 8th floor. The rear and one side of the machine room is separated from large ductwork by plexiglass sheets mounted on metal studs. We observed several plexiglass sheets that had been removed during our survey.

Elevators 10, 11, 13, 14, 16, 18, 22, 24, 26, 31 have swing doors to access their respective machinery rooms. The enclosure doors are equipped with automatic closure and hardware required to maintain room security while allowing egress. Elevators 3-8 do not have self-closing, self-locking doors. Elevator 19 machinery space is not enclosed.

The light switches for the machine rooms for all elevators except elevator 19 are located inside their respective machine rooms beside the entrance to each machine room. Elevator 19 has a switch mounted on the column adjacent to the gate entrance the machinery space.

Elevator machine rooms required 84" clear overhead. For Elevators 10, 11, 13, 18 and 19 there are various ducts, piping, wiring, etc. that do not meet this requirement.

Lighting requirements for control spaces at the time of installation were 10 ft/candles at the floor. Current lighting levels are acceptable in most machine rooms, however two rooms fall below the new code requirements of 19fc measured at floor level. See Table 2.4 below for specific lighting measured.

It is recommended that the existing fluorescent strip light fixtures be upgraded to LED industrial strip lights to ensure minimum lighting levels are achieved in machine rooms for elevators 10 and 31.

Elevator 10 machine room floor is uneven and has height differences throughout its enclosure creating tripping hazards.

Elevators 3 – 8, 10, 14, and 16 supplied at 480V, 3-phase through safety switches. Elevators 11, 13, 18, 19, 22, 24, 26, and 31 are supplied at 208V, 3-phase through safety switches. Safety switches are capable of being locked in the open position as is required.

Elevators 3, 4, 7, 8, 11, 13, 18, 22, 24, 26, and 31 elevator cab lighting 120V supply circuit is routed through safety switches that are capable of being locked in the open position. Note that elevators 22, 24 and 26 cab light disconnect switches have elevator numbers but do have identifying information on them stating disconnect is for cab lighting.

Elevators 5, 6, 10, 14, 16 and 19 do not have cab lighting 120V safety switches that are capable of being locked in the open position in their respective machine rooms. These elevators have circuit breakers, but the breakers are not individually lockable.

There are outlets in the various machine rooms. It is undetermined if the circuits serving each room is dedicated as is required by the National Electrical Code.

There is tagged fire extinguisher in each machine room as is required.

Elevators 3, 4, 7, 8, 11, 13, 18, 22, 24, and 26 have MCE IMC Performa elevator controllers with SCR drives from the 2000-2005 alterations. The controllers are floor mounted in each machine room. Some parts are still available but these

drives are obsolete. These controls do not have features such as a phone line monitoring or modern Firefighters' Emergency Operation.

Elevators 5, 6, 10, 12, and 14 have MCE IMC elevator controllers with SCR drives from the 2000-2005 alterations. The controllers are floor mounted in each machine room. Some parts are still available but these drives are obsolete. These controls do not have features such as a phone line monitoring or modern Firefighters' Emergency Operation. Elevators 5, 6, 12 and 14 have separate Peelle door controls. The existing Peelle door controllers do not have the features required for the various required detection means for freight elevator cab gates and object sensing.

Elevator 19 has the original Otis controls. We did not observe a manufacture date on the controls or the elevator crosshead. The code year listed for this equipment on the controller was the ASA A17.1 1931 edition. The controls are obsolete relay logic controls. Elevator 19 had a power door alteration performed under the ASME A17.1 – 1960 edition of the elevator code. The power doors controls were manufactured by Security Fire Door Company. Security was sold to Courion and is now operates under the Vantage Solution family of brands. Minimal parts are available for the Otis controls and for the Security door controls. Complete upgrades are recommended.

Elevator 31 has MCE VFMC–1000 controls with a VVVF drive from the 2005 alteration. Some parts are still available but the drive is obsolete.

Elevators 3, 4, 7, 8, 11, 13, 18, 19, 22, 24, 26 have what appear to be the original Otis machines. We did not observe manufacture dates on the machine during our survey. Elevators 3, 4, 7, and 8 have Otis 74D double-wrap traction (DWT) machines. Elevators 11, 13, 18, 22, 24, and 26 have Otis 72 DWT machines. Elevator 19 has the original Otis 1930s vintage geared machine. See Table 2.4 below for motor sizing. The original machines have been excellently maintained but bearings, seals, commutators, and motors are reaching end of life.

Elevators 5, 6, 10, 14, and 16 have the Thyssen machines from the 2000-2005 alterations. They are geared Northern 450 machines. See Table 2.4 below for motor sizing. The machines have been excellently maintained but due to the nature of the facility, the machines are run constantly causing heavy wear on the equipment. The motors are all reaching end of life. Elevator 5 was out of service and in need of a motor rebuild at the time of our survey.

Elevators 3, 4, 7, 8, 22, 24, 26, and 31 have the original Otis safeties. Elevators 22, 24, and 26 safeties require a manual reset by an elevator technician with a large geared "key" to reset the safeties after every application.

Elevators 5, 6, 10, 14, and 16 have safeties listed on the Fujitec shop drawings as "Thyssen B40". Based on information and belief, these appear to be Payne type B safeties.

Elevators 11, 13, 18 have Hollister-Whitney type B safeties from the 2000-2005 alterations.

Upon investigation, it appears as though the original Otis elevators were installed in 1950s. Based upon information and belief of the 1950s construction of the elevators, the elevators were most likely originally installed under the American Standard Association Safety Code for Elevators, Dumbwaiters, and Escalators A17.1 – 1931 (ASA A17.1 – 1931). The early 2000s alterations were performed under the American National Standard Safety Code for Elevators and Escalators ASME A17.1c – 2000 as indicated by tags on the controllers and disconnects. We were unable to find any original data tags with installation dates. Elevator 19 has the original Otis sales number, but does not have a date listed.

In ASA A17.1 – 1931 there are no loading classifications. It was not until the 1955 edition of the code that Class A loading and Class C Industrial Truck Loading (loading not to exceed rated load) were added to the elevator code. We currently call this Class C-1 loading. Class C-2 (loading of the elevator with a load greater than the rated load when the elevator is parked at a landing) was not added until the 1965 edition of the elevator code.

Elevators 5, 6, 14, and 16 had new car slings and platforms provided with the early 2000s alterations. This is due to the drastic changes in loading for freight elevators classified as C-1 loading. Car frame member sizes and spacing requirements have significantly changed since the original installation. Elevator 19, when upgraded, will need a complete new sling and platform to comply with the current A17.1 loading requirements.

The elevator machine rooms do not have dedicated temperature and humidity control required for modern elevators. For elevators 3-8 there are only window units to provide air conditioning. These units are not properly sized for these large machine rooms.

In multiple machine rooms there are unrelated disconnects, wiring, water lines, piping, roof drains, systems, and ductwork that should be removed or relocated during the alterations. Only machinery, equipment, wiring, raceways, cables, coaxial wiring and antennas used directly in connection with the elevator is permitted to be installed inside the hoistway or machine room.

2.7.2 Maintenance Path and Clearance

2.7.2.1 Maintenance Path in Machine Rooms and Control Rooms. A clear path of not less than 450 mm (18 in.) shall be provided to all components that require maintenance.

2.7.2.2 Maintenance Path in Machinery Spaces and Control Spaces. All components requiring maintenance in machinery spaces and control spaces shall have safe and convenient access.

2.7.2.3 Maintenance Clearance in Machine Rooms and Control Rooms. A clearance of not less than 450 mm (18 in.) shall be provided in the direction required for maintenance access.

2.7.2.4 Maintenance Clearance in Machinery Spaces and Control Spaces

2.7.2.4.1 Where a space is intended to be accessed with full bodily entry, the requirements of 2.7.2.3 shall apply.

2.7.2.4.2 Where a space is not intended to be accessed with full bodily entry, all components requiring maintenance shall have safe and convenient access.

NOTE (2.7.2): For electrical clearance requirements, see NFPA 70 or CSA C22.1, whichever is applicable (see Part 9).

2.7.3 Access to Machinery Spaces, Machine Rooms, Control Spaces, and Control Rooms

2.7.3.1 General Requirements

2.7.3.1.1 A permanent and unobstructed means of access shall be provided to

(a) machine rooms and control rooms

(b) machinery spaces and control spaces outside the hoistway

(c) machinery spaces and control spaces inside the hoistway that do not have a means of access to the space as specified in 2.7.3.1.2

2.7.3.1.2 Access to machinery spaces and control spaces inside the hoistway

(a) from the pit shall comply with 2.2.4 and 2.7.5.2.4

(b) from the car top shall comply with 2.12.6 and 2.12.7

(c) from a platform shall comply with 2.7.5.3.5

(d) from inside the car shall comply with 2.7.5.1.4

2.7.3.1.3 Access to other locations within the building or access to machinery and equipment not related to elevators through the machinery space, machine room, control spaces, or control rooms shall not be permitted.

2.7.3.2 Passage Across Roofs. The requirements of 2.7.3.2.1 and 2.7.3.2.2 shall be conformed to where passage over roofs is necessary to reach the means of access to machinery spaces, machine rooms, control spaces, and control rooms.

2.7.3.2.1 A stairway with a swinging door and platform at the top level, conforming to 2.7.3.3, shall be provided from the top floor of the building to the roof level. Hatch covers, as a means of access to roofs, shall not be permitted.

2.7.3.2.2 Where the passage is over a roof having a slope exceeding 15 deg from the horizontal, or over a roof where there is no parapet or guardrail at least 1 070 mm (42 in.) high around the roof or passageway, a permanent, unobstructed, and substantial walkway not less than 600 mm (24 in.) wide, equipped on each side with a railing conforming to 2.10.2, shall be provided from the building exit door at the roof level to the means of access.

2.7.3.3 Means of Access. The means of access to the following shall conform to 2.7.3.3.1 through 2.7.3.3.6:

(a) machine rooms, control rooms, and machinery spaces and control spaces outside the hoistway and machinery spaces and control spaces inside the hoistway that do not have a means of access to the space as specified in 2.7.3.1.2

(b) between different floor levels in machine rooms, in control rooms, and in machinery spaces or control spaces outside the hoistway

(c) from within machine rooms or control rooms to machinery spaces and control spaces

2.7.3.3.1 A permanent, fixed, noncombustible ladder or stair shall be provided where the floor of the room or the space above or below the floor or roof from which the means of access leads, or where the distance between floor levels in the room or space is more than 200 mm (8 in.).

(19) **2.7.3.3.2** A permanent, noncombustible stair shall be provided where the floor of the room or the space above or below the floor or roof from which the means of access leads, or where the distance between floor levels in the room or space is 900 mm (35 in.) or more. Vertical ladders with handgrips shall be permitted to be used in lieu of stairs for access to overhead machinery spaces, except those containing controllers or motor-generators.

2.7.3.3.3 Permanent, fixed, noncombustible ladders shall conform to ANSI A14.3.

2.7.3.3.4 Permanent, noncombustible stairs shall have a maximum angle of 60 deg from the horizontal and shall be equipped with a noncombustible railing conforming to 2.10.2.1 through 2.10.2.3.

2.7.3.3.5 A permanent, noncombustible platform or floor shall be provided at the top of the stairs conforming to the following:

(a) Railings conforming to 2.10.2 shall be provided on each open side.

(b) The floor of the platform shall be at the level not more than 200 mm (8 in.) below the level of the access-door sill.

(c) The depth of the platform shall be not less than 750 mm (29.5 in.), and the width not less than the width of the door.

(d) The size of the platform shall be sufficient to permit the full swing of the door plus 600 mm (24 in.) from the top riser to the swing line of the door.

2.7.3.3.6 Where a ladder is provided, a permanent, noncombustible platform or floor shall be provided at the top of the ladder, conforming to the following:

(a) Railings conforming to 2.10.2 shall be provided on each open side.

(b) The floor of the platform shall be located below the level of the access-door sill by a vertical distance of not more than 200 mm (8 in.) where full bodily entry is required, and by a vertical distance of not more than 900 mm (35 in.) where full bodily entry is not required.

(c) The depth of the platform shall be not less than 915 mm (36 in.) and the width not less than the width of the door or a minimum of 915 mm (36 in.), whichever is greater.

(d) The size of the platform shall be sufficient to permit the full swing of the door plus 600 mm (24 in.) from the standard railing to the swing line of the door.

(e) The ladder or handgrips shall extend a minimum of 1 220 mm (48 in.) above the platform floor level and shall be located on the access door/panel strike jamb side of the platform.

(f) The railing on the access side shall be provided with a hinged section not less than 600 mm (24 in.) wide with a latchable end adjacent to the ladder.

2.7.3.4 Access Doors and Openings

2.7.3.4.1 Access doors shall be

(a) self-closing and self-locking

(b) provided with a spring-type lock arranged to permit the doors to be opened from the inside without a key

(c) kept closed and locked

2.7.3.4.2 Access doors to machine rooms and control rooms shall be provided. They shall be a minimum width of 750 mm (29.5 in.) and a minimum height of 2 030 mm (80 in.). Keys to unlock the access doors shall be Group 2 Security (see Section 8.1).

2.7.3.4.3 Access doors for spaces specified in 2.7.4.2 through 2.7.4.4 other than those for machine rooms or control rooms shall be a minimum width and height of 750 mm (29.5 in.). Keys to unlock the access doors shall be Group 2 Security (see Section 8.1).

2.7.3.4.4 Access doors for control spaces outside the hoistway shall be a minimum width and height of 750 mm (29.5 in.). Keys to unlock the access doors shall be Group 2 Security (see Section 8.1).

2.7.3.4.5 Doors are not required at openings in machine room or control room floors for access to machinery spaces outside the hoistway, provided the access opening is provided on all four sides with a standard railing conforming to 2.10.2, one side of which is arranged to slide or swing to provide access to the ladder or stairs leading to the space. Trap doors, where provided, shall have a standard railing conforming to 2.10.2 or guard wings on all open nonaccess sides.

2.7.3.4.6 Access openings located in the machinery space floor, secondary level floor, machine room floor, control space floor, or control room floor for access into the hoistway shall be provided with doors that shall be kept closed and locked. Keys to unlock the access doors shall be Group 1 Security (see Section 8.1).

2.7.3.4.7 Access openings in elevator hoistway enclosures where full bodily entry is not necessary for maintenance and inspection of components shall be

(a) located to permit the required maintenance and inspection.

(b) a maximum width of 600 mm (24 in.) and a maximum height of 600 mm (24 in.). These dimensions shall be permitted to be increased, provided that any resultant opening through the access opening into the hoistway shall reject a 300 mm (12 in.) diameter ball.

(c) provided with doors that shall be kept closed and locked. Keys to unlock the access doors to the elevator hoistways shall be Group 1 Security (see Section 8.1).

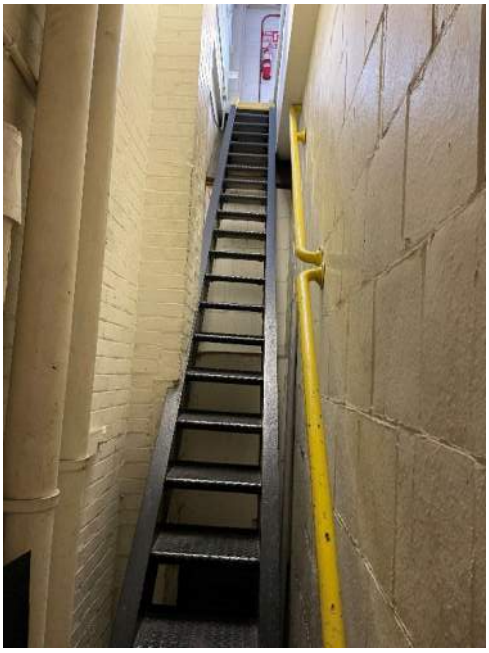
Table 2.4

Elevator Number	Motor Size (HP)	Controller Power (Volts / 3 Phase)	Cab Lighting (Disconnect/Circuit Breaker)	Machine Room Lighting (foot candles)
3	59	480	Disconnect	25
4	59	480	Disconnect	25
5	100	480*	Circuit Breaker/not lockable	25
6	100	480*	Circuit Breaker/not lockable	40
7	59	480	Disconnect	40
8	59	480	Disconnect	40
10	100	480	Circuit Breaker/not lockable	9
11	36	208	Disconnect	22
13	36	208	Disconnect	22
14	100	480*	Circuit Breaker/not lockable	25
16	100	480*	Circuit Breaker/not lockable	25
18	36	208	Disconnect	23
19	63	208*	Circuit Breaker/not lockable	19
22	36	208	Disconnect	24
24	36	208	Disconnect	24
26	36	208	Disconnect	24
31	7.5	208	Disconnect	15

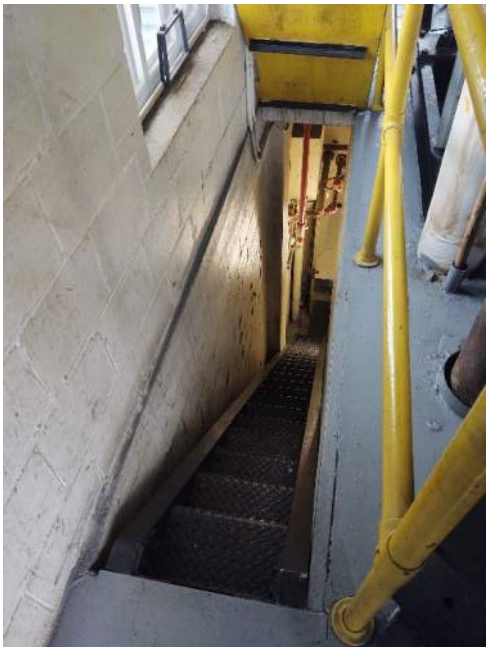
* Denotes controller also has separate door controller. Door controls are 208V
Red values indicate below code requirement of 19 fc minimum

MACHINE ROOM PHOTOGRAPHS

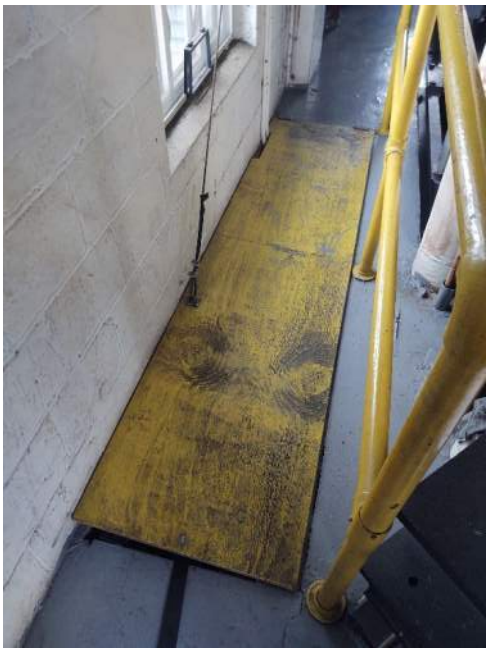
Elevators 6-8 Machine Room Access (Similar for 3-5)



Elevators 6-8 Machine Room Access (Similar for 3-5)



Elevators 3-5 Ramp Up (yellow) to Access Stairs (6-8 Similar)



Elevators 3-5 Ramp down (yellow) to Access Machine Room (6-8 Similar)

MACHINE ROOM PHOTOGRAPHS

Elevator 5 Obsolete Hollister-Whitney Governor

Elevator 5 Machine with Governor and Ramp behind

Elevator 5 Motor Damage

Elevator 5 Machine Data Tag

MACHINE ROOM PHOTOGRAPHS

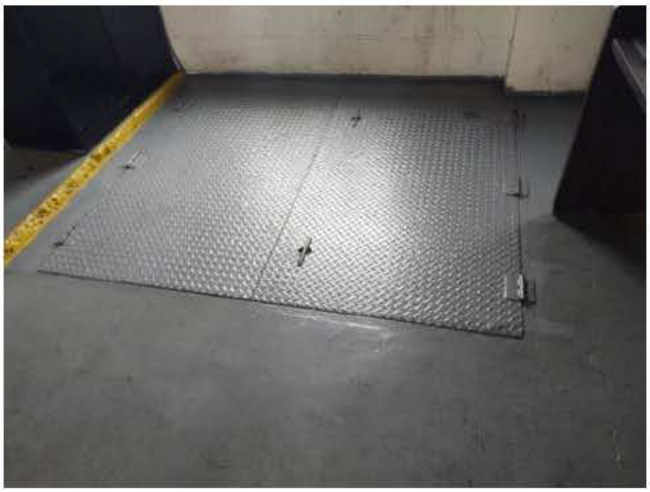
Elevators 3-5 Hoistway Lighting Switch

Window Unit AC for Elevators 3-5

Elevator 3-5 Abandoned Electrical Equipment

Elevator 5 Controller

MACHINE ROOM PHOTOGRAPHS



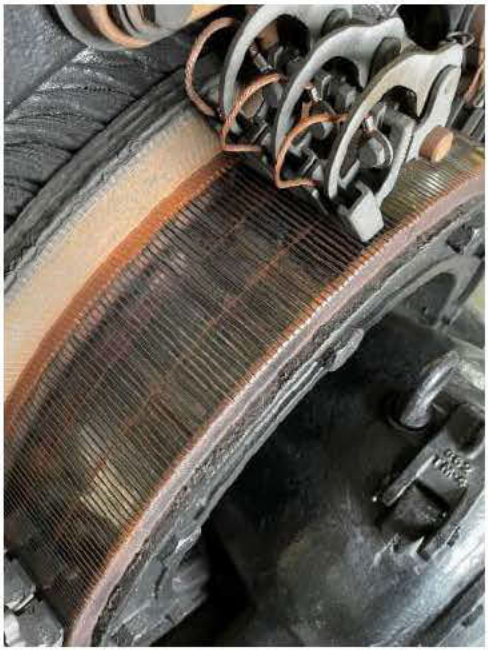
Trap Door for Removal of Equipment – Elevators 3-6

Elevator 5 Door Controller

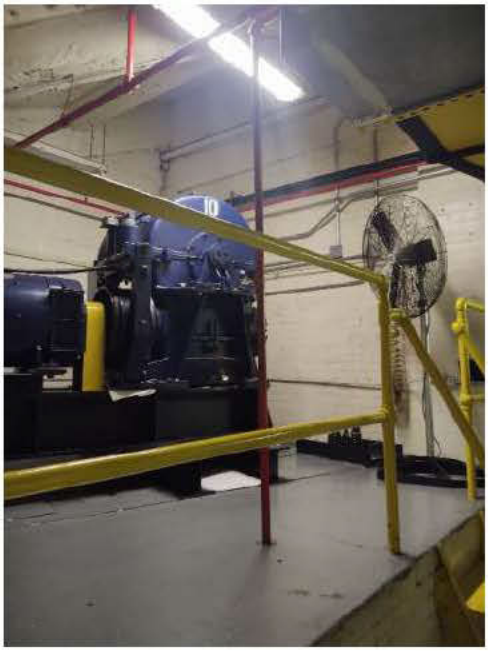
Elevator 4 Gearless Otis 74D Machine

Elevator 4 Emergency Brake (Rope Gripper)

MACHINE ROOM PHOTOGRAPHS



Elevator 8 Commutator Wear



Elevator 10 Machine

Access to Elevator 10 Machine

Low Overhead to Elevator 10 Machine

MACHINE ROOM PHOTOGRAPHS

Elevators 11, 13 Machines (Otis 72 Gearless)

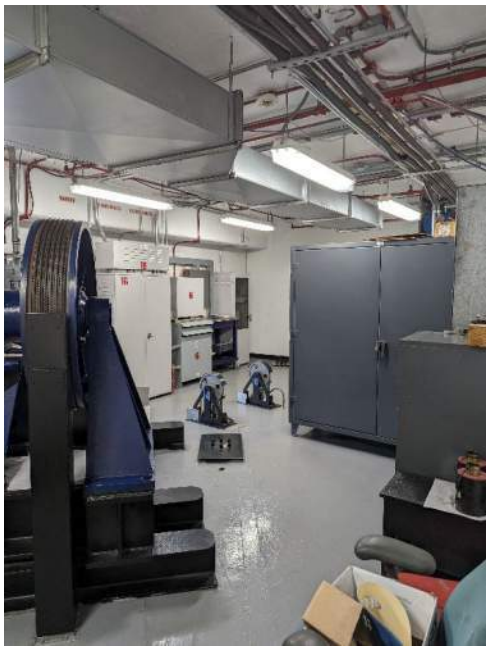
Non-Elevator Related Mechanical Equip. in Machine room for Elevators 11, 13

Elevator 14 Machine (Northern 450)

Elevator 14 Obsolete Hollister-Whitney Governor

MACHINE ROOM PHOTOGRAPHS

Elevator 14 Door Controller

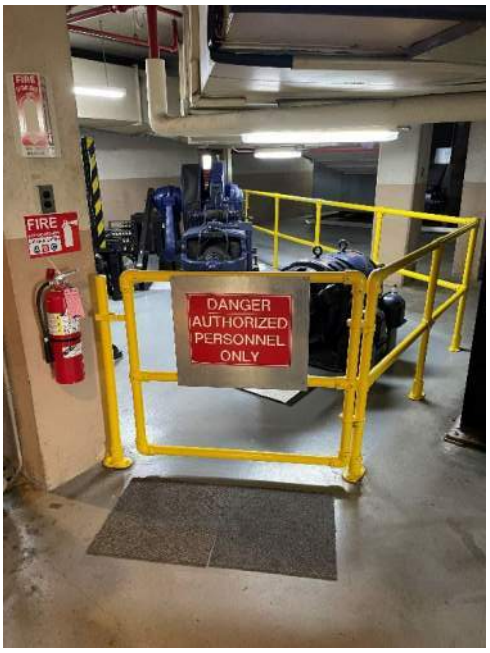


Elevator 14-16 Machine Room – Non-Elevator equipment throughout

Elevator 18 Machine (Otis 72 Gearless)

Elevator 18 Governor. Electrical Equipment on Wall has insufficient NFPA clearance

MACHINE ROOM PHOTOGRAPHS



Elevator 19 “Machine Room” – Open to Mechanical Area

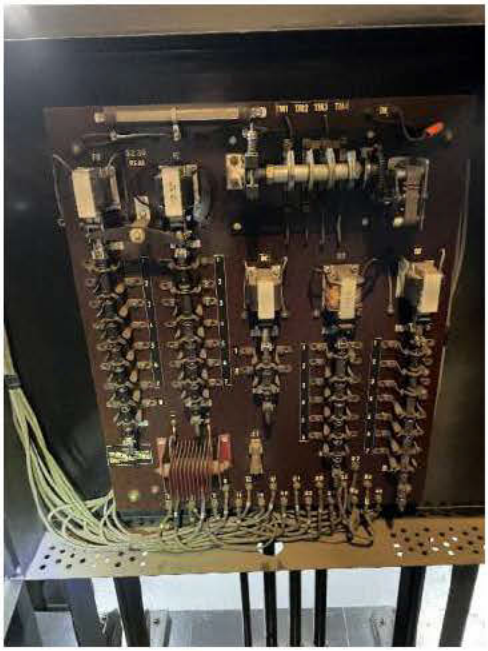
Elevator 19 Motor Generator

Elevator 19 Geared Machine

Elevator 19 Original Otis Flyball Governor

MACHINE ROOM PHOTOGRAPHS

Elevator 19 Controller- 1930s Vintage



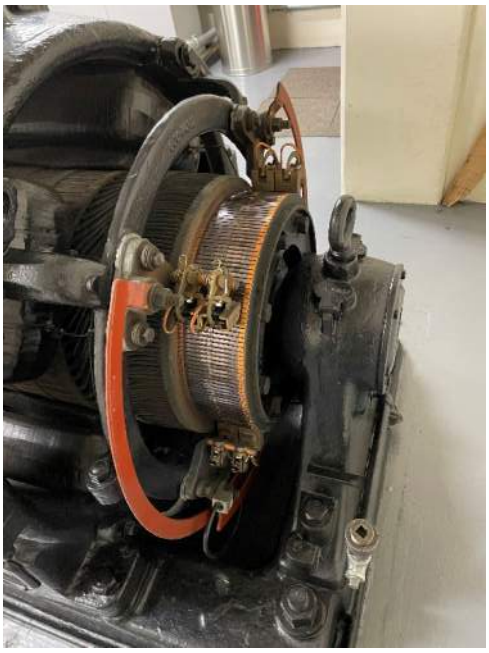
Elevator 19 1960s Security Door Controller

Elevator 19 Controller

Elevator 19 Rear of Controller

MACHINE ROOM PHOTOGRAPHS

Elevators 22, 24, 26 Machines (Otis 72 Gearless)



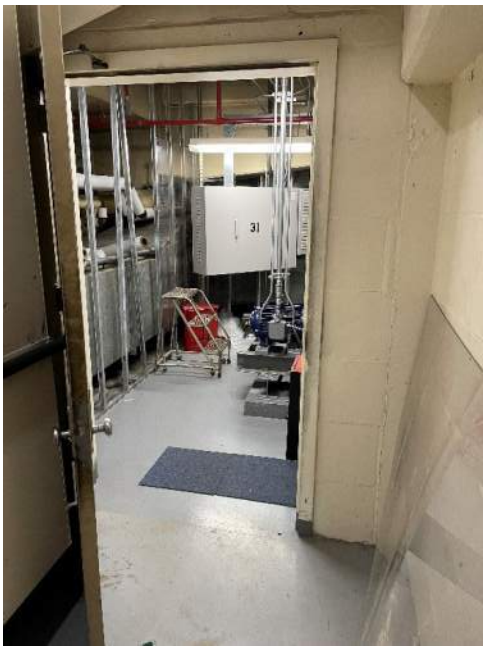
Elevator 22 Commutator

Elevator 31 Access to Overhead Governors/Sheaves behind 19 Controller

Elevator 31 Original Overhead Sheaves with Jute for Lubrication of Bearings

MACHINE ROOM PHOTOGRAPHS

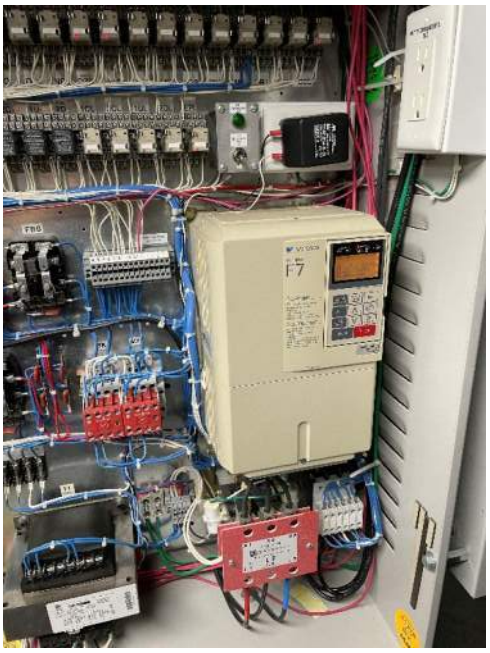
Elevator 31 Overhead Sheaves and Counterweight Governor



Elevator 31 Machine Room – Non-Elevator equipment throughout

Elevator 31 Machine (Hollister-Whitney 44-OD)

Elevator 31 MCE VFMC-1000 Controls

MACHINE ROOM PHOTOGRAPHS	
	
Elevator 31 VVVF Drive	Ductwork behind Plexiglass in Elevator 31 Machine Room – Plexiglass Removed

4. Hoistways

The hoistway are of masonry construction. The walls are a combination of hollow clay tile and brick with concrete floor slabs. The hollow clay tile is damaged and cracking in multiple areas. There is bowing of the clay tiles in elevators 14 and 16 and significant bowing of several rows of clay tiles in elevator 18. In elevators 14 and 16 there are sections where the inside face of the clay tiles has broken off and the opposite side of the block can be seen.

In the hoistway there are multiple penetrations for various abandoned and non-elevator related conduit lines and cables. In the rear of elevators 3, 4 and 7,8 there is what appears to be a drain line that runs from the top of the hoistway to the bottom of the pit. There is fascia at the rear of these two hoistways that runs from the pit up to the 4th floor. In the hoistway for elevators 3, 4, 5 and for 6, 7, 8 there is a large vent in the rear of the shaft. Previous building codes required ventilation of the hoistway. This requirement was removed in the 2015 IBC International Building Code and the ventilation can be sealed during the future alterations.

ASME A17.1 guidelines require that only mechanical equipment and systems directly related to the installation, operation and maintenance of the elevator are allowed in the elevator hoistways. Pipes, ducts, and conduit not related to the elevator system must not penetrate the hoistway. Where penetrations have been made into the hoistway, the piping, ducts, wiring, conduit, etc. should be relocated or removed and holes patched to maintain hoistway fire rating.

Each elevator crosshead (the top structural members of the car sling that are above the car top) has elevator data tags. The data tags were updated during the alterations performed in the early 2000s. Elevator 19 has the original Otis data tag, but the date of installation was never engraved. Each elevator is supported by hoist ropes. Rope diameter listed in Table 2.4 below.

Most of the elevators except elevator 31 are roped in a 2:1 configuration. The 2:1 roping allows for a heavier load to lifted by a smaller machine. In a 2:1 configuration the hoist ropes connect to a hitch plate (dead-end hitch) in the top of the hoistway or in the machine room, run down to the car, travel around a sheave on the car top, up to the machine, around the drive sheave, down and around a sheave on the counterweight, and finally to a hitch plate (dead-end hitch) either in the top of the hoistway or the machine room and are secured with shackles on both ends. For the passenger elevators there is one 2:1 sheave mounted to the crosshead assembly. For the large capacity elevators there are two 2:1 sheaves mounted to the underside of the crosshead. There is another 2:1 sheave on the top of each counterweight assembly.

Elevator 31: is roped in a 1:1 configuration. In a 1:1 configuration, there is a hitch plate mounted to the crosshead members and another hitch plate mounted to the counterweight frame. The ropes have shackles mounted to the hitch plates and the hoist ropes travel from the car top, up and over the machine drive sheave and down to terminate on the counterweight hitch plate.

The passenger elevators have metal, two-speed, side-slide doors with painted baked enamel on the landing side. Elevator 10 has two sets of the side-slide doors that operate in tandem allowing a center-opening entrance with a large opening. The doors have applied hangers and have 1½ hour fire rating.

The freight elevators have vertical bi-parting hoistway doors that most likely have been replaced since the original installation. The door entrance frames appear to be from the original installation.

Each car top lighting is a single bulb in the car top inspection station with guard. Car top lighting does not meet the current A17.1 guideline minimum requirements for illumination. Car top lighting requirements for lighting is 10 foot candles in any area of the car top that would require maintenance or examination. The high-speed passenger elevators have roller guides. The low-speed passenger elevators (10 and 31) and the freight elevators have slide guides. There are handrails on the sides of the elevator car tops.

Each bank of elevators has lighting in the hoistway. For elevators 3-5 the lighting is located between the divider beams for elevators 3 and 4 (fluorescent fixtures). For elevators 6-8 the lighting is located on the side wall of elevator 8 (incandescent fixtures). For elevators 11 and 13 the lighting is located between the divider beams of the two cars (fluorescent fixtures). For elevators 22, 24, and 26 the lighting is located on both sides of elevator 24, between the divider beams (fluorescent fixtures). The individual shafts that do not have multiple elevators for elevators 10, 14, 16, and 18 each have hoistway lighting. The hoistway lighting does not have switches at the terminal landings for each set of elevators. Light switches for the hoistways are located in their respective machine rooms.

The elevators have car guide rails that are supported by inserts in the concrete slabs. The code under which these elevators was originally installed is most likely ASA A17.1 – 1931. Since that time the maximum bracket spacing requirements has been reduced. The original brackets are still in place and connected to the rails and columns. It appears to be possible to reuse the existing anchor locations for the brackets but more brackets may be required, specifically for elevator 19.

A structural engineer should make the determinations as to the feasibility and strength of the existing inserts and brackets. New bracket spacing is determined by the new weight of the elevators that should be shown on preliminary layouts.

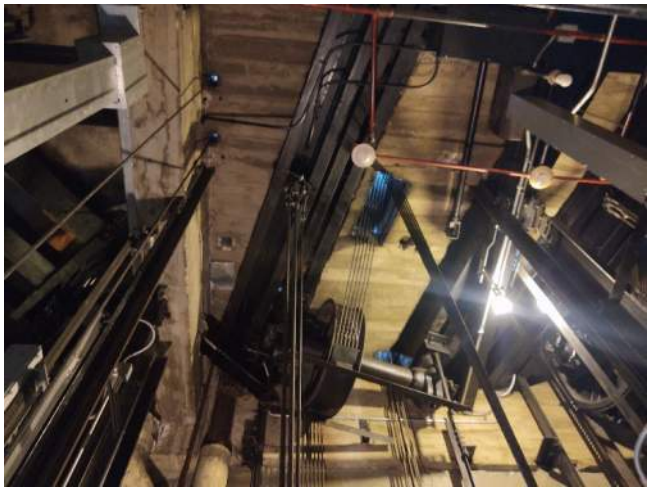
The maximum allowable spacing is 16’0” between counterweight rail brackets. At distances of 12’0” to 14’0” one intermediate tie bracket is required. At distances of 14’0” to 16’0” two intermediate tie brackets are required. It was not in the scope of this work to measure all bracket spacing. We did not observe any intermediate tie brackets. The counterweight brackets are only mounted to at each floor landing.

Table 2.5

Elevator Number	Hoist Ropes (number - diameter)	Hoistway Door Type	Guide Type
3	6 – ½"	Two-speed, Side Slide	Roller
4	6 – ½"	Two-speed, Side Slide	Roller
5	6 – 5/8"	Vertical Bi-Parting	Slide
6	6 – 5/8"	Vertical Bi-Parting	Slide
7	6 – ½"	Two-speed, Side Slide	Roller
8	6 – ½"	Two-speed, Side Slide	Roller
10	7 – 5/8"	Two-speed, Center Opening	Slide
11	6 – ½"	Two-speed, Side Slide	Roller
13	6 – ½"	Two-speed, Side Slide	Roller
14	6 – 5/8"	Vertical Bi-Parting	Slide
16	6 – 5/8"	Vertical Bi-Parting	Slide
18	6 – ½"	Two-speed, Side Slide	Roller
19	8 – 5/8"	Vertical Bi-Parting	Slide
22	6 – ½"	Two-speed, Side Slide	Roller
24	6 – ½"	Two-speed, Side Slide	Roller
26	6 – ½"	Two-speed, Side Slide	Roller
31	5 – ½"	Two-speed, Side Slide	Slide

ELEVATOR HOISTWAY PHOTOGRAPHS

Elevator 4 GAL MOVFR Door Operator



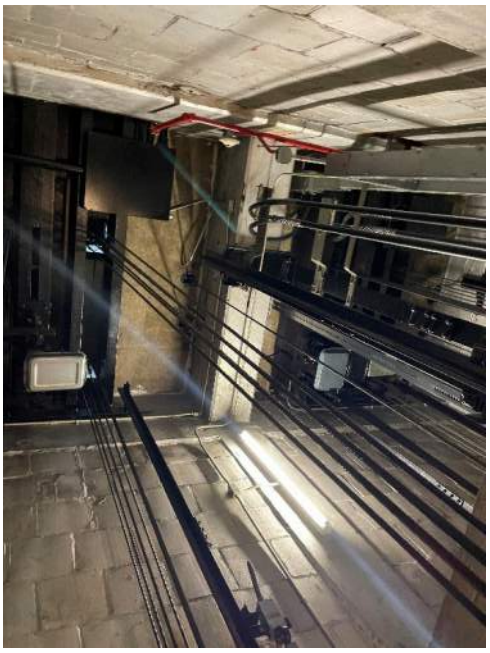
Elevators 4 Top of Hoistway

Elevator 4 Hoistway Ventilation Not Required

Elevator 7 Tie Down Compensation Connection to Counterweight (Babitted Shackles)

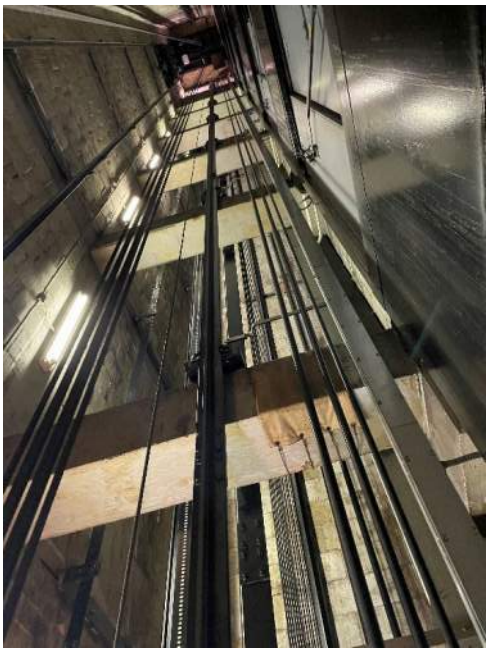
ELEVATOR HOISTWAY PHOTOGRAPHS

Elevator 13 Top of Cab/ 2:1 Sheave/Door Operator



Elevators 11, 13 Top of Hoistway

Elevator 13 Counterweight Assembly

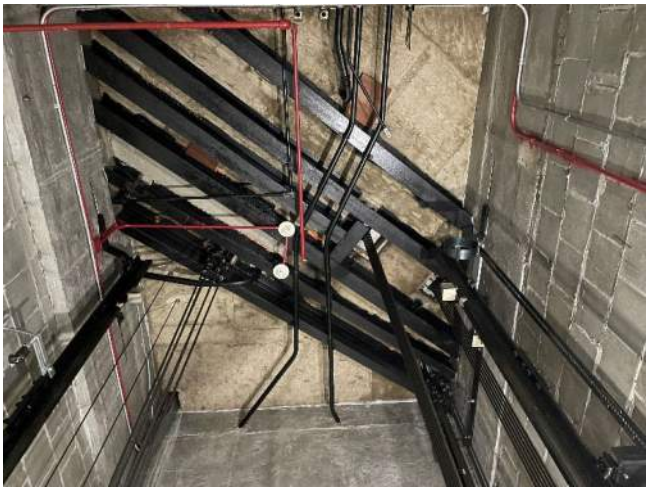


Elevator 13 View Up Hoistway

ELEVATOR HOISTWAY PHOTOGRAPHS

Elevator 13 Hoistway Door Closer and Door Pick-up Rollers

Elevator 16 top of Cab



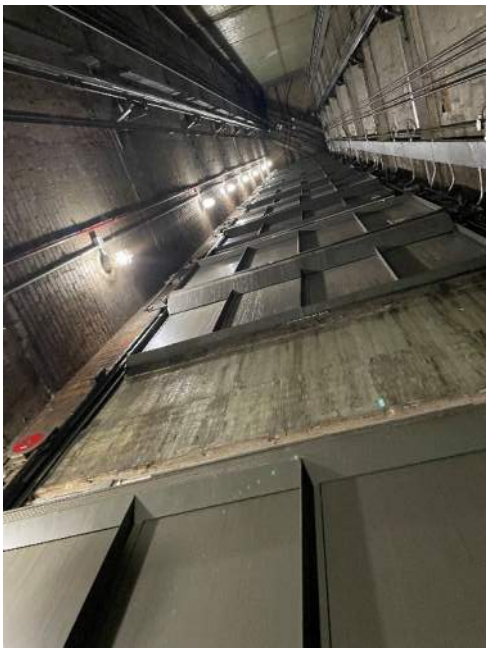
Elevator 16 Top of Hoistway

Elevator 16 Counterweight Assembly

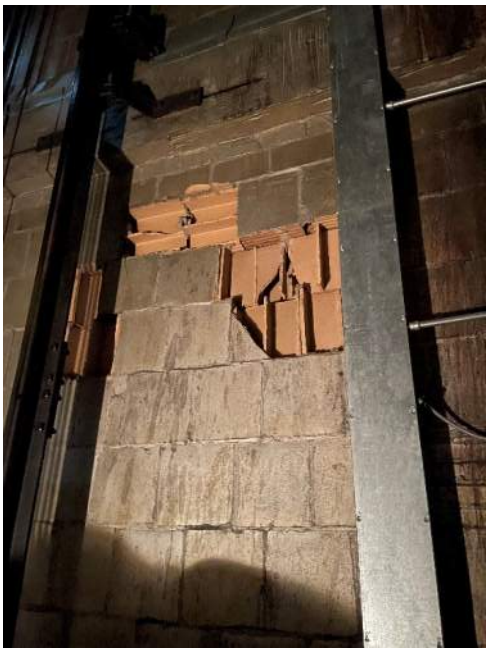
ELEVATOR HOISTWAY PHOTOGRAPHS

Elevator 16 Hollow Clay Tile Broken

Elevator 16 Rail Reinforcement



Elevator 16 View up Hoistway

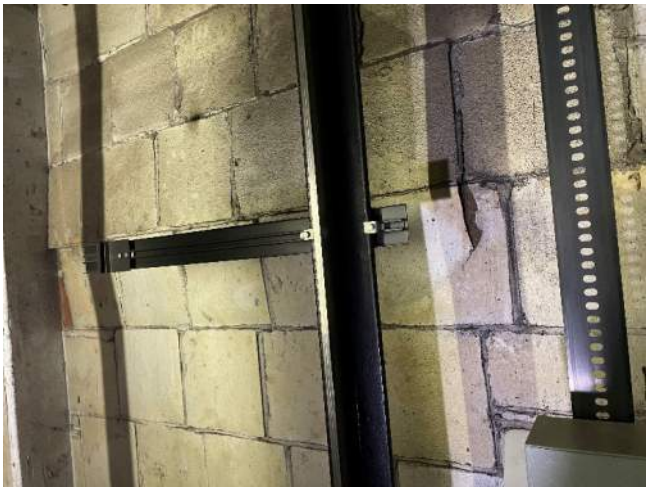


Elevator 16 Hollow Clay Tile Broken

ELEVATOR HOISTWAY PHOTOGRAPHS

Elevator 18 Top of Cab

Elevator 18 Floor 1 Locked Out



Elevator 18 Hollow Clay Tile Bowing

Close-Up of Bowing Hollow Clay Tiles

ELEVATOR HOISTWAY PHOTOGRAPHS

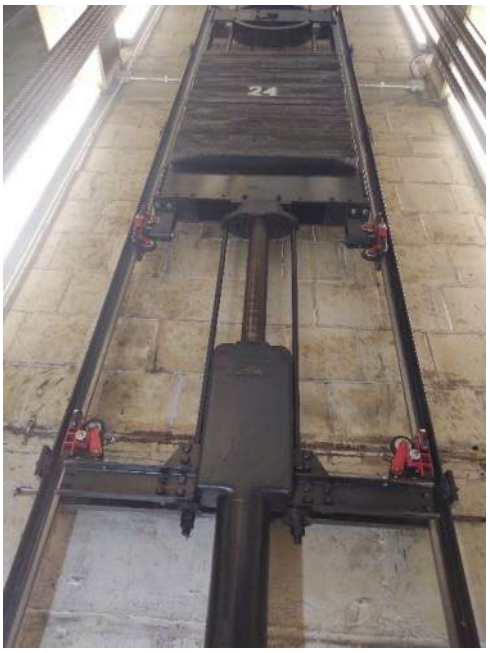
Elevator 19 Original Otis Data Tag

Elevator 19 Top of Hoistway

Elevator 19 Original Counterweight – No Space for Additional Weight

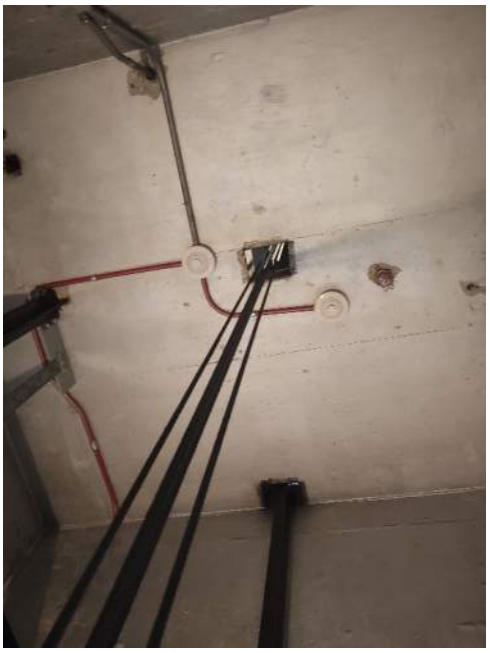
Elevator 24 Top of Hoistway

ELEVATOR HOISTWAY PHOTOGRAPHS



Elevator 24 Counterweight Assembly

Elevator 22 Side Exit Locked Out



Elevator 31 Top of Hoistway (below Overhead Sheave Space)

Elevator 31 Machine Viewed from Car Top

5. Outside Hoistways (Entrances, Landings, Access)

Passenger elevators 3, 4, 7, 8, 11, 13, 18, 22, 24, 26, and 31 have hall lanterns with position indicators. The hall position indicators inform building occupants of the elevator's location. The hall call stations are flush mounted to the wall adjacent to the entrances. The hall call stations appear to have been replaced during the 2000s modernization. The entrance frames are painted frames, the hoistway doors are brushed stainless-steel, and the fixtures are bronze. A cohesive finish design is recommended during the elevator alterations.

Elevators 5, 6, 10, 14, 16, 19 do not have hall lanterns or position indicators. The entrance frames are painted frames, the hoistway doors are painted steel, and the fixtures are stainless-steel (bronze for elevator 19 only). A cohesive finish design is recommended during the elevator alterations. Various entrance door assemblies for the freight elevators in the Annex have had loading ramps added to the doors and jambs. These ramps were not part of the original design and affect operation of the doors. During the alterations, removal of these ramps is recommended.

Elevators 14 and 16 have had built-in door frames added inside the hoistway door jambs on the 7th floor. The door frame opening measures 82 ½" clear width by 84" clear height.

The 1st floor front entrance is the designated landing with the Firefighters' Emergency Operation recall key switch for the elevators 3-8, 10, 11, 13, 14, 16, and 18.

The 2nd floor front entrance is the designated landing with the Firefighters' Emergency Operation recall key switch for the elevators 22, 24 and 26.

The 7th floor front entrance is the designated landing with the Firefighters' Emergency Operation recall key switch for elevator 31.

Elevator 19 does not have Firefighters' Emergency Operation features.

Elevators 3-8, 11, 13, 18, 22, 24, 26, and 31 have access key switches at the top terminal landings for access to the top of the elevator shaft and the car tops.

Elevators 10, 14, 16, have access key switches at the top and bottom terminal landings for access to the top of the elevator shaft and the pits.

Table 2.6

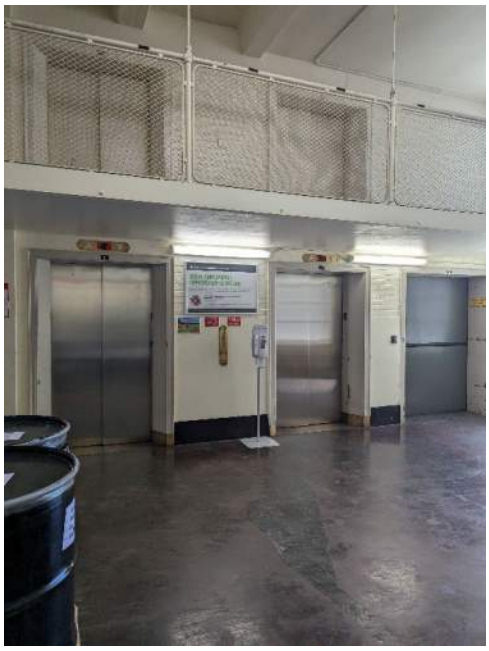
Elevator Number	Designated Landing Floor	Lobby Lighting Elevator Sill (foot candles)									
		B	Lvl 1	Lvl 1G	Lvl 2	Lvl 3	Lvl 4	Lvl 5	Lvl 6	Lvl 7	Lvl 8
3	1	8.1	2.1	27	3.97	7.51	7.2	22	--	--	--
4	1	8.1	2.1	27	3.97	7.51	7.2	22	--	--	--
5	1	8.1	2.1	--	3.97	7.51	7.2	22	--	--	--
6	1	6.7	5.5	--	6.5	4.0	4.5	26	--	--	--
7	1	6.7	5.5	18	6.5	4.0	4.5	26	--	--	--
8	1	6.7	5.5	18	6.5	4.0	4.5	26	--	--	--
10	1	9.6	3.0	--	9	9	8	6	--	--	--
11	1	4	21	--	2.2	4.1	3.2	1.9	2.1	3.1	--
13	1	4	21	--	2.2	4.1	3.2	1.9	2.1	3.1	--
14	1	3.5	4.75	--	2.3	3.4	2.9	2.9	2.8	18	--
16	1	3.5	4.75	--	2.3	3.4	2.9	2.9	2.8	18	--
18	1	5.3	9.5	--	4.3	2.6	2.9	3.5	3.4	6.6	--
19	N/A	3.2	2.3	--	2.8	4.2	2.7	2.65	3.9	2.4	--
22	2	3.4	1.45	--	3.0	4.12	3.75	3.5	3.3	3	
24	2	3.4	1.45	--	3.0	4.12	3.75	3.5	3.3	3	--
26	2	3.4	1.45	--	3.0	4.12	3.75	3.5	3.3	3	--
31	7	--	--	--	--	--	--	--	3.4	3.4	--

ELEVATOR OUTSIDE HOISTWAY PHOTOGRAPHS

Elevator 4 Floor 4 Lobby

Elevator 4 Hall Position Indicator

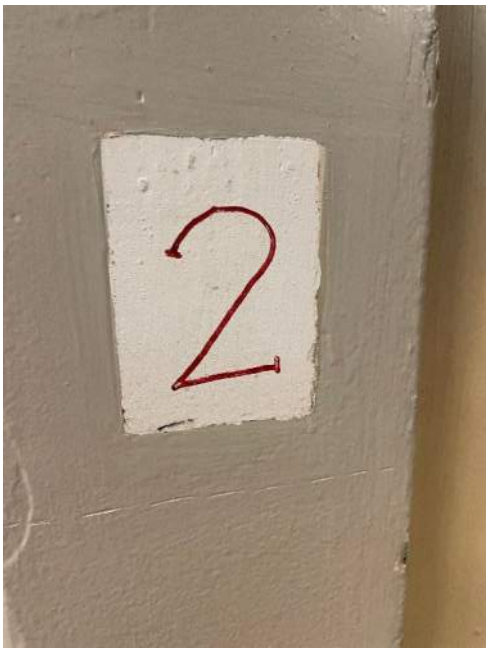
Elevator 5 Hall Call Fixture in Door Frame



Elevators 6-8 Floor 4 Lobby – Stainless-Steel Doors, Bronze Hall Fixtures, Painted Frames

ELEVATOR OUTSIDE HOISTWAY PHOTOGRAPHS

Elevators 7,8 Top Terminal Hall Call Fixture – Finish Worn



Elevator 8 Braille Missing at Floor 2

Elevator 8 Locked Out Landings

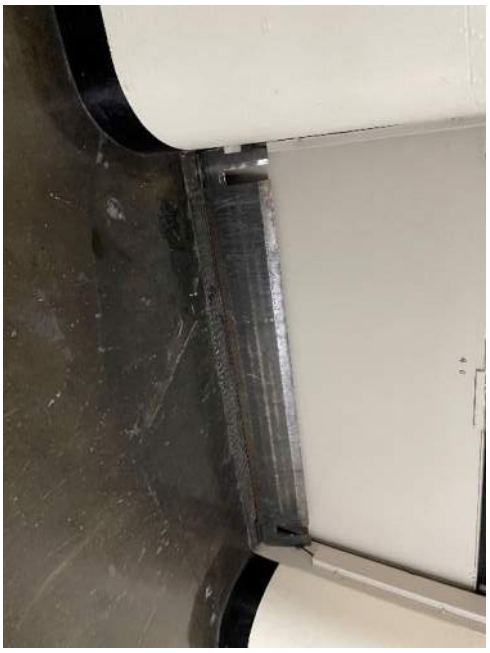
Elevator 10 Floor B Lobby

ELEVATOR OUTSIDE HOISTWAY PHOTOGRAPHS

Elevators 11, 13 Lobby Fixtures

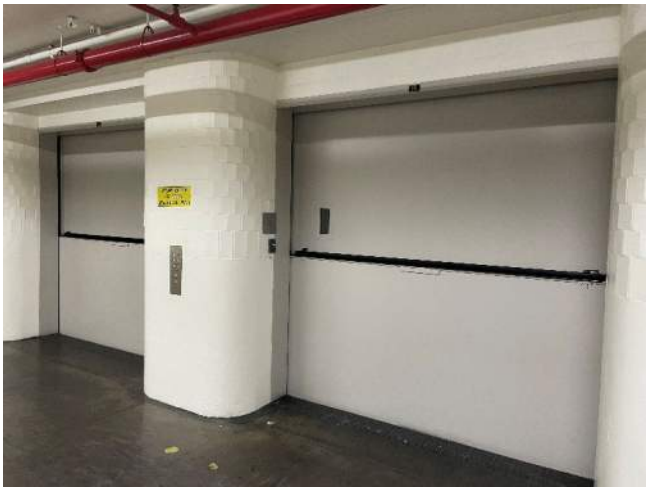
Elevators 14, 16 Hall Fixture

Door Frame Built inside Elevator Door Frame at top landing – Elevators 14 and 16



Elevator 16 Doors with field installed Loading Ramp

ELEVATOR OUTSIDE HOISTWAY PHOTOGRAPHS



Elevators 14, 16 Lobby without Loading Ramp

Elevator 18 Floor 7 Lobby

Elevators 22, 24, 26 Lobby – Only One Hall Station Fixture

Elevators 22, 24, 26 Designated Landing Fixture

ELEVATOR OUTSIDE HOISTWAY PHOTOGRAPHS

Elevator 31 Floor 7 Lobby

Elevator 31 Floor 8 Lobby

Elevator 31 Hall Position Indicator (Bronze) and Hoistway Doors (Stainless-Steel)

6. Fire Alarm/Fire Suppression/Firefighters' Emergency Operation

The building is sprinklered in some portions. We did not observe shunt trip devices in all the machine rooms.

The elevators, except for elevator 19, have an early version of Firefighters' Emergency Operation, but it does not have key features such as the blinking fire hat to alert the firefighters of a fire in the hoistway or machine room.

There are what appear to be dedicated elevator related fire alarm initiating devices for the elevators. List of types of devices and locations are in Table 2.7 below.

There are smoke detectors/heat detectors/flow control switches in the top of the elevator shafts. There are smoke detectors/heat detectors/flow control switches in the machine rooms. There are smoke detectors/heat detectors/flow control switches in most of the pits. There are building fire-alarm system modules in each elevator machine room.

There is a labeled and tagged fire extinguisher in each machine room.

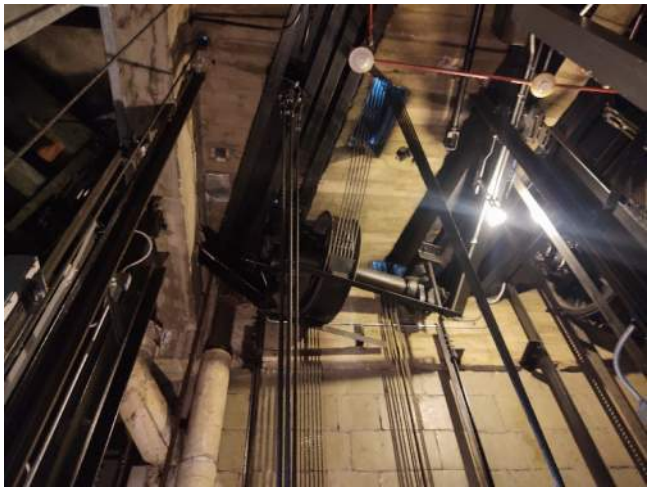
Table 2.7

Elevator Number	FA Device (top of hoistway)	FA Device (pit)	FA Device (Machine Room)	FA Device (Lobbies)	Sprinkler Heads
3	HD	--	2 SD/ 9 HD – shares with 4, 5	7 SD (fronts) Rear unknown – shares with 4, 5	HW, MR, Pit
4	SD/HD	--	--	--	HW, MR, Pit
5	HD	SD/ 2 HD	--	--	HW, MR, Pit
6	2 HD	--	2 SD/ 9HD – shares with 7,8	7 SD (fronts) Rear unknown – shares with 7, 8	HW, MR, Pit
7	SD/HD	--	--	--	HW, MR, Pit
8	HD	SD/ 2 HD	--	--	HW, MR, Pit
10	SD/HD	2 HD	SD/ 3 HD	5 SD	HW, MR, Pit
11	SD/HD	--	3 SD / 6 HD – shares with 13	8 SD – shares with 13	MR, HW
13	HD	--	--	--	MR, HW
14	SD/HD	SD/HD	2 SD/ 8 HD – shares with 16	8 SD front, 4 SD rear – shares with 16	HW, MR, Pit
16	SD/HD	SD/HD	--	--	HW, MR, Pit
18	SD/HD	--	2 SD / 3 HD	8 SD	MR, HW
19	SD/HD	--	--	--	HW
22	SD/HD	--	4 SD / 6 HD – shares with 24, 26	8 SD – shares with 24, 26	MR, HW
24	SD/HD	--	--	--	MR, HW
26	SD/HD	--	--	--	MR, HW
31	SD/HD	--	SD/HD and also SD/HD behind plexiglass	3 SD	MR, HW

Definitions:
***FA** – Fire Alarm*
***HD** – Heat Detector*
***HW** – Hoistway*
***MR** – Machine Room*
***SD** – Smoke Detector*

ELEVATOR FIRE ALARM PHOTOGRAPHS

Alarm in Machine Room for Elevators 3-5

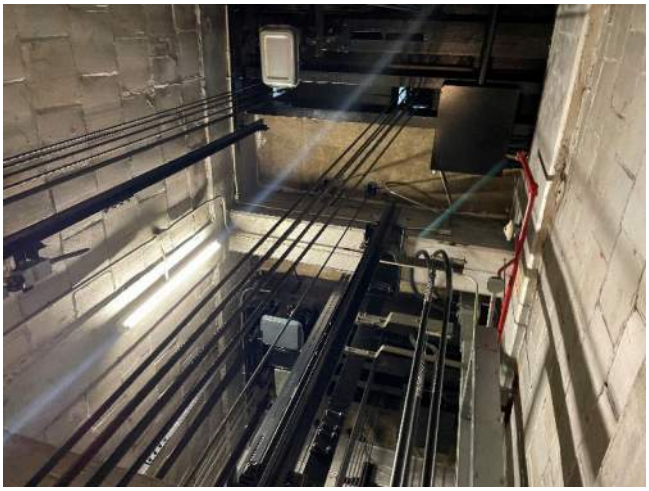


Devices in Top of Elevator 4 Hoistway

Devices and Sprinklers in Elevator 10 Machine Room

Device and Sprinklers in 11, 13 Machine Room

ELEVATOR FIRE ALARM PHOTOGRAPHS



Devices and Sprinkler at top of Elevator 11, 13 Hoistway

Devices and Sprinkler top of Elevator 14, 16 Hoistways

Devices and Sprinkler Elevator 14, 16 Machine Room

Devices and Sprinkler Elevator 14, 16 Pits

ELEVATOR FIRE ALARM PHOTOGRAPHS

Fire Alarm Modules Elevator 18 Machine Room

Elevator 19 “Machine Room” Has Capped Sprinklers

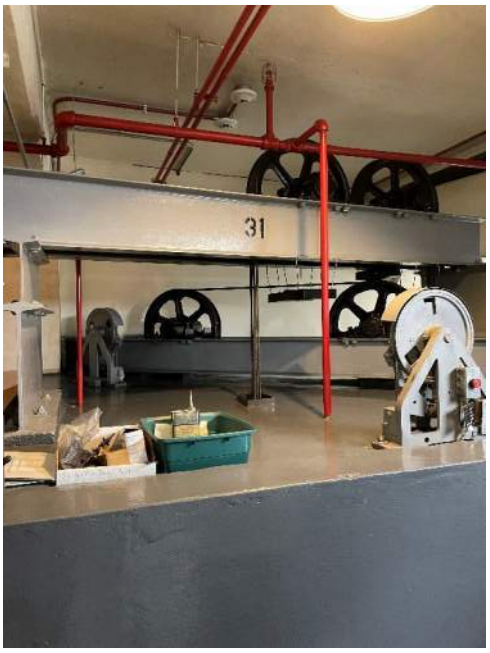
Elevator 19 Top of Hoistway Device and Sprinkler

Elevator 24 Top of Hoistway Devices and Sprinkler

ELEVATOR FIRE ALARM PHOTOGRAPHS

Devices and Sprinkler in Elevators 22, 24, 26 Machine Room

Fire Alarm Modules in Elevators 22, 24, 26 Machine Room



Elevator 31 Has Devices and Sprinklers (adjacent to Elevator 19 controls)

Elevator 31 Fire Extinguisher and Fire Alarm Modules Below Disconnects

7. SCADA System

The existing elevators controllers are manufactured by MCE. An output Cat6 cable is routed from the elevator control board to existing BEP Cisco switches, tying into the secure BEP enterprise network. A BEP network connection is routed to an enclosure located in the Annex Building Mechanical Penthouse. The existing BMS link (JACE-300) IP Gateway for BaCNet SCADA connection are located in this enclosure. This enclosure contains two MCE BMS link modules and a Belkin switch, with an ethernet connection back on the BEP network. The BaCNet gateways formerly communicated to the Aveva SCADA system in use by BEP. The graphics and points are programmed in the Aveva system, but will need to be remapped to the new points when the devices are replaced.

Currently only elevator #2 is able to be monitored through the BEP SCADA software via a newer MCE BMS Link Device. The SCADA connection to all other elevator controllers throughout the building are not operational.

The selected manufacturer of the new elevator controllers will dictate the exact equipment for BaCnet/Modbus protocol, however the system architecture will remain the same. An ethernet connection will be installed between the elevator controller and the BaCnet/Modbus link module(s). If a manufacturer is selected which provides Modbus output, a Modbus to Bacnet converter will be needed at the IP gateway. The output(s) of the link module will be connected back to the BEP network for integration into the Aveva SCADA system.

Each manufacturer may have a limit on the status points monitored, but the list below can be used as a guideline to work from:

1) Group operational mode
2) In/out of service
3) In/out of group service
4) Supervisory failure
5) Location and direction of hall calls
6) Individual car status - expandable menus
7) Direction of travel
8) Independent service
9) Inspection service
10) Fire service
11) Position of elevator
12) Door status (open, opening, closing, closed)
13) Door dwell time
14) Load by-pass
15) Power on/off
16) Door detector
17) Safety circuit

18) Door zone
19) Stop switch
20) Alarm button
21) Registered Car Calls

C. Condition of Equipment

MACHINES

Elevators 3, 4, 7, 8, 11, 13, 18, 19, 22, 24, 26: Appear to be original Otis Elevator machines. Machines have served their useful life. Commutators and seals show signs of wear. Windings visually appear to be in good condition for their age. If machines are retained, commutator truing/cleaning and rewinding of the machines is recommended. We recommend new AC motors using variable voltage variable frequency drives (VVVF) with the new machines. Elevator 19 does not have emergency brake (rope gripper). Recommend new rope grippers with new machines.

Elevators 5, 6, 10, 14, 16: Thyssen 450 machines manufactured by Northern from the 2000-2005 alterations. Machines are in fair conditions. Elevator 5 was not operational on automatic during our survey due to the motor being in need of repair. These machines are in use constantly. Machines are rated for 200 FPM which is high-speed for large capacity elevators. Recommend replacement of all motors if machines are retained. If machines are replaced, recommend VVVF drives and AC motors for new machines.

Elevator 31: Hollister-Whitney 44-OD machine from the 2005 alterations. Machine is in good condition. Suitable for reuse with upgraded controls. If the machine will be replaced by a hydraulic power unit and complete replacement would be required.

CONTROLS

Elevators 3 – 8, 10, 11, 13, 14, 16, 18, 22, 24, 26 have Motion Control Engineering (MCE) IMC series controls with SCR drives from the 2000-2005 alterations. These controllers do not have the required circuits for features such as phone line monitoring modern Firefighters' Service features. A new microprocessor control system is recommended. Design will be a non-proprietary type controller. Drives have served their useful life and have started to fail due to age. Existing drives have to be repaired when they fail since these model drives are no longer manufactured. Recommend new controls with VVVF drives in conjunction with new machines. If machines are retained, new controls should have SCR drives.

Elevator 31 has MCE VFMC-1000 series controls with VVVF drive from the 2005 alteration. The controller does not have the required circuits for features such as phone line monitoring modern Firefighters' Service features. A new microprocessor control system is recommended. Design will be a non-proprietary type controller.

CAR RAILS

See Table 2.3 for rail sizing data. Suitable for reuse. Clean and Paint. Recommend verification of bracket spacing and loading on existing elevator systems in conjunction with structural analysis. Elevator 19 may require additional rail brackets and/or rail reinforcement when it is upgraded.

CAR AND COUNTERWEIGHT BUFFERS

Elevators 3, 4, 7, 8, 11, 13, 18, 22, 24, and 26 have original Otis oil buffers in the pit and original gravity return oil buffers attached to the counterweights. Recommend replace with new oil buffers in conjunction with alterations due to age.

Elevators 5, 6, 10, 14, and 16 have oil buffers from the 2000-2005 alterations. Buffers are suitable for reuse unless loading type and/or capacity of system is changed.

Elevator 19 has original spring buffers. Replace with new oil buffers in conjunction with alterations.

Elevator 31 has spring buffers. Suitable for reuse. If alternate 7 is chosen, new buffers will be required.

CAR SLINGS

Elevators 3, 4, 7, 8, 11, 13, 18, 19, 22, 24, 26, and 31 appear to have the original Otis sling, frame and platform members with original sheaves. Recommend minimum replacement of all car top and deflector sheave bearings with new. Elevator 19 will need a new sling and platform for the new elevator system. Slings and platforms are suitable for reuse for the other elevators. If alternate 7 is chosen, new sling and platform will be required for elevator 31. Note: elevators equipped with emergency brakes require a 48” car apron (toe guard) on the entrance sides of the platform. We did not observe any platforms with 48” aprons. Recommend installation of 48” aprons on all elevators equipped with emergency brakes.

Elevators 5, 6, 10, 14, and 16 have slings and platforms from the 2000-2005 alterations. Slings and platforms are suitable for reuse unless loading type and/or capacity is changed. Note: elevators equipped with emergency brakes require a 48” car apron (toe guard) on the entrance sides of the platform. We did not observe any platforms with 48” aprons. Recommend installation of 48” aprons on all elevators equipped with emergency brakes.

SAFETIES AND GOVERNORS

Elevators 3, 4, 7 and 8 have the original Otis 14D flexible guide clamp safeties. Recommend replace with new safeties due to age. The safeties are activated by Hollister-Whitney Model 201 governors from the 2000-2005 alterations.

Elevators 5, 6, 10, 14, and 16 have the “Thyssen B40” type B safeties per Fujitec drawings. Suitable for reuse. Elevators 5, 6, 14, and 16 safeties are activated by Hollister-Whitney Model 205 governors from the 2000-2005 alterations. Elevator 10 has Hollister-Whitney model 206 governor. Models 205 and 206 governors are now obsolete and stopped being manufactured by Hollister-Whitney around 2012. Recommend governor replacements.

Elevators 11, 13, 18 have Hollister-Whitney Model 480 type B safeties from the 2000-2005 alterations. The safeties are activated by Hollister-Whitney model 201 governors from the alterations. Suitable for reuse.

Elevator 19 has the original Otis safeties from the 1930s installation. Activation of the safeties is by an original Otis flyball-type governor. Replace with new for any alterations.

Elevators 22, 24, and 26 have the original Otis type B safeties. These safeties require a manual reset of the safety device by a geared “key”. The access to this reset is in the middle each elevator cab. Recommend replacement of safeties with Type B self-resetting safeties. The safeties are activated by Hollister-Whitney model 202 governors.

Elevator 31 have the original Otis instantaneous (Type A) safeties. Recommend replace with new safeties due to age. The safeties are activated by Hollister-Whitney Model 207 governors from the 2005 alterations.

HOIST ROPES

Due to the age and usage of the equipment we recommend replacement of hoist ropes with any alterations. Compensation ropes (elevators 3, 4, 7,8) should be replaced with new. See Table 2.5 for number of hoist ropes for each elevator and hoist rope diameter.

COUNTERWEIGHT

Elevators 3, 4, 7, 8, 11, 13, 18, 19, 22, 24, 26, and 31 appear to have the original Otis counterweight assemblies. Elevator 19 counterweight does not have sufficient space for rebalancing with a new car sling and platform. Replace elevator 19 counterweight frame and weights. All others are suitable for reuse.

Elevators 5, 6, 10, 14, and 16 have counterweight frames from the 2000-2005 alterations. Suitable for reuse.

CAR AND COUNTERWEIGHT GUIDES

Guide type is listed in Table 2.5. Roller guides are all spring-loaded, adjustable guides suitable for smooth operation. Suitable for reuse but recommend roller replacements if guide assemblies are reused.

Elevators 5, 6, 10, 14, and 16 slide guides appear to be from 2000-2005 alterations. Suitable for reuse but recommend new inserts be installed if retained.

Elevators 31 appears to have the original Otis slide guide assemblies. Suitable for reuse. If new safeties are installed, recommend replacement of guide assemblies.

CAR ENCLOSURE

Elevators 3, 4, 7, 8, 11, 13, 18, 22, 24, 26, and 31 cab shells appear to be from original installation. The cab interior hung panels and finishes appear to have

been upgraded. Shells suitable for reuse. New cab interior panels and finishes are recommended. Flooring appears to be an applied rubber tile type. New flooring is recommended in conjunction with new cab interiors.

Elevators 5, 6, 10, 14, and 16 have textured stainless-steel walls and matte white steel ceilings from the 2000-2005 alterations. Suitable for reuse. Cab flooring is steel diamond plate with protective 6” high guards welded to the floor. Suitable for reuse.

Elevators 19 has painted steel walls from the car floor to ceiling. The ceiling is of perforated metal. Replace enclosures with new, solid metal enclosures. New cab shell and new platform are required with any alteration.

DOOR OPERATORS

Elevators 3, 4, 7, 8, 10, 11, 13, 18, 22, 24, 26, and 31 have GAL Manufacturing MOVFR door operators. These door operators are heavy-duty, harmonic door operators from the 2000-2005 alterations. Clutches and systems are showing signs of wear. Recommend replacement with new, similar, harmonic-type operators.

DOOR CONTROLS

Elevators 5, 6, 14, 16, and 19 do not have door operators on the elevator but have separate door controls in the machine rooms to operate the bi-parting freight doors. Existing door controls are dated and do not have modern features. Recommend replacement with new PLC style door controls. Door control manufacturer is to be the same as the manufacturer of the hoistway doors. Elevators 5, 6, 14 and 16 have Peelle door controls. Elevator 19 has Security (now known as Courion) door controls.

HOISTWAY DOOR HARDWARE

Elevators 3, 4, 7, 8, 10, 11, 13, 18, 22, 24, 26, and 31 from 2000-2005 alterations. Recommend minimum replacement of hanger rollers, gibs, door closers, and pick-up rollers.

Elevators 5, 6, 14, and 16 door tracks, chains and hardware from 2000-2005 alterations. Replace with new of same manufacturer of hoistway doors.

Elevator 19 recommend replace with new in conjunction with complete elevator alterations.

HOISTWAY DOOR PANELS

Elevators 3, 4, 7, 8, 11, 13, 18, 22, 24, 26, and 31 from 2000-2005 alterations. There are different door manufacturers for each set of elevators. Hoistway doors are finished with brushed stainless-steel. Suitable for reuse. Recommend cohesion of finishes from hall fixtures, doors and cab finishes. If stainless- steel is not preferred, recommend replacement of hoistway doors.

Elevators 10 has painted steel doors from the 2000-2005 alteration. Suitable for reuse. If finish of doors is to be changed, recommend replacement.

Elevators 5, 6, 14, and 16 have Peelle doors. Suitable for reuse. Recommend replacement of astragals.

HOISTWAY DOOR FRAMES

Original painted steel frames. Remove loading ramps and added hardware for ramp chains from door frames. Retain and recondition any damaged sections and paint color approved by BEP. Verification of new loading on existing frame by structural engineer due to change to C-1 loading required for elevator 19.

HOISTWAY AND MACHINE ROOM WIRING

Replace all wiring with new. New wiring between machine room and the car and traveling cables to be provided in conjunction with the new controller installation.

OPERATING AND SIGNAL DEVICES

Present car and hall fixtures are dated in appearance, functionality and circuitry. The car panels should be replaced with a durable attractive design that can withstand heavy use and provide long life illumination of the buttons. Present hall fixtures are flush mounted adjacent to the landing entrance frames and new hall fixtures with matching designs and functionality should be specified to replace existing fixtures. Add independent riser (swing car operation) to elevators 14 and 16. Add additional risers at each landing for elevators 22, 24, 26.

D. Machine Room, Hoistway and Pit Conditions (Work by trades other than the Division 14 subcontractor)

MACHINE ROOM

1. A fused disconnect switch or circuit breaker shall be provided for each elevator in the machine room (NFPA 70, Section 620-51).
2. Wiring from source to disconnect required .
3. Enclosed and protected machine room and/or machinery space (A17.1, Sections 2.7.1 and 3.7). Rated and fully enclosed machine room/space.
4. Access to machine room and/or machinery space (A 17.1, Section 2.7.3).
5. Lighting, and convenience outlets of machine room and/or machinery space (A 17.1, Section 2.7.5.1 and NFPA 70, Section 620-23).
6. Machine room and/or machinery space environment to be maintained between 70° F and 90° F and 35% to 60% relative humidity at all times and in all weather conditions. HVAC design to include BTU heat load generated by the operation of the elevator equipment.
   - HVAC not to be located above elevator equipment
   - HVAC not to be within 18” horizontally of any elevator drive machine and any mechanical or electrical equipment
   - HVAC to be above 7’ from machine room floor
   - AC condensate to drain to location outside machine room and hoistway
7. A car light disconnecting means shall be provided for each elevator in the machine room (NFPA 70, Section 620-53). Wiring from source to disconnect required and to new controls.

8. For freight elevators with power operated hoistway doors, a separate branch circuit of adequate size and a fused disconnect switch or circuit breaker shall be provided in the machine room or machinery space.

HOISTWAY

1. Beveled guards or screening are required for projections, recesses and setbacks in the hoistway that project more than 4 in. inside the hoistway on sides not used for loading or unloading. (A 17.1, Section 2.1.6).
2. Supports for guide rail fastening at each floor and/or intermediate supports as required by A 17.1, Section 2.23.9.
3. Recesses, supports, fireproofing and patching, as required, to accommodate hall button boxes, signal fixtures, hoistway entrance frames, etc..
4. Convenience outlet and light fixture in pit with switch located adjacent to the access door (A 17.1, Section 2.2.5 and NFPA 70, Section 620-24).
5. Provide a separate branch circuit supplying the hoistway pit lighting and a minimum of one duplex GFCI receptacles in the pit. Locate receptacle on side wall of the hoistway, at least 3 feet (915 mm) above pit floor.
6. Vertical, noncombustible ladder for each elevator extending 48 in. above the sill of the access door where the pit extends more than 35 in. below the sill of the access door (A17.1, Section 2.2.4).
7. Supports for vertical wireways (NFPA 70, Section 620- 34).
8. Provide a dry pit, and permanent provisions to prevent accumulation of water. Provide Sump and pit sump pump with wiring and piping (A 17.1, Section 2.2.2) Must be 3000/gal per hour.
9. Provide a dedicated simplex receptacle, with GFI protection, to supply the permanently installed sump pump. Mount sump pump receptacle 5 feet (1524 mm) above elevator pit floor.
10. Pit reinforced to sustain vertical forces from guide rails and buffers.
11. Remove or relocated all non-elevator related pipes, ducts, and conduit from hoistways.
12. Hoistway pit lighting to provide a minimum of 10 fc at the pit floor in all areas of the pit. Hoistway lighting design must include a minimum of two lighting fixtures for lighting of the elevator hoistway pit. The fixtures must have a one piece, molded, high-impact clear acrylic diffuser with a secure seal against dust and moisture. A similar fixture must be provided at a minimum of every 10 feet (3 m) vertically up the hoistway. The fixture at the top of the hoistway must be mounted on the ceiling. For control of the hoistway lighting circuit, provide two 3-way switches inside the elevator hoistway, at a height of 4 feet (1.2 m) above the top and bottom elevator landings. Mount the switches on the hoistway wall, adjacent to the hoistway entrance strike jamb. The lower-level lighting switch must be located adjacent to the hoistway pit access ladder.
13. Provide a separate branch circuit supplying the hoistway pit lighting and a duplex GFCI receptacle in the pits.

HOISTWAY ENTRANCES

1. Support for sills the full width of door opening.
2. Furnishing, installing and maintaining the required fire rating of elevator hoistway walls, including the penetration of fire wall by elevator fixture boxes.

GENERAL REQUIREMENTS

1. Fire alarm initiating devices (NFPA 72) in the elevator lobbies and machine room(s) including wiring to the terminals of the elevator controllers for firefighters' service, (A 17.1, Section 2.27.3.2).
2. Where sprinklers are provided, shunt trip disconnects required for each elevator main power and emergency power, if provided.
3. Where sprinklers are provided, sprinkler line flow control switches required to activate shunt trip disconnect.
4. Telephone, visual monitoring system or means within the car for communications with or signaling to an accessible point outside the hoistway, or central exchange system, or an approved emergency service (A17.1, Section 2.27.1, A 117.1 and ABA).
5. Emergency communications systems. Provide dedicated elevator communication service line for each elevator adjacent to each elevator controller. Indicate outlets on telephone riser
6. Separate, dedicated branch circuits with fused disconnect or breaker in the machine room for each of the following: 120 VAC elevator cab lighting and receptacles; elevator cab HVAC equipment circuit, if provided; elevator pit sump pump power and control
7. All necessary wiring, conduit and labor from the elevator hoistways for elevator monitoring panels that are required for security, life safety, or fire requirements that are provided for the elevator

ELECTRIC ELEVATOR ADDITIONAL REQUIREMENTS

1. Hoisting beam, trap doors or other means of access to machine room of adequate size for maintenance and equipment removal purposes (A 17.1, Section 2.7.3.4)
2. Supports for machinery and/or sheave beams (A 17.1, Section 2.9).
3. Wall pockets and patching after beams are in place, if needed.
4. Construction of machine room and/or machinery space floors (A 17.1, Section 2.1.3)

E. PERFORMANCE

Summary of Findings

The relative elevator motion control efficiency for the elevators based upon our PERFORMANCE TEST SUMMARY SHEETS (below) are as follows:

Well-adjusted elevators with premium maintenance should operate in the 80-90% range for motion control efficiency. A majority of the elevators were in this range, with half of the elevators approaching the 90% efficiency rating. Elevator 4 was the lowest performing elevator at 79.4% efficiency. Elevator 4 rating was primarily due to long starting time.

The elevators have door open times and door close times longer than the NEII industry standards. Building management should be consulted before setting times since building conditions and special passenger needs should be taken into consideration. If times are decreased, closer to industry standards, the overall efficiency of the elevators will significantly increase.

Elevator speeds were within the standard 10% variance in the up and down directions.

Elevators 22, 26, and 31 do not meet the minimum ABA requirement for acceptable notification time. The minimum hall call notification (or access) time is measured from the time of notification that a call is being answered (the hall lantern illuminates, chimes and is visible from the hall button) until the doors start to close. Hall call door dwell times must be increased to the minimum ABA requirements.

Elevator 31 does not meet the minimum ABA requirement for acceptable Car call door dwell time. Time must be increased to the minimum 3.0 seconds.

Floor to floor times do not meet the standard and need to be adjusted. This is most likely due to the acceleration/deceleration rates and long leveling zones.

Elevators 4, 22, 24, and 26 have vertical vibrations that exceed the 20 milli-g limit.

The elevators were leveling within the ½ inch standard at all floors during the time of our survey.

Acceleration and deceleration should be adjusted to the standards listed. (3.2 feet/sec^2)

The elevators were operating at a combined 85.0% (average) relative elevator motion control efficiency. The elevators have average performance ratings for elevators of this type and operation.

These ratings mean the elevators can deliver more service to the building when adjusted from the present performance average to the standard.

Standards for this equipment are shown on the PERFORMANCE TESTS SUMMARY SHEET. These sheets are for the elevator maintenance company's guidance. This information was obtained from our initial field measurements and calculations from published industry standards. Highlighted sections on PERFORMANCE TESTS SUMMARY SHEETS are those that can be adjusted to increase performance.

PASSENGER ELEVATOR PERFORMANCE ANALYSIS

General

The purpose of this analysis was to review the overall elevator operation and to measure the operation of specific features of the elevator system against standards which have been established either by national codes or elevatoring practices common to the elevator industry.

The components of the systems selected for testing were those most directly related to the safe operation of the elevator and the overall installation, although some items, such as the speed of the elevator and door open and close times are related to the efficiency of the operation and grade of service provided.

Definitions and findings

1. ELEVATOR SPEED

Elevator speed is measured while the elevator makes a full run through the hoistway with a light to moderate load in the car. To check the rated speed (indicated on the crosshead data plate), a full load must be placed in the car. This was not within the scope of this report. For traction elevators, up and down speed should be maintained at the speed specified under all load conditions. Speed should be within 10% of the rated speed in the up direction of travel and within 10% of the rated speed in the down direction of travel for electric elevators of this vintage. New equipment should be within 5% of the rated speed, up or down.

2. DOOR OPEN AND CLOSE TIMES

Measured from the instant the doors begin to open until the doors are fully open and from the instant the doors begin to close until they are stopped.

Door open time should be as fast as possible to provide efficient elevator service. Our recommended door times are based on the fastest speed obtainable with the door operation equipment design while providing smooth operation and long life.

Door operators should close doors at approximately 1 foot per second in accordance with code-stipulated door closing requirements but not be set so long as to interfere with good traffic handling.

Building management should be consulted before setting times since building conditions and special passenger needs should be taken into consideration.

3. NORMAL DOOR HOLD OPEN TIME (HALL CALL= LONG; CAR CALL= SHORT)

Measured from the instant the doors are fully open until the doors begin to close when the car is stopped in response to a hall or car call. The minimum acceptable time from notification that a car is answering a call until the doors of that car start to close is calculated from the following equation: T = D/(1.5 ft/s) or a 5 seconds minimum. Where T equals the total time in seconds and D equals the distance (in feet) from the point in the lobby or corridor 60 inches directly in front of the farthest call button controlling that car to the centerline of its hoistway door.

4. FORCED DOOR CLOSING (NUDGING)

Measured from the instant the doors are fully open until warning buzzer sounds and the doors begin to close at approximately half speed. Activation of this feature tends to keep passengers from holding the doors open for inordinate amounts of time and speeds up service.

5. DOOR PRESSURE

Measured with a spring scale as the hoistway doors attempt to close. The measured value is the pressure required to prevent the door from closing under power. ASME A17.1 Safety Code for Elevators and Escalators requires that door pressure be no more than 30 pounds.

6. FLOOR TO FLOOR TIME (floor to floor)

Floor to floor time is measured from the instant the elevator leaves one floor until the elevator is stopped level with the next successive floor, up or down, and the elevator stops.

7. ACCELERATION, DECELERATION, VIBRATIONS, AND FLOOR STOPPING

The car should level at each landing ± 1/4 inch from the floor. ICC/ANSI A117.1 – 2009 requires leveling within a tolerance of ± 1/2 inch. Acceleration and deceleration should be approximately 3.2 feet/sec^2 for 500 fpm cars, be smooth and have little noticeable transition to attain leveling speed. The values for vibrations front to back and side to side should not exceed 20 milli-g (mg). The vertical vibrations should be no more than 20 mg. Standards for this equipment are shown on the attached Ride Quality Graphs listing each individual elevator in the up and the down directions. These sheets are for the elevator maintenance company's guidance. This information was obtained from our triaxial accelerometer and calculations from published industry standards.

PERFORMANCE TESTS SUMMARY

The following PERFORMANCE TESTS SUMMARY SHEET contains the field readings for performance of the elevator. Comparison of actual to the standards shown for the car indicates the specific areas that need attention. Highlighted areas should be addressed immediately to improve elevator performance. Note that dwell times above

the minimum times were not highlighted since building conditions and special passenger needs should be taken into consideration prior to adjustments.

RIDE QUALITY EVALUATION

Our investigation in this report measured the ride quality of the elevators measured against industry standards. The required adjustments in the elevator system will be identified relative to performance standards recognized in the elevator industry. Ride quality graphs are attached to the end of this report for the elevators listed.

METHODS AND TOOLS

The ride quality measurements for the elevator were obtained by placing an instrument in the center of the elevator platform. The measuring device incorporates three accelerometers in a triaxial arrangement. The vibrations measured are vertical, front to back, and side to side in the elevator. There is also a condenser microphone that records the audio as the elevator moves through the hoistway and operates the doors. The test was conducted with two persons on the car, and it was operated from the lowest level to the highest floor and then returned to the lowest level. The doors were operated normally at each terminal landing. The readings were accumulated on our event recorder and downloaded into our office computer for analysis. Graphs were printed to allow careful analysis of the ride through the hoistway.

STANDARDS

The National Elevator Industry, Inc. (NEII-1 2013) has published acceptable values applicable to elevators for the items tested. The values for vibrations front to back and side to side should not exceed 20 milli-g (mg). The vertical vibrations should be no more than 20 mg. The variance in contract speed should not exceed plus or minus ten percent in the up direction and should not exceed plus or minus ten percent in the down direction. The sound level reading in a running elevator should not exceed 60 dB(A) excluding the passing floor chimes, and the sound level of the door operation should not exceed 64 dB(A), all with a 50 dB(A) ambient level.

PERFORMANCE TESTS SUMMARY SHEET

Building	**Bureau of Engraving and Printing (Main)**	**Date of Test**	**05/15/2024**
		Door Type	**2-speed Side Slide**
		Size	**3'-8"and 8'-0" (10)**
Address	**14th Street, S.W. Washington, D.C.**	**Material**	**Stainless-Steel**
		Operation	**Group Auto**
		Typical Floor Height	**16' - 10"**
		Door Reversal Device	**Infrared**

Installation Date: Unknown
Modification Date: 2000-2005
Elevator equipment installed in compliance with: ANSI A17.1 - 2000

Unit I.D.	Standard	3	4	7	8	10		Action Req'd (Y/N)
Stops		8	8	8	8	5		
Load/Speed		3000 / 500	3000 / 500	3000 / 500	3000 / 500	15000 / 200		
Speed Up (fpm)	500 / 200 (10)	475.9	488.2	487.5	486.5	197.7		N
Speed Down (fpm)	500 / 200 (10)	476.9	488.8	490.7	486.2	197.1		N
Floor - Floor Time (Sec.)	4.9 / 8.3 (10)	6.5	6.3	6.7	6.9	15.0		Y
Door Open (Seconds)	2.6 3.0 (10)	4.4	4.0	5.3	4.9	3.4		Y
Door Close (Seconds)	3.8 5.0 (2)	5.0	5.8	5.6	5.1	5.4		Y
Car Start (Seconds)	0.5	0.8	1.6	0.5	0.5	0.5		Y
Door Force	30# MAXIMUM	23	24	18	20	<30		N
Door Dwell, Long (Sec.)	5.0	7.2	7.3	5.5	5.1	16.0		Y
Door Dwell, Short (Sec.)	3.0	6.7	7.0	5.4	5.9	17.0		Y
Nudging (Seconds)	20 Minimum	30.0	38.4	39.0	23.0	90.0		Y
Accel. Rate (Up/Down)	3.2 ft/sec^2 Maximum	2.9 / 2.9	3.4 / 3.5	3.2 / 3.1	3.0 / 3.0	3.0 / 2.3		Y
Decel. Rate (Up/Down)	3.2 ft/sec^2 Maximum	2.5 / 2.4	3.2 / 3.3	2.9 / 2.7	2.7 / 2.8	2.8 / 2.8		Y
Vibrations (horizontal/ vertical) Avg	20 (25 for #10) ((milli(g))	10.0 / 16.6	11.4 / 27.6	13.9 / 18.0	11.2 / 17.6	8.0 / 22.9		Y
Leveling	+/- ¼"	OK	OK	OK	OK	OK		N
Overall Car Performance Avg. % Variance: Actual vs. Std.		81.8	79.4	87.1	87.6	80.8		

COMMENTS: *Floor to floor measurements to be taken at typical floors about midpoint of travel. Calculate variance of actual readings against standard and record percent. When reading is less than the standard, divide the standard by the reading to obtain percent. If reading is within a permitted range, record as 100. If door force is 30 or below record as 100. If door force is above 30 record as 0. Total calculated per cent columns for each elevator and divide by 14 to determine Overall Car Performance Average. This number represents the Relative Elevator Efficiency to the listed standard. Determine average for the group by totaling the individual car performance averages and dividing by the number of cars in group. The Owner's elevator maintenance company should be advised to take action on any individual elevator item which falls outside standard when Y is checked for the row. Verify with building management long and short door times and impact they may have on passenger transfer, safety and system performance.*

PERFORMANCE TESTS SUMMARY SHEET

Building	**Bureau of Engraving and Printing (Annex)**	**Date of Test**	**05/15/2024**
		Door Type	**2-speed Side Slide**
		Size	**4' - 0"**
Address	**C Street, S.W. Washington, D.C.**	**Material**	**Stainless-Steel**
		Operation	**Group Auto**
		Typical Floor Height	**11' - 5"**
		Door Reversal Device	**Infrared**

Installation Date: Unknown
Modification Date: 2000-2005
Elevator equipment installed in compliance with: ANSI A17.1 - 2000

Unit I.D.	Standard	11	13	18	22	24	26	Action Req'd (Y/N)
Stops		8	8	8	8	5		
Load/Speed		3000 / 500	3000 / 500	3000 / 500	3000 / 500	3000 / 500	3000 / 500	
Speed Up (fpm)	500	475.9	487.8	486.9	486.9	495.2	483.0	N
Speed Down (fpm)	500	477.8	487.2	488.8	487.2	496.5	482.4	N
Floor - Floor Time (Sec.)	4.4	6.5	5.2	5.4	6.3	6.5	5.9	Y
Door Open (Seconds)	2.7	4.4	3.8	4.8	7.0	5.3	5.3	Y
Door Close (Seconds)	4.5	5.9	4.7	6.5	5.6	6.4	5.3	Y
Car Start (Seconds)	0.5	0.5	0.4	0.5	0.5	0.3	0.3	N
Door Force	30# MAXIMUM	17	17	21	19	15	21	N
Door Dwell, Long (Sec.)	5.0	5.0	5.7	5.9	4.2	6.5	3.2	Y
Door Dwell, Short (Sec.)	3.0	5.4	4.9	5.6	4.2	4.5	3.9	Y
Nudging (Seconds)	20 Minimum	46.0	45.0	46.0	28.4	50.4	46.7	Y
Accel. Rate (Up/Down)	3.2 ft/sec^2 Maximum	2.7 / 2.7	3.0 / 3.1	4.9 / 3.3	5.7 / 4.1	4.1 / 3.2	3.0 / 3.2	Y
Decel. Rate (Up/Down)	3.2 ft/sec^2 Maximum	3.2 / 3.1	2.7 / 2.7	2.7 / 2.8	2.6 / 2.7	2.7 / 2.7	2.7 / 2.7	Y
Vibrations (horizontal/ vertical) Avg	20 (milli(g))	11.2 / 19.8	13.7 / 17.0	8.2 / 19.4	12.7 / 30.2	17.0 / 28.8	19.8 / 35.6	Y
Leveling	+/- ¼"	OK	OK	OK	OK	OK	OK	N
Overall Car Performance Avg.% Variance: Actual vs. Std.		88.1	89.6	86.0	82.4	83.7	84.6	

COMMENTS: *Floor to floor measurements to be taken at typical floors about midpoint of travel. Calculate variance of actual readings against standard and record percent. When reading is less than the standard, divide the standard by the reading to obtain percent. If reading is within a permitted range, record as 100. If door force is 30 or below record as 100. If door force is above 30 record as 0. Total calculated per cent columns for each elevator and divide by 14 to determine Overall Car Performance Average. This number represents the Relative Elevator Efficiency to the listed standard. Determine average for the group by totaling the individual car performance averages and dividing by the number of cars in group. The Owner's elevator maintenance company should be advised to take action on any individual elevator item which falls outside standard when Y is checked for the row. Verify with building management long and short door times and impact they may have on passenger transfer, safety and system performance.*

PERFORMANCE TESTS SUMMARY SHEET

Building	**Bureau of Engraving and Printing (Annex)**	**Date of Test**	**05/15/2024**
		Door Type	**2-speed Side Slide**
		Size	**4' – 0"**
Address	**C Street, S.W. Washington, D.C.**	**Material**	**Stainless-Steel**
		Operation	**Group Auto**
		Typical Floor Height	**10' - 6"**
		Door Reversal Device	**Infrared**

Installation Date: Unknown
Modification Date: 2000-2005
Elevator equipment installed in compliance with: ANSI A17.1 - 2000

Unit I.D.	Standard	31			14	16	19	Action Req'd (Y/N)
Stops		2	Freight Data included for information only. Freights do not have industry performance standards other than contract speed/load		9	9	8	
Load/Speed		3000 / 50			15000 / 200	15000 / 200	10000 / 200	
Speed Up (fpm)	50	57.0			200.6	205.1	188.0	N
Speed Down (fpm)	50	59.6			203.5	206.1	164.5	N
Floor - Floor Time (Sec.)	9.9	15.4			8.4	8.5	N/A (Car switch)	Y
Door Open (Seconds)	2.7	3.5			N/A	N/A	N/A	Y
Door Close (Seconds)	4.5	4.4			N/A	N/A	N/A	Y
Car Start (Seconds)	0.5	0.5			N/A	N/A	N/A	N
Door Force	30# MAXIMUM	18			N/A	N/A	N/A	N
Door Dwell, Long (Sec.)	5.0	3.8			N/A	N/A	N/A	Y
Door Dwell, Short (Sec.)	3.0	1.7			N/A	N/A	N/A	Y
Nudging (Seconds)	20 Minimum	46.0			N/A	N/A	N/A	N
Accel. Rate (Up/Down)	3.2 ft/sec^2 Maximum	3.2 / 3.0			2.5 / 2.5	2.7 / 2.8	2.0 / 2.1	N
Decel. Rate (Up/Down)	3.2 ft/sec^2 Maximum	2.2 / 2.2			2.9 / 3.0	3.1 / 3.2	2.8 / 5.2	Y
Vibrations (horizontal/ vertical) Avg	25 (milli(g))	1.6 / 6.7			20.6 / 23.9	12.1 / 14.1	13.1 / 35.3	N
Leveling	+/- ¼"	OK			OK	OK	OK	N
Overall Car Performance Avg. % Variance: Actual vs. Std.		88.8			N/A	N/A	N/A	

COMMENTS: *Floor to floor measurements to be taken at typical floors about midpoint of travel. Calculate variance of actual readings against standard and record percent. When reading is less than the standard, divide the standard by the reading to obtain percent. If reading is within a permitted range, record as 100. If door force is 30 or below record as 100. If door force is above 30 record as 0. Total calculated per cent columns for each elevator and divide by 14 to determine Overall Car Performance Average. This number represents the Relative Elevator Efficiency to the listed standard. Determine average for the group by totaling the individual car performance averages and dividing by the number of cars in group. The Owner's elevator maintenance company should be advised to take action on any individual elevator item which falls outside standard when Y is checked for the row. Verify with building management long and short door times and impact they may have on passenger transfer, safety and system performance.*

SECTION III

ACCESSIBILITY ISSUES

A. SCOPE

We conducted an elevator accessibility survey at the subject building on the passenger elevators serving the general public and employees. The survey was based on the ICC/ANSI A117.1 – 2009 Checklist for determining the level of accessibility of the elevators to persons with disabilities. Comments are included below for consideration regarding general accessibility design and physical state of the present passenger elevators.

We did not conduct an elevator accessibility survey at the subject building on the freight elevators. Only passenger elevators serving the general public and employees must comply with ABA requirements. Freight elevators do not have to comply with ABA.

B. FINDINGS

Elevators 3, 4, 7, 8, 10, 11, 13, 18, 22, 24, 26, 31

1. Hall calls are registered from a riser of hall buttons located adjacent to the elevator entrances. Each group of elevators has individual risers. Note that for the three-car group (22, 24, and 26) there is only one riser at each landing.

2. The elevators are equipped with an early version of firefighters' service and the firefighters' service is in compliance with ASME A17.1- 2000 Safety Code for Elevators and Escalators, including ASME A17.1a-2002 Addenda and ASME A17.1b-2003 Addenda as is referenced in the ABA standards.

3. The elevators are automatic with self-leveling. The elevators were stopping within the code tolerance of ± 1/2".

4. The flush mounted hall buttons are centered at the required 15" to 42" from finished floor with proper illumination, minimum ¾" diameter. New fixtures should be mounted at the correct height and have the code-required separate Elevator Corridor Call Station Pictograph advising not to use elevators in case of fire. We recommend this signage be permanently engraved on the hall button fixtures.

5. The call buttons do have visible signals to indicate when each call is registered and when each call is answered.

6. The elevators have hall lanterns to give the required visual indication that the elevator is making a stop. The elevators have double stroke gongs, that sound once for up twice for down, with minimum 2-1/2 inch lens in the smallest dimension.

7. The present hoistway door jambs do have the Braille installed at each landing. Braille is required to be mounted at 60" to the center of the Braille plate. (Required characters on each side, center of the Braille 60" above the floor with contrasting colors between the background and the raised letters). At the time of

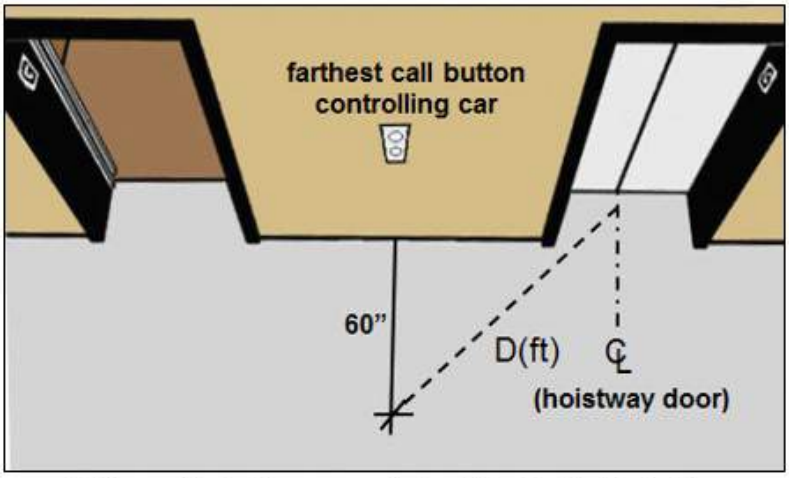
our survey Elevator 8 was missing one Braille plate on floor 2. In the main building there is no Braille installed on the 1G landing.

8. The elevators have non-contact, infrared door reopening devices.

9. For elevators 3, 4, 7, 8, 10, 11, 13, 18, and 31 the minimum door and signal timing is 5.0 seconds from the time the hall lantern chimes for a stop in response to a hall call or when the doors begin to open when there are no hall lanterns.

10. The minimum door and signal timing is variable for elevators 22, 24, and 26 due to the hall button arrangement. The time starts from the time the hall lantern chimes for a stop in response to a hall call or when the doors begin to open when there are no hall lanterns. Times should be adjusted to meet the requirements. Gongs should sound earlier and/or times should be adjusted to provide required minimum times. See below diagram for more information. There is only one riser located between elevators 24 and 26.

Door and Signal Timing (§407.3.4)
Timing begins at audible and visible notification of car arrival based on when the signal becomes visible from the specified location point in front of the call button. At elevators with in-car lanterns, timing begins once doors open wide enough for the signal to be visible from this point.



Minimum timing from car arrival notification to start of door closing: D / 1.5 ft/s (no less than 5 sec.)

11. The minimum door open dwell time in response to a car call should be three seconds. The elevators 3, 4, 7, 8, 10, 11, 13, 18, 22, 24, and 26 exceed the minimum 3.0 seconds car call time. Elevator 31 does not meet the minimum required time (measured at 1.7 seconds). Adjust elevator 31 car call dwell time to 3.0 seconds. Times exceeding 3.0 seconds may be adjusted down to the 3.0 second minimum.

12. Running clearances (distance between car sill and hoistway sill) exceed 1-¼" elevators 3 (floors 2/4), 4 (floor B), 7 (floors 1/1G/3/4/5), 10 (floors 2/4), 22 (floor 1), 24 (floor 7), and 26 (floor B). Recommend installing shims on front of elevator hoistway sills at specific landings to reduce running clearances.

13. Flooring is satisfactory for the type of floor surface required by ABA.

14. Illumination in the cabs is above the minimum of 5 foot-candles for most elevators. Elevator 31 lighting did not have sufficient lighting at the time of our survey.

15. The car controls meet ABA requirements. Raised characters with symbols and Braille designations immediately to the left of the control button to which the designations apply are required.

16. There are car position indicators and passing floor chimes that provided the audible signals (no less than 20 decibels with frequency no higher than 1500 Hz) which sounds as the car passes or stops at a floor.

17. The elevators are equipped with an intercom or a telephone instrument that conforms to the ABA standard. The phones have tactile symbols and characters adjacent to the devices (Character > 5/8” high raised >1/32” upper case serif [block letters] or simple serif type, accompanied by Grade II braille and “PHONE” symbol).

18. Door opening sizes exceed the minimum ABA size.

19. The floor plans of the elevator cab comply with the ABA minimum of 68” x 51” for elevators with side-slide doors. Existing dimensions are listed on Table 2.2 above.

END OF REPORT

ATTACHMENT

COST ESTIMATE

CCI # 1660

Bureau of Engraving and Printing
14th & C Street, SW, Washington DC

Assessment Report Rough Order of Magnitude (ROM) Estimate Update

for

[redacted]

8/23/2024

[redacted]

PROJECT GENERAL NOTES

1. The estimate does not include monies for land costs, & financing costs.

2. The unit prices used in this estimate have been specifically developed for and should only be used for this project. Unit prices used in one part of the estimate may not be interchangeable with those in other sections of this estimate. Prices are based on specific conditions and ratios, such as length to width ratios, which are unique to that part of the estimate for which they were developed. Use of these on other projects could result in substantial errors being made.

3. The unit prices have been developed by using prevailing wage rates and relative productivities. These unit prices should not be used under any circumstances for estimates of general contractors' costs, where such wage rates are not applicable.

4. Evaluation of the owner's project budget, preliminary estimates of construction cost and detailed estimates of construction cost, if any, prepared for this part of the project, represent CCI'S best judgment as a professional familiar with the construction industry. It must be recognized, however, that neither CCI, nor the designer has control over the costs of labor, materials or equipment, over the contractor's methods of determining bid prices, or over competitive bidding, market or negotiating conditions. Accordingly, CCI cannot and does not warrant or represent that bids or negotiated prices for this part of the project will not vary from the owner's project budget or from any estimate of construction cost or evaluation prepared or agreed to by CCI.

5. The general contractor's overhead and profit mark-ups are based on typical owner requirements for standard building construction only. Actual costs may vary based on the owner's special and general requirements.

PROJECT SPECIFIC NOTES

1. The estimate is based on a Design-Bid-Build environment in which the Owner will be selecting from General Contractors bidding and managing subcontractors to complete the project.
2. We assume the General Contractors will be receiving a minimum of three subcontractor bids from each trade
3. Subcontractor overhead and profit mark-ups are included in the estimate.
4. Escalation is included at 4.5% per annum, for 3 years.
5. The estimate includes a 20% design contingency .
6. The unit prices in the estimate include local sales taxes as applicable.

PROJECT SPECIFIC NOTES Cont.

7. Projects have been priced as stand alone projects.
8. Wage rates and material prices have been adjusted for this specific project and project location.
9. The estimate is based on mobilizing and demobilizing once per contractor. All work to be performed at standard times.
10. The estimate is based on awarding a lump sum, with continuous construction duration.
11. The estimate is not based on a prediction of the lowest bid possible. The estimate is our determination of the probable market value for the construction of the project assuming that the general contractor and subcontractors will seek the reimbursement of their direct and indirect costs and include a reasonable profit in their bids.
12. CCI makes no representation with regard to the accuracy nor content of the information received to prepare the estimate and cannot accept any legal responsibility or liability for any errors or omissions.
13. The estimate is based on information received from Northarrow including drawings and narratives, as noted on the pages following the cost estimate breakdown sheets.
14. The estimate assumes that existing utility and equipment infrastructure is sufficient to support the new modifications
15. Detailed scope of work was very limited in this study, estimator used best judgement to determine potential costs
16. The following is a list of items not included in the estimate :
    - Independent testing and inspection services
    - Utility company fees
    - LEED requirements
    - Third Party Commissioning
      Major MEP system Replacements/Upgrades - limited MEP scope of study included - additional investigations required
    - Removal of owners equipment and furnishings prior to construction start
    - FF&E, Equipment and Furnishings
    - FF&E, Equipment and Furnishings
    - Additions to building
    - Historical Elements

Assessment Report Rough Order of Magnitude (ROM) Estimate Update

The following plans were used to develop this estimate.	Received
Narratives	
Existing Conditions Report	7/1/2024

ATTACHMENT

RIDE QUALITY GRAPHS

[redacted]

Filename: OX85FHTP.VE2
Trigger Time: 12:50:02
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	6.5	7.3	18.4	33.5
A95	4.1	4.1	11.0	6.9

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	60.7	79.1	67.0	79.1
L Aleq	56.5	64.6	57.2	60.7

Performance	Max	95	Average
Velocity (ft/min)	475.9	475.9	
Jerk (ft/s^3)	5.278		
Acceleration (ft/s^2)	2.905	2.865	2.615
Deceleration (ft/s^2)	2.510	2.405	2.173
Distance Travelled (ft)	84.7		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	7.3	20.0	36.73
Max Vertical Vib. ISO (milli(g))	18.4	20.0	91.84
Max Jerk (ft/s^3)	5.278	8.000	65.972
Max Velocity (ft/min)	475.9	500.0	95.2
Max Acceleration (ft/s^2)	2.905	3.200	90.768
Max Sound Level dB(A)	60.7	60.0	+0.7 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000003
Start/Stop	B, 1, 1G, 2 - 5
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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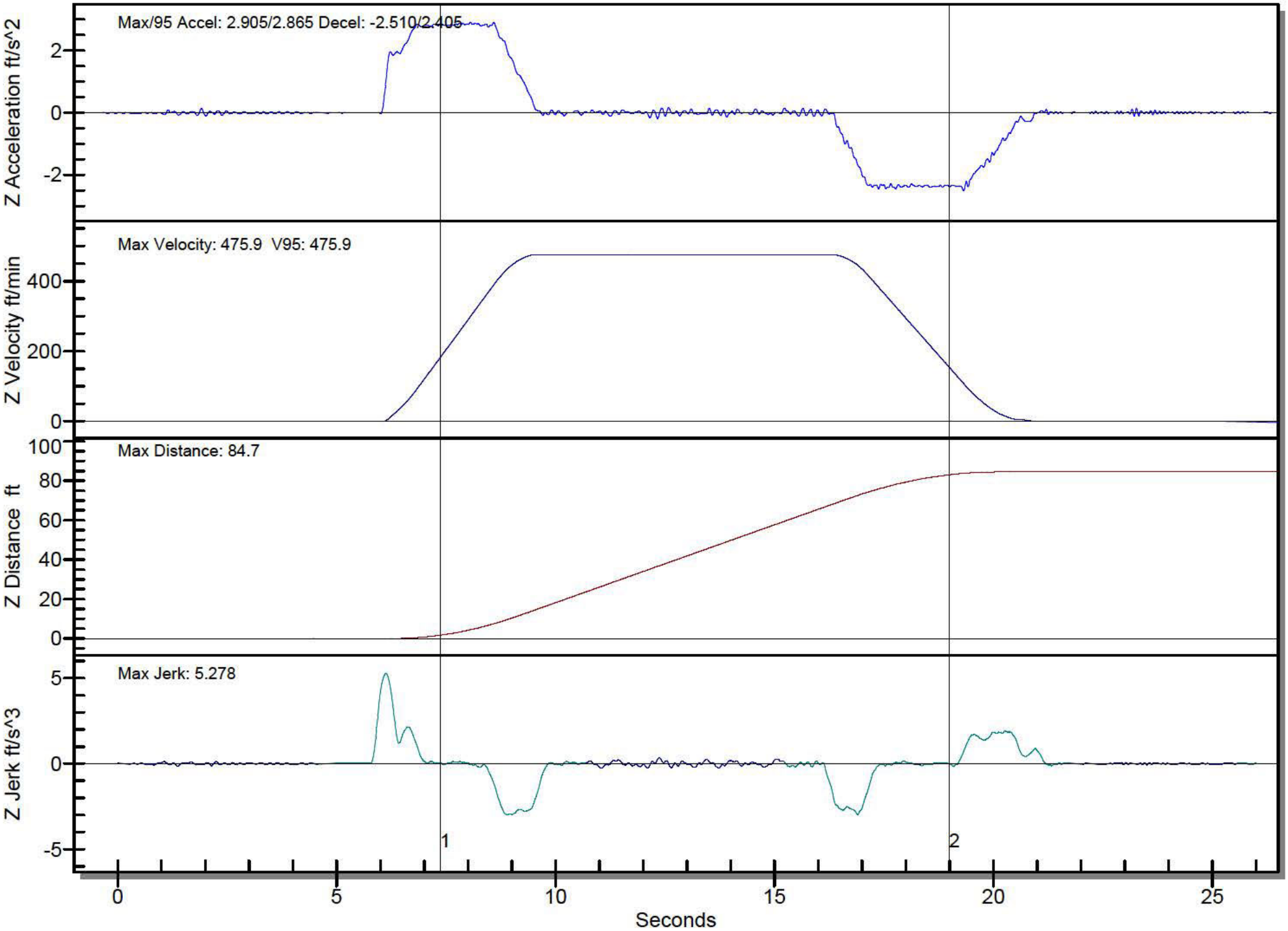
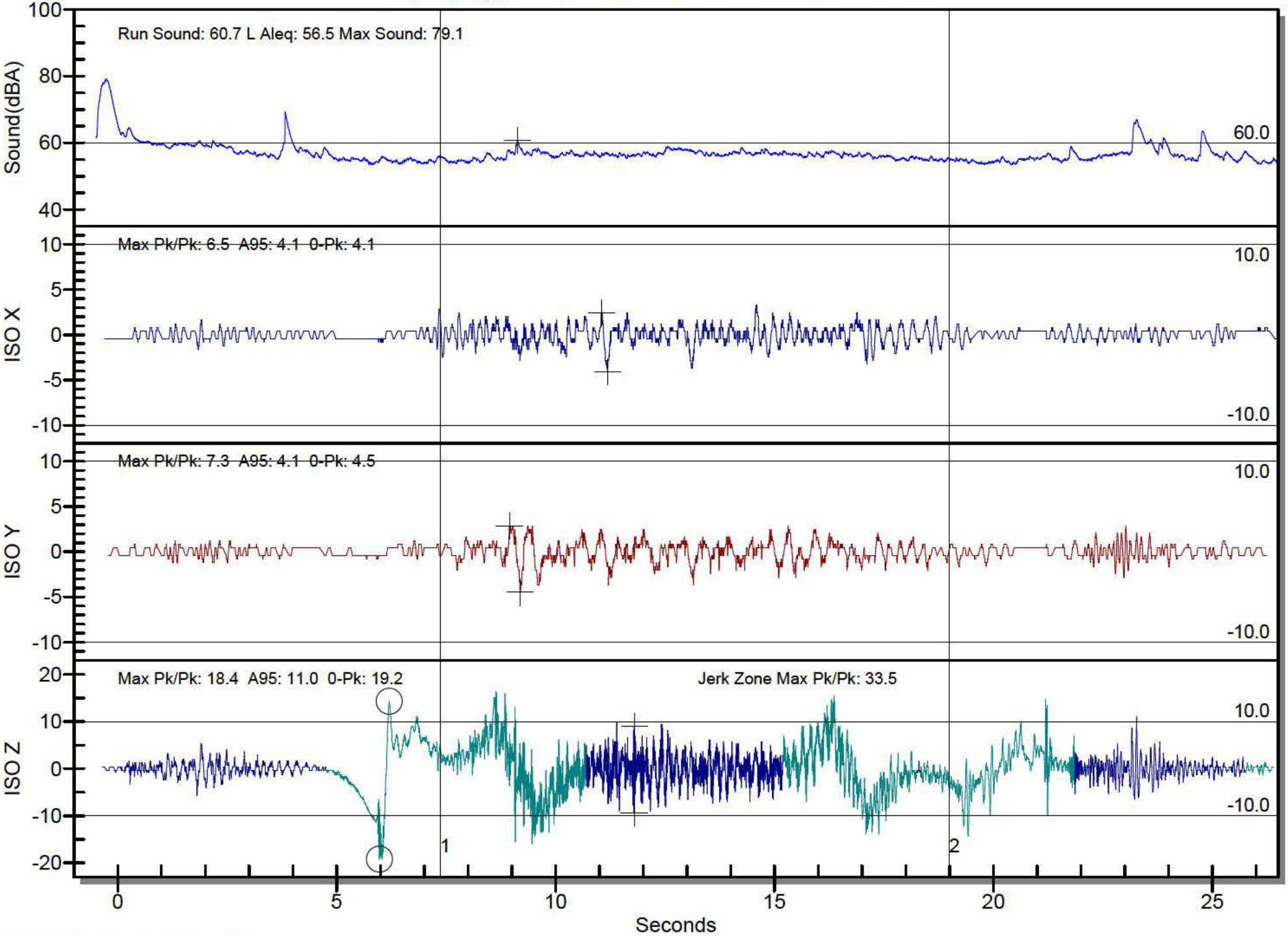
Bureau of Engraving and Printing Elevator 000003

Units: milli(g) File: OX85FHTP.VE2 12:50:02 05/15/24



Bureau of Engraving and Printing Elevator 000003

Units: milli(g) File: OX85FHTP.VE2 12:50:02 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FHV4.VE2
Trigger Time: 12:51:45
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	6.5	12.7	14.7	20.4
A95	3.7	6.1	10.2	5.3

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	75.0	66.2	67.8	75.0
L Aleq	58.7	57.1	60.4	58.7

Performance	Max	95	Average
Velocity (ft/min)	476.9	476.9	
Jerk (ft/s^3)	4.783		
Acceleration (ft/s^2)	2.891	2.865	2.609
Deceleration (ft/s^2)	2.431	2.418	2.180
Distance Travelled (ft)	85.0		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	12.7	20.0	63.27
Max Vertical Vib. ISO (milli(g))	14.7	20.0	73.47
Max Jerk (ft/s^3)	4.783	8.000	59.787
Max Velocity (ft/min)	476.9	500.0	95.4
Max Acceleration (ft/s^2)	2.891	3.200	90.357
Max Sound Level dB(A)	75.0	60.0	+15.0 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000003
Start/Stop	B, 1, 1G, 2 - 5
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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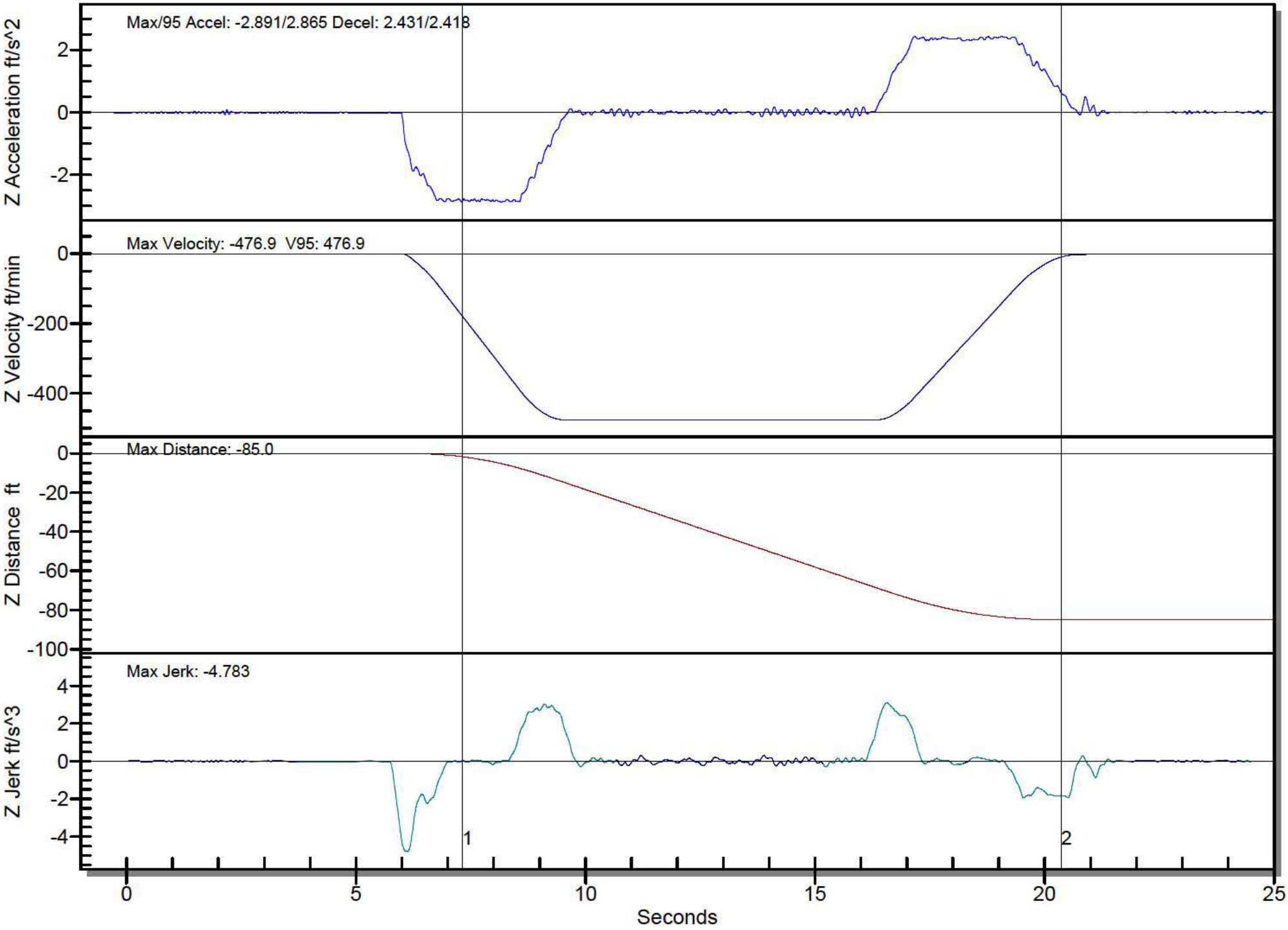
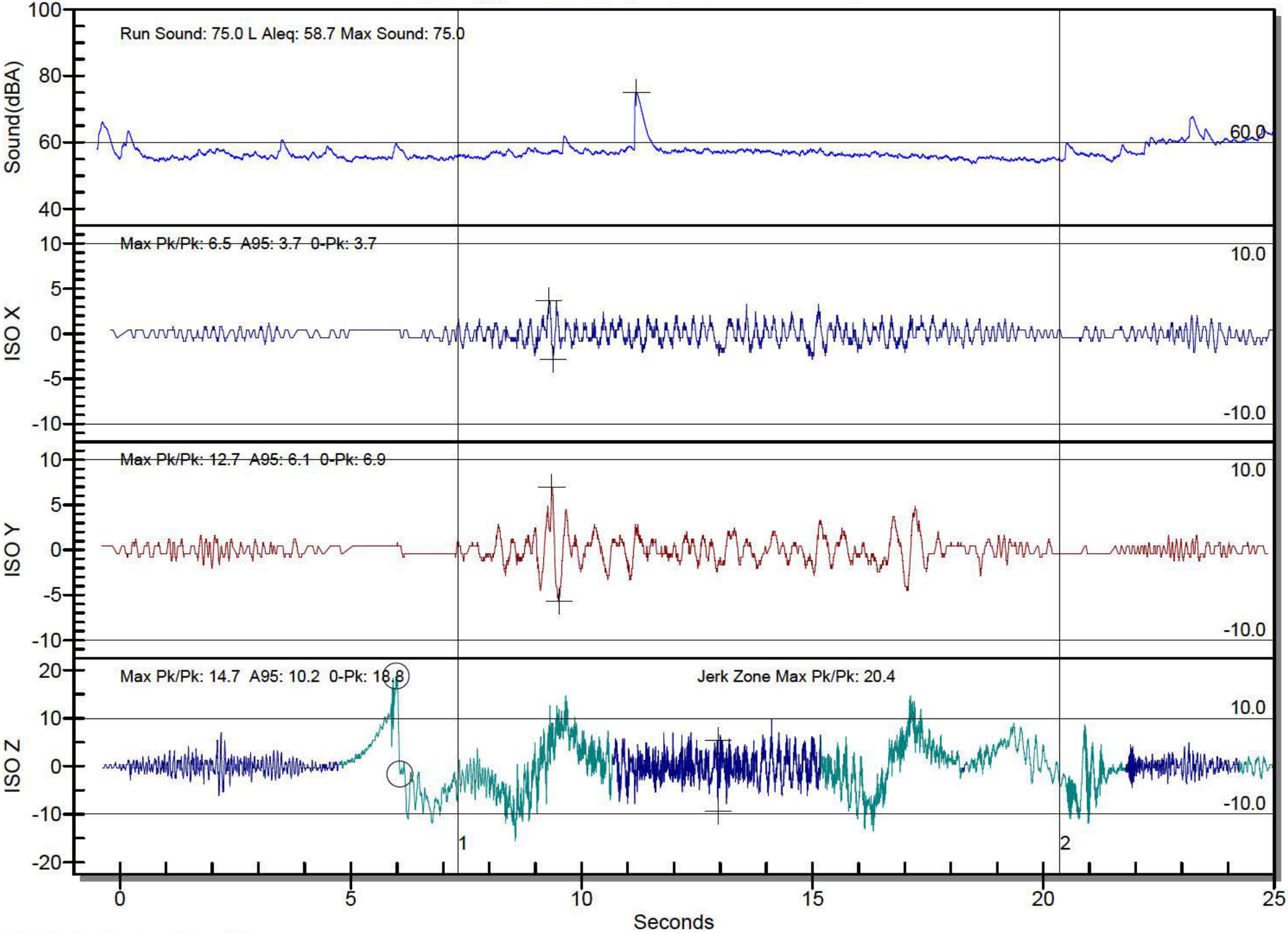
Bureau of Engraving and Printing Elevator 000003

Units: milli(g) File: OX85FHV4.VE2 12:51:45 05/15/24



Bureau of Engraving and Printing Elevator 000003

Units: milli(g) File: OX85FHV4.VE2 12:51:45 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85GISL.VE2
Trigger Time: 13:31:54
Trigger Date: 05/16/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	6.1	10.6	29.4	24.5
A95	4.1	5.7	18.8	9.8

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	66.6	73.4	55.2	73.4
L Aleq	60.2	60.2	52.0	59.3

Performance	Max	95	Average
Velocity (ft/min)	488.2	488.2	
Jerk (ft/s^3)	4.420		
Acceleration (ft/s^2)	3.470	3.443	3.100
Deceleration (ft/s^2)	3.220	3.167	2.726
Distance Travelled (ft)	84.8		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	10.6	20.0	53.06
Max Vertical Vib. ISO (milli(g))	29.4	20.0	146.94
Max Jerk (ft/s^3)	4.420	8.000	55.252
Max Velocity (ft/min)	488.2	500.0	97.6
Max Acceleration (ft/s^2)	3.470	3.200	108.429
Max Sound Level dB(A)	66.6	60.0	+6.6 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000004
Start/Stop	B, 1 - 7
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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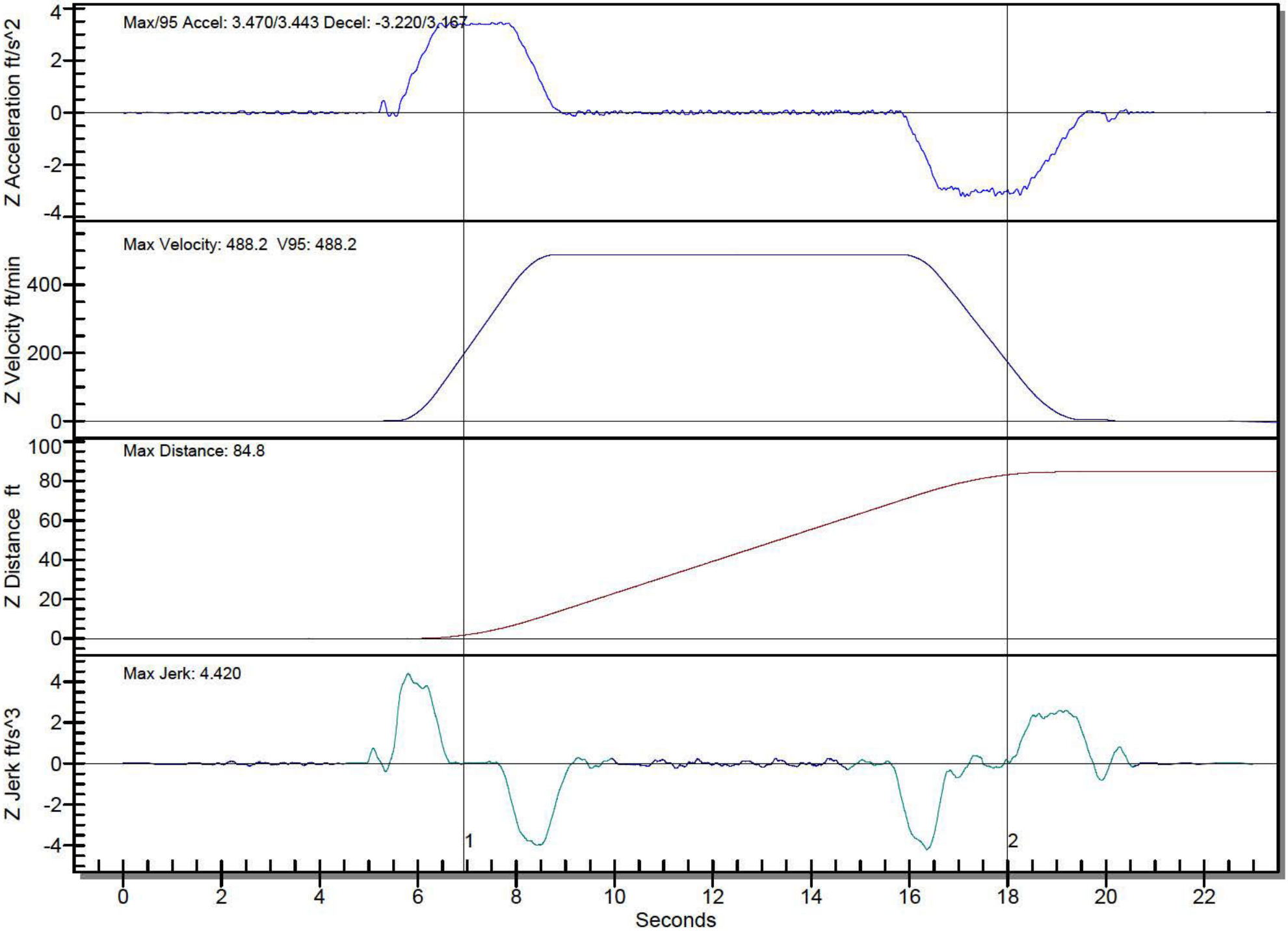
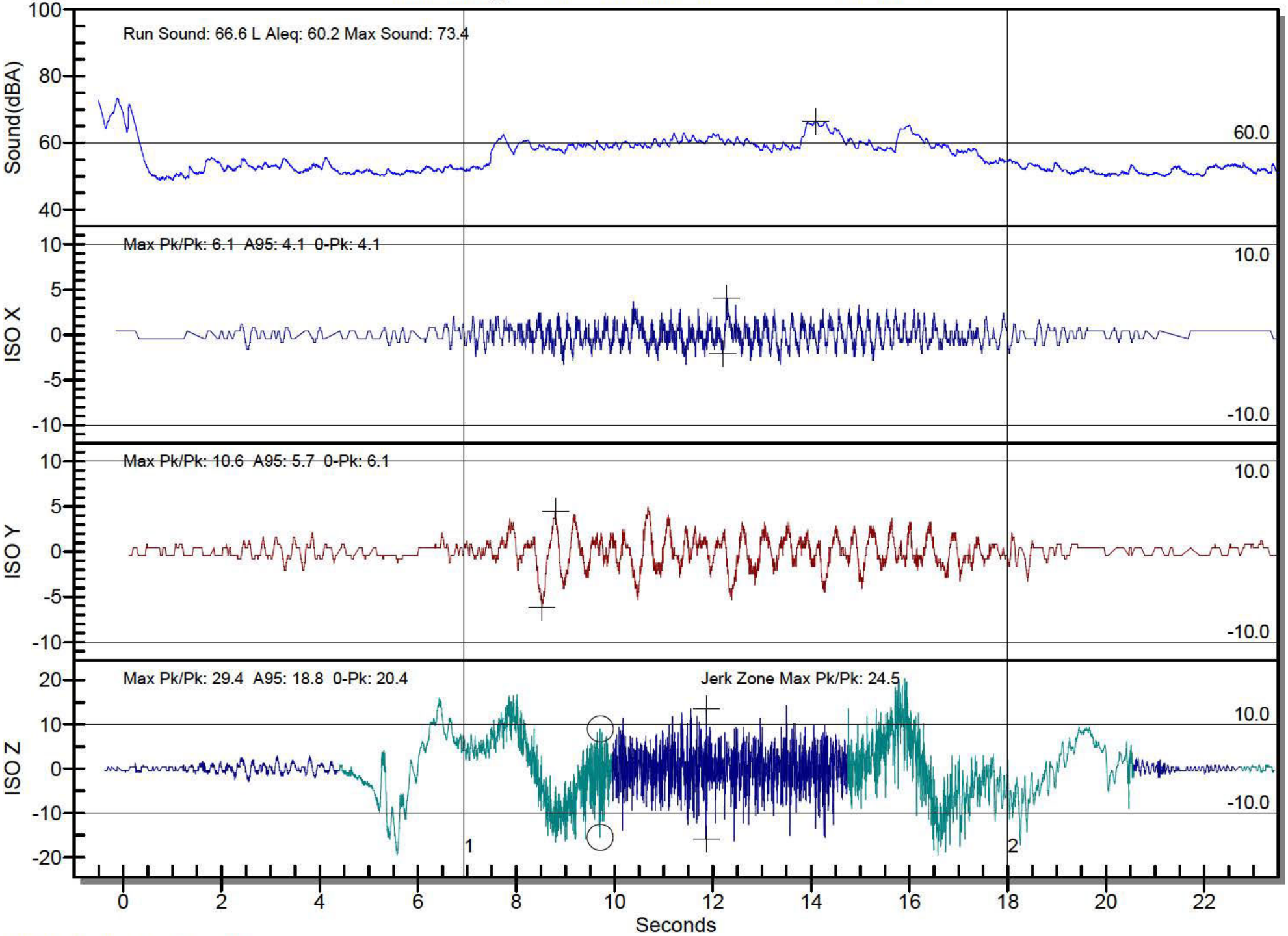
Bureau of Engraving and Printing Elevator 000004

Units: milli(g) File: OX85GISL.VE2 13:31:54 05/16/24



Bureau of Engraving and Printing Elevator 000004

Units: milli(g) File: OX85GISL.VE2 13:31:54 05/16/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85GITD.VE2
Trigger Time: 13:32:51
Trigger Date: 05/16/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	7.3	12.2	25.7	34.3
A95	5.7	6.9	18.4	8.6

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	63.6	74.3	61.9	74.3
L Aleq	58.5	61.8	52.1	59.3

Performance	Max	95	Average
Velocity (ft/min)	488.8	488.8	
Jerk (ft/s^3)	5.443		
Acceleration (ft/s^2)	3.483	3.457	3.129
Deceleration (ft/s^2)	3.286	3.181	2.736
Distance Travelled (ft)	85.0		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	12.2	20.0	61.22
Max Vertical Vib. ISO (milli(g))	25.7	20.0	128.57
Max Jerk (ft/s^3)	5.443	8.000	68.034
Max Velocity (ft/min)	488.8	500.0	97.8
Max Acceleration (ft/s^2)	3.483	3.200	108.839
Max Sound Level dB(A)	63.6	60.0	+3.6 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000004
Start/Stop	B, 1, 1G, 2 - 5
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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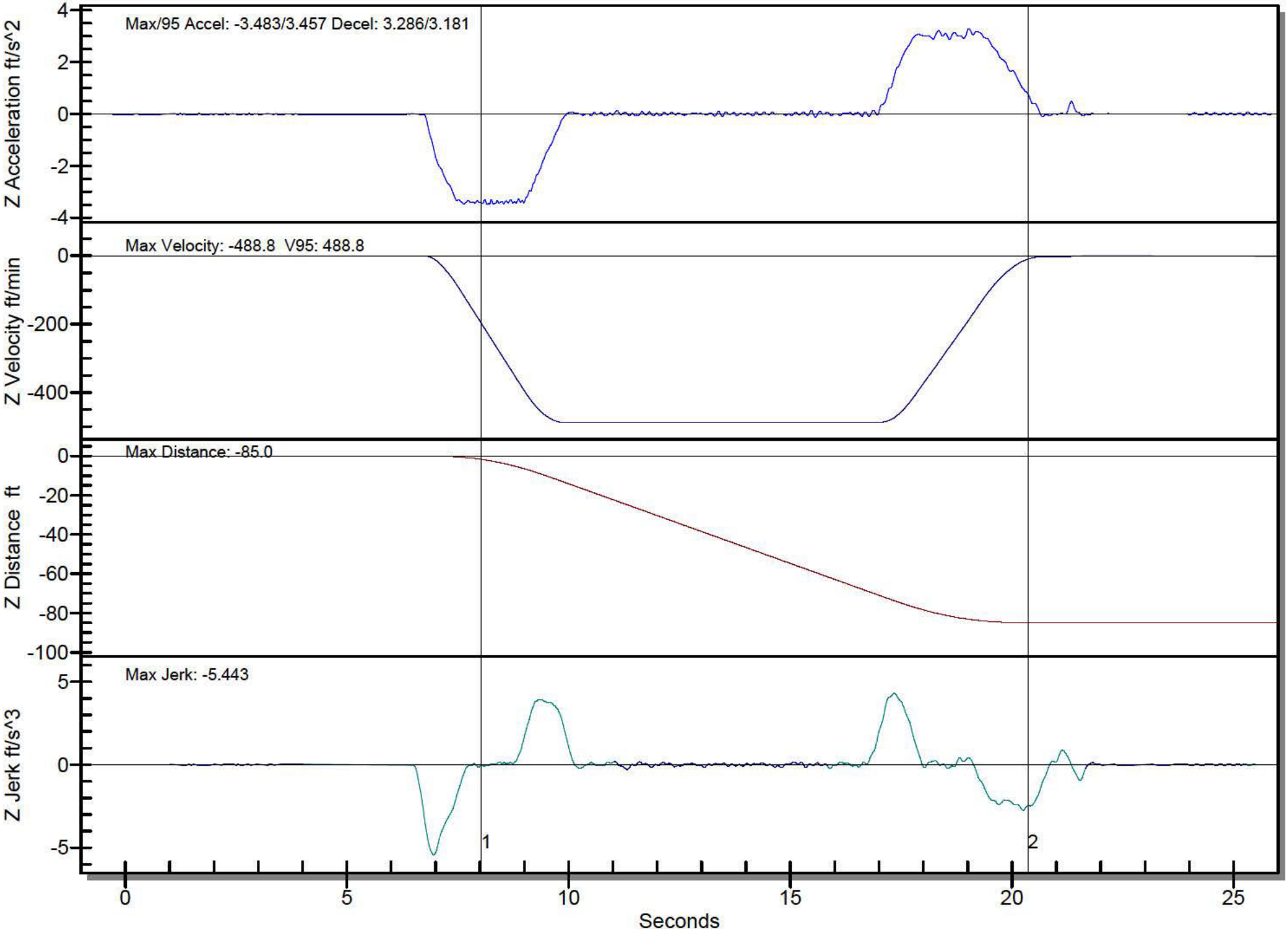
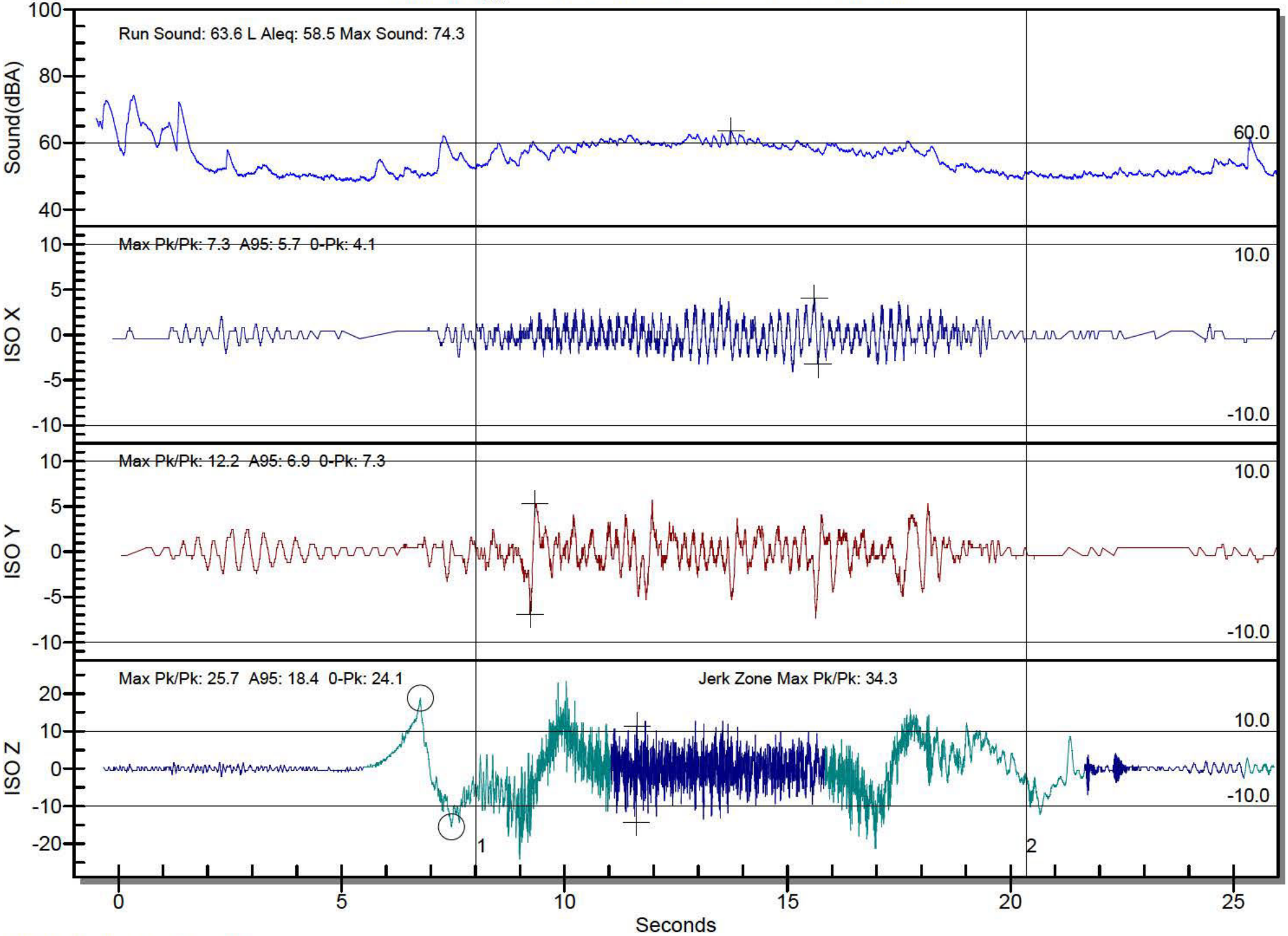
Bureau of Engraving and Printing Elevator 000004

Units: milli(g) File: OX85GITD.VE2 13:32:51 05/16/24



Bureau of Engraving and Printing Elevator 000004

Units: milli(g) File: OX85GITD.VE2 13:32:51 05/16/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FG3Y.VE2
Trigger Time: 11:35:56
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	7.8	13.5	16.3	46.9
A95	5.7	6.5	12.2	6.9

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	64.3	74.1	65.9	74.1
L Aleq	60.0	61.6	63.4	61.7

Performance	Max	95	Average
Velocity (ft/min)	487.5	487.5	
Jerk (ft/s^3)	4.255		
Acceleration (ft/s^2)	3.181	3.102	2.714
Deceleration (ft/s^2)	2.852	2.642	2.271
Distance Travelled (ft)	84.8		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	13.5	20.0	67.35
Max Vertical Vib. ISO (milli(g))	16.3	20.0	81.63
Max Jerk (ft/s^3)	4.255	8.000	53.190
Max Velocity (ft/min)	487.5	500.0	97.5
Max Acceleration (ft/s^2)	3.181	3.200	99.393
Max Sound Level dB(A)	64.3	60.0	+4.3 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000007
Start/Stop	B, 1, 1G, 2 - 5
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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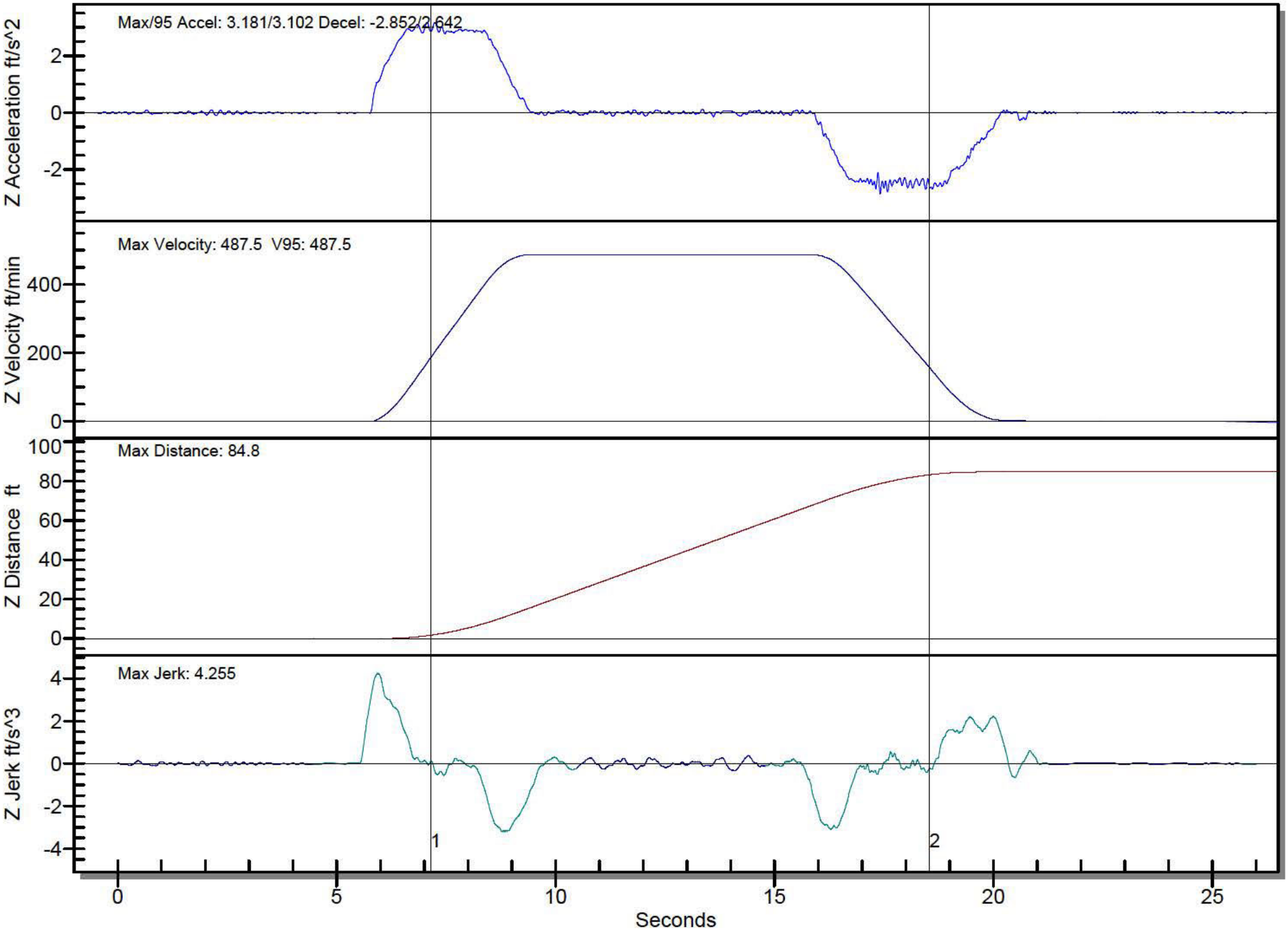
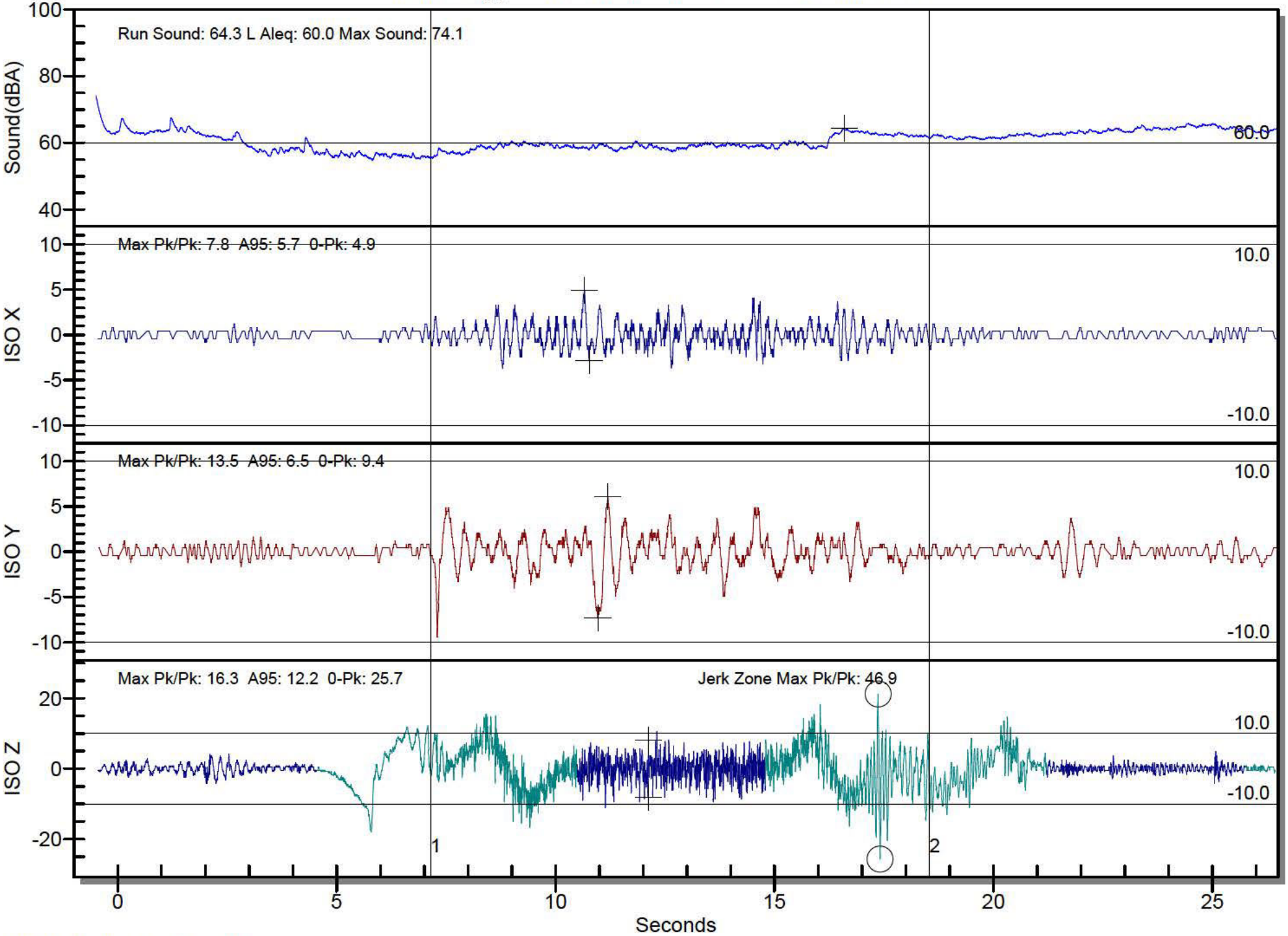
Bureau of Engraving and Printing Elevator 000007

Units: milli(g) File: OX85FG3Y.VE2 11:35:56 05/15/24



Bureau of Engraving and Printing Elevator 000007

Units: milli(g) File: OX85FG3Y.VE2 11:35:56 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FG52.VE2
Trigger Time: 11:37:16
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	10.2	14.3	19.6	26.9
A95	4.9	6.9	14.7	6.5

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	60.6	65.6	66.6	66.6
L Aleq	58.5	58.0	61.2	59.2

Performance	Max	95	Average
Velocity (ft/min)	490.7	490.7	
Jerk (ft/s^3)	4.816		
Acceleration (ft/s^2)	3.141	3.062	2.716
Deceleration (ft/s^2)	2.734	2.642	2.339
Distance Travelled (ft)	85.1		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	14.3	20.0	71.43
Max Vertical Vib. ISO (milli(g))	19.6	20.0	97.96
Max Jerk (ft/s^3)	4.816	8.000	60.199
Max Velocity (ft/min)	490.7	500.0	98.1
Max Acceleration (ft/s^2)	3.141	3.200	98.161
Max Sound Level dB(A)	60.6	60.0	+0.6 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000007
Start/Stop	B, 1, 1G, 2 - 5
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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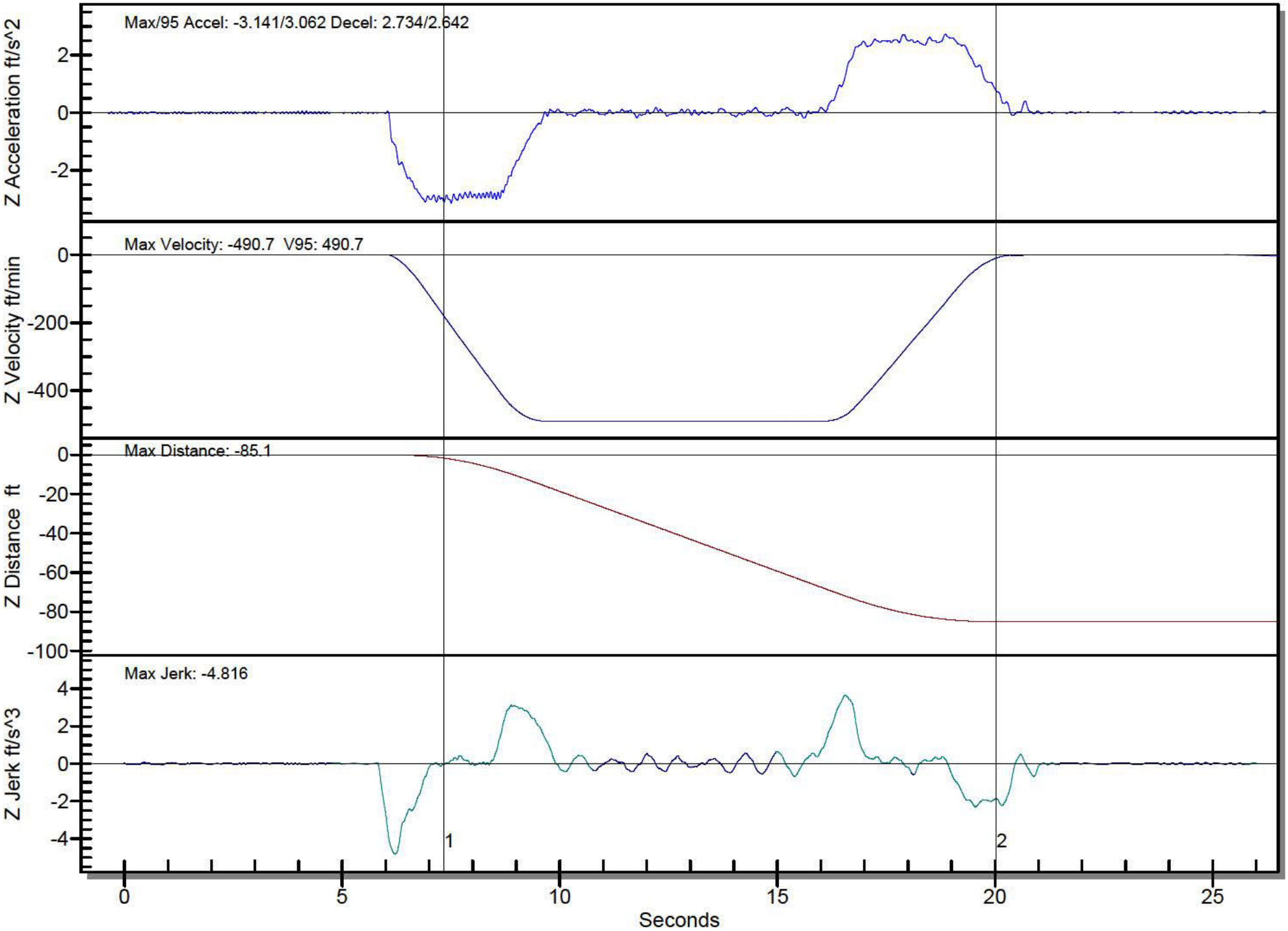
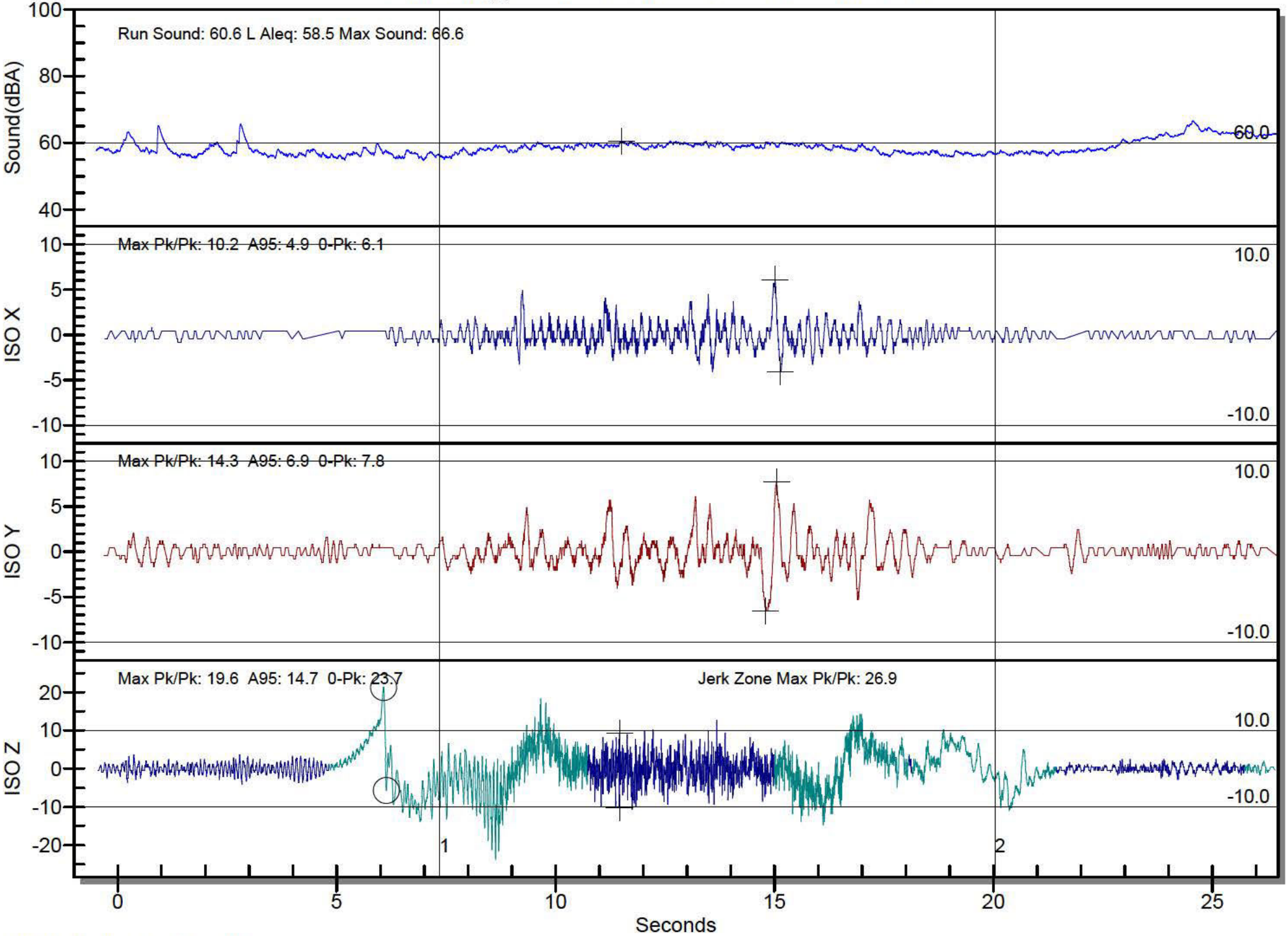
Bureau of Engraving and Printing Elevator 000007

Units: milli(g) File: OX85FG52.VE2 11:37:16 05/15/24



Bureau of Engraving and Printing Elevator 000007

Units: milli(g) File: OX85FG52.VE2 11:37:16 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FFB2.VE2
Trigger Time: 11:01:16
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	9.4	12.2	18.4	22.0
A95	6.9	6.5	13.1	7.8

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	69.9	64.1	76.9	76.9
L Aleq	59.4	59.5	64.2	61.3

Performance	Max	95	Average
Velocity (ft/min)	486.5	486.5	
Jerk (ft/s^3)	4.816		
Acceleration (ft/s^2)	2.997	2.957	2.685
Deceleration (ft/s^2)	2.734	2.602	2.296
Distance Travelled (ft)	84.9		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	12.2	20.0	61.22
Max Vertical Vib. ISO (milli(g))	18.4	20.0	91.84
Max Jerk (ft/s^3)	4.816	8.000	60.199
Max Velocity (ft/min)	486.5	500.0	97.3
Max Acceleration (ft/s^2)	2.997	3.200	93.643
Max Sound Level dB(A)	69.9	60.0	+9.9 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000008
Start/Stop	B, 1, 1G, 2 - 5
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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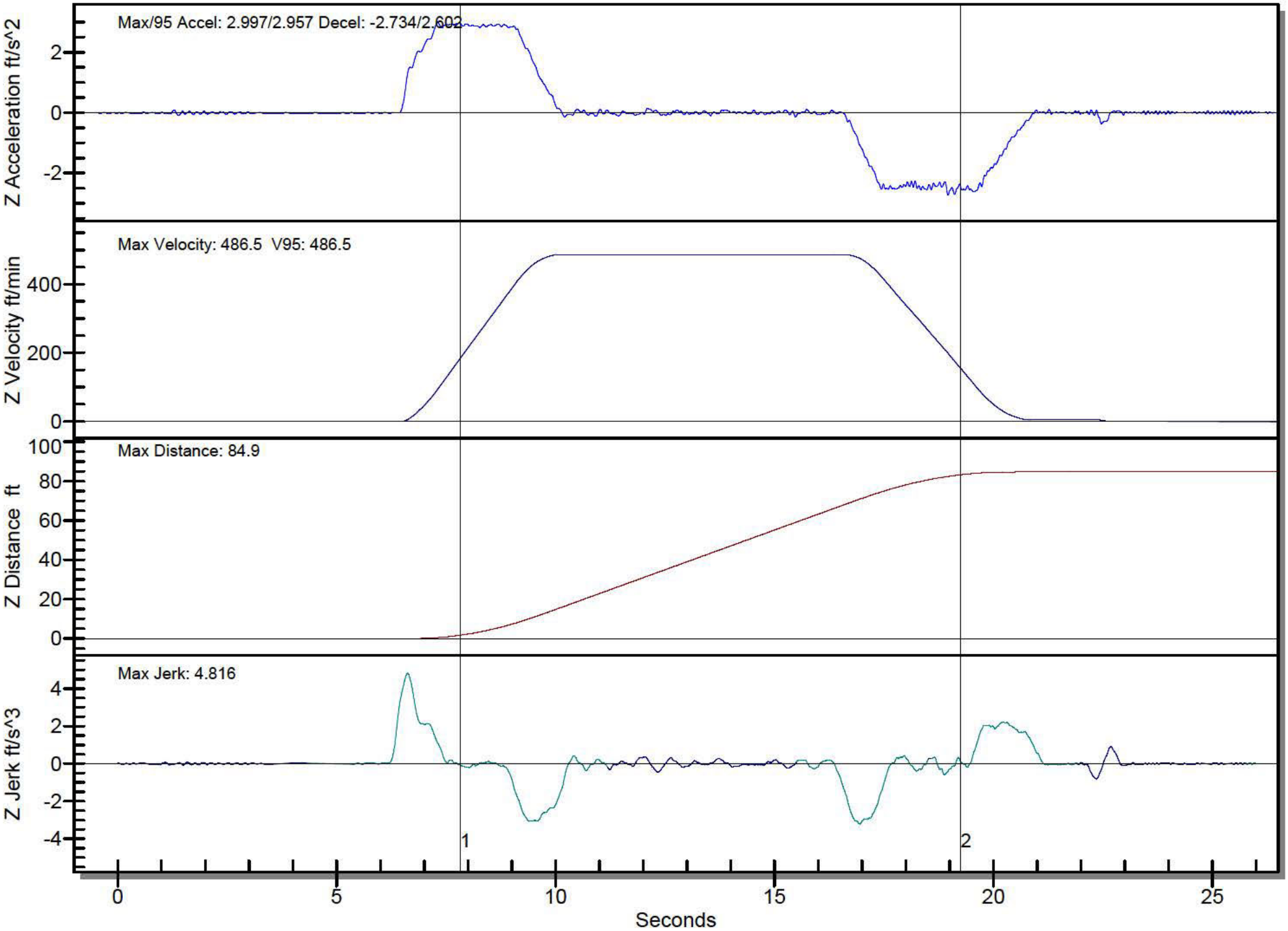
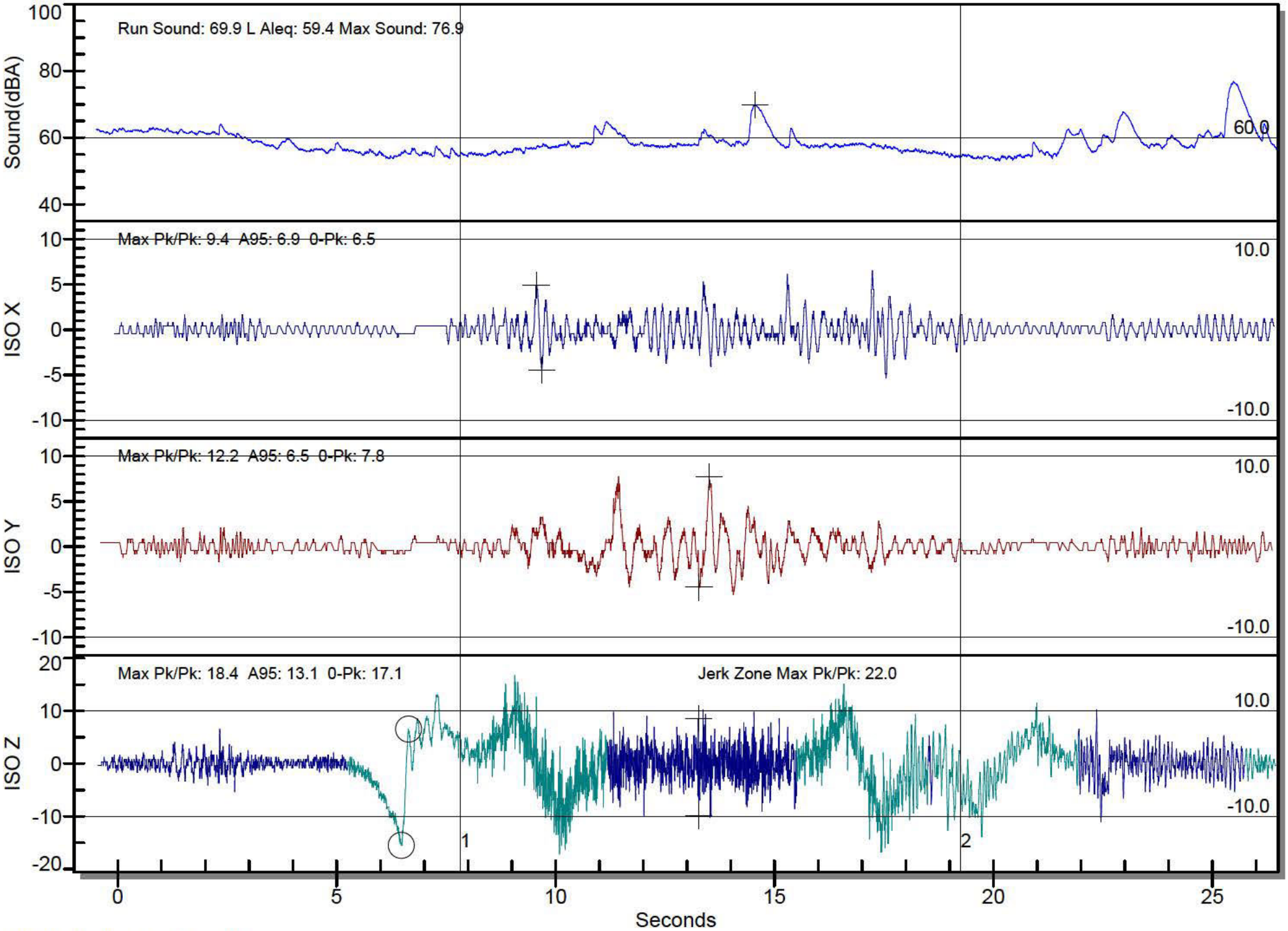
Bureau of Engraving and Printing Elevator 000008

Units: milli(g) File: OX85FFB2.VE2 11:01:16 05/15/24



Bureau of Engraving and Printing Elevator 000008

Units: milli(g) File: OX85FFB2.VE2 11:01:16 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FFC4.VE2
Trigger Time: 11:02:33
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	10.2	10.2	16.7	19.2
A95	5.3	6.5	11.0	5.3

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	64.0	65.0	66.3	66.3
L Aleq	57.3	56.5	61.5	58.6

Performance	Max	95	Average
Velocity (ft/min)	486.2	486.2	
Jerk (ft/s^3)	3.694		
Acceleration (ft/s^2)	3.036	2.983	2.675
Deceleration (ft/s^2)	2.773	2.602	2.295
Distance Travelled (ft)	85.1		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	10.2	20.0	51.02
Max Vertical Vib. ISO (milli(g))	16.7	20.0	83.67
Max Jerk (ft/s^3)	3.694	8.000	46.180
Max Velocity (ft/min)	486.2	500.0	97.2
Max Acceleration (ft/s^2)	3.036	3.200	94.875
Max Sound Level dB(A)	64.0	60.0	+4.0 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000008
Start/Stop	B, 1, 1G, 2 - 5
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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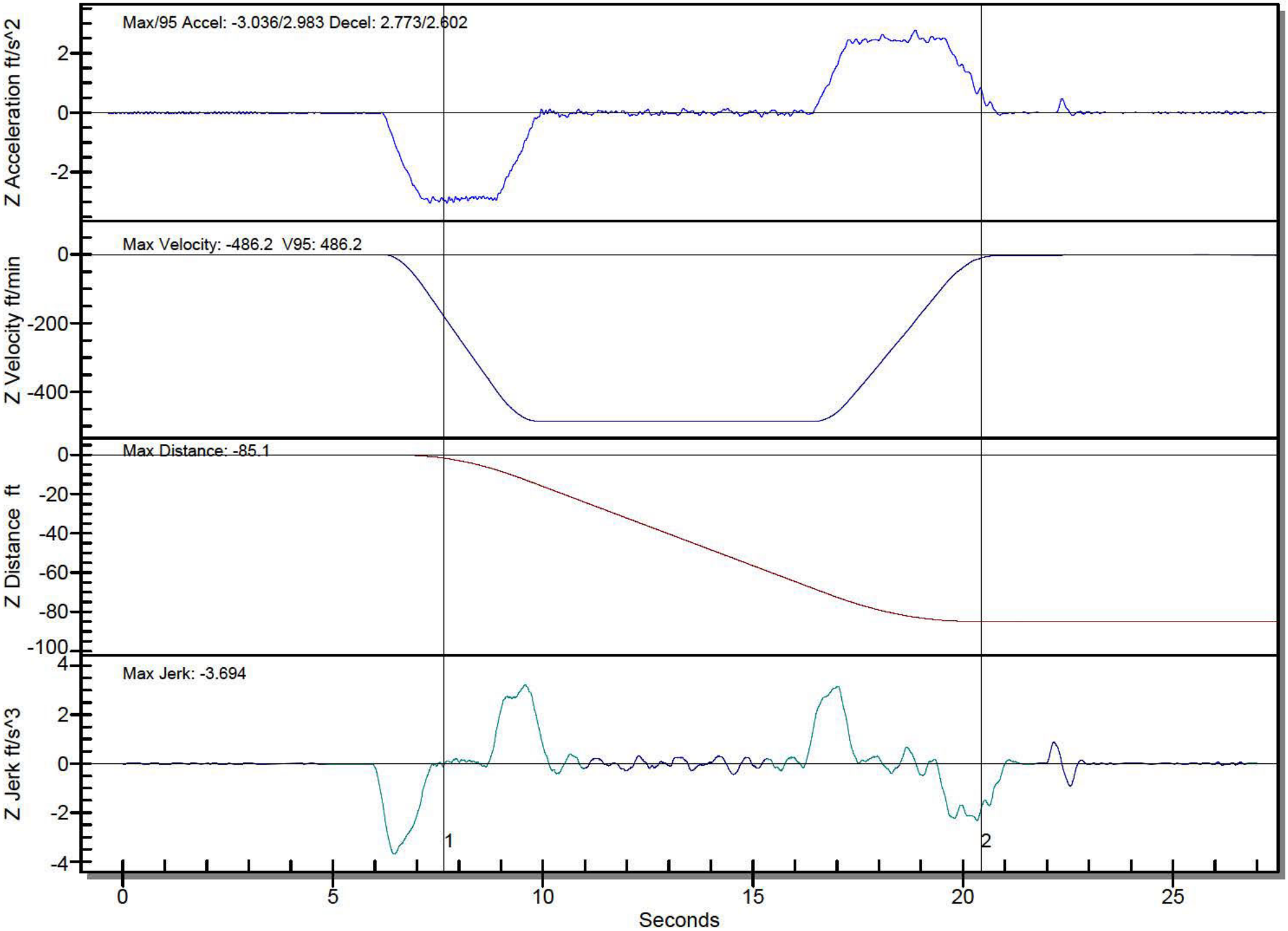
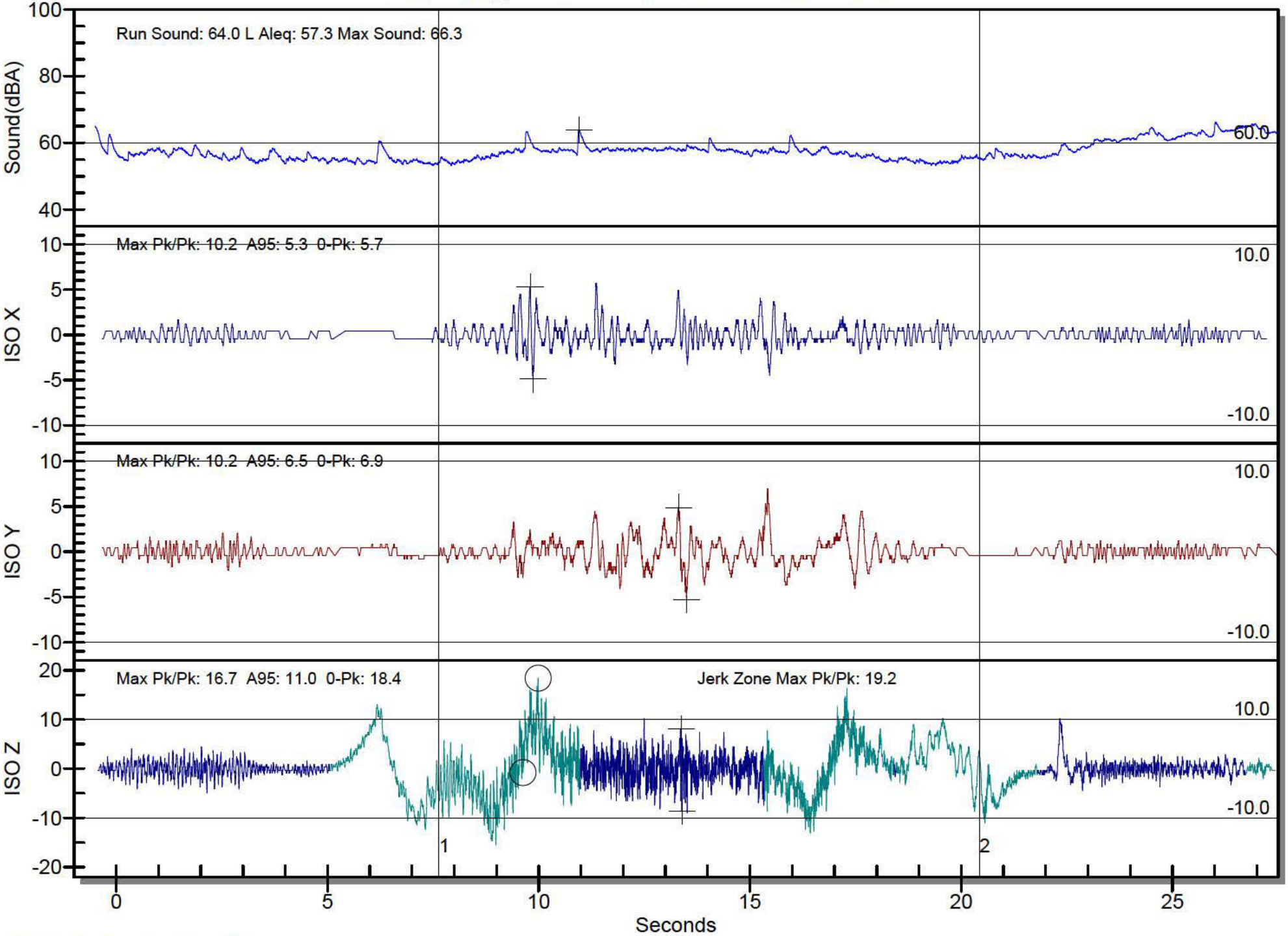
Bureau of Engraving and Printing Elevator 000008

Units: milli(g) File: OX85FFC4.VE2 11:02:33 05/15/24



Bureau of Engraving and Printing Elevator 000008

Units: milli(g) File: OX85FFC4.VE2 11:02:33 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FCVP.VE2
Trigger Time: 09:16:27
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	6.5	9.0	19.6	95.9
A95	1.6	3.3	13.9	9.0

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	70.1	69.7	66.0	70.1
L Aleq	63.9	62.3	62.0	63.2

Performance	Max	95	Average
Velocity (ft/min)	197.7	196.4	
Jerk (ft/s^3)	5.245		
Acceleration (ft/s^2)	3.023	2.615	1.783
Deceleration (ft/s^2)	2.839	2.773	1.367
Distance Travelled (ft)	67.0		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	9.0	25.0	35.92
Max Vertical Vib. ISO (milli(g))	19.6	25.0	78.37
Max Jerk (ft/s^3)	5.245	12.000	43.706
Max Velocity (ft/min)	197.7	200.0	98.9
Max Acceleration (ft/s^2)	3.023	2.800	107.959
Max Sound Level dB(A)	70.1	60.0	+10.1 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000010
Start/Stop	5 Stops, 5 front
Comments	ThyssenKrupp/Payne Machine
Comments	MCE Controls
Comments	15000# at 200 FPM

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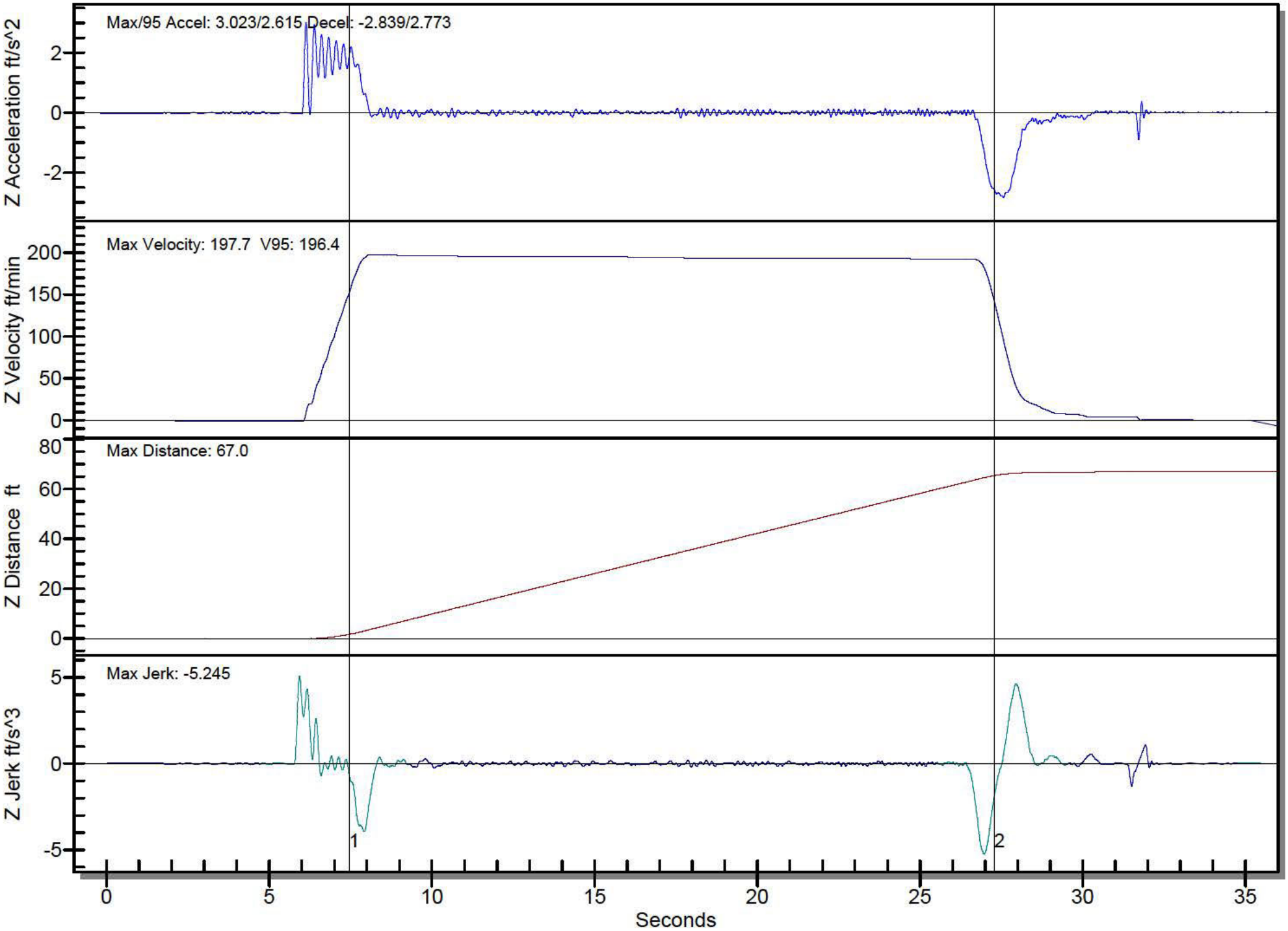
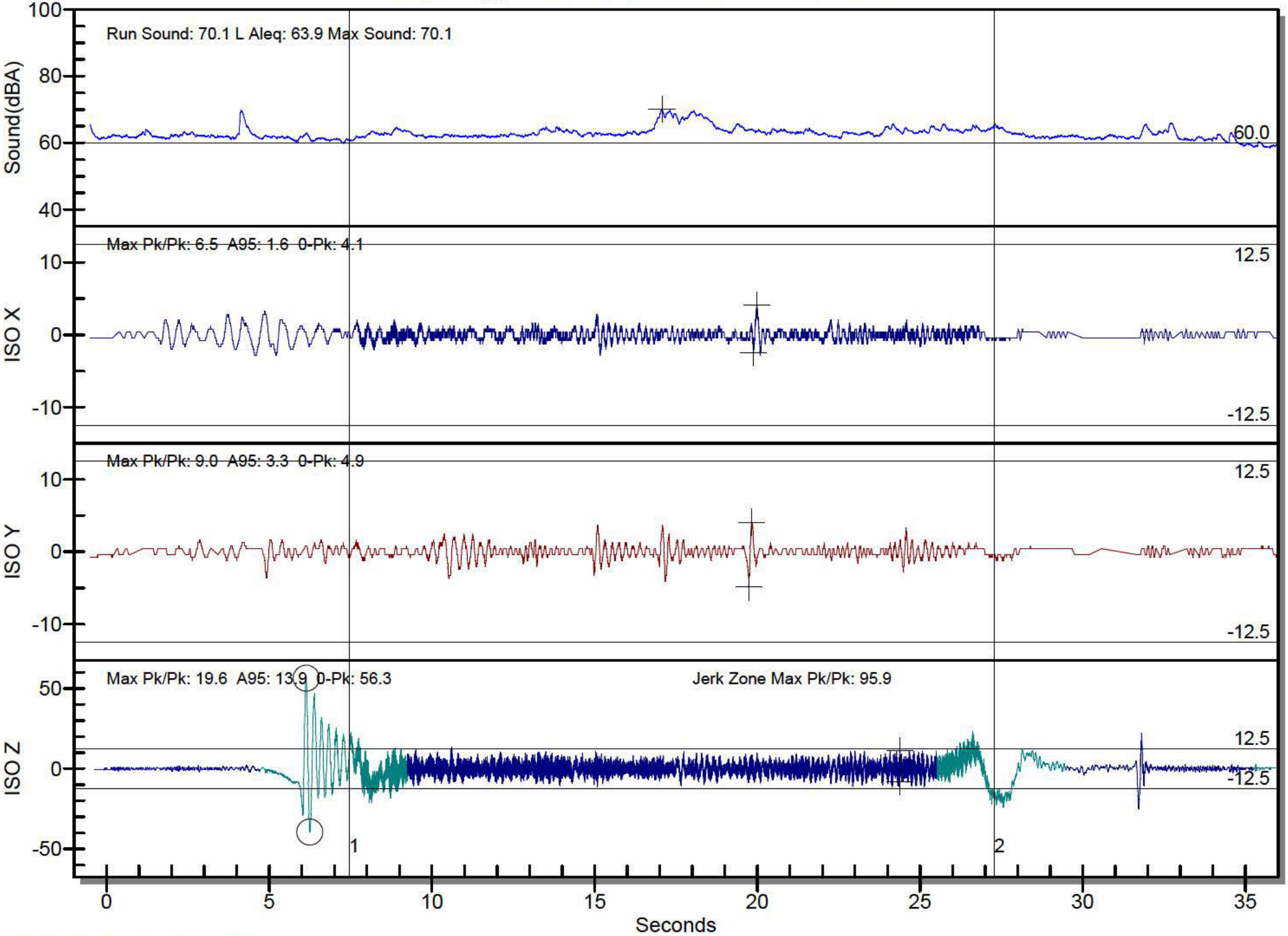
Bureau of Engraving and Printing Elevator 000010

Units: milli(g) File: OX85FCVP.VE2 09:16:27 05/15/24



Bureau of Engraving and Printing Elevator 000010

Units: milli(g) File: OX85FCVP.VE2 09:16:27 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FCWQ.VE2
Trigger Time: 09:17:41
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	6.1	6.9	26.1	55.9
A95	2.0	2.4	18.4	18.0

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	65.9	65.2	67.6	67.6
L Aleq	63.3	61.6	63.6	63.0

Performance	Max	95	Average
Velocity (ft/min)	197.1	197.1	
Jerk (ft/s^3)	5.443		
Acceleration (ft/s^2)	2.274	2.063	1.844
Deceleration (ft/s^2)	2.813	2.747	1.305
Distance Travelled (ft)	67.8		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	6.9	25.0	27.76
Max Vertical Vib. ISO (milli(g))	26.1	25.0	104.49
Max Jerk (ft/s^3)	5.443	12.000	45.356
Max Velocity (ft/min)	197.1	200.0	98.5
Max Acceleration (ft/s^2)	2.813	2.800	100.449
Max Sound Level dB(A)	65.9	60.0	+5.9 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000010
Start/Stop	5 Stops, 5 front
Comments	ThyssenKrupp/Payne Machine
Comments	MCE Controls
Comments	15000# at 200 FPM

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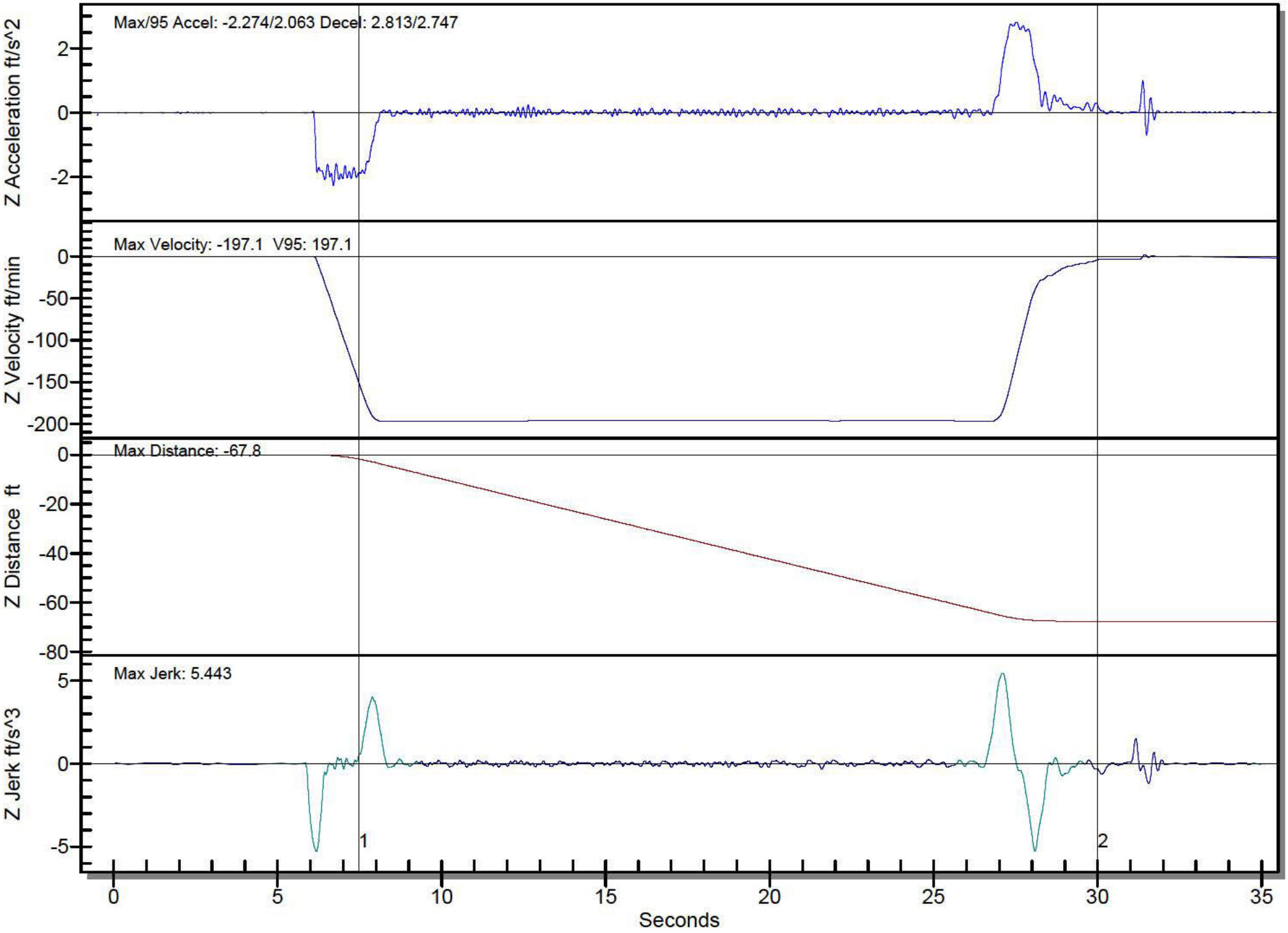
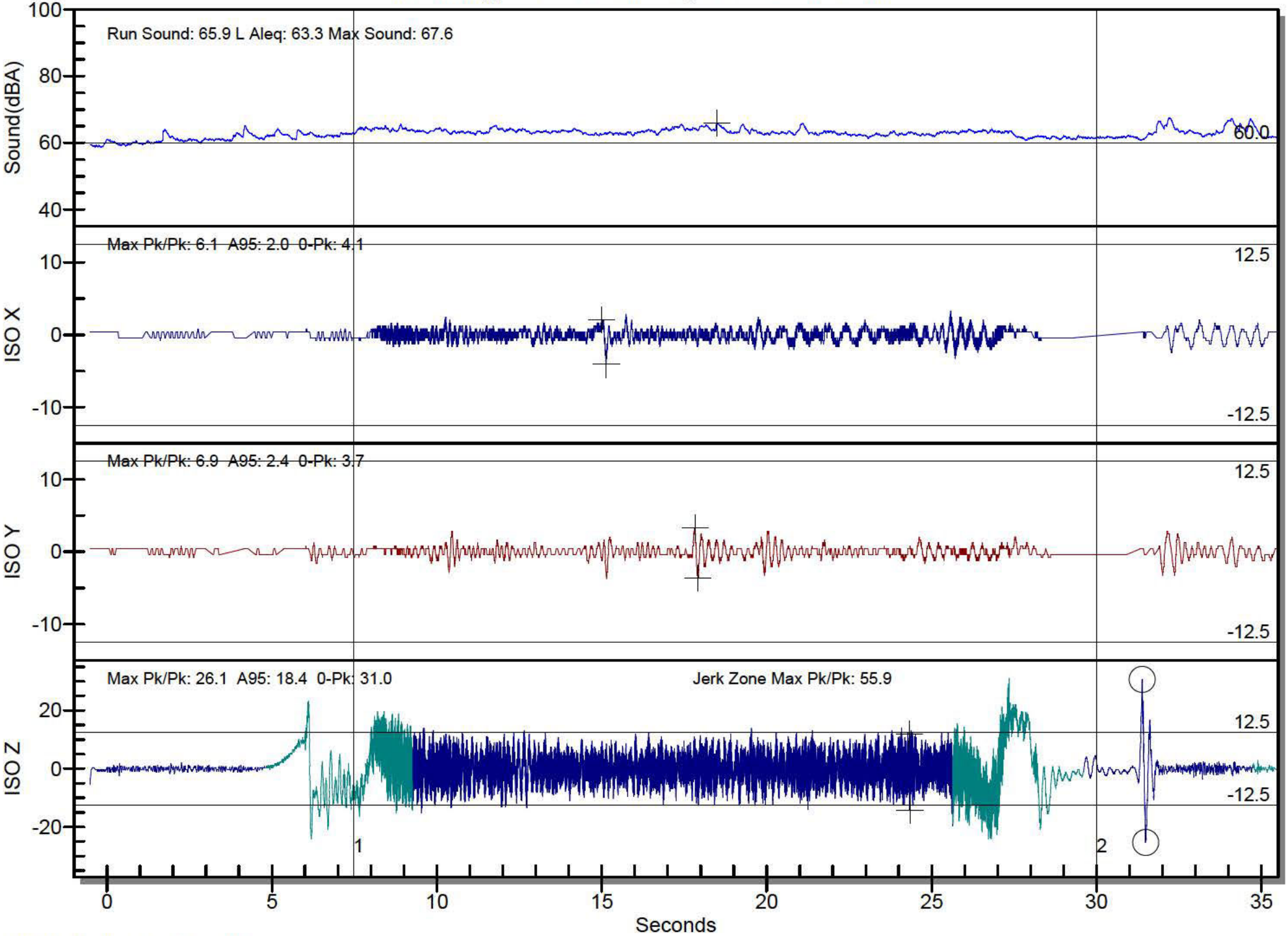
Bureau of Engraving and Printing Elevator 000010

Units: milli(g) File: OX85FCWQ.VE2 09:17:41 05/15/24



Bureau of Engraving and Printing Elevator 000010

Units: milli(g) File: OX85FCWQ.VE2 09:17:41 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJH7.VE2
Trigger Time: 14:01:27
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	11.8	6.5	17.1	60.8
A95	6.5	3.7	13.5	8.6

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	68.8	65.9	68.2	68.8
L Aleq	61.7	61.9	61.5	61.7

Performance	Max	95	Average
Velocity (ft/min)	475.9	475.6	
Jerk (ft/s^3)	4.057		
Acceleration (ft/s^2)	2.694	2.642	2.102
Deceleration (ft/s^2)	3.181	2.970	2.491
Distance Travelled (ft)	81.9		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	11.8	20.0	59.18
Max Vertical Vib. ISO (milli(g))	17.1	20.0	85.71
Max Jerk (ft/s^3)	4.057	8.000	50.716
Max Velocity (ft/min)	475.9	500.0	95.2
Max Acceleration (ft/s^2)	3.181	3.200	99.393
Max Sound Level dB(A)	68.8	60.0	+8.8 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000011
Start/Stop	B, 1 - 7
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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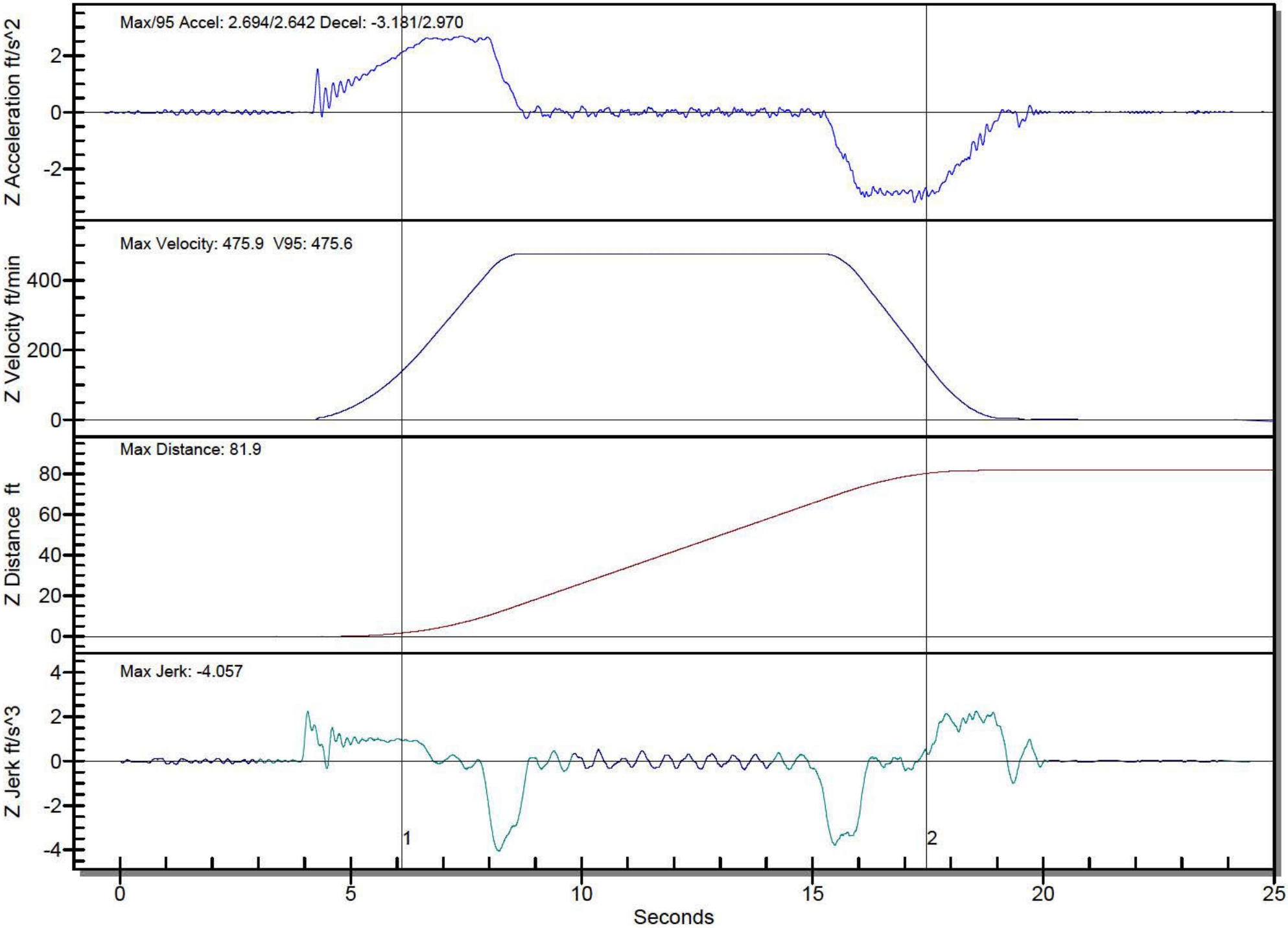
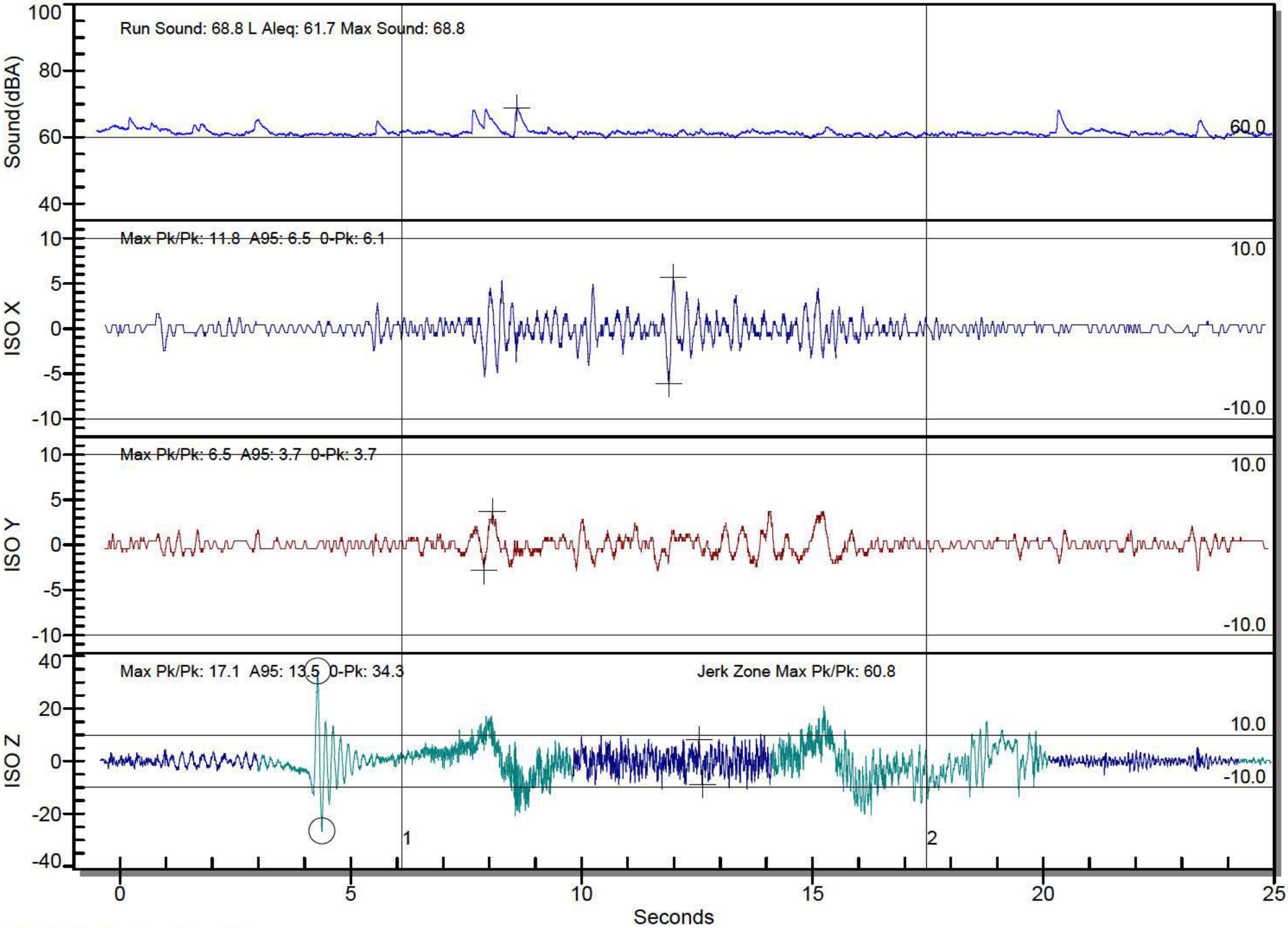
Bureau of Engraving and Printing Elevator 000011

Units: milli(g) File: OX85FJH7.VE2 14:01:27 05/15/24



Bureau of Engraving and Printing Elevator 000011

Units: milli(g) File: OX85FJH7.VE2 14:01:27 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJIN.VE2
Trigger Time: 14:03:10
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	10.6	9.0	22.4	35.1
A95	4.9	3.7	15.9	6.9

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	69.5	71.4	78.2	78.2
L Aleq	61.8	62.1	66.0	63.2

Performance	Max	95	Average
Velocity (ft/min)	477.8	477.5	
Jerk (ft/s^3)	4.222		
Acceleration (ft/s^2)	2.734	2.681	2.130
Deceleration (ft/s^2)	3.102	2.957	2.544
Distance Travelled (ft)	82.2		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	10.6	20.0	53.06
Max Vertical Vib. ISO (milli(g))	22.4	20.0	112.24
Max Jerk (ft/s^3)	4.222	8.000	52.778
Max Velocity (ft/min)	477.8	500.0	95.6
Max Acceleration (ft/s^2)	3.102	3.200	96.929
Max Sound Level dB(A)	69.5	60.0	+9.5 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000011
Start/Stop	B, 1 - 7
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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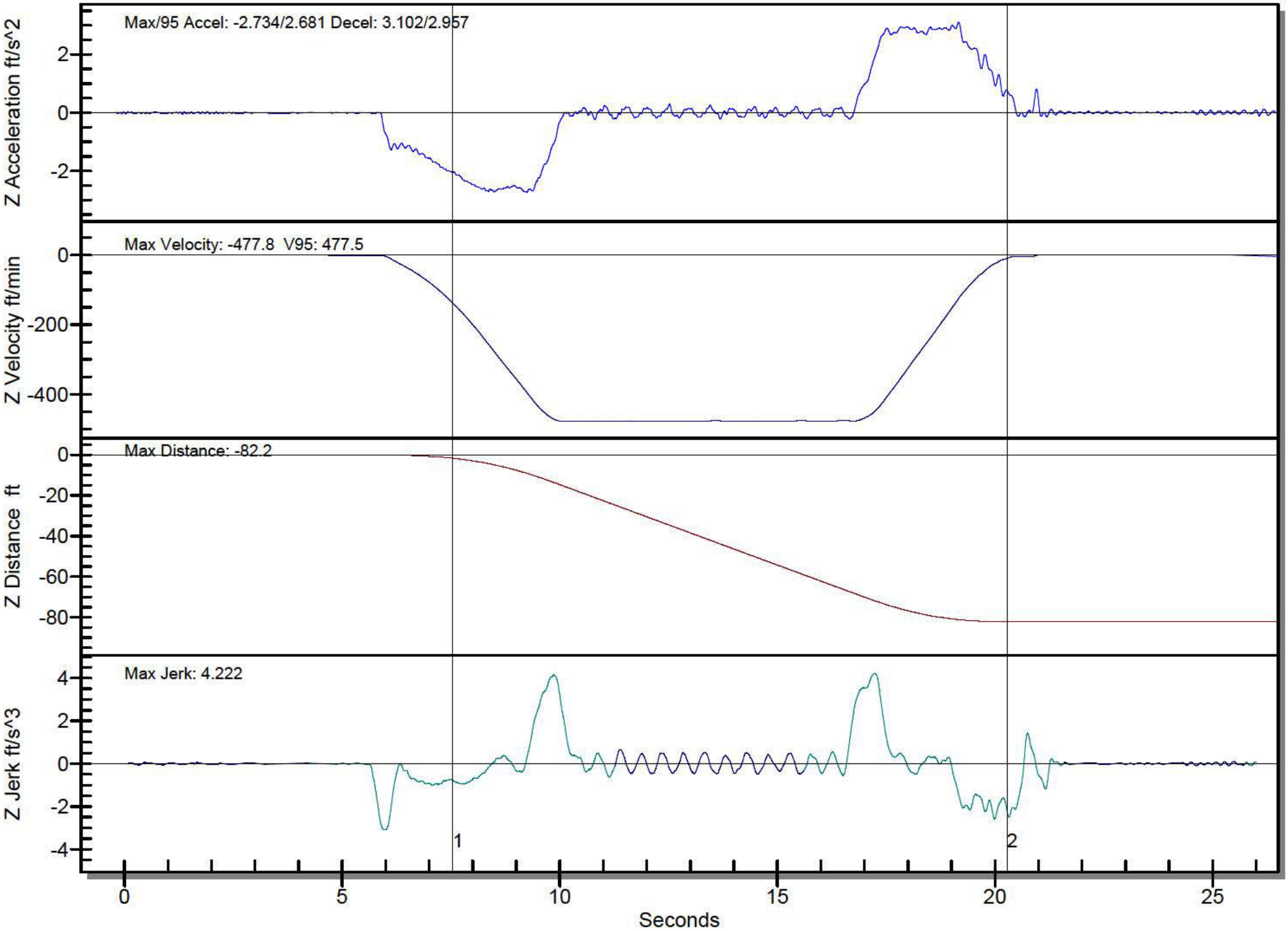
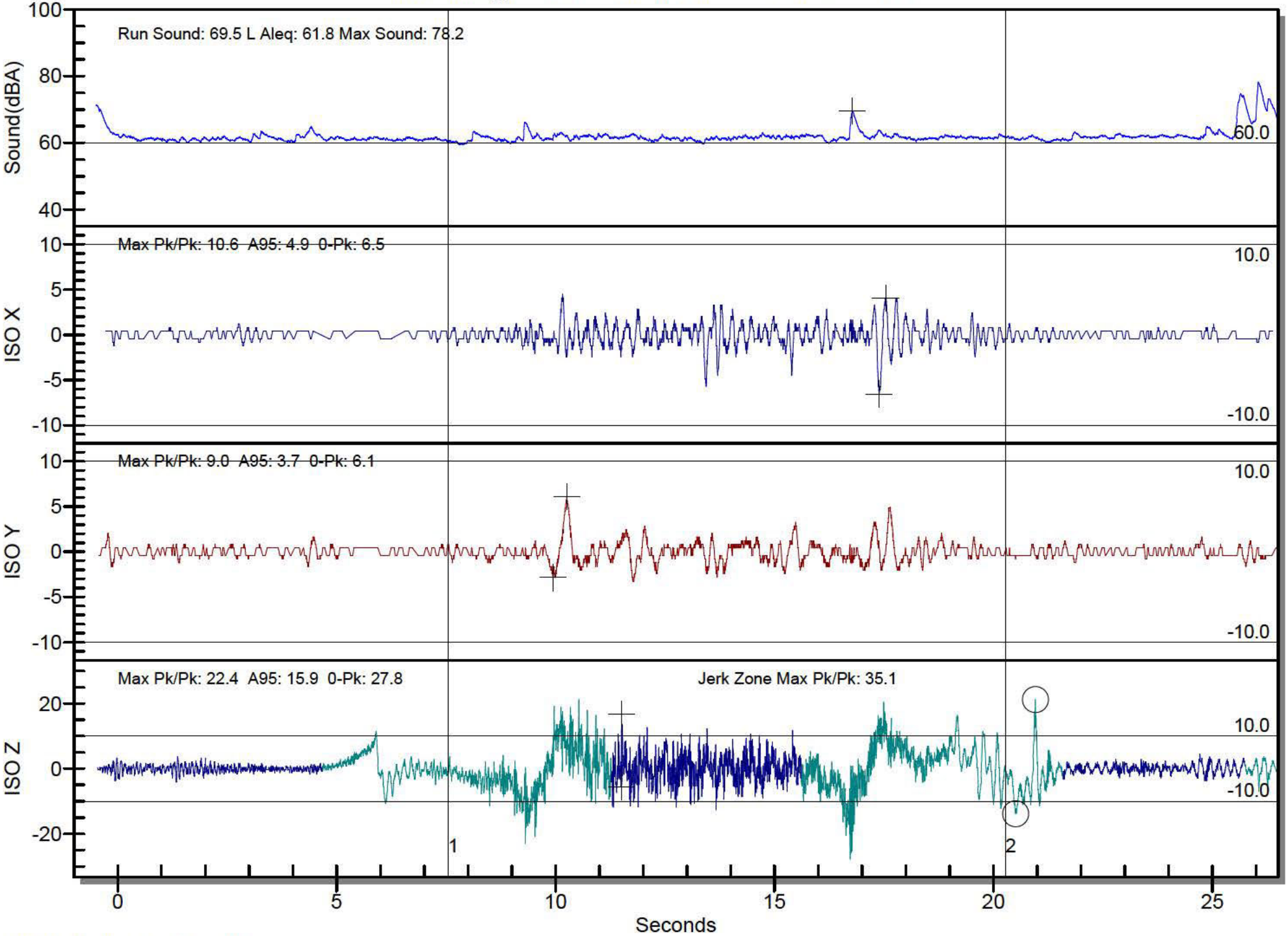
Bureau of Engraving and Printing Elevator 000011

Units: milli(g) File: OX85FJIN.VE2 14:03:10 05/15/24



Bureau of Engraving and Printing Elevator 000011

Units: milli(g) File: OX85FJIN.VE2 14:03:10 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJF9.VE2
Trigger Time: 13:59:07
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	11.8	5.7	15.5	51.8
A95	9.8	4.1	11.8	12.7

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	69.3	68.8	69.0	69.3
L Aleq	61.8	62.1	63.3	62.3

Performance	Max	95	Average
Velocity (ft/min)	487.8	487.5	
Jerk (ft/s^3)	4.717		
Acceleration (ft/s^2)	3.062	3.010	2.650
Deceleration (ft/s^2)	2.747	2.629	2.275
Distance Travelled (ft)	81.9		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	11.8	20.0	59.18
Max Vertical Vib. ISO (milli(g))	15.5	20.0	77.55
Max Jerk (ft/s^3)	4.717	8.000	58.962
Max Velocity (ft/min)	487.8	500.0	97.6
Max Acceleration (ft/s^2)	3.062	3.200	95.696
Max Sound Level dB(A)	69.3	60.0	+9.3 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000013
Start/Stop	B, 1, 1G, 2 - 5
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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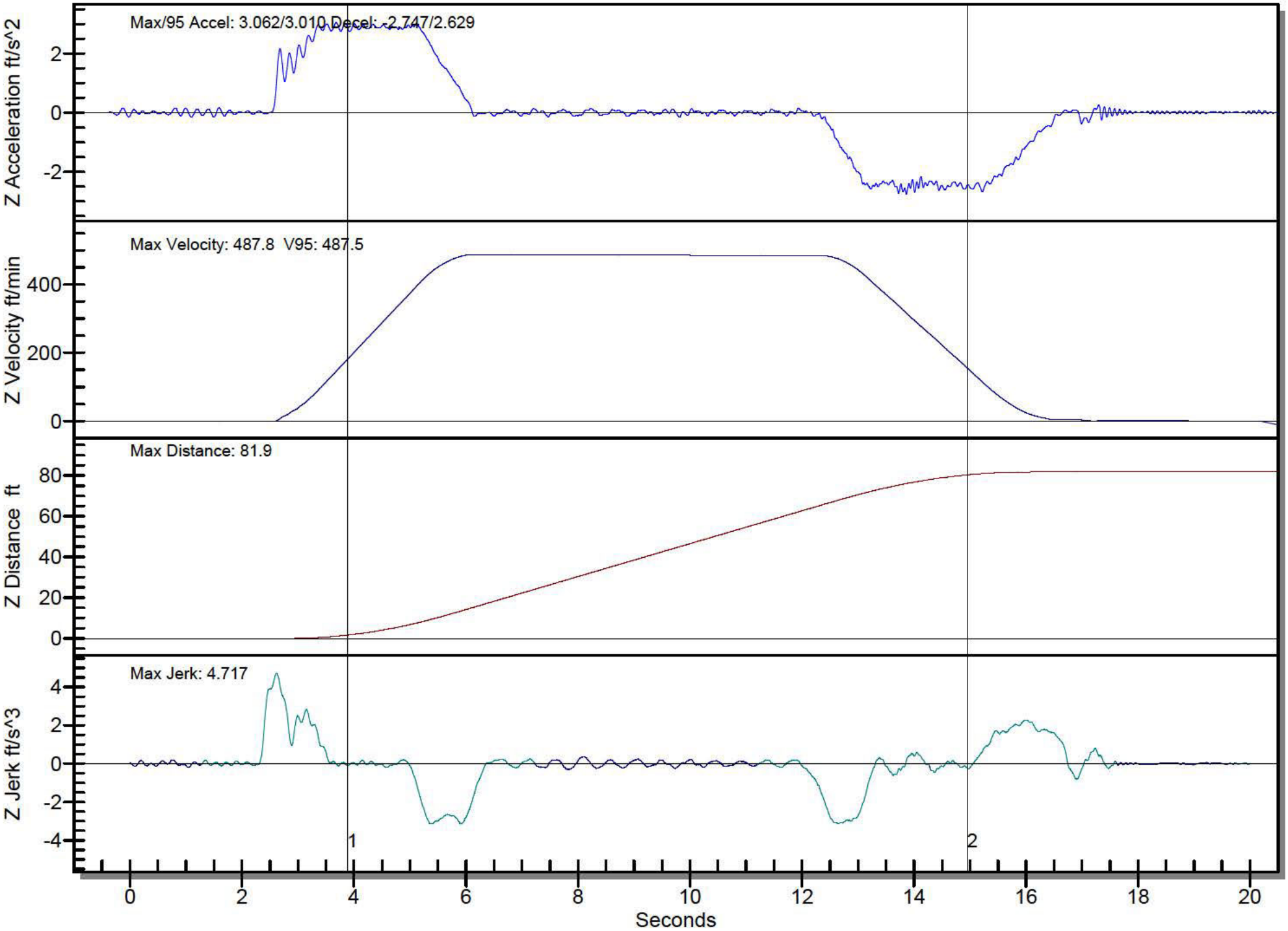
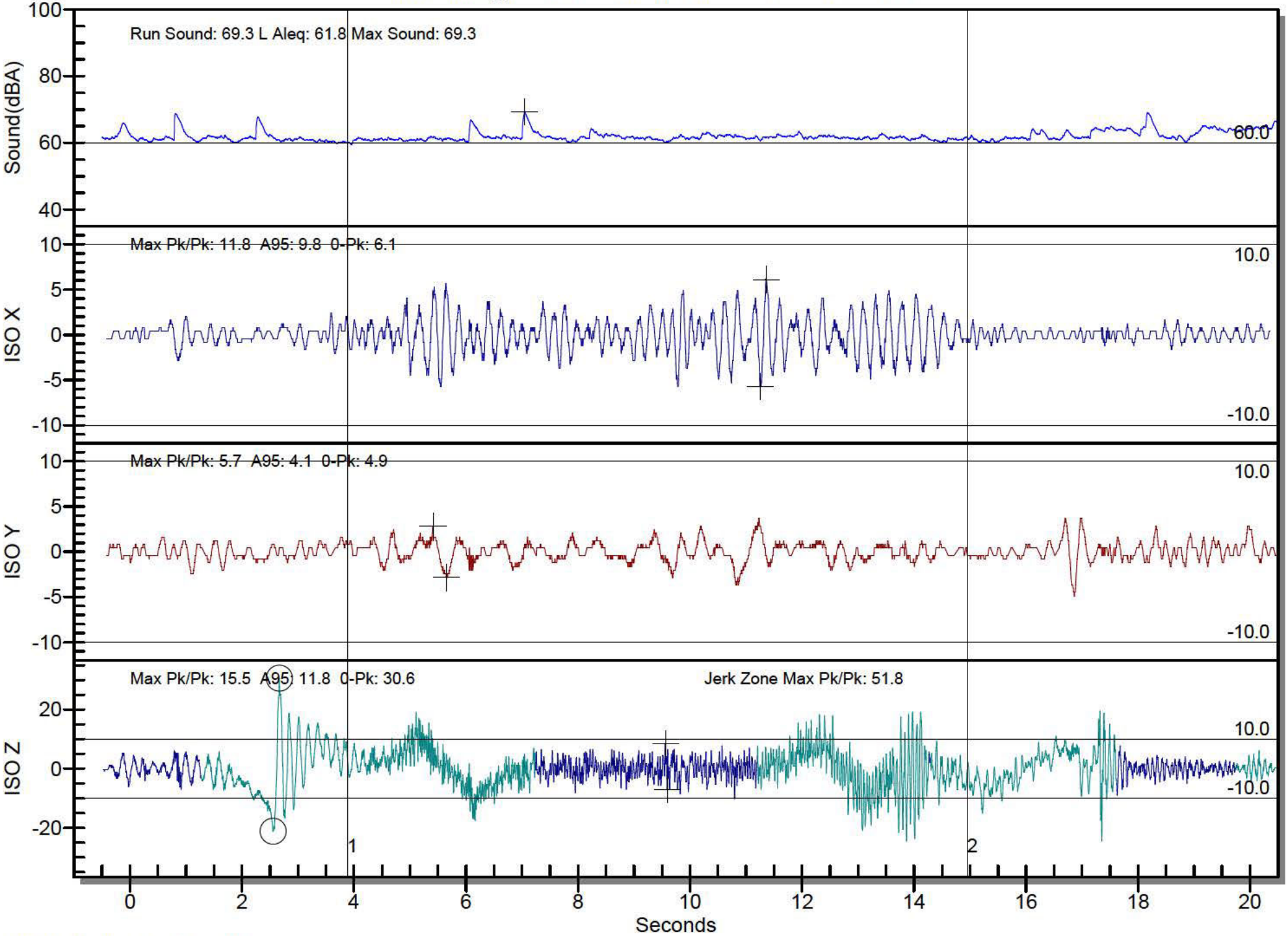
Bureau of Engraving and Printing Elevator 000013

Units: milli(g) File: OX85FJF9.VE2 13:59:07 05/15/24



Bureau of Engraving and Printing Elevator 000013

Units: milli(g) File: OX85FJF9.VE2 13:59:07 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJG1.VE2
Trigger Time: 14:00:03
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	15.5	6.9	18.4	34.3
A95	10.6	3.3	12.2	9.4

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	69.1	68.5	67.5	69.1
L Aleq	62.2	61.4	62.3	62.0

Performance	Max	95	Average
Velocity (ft/min)	487.2	486.9	
Jerk (ft/s^3)	5.377		
Acceleration (ft/s^2)	3.128	3.089	2.782
Deceleration (ft/s^2)	2.747	2.629	2.292
Distance Travelled (ft)	82.0		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	15.5	20.0	77.55
Max Vertical Vib. ISO (milli(g))	18.4	20.0	91.84
Max Jerk (ft/s^3)	5.377	8.000	67.209
Max Velocity (ft/min)	487.2	500.0	97.4
Max Acceleration (ft/s^2)	3.128	3.200	97.750
Max Sound Level dB(A)	69.1	60.0	+9.1 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000013
Start/Stop	B, 1 - 7
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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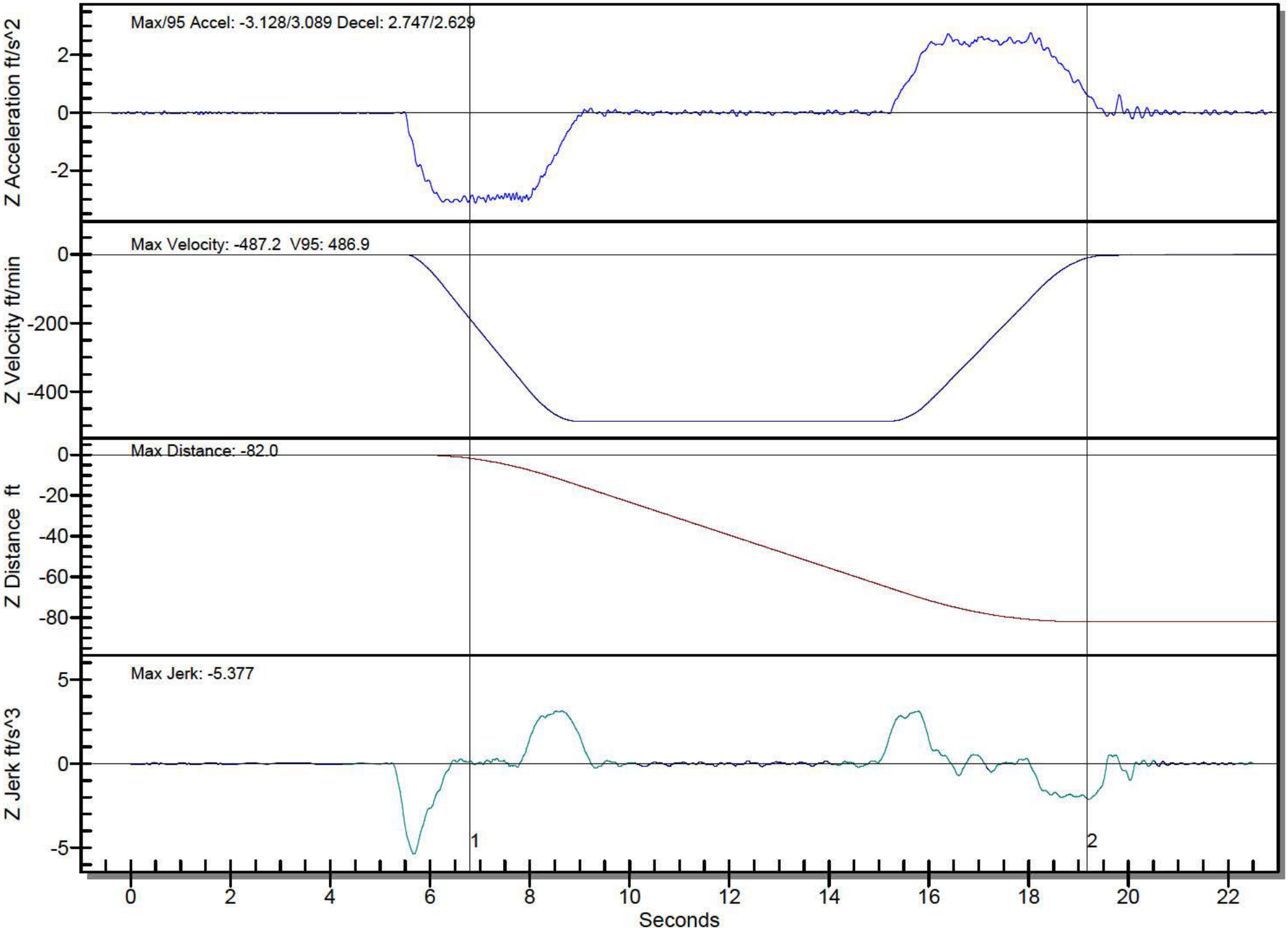
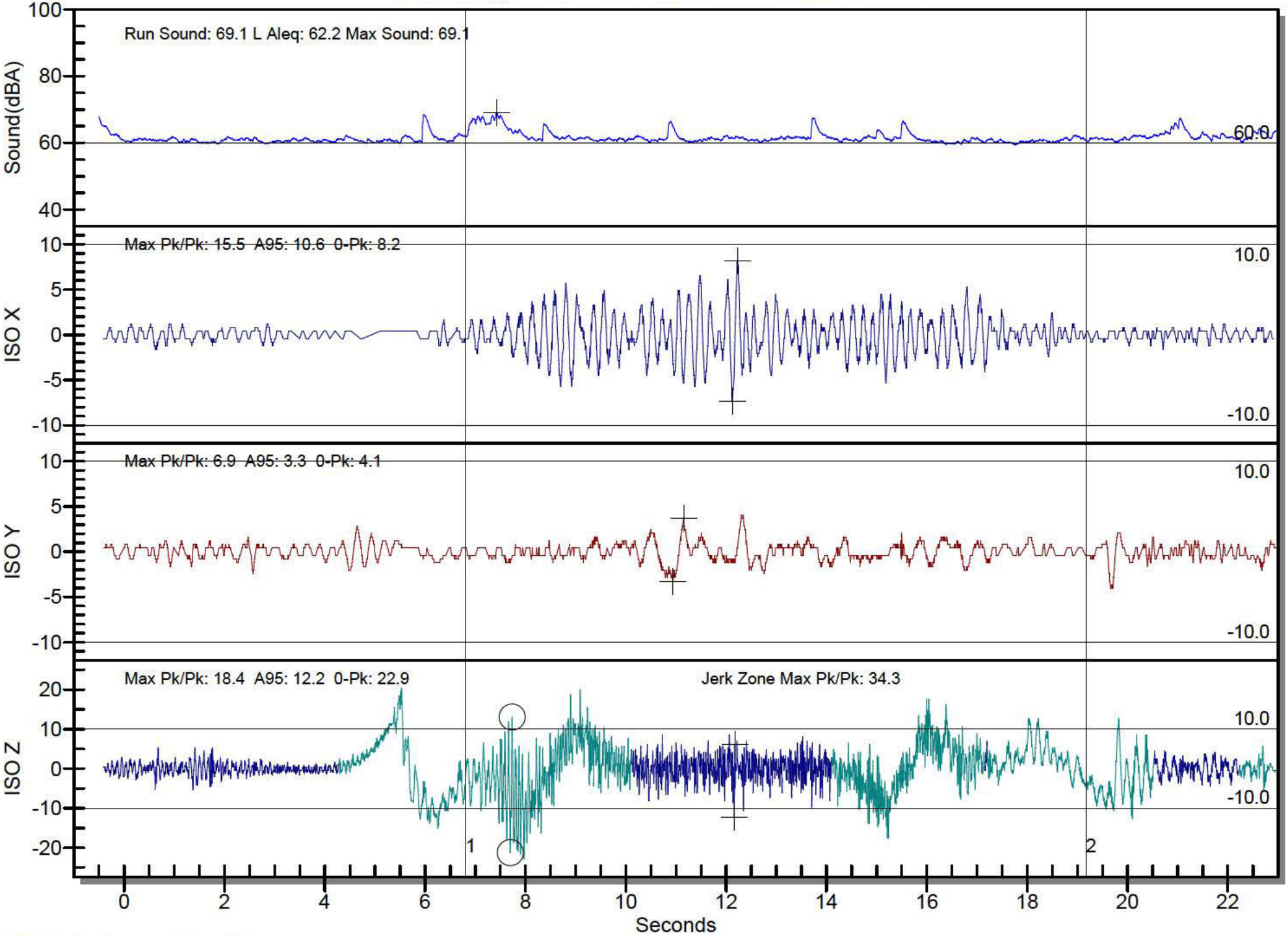
Bureau of Engraving and Printing Elevator 000013

Units: milli(g) File: OX85FJG1.VE2 14:00:03 05/15/24



Bureau of Engraving and Printing Elevator 000013

Units: milli(g) File: OX85FJG1.VE2 14:00:03 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85EJC2.VE2
Trigger Time: 13:55:16
Trigger Date: 05/14/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	9.8	19.2	20.4	22.4
A95	4.1	11.4	9.8	0.8

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	67.8	82.3	87.2	87.2
L Aleq	63.4	72.7	75.4	70.6

Performance	Max	95	Average
Velocity (ft/min)	200.6	200.0	
Jerk (ft/s^3)	5.212		
Acceleration (ft/s^2)	2.471	2.431	2.116
Deceleration (ft/s^2)	2.878	2.799	1.349
Distance Travelled (ft)	98.5		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	19.2	25.0	76.73
Max Vertical Vib. ISO (milli(g))	20.4	25.0	81.63
Max Jerk (ft/s^3)	5.212	12.000	43.432
Max Velocity (ft/min)	200.6	200.0	100.3
Max Acceleration (ft/s^2)	2.878	2.800	102.796
Max Sound Level dB(A)	67.8	60.0	+7.8 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000014
Start/Stop	9 Stops, 8 front/4 rear
Comments	ThyssenKrupp/Payne Machine
Comments	MCE Controls
Comments	15000# at 200 FPM

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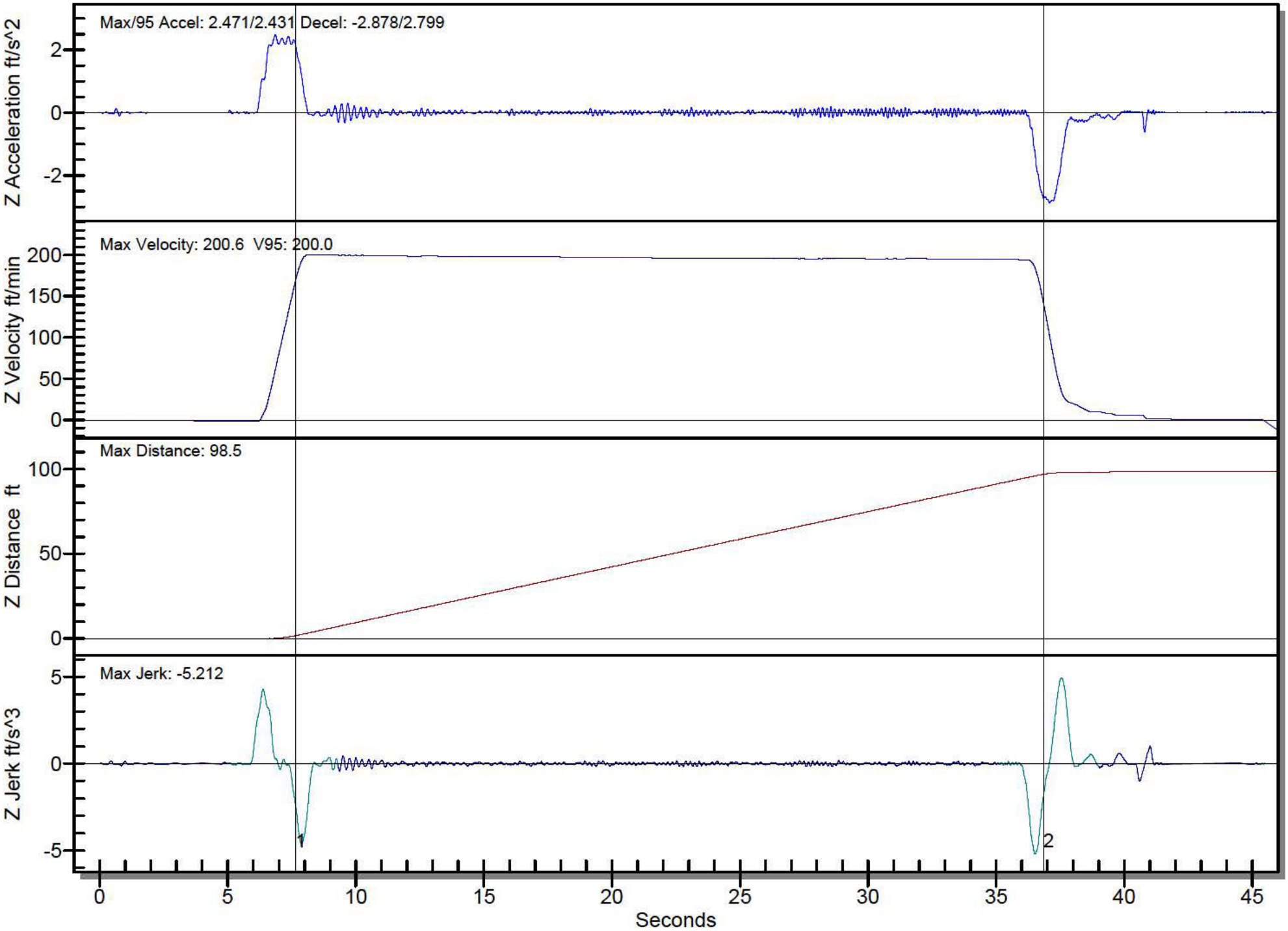
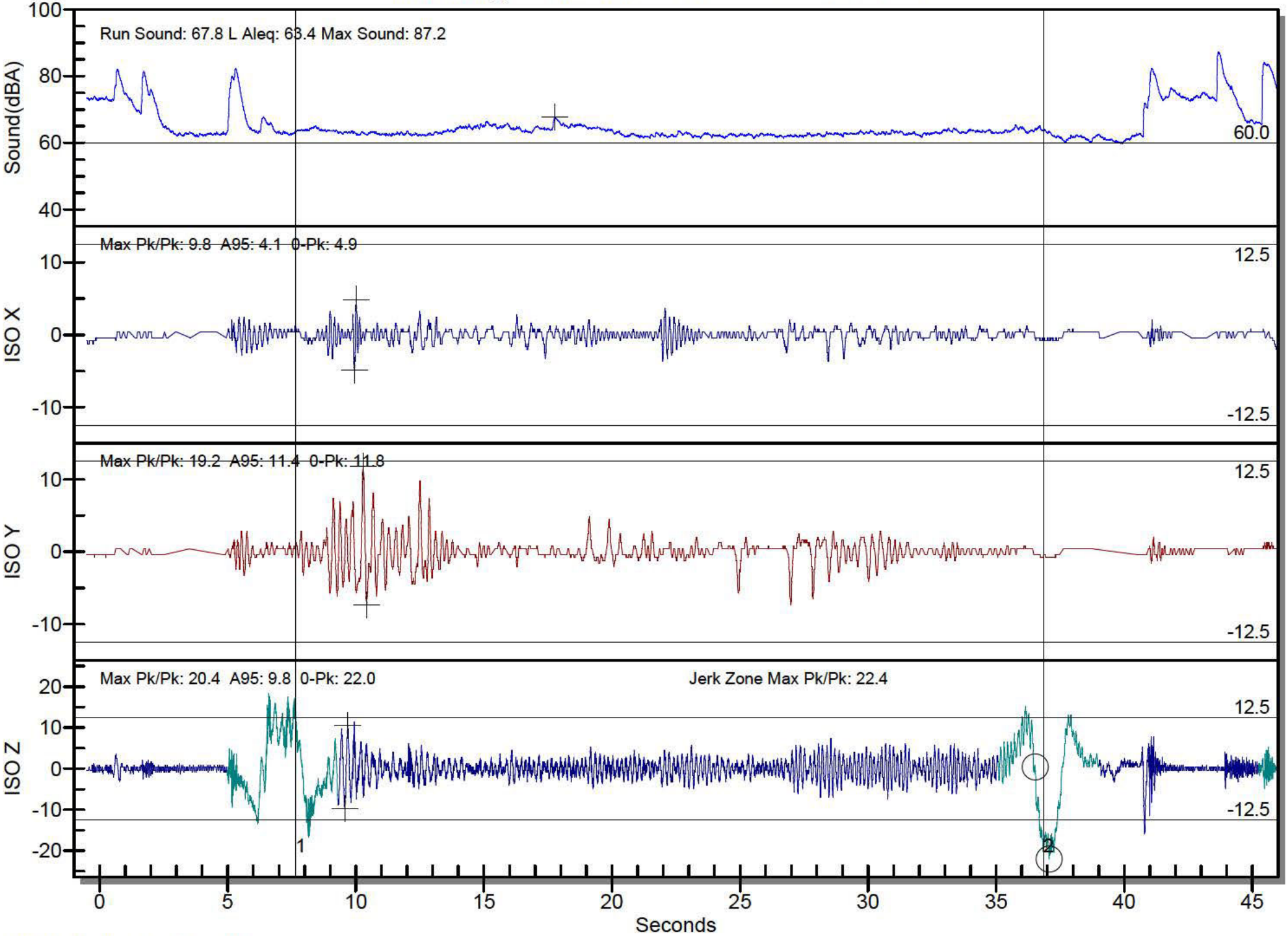
Bureau of Engraving and Printing Elevator 000014

Units: milli(g) File: OX85EJC2.VE2 13:55:16 05/14/24



Bureau of Engraving and Printing Elevator 000014

Units: milli(g) File: OX85EJC2.VE2 13:55:16 05/14/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85EJ9Q.VE2
Trigger Time: 13:52:29
Trigger Date: 05/14/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	7.3	22.0	27.3	39.2
A95	3.7	12.7	14.3	0.8

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	67.4	85.5	84.9	85.5
L Aleq	63.2	73.0	75.6	70.5

Performance	Max	95	Average
Velocity (ft/min)	203.5	202.5	
Jerk (ft/s^3)	5.740		
Acceleration (ft/s^2)	2.458	2.405	2.171
Deceleration (ft/s^2)	2.957	2.931	1.276
Distance Travelled (ft)	100.3		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	22.0	25.0	88.16
Max Vertical Vib. ISO (milli(g))	27.3	25.0	109.39
Max Jerk (ft/s^3)	5.740	12.000	47.830
Max Velocity (ft/min)	203.5	200.0	101.8
Max Acceleration (ft/s^2)	2.957	2.800	105.612
Max Sound Level dB(A)	67.4	60.0	+7.4 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000014
Start/Stop	9 Stops, 8 front/4 rear
Comments	ThyssenKrupp/Payne Machine
Comments	MCE Controls
Comments	15000# at 200 FPM

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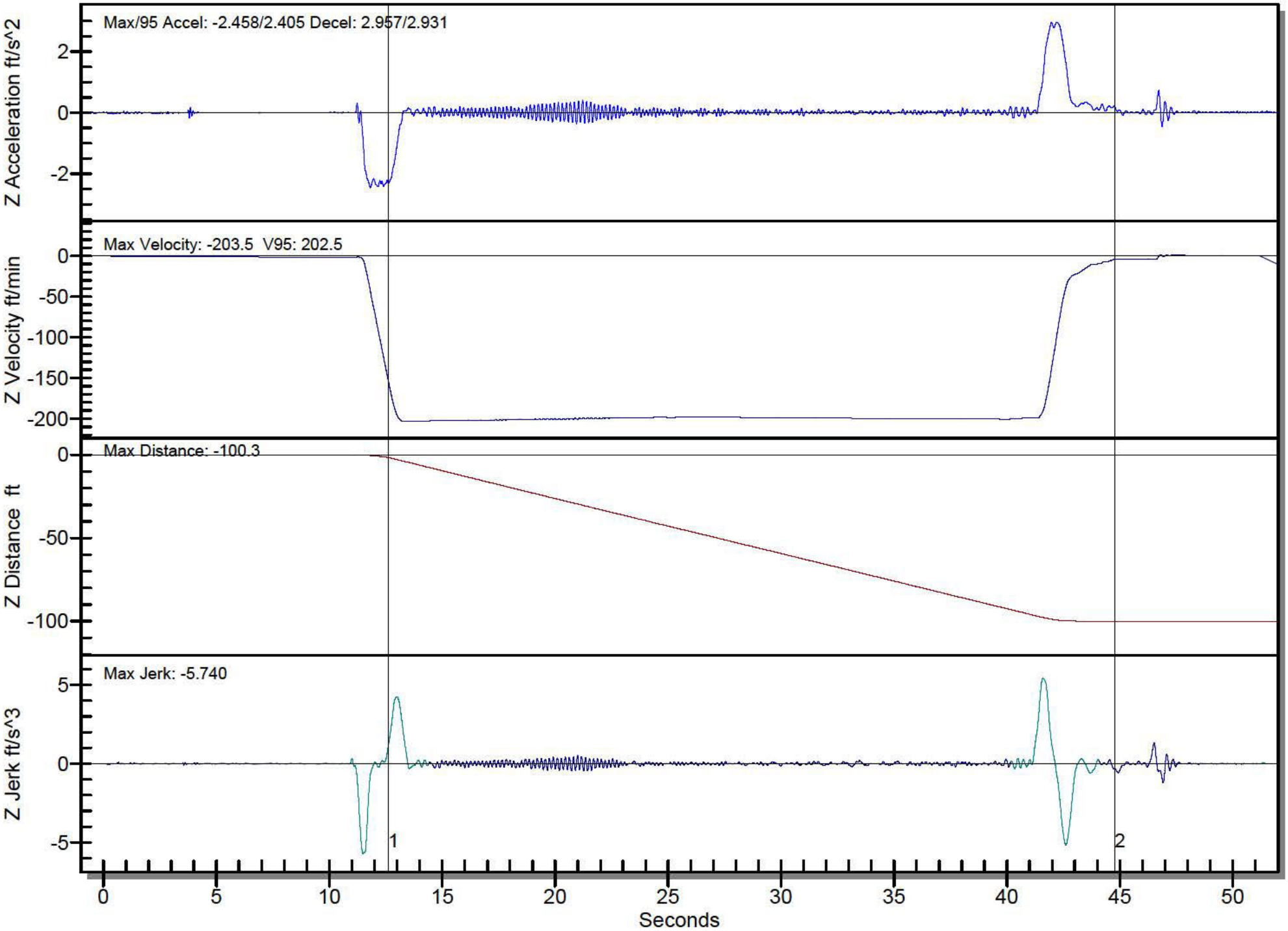
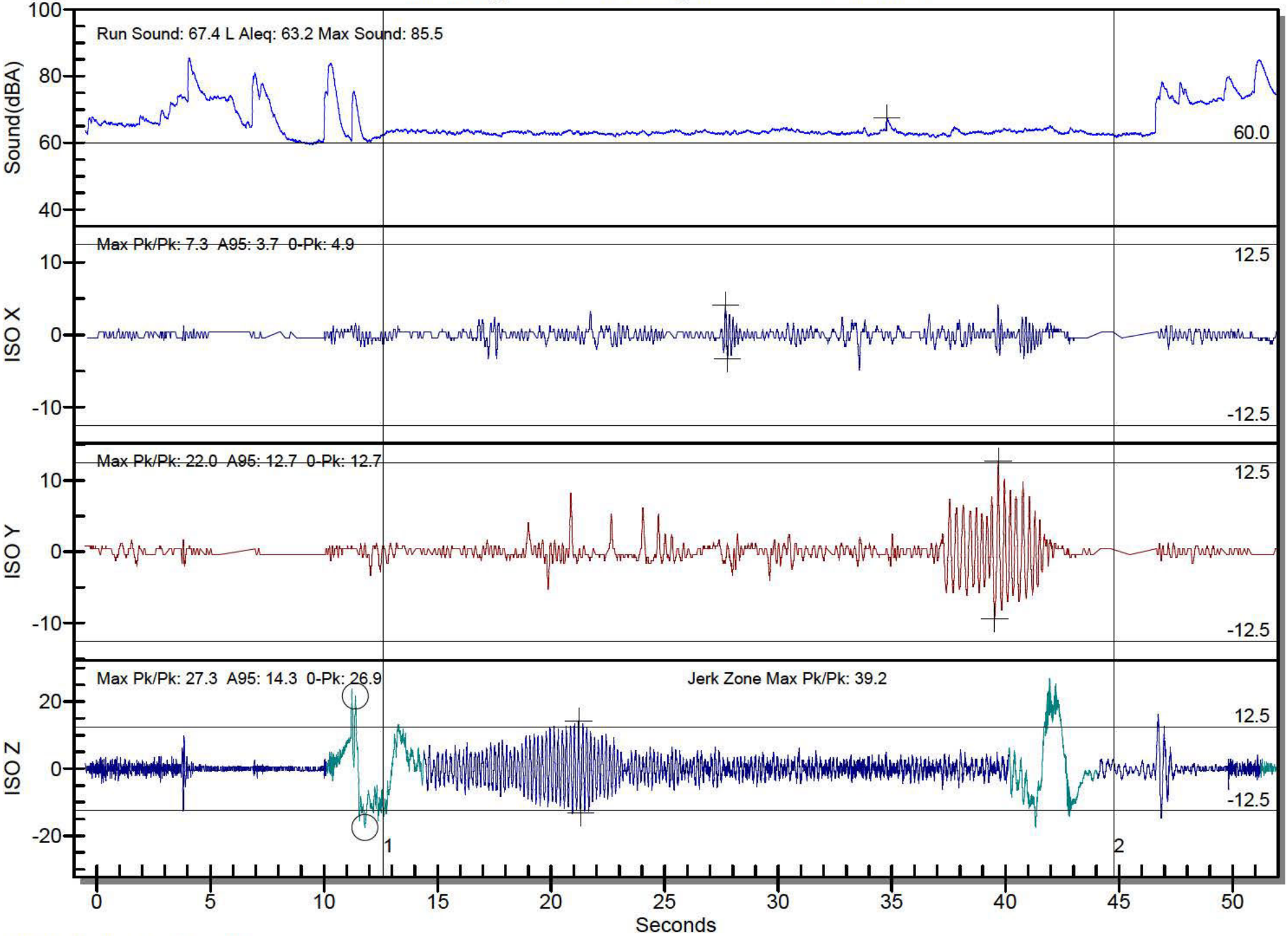
Bureau of Engraving and Printing Elevator 000014

Units: milli(g) File: OX85EJ9Q.VE2 13:52:29 05/14/24



Bureau of Engraving and Printing Elevator 000014

Units: milli(g) File: OX85EJ9Q.VE2 13:52:29 05/14/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85EKEX.VE2
Trigger Time: 14:41:55
Trigger Date: 05/14/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	9.0	15.1	11.8	45.3
A95	3.3	5.7	6.5	1.2

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	67.2	84.7	82.1	84.7
L Aleq	63.8	73.5	74.3	69.6

Performance	Max	95	Average
Velocity (ft/min)	205.1	203.2	
Jerk (ft/s^3)	5.970		
Acceleration (ft/s^2)	2.668	2.589	2.140
Deceleration (ft/s^2)	3.089	3.049	1.254
Distance Travelled (ft)	99.9		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	15.1	25.0	60.41
Max Vertical Vib. ISO (milli(g))	11.8	25.0	47.35
Max Jerk (ft/s^3)	5.970	12.000	49.754
Max Velocity (ft/min)	205.1	200.0	102.6
Max Acceleration (ft/s^2)	3.089	2.800	110.306
Max Sound Level dB(A)	67.2	60.0	+7.2 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000016
Start/Stop	9 Stops, 8 front/4 rear
Comments	ThyssenKrupp/Payne Machine
Comments	MCE Controls
Comments	15000# at 200 FPM

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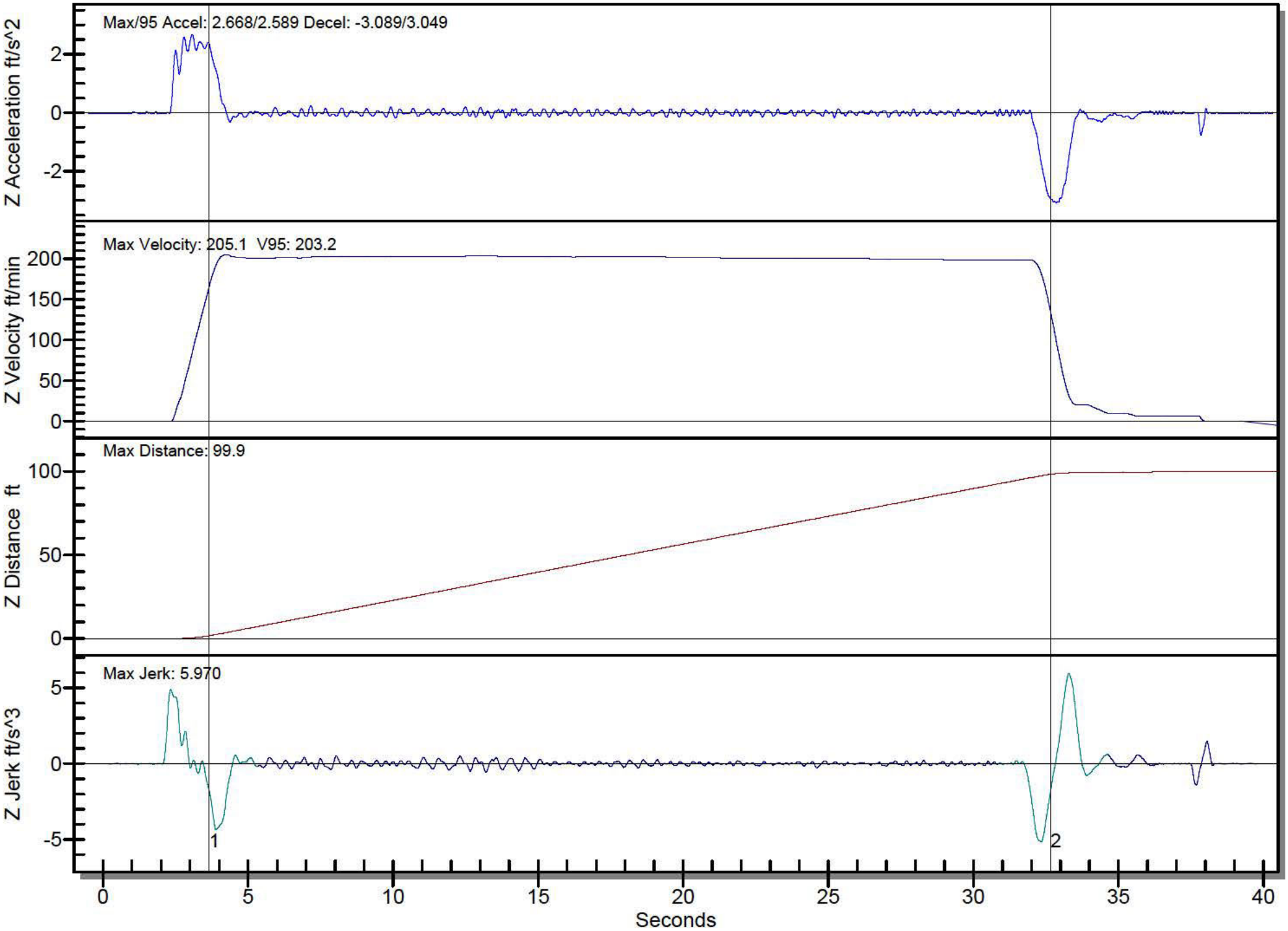
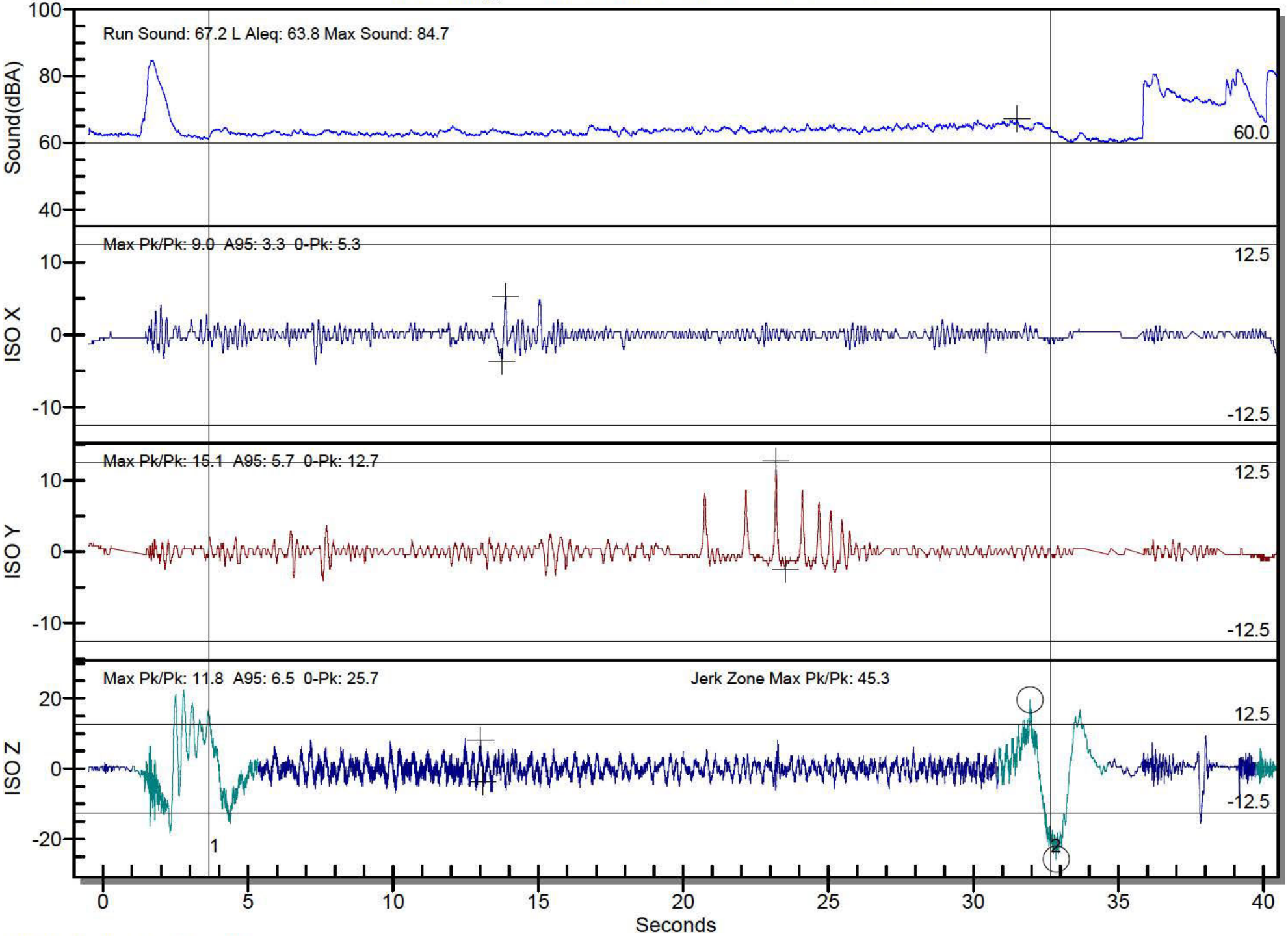
Bureau of Engraving and Printing Elevator 000016

Units: milli(g) File: OX85EKEX.VE2 14:41:55 05/14/24



Bureau of Engraving and Printing Elevator 000016

Units: milli(g) File: OX85EKEX.VE2 14:41:55 05/14/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85EKB5.VE2
Trigger Time: 14:37:23
Trigger Date: 05/14/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	8.2	9.0	16.3	42.4
A95	3.7	4.5	6.9	0.8

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	66.8	89.0	80.8	89.0
L Aleq	64.0	82.8	75.1	76.5

Performance	Max	95	Average
Velocity (ft/min)	206.1	201.9	
Jerk (ft/s^3)	6.597		
Acceleration (ft/s^2)	2.760	2.721	2.285
Deceleration (ft/s^2)	3.220	3.154	1.358
Distance Travelled (ft)	98.7		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	9.0	25.0	35.92
Max Vertical Vib. ISO (milli(g))	16.3	25.0	65.31
Max Jerk (ft/s^3)	6.597	12.000	54.977
Max Velocity (ft/min)	206.1	200.0	103.0
Max Acceleration (ft/s^2)	3.220	2.800	115.000
Max Sound Level dB(A)	66.8	60.0	+6.8 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000016
Start/Stop	9 Stops, 8 front/4 rear
Comments	ThyssenKrupp/Payne Machine
Comments	MCE Controls
Comments	15000# at 200 FPM

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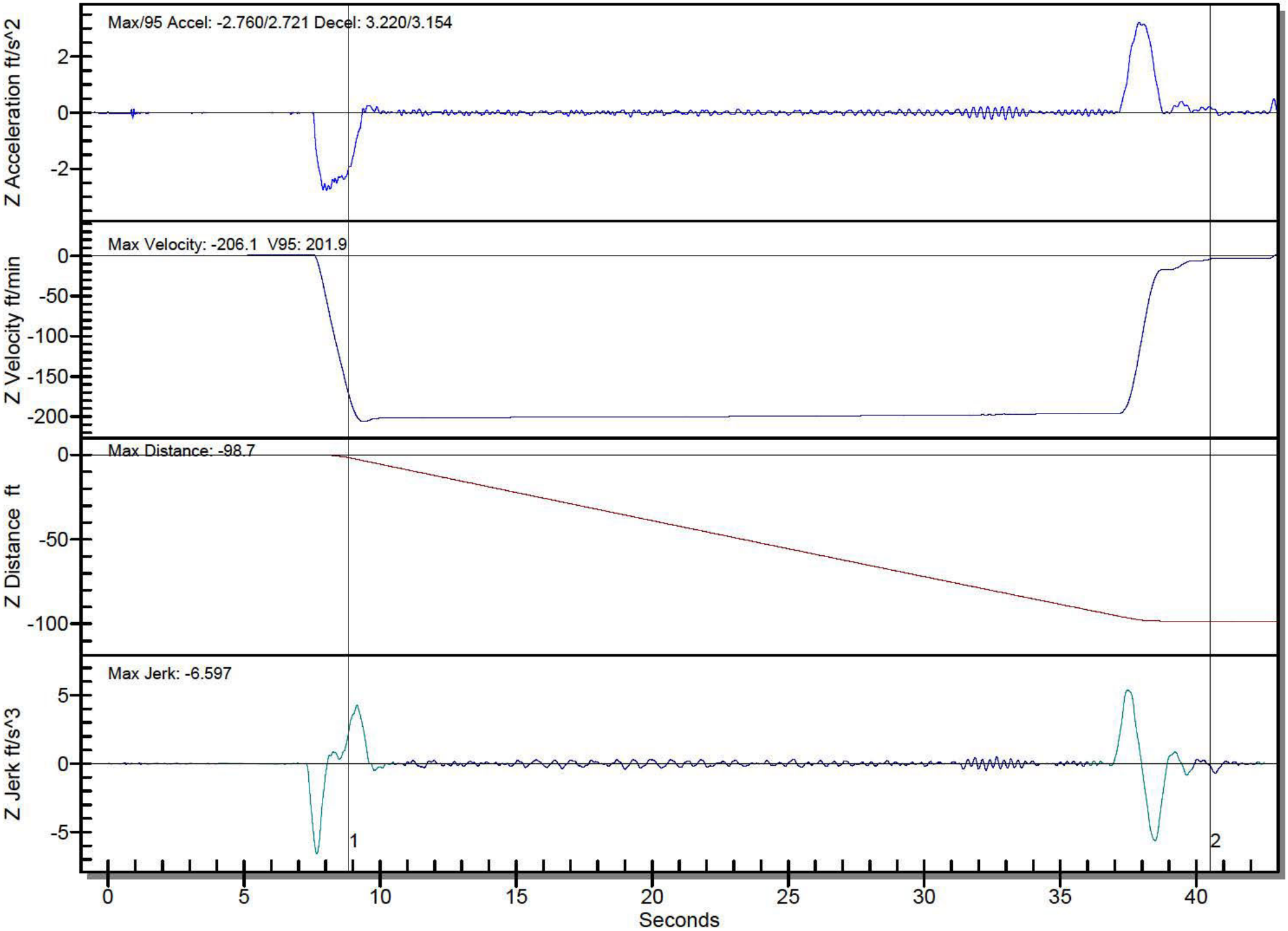
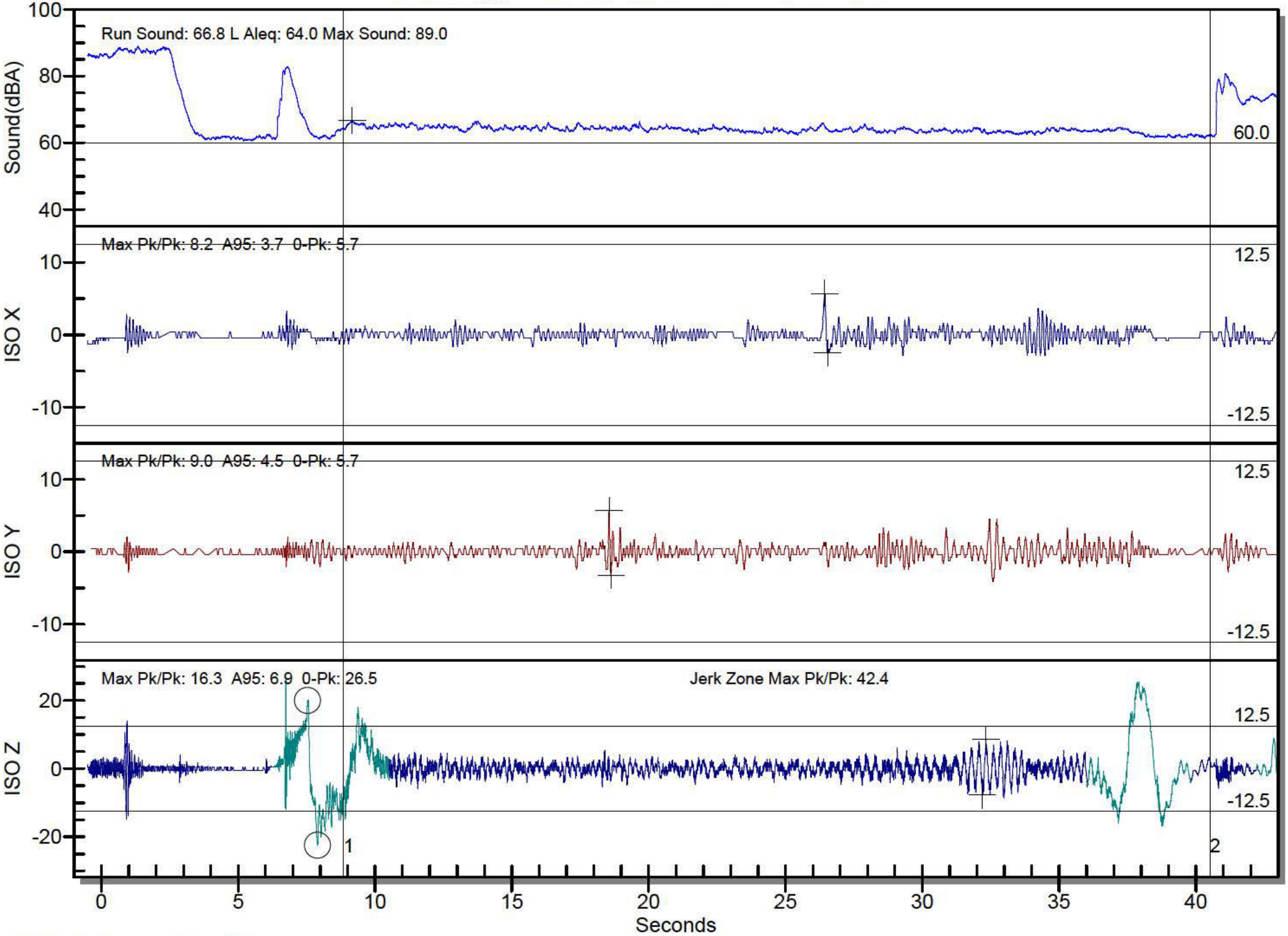
Bureau of Engraving and Printing Elevator 000016

Units: milli(g) File: OX85EKB5.VE2 14:37:23 05/14/24



Bureau of Engraving and Printing Elevator 000016

Units: milli(g) File: OX85EKB5.VE2 14:37:23 05/14/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJN2.VE2
Trigger Time: 14:08:28
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	7.8	4.9	19.6	111.4
A95	6.1	3.3	13.5	10.6

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	63.3	61.5	69.1	69.1
L Aleq	58.3	57.6	59.6	58.5

Performance	Max	95	Average
Velocity (ft/min)	486.9	486.5	
Jerk (ft/s^3)	8.972		
Acceleration (ft/s^2)	4.876	3.036	2.664
Deceleration (ft/s^2)	2.655	2.589	2.298
Distance Travelled (ft)	81.9		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	7.8	20.0	38.78
Max Vertical Vib. ISO (milli(g))	19.6	20.0	97.96
Max Jerk (ft/s^3)	8.972	8.000	112.152
Max Velocity (ft/min)	486.9	500.0	97.4
Max Acceleration (ft/s^2)	4.876	3.200	152.375
Max Sound Level dB(A)	63.3	60.0	+3.3 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000018
Start/Stop	B, 2 - 7
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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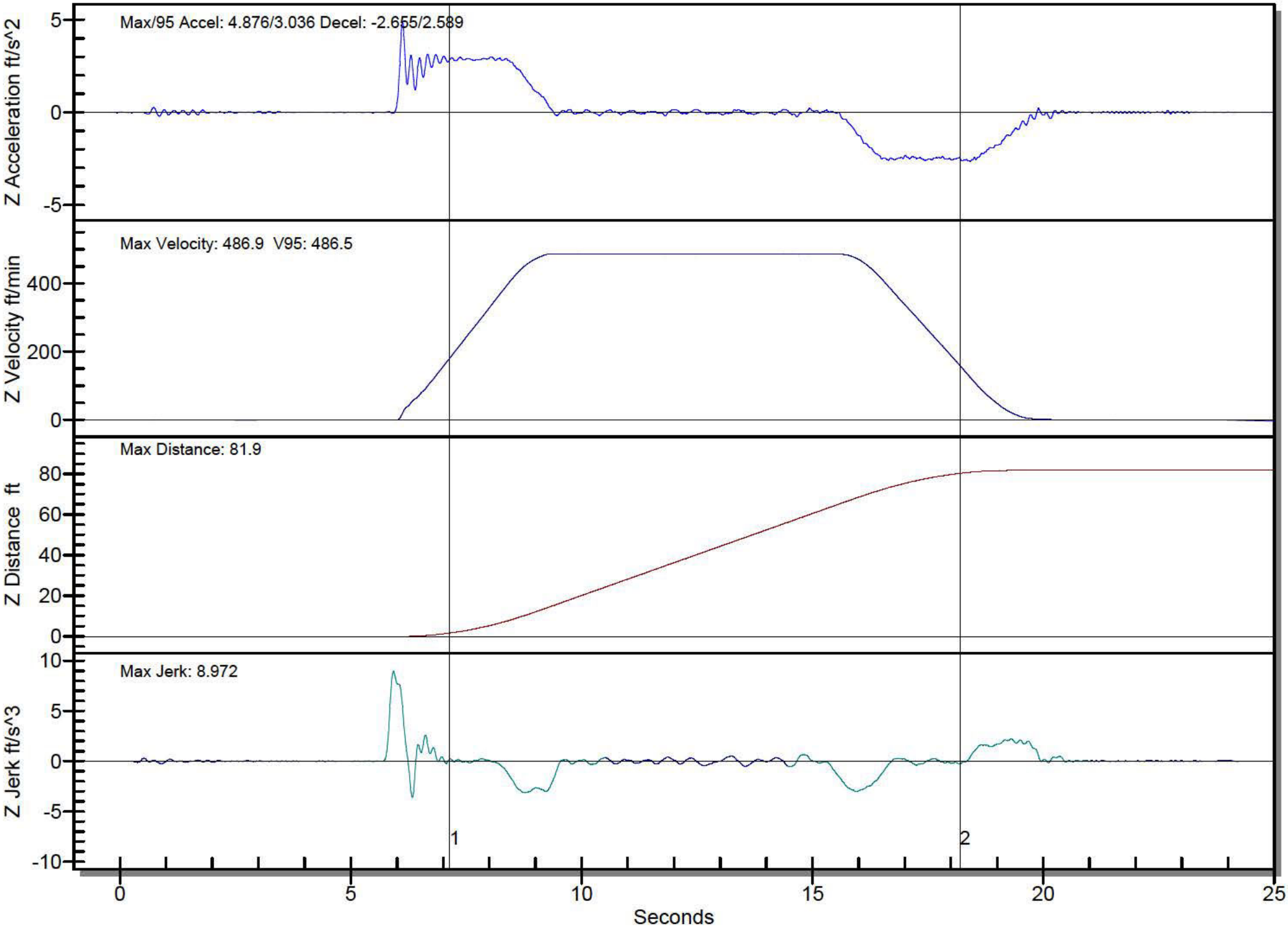
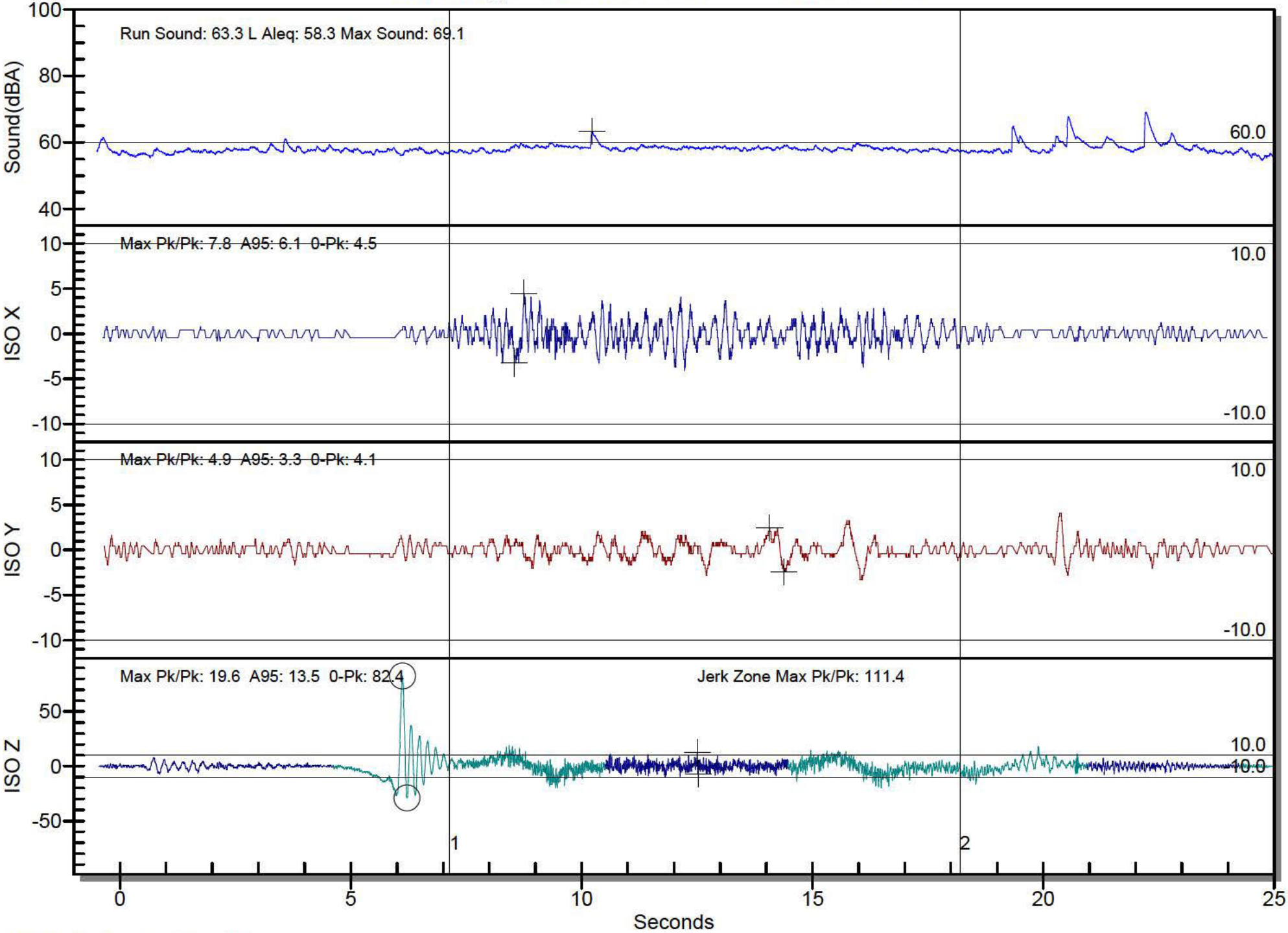
Bureau of Engraving and Printing Elevator 000018

Units: milli(g) File: OX85FJN2.VE2 14:08:28 05/15/24



Bureau of Engraving and Printing Elevator 000018

Units: milli(g) File: OX85FJN2.VE2 14:08:28 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJMC.VE2
Trigger Time: 14:07:36
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	8.6	6.1	19.2	84.5
A95	6.5	3.7	12.2	8.2

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	63.0	65.8	71.7	71.7
L Aleq	58.6	58.6	60.8	59.0

Performance	Max	95	Average
Velocity (ft/min)	488.8	488.5	
Jerk (ft/s^3)	7.653		
Acceleration (ft/s^2)	3.299	3.128	2.702
Deceleration (ft/s^2)	2.813	2.681	2.294
Distance Travelled (ft)	82.2		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	8.6	20.0	42.86
Max Vertical Vib. ISO (milli(g))	19.2	20.0	95.92
Max Jerk (ft/s^3)	7.653	8.000	95.659
Max Velocity (ft/min)	488.8	500.0	97.8
Max Acceleration (ft/s^2)	3.299	3.200	103.089
Max Sound Level dB(A)	63.0	60.0	+3.0 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000018
Start/Stop	B, 1 - 7
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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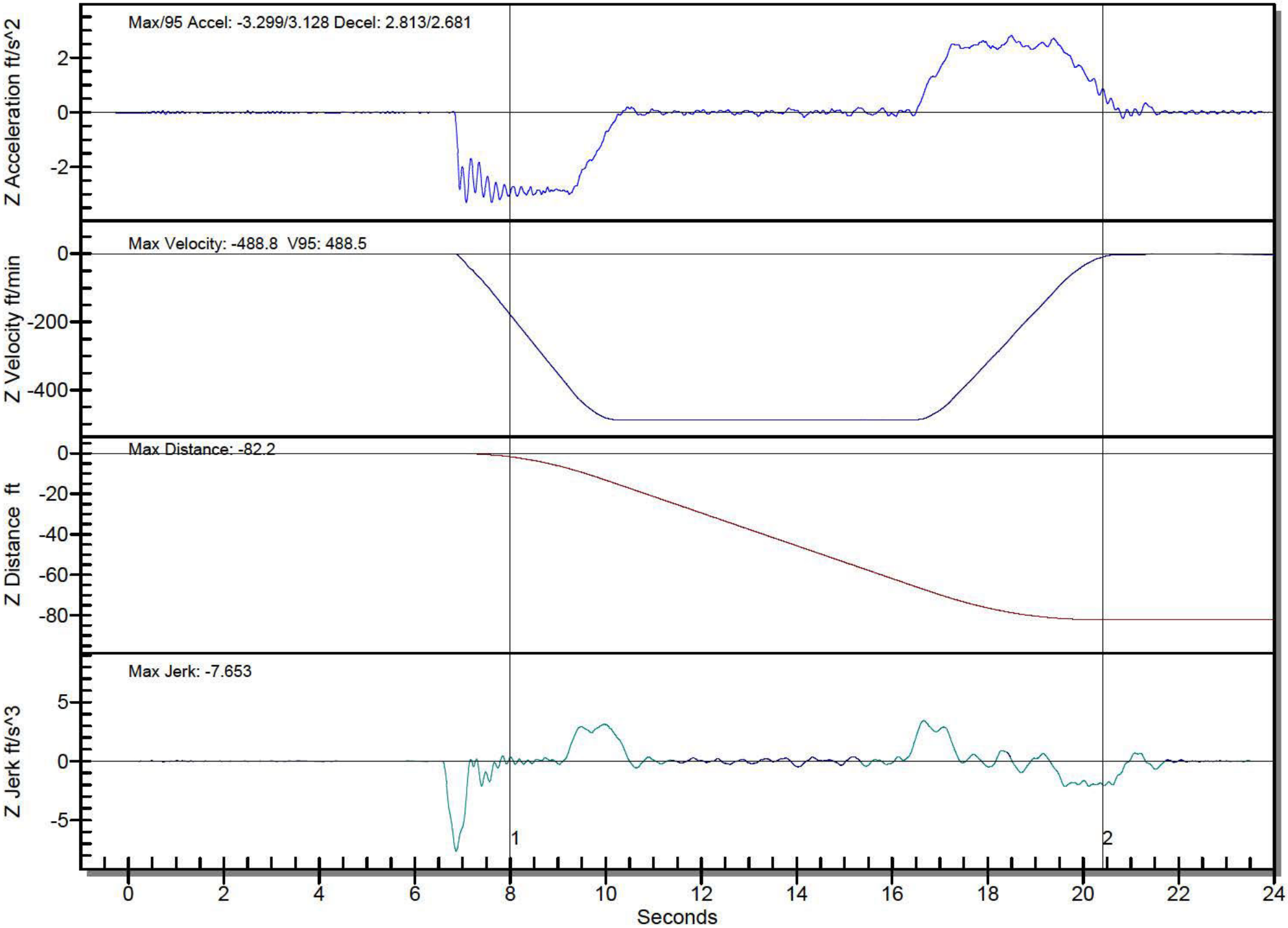
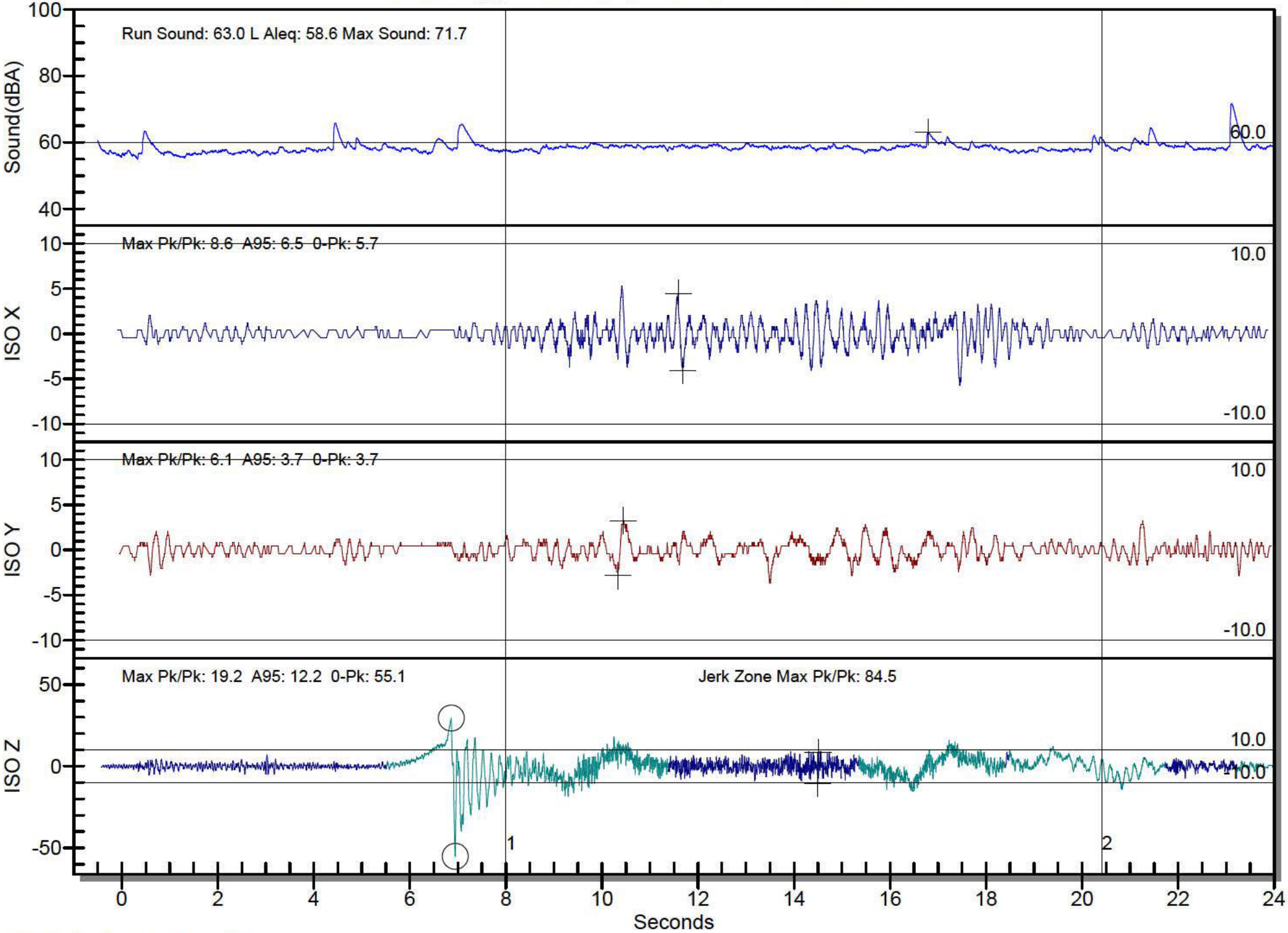
Bureau of Engraving and Printing Elevator 000018

Units: milli(g) File: OX85FJMC.VE2 14:07:36 05/15/24



Bureau of Engraving and Printing Elevator 000018

Units: milli(g) File: OX85FJMC.VE2 14:07:36 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJXP.VE2
Trigger Time: 14:21:14
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	6.9	13.1	29.8	146.1
A95	2.0	2.9	13.5	4.5

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	65.4	77.5	78.5	78.5
L Aleq	59.4	70.8	69.9	64.8

Performance	Max	95	Average
Velocity (ft/min)	188.0	187.4	
Jerk (ft/s^3)	5.773		
Acceleration (ft/s^2)	1.958	1.774	0.853
Deceleration (ft/s^2)	2.786	2.523	1.170
Distance Travelled (ft)	81.9		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	13.1	25.0	52.24
Max Vertical Vib. ISO (milli(g))	29.8	25.0	119.18
Max Jerk (ft/s^3)	5.773	12.000	48.105
Max Velocity (ft/min)	188.0	200.0	94.0
Max Acceleration (ft/s^2)	2.786	2.500	111.451
Max Sound Level dB(A)	65.4	65.0	+0.4 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000019
Start/Stop	8 Stops, 8 front/ rear locked out
Comments	Otis Geared Machine
Comments	Original 1937 Controls, 1960s Door Controls
Comments	1000# at 200 FPM

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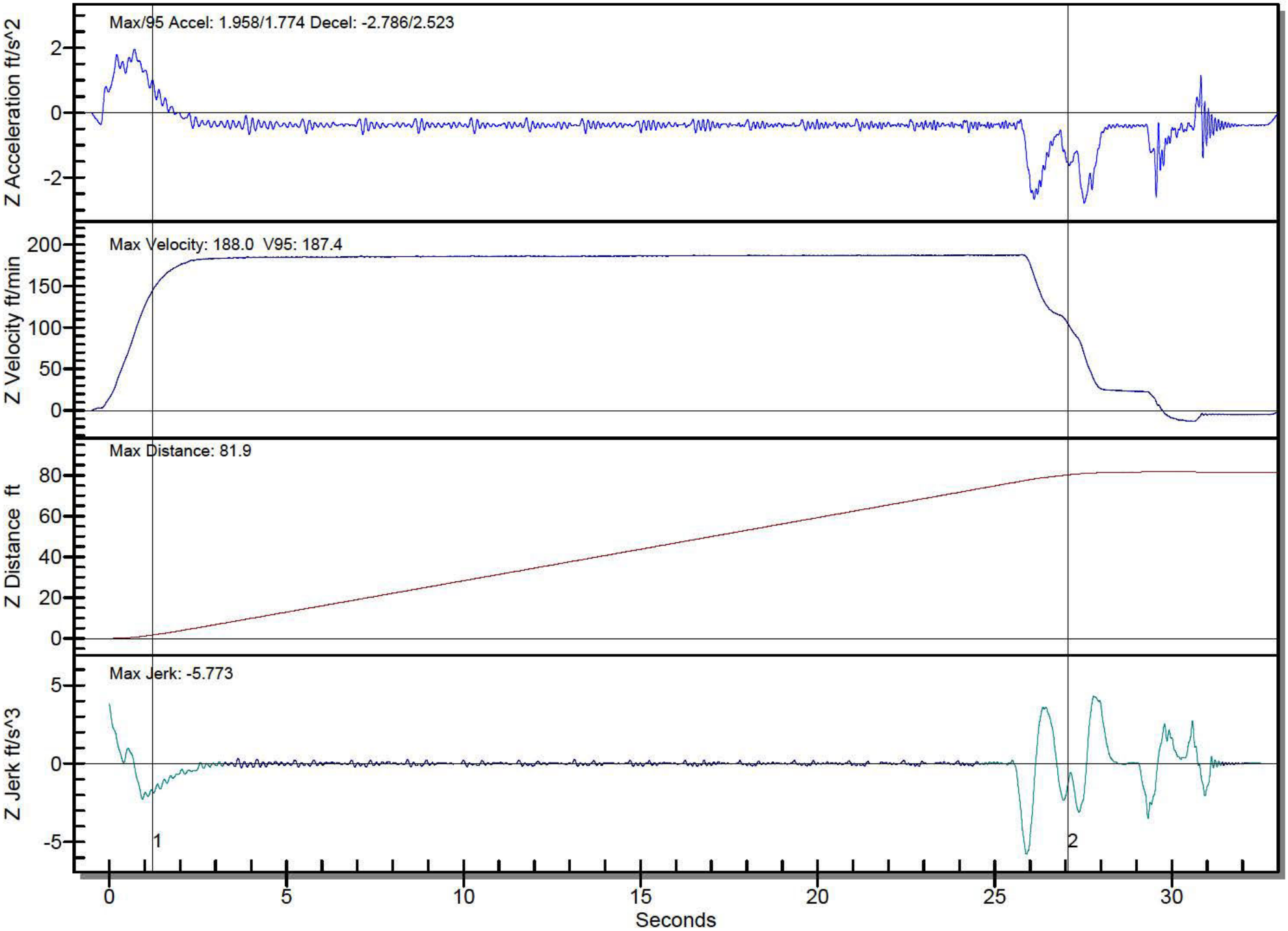
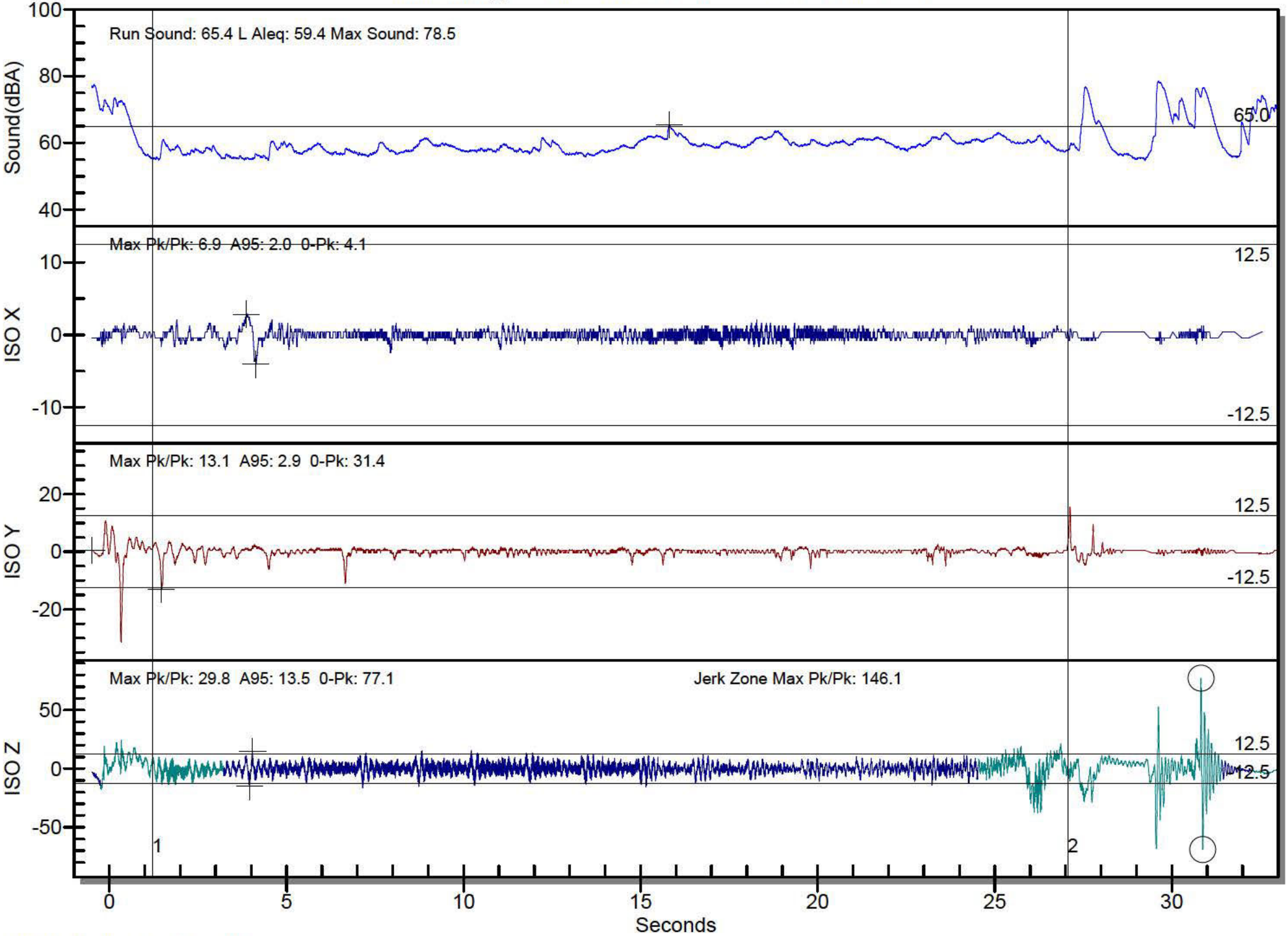
Bureau of Engraving and Printing Elevator 000019

Units: milli(g) File: OX85FJXP.VE2 14:21:14 05/15/24



Bureau of Engraving and Printing Elevator 000019

Units: milli(g) File: OX85FJXP.VE2 14:21:14 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJYL.VE2
Trigger Time: 14:22:18
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	4.1	13.1	40.8	136.7
A95	1.6	2.9	18.0	3.3

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	75.1	78.4	73.5	78.4
L Aleq	59.6	70.4	65.4	63.3

Performance	Max	95	Average
Velocity (ft/min)	164.5	164.2	
Jerk (ft/s^3)	9.929		
Acceleration (ft/s^2)	2.050	1.971	0.969
Deceleration (ft/s^2)	5.205	4.363	1.711
Distance Travelled (ft)	82.9		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	13.1	25.0	52.24
Max Vertical Vib. ISO (milli(g))	40.8	25.0	163.27
Max Jerk (ft/s^3)	9.929	12.000	82.740
Max Velocity (ft/min)	164.5	200.0	82.3
Max Acceleration (ft/s^2)	5.205	2.500	208.183
Max Sound Level dB(A)	75.1	65.0	+10.1 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000019
Start/Stop	8 Stops, 8 front/ rear locked out
Comments	Otis Geared Machine
Comments	Original 1937 Controls, 1960s Door Controls
Comments	1000# at 200 FPM

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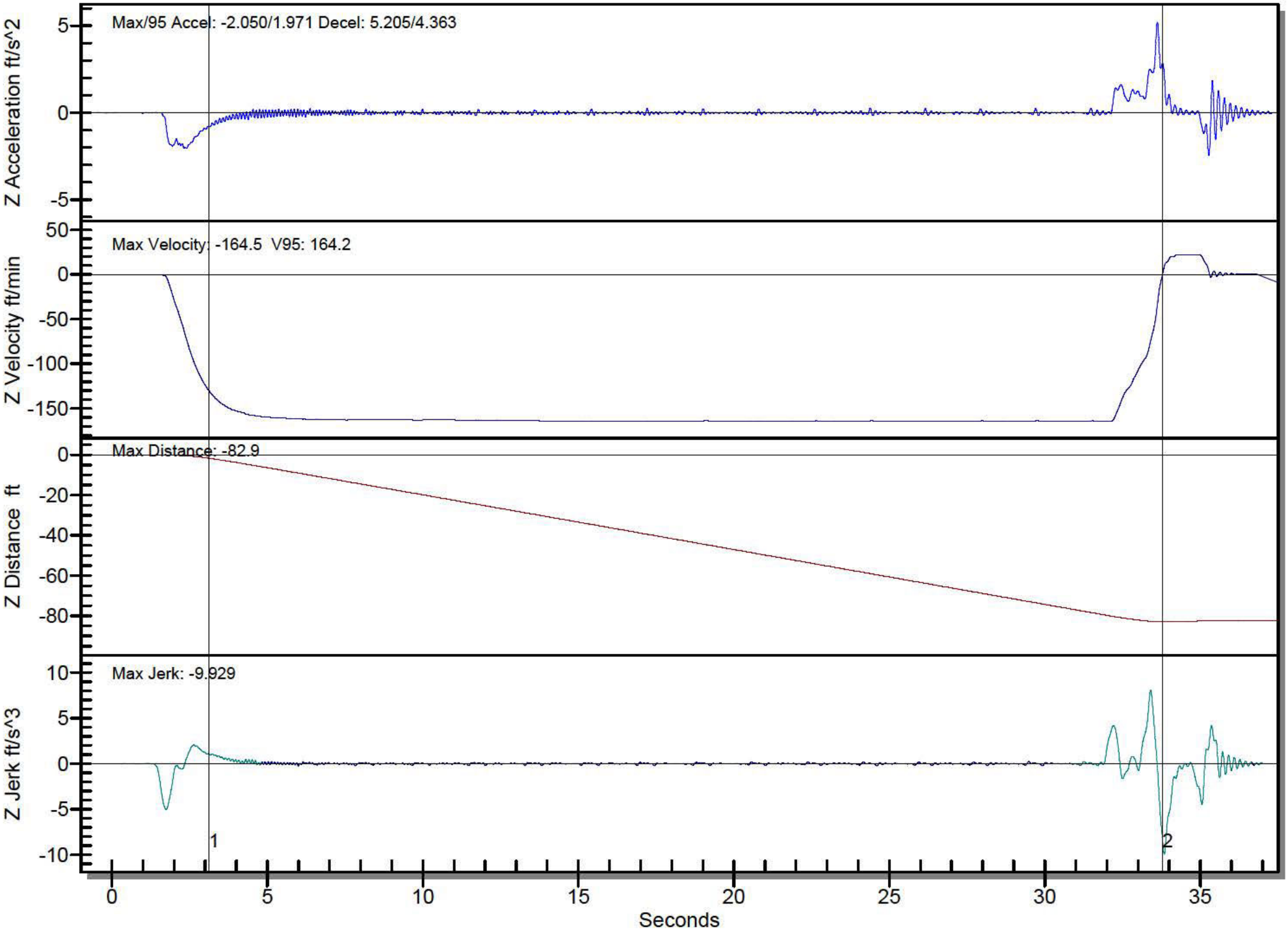
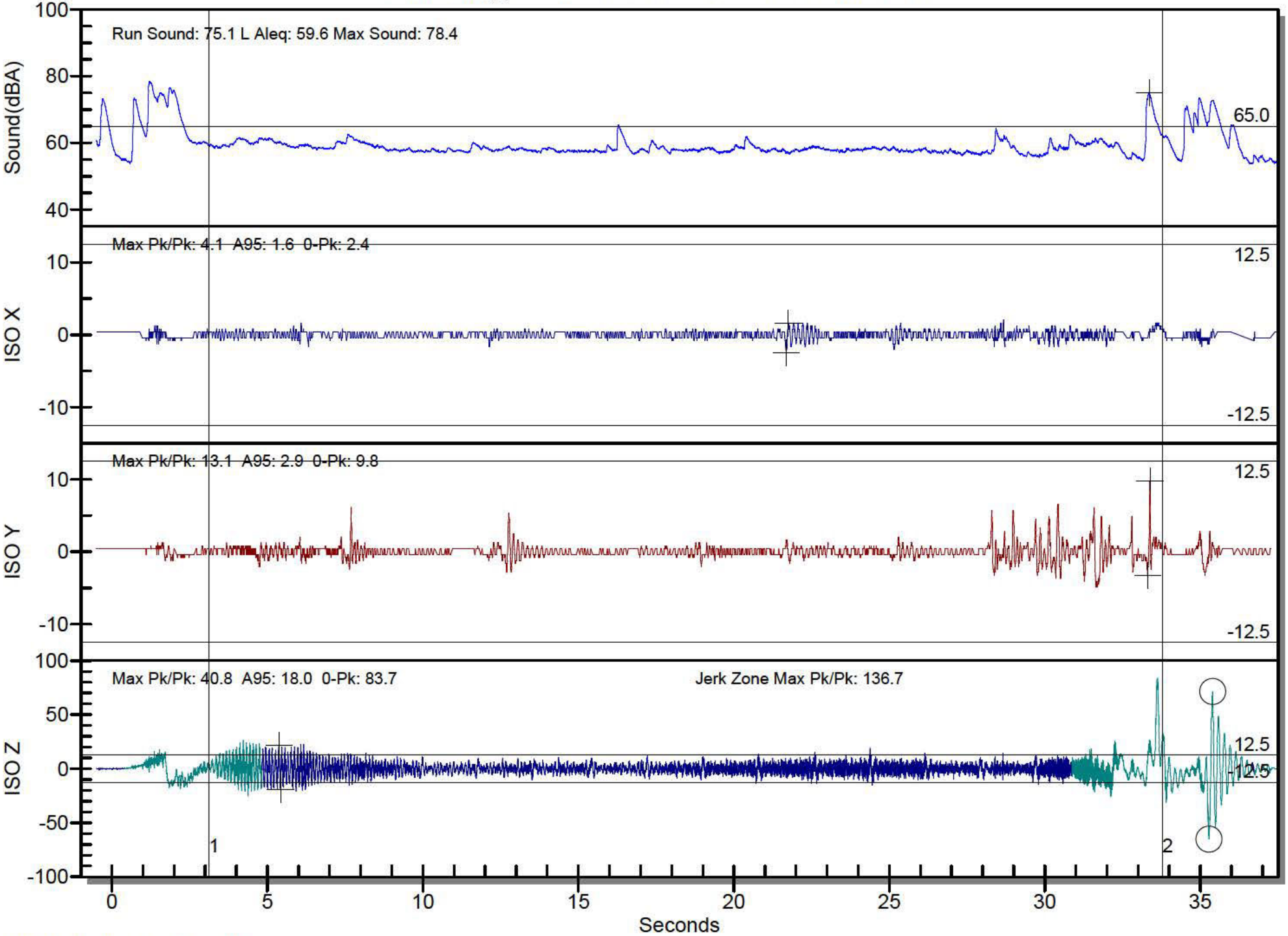
Bureau of Engraving and Printing Elevator 000019

Units: milli(g) File: OX85FJYL.VE2 14:22:18 05/15/24



Bureau of Engraving and Printing Elevator 000019

Units: milli(g) File: OX85FJYL.VE2 14:22:18 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJS0.VE2
Trigger Time: 14:14:25
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	6.5	14.7	34.3	124.1
A95	3.7	5.3	26.1	14.3

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	63.1	68.4	64.7	68.4
L Aleq	61.4	60.7	60.6	61.0

Performance	Max	95	Average
Velocity (ft/min)	486.9	486.5	
Jerk (ft/s^3)	10.720		
Acceleration (ft/s^2)	5.717	3.877	2.803
Deceleration (ft/s^2)	2.629	2.589	2.297
Distance Travelled (ft)	82.0		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	14.7	20.0	73.47
Max Vertical Vib. ISO (milli(g))	34.3	20.0	171.43
Max Jerk (ft/s^3)	10.720	8.000	134.006
Max Velocity (ft/min)	486.9	500.0	97.4
Max Acceleration (ft/s^2)	5.717	3.200	178.661
Max Sound Level dB(A)	63.1	60.0	+3.1 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000022
Start/Stop	B, 1 - 7
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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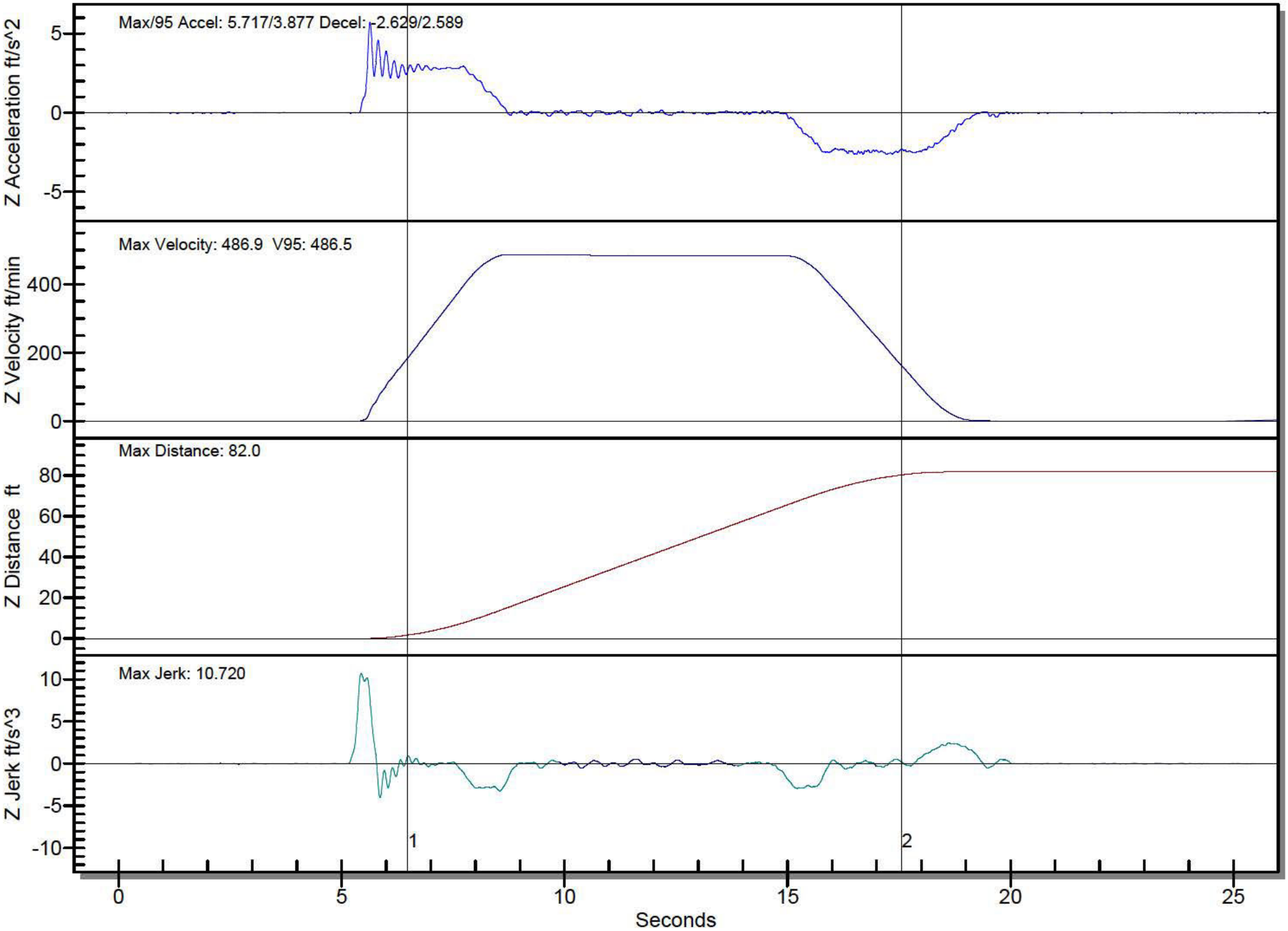
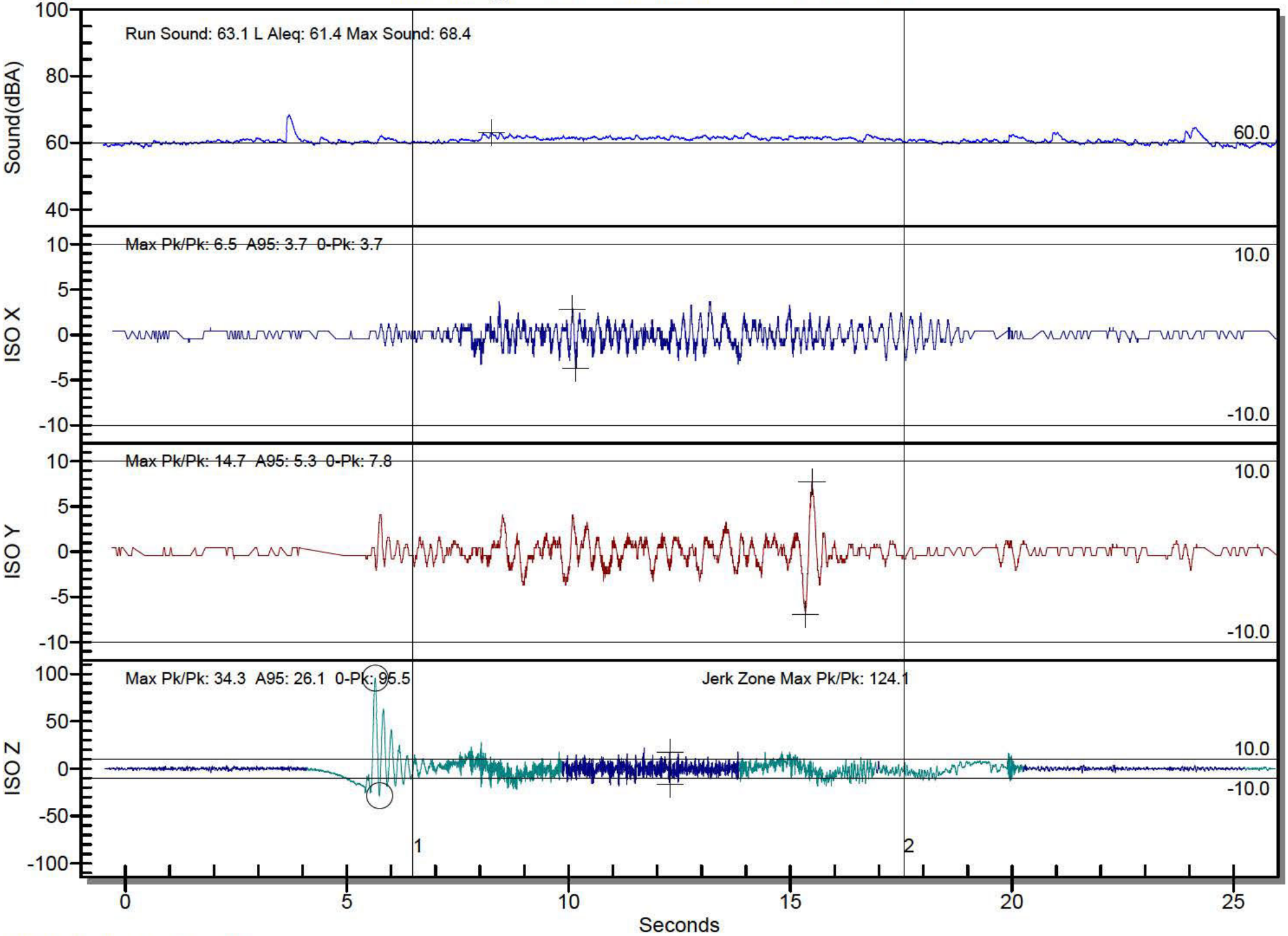
Bureau of Engraving and Printing Elevator 000022

Units: milli(g) File: OX85FJS0.VE2 14:14:25 05/15/24



Bureau of Engraving and Printing Elevator 000022

Units: milli(g) File: OX85FJS0.VE2 14:14:25 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJQU.VE2
Trigger Time: 14:13:01
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	6.9	10.6	26.1	117.6
A95	4.5	5.7	18.0	12.2

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	64.7	68.8	64.7	68.8
L Aleq	61.2	61.4	60.2	61.0

Performance	Max	95	Average
Velocity (ft/min)	487.2	486.9	
Jerk (ft/s^3)	9.929		
Acceleration (ft/s^2)	4.127	3.614	2.806
Deceleration (ft/s^2)	2.707	2.629	2.252
Distance Travelled (ft)	82.3		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	10.6	20.0	53.06
Max Vertical Vib. ISO (milli(g))	26.1	20.0	130.61
Max Jerk (ft/s^3)	9.929	8.000	124.110
Max Velocity (ft/min)	487.2	500.0	97.4
Max Acceleration (ft/s^2)	4.127	3.200	128.964
Max Sound Level dB(A)	64.7	60.0	+4.7 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000022
Start/Stop	B, 2 - 7
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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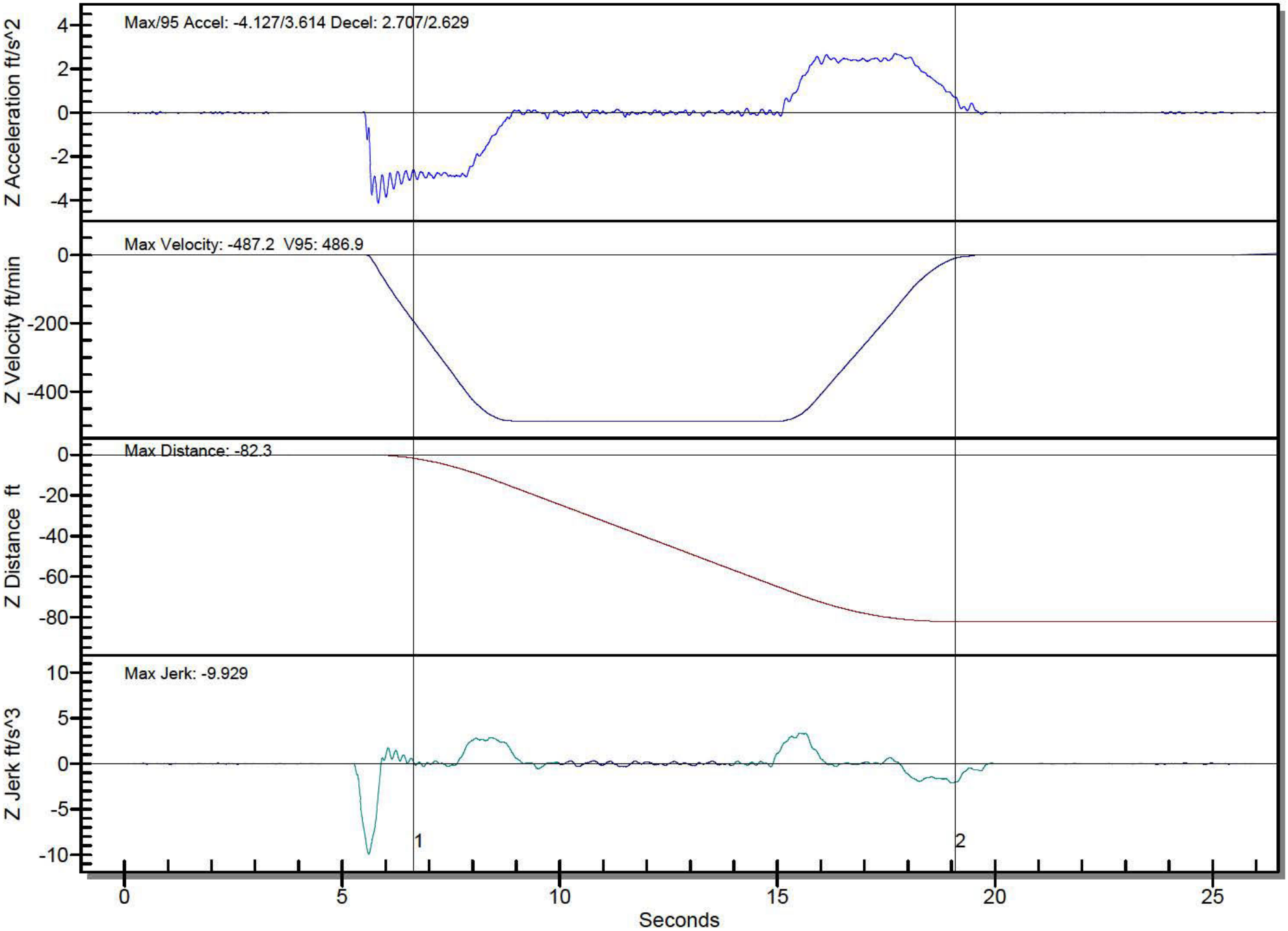
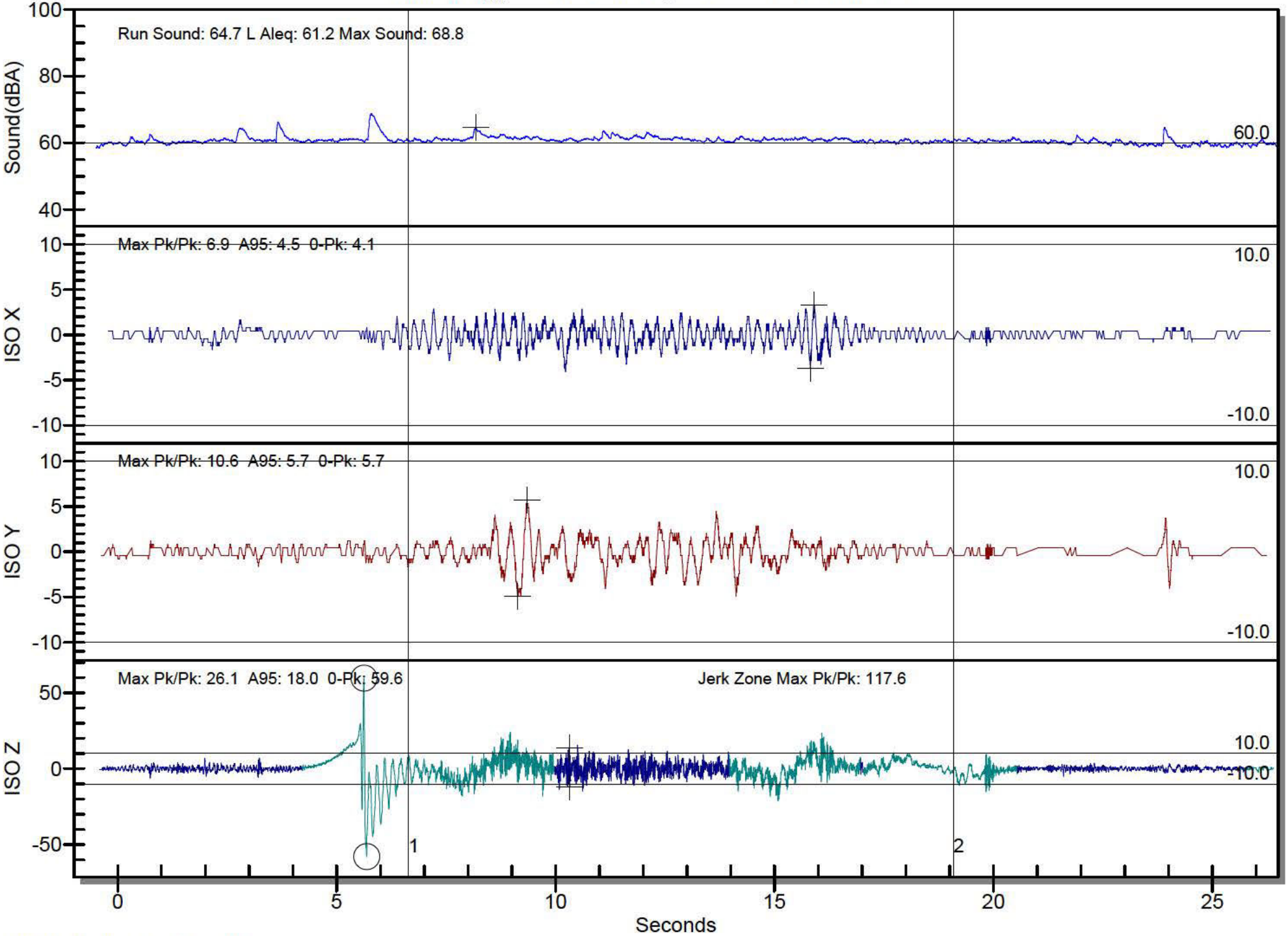
Bureau of Engraving and Printing Elevator 000022

Units: milli(g) File: OX85FJQU.VE2 14:13:01 05/15/24



Bureau of Engraving and Printing Elevator 000022

Units: milli(g) File: OX85FJQU.VE2 14:13:01 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJV9.VE2
Trigger Time: 14:18:18
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	5.7	19.2	30.2	82.0
A95	2.9	10.2	21.2	15.1

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	65.6	62.9	66.7	66.7
L Aleq	59.7	58.5	59.9	59.5

Performance	Max	95	Average
Velocity (ft/min)	495.2	494.6	
Jerk (ft/s^3)	8.279		
Acceleration (ft/s^2)	4.127	3.181	2.609
Deceleration (ft/s^2)	2.747	2.707	2.316
Distance Travelled (ft)	82.3		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	19.2	20.0	95.92
Max Vertical Vib. ISO (milli(g))	30.2	20.0	151.02
Max Jerk (ft/s^3)	8.279	8.000	103.494
Max Velocity (ft/min)	495.2	500.0	99.0
Max Acceleration (ft/s^2)	4.127	3.200	128.964
Max Sound Level dB(A)	65.6	60.0	+5.6 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000024
Start/Stop	B, 1 - 7
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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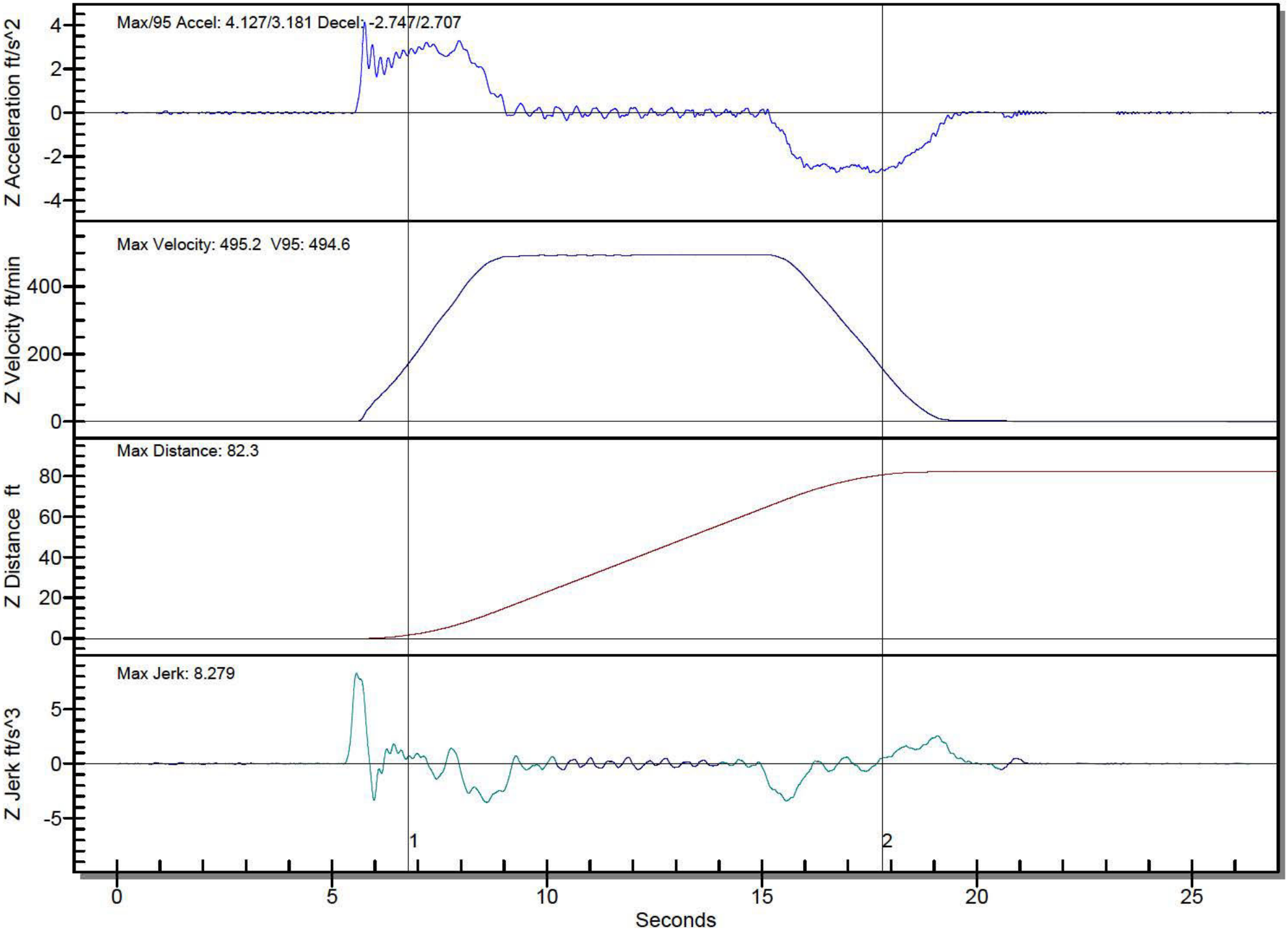
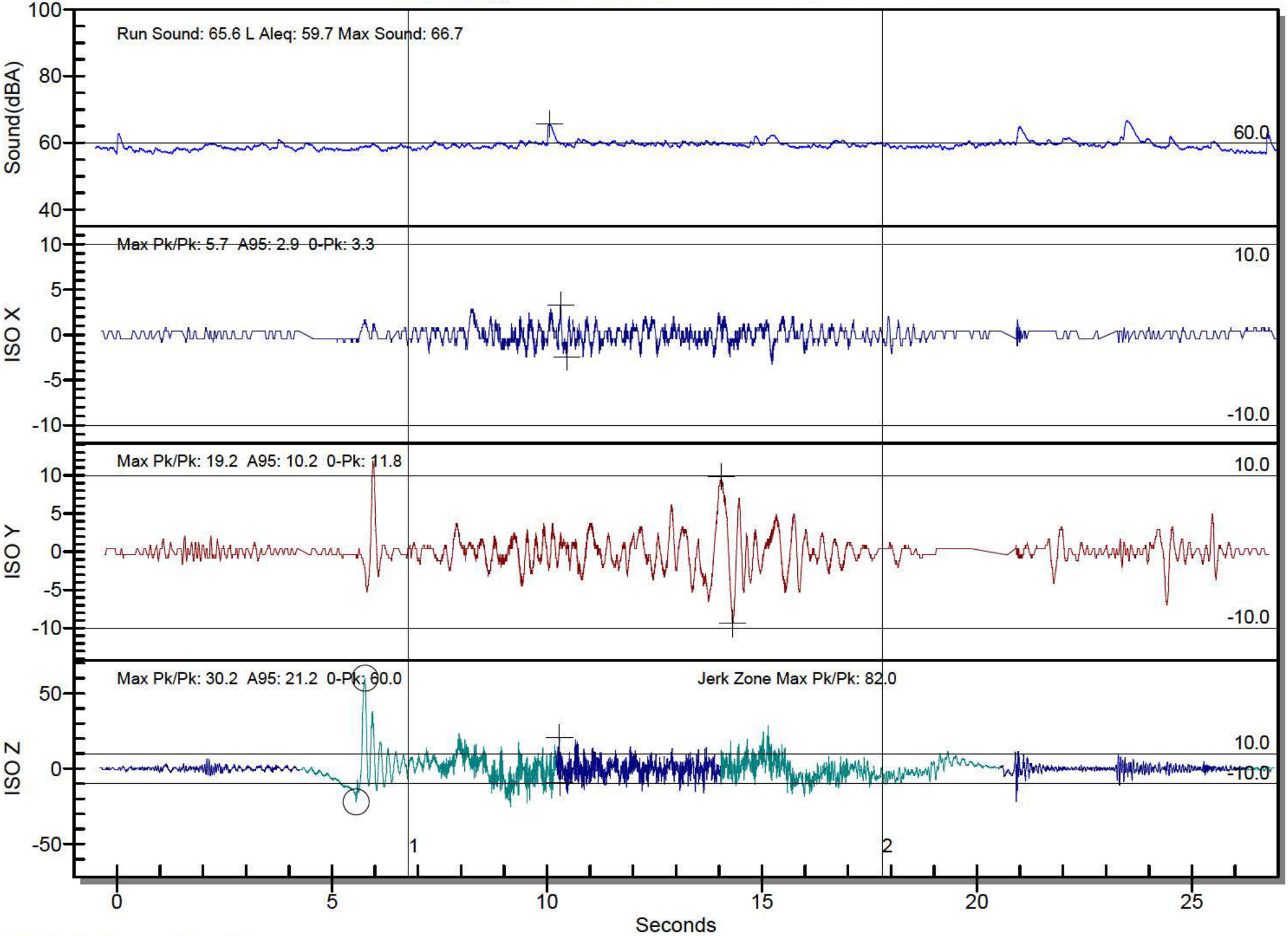
Bureau of Engraving and Printing Elevator 000024

Units: milli(g) File: OX85FJV9.VE2 14:18:18 05/15/24



Bureau of Engraving and Printing Elevator 000024

Units: milli(g) File: OX85FJV9.VE2 14:18:18 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJTX.VE2
Trigger Time: 14:16:43
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	4.5	14.7	27.3	74.3
A95	2.9	6.9	21.6	12.2

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	66.9	65.6	66.6	66.9
L Aleq	60.0	59.6	59.0	59.6

Performance	Max	95	Average
Velocity (ft/min)	496.5	495.9	
Jerk (ft/s^3)	6.498		
Acceleration (ft/s^2)	3.181	3.141	2.659
Deceleration (ft/s^2)	2.721	2.668	2.323
Distance Travelled (ft)	82.2		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	14.7	20.0	73.47
Max Vertical Vib. ISO (milli(g))	27.3	20.0	136.73
Max Jerk (ft/s^3)	6.498	8.000	81.228
Max Velocity (ft/min)	496.5	500.0	99.3
Max Acceleration (ft/s^2)	3.181	3.200	99.393
Max Sound Level dB(A)	66.9	60.0	+6.9 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000024
Start/Stop	B, 1 - 7
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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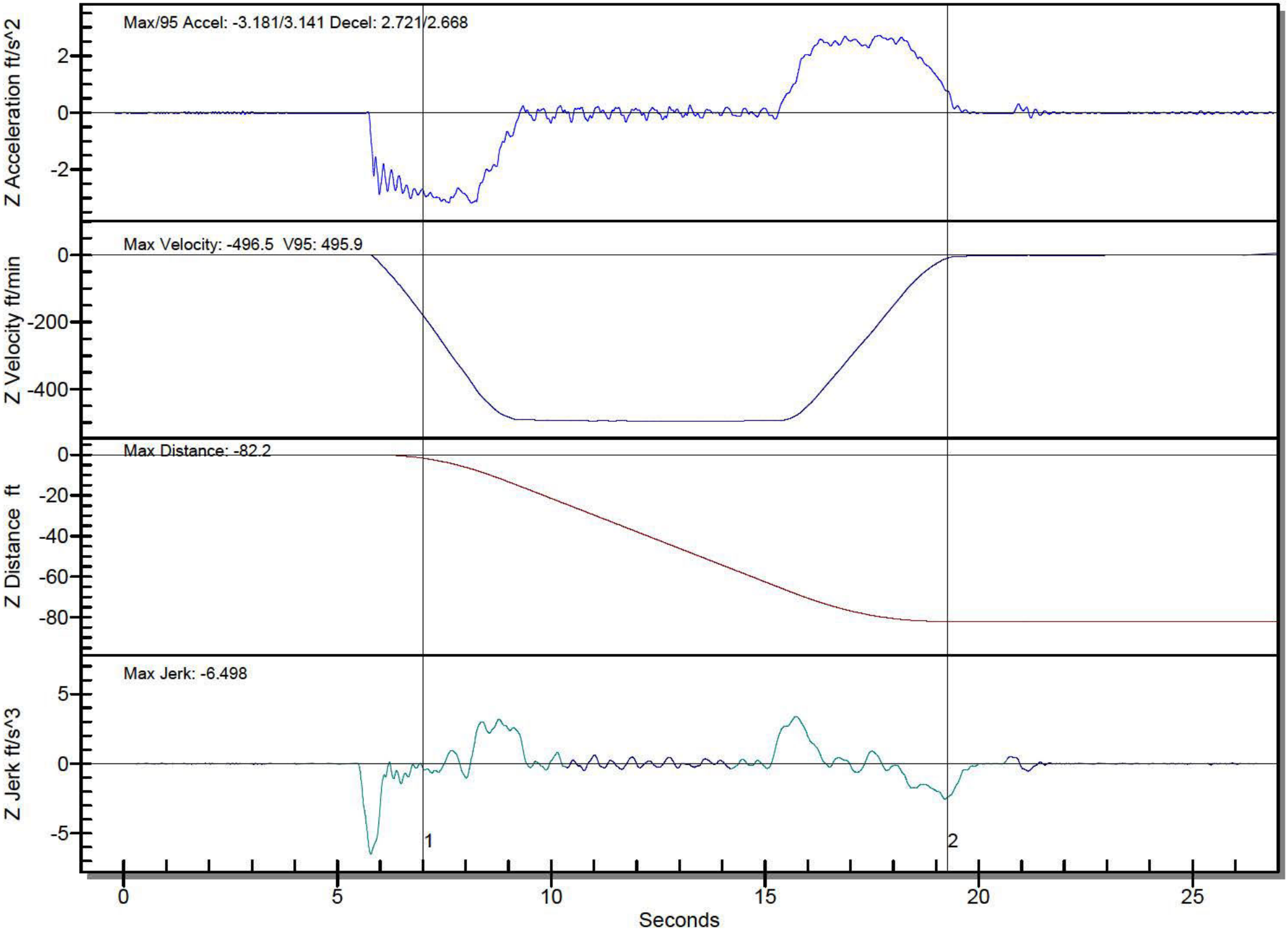
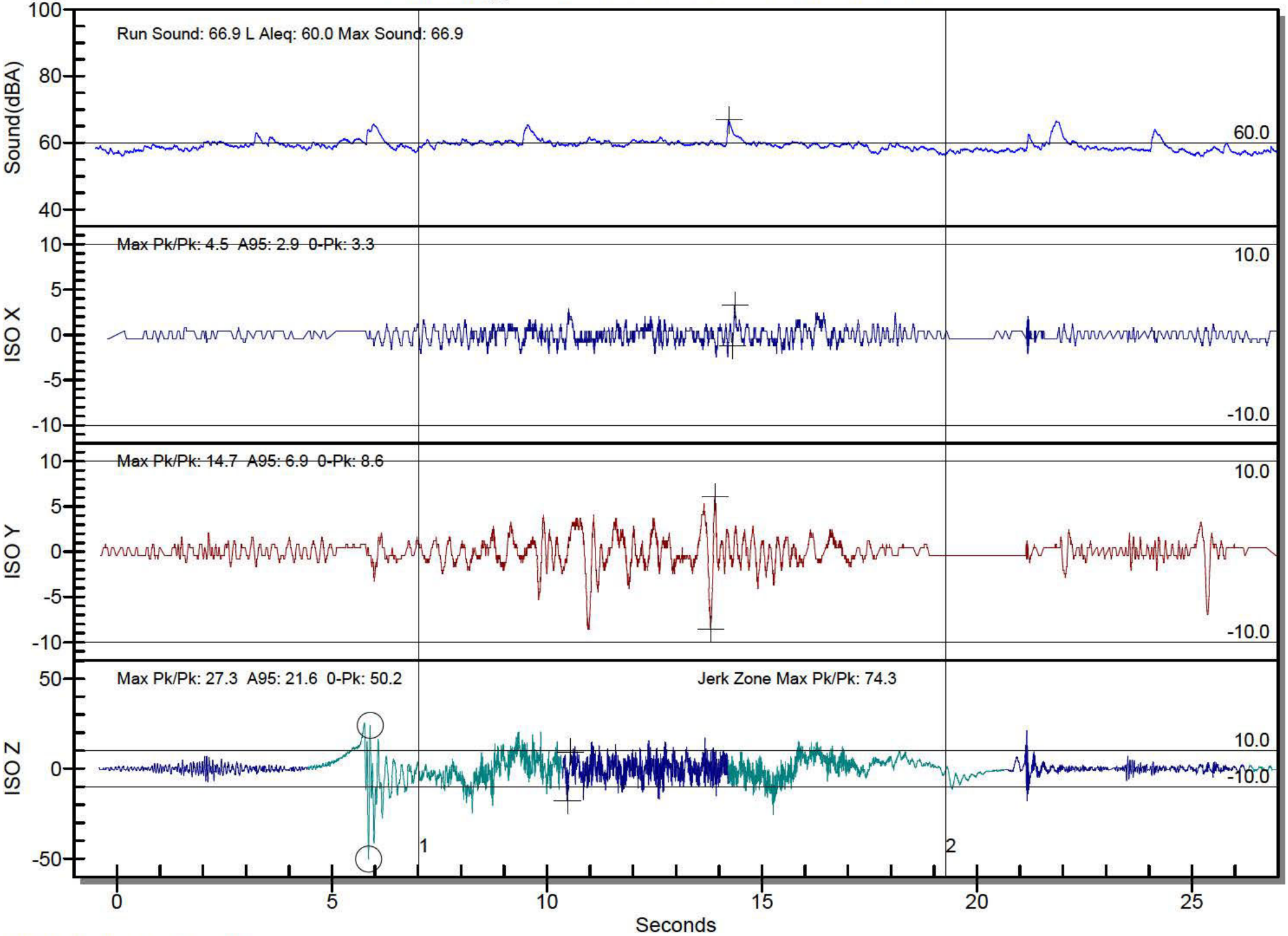
Bureau of Engraving and Printing Elevator 000024

Units: milli(g) File: OX85FJTX.VE2 14:16:43 05/15/24



Bureau of Engraving and Printing Elevator 000024

Units: milli(g) File: OX85FJTX.VE2 14:16:43 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85GEZV.VE2
Trigger Time: 10:47:51
Trigger Date: 05/16/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	7.3	20.4	33.1	64.5
A95	3.3	9.4	21.6	20.0

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	66.5	85.7	59.3	85.7
L Aleq	61.5	73.9	55.3	67.7

Performance	Max	95	Average
Velocity (ft/min)	483.0	483.0	
Jerk (ft/s^3)	6.663		
Acceleration (ft/s^2)	3.023	2.944	2.678
Deceleration (ft/s^2)	2.694	2.576	2.256
Distance Travelled (ft)	81.6		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	20.4	20.0	102.04
Max Vertical Vib. ISO (milli(g))	33.1	20.0	165.31
Max Jerk (ft/s^3)	6.663	8.000	83.290
Max Velocity (ft/min)	483.0	500.0	96.6
Max Acceleration (ft/s^2)	3.023	3.200	94.464
Max Sound Level dB(A)	66.5	60.0	+6.5 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000026
Start/Stop	B, 1 - 7
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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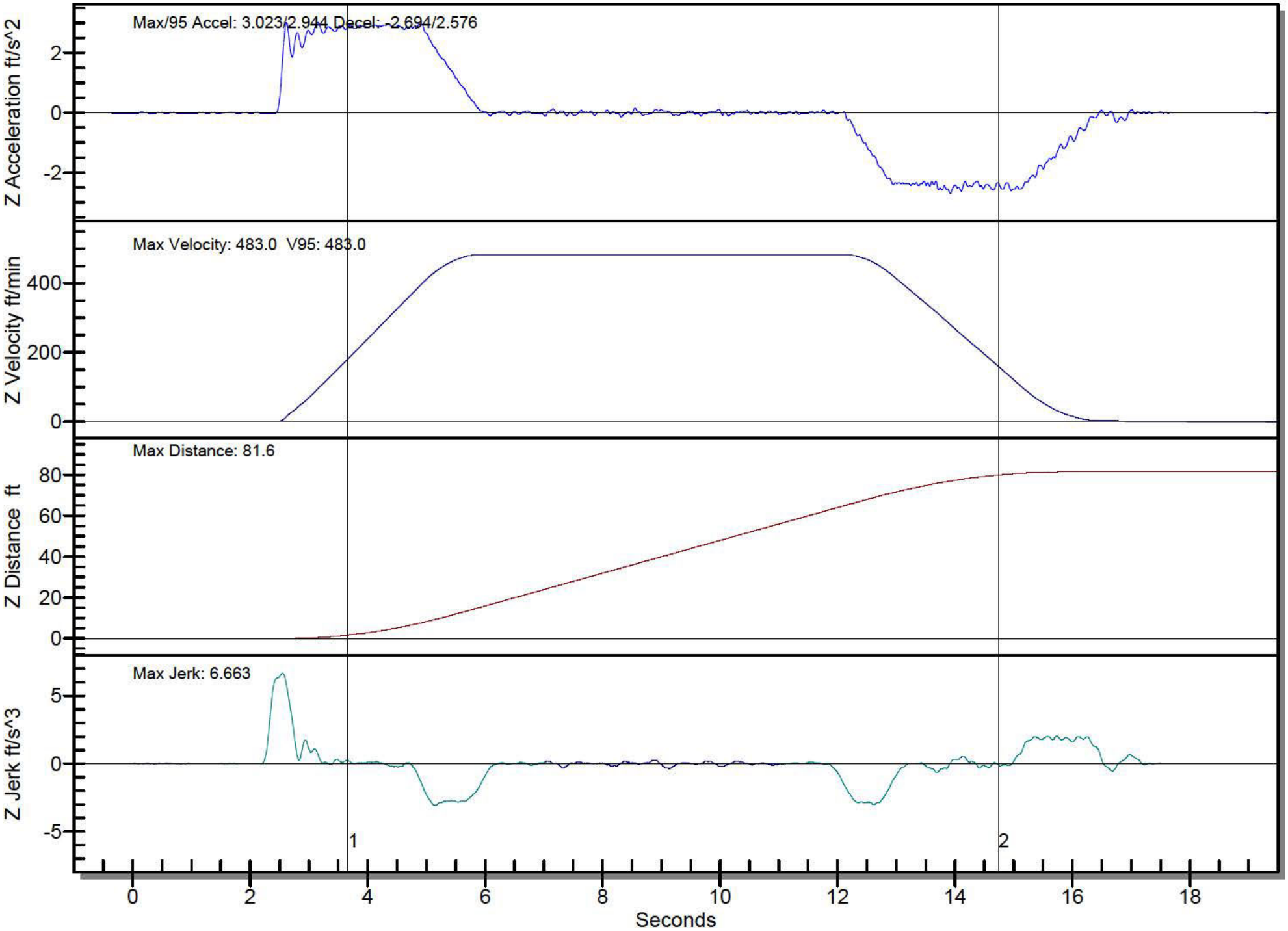
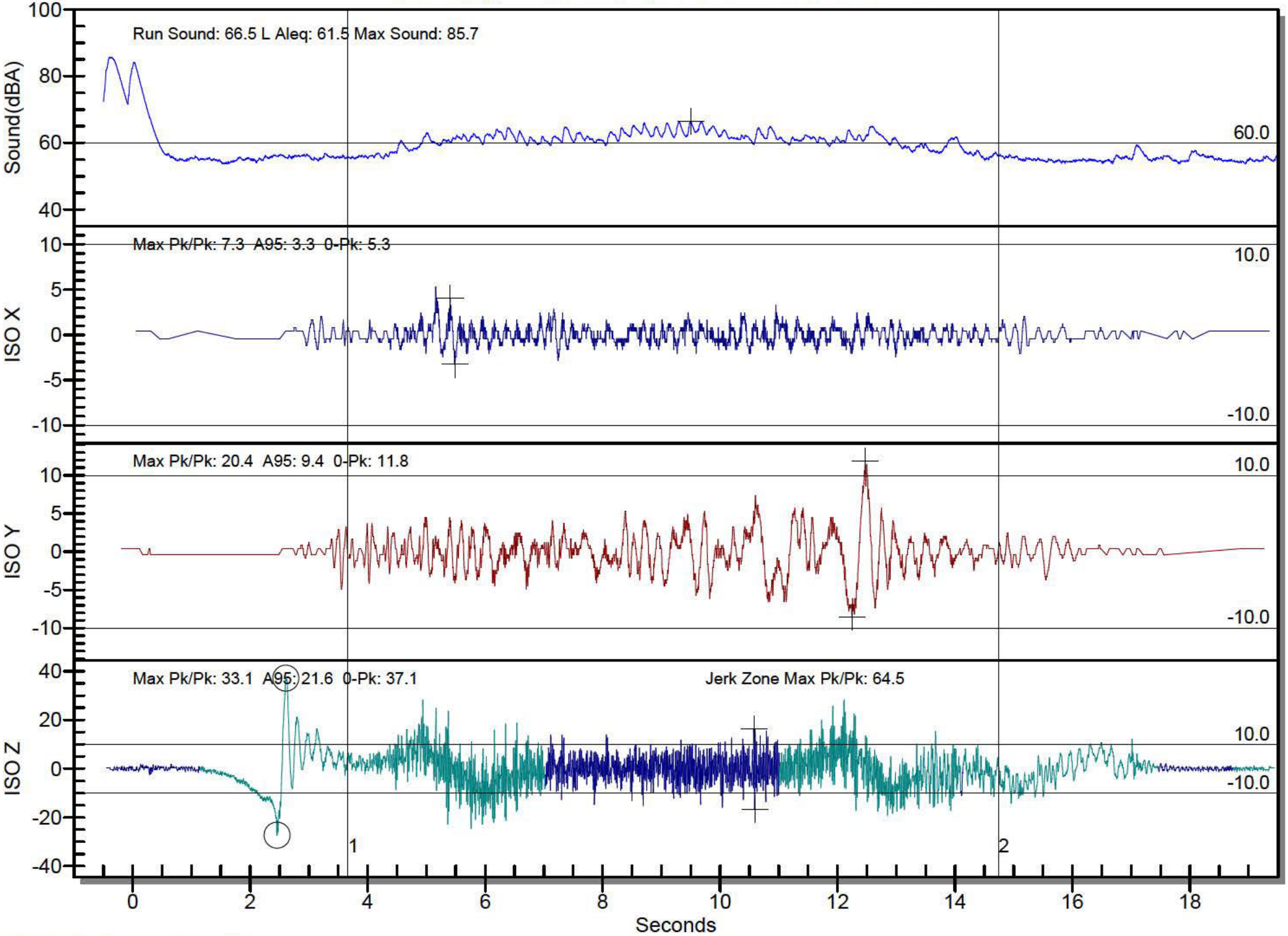
Bureau of Engraving and Printing Elevator 000026

Units: milli(g) File: OX85GEZV.VE2 10:47:51 05/16/24



Bureau of Engraving and Printing Elevator 000026

Units: milli(g) File: OX85GEZV.VE2 10:47:51 05/16/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85GF0R.VE2
Trigger Time: 10:48:55
Trigger Date: 05/16/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	4.1	19.2	38.0	49.0
A95	2.9	8.2	28.2	14.3

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	66.4	89.6	57.3	89.6
L Aleq	60.9	80.3	54.5	73.4

Performance	Max	95	Average
Velocity (ft/min)	482.4	482.4	
Jerk (ft/s^3)	6.003		
Acceleration (ft/s^2)	3.220	3.075	2.721
Deceleration (ft/s^2)	2.694	2.563	2.222
Distance Travelled (ft)	81.8		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	19.2	20.0	95.92
Max Vertical Vib. ISO (milli(g))	38.0	20.0	189.80
Max Jerk (ft/s^3)	6.003	8.000	75.043
Max Velocity (ft/min)	482.4	500.0	96.5
Max Acceleration (ft/s^2)	3.220	3.200	100.625
Max Sound Level dB(A)	66.4	60.0	+6.4 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000026
Start/Stop	B, 1 -7
Comments	Otis Gearless Machine
Comments	MCE Controls
Comments	3000# at 500 FPM

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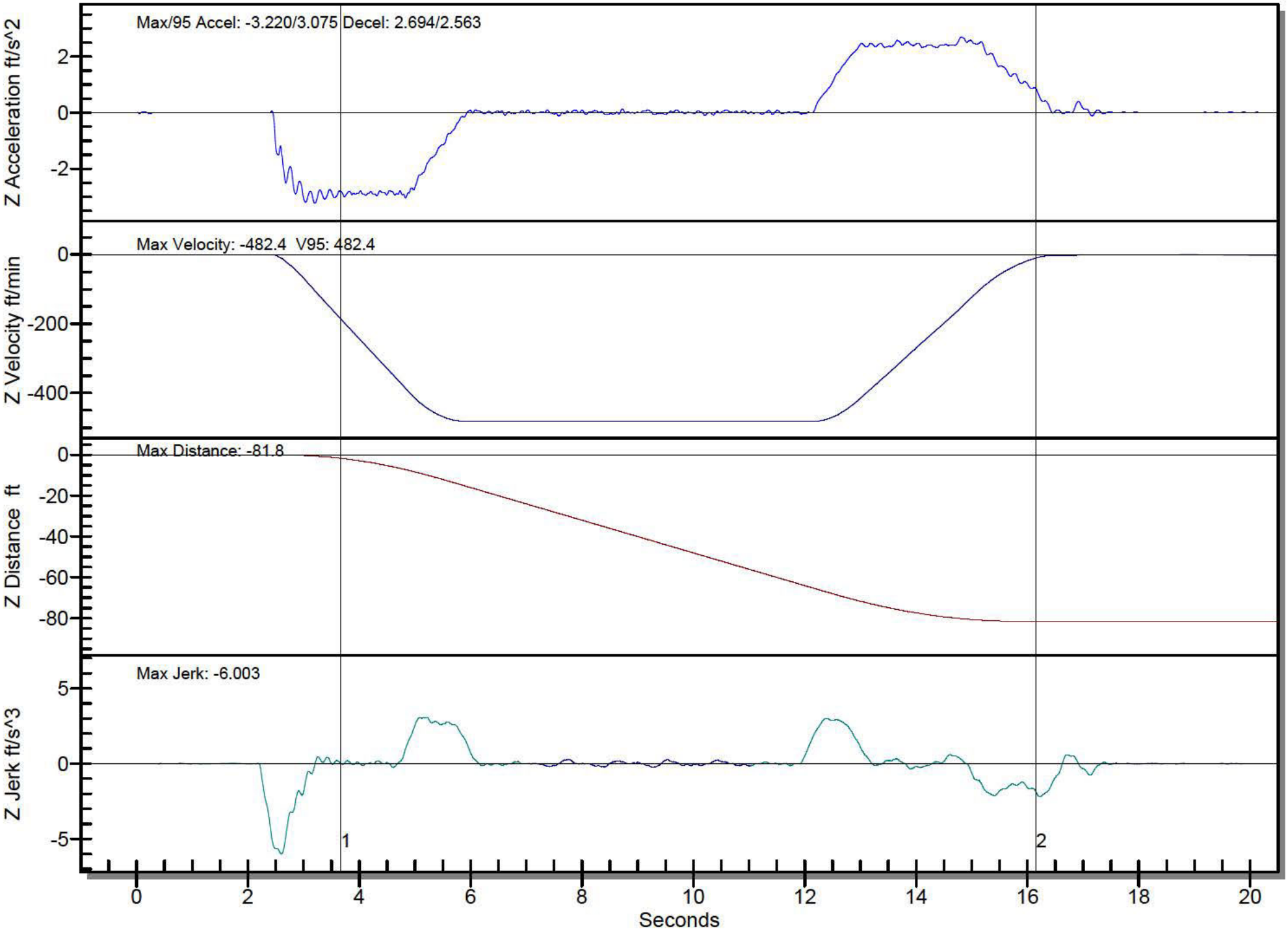
Bureau of Engraving and Printing Elevator 000026

Units: milli(g) File: OX85GF0R.VE2 10:48:55 05/16/24



Bureau of Engraving and Printing Elevator 000026

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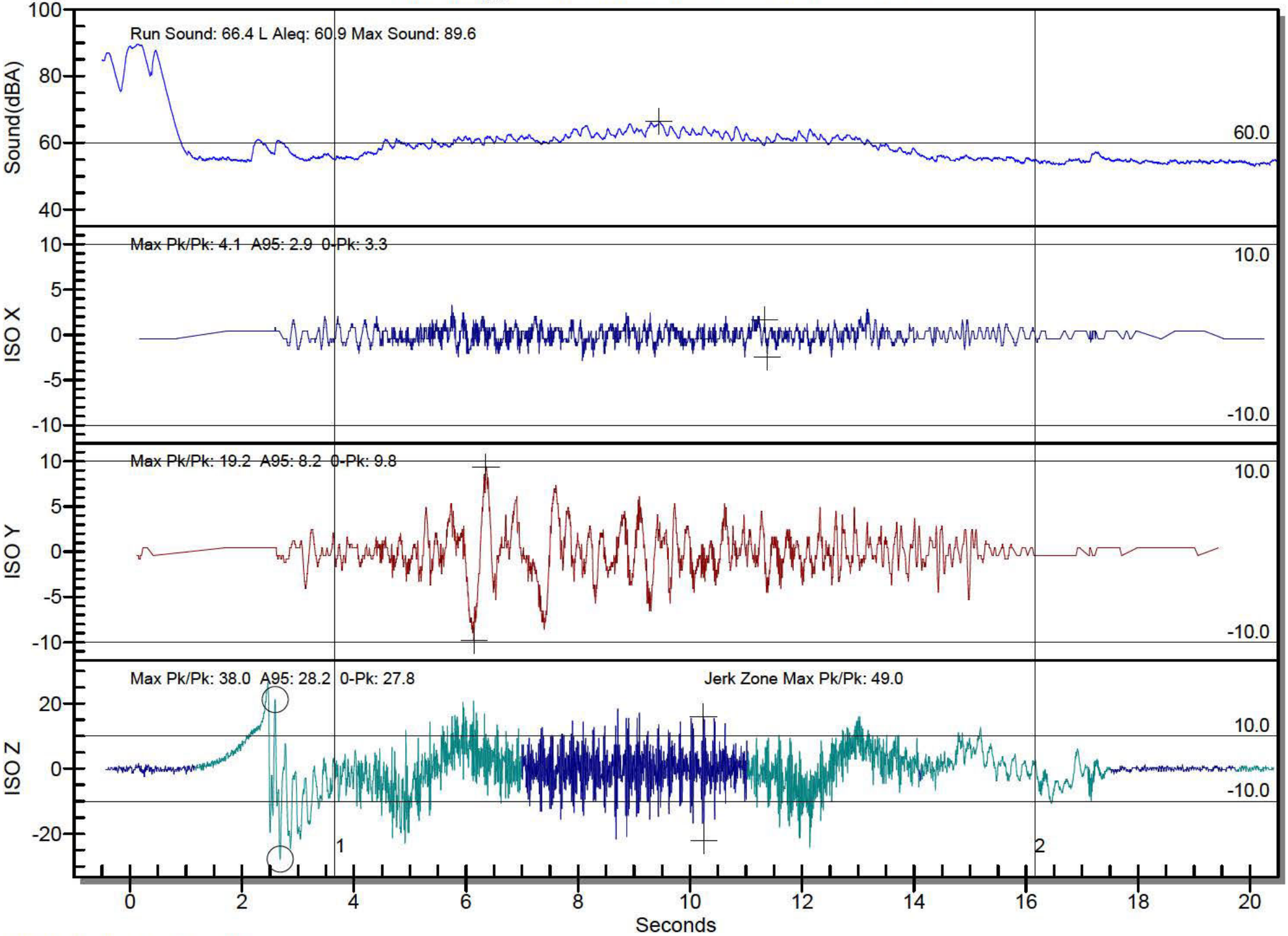

ISO Whole Body X,Y,Z 1999

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Filename: OX85FJOS.VE2
Trigger Time: 14:10:32
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	1.2	1.6	6.5	88.6
A95	1.2	1.2	5.7	4.1

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	62.5	69.3	67.8	69.3
L Aleq	59.7	60.0	59.4	59.7

Performance	Max	95	Average
Velocity (ft/min)	57.0	56.0	
Jerk (ft/s^3)	7.653		
Acceleration (ft/s^2)	3.246	3.194	1.882
Deceleration (ft/s^2)	2.221	2.169	1.005
Distance Travelled (ft)	10.1		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	1.6	25.0	6.53
Max Vertical Vib. ISO (milli(g))	6.5	25.0	26.12
Max Jerk (ft/s^3)	7.653	12.000	63.773
Max Velocity (ft/min)	57.0	50.0	114.0
Max Acceleration (ft/s^2)	3.246	1.600	202.893
Max Sound Level dB(A)	62.5	60.0	+2.5 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000031
Start/Stop	7 - 8
Comments	Hollister Geared Machine
Comments	MCE Controls
Comments	3000# at 50 FPM

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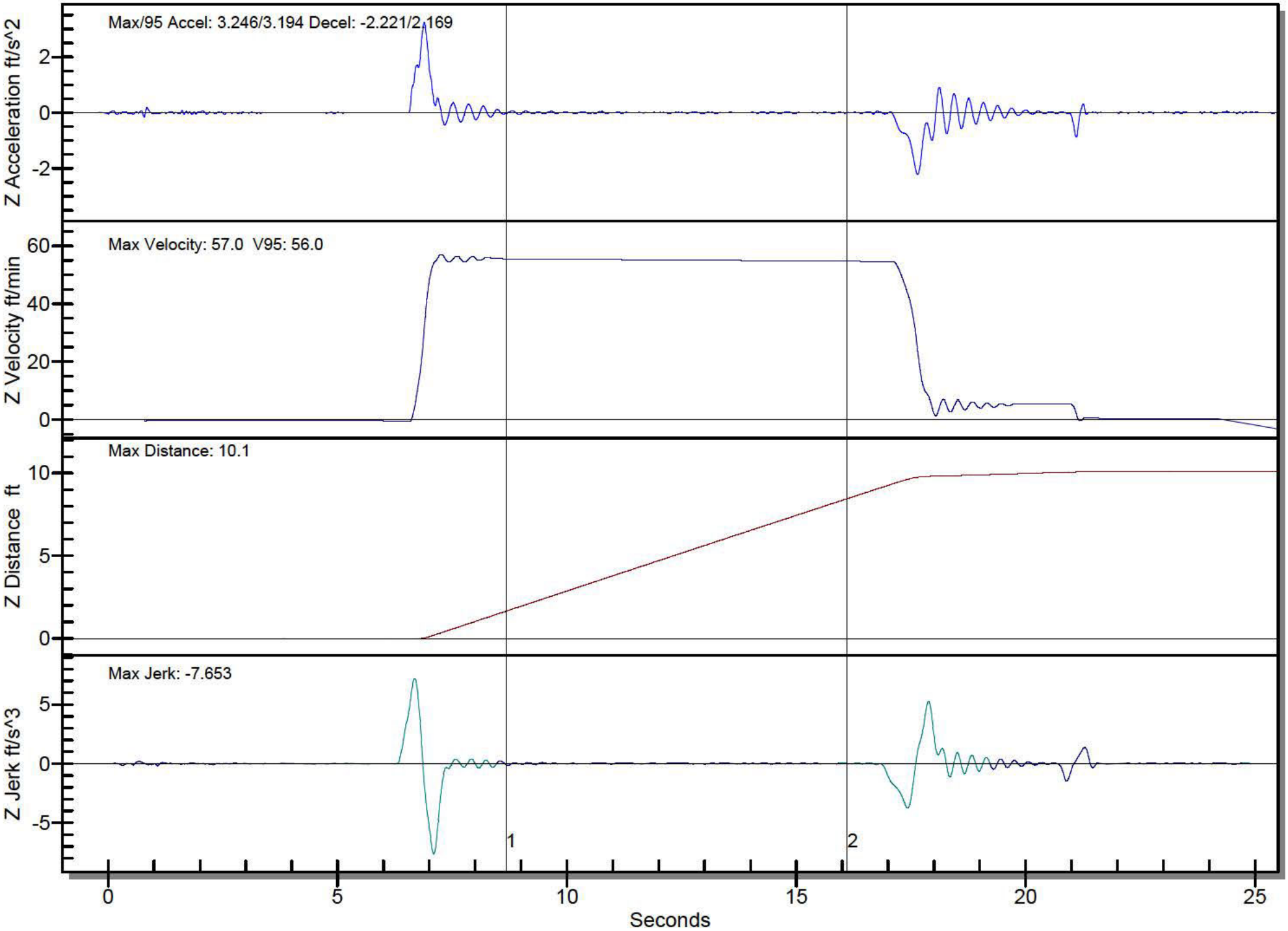
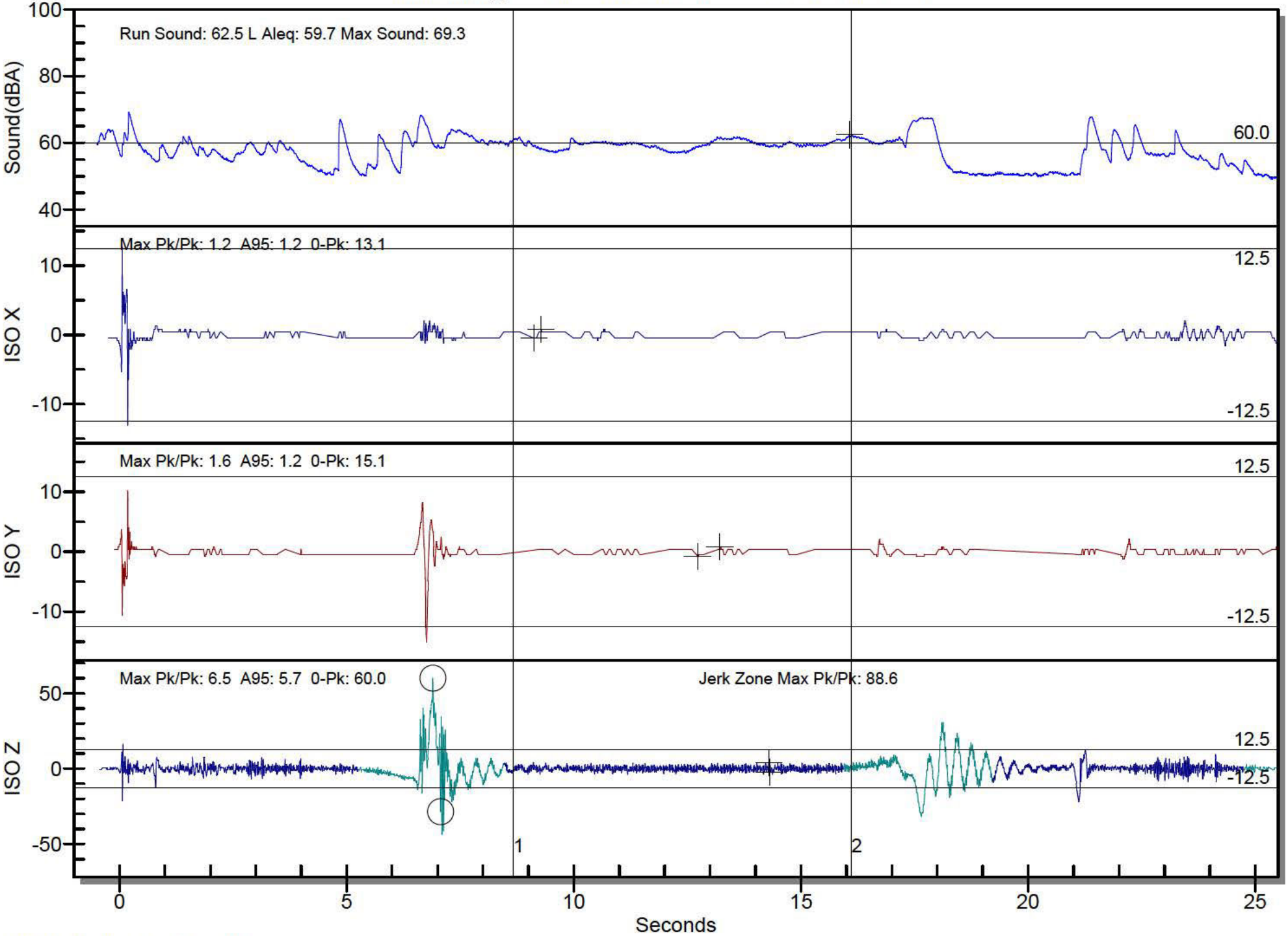
Bureau of Engraving and Printing Elevator 000031

Units: milli(g) File: OX85FJOS.VE2 14:10:32 05/15/24



Bureau of Engraving and Printing Elevator 000031

Units: milli(g) File: OX85FJOS.VE2 14:10:32 05/15/24



ISO Whole Body X,Y,Z 1999

[redacted]

Filename: OX85FJPJ.VE2
Trigger Time: 14:11:27
Trigger Date: 05/15/24
EVA Serial Number: E99043489
EVA Vibration Analysis Tools Test Version 8.75.2006

Measurements

ISO Ride Quality (milli(g))*	X	Y	Z	Jerk Zone
Max Pk to Pk	1.2	1.6	6.9	60.0
A95	1.2	1.2	4.9	3.7

*ISO Whole Body X,Y,Z 1999

Sound Level dB(A)	Full Run	Pre-Run	Post-Run	Full Record
Max	70.1	72.6	68.5	72.6
L Aleq	59.5	61.4	60.2	60.3

Performance	Max	95	Average
Velocity (ft/min)	59.6	59.6	
Jerk (ft/s^3)	7.884		
Acceleration (ft/s^2)	3.036	2.997	1.815
Deceleration (ft/s^2)	2.247	0.789	0.092
Distance Travelled (ft)	10.3		

Analysis	Measured	Limit	% Limit
Max Horizontal Vib. ISO (milli(g))	1.6	25.0	6.53
Max Vertical Vib. ISO (milli(g))	6.9	25.0	27.76
Max Jerk (ft/s^3)	7.884	12.000	65.697
Max Velocity (ft/min)	59.6	50.0	119.1
Max Acceleration (ft/s^2)	3.036	1.600	189.750
Max Sound Level dB(A)	70.1	60.0	+10.1 dB

Report

Project	Bureau of Engraving and Printing
Client	Bureau of Engraving and Printing
Operator	[redacted]
[redacted]	[redacted]
Location	Washington, D.C.
Elevator	000031
Start/Stop	7 - 8
Comments	Hollister Geared Machine
Comments	MCE Controls
Comments	3000# at 50 FPM

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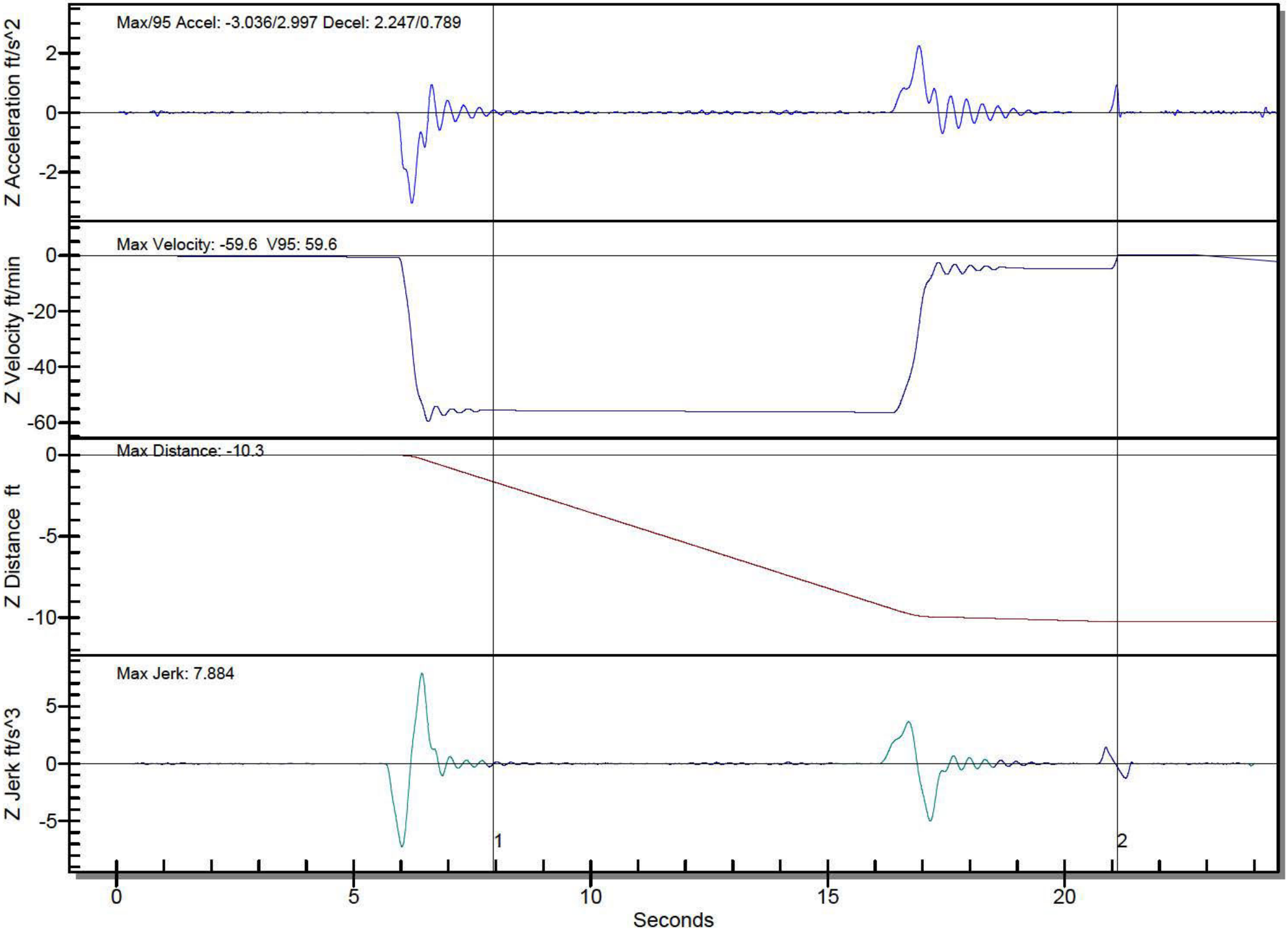
Bureau of Engraving and Printing Elevator 000031

Units: milli(g) File: OX85FJPJ.VE2 14:11:27 05/15/24



Bureau of Engraving and Printing Elevator 000031

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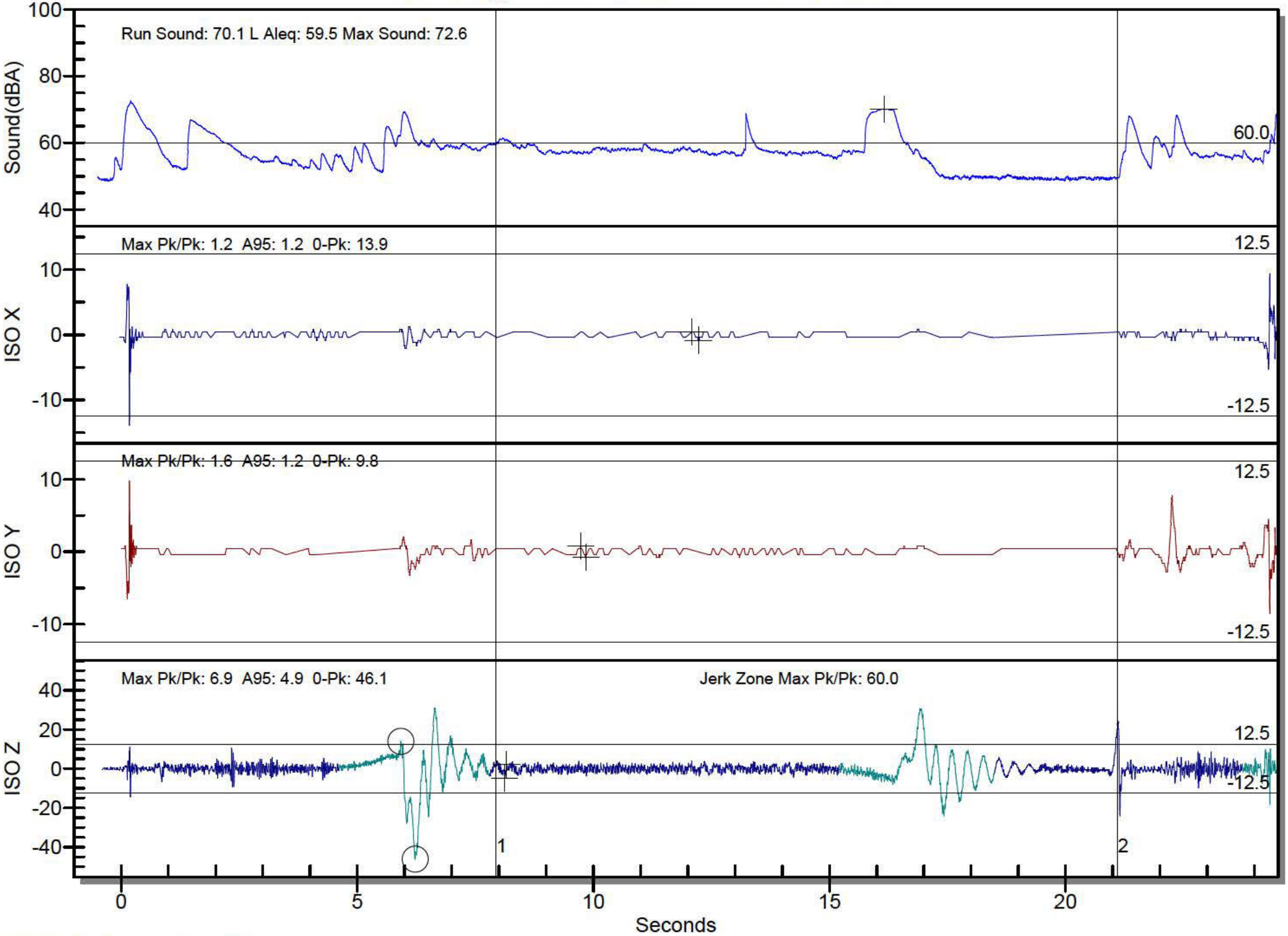

ISO Whole Body X,Y,Z 1999