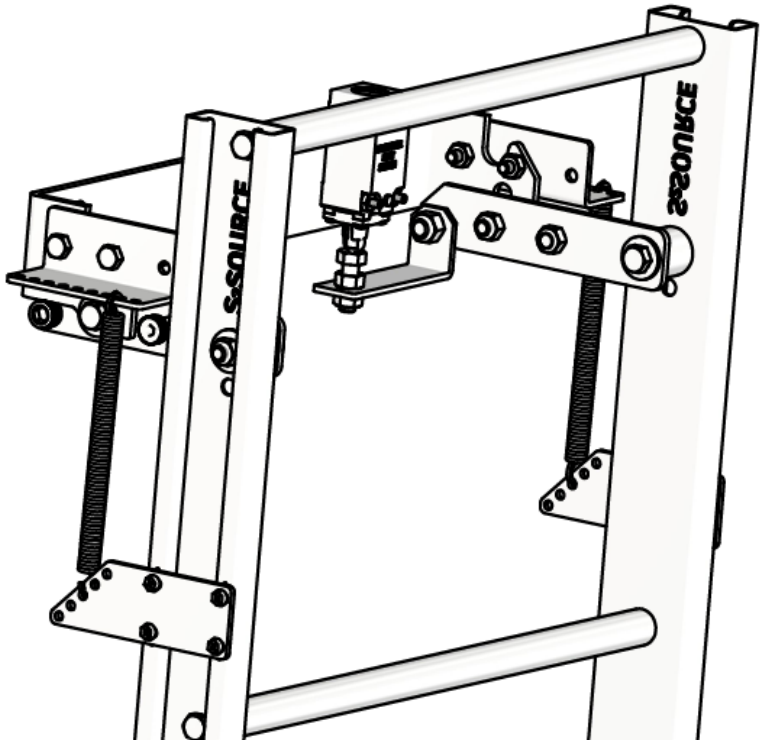
S2-CLIMBER-ST22

SPECIFICATIONS FOR ST22 STATIONARY PIT LADDER

Compliant with 2022 Code – *Switched Model with Integrated Electric Switch*



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1. GENERAL

1.1. Purpose

This document defines the technical requirements for a stationary pit ladder with switched version (2022 Compliant) designed for installation in below-grade service pits, maintenance bays, and other restricted-access environments where space optimization and safe retraction are critical. It serves as a guide for engineers, contractors, and facility managers in selecting, installing, and verifying ladders that meet safety, durability, and regulatory standards. The specification supports consistent fabrication, secure mounting, smooth moving mechanisms, and long-term operational reliability.

1.2. Scope

This specification applies to stationary steel pit ladders designed for vertical wall mounting in industrial and commercial facilities where space constraints and controlled access are critical. It covers:

- Material Composition
- Dimensional parameters, rung spacing, and clearance
- Load ratings and structural performance
- Mounting configurations, anchorage details, and locking mechanisms
- Hardware components, moving assemblies, and operational guidelines
- Compliance with applicable safety codes and standards, including OSHA and ANSI

The scope excludes fixed ladders, portable units, and any installations not equipped with retractable or stowable functionality.

1.3. Applicable Standards

All pit ladder designs, materials, and installations comply with the latest editions of the following standards:

ASME A17.1-2016 through ASME A17.1-2025 – Safety Code for Elevators and Escalators

ASME CSA B44.1-14 / ASME A17.5-2014 – Elevator and Escalator Electrical Equipment

OSHA – Occupational Safety and Health Administration regulations, including 29 CFR Part 1910 Subpart D (Walking-Working Surfaces)

Where conflicts arise between standards, the most stringent requirement shall apply.

2. MATERIAL SPECIFICATIONS

2.1. Ladder Sides

Ladder sides are fabricated from 16-gauge galvanized steel sheet (0.059" thickness), precisely laser-cut and brake-formed to shape. The galvanized finish provides inherent corrosion resistance, ensuring long-term durability in pit environments.

2.2. Rungs

Ladder rungs are fabricated from **aircraft-grade 6061-T6 aluminum**, selected for its high strength-to-weight ratio, excellent durability, and inherent corrosion resistance. Each rung features a **knurled surface** to enhance grip and reduce slip risk in demanding environments. The material provides reliable performance while minimizing overall ladder weight. Rungs are uniformly spaced and mechanically fastened to ensure consistent load distribution and long-term structural integrity.

2.3. Wall Mounting Brackets

Wall mounting brackets are fabricated from 8-gauge galvanized steel sheet (.179" thickness), precisely laser-cut and brake-formed to shape. The galvanized finish provides inherent corrosion resistance, ensuring long-term durability in pit environments.

2.4. Finish

Side Rails & Wall Brackets: Manufactured from pre-galvanized steel sheet, offering built-in corrosion resistance without the need for additional paint or coatings.

Rungs: Supplied in mill finish 6061-T6 aluminum. Optional clear or black anodizing is available upon request to improve surface hardness and enhance corrosion resistance.

2.5. Spring

Music Wire Steel Extension Spring with Hook Ends. 5" Long, 0.5" OD, 0.075" Wire Diameter. Spring Rate 10.7 lbs./in. Material: Music-Wire Steel, End Type: Hook

2.6. Limit Switch

This system incorporates the auto reset limit switch specified below as the standard component.

IEC limit switch, metal plunger with metal roller, 90-degree adjustable head, (1) N.O./ (1) N.C. contact(s), snap action, zinc alloy, (1) 1/2in NPT cable entry.	

3. DIMENSIONS

3.1. Overall Height

Ladders are available in single continuous lengths ranging from 36 inches (minimum) up to 119 inches (maximum). For installations requiring heights greater than 119 inches, an extension section is provided and joined using a splice plate assembly to achieve the total required height per project specifications. This modular approach ensures structural continuity while allowing flexibility for varying site conditions

3.2. Rung Spacing

Rungs are spaced at 12 inches center-to-center, meeting the requirements of OSHA 29 CFR 1910.23, ASME A17.1, and ANSI A14.3-2008 for fixed ladder design. This uniform spacing ensures safe and consistent climbing intervals across all ladder configurations, including those used in elevator pits, machine rooms, and general industrial environments. The 12-inch spacing falls within OSHA's allowable range of 10–14 inches and aligns with ASME and ANSI standards for elevator-related applications.

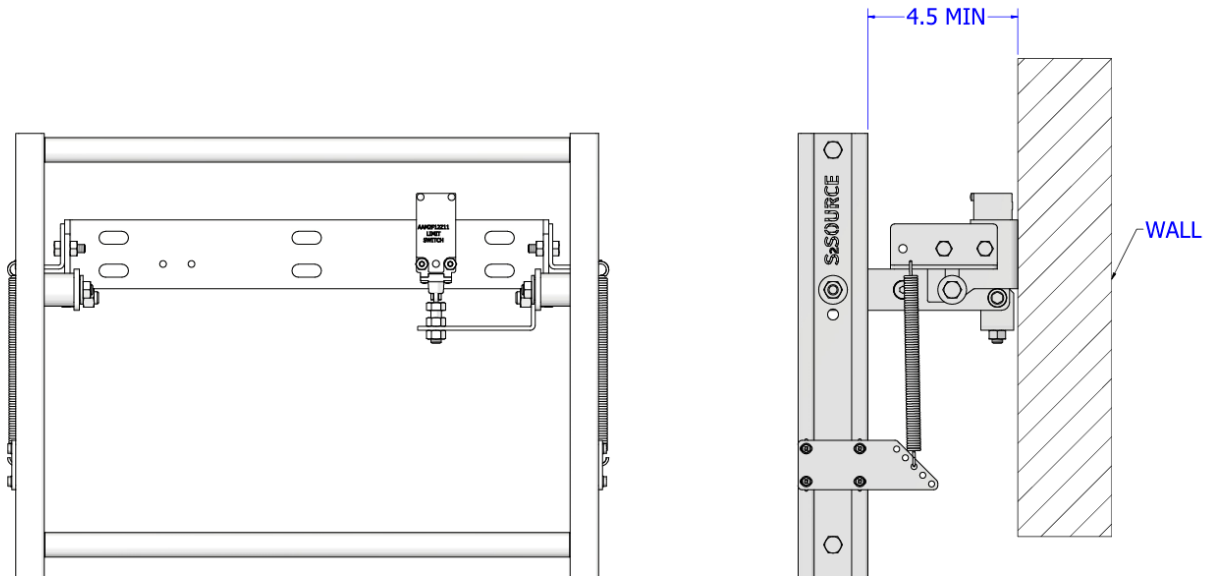
3.3. Clear Width

Ladder rungs are designed with a minimum clear width of 16 inches between side rails, in accordance with OSHA 29 CFR 1910.23(b)(4) and ANSI A14.3-2008 requirements for fixed ladders. This ensures adequate foot placement and safe climbing access across all ladder configurations. The 16-inch clear width is measured before installation of any ladder safety systems and provides consistent compliance for both general industrial and elevator-related applications.

3.4. Wall Clearance

Standard stationary ladders have a minimum clearance of 4.5 inches between side rails and adjacent walls at open positions.

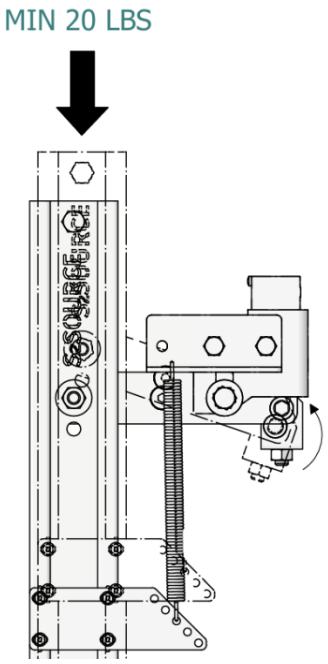
STANDARD POSITION



4. KINEMATICS

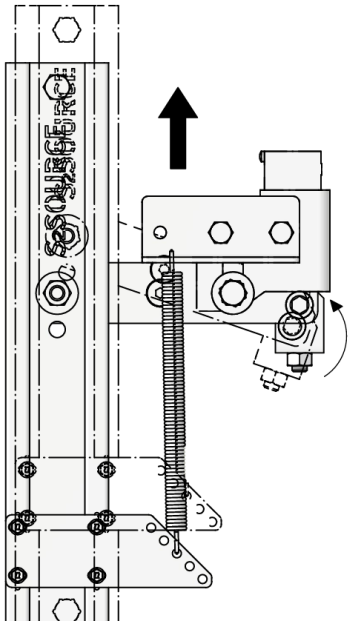
4.1. Weighted position

The ladder features an automatic self-seating mechanism that activates once the unit reaches its specified load threshold. A stop pin locks securely into the wall bracket, safeguarding the switch mechanism from overload. The switch engages only when a **minimum of 20 lbs**. is applied to the ladder.

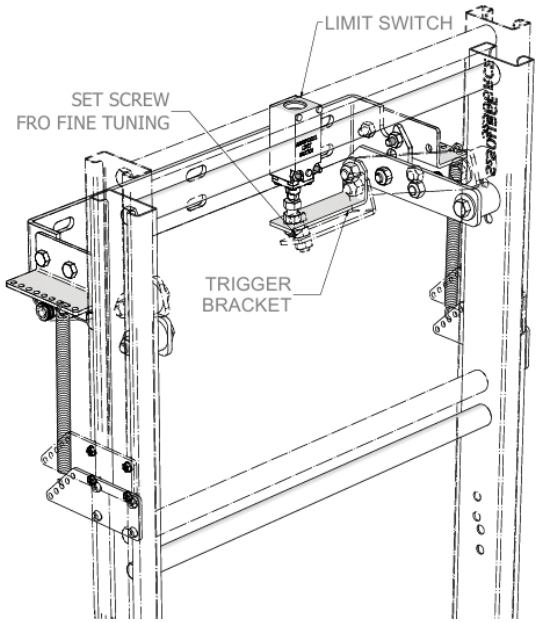


4.2. Free State

The system utilizes a spring-driven self-pulling mechanism that automatically retracts the ladder to its free-floating position when no downward pressure is applied. In this disengaged state, the ladder remains unseated, and the switch remains inactive. To re-engage the switch and secure the ladder in its operational position, a minimum of 20 lbs. of downward force must be applied. Once this threshold is met, the ladder seats into its designated position and the switch activates accordingly



4.3. Switch Mechanism

The ST22 stationary ladder includes an integrated limit switch system to monitor ladder deployment. The switch is mounted on a fixed wall bracket, while a secondary bracket attached to the ladder side rail moves in tandem with the ladder during operation. When min 20 lbs. applied, the ladder reaches its fully open position, the moving bracket makes contact with the limit switch, triggering activation. A fine-tuning set screw is pre-adjusted at the factory to ensure reliable engagement, but it can be field adjusted on-site to accommodate specific mounting conditions or alignment preferences.	

5. WEIGHT

Approximate weight is **3.5 lbs. (1.59 kg) per foot**.

For example, a **14-foot ladder** (used in a 10-foot pit) weighs approximately **49 lbs. (22.23 kg)**. No lifting assistance (Push Spring, Gas Spring required due to light weight design.

Note: Listed weight applies to the ladder only and excludes wall brackets. This value is not intended for use in shipping calculations.

6. STRUCTURAL CAPACITY

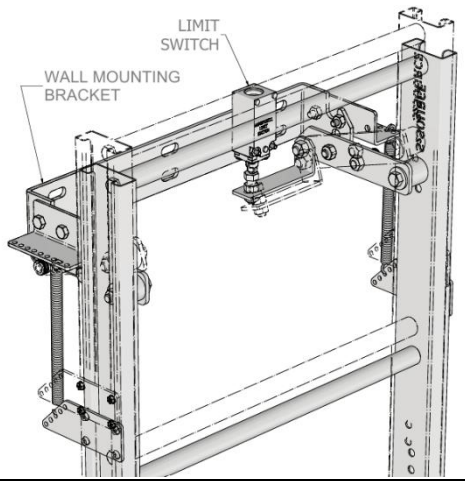
6.1. Load Rating

Designed to support a minimum load of 135 kg (300 lbs.) in normal use without fatigue.

7. INSTALLATION

The **ST22** Stationary ladder is delivered pre-assembled to accommodate its complex design. Installation requires only wall mounting to complete setup.

7.1. Wall Mounting

The stationary ladder features a continuous single-piece design with integrated wall mounting brackets. These brackets maintain a minimum clearance of **4.5 inches** between the wall and the ladder's side rails, ensuring proper spacing and stability. With no assembly required and only basic wall mounting needed, installation is quick and straightforward—even for non-specialist installers	

7.2. Anchorage Details

Wall mounting bracket holes are sized for a maximum 3/8″ wedge anchor.

8. HARDWARE

8.1. Fasteners

Refer to the drawing BOM for a detailed breakdown of the kinematic mechanism components.

8.1.1. Rung Fasteners

Rungs use 5/16-18 Hex Head bolt min. ½ Long Finish: Clear Zinc Plated

8.1.2. Wall mounting Fasteners

Wall brackets are secured to the side rails using 5/16-18 hex head bolts and anchored to the wall with 3/8″ wedge anchors

9. ASSEMBLY INSTRUCTIONS

Each ladder includes project-specific assembly instructions in the packaging. A downloadable copy is also available on the S2Source website.

10. COMPLIANCE

10.1. OSHA Requirements

All stationary ladders OSHA compliant per OSHA – Occupational Safety and Health Administration regulations, including 29 CFR Part 1910 Subpart D (Walking-Working Surfaces)

10.2. Standards

All stationary pit ladders compliant to

1. ASME A17.1-2016 - ASME A17.1-2025
2. ASME CSA B44.1-14/ASME A17.5-2014

11. PART NUMBERING

The S2-Climber series includes three ladder configurations:

- Stationary (fixed position)

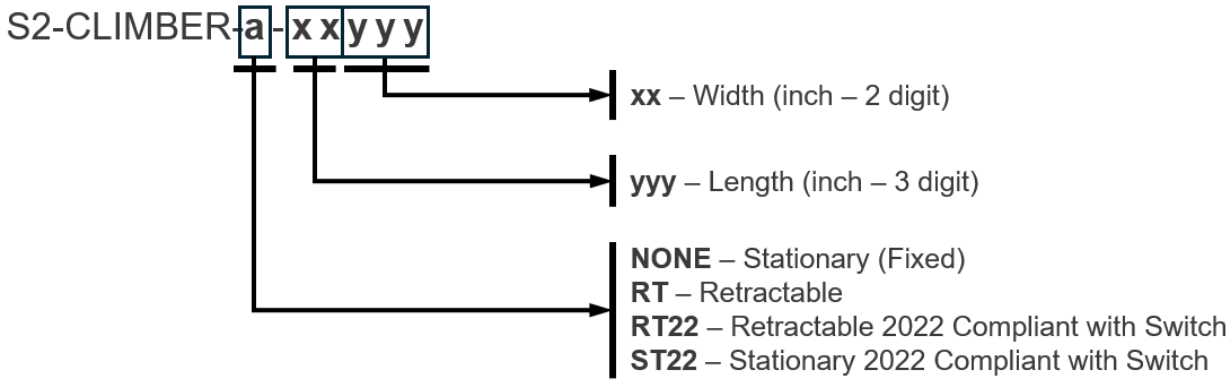
- Retractable (non-switched)

- Retractable 2022 Compliant (with integrated switch)

Each model is identified by a unique part number in the format:

S2CLIMBER-a-xxyyy

Where the final five digits (xxyyy) specify the ladder's width and length in inches



Examples:

S2-CLIMBER-12060 (PIT LADDER, STATIONARY, 12" W, 60" LG.)

S2-CLIMBER-16096 (PIT LADDER, STATIONARY, 16" W, 96" LG.)

S2-CLIMBER-RT-16108 (PIT LADDER, RETRACTABLE, 16" W, 108" LG.)

S2-CLIMBER-RT22-16108 (PIT LADDER, RETRACTABLE, CODE 2022 16" W, 108" LG.)

S2-CLIMBER-ST22-16108 (PIT LADDER, STATIONARY W SWITCH, CODE 2022, 16" W, 108" LG.)