



**AUTOMATED FLUORESCENT PENETRANT
INSPECTION SYSTEMSⁱ**

Designed. Engineered. Manufactured. **Supported.**

At REL, Inc., our approach to designing, building, and installing automated non-destructive testing equipment for fluorescent penetrant and magnetic particle inspection has been built on decades of experience solving complex technical challenges for our customers. REL ideates and manufactures world class, Industry 4.0, reliable, and exactly controlled equipment.

Visit relinc.com to view all of REL's products.

**AUTOMATED FLUORESCENT PENETRANT
INSPECTION**

2

**AUTOMATED FLUORESCENT PENETRANT
INSPECTION LINES**

4

PAST SYSTEM'S PART ENVELOPES

8



AUTOMATED FLUORESCENT PENETRANT INSPECTION

At REL, we design, manufacture, and install custom non-destructive testing equipment for fluorescent penetrant and magnetic particle inspection.

**When customers ask us for the impossible, we ask
“when would you like it?”**

Backed by decades of scientific knowledge, technical acumen, and practical expertise, we excel at identifying and solving the complicated engineering challenges involving part presentation and part movement in a well-designed, long-lasting, non-destructive testing line. From multiple complex part geometries moving at a rapid clip through an automated system according to recipe-driven processing, to understanding operator safety and health in industrial environments, we have REaL solutions for any individual or multi-facility manufacturing operation.

REL's automated fluorescent penetrant inspection (FPI) lines are precision engineered to solve your specific non-destructive testing challenges, maximize accuracy, and ensure part volume and speed for your facility.

AUTOMATED FLUORESCENT PENETRANT INSPECTION LINES



We provide premium automated non-destructive testing lines.

REL automated fluorescent penetrant inspection (FPI) lines feature innovative process methods designed to increase our customer's productivity and throughput within their facilities. We design, manufacture, and install automated NDT Processing lines that are designed to handle specific complex part geometry. We specialize in the application of penetrant electrostatically. Why not save 80% of the penetrant cost compared to dip processing? Utilizing process water more than once for pre-rinsing also saves effluent that must be discharged or treated. These techniques along with REL's expertise in building fixtures minimizes Level III skepticism associated with safety critical components that are automatically processed.

REL's systems are designed to allow for safe operator intervention throughout the process for verification and required process check-offs during the process. If the plant loses power, there is no panic in the NDT department, because REL equipment has STATE Based recovery akin to desktop computers. This recovery allows for the system to pick up processing right where it left off before the power outage. The system standard UPS will keep the industrial grade server and the PLC under power for 24 hours to ensure no data is lost!

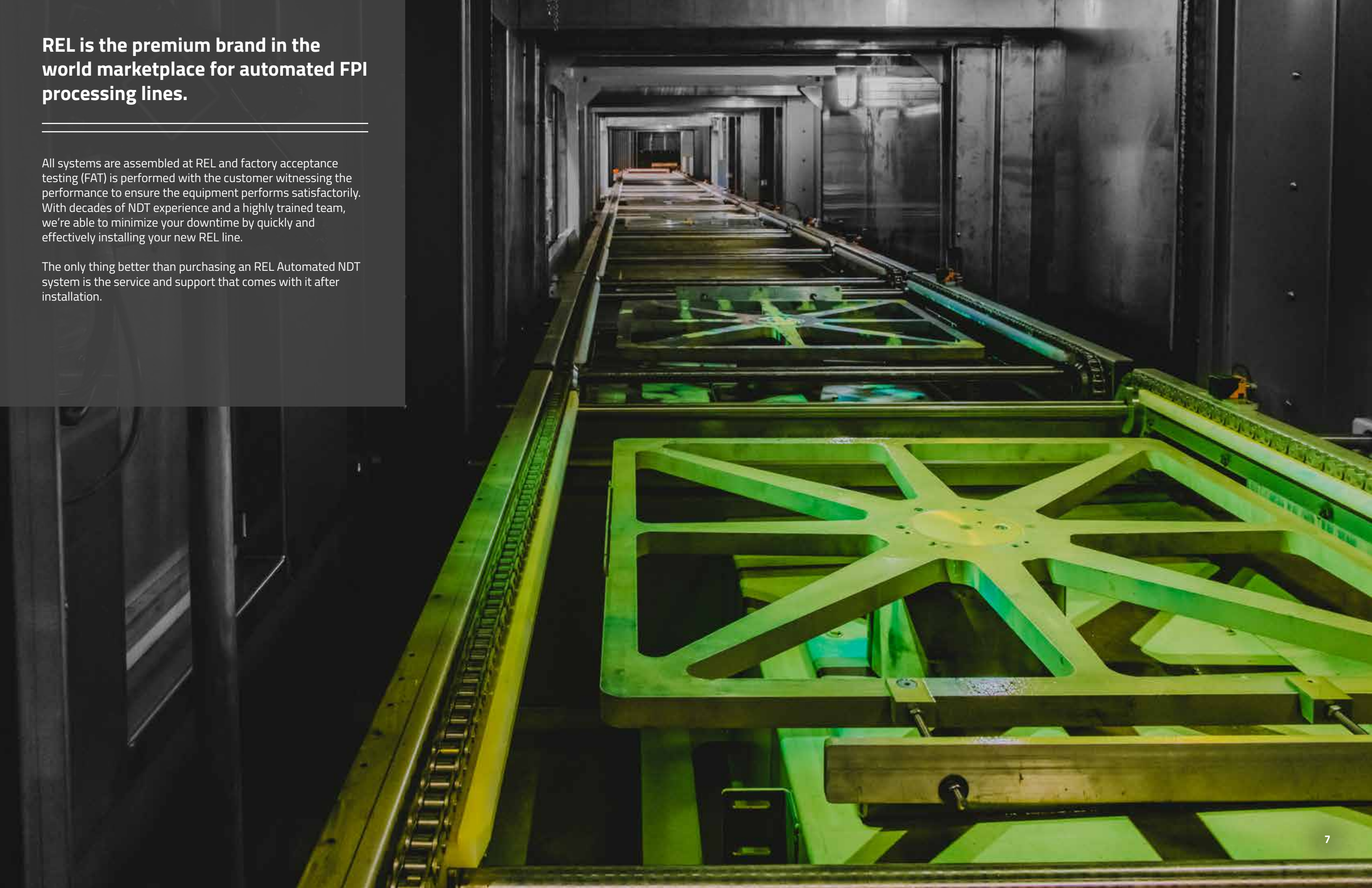


1. Electrostatic penetrant application
2. 16' L x 10' W x 10' H large part dryer
3. Line material handling individually driven chain conveyors to avoid process cross contamination
4. System carrier with integrated part baskets for small part processing

REL is the premium brand in the world marketplace for automated FPI processing lines.

All systems are assembled at REL and factory acceptance testing (FAT) is performed with the customer witnessing the performance to ensure the equipment performs satisfactorily. With decades of NDT experience and a highly trained team, we're able to minimize your downtime by quickly and effectively installing your new REL line.

The only thing better than purchasing an REL Automated NDT system is the service and support that comes with it after installation.



REL SYSTEMS WITH PART ENVELOPES SHOWN



Fluorescent Penetrant
Inspection Line
Model #MCLFPI-224848

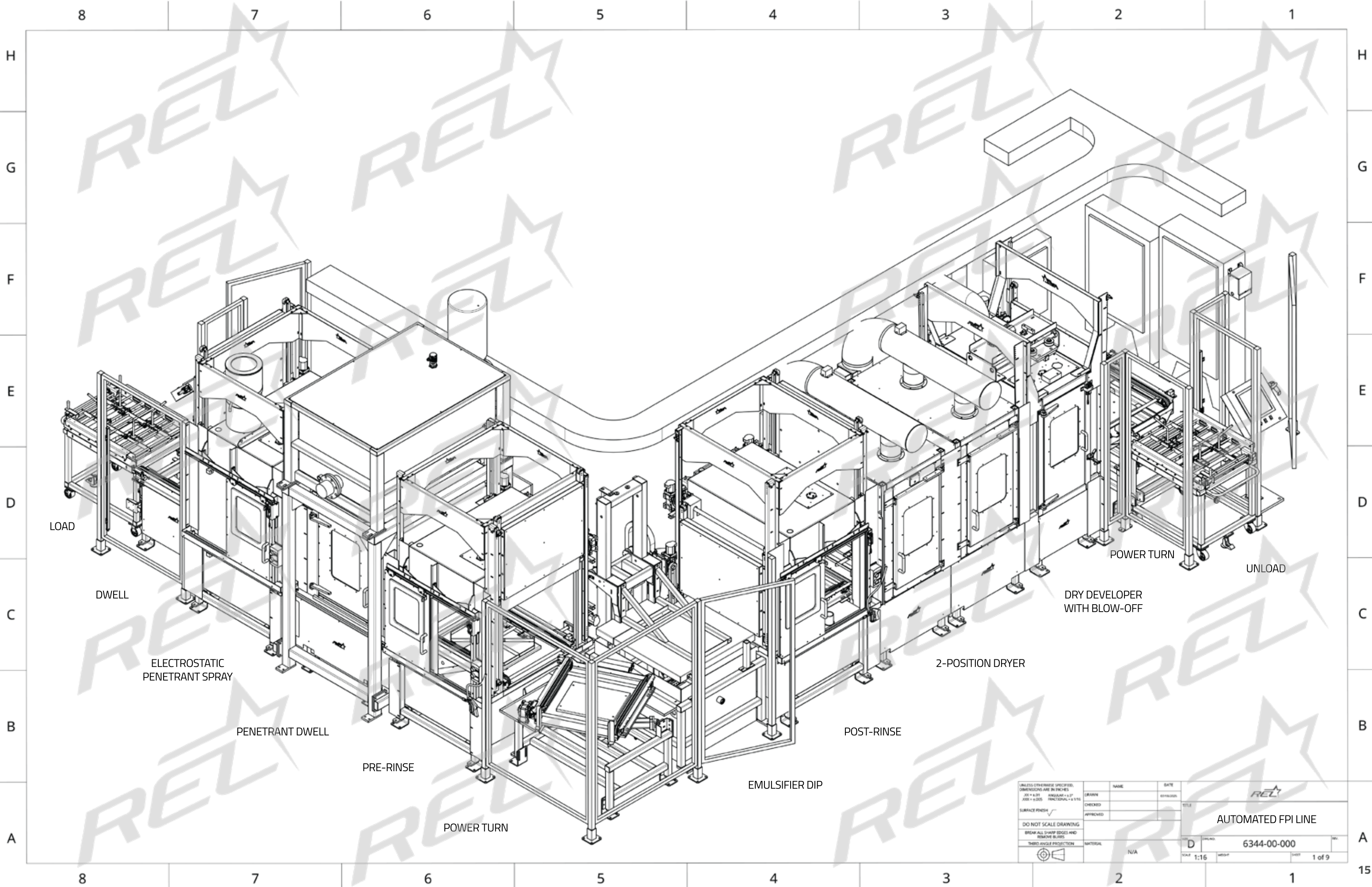


22"

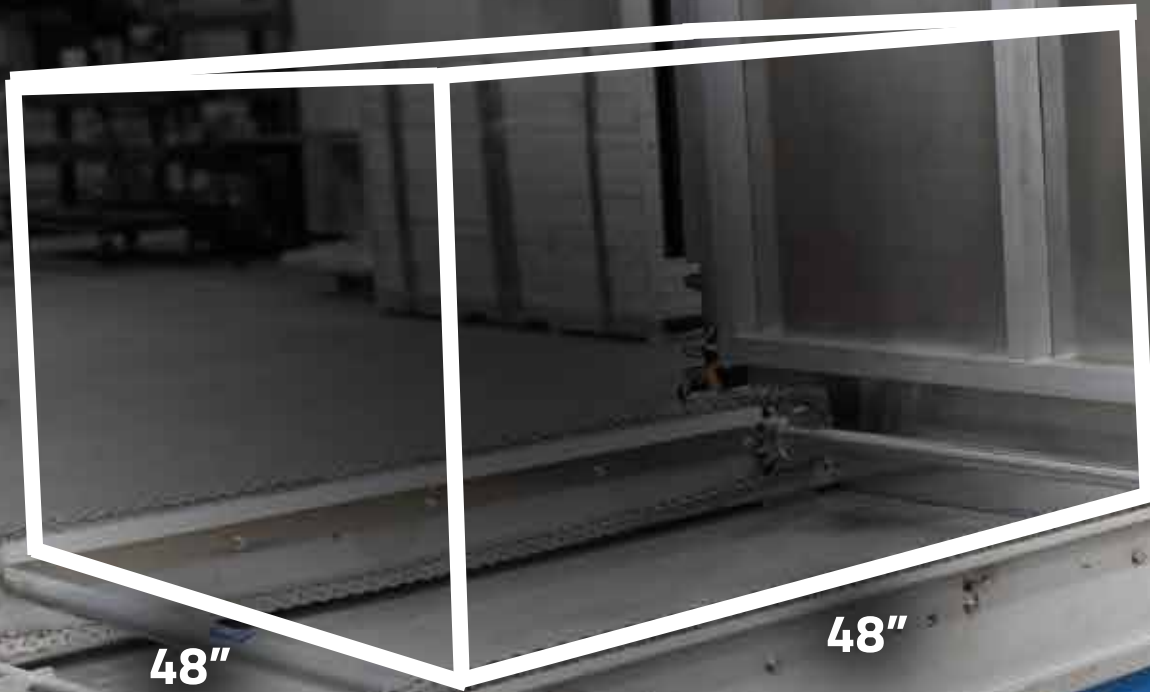
36"

30"

Fluorescent Penetrant
Inspection Line
Model #AFPI363022L



| | | | | |
|--|------------------------------|-------------------------|------------------|----|
| UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES | | DATE | REVISION | |
| JOB # 4-01 SIZE 4-8000 SURFACE FINISH ✓ | DRAWN CHECKED APPROVED | NAME TITLE | EXPIRES TITLE | |
| DO NOT SCALE DRAWING | | AUTOMATED FPI LINE | | |
| BREAK ALL SHARP EDGES AND REMOVE BURRS | | D PART NO. 6344-00-000 | | 15 |
| THIRD ANGLE PROJECTION | | SCALE 1:16 SHEET 1 of 9 | | |



48"

48"

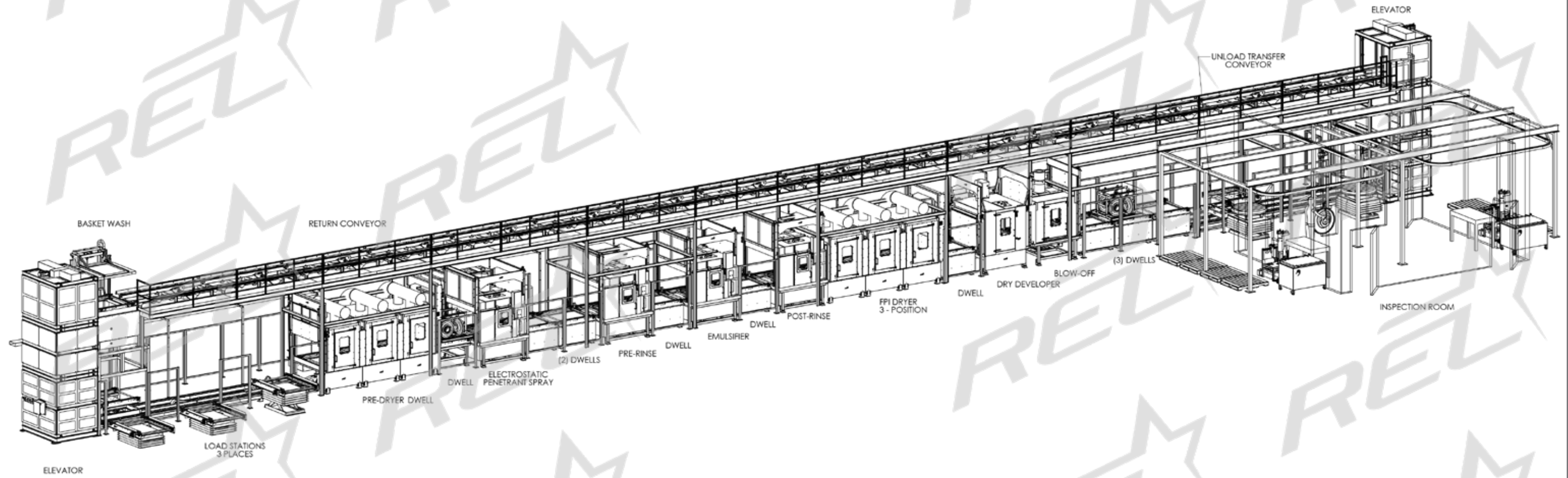
36"

DWELL
600

PENETRANT SPRAY
700

**Fluorescent Penetrant
Inspection Line
Model #FPI484836**

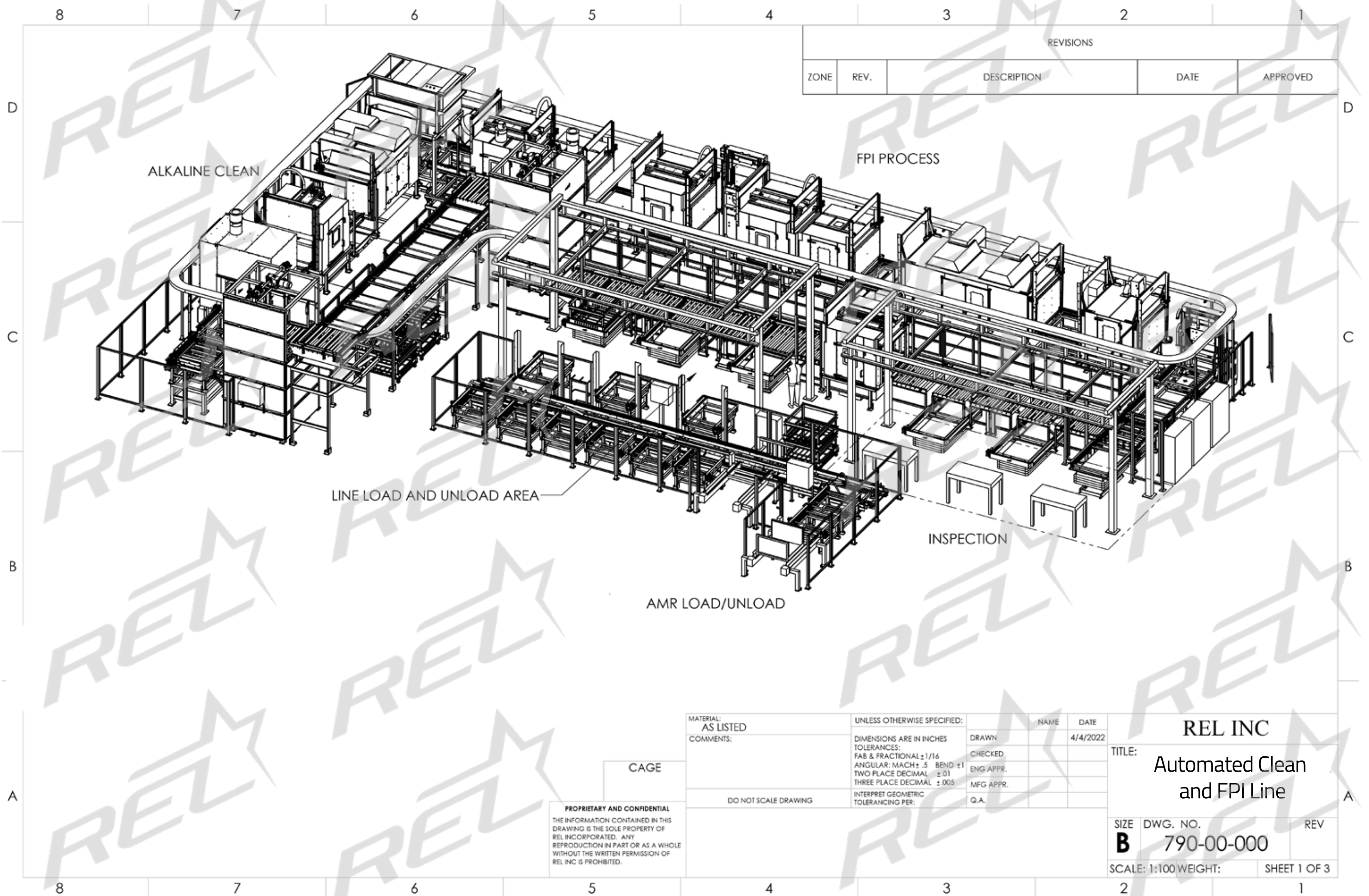
DO NOT SCALE THIS DRAWING FOR DIMENSIONS. ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED.



| | | | | |
|---|--|---------------------|-------------|--|
| HEAT TREATMENT | | SCALE | FPI LINE | |
| | | DATE | | |
| | | DRAWN | NAME | |
| | | CHECKED | MATERIAL | |
| | | APPROVED | | |
| TOLERANCES | | DATE PLOTTED TO DWS | EST. WEIGHT | |
| ALL FRACTIONAL TOLERANCES $\pm 1/16$ UNLESS OTHERWISE SPECIFIED | | FORMAT | DWG. NO. | |
| ALL ANGULAR TOLERANCES $\pm 1/2$ UNLESS OTHERWISE SPECIFIED | | | EQUIP. NO. | |
| ALL FINISHES 250 RMS UNLESS OTHERWISE SPECIFIED | | | REV. | |



**Cleaning and FPI Line
Model #CLFPI484836**



| REVISIONS | | | | |
|-----------|------|-------------|------|----------|
| ZONE | REV. | DESCRIPTION | DATE | APPROVED |
| | | | | |

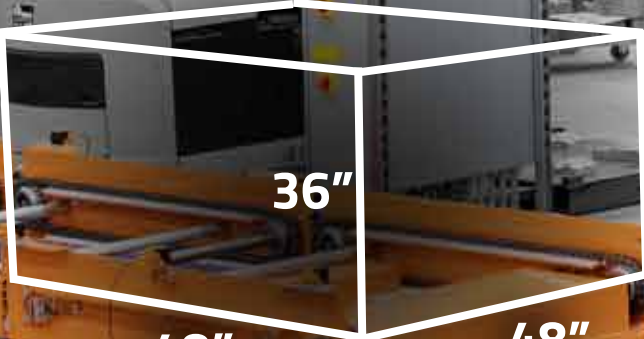
| | | | |
|------------------------|---|-----------|----------|
| MATERIAL: AS LISTED | UNLESS OTHERWISE SPECIFIED: | NAME | DATE |
| COMMENTS: | DIMENSIONS ARE IN INCHES TOLERANCES: F&S & FRACTIONAL ±1/16 ANGULAR: MACH ±.5 BEND ±1 TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.005 | DRAWN | 4/4/2022 |
| | INTERPRET GEOMETRIC TOLERANCING PER: | CHECKED | |
| | | ENG APPR. | |
| | | MFG APPR. | |
| | | Q.A. | |

CAGE

PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF REL INCORPORATED. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF REL INC IS PROHIBITED.

DO NOT SCALE DRAWING

| | | |
|-------------------------------------|------------|--------------|
| REL INC | | |
| TITLE: Automated Clean and FPI Line | | |
| SIZE | DWG. NO. | REV |
| B | 790-00-000 | |
| SCALE: 1:100 | WEIGHT: | SHEET 1 OF 3 |



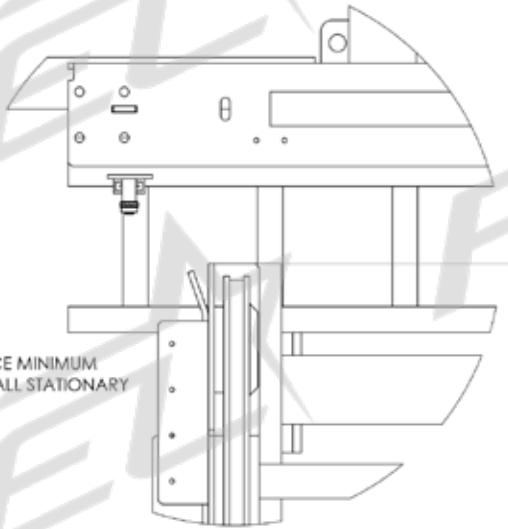
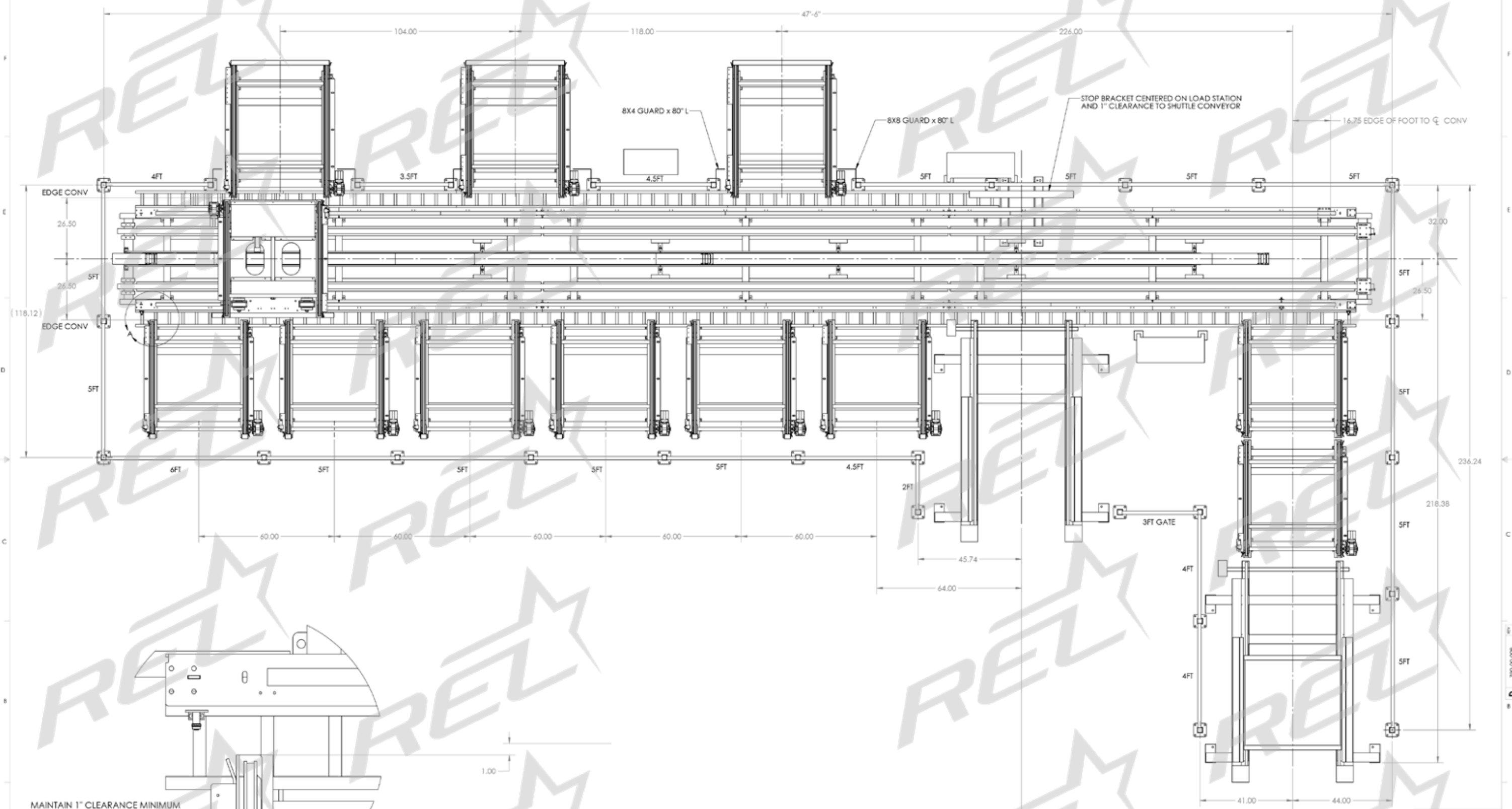
36"

48"

48"

**Bin Conveyor Line
Model #CLFPI484836**

| REVISIONS | | | | |
|-----------|------|-------------|------|----------|
| ZONE | REV. | DESCRIPTION | DATE | APPROVED |
| | | | | |



MAINTAIN 1" CLEARANCE MINIMUM BETWEEN SHUTTLE AND ALL STATIONARY CONVEYORS

DETAIL A
SCALE 1:4

QUANTITY: 1

| | | | |
|----------------------------------|---|-------------|------------|
| MATERIALS AS LISTED COMMENTS: | UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONS 1/16" DECIMALS .0005" ANGLES AS SHOWN ± .0001" HOLE PLACEMENT ± .005" HOLE LOCATION ± .005" HOLE SIZE ± .0005" HOLE POSITION ± .005" HOLE DIA. ± .0005" HOLE LENGTH ± .005" HOLE TOLERANCE ± .005" | DATE | 12/25/2023 |
| | | DESIGNED BY | |
| CAGE | *6115-75-012XU-6978* | DRAWN | |
| | | CHECKED | |
| | | ENG APPR | |
| | | MFG APPR | |
| | | G.A. | |

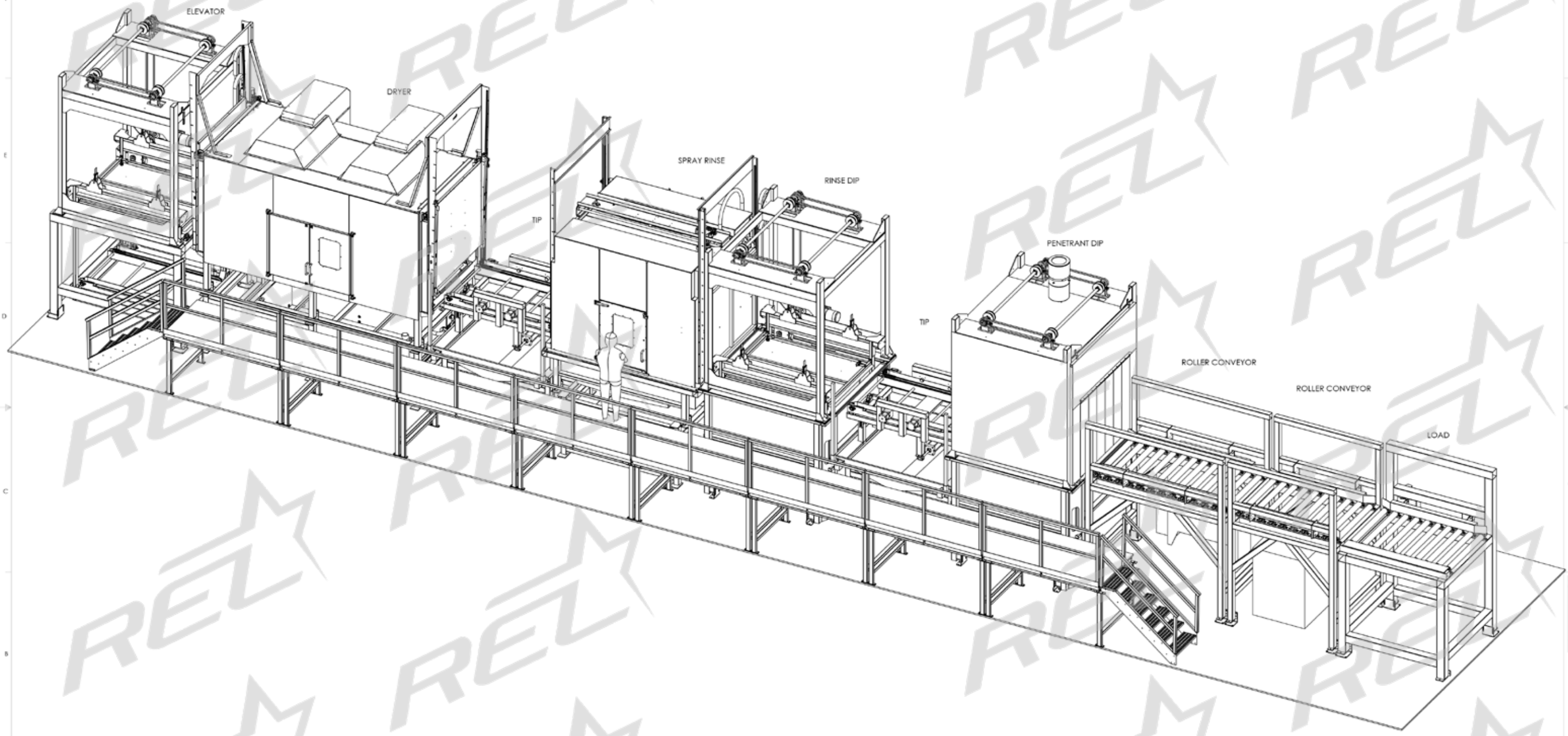
REL INC
BIN CONVEYOR

SIZE DWG. NO. REV
D
SCALE: 1:20 WEIGHT: 956098.2 SHEET 2 OF 2



**Fluorescent Penetrant
Inspection Line
Model #FPI467860**

| REVISIONS | | | | |
|-----------|------|-------------|------|----------|
| ZONE | REV. | DESCRIPTION | DATE | APPROVED |
| | | | | |



PROPRIETARY AND CONFIDENTIAL
 THE INFORMATION CONTAINED IN THIS
 DRAWING IS THE SOLE PROPERTY OF
 REL INCORPORATED. ANY
 REPRODUCTION OR USE OF THIS DRAWING
 WITHOUT THE WRITTEN PERMISSION OF
 REL INC IS PROHIBITED.

| DATE | BY | CHKD | DATE |
|-----------|----|------|------|
| 8/17/2022 | | | |

QUANTITY: -

REL INC

SIZE: DWG. NO. 800-00-000
 SCALE: 1:30 WEIGHT: -
 SHEET 1 OF 8



20"

48"

48"

**Fluorescent Penetrant
Inspection Line
Model #FPI484820**



**Fluorescent Penetrant
Inspection Line
Model #RCF242418**

8

7

6

5

4

3

2

1

REVISIONS

| ZONE | REV. | DESCRIPTION | DATE | APPROVED |
|------|------|--|-----------|----------|
| | 0 | FINAL DESIGN LAYOUT | 8/23/2017 | SB |
| | A | ADDED HMI IN INSPECTION ROOM (SEE SHT.2). ADDED UTILITY LAYOUT DRAWING (SHT.4) | 10/2/2017 | SB |

D

D

C

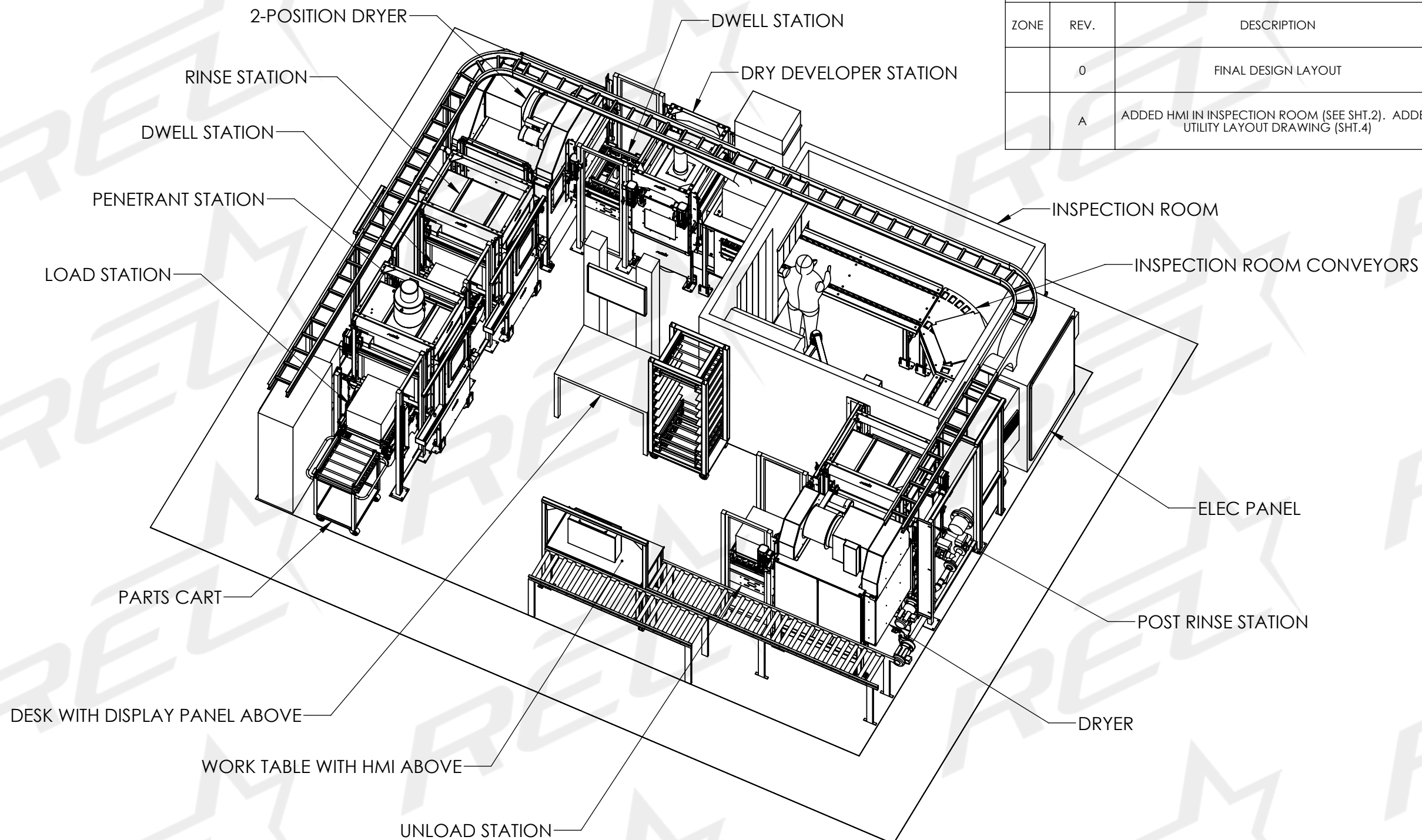
C

B

B

A

A



QUANTITY: -

| | | | | | |
|------------------------|---|-----------|------|---|-------------------|
| MATERIAL: AS LISTED | UNLESS OTHERWISE SPECIFIED: | NAME | DATE | REL INC | |
| COMMENTS: | DIMENSIONS ARE IN INCHES | DRAWN | | | TITLE: |
| | TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±.5 BEND ±1 TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.005 | CHECKED | | | FPI LAYOUT |
| | INTERPRET GEOMETRIC TOLERANCING PER: | ENG APPR. | | | SIZE DWG. NO. REV |
| DO NOT SCALE DRAWING | | MFG APPR. | | B 410-00000 A | |
| | | Q.A. | | SCALE: 1:48 WEIGHT: 84572.40 SHEET 1 OF 4 | |

PROPRIETARY AND CONFIDENTIAL
 THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF REL INCORPORATED. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF REL INC IS PROHIBITED.

8

7

6

5

4

3

2

1

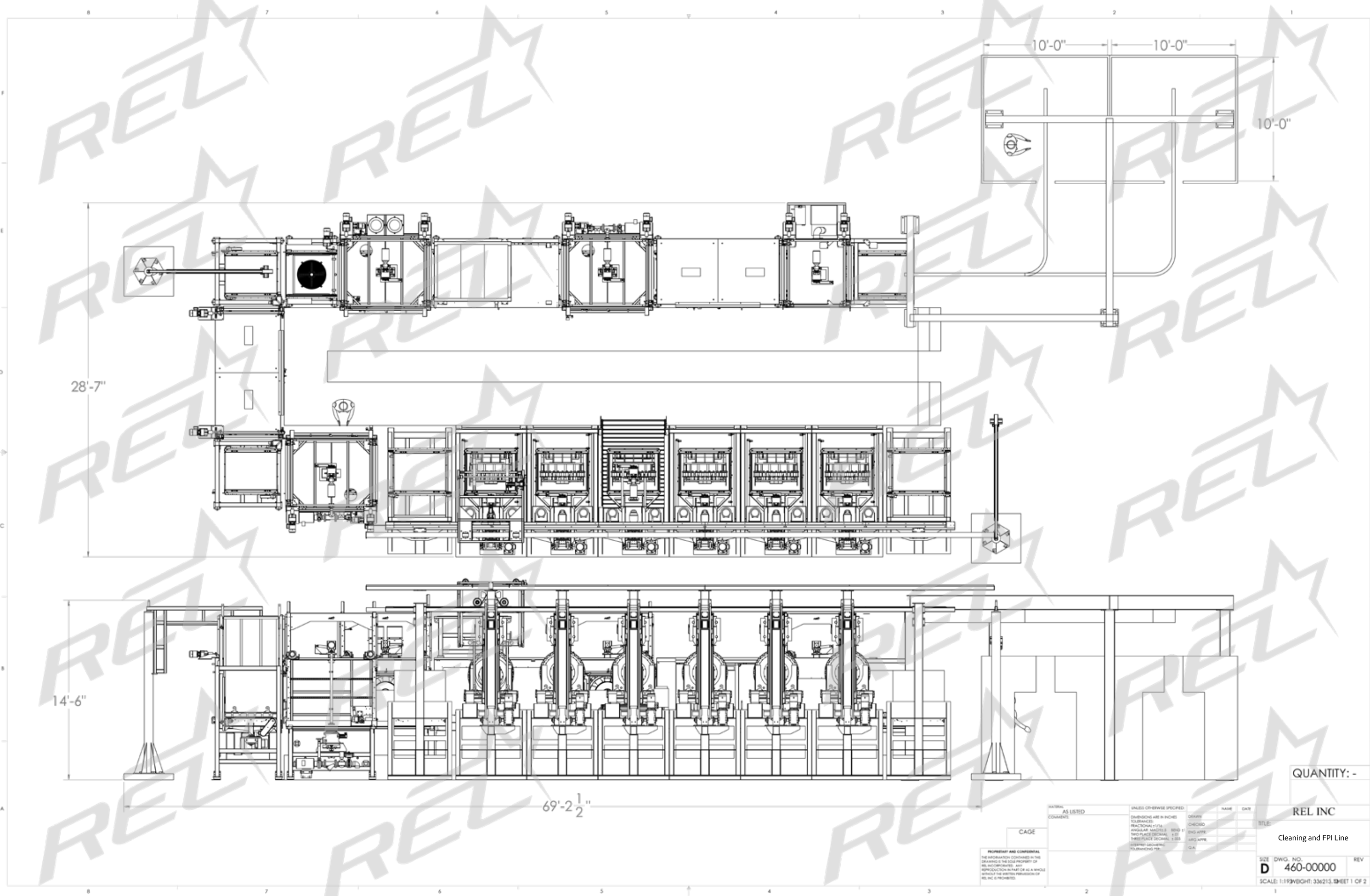


44"

44"

30"

**Cleaning and FPI Line
Model #CLFPI304444**



28'-7"

14'-6"

69'-2 1/2"

10'-0"

10'-0"

10'-0"

| DATE | NAME | DATE |
|------------|------|------|
| DESIGN | | |
| CHECKED | | |
| ENG. APPR. | | |
| MFG. APPR. | | |
| QA | | |

PROPRIETARY AND CONFIDENTIAL
 THE INFORMATION CONTAINED IN THIS
 DRAWING IS THE SOLE PROPERTY OF
 REL INCORPORATED. ANY
 REPRODUCTION IN PART OR AS A WHOLE
 WITHOUT THE WRITTEN PERMISSION OF
 REL INC IS PROHIBITED.

QUANTITY: -

REL INC

Cleaning and FPI Line

SIZE DWG. NO. REV
D 460-00000
 SCALE: 1:1 (WEIGHT: 336213, SHEET 1 OF 2)

D 460-00000_LPC

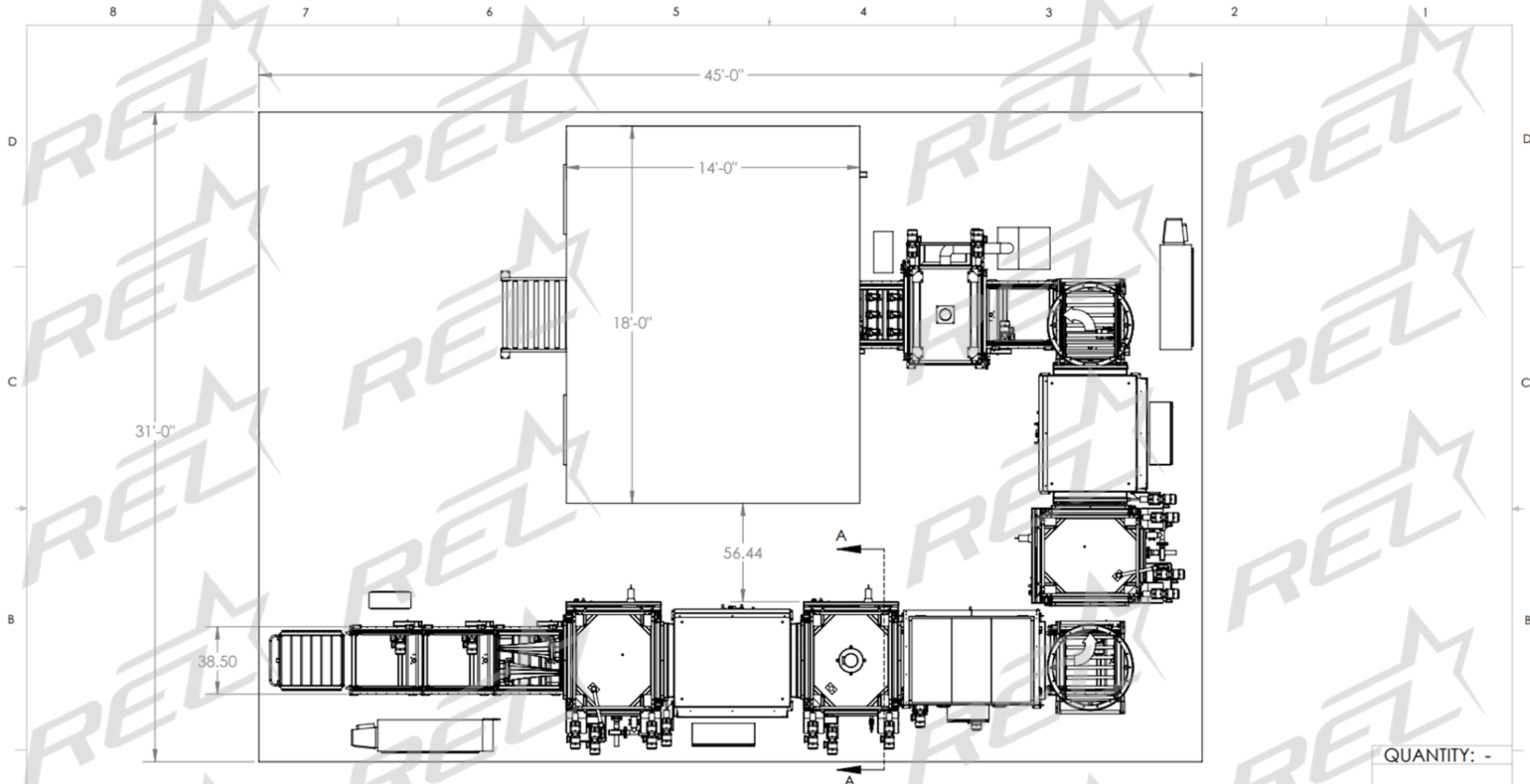


22"

36"

30"

**Fluorescent Penetrant
Inspection Line
Model #MLF303622**



QUANTITY: -

PLAN VIEW

CAGE

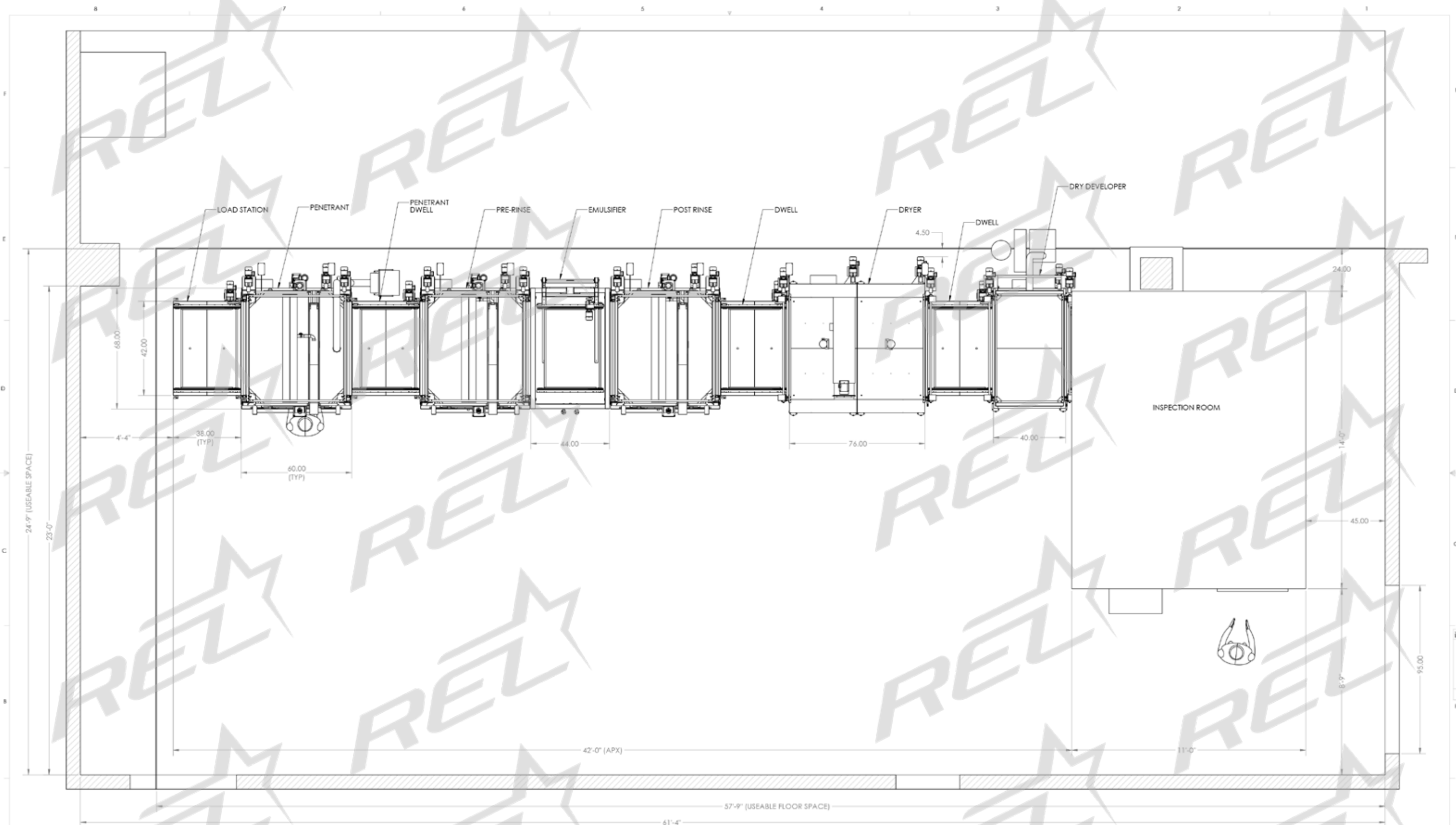
PROPRIETARY AND CONFIDENTIAL
 THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF REL INCORPORATED. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF REL INC IS PROHIBITED.

| | | | |
|------------------------|--------------------------------------|-----------|-----------|
| MATERIAL: AS LISTED | UNLESS OTHERWISE SPECIFIED: | NAME | DATE |
| COMMENTS: | DIMENSIONS ARE IN INCHES | DRAWN | 1/20/2017 |
| | TOLERANCES: | CHECKED | |
| | FRACTIONAL: $\pm 1/16$ | ENG APPR. | |
| | ANGULAR: MACH $\pm .5$ BEND ± 1 | MFG APPR. | |
| | TWO PLACE DECIMAL $\pm .01$ | Q.A. | |
| | THREE PLACE DECIMAL $\pm .005$ | | |
| DO NOT SCALE DRAWING | INTERPRET GEOMETRIC TOLERANCING PER: | | |

| | | |
|---|--------------|-----|
| REL INC | | |
| TITLE: AUTOMATED FPI LINE | | |
| SIZE | DWG. NO. | REV |
| B | 380-C2-00000 | |
| SCALE: 1:54 WEIGHT: 242332.5 SHEET 2 OF 5 | | |



**Fluorescent Penetrant
Inspection Line
Model #MLF303622**



PROPRIETARY AND CONFIDENTIAL
 THE INFORMATION CONTAINED HEREIN IS THE SOLE PROPERTY OF REL INC. ANY REPRODUCTION OR TRANSMISSION IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN PERMISSION OF REL INC IS PROHIBITED.

| UNLESS OTHERWISE SPECIFIED: | NAME | DATE |
|--|----------|---------|
| DIMENSIONS ARE IN INCHES | DRYER | 4/29/15 |
| TOLERANCES UNLESS OTHERWISE SPECIFIED: | CHECKED | |
| FRACTIONAL FITS | ENG APPR | |
| ANGULAR DIMENSIONS | MFG APPR | |
| THIRD PLACE DECIMAL | QA | |
| THIRD PLACE DECIMAL | COMANDED | |
| MINIMUM DIMENSION | | |
| MAXIMUM | | |

| | |
|---------------------|--------------|
| QUANTITY: 1 | |
| REL INC | TITLE: |
| AUTOMATED FPI LINE | |
| SIZE DWG. NO. | REV |
| D 190-00000 | |
| SCALE: 1:80 WEIGHT: | SHEET 1 OF 7 |



**Fluorescent Penetrant
Inspection Line
Model #RBF487242**



**Fluorescent Penetrant
Inspection Line
Model #SAF472819**



28"

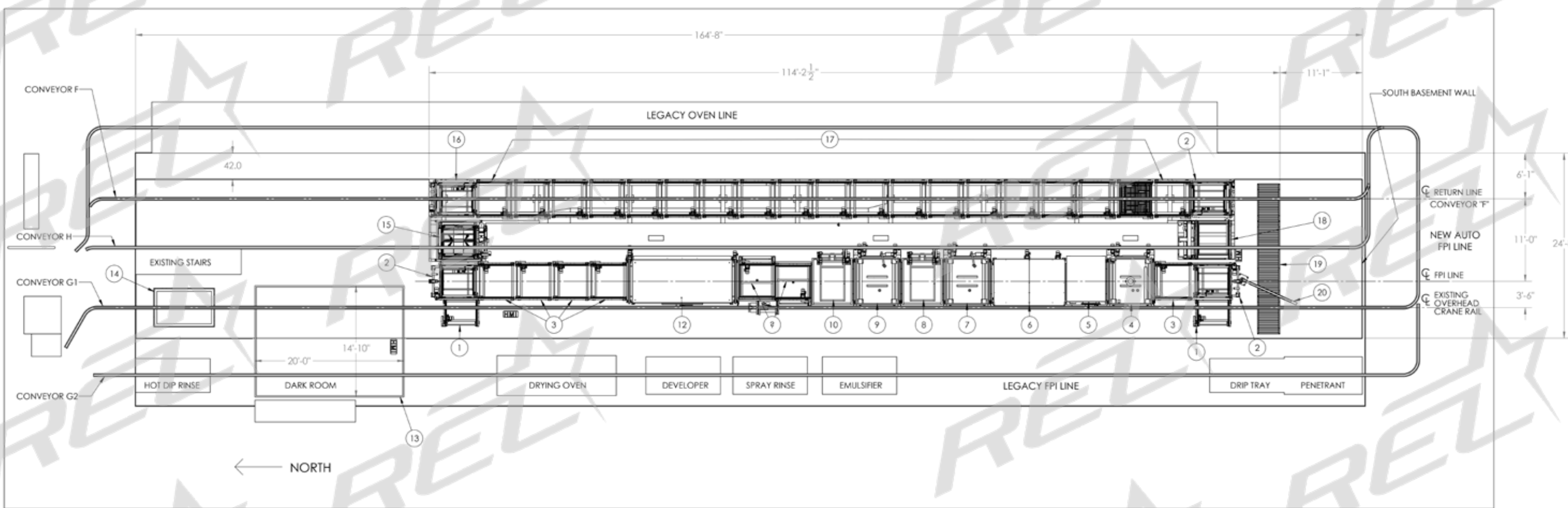
48"

56"

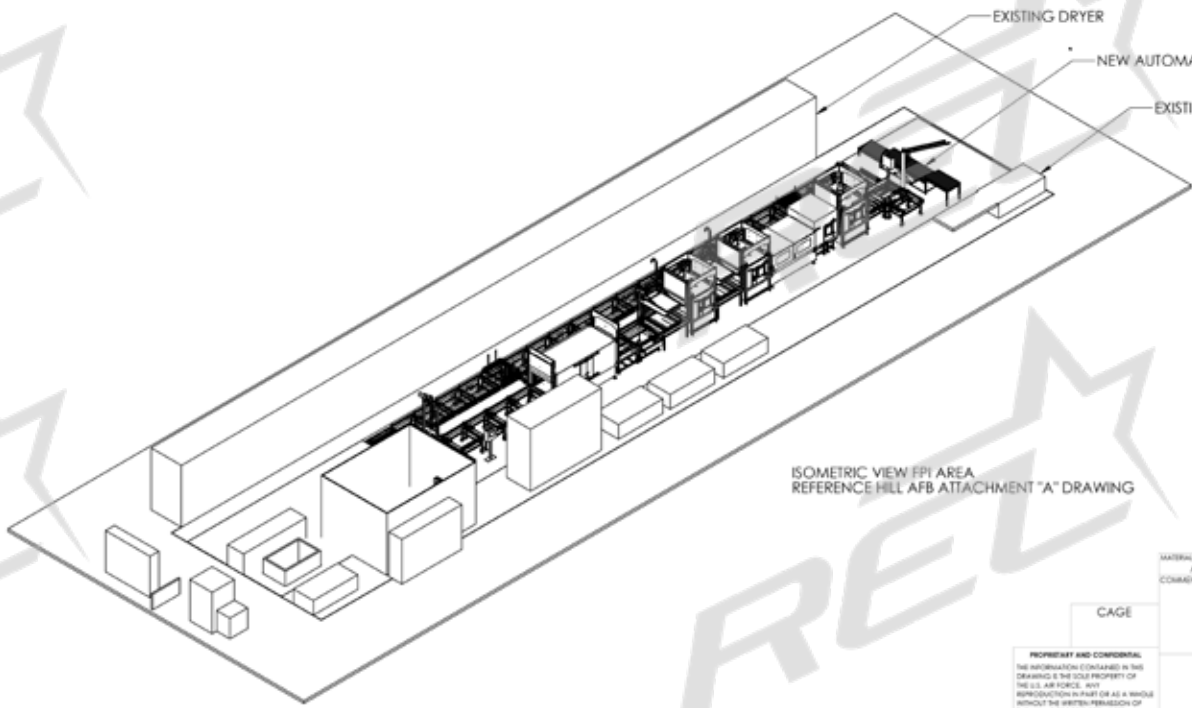
**Fluorescent Penetrant
Inspection Line
Model #FPI244848**

PLAN VIEW AUTO FPI LINE LAYOUT

- NOTES:
1. AREA FOR NEW AUTO FPI LINE 164'-8" X 24'-8".
 2. NEW AUTO FPI LINE LOCATED IN PLACE OF EXISTING EAST FPI LINE AND DECOMMISSIONED CLEANING LINES. OLD EQUIPMENT TO BE REMOVED PER ATTACHED DEMOLITION DRAWINGS.
 3. WEST LEGACY FPI LINE AND DRYING OVEN TO THE EAST OF AUTO FPI AREA REMAIN AS SHOWN.
 4. EXISTING DARK ROOM WITH CURTAIN AND LIGHTING UPGRADES PER SPEC.
 5. REFERENCE OVERHEAD CONVEYOR INTEGRATION DRAWING FOR LOAD STOP POSITIONS.
 6. REFERENCE HILL AFB ATTACHMENT "A" FPI AREA DRAWING FOR EXISTING EQUIPMENT LAYOUT.



| NUMBER | STATION NAME | WETTED | DRY |
|--------|-----------------------------------|--------|-----|
| 1 | LOAD/UNLOAD STATION | | X |
| 2 | TRANSFER STATION | | X |
| 3 | DWELL STATION | | X |
| 4 | PENETRANT STATION, ELECTROSTATIC | X | |
| 5 | INSPECTION/TOUCH-UP STATION | X | |
| 6 | COVERED DWELL STATION, 2-POSITION | X | |
| 7 | PRE-RINSE STATION | X | |
| 8 | EMULSIFIER DIP STATION | X | |
| 9 | POST-RINSE STATION | X | |
| 10 | DEVELOPER DIP STATION | X | |
| 11 | TILT/DWELL STATION | X | |
| 12 | DRYER, 3-POSITION | X | |
| 13 | INSPECTION BOOTH | | X |
| 14 | HOT WATER RINSE | X | |
| 15 | CARRIER WASH | X | |
| 16 | COOLING TRANSFER CONVEYER | X | |
| 17 | RETURN CONVEYERS | | X |
| 18 | ELEVATOR STATION | | X |
| 19 | ROLLER CONVEYOR TABLE | | X |
| 20 | CRANE | | X |



QUANTITY: -

| | |
|----------|-------------|
| DATE | 3/21/2019 |
| DESIGNER | ENG APPR |
| CHECKED | ENG APPR |
| DATE | |
| SCALE | 1:80 WEIGHT |

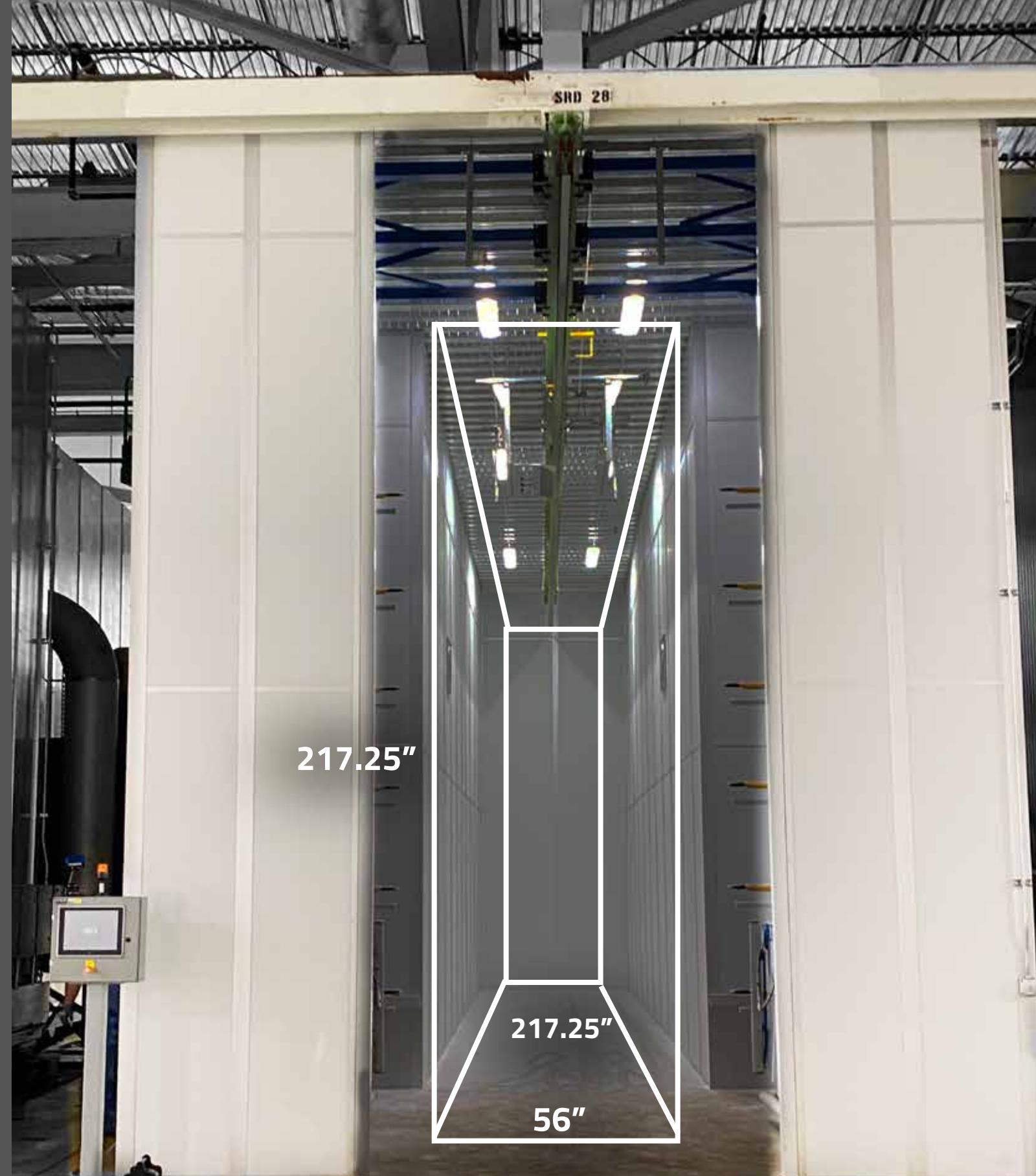
Automated FPI

SIZE DWG. NO. REV

SCALE: 1:80 WEIGHT: SHEET 1 OF 1



**Fluorescent Penetrant
Inspection Line
Model #EXBF57630144**



**Fluorescent Penetrant
Inspection Line
Model #FPI4896132**





57640 North Eleventh St.

Calumet, MI 49913

906-337-3018

rel@relinc.com



**Made in
the USA**

relinc.com