

AUTOMATED METAL ETCH SYSTEMSⁱ

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

At REL, Inc., our approach to designing, building, and installing automated metal etch processing lines and chemical cleaning processing lines 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.

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METAL ETCH

Complex challenges. Convenient Controlled Solutions.

Exact Metal Etch Equipment

Effective cleaning and surface etch preparation is a critical step in the quality control of precision parts for all part manufacturers, especially those providing parts to aerospace and outer space vehicles. At REL, our approach to designing, building, and installing automated metal etch and chemical cleaning processing lines has been built on decades of experience solving complex technical challenges for our customers to create scientifically sound, industry certified, high throughput, reliable, and long-lasting equipment.

REL automated Metal Etching lines allow for effective surface removal before Non-Destructive Evaluation of your Safety Critical Components. Removing exact material thickness to expose subsurface material structure allows for subsequent material integrity evaluation or surface preparation for the next coating operation. Utilize your current chemical supplier and REL equipment. Design and implement processing recipes with real time etch rate control, and automated chemical dosing, and log all processing data with our dynamic motion control and infinite processing memory.

REL automated Chemical Cleaning lines allow for effective surface cleaning prep before Non-Destructive Testing of your Safety Critical Components. Remove surface coatings and tarnishes utilizing your chosen chemical supplier and REL equipment. Design and implement processing recipes 'on the fly', and log all processing data with our dynamic motion control and infinite processing memory.

AUTOMATED METAL ETCH LINES

We 'cut our teeth' on material removal.

Material removal via chemical reaction is Metal Etching. How else can you remove precisely 0.0002" of material over the equivalent surface area of a football field on a part with complex geometry? This process is utilized for surface material removal and/or surface prep for a plethora of aerospace and rocket parts. As a manufacturer of automated processing metal etch equipment, we maximize our metallurgical and chemical understanding of materials that make up things that move in the world. Our automated systems use a range of overhead conveyance methods and precision carriers, to move multiple parts with complex geometries and varying weights carefully and smoothly through the stages of your specific process requirements.

Our equipment has real time control to meet exact etching requirements. Etch rates can be predicted and learned on the control to increase throughput without guessing, and checking to verify surface material removal.

Our Automated Metal Etch and Chemical Processing Systems are run on our comprehensive Control Systems platform. Each automated line is controlled and monitored using a historian database that can be configured to exacting specifications. The intuitive user interface (UI) stores recipes which can be selected and applied to individual baskets. Random loading high throughput lines are our standard and our specialty. Coho Control, the breakthrough software Industry 4.0 component of our control system platform, provides real time data enabling real time database queries, rapid trouble shooting, in depth analytics, and compliance reporting.



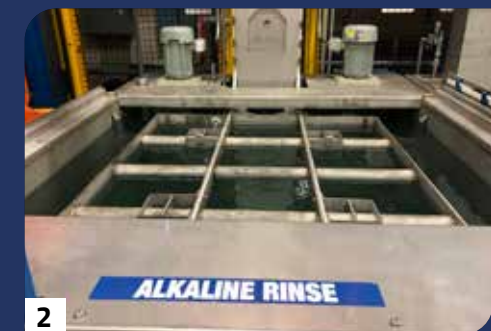
1. Chemical processing tank with eductor agitation
2. Process visibility with REL process control
3. Anodized parts from an REL automated anodizing process
4. Integrated safety in process control

AUTOMATED CLEANING LINES

Cleanliness. Demanded.

Cleaning and surface preparation are a critical step in the quality control of precision parts for all part manufacturers, especially those providing parts to aerospace and outer space vehicles. At REL, our approach to designing, building, and installing automated precision Chemical Cleaning lines has been built on decades of experience in solving complex technical challenges for our customers.

Our automated systems use a range of overhead conveyance methods and precision basket carriers to move multiple parts with complex geometries and varying weights carefully and smoothly through the stages of your specific cleaning process requirements. We excel in working with all stakeholders in the process including chemical suppliers, wastewater treatment suppliers, factory secondary/tertiary containment, backup power integration and air quality requirements to keep your employees and everyone's environment safe.



1. Servo index setup screen for the automated system transporter
2. Integrated stainless steel lowerator in a cleaning process
3. View of air ventilation, plumbing and electrical packaging on a cleaning system
4. Motor control components and protection for run monitoring and service

Features and Benefits

- High throughput random loading
- Web based UI for maximum process visibility and safety
- State-based recovery from industrial grade on-site server
- Designed specially to integrate with Allen Bradley PLC's
- On-the-fly tank configurations
- Real-time Automated Tank Filling with adjustable chemical concentrations
- Infinite process recipe flexibility with the ability to move multi-directionally through processing
- Dynamic Tank Control - Individual tanks can be 'Blocked' (from processing parts) or 'Disabled' (taken out of service) during processing



REL SYSTEMS WITH PART ENVELOPES SHOWN

30"

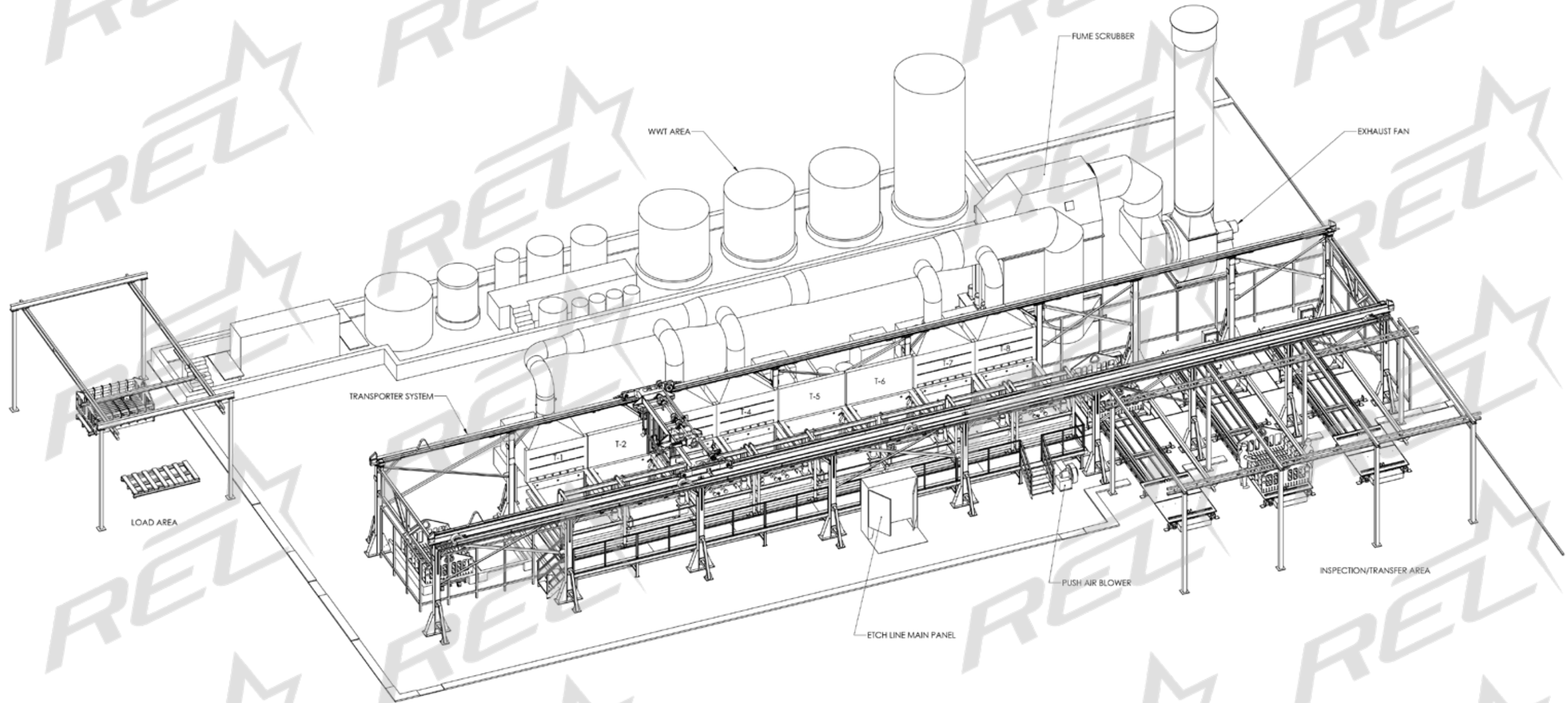
80"

60"

Clean/Etch Line
Model #CE608030

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

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED



TANK	DESCRIPTION
T-1	DEGREASE
T-2	RINSE
T-3	FeCl ETCH
T-4	FeCl ETCH
T-5	RINSE
T-6	HOT WATER RINSE
T-7	NITRIC/HF
T-8	NITRIC/HF

CHANGE NOTICE		HEAT TREATMENT		SCALE	1:65
				DATE	11/13/2020
				DRAWN	1888G
				CHECKED	
				APPROVED	
				DATE PLOTTED TO DMS	
				FORMAT	AUTOCAD MECH
TOLERANCES				NAME	
ALL FRACTIONAL TOLERANCES ±1/16 UNLESS OTHERWISE SPECIFIED				ACID ETCH LINE	
ALL ANGULAR TOLERANCES ±1/2 UNLESS OTHERWISE SPECIFIED				MATERIAL	
ALL FINISHES 250 RMS UNLESS OTHERWISE SPECIFIED				EST. WEIGHT	
		DWG. NO.		REV.	



26"

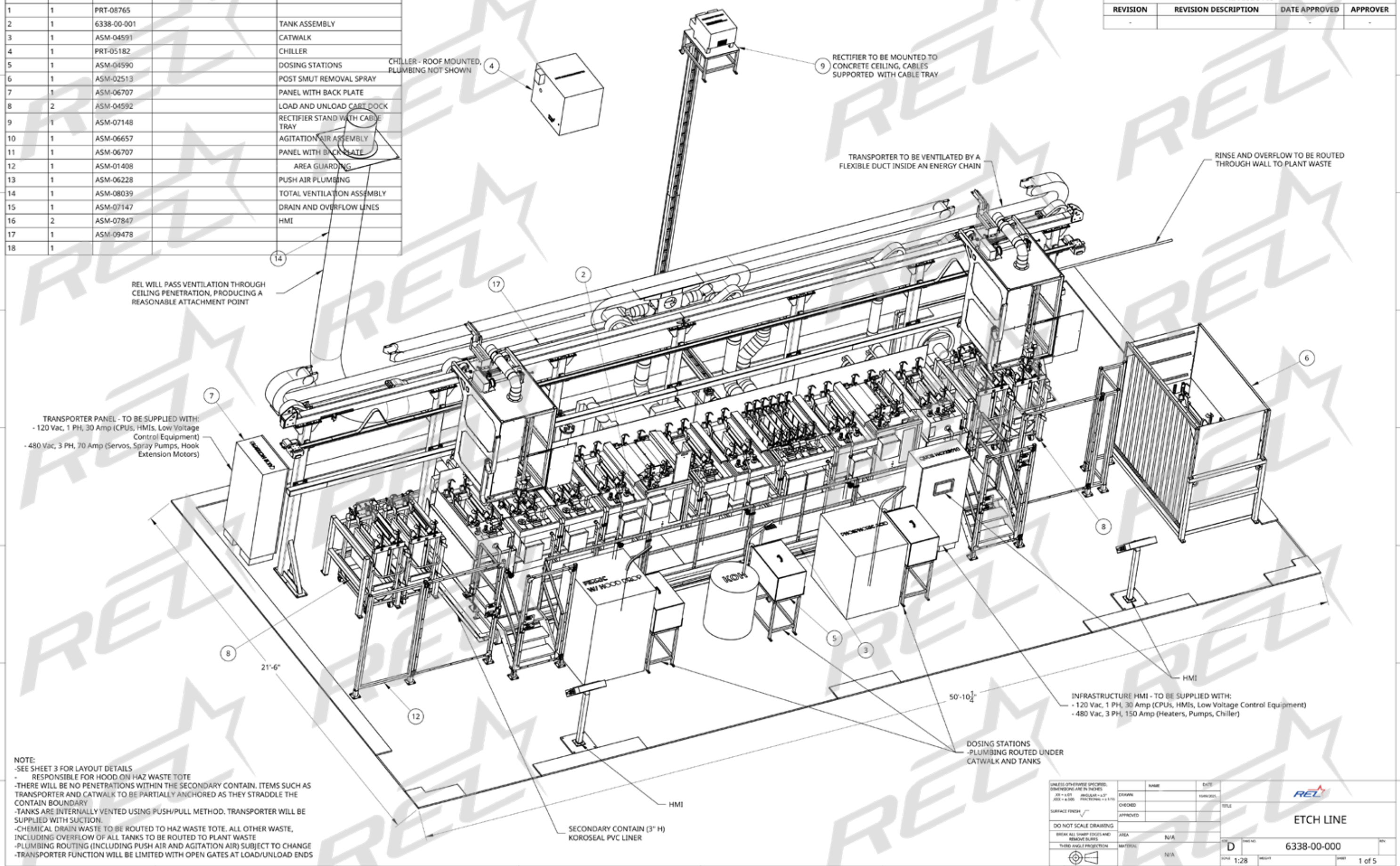
24"

4"

**Automated Etch Line
Model #AEL242604**

ITEM	QUANTITY	INVENTORY ID	DESCRIPTION
1	1	PRT-08765	
2	1	6338-00-001	TANK ASSEMBLY
3	1	ASM-04591	CATWALK
4	1	PRT-05182	CHILLER
5	1	ASM-04590	DOSING STATIONS
6	1	ASM-02513	POST SMUT REMOVAL SPRAY
7	1	ASM-06707	PANEL WITH BACK PLATE
8	2	ASM-04592	LOAD AND UNLOAD CART DOCK
9	1	ASM-07148	RECTIFIER STAND WITH CABLE TRAY
10	1	ASM-06657	AGITATION AIR ASSEMBLY
11	1	ASM-06707	PANEL WITH BACK PLATE
12	1	ASM-01408	AREA GUARDING
13	1	ASM-06228	PUSH AIR PLUMBING
14	1	ASM-08039	TOTAL VENTILATION ASSEMBLY
15	1	ASM-07147	DRAIN AND OVERFLOW LINES
16	2	ASM-07847	HMI
17	1	ASM-09478	
18	1		

REVISIONS			
REVISION	REVISION DESCRIPTION	DATE APPROVED	APPROVER



REL WILL PASS VENTILATION THROUGH CEILING PENETRATION, PRODUCING A REASONABLE ATTACHMENT POINT

TRANSPORTER PANEL - TO BE SUPPLIED WITH:
 - 120 Vac, 1 PH, 30 Amp (CPUs, HMIs, Low Voltage Control Equipment)
 - 480 Vac, 3 PH, 70 Amp (Servos, Spray Pumps, Hook Extension Motors)

INFRASTRUCTURE HMI - TO BE SUPPLIED WITH:
 - 120 Vac, 1 PH, 30 Amp (CPUs, HMIs, Low Voltage Control Equipment)
 - 480 Vac, 3 PH, 150 Amp (Heaters, Pumps, Chiller)

DOSING STATIONS - PLUMBING ROUTED UNDER CATWALK AND TANKS

NOTE:
 -SEE SHEET 3 FOR LAYOUT DETAILS
 - RESPONSIBLE FOR HOOD ON HAZ WASTE TOTE
 -THERE WILL BE NO PENETRATIONS WITHIN THE SECONDARY CONTAIN. ITEMS SUCH AS TRANSPORTER AND CATWALK TO BE PARTIALLY ANCHORED AS THEY STRADDLE THE CONTAIN BOUNDARY
 -TANKS ARE INTERNALLY VENTED USING PUSH/PULL METHOD. TRANSPORTER WILL BE SUPPLIED WITH SUCTION.
 -CHEMICAL DRAIN WASTE TO BE ROUTED TO HAZ WASTE TOTE. ALL OTHER WASTE, INCLUDING OVERFLOW OF ALL TANKS TO BE ROUTED TO PLANT WASTE
 -PLUMBING ROUTING (INCLUDING PUSH AIR AND AGITATION AIR) SUBJECT TO CHANGE
 -TRANSPORTER FUNCTION WILL BE LIMITED WITH OPEN GATES AT LOAD/UNLOAD ENDS

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES 3/16" < 1/8" REGULAR - 1/8" JOBS < 1/4" FRACTIONS - 1/16"	NAME	DATE	
DRAWN	YORKS	TITLE	
CHECKED			
SURFACE FINISH	APPROVED		ETCH LINE
DO NOT SCALE DRAWING	AREA	N/A	PROJECT NO. 6338-00-000
BREAK ALL SHARP EDGES AND REMOVE BURRS	MATERIAL	N/A	SCALE 1:28 SHEET 1 of 5
THIRD ANGLE PROJECTION			



TRANSPORTER 1

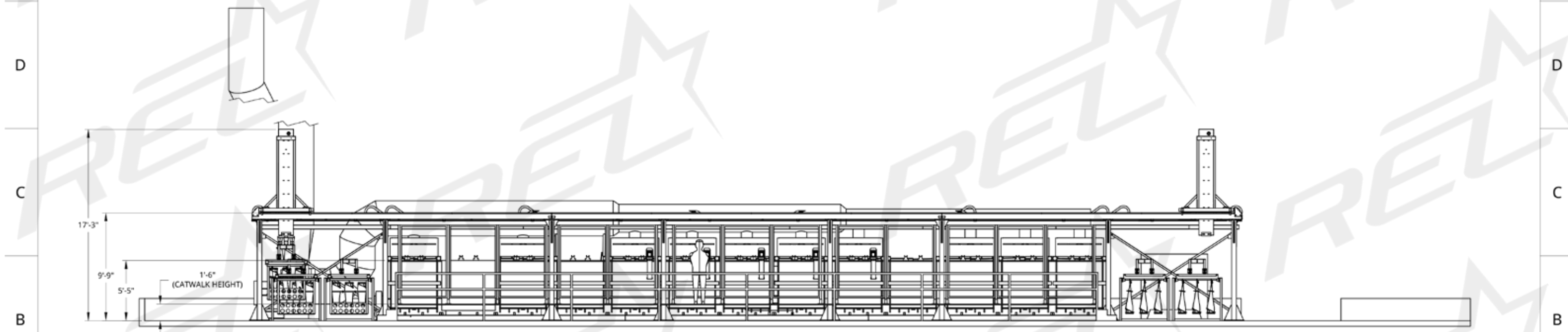
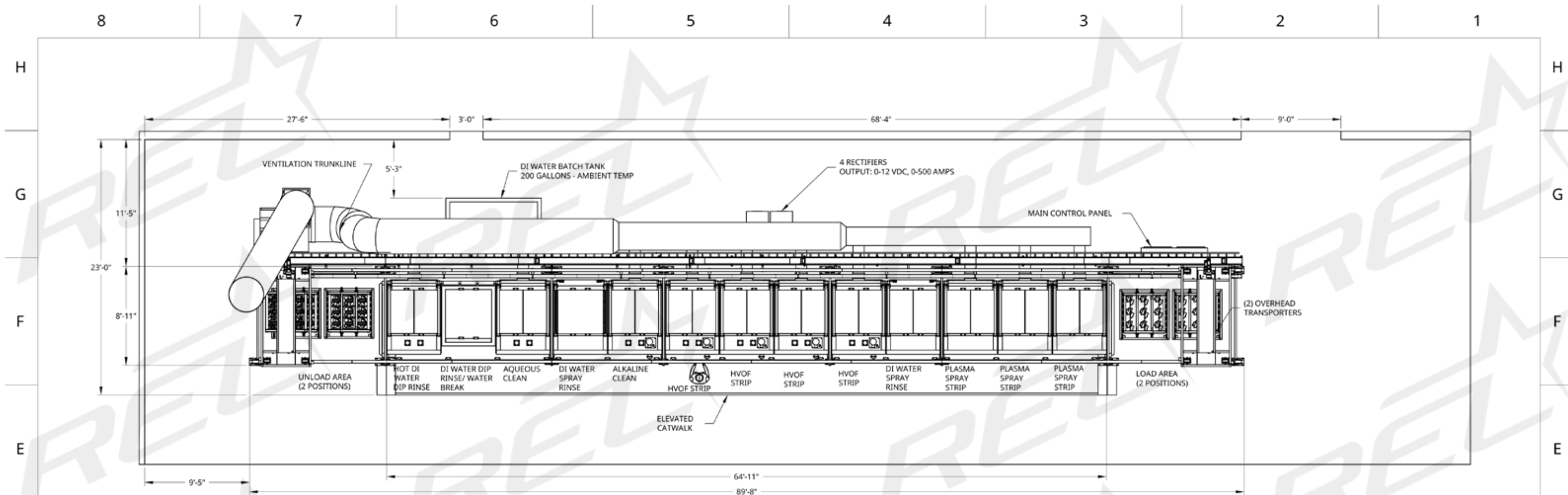
HEL

38"

44"

44"

Strip Line
Model #SL444438



QUANTITY:-

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES X.XX = 0.01 ANGULAR = 0.01° XXX = 0.005 FRACTIONAL = 1/16	NAME	DATE	
SURFACE FINISH ✓	DRAWN	03/10/2024	
DO NOT SCALE DRAWING BREAK ALL SHARP EDGES AND REMOVE BURRS THIRD ANGLE PROJECTION	CHECKED		
	APPROVED		TITLE
			Etch Line
	MATERIAL		REV
			D
			SCALE 1:50
			SHEET 2 of 14



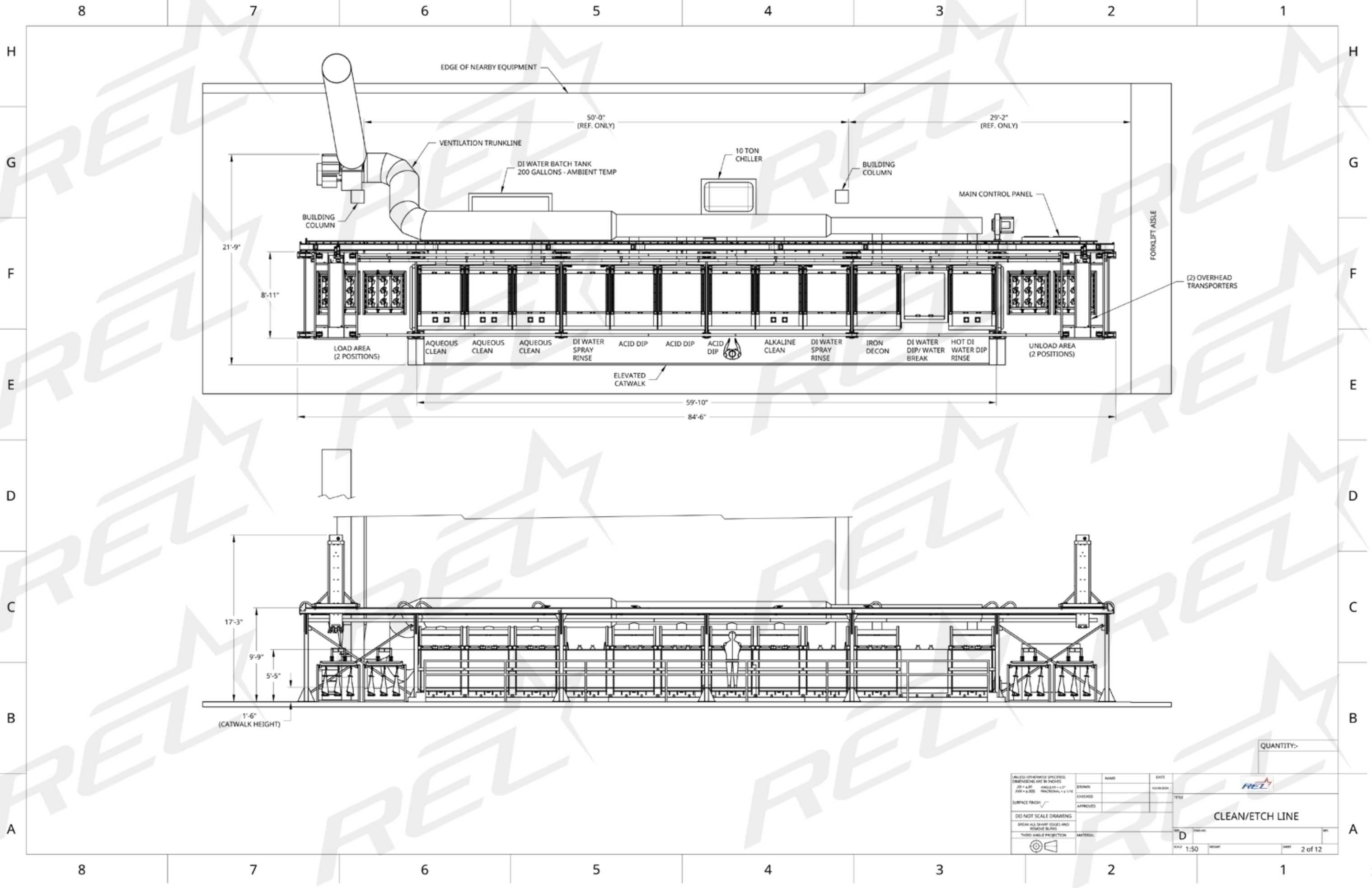
TRANSPORTER 2

38"

44"

44"

Clean/Etch Line
Model #CL444438



UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES		NAME		DATE	
20" ± 0.01	ANGULAR ± 0.5°	DRAWN		REVISION	
300" ± 0.002	FRACTIONS 1/16" LINE	CHECKED		TITLE	
SURFACE FINISH		APPROVED			
DO NOT SCALE DRAWING					
BREAK ALL SHARP EDGES AND REMOVE BURRS					
THIRD ANGLE PROJECTION		MATERIAL			

QUANTITY:-

CLEAN/ETCH LINE

D		SCALE		SHEET	
1:50	HEIGHT			2 of 12	



48"

60"

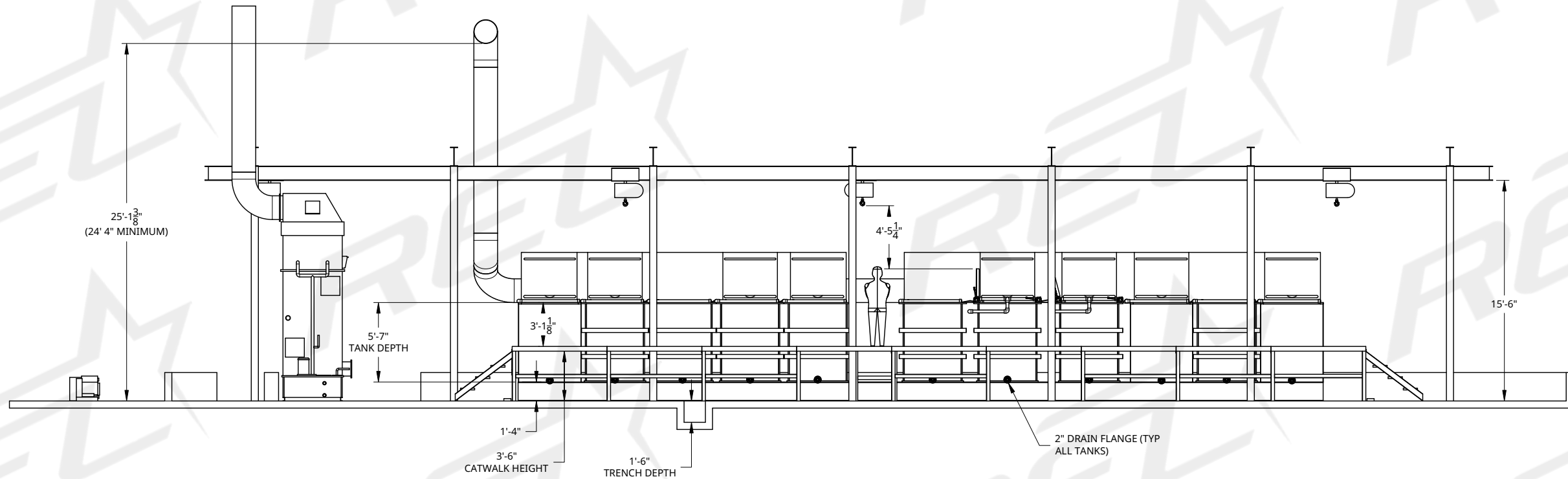
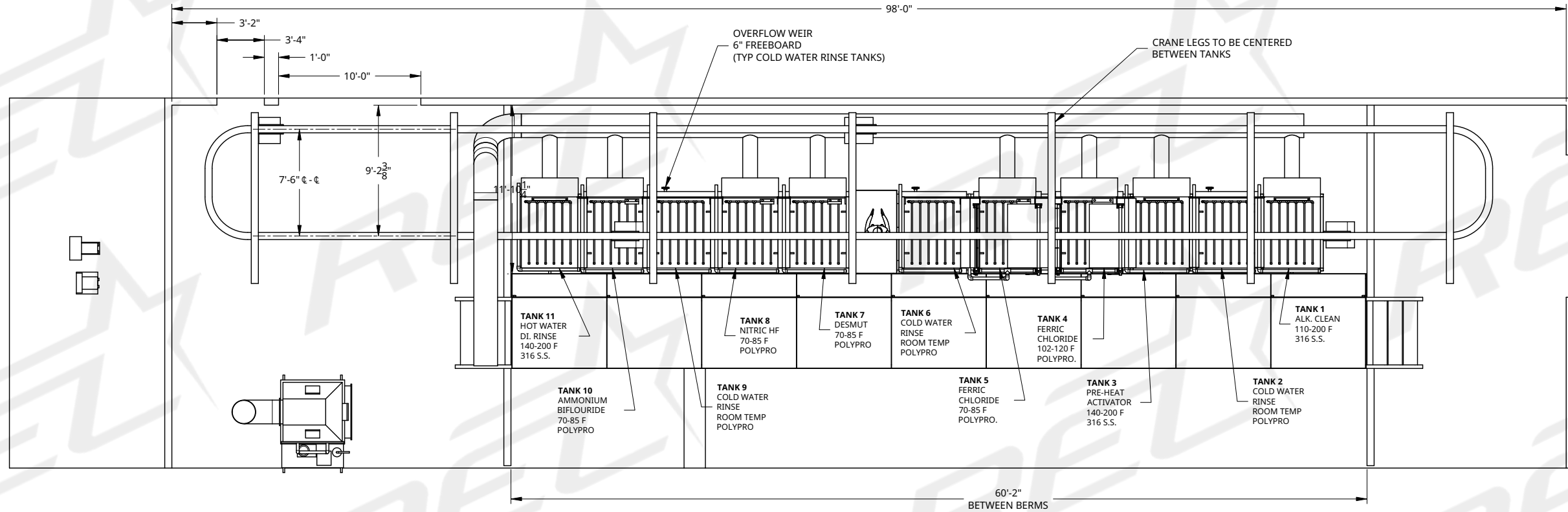
60"

**Ferric Etch Line
Model #CE486060**

CAUTION
Floor slippery when wet

LOCKING
LOOSE
CONTROL LINE

REI
FOR MORE INFORMATION CONTACT
OUR SALES REPRESENTATIVE
1-800-851-1111
WWW.REI.COM



QUANTITY: -

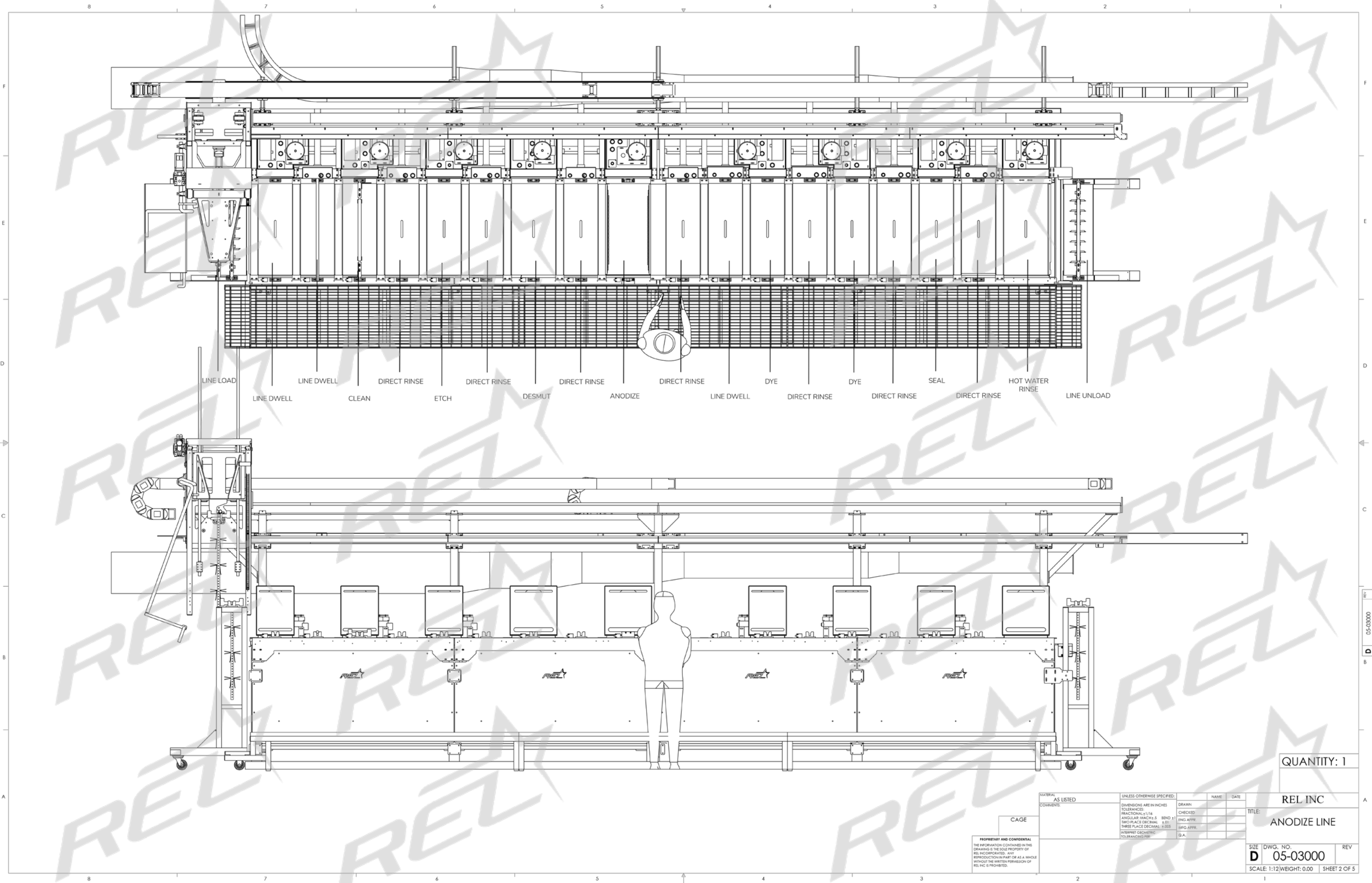
CAGE	MATERIAL	COMMENTS:	UNLESS OTHERWISE SPECIFIED:		NAME	DATE	REL INC
			DRAWN	CHECKED	32/07/2024	TITLE:	
PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF REL INCORPORATED. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF REL INC IS PROHIBITED.	DIMENSIONS ARE IN INCHES			ENG APPR.		ETCH LINE SIZE DWG. NO. REV SCALE: WEIGHT: SHEET 2 OF 2	
	TOLERANCES			MFG APPR.			
	FRACTIONAL $\pm 1/16$			Q.A.			
	ANGULAR ± 0.5 BEND ± 1						
TWO PLACE DECIMAL ± 0.1							
THREE PLACE DECIMAL ± 0.05							
INTERPRET GEOMETRIC TOLERANCING PER:							



WASTE

33"
28"
11"

**Automated Anodize Line
Model #A331128**



LINE LOAD LINE DWELL CLEAN ETCH DESMUT ANODIZE LINE DWELL DYE DYE SEAL HOT WATER RINSE LINE UNLOAD

CAGE

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MATERIAL AS LISTED COMMENTS	UNLESS OTHERWISE SPECIFIED:	NAME	DATE
	DIMENSIONS ARE IN INCHES	DRAWN	
	TOLERANCES: FRACTIONAL: 1/16 ANGULAR: 3/4 CH 5 BEND 1/2	CHECKED	
	TWO PLACE DECIMAL 0.01 THREE PLACE DECIMAL 0.005 INTERPRET GEOMETRIC TOLERANCING PER	ENG APPR	
		SPG APPR	
		G.A.	

QUANTITY: 1

REL INC
 ANODIZE LINE

SIZE DWG. NO. REV
D 05-03000
 SCALE: 1:12 WEIGHT: 0.00 SHEET 2 OF 5

05-03000

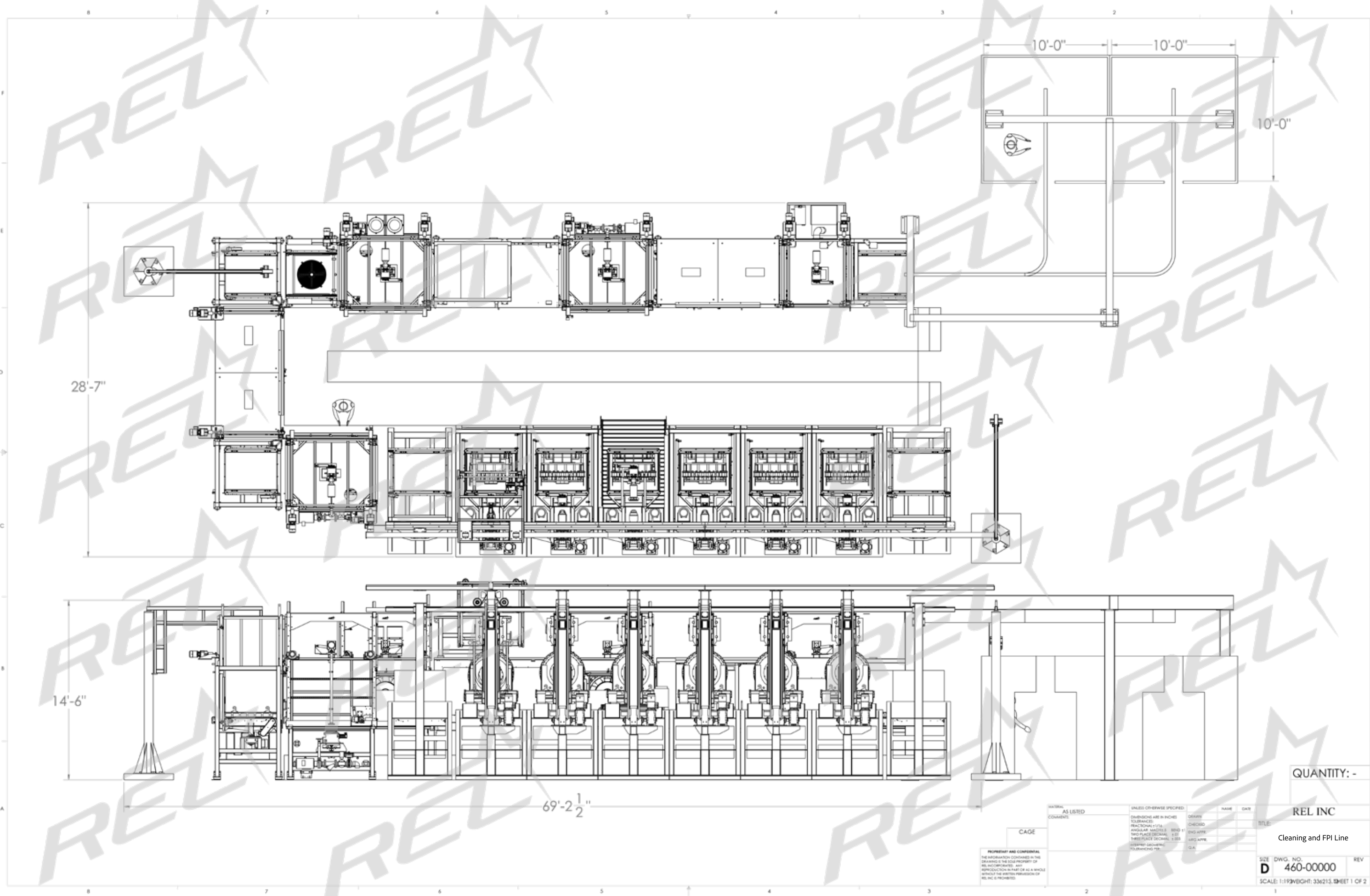


44"

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		

QUANTITY: -

REL INC

Cleaning and FPI Line

SIZE DWG. NO. REV
D 460-00000
 SCALE: 1:1 (9) WEIGHT: 336213 SHEET 1 OF 2

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D 460-00000 LPC

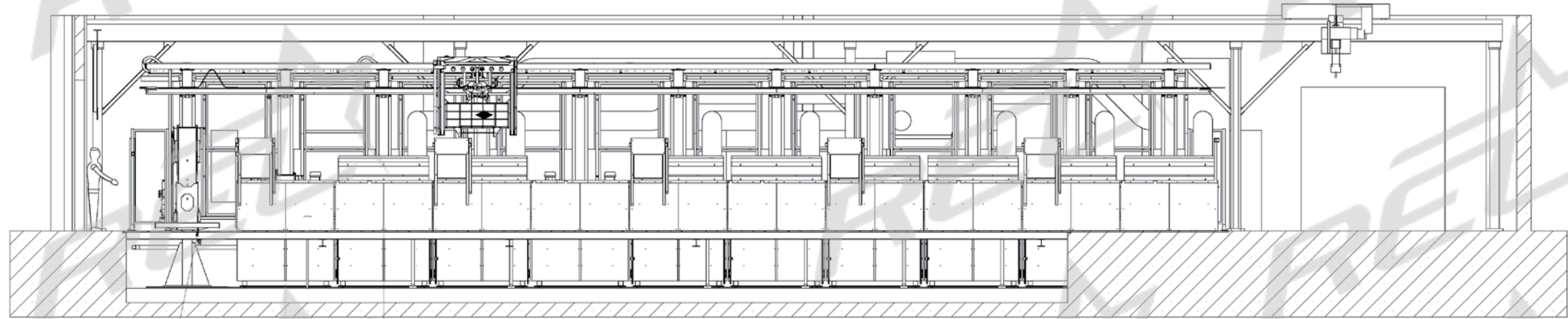
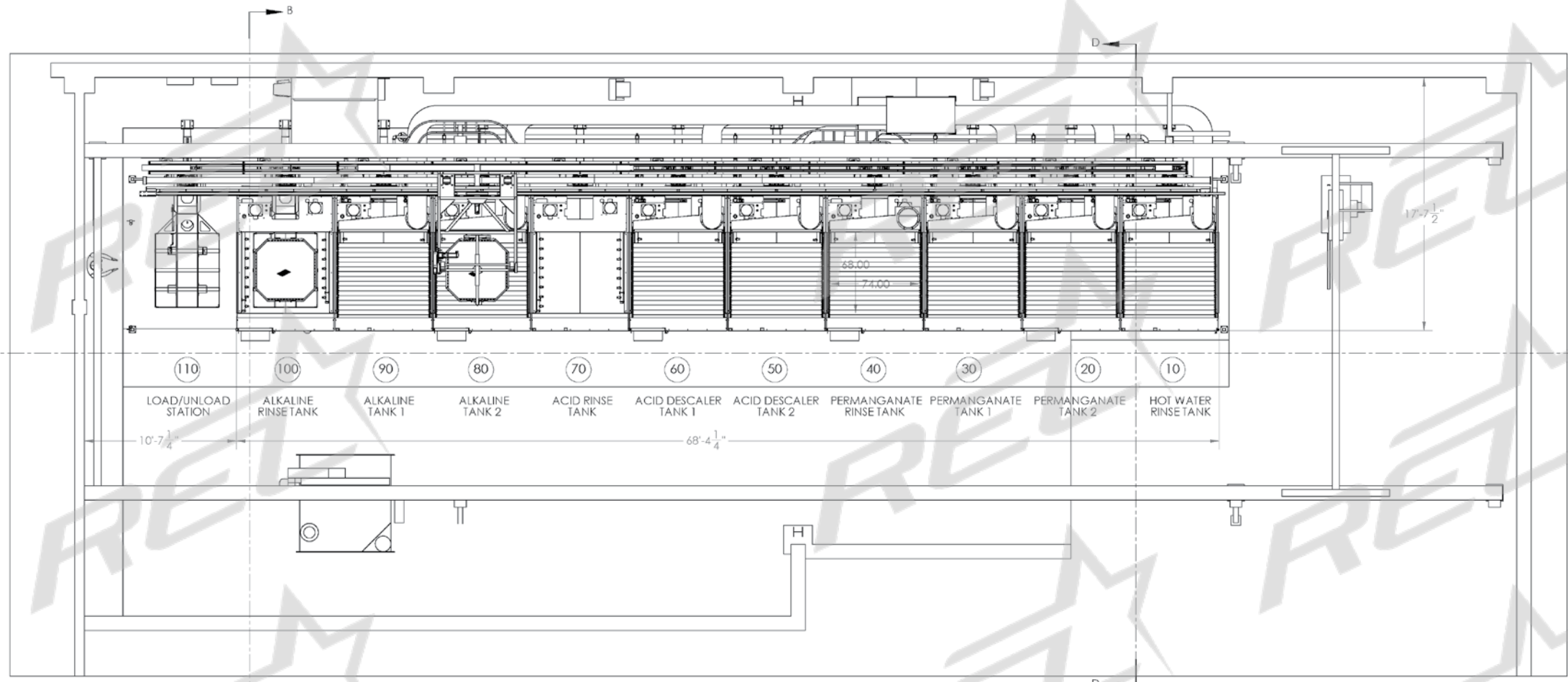


50"

48"

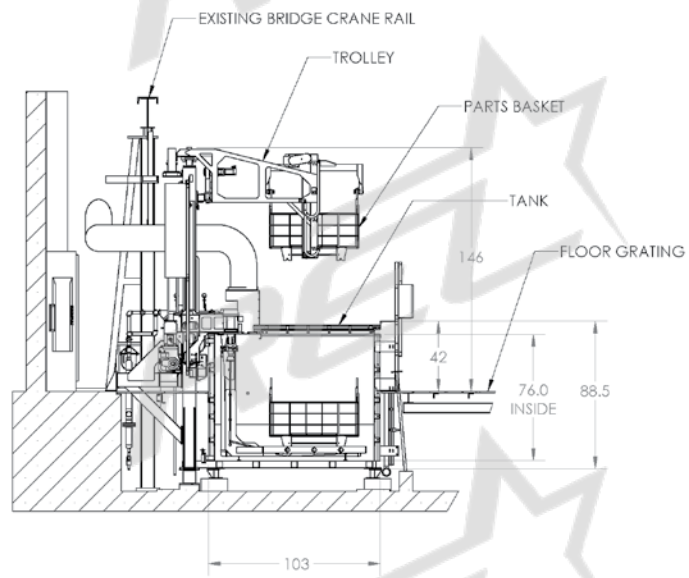
38"

**Cleaning Line
Model #CL504838**



LOAD STATION LIFT
(APX 24" TRAVEL)

SECTION A-A



SECTION B-B

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DATE	BY	CHKD	APP'D	DATE	BY	CHKD	APP'D
3-15-15							

REL INC	
TITLE: CLEANING LINE	
SIZE DWG. NO.	REV
D 170-00000	
SCALE: 1:56 WEIGHT: 40929.5 SHEET 2 OF 4	



55'

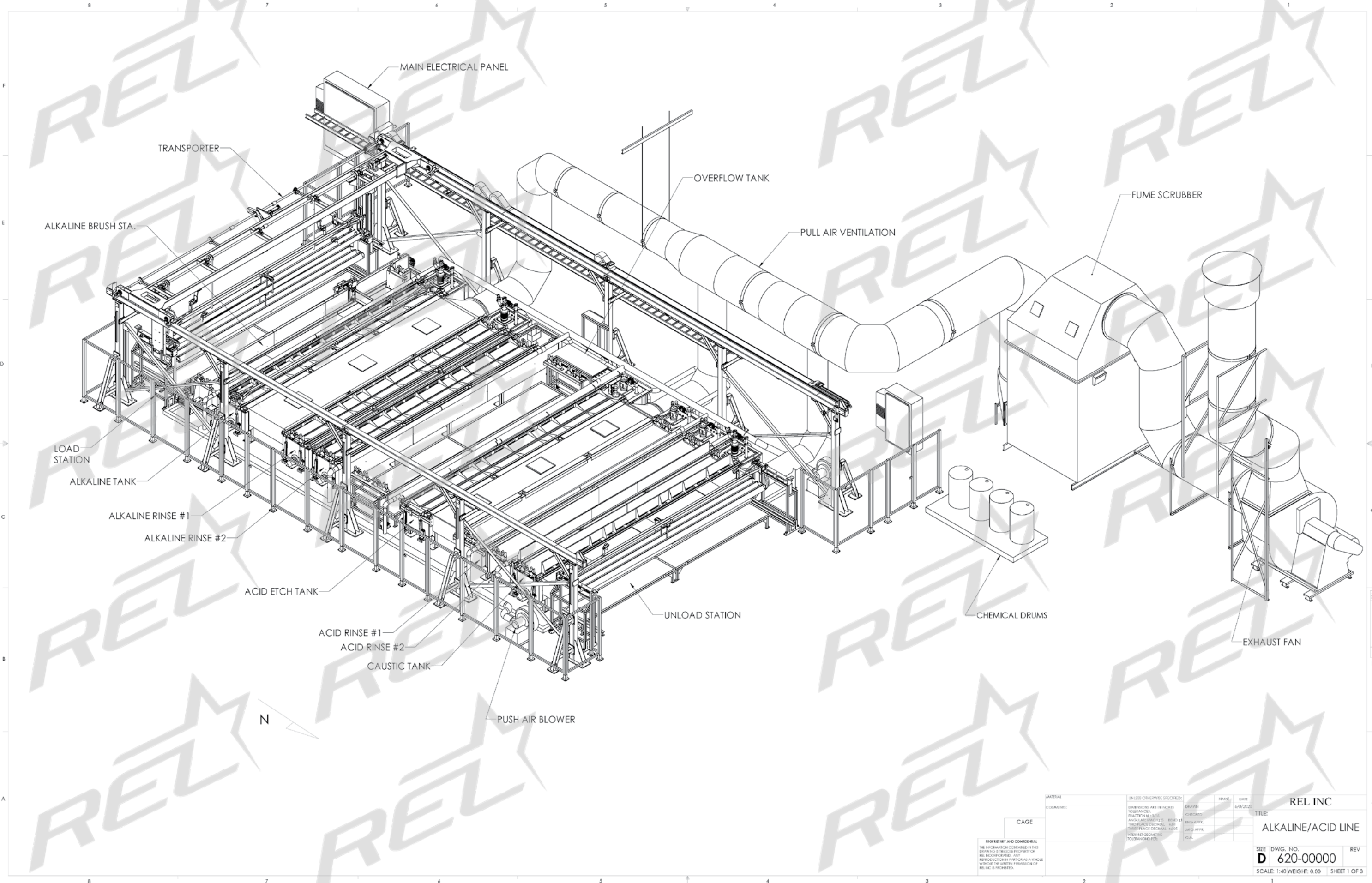
34'

252"

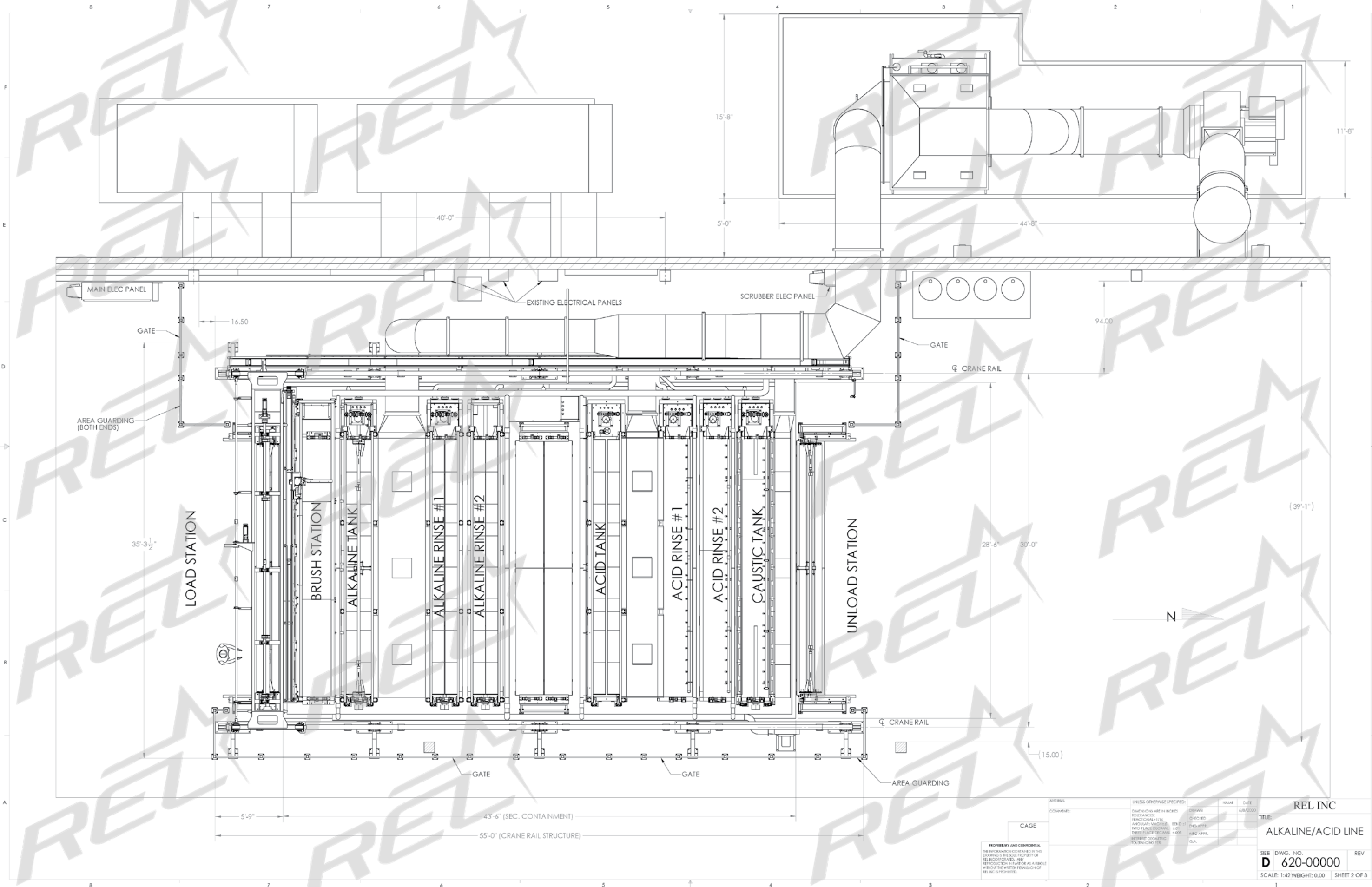
14"

24"

**Cleaning and Etch Line
Model #WPR2930025**



MATERIAL		UNLESS OTHERWISE SPECIFIED:		DRAWN	NAME	DATE	REL INC
COMMENTS:		DIMENSIONS ARE IN INCHES	TOLERANCES:	CHECKED		6/8/2020	TITLE
CAGE		FRACTIONAL SIZES	ANGULAR DIMENSIONS - REND 11	INGL APPR.			ALKALINE/ACID LINE
		TWO DECIMALS	TWO DECIMALS	AND APPR.			SITE DWG. NO.
		TWO DECIMALS	TWO DECIMALS	AND APPR.			D 620-00000
		TWO DECIMALS	TWO DECIMALS	AND APPR.			SCALE: 1:40 WEIGHT: 0.00 SHEET 1 OF 3
		TWO DECIMALS	TWO DECIMALS	AND APPR.			REV



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		DIMENSIONS ARE IN INCHES	CHECKED		6/8/2000
		FRACTIONAL SIZES			
		ANGULAR DIMENSIONS			
		TWO PLACE DECIMAL			
		THREE PLACE DECIMAL			
		REFER GOVERNING			
		EXPLANATIONS			

REL INC	
TITLE:	ALKALINE/ACID LINE
SIZE	DWG. NO.
D	620-00000
SCALE: 1:42	WEIGHT: 0.00
SHEET 2 OF 3	

D 620-00000



ALKALINE RINSE



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**Made in
the USA**

relinc.com