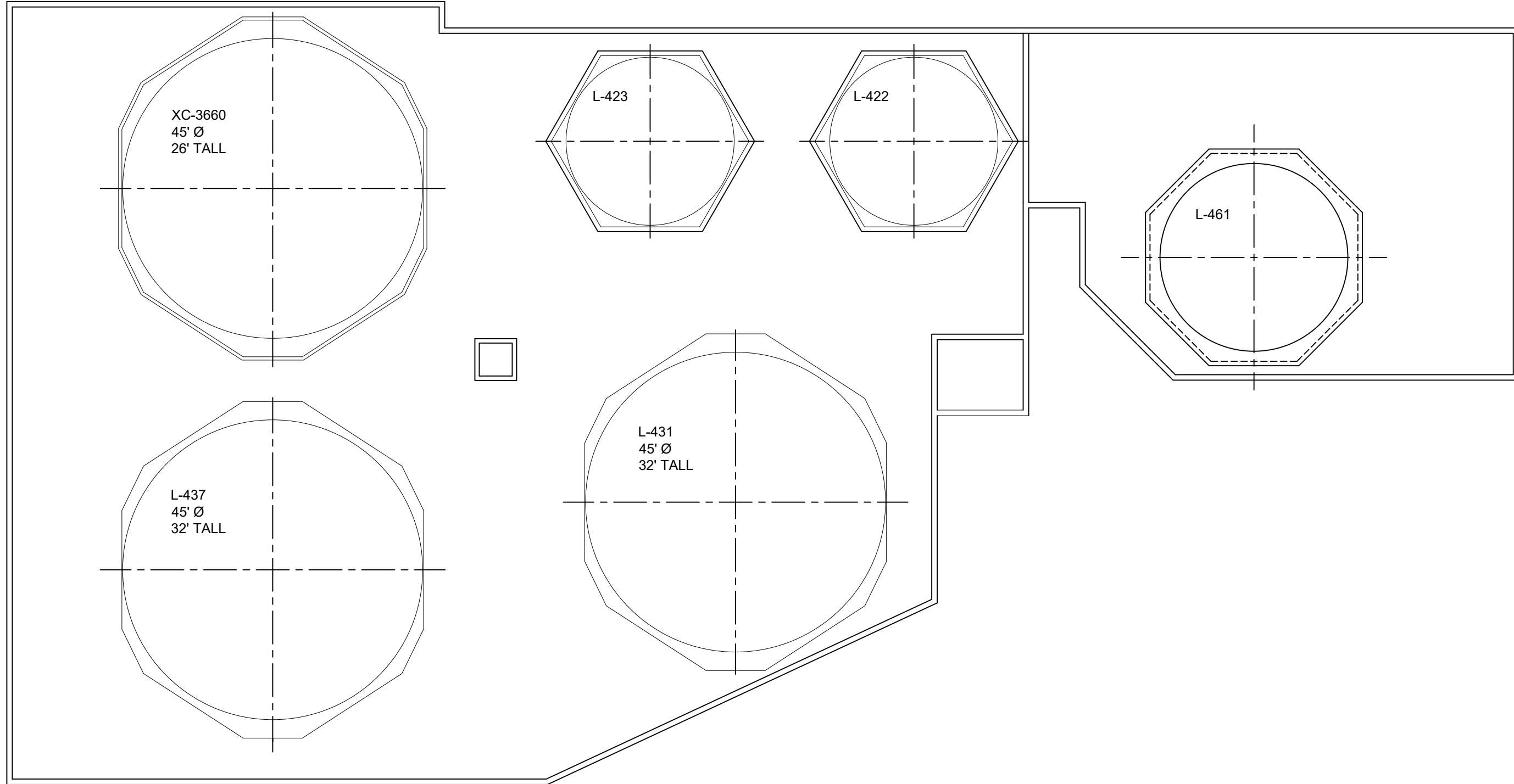


OWNER:
 FACILITY:
 ENGINEER: STRUCTURAL TECHNOLOGIES STRONGPOINT, LLC
 CONTRACTOR: STRUCTURAL PRESERVATION SYSTEMS, LLC
 PROJECT: SHELL NORCO ALKY SUMP

DRAWING INDEX		
CAD NO	DESCRIPTION	REV NO
001	DRAWING TITLE AND INDEX SHEET	0
002-003	EXISTING CONDITIONS	0
100-105	SAFETY CONSIDERATIONS	0
200-218	INJECTION DETAILS	0
300-315	ACRYLATE GROUTING DETAILS	0



Safety Related
 Augmented Quality
 Non-Safety Related

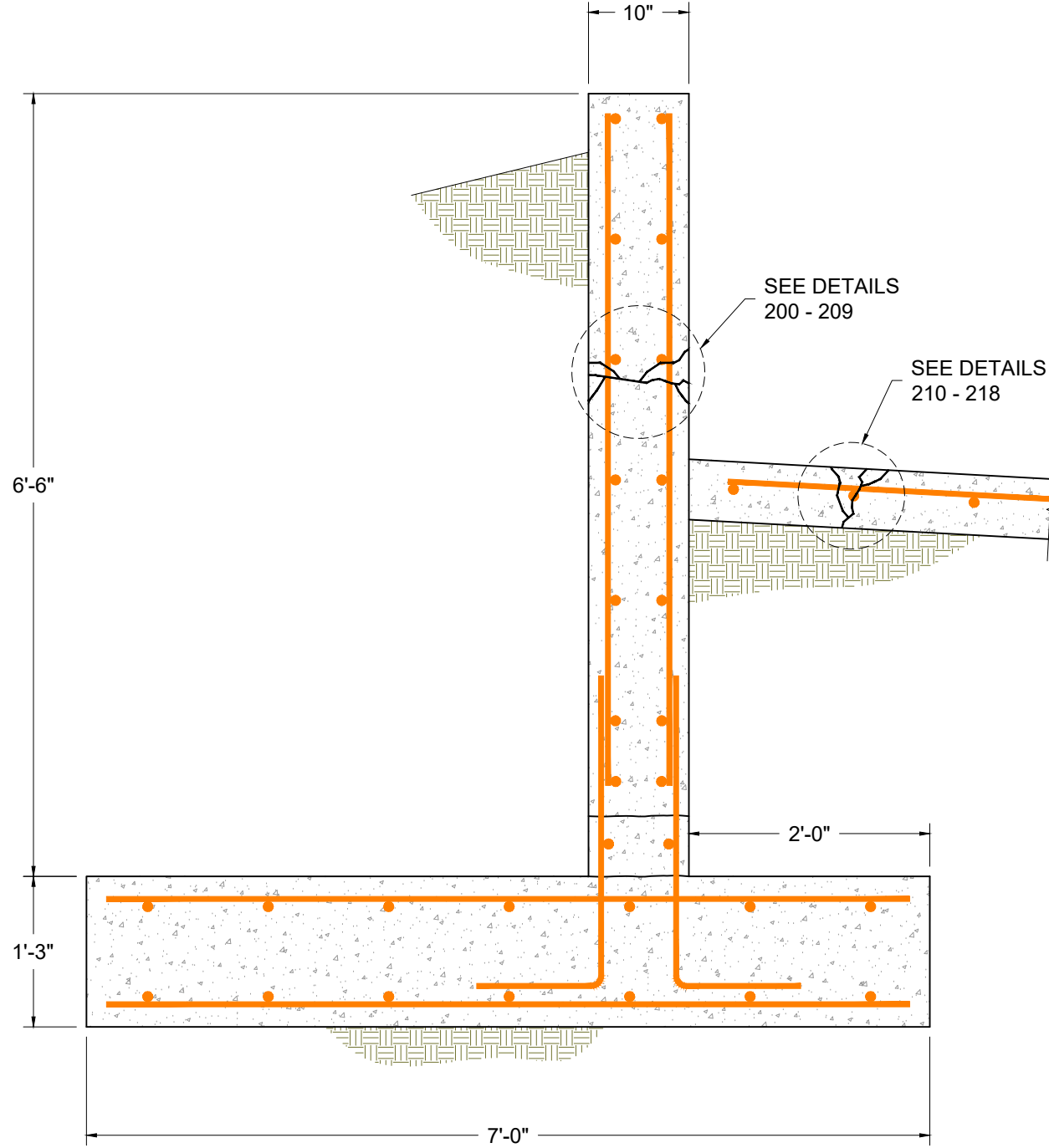
SHELL NORCO ALKY SUMP
 DRAWING TITLE AND SHEET INDEX

ST JOB NO: 702736
 SPS JOB NO: 698217
 SHEET: 702736-D03-001

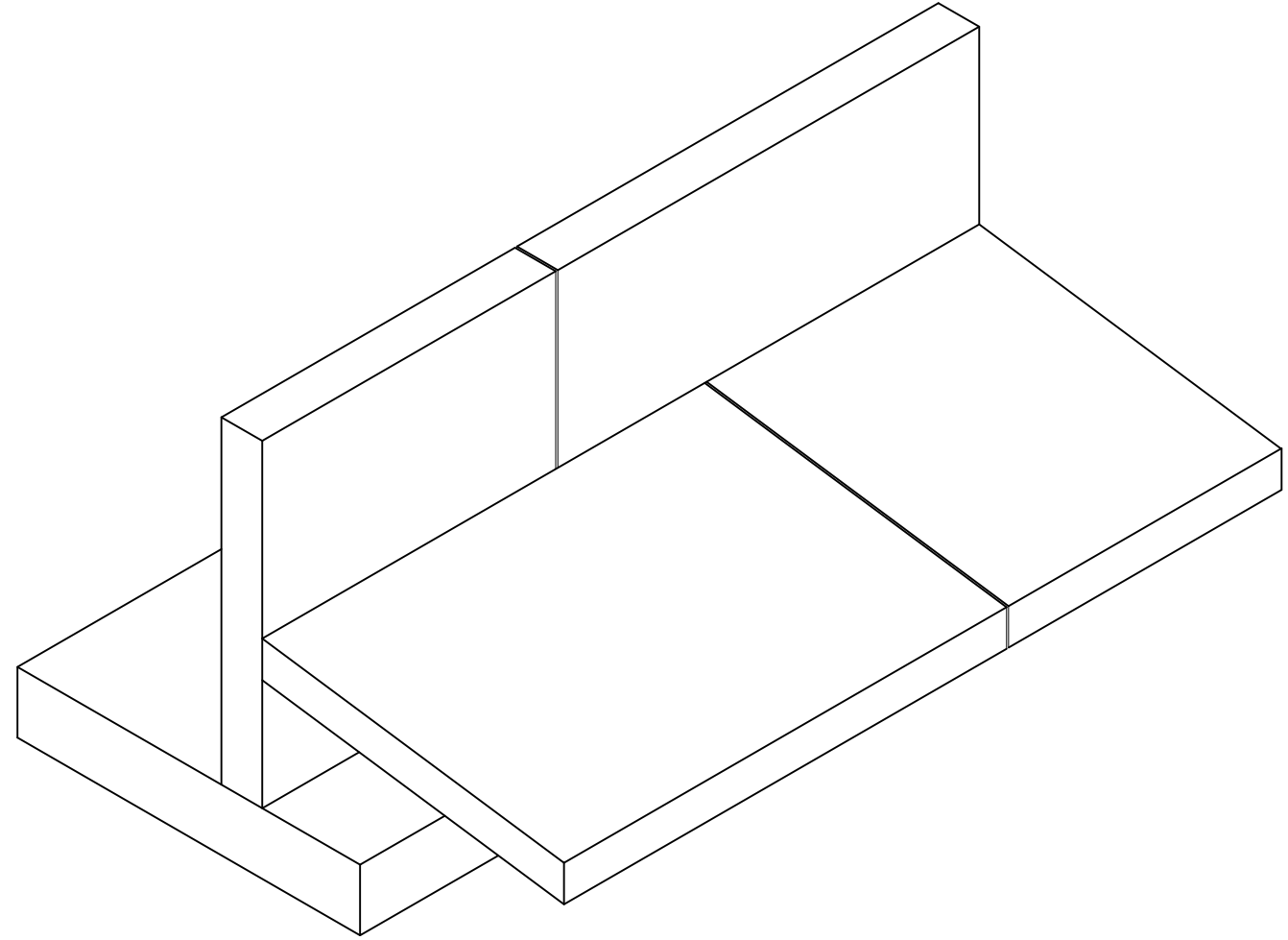
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

structural TECHNOLOGIES
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
 10150 Old Columbia Rd.
 COLUMBIA, MD 21046
 Phone: 410.650.7000
 Fax: 410.650.4111

DCSN BY	BA
DWN BY	TB
IV BY	
APP BY	
NO.	0
DATE	1/23/2026
ISSUED FOR REVIEW	TB
REVISIONS	BY



PLAN
 Scale 1/16"=1'-0"



ISOMETRIC
 N.T.S.

Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP
 DRAWING TITLE AND SHEET INDEX

ST JOB NO: 702736
 SPS JOB NO: 698217
 SHEET: 702736-D03-003

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

structural TECHNOLOGIES
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
 10150 Old Columbia Rd.
 COLUMBIA, MD 21046
 Phone: 410.650.7000
 Fax: 410.650.4111

NO.	DATE	REVISIONS
0	1/23/2026	ISSUED FOR REVIEW

DESIGN BY	BA
DRAWN BY	TB
IN BY	
APP BY	

1. GENERAL POWER TOOL SAFETY WARNINGS

1.1. WORK AREA SAFETY

- 1.1.1. KEEP WORK AREA CLEAN AND WELL LIT. CLUTTERED OR DARK AREAS INVITE ACCIDENTS.
- 1.1.2. DO NOT OPERATE POWER TOOLS IN EXPLOSIVE ATMOSPHERES, SUCH AS IN THE PRESENCE OF FLAMMABLE LIQUIDS, GAS OR DUST. POWER TOOLS CREATE SPARKS WHICH MAY IGNITE THE DUST OR FUMES.
- 1.1.3. KEEP CHILDREN AND BYSTANDERS AWAY WHILE OPERATING A POWER TOOL. DISTRACTIONS CAN CAUSE YOU TO LOSE CONTROL.

1.2. ELECTRICAL SAFETY

- 1.2.1. POWER TOOL PLUGS MUST MATCH THE OUTLET. NEVER MODIFY THE PLUG IN ANY WAY. DO NOT USE ANY ADAPTER PLUGS WITH EARTHED (GROUNDED) POWER TOOLS. UNMODIFIED PLUGS AND MATCHING OUTLETS WILL REDUCE RISK OF ELECTRIC SHOCK.
- 1.2.2. AVOID BODY CONTACT WITH EARTHED OR GROUNDED SURFACES, SUCH AS PIPES, RADIATORS, RANGES AND REFRIGERATORS. THERE IS AN INCREASED RISK OF ELECTRIC SHOCK IF YOUR BODY IS EARTHED OR GROUNDED.
- 1.2.3. DO NOT EXPOSE POWER TOOLS TO RAIN OR WET CONDITIONS. WATER ENTERING A POWER TOOL WILL INCREASE THE RISK OF ELECTRIC SHOCK.
- 1.2.4. DO NOT ABUSE THE CORD. NEVER USE THE CORD FOR CARRYING, PULLING OR UNPLUGGING THE POWER TOOL. KEEP CORD AWAY FROM HEAT, OIL, SHARP EDGES OR MOVING PARTS. DAMAGED OR ENTANGLED CORDS INCREASE THE RISK OF ELECTRIC SHOCK.
- 1.2.5. WHEN OPERATING A POWER TOOL OUTDOORS, USE AN EXTENSION CORD SUITABLE FOR OUTDOOR USE. USE OF A CORD SUITABLE FOR OUTDOOR USE REDUCES THE RISK OF ELECTRIC SHOCK.
- 1.2.6. IF OPERATING A POWER TOOL IN A DAMP LOCATION IS UNAVOIDABLE, USE A RESIDUAL CURRENT DEVICE (RCD) PROTECTED SUPPLY. USE OF AN RCD REDUCES THE RISK OF ELECTRIC SHOCK.

1.3. PERSONAL SAFETY

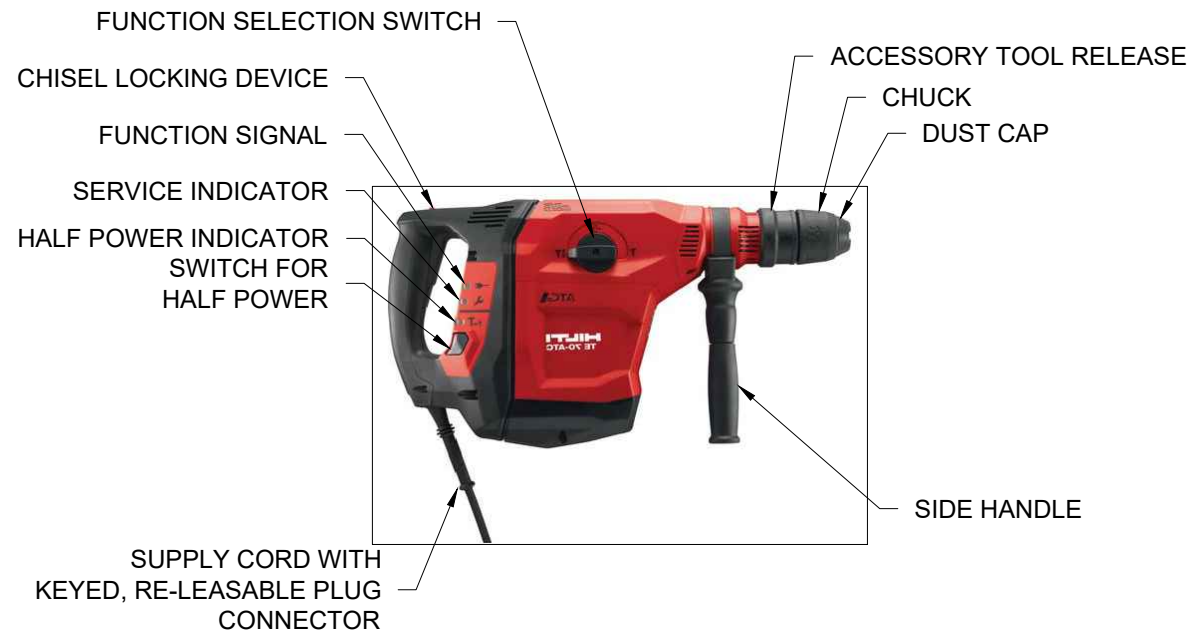
- 1.3.1. STAY ALERT, WATCH WHAT YOU ARE DOING AND USE COMMON SENSE WHEN OPERATING A POWER TOOL. DO NOT USE A POWER TOOL WHILE YOU ARE TIRED, OR UNDER THE INFLUENCE OF DRUGS, ALCOHOL, OR MEDICATION. A MOMENT OF INATTENTION WHILE OPERATING POWER TOOLS MAY RESULT IN SERIOUS PERSONAL INJURY.
- 1.3.2. USE PPE. ALWAYS WEAR EYE PROTECTION. PPE SUCH AS A DUST MASK, NON-SKID SAFETY SHOES, HARD HAT OR HEARING PROTECTION USE FOR APPROPRIATE CONDITIONS WILL REDUCE PERSONAL INJURIES.
- 1.3.3. PREVENT UNINTENTIONAL STARTING. ENSURE THE SWITCH IS IN THE OFF-POSITION BEFORE CONNECTING TO POWER SOURCE AND/OR BATTERY PACK, PICKING UP OR CARRYING THE TOOL. CARRYING POWER TOOLS WITH YOUR FINGER ON THE SWITCH OR ENERGIZING POWER TOOLS THAT HAVE THE SWITCH ON INVITES INJURIES.
- 1.3.4. REMOVE ANY ADJUSTING KEY OR WRENCH BEFORE BEFORE TURNING THE POWER TOOL ON. A WRENCH OR A KEY LEFT ATTACHED TO A ROTATING PART OF THE POWER TOOL MAY RESULT IN PERSONAL INJURY.
- 1.3.5. DO NOT OVERREACH. KEEP PROPER FOOTING AND BALANCE AT ALL TIMES. THIS ENABLES BETTER CONTROL OF THE POWER TOOL IN UNEXPECTED SITUATIONS.
- 1.3.6. DRESS PROPERLY. DO NOT WEAR LOOSE CLOTHING OR JEWELLERY. KEEP YOUR HAIR AND CLOTHING AWAY FROM MOVING PARTS. LOOSE CLOTHES, JEWELLERY OR LONG HAIR CAN BE CAUGHT IN MOVING PARTS.
- 1.3.7. IF DEVICES ARE PROVIDED FOR THE CONNECTION OF DUST EXTRACTION AND COLLECTION FACILITIES, ENSURE THESE ARE CONNECTED AND PROPERLY USED. USE OF DUST COLLECTION CAN REDUCE DUST-RELATED HAZARDS.
- 1.3.8. DO NOT LET FAMILIARITY GAINED FROM FREQUENT USE OF TOOLS ALLOW YOU TO BECOME COMPLACENT AND IGNORE TOOL SAFETY PRINCIPALS. A CARELESS ACTION CAN CAUSE SEVERE INJURY WITHIN A FRACTION OF A SECOND.

1.4. POWER TOOL USE AND CARE

- 1.4.1. DO NOT FORCE THE POWER TOOL. USE THE CORRECT POWER TOOL FOR YOUR APPLICATION. THE CORRECT POWER TOOL WILL DO A JOB BETTER AND SAFER AT THE RATE FOR WHICH IT WAS DESIGNED.
- 1.4.2. DO NOT USE THE POWER TOOL IF THE SWITCH DOES NOT TURN IT ON OR OFF. ANY POWER TOOL THAT CANNOT BE CONTROLLED WITH THE SWITCH IS

DANGEROUS AND MUST BE REPAIRED.

- 1.4.3. DISCONNECT THE PLUG FROM THE POWER SOURCE AND / OR REMOVE THE BATTERY PACK. IF DETACHABLE, FROM THE POWER TOOL BEFORE MAKING ANY ADJUSTMENTS, CHANGING ACCESSORIES, OR STORING POWER TOOLS. SUCH PREVENTIVE SAFETY MEASURES REDUCES THE RISK OF STARTING THE POWER TOOL ACCIDENTALLY.
 - 1.4.4. STORE IDLE POWER TOOLS OUT OF THE REACH OF CHILDREN AND DO NOT ALLOW PERSONS UNFAMILIAR WITH THE POWER TOOL TO OPERATE THE POWER TOOL. POWER TOOLS ARE DANGEROUS IN THE HANDS OF UNTRAINED USERS.
 - 1.4.5. MAINTAIN POWER TOOLS AND ACCESSORIES. CHECK FOR MISALIGNMENT OR BINDING OF MOVING PARTS, BREAKAGE OF PARTS AND ANY OTHER CONDITION THAT MAY AFFECT THE POWER TOOL'S OPERATION. IF DAMAGED, HAVE THE POWER TOOL REPAIRED BEFORE USE. MANY ACCIDENTS ARE CAUSED BY POORLY MAINTAINED POWER TOOLS.
 - 1.4.6. KEEP CUTTING TOOLS SHARP AND CLEAN. PROPERLY MAINTAINED CUTTING TOOLS WITH SHARP CUTTING EDGES ARE LESS LIKELY TO BIND AND ARE EASIER TO CONTROL.
 - 1.4.7. USE THE POWER TOOL, ACCESSORIES AND TOOL BITS ETC. IN ACCORDANCE WITH THESE INSTRUCTIONS, TAKING INTO ACCOUNT THE WORKING CONDITIONS AND THE WORK TO BE PERFORMED. USE OF THE POWER TOOL FOR OPERATIONS DIFFERENT FROM THOSE INTENDED COULD RESULT IN A HAZARDOUS SITUATION.
 - 1.4.8. KEEP HANDLES AND GRASPING SURFACES DRY, CLEAN AND FREE FROM OIL AND GREASE. SLIPPERY HANDLES AND GRASPING SURFACES DO NOT ALLOW FOR SAFE HANDLING AND CONTROL OF THE TOOL IN UNEXPECTED SITUATIONS.
- 1.5. SERVICE
- 1.5.1. HAVE YOUR POWER TOOL SERVICED BY A QUALIFIED REPAIR PERSON USING ONLY IDENTICAL REPLACEMENT PARTS. THIS WILL ENSURE THAT THE SAFETY OF THE POWER TOOL IS MAINTAINED.



1 HILTI TE 70-ATC

Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP

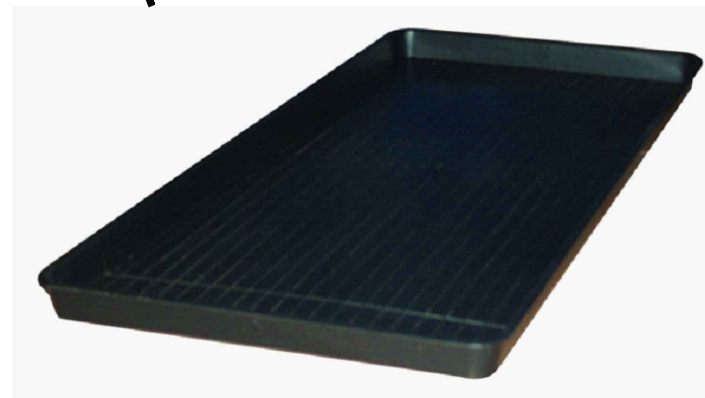
ST JOB NO: 702736
SPS JOB NO: 698217
SHEET: 702736-D03-104

structural TECHNOLOGIES
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
10150 Old Columbia Rd.
COLUMBIA, MD 21046
Phone: 410850-7000
Fax: 410850-4111

DESIGN BY	BA
DRAWN BY	TB
ISSUED FOR REVIEW	NO.
DATE	1/23/2026
REVISIONS	TB
BY	BY

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

SAFETY CONSIDERATIONS FOR CHEMICAL GROUTING



General Jobsite Safety Protocols:

1. Contractor shall consider ventilation requirements at the work area:
 - 1.1. Outside conditions, open air ventilation.
 - 1.2. Inside conditions, with good mechanical ventilation.
 - 1.3. Inside conditions, with minimal mechanical ventilation.
2. Weather Exposure:
 - 2.1. Materials shall not be exposed to direct sunlight during operation and excessive heat or cold temperatures.
 - 2.2. Store polyurethane solution in opaque containers and avoid direct sunlight exposure.
 - 2.2.1. Direct sunlight (UV exposure) causes gelling of solution, and
 - 2.2.2. Storage temperatures should be between (45-80) ° F.
 - 2.3. Cold temperatures delay reactions, warm temperatures accelerate reactions.
 - 2.3.1. For a 20° change in temperature from the bases - reactions will either accelerate (half the set time) or decline (twice the set time).
 - 2.4. Note: Cold temperatures (above 32° F) can cause ice buildup (freeze / frost) within air motors on grout and flushing pumps.
3. Confined Space Requirements:
 - 3.1. Check OSHA requirements for determination if work area is confined space
 - 3.2. Follow OSHA regulations for confined space monitoring and air supply
4. Spill-Pads
 - 4.1. All materials, power, and operational grouting equipment shall be oriented / positioned over spill pads
 - 4.2. Place spill pad on level substate
 - 4.3. Spill pad should be 1.5 times the volume of stored materials
 - 4.4. Spill pads should be one of the following materials:
 - 4.4.1. HDPE-High Density Polyethelene
 - 4.4.2. Elvaloy PVC - Polyvinyl Chloride
 - 4.4.3. PP - Polypropylene
 - 4.4.4. Rigid PVC - Polyvinyl Chloride
 - 4.4.5. EPDM - Ethylene Propylene Diene Monomer
5. Buried Utilities:
 - 5.1. Prior to any drilling ensure utility locations are coordinated



Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP

ST JOB NO: 702736
SPS JOB NO: 698217
SHEET: 702736-D03-103

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

structural TECHNOLOGIES
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
10150 Old Columbia Rd.
COLUMBIA, MD 21046
Phone: 410-650-7000
Fax: 410-650-4111

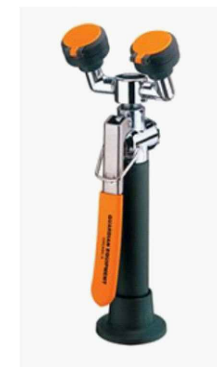
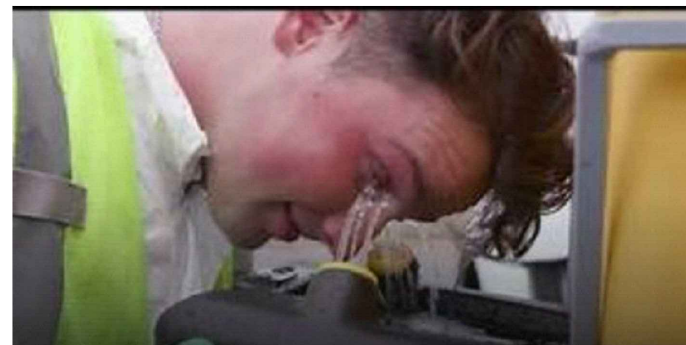
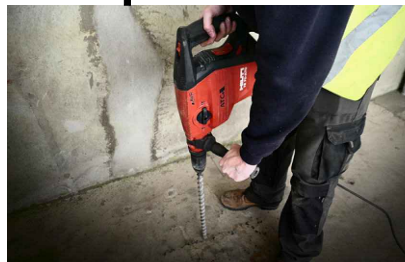
DESIGN BY: BA
DRAWN BY: TB
CHECKED BY: IV
APP BY: APP

NO.	DATE	ISSUED FOR REVIEW	TB	BY
0	1/23/2026			
				REVISIONS

SAFETY CONSIDERATIONS FOR CHEMICAL GROUTING

Power Equipment:

1. Air compressors and associated lines shall be equipped as follows:
 - 1.1. With moisture separator if temperatures are below 50°,
 - 1.2. Anti-whip lines at all connections,
 - 1.3. Pin or wire air line connections to ensure no separation occurs,
 - 1.4. Air manifolds secured to ground anchorage, and
 - 1.5. Ensure air lines, if in drive lanes, are protected against damage.
2. Electric generators and chords to be set up with ground fault interceptors (GFI).
 - 2.1. Ensure electric lines if in drive lanes are protected against damage.
 - 2.2. Ensure proper grounding of equipment.
3. Electric Power Tools.
 - 3.1. Electric hammer drills equipped with clutches to protect against sudden torque.
 - 3.2. Electric grinders equipped with OSHA approved shields.
4. Fire extinguisher:
 - 4.1. Have fire extinguisher near pumping area and one near injection area, and
 - 4.2. Best results are achieved with CO₂ type extinguisher.
5. Eye Wash Station:
 - 5.1. Eye wash station shall be located on-site, and
 - 5.2. If on-site station is not available, contractor shall set up portable station near pumping area.



THE FIVE CLASSES OF FIRES

A Ordinary Combustibles		Class A: Fires that involve ordinary combustible materials such as wood, cloth, paper, rubber, and many plastics.
B Flammable Liquids		Class B: Fires that involve flammable liquids, combustible liquids, petroleum greases, tars, oils, oil-based paints, solvents, lacquers, alcohols, and flammable gases.
C Electrical Equipment		Class C: Fires that involve energized electrical equipment, such as power tools, wiring, fuse boxes, appliances, TVs, computers, and electrical motors.
D Combustible Metals	NO SYMBOL	Class D: Fires that involve combustible metals such as magnesium, potassium, titanium, zirconium, lithium, and sodium.
K		Class K: Fires that involve combustible cooking oils and fats used in commercial cooking equipment.

www.osha-train.org © 2020, OSHA Academy

FIRE CLASSIFICATIONS

LOOK FOR THE FOLLOWING SYMBOLS TO TELL YOU WHAT TYPES OF FIRES AN EXTINGUISHER IS MEANT TO PUT OUT:

LETTER SYMBOL	PICTURE SYMBOL	DESCRIPTION
A		USE ON WOOD, PAPER, TEXTILES AND RUBBISH
B		USE ON FLAMMABLE LIQUIDS
C		USE ON ELECTRICAL EQUIPMENT
D		USE ON COMBUSTIBLE METALS
K		USE ON COMBUSTIBLE COOKING MEDIA

Safety Related Augmented Quality Non-Safety Related

ST JOB NO:	702736
SPS JOB NO:	698217
SHEET:	702736-D03-102
ISSUED FOR REVIEW	1/23/2026
DATE	0
NO.	NO.
REVISIONS	BY
DESIGN BY	BA
DRAWN BY	TB
IV BY	
APP BY	
structural TECHNOLOGIES STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-695-7000 Fax: 410-695-4111	
<small>This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.</small>	
SHELL NORCO ALKY SUMP	

SAFETY CONSIDERATIONS FOR CHEMICAL GROUTING

1. PPE (Personal Protective Equipment) for Chemical Grouting:

1.1. PPE Checklist:

- 1.1.1. Protective cover-all's shall be vapor tight and chemical resistant.
 - 1.1.1.1. Tradesmen exposed to liquid splatter, rebound, overflow, and similar releases shall be outfitted with waterproof shoes, suits, or comparable attire.
- 1.1.2. Rubber gloves shall be rated for chemical exposure.
 - 1.1.2.1. Nitrile rubber
 - 1.1.2.2. Latex rubber
- 1.1.3. Eye protection requirements:
 - 1.1.3.1. Safety glasses for general use,
 - 1.1.3.2. Goggles for conditions of intense splatter, back-spray, or vapor release,
 - 1.1.3.3. Face-shields to augment cases where either glasses or goggles are worn.
- 1.1.4. Ear protection required during hammer-drilling injection port holes.
- 1.1.5. Hard hats required with chin strap.
- 1.1.6. Toe protected shoes.
- 1.1.7. Fire Resistant Clothing (FRC) required in certain chemical plants.
- 1.1.8. Air monitoring devices (CO₂, O₂, H₂O, H₂S) required in certain chemical plants.
- 1.1.9. Determine Respirator Requirements:
 - 1.1.9.1. Silica dust, type XX cartridge,
 - 1.1.9.2. Organic vapors, XX cartridge.

CHOOSING THE RIGHT CARTRIDGE

HEPA Cartridge (dust)

- Chipping
- Grinding
- Sweeping
- Bush Hammering
- Air Lancing
- Saw Cutting (concrete)
- Electrical Saw (wood)
- Rotary Hammer Drilling
- Pneumatic Drilling
- Mixing Concrete
- Dusty Tasks

Organic Vapor Cartridge

- Solvent Based Coatings
- Methyl Ethyl Ketone
- Acetone
- Solvent Based Paints
- Desk Sealers
- Epoxy Coatings
- Adhesives
- Chemical Grouting
- Methyl Methacrylate



CORRECT GLOVES FOR THE TASK



Glove Types	Proper Use
General Work Gloves	Whenever other specialty gloves aren't required.
Cut Resistant	Sharp Materials, Blade Replacement
Chemical Resistant	Epoxy, Solvents, other Chemicals
Heat Resistant	Welding, Asphalt, Hot Applied Coatings
Anti-Vibration	Hammer Drills, Vibrators

Chemical Resistant Gloves



Remove contaminated gloves so that your skin does not contact the outside of the glove.



Safety Related Augmented Quality Non-Safety Related

ST JOB NO: 702736		ISSUED FOR REVIEW		TB	
SPS JOB NO: 698217		NO.		DATE	
SHEET: 702736-D03-101		REVISIONS		BY	

ST. JOB NO: 702736
 SHELL NORCO ALKY SUMP
 This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

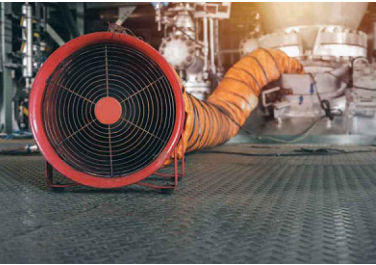
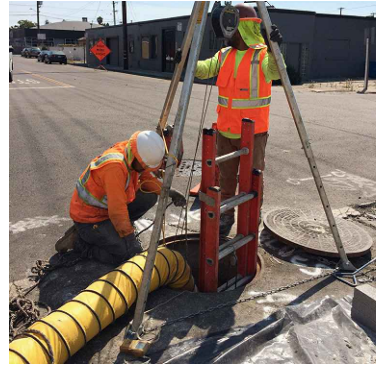
structural TECHNOLOGIES
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
 10150 Old Columbia Rd.
 COLUMBIA, MD 21046
 Phone: 410-650-7000
 Fax: 410-650-4111

COORDINATED SAFETY PLAN FROM CONTRACTOR

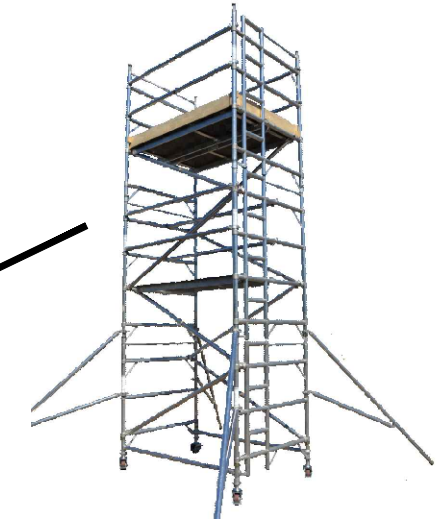
Each project is a unique environment and has different safety requirements that vary depending on what hazards are present. A detailed Pre Project Planning Meeting must be done to identify these unique hazards and the safety procedures required to protect employees from these hazards.

1. Coordinated Safety Plan from Grouting Contractor:

- 1.1. Site Specific Safety Plan (SSSP)
- 1.2. Emergency Action Plan - #'s of nearby hospitals, addresses
 - 1.2.1. First Aid Station + Eye Wash Station
- 1.3. Task Hazard Analysis (THA), Identify Work Tasks and Associated Hazards
- 1.4. HazCom and Material Handling Program, spill mitigation
- 1.5. Hazard Communication Plan, SDS Information available on site
- 1.6. JSA (Job Safety Analysis) form to be filled out each morning
 - 1.6.1. air and electrical line connections to work area
 - 1.6.2. Spill pads, fire extinguishers, eye wash stations
 - 1.6.3. scaffolding, ladders, lifts, motorized equipment
- 1.7. Site Observation Report (SOR), on any site observation
- 1.8. Special Conditions:
 - 1.8.1. Ventilation Plan with air monitoring
 - 1.8.2. Respirator Plan



2300N95
Grinding Metal, Sanding, Sweeping, Bagging, Buffing, Polishing, Cutting Wood, Light Demo



EMERGENCY PLAN

SCAFFOLDING REQUIREMENTS

CONFINED SPACE PROGRAM

AIR VENTILATION PLAN

FIRE PROTECTION & PREVENTION

HAZCOM & MATERIAL HANDLING PROGRAM

HEARING CONSERVATION PROGRAM

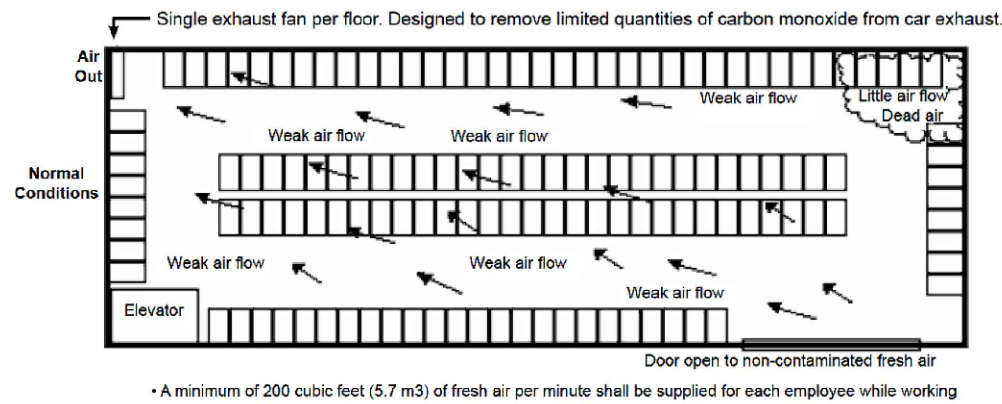
RESPIRATORY PROGRAM

INJURY MANAGEMENT TRAINED

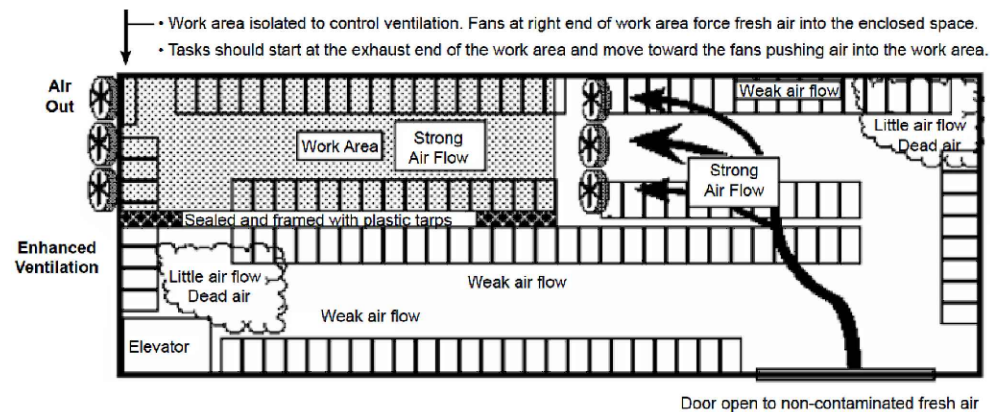
ELECTRICAL SAFETY

EYE WASH & 1st AID STATION EQUIPPED TO TREAT BURNS

Analyze and Use Air Supply Systems in Facility



Analyze and Use Air Supply Systems in Facility



DCSN BY	BA	TB	IV BY	NO.	DATE	ISSUED FOR REVIEW	TB	BY
					0 1/23/2026			REVISIONS
SHELL NORCO ALKY SUMP ST JOB NO: 702736 SPS JOB NO: 698217 SHEET: 702736-D03-100								

Safety Related
 Augmented Quality
 Non-Safety Related

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

CRACK REPAIR DEFINITIONS AND CONCEPTS:

DEFINITIONS:

INTERRUPTIONS IN MONOLITHIC CONCRETE ARE COMMONLY CALLED CRACKS OR JOINTS. IN DESCRIBING A CRACK THERE ARE A FEW DEFINITIONS WORTHY OF DISCUSSION:

TAIL--CRACK LOCATION OR POINT WHERE WATER LEAKS OUT

HEAD--CRACK LOCATION OR POINT WHERE WATER ENTERS

SIDEWALLS--TWO OR MORE INTERNAL CONCRETE FACES OPPOSITE AND ADJACENT TO EACH OTHER ESTABLISHING THE CRACK SURFACE CONDITIONS AND BOUNDARIES

VOID VOLUME--THREE-DIMENSIONAL VOLUME OF CRACK OR JOINT

INTERLOCK--SURFACE AREA WHERE ADJACENT CRACK SIDEWALLS HAVE INTERLOCKED NOT ALLOWING VOID CONTINUITY

AUTOGENOUS SEALING

DESCRIBING HOW A CRACK LEAKS IS ALSO IMPORTANT IN SELECTING A CHEMICAL GROUT. THERE ARE FIVE DEGREES OF ACTIVE WATER LEAKAGE BASED ON FLOW RATE COMMONLY USED IN THE INDUSTRY. THESE ARE DESCRIBED AS FOLLOWS:

1. A SUSTAINED DAMP STAIN, A WET SPOT, THAT DOES NOT DRIP-IF OVERHEAD, NOR FLOW DOWNWARD-IF ON A WALL, OR SPREAD OUTWARD-IF ON A FLOOR SURFACE, BECAUSE LOCAL EVAPORATION IS ENOUGH TO CONTROL SPREAD,
2. "SEEPAGE", A WET SPOT, THAT DRIPS ON OCCASION-IF OVERHEAD, WILL FLOW DOWNWARD A FEW FEET AND THEN EVAPORATE-IF ON A WALL, OR SPREADS OUTWARD LESS THAN TWO FEET AND EVAPORATES-IF ON A FLOOR SURFACE. THIS CONDITION CAN CREATE LARGE AMOUNTS OF CARBONATES AND BYPRODUCT BUILDUP ON AN EXPOSED CONCRETE SURFACE,
3. "WEEPS", A WET SPOT, THAT DRIPS INTERMITTENTLY BUT CONTINUALLY-IF OVERHEAD, WILL FLOW DOWNWARD AND ACCUMULATE-IF ON A WALL, OR SPREADS OUTWARD AND ACCUMULATE-IF ON A FLOOR SURFACE. THIS CONDITION CAN CREATE LARGE AMOUNTS OF CARBONATES AND BYPRODUCT BUILDUP ON AN EXPOSED CONCRETE SURFACE AT THE CRACK OR JOINT TAIL,
4. "FLOWING", CONTINUOUS ACTIVITY (DRIPPING/FLOW) OF WATER FROM A ROOF, WALL, OR FLOOR AREA WHICH MUST BE COLLECTED TO CONTROL ITS SPREAD,
5. "GUSHING", PRESSURIZED WATER ACTIVITY AT OVERHEAD ROOF, WALL, OR FLOOR, AREAS CHARACTERIZED BY PROJECTING STREAM BYPASSING THE SURFACE.

INACTIVE WATER LEAKAGE FOR PURPOSES AND CONSIDERATION IN THIS DOCUMENT, IS A "STATE OF DRYNESS" WHICH MAY INCLUDE THE FOLLOWING:

1. DISCOLORED DARK OR WHITE STAINS WITHOUT PRESENCE OF DAMPNESS; AND/OR
2. WHITE/GRAY/RUST COLORED CRYSTALLINE SURFACE GROWTH (EFFLORESCENCE) OR ACCUMULATION ON SUBSTRATE WITHOUT DAMPNESS.

CONCRETE CRACK DYNAMICS:

SELECTING A CHEMICAL GROUT MATERIAL FOR SEALING WATER LEAKAGE IN CONCRETE CRACKS INCLUDES A BASIC UNDERSTANDING OF CRACK MOVEMENT POSSIBILITIES. THE THREE MOST COMMON INFLUENTIAL CRITERIA FOR CRACK DYNAMICS ARE CHANGES IN: TEMPERATURE, ENVIRONMENTAL MOISTURE, AND SERVICE LOADINGS. THE FOLLOWING CONDITIONS AND PARAMETERS REGARDING THE CRACK REQUIRE ENGINEERING JUDGEMENT AND WILL HELP IN MATERIAL SELECTION.

1. CRACK MOVEMENT: STATIC OR DYNAMIC CONDITIONS:
 - 1.1. DYNAMIC CRACK CONDITIONS ARE VERY PREVALENT IN WATER LEAKAGE CONTROL. VIRTUALLY ALL SOLID MATERIALS EXPAND WHEN HEATED AND CONTRACT WHEN COOLED. CONCRETE AND STEEL EXPAND AND CONTRACT RELATIVELY SIMILAR FROM THERMAL FLUCTUATIONS, THIS SERVICE CONDITION EXISTS FOREVER. CRACKS SUBJECT TO DIURNAL CONDITIONS, ENVIRONMENTAL TEMPERATURE EXPOSURES, AND SIMILAR CONDITIONS, ARE MOVING BACK-AND-FORTH AT VARIOUS RATES. CRACKS IN TANKS SUBJECT TO (WARM AND COLD) WATER ACTIVITY ARE ALSO MOVING.
 - 1.2. STATIC CRACK CONDITIONS WOULD TYPICALLY OCCUR IN HABITABLE SPACE, WITH CONDITIONED AIR TEMPERATURES AND HUMIDITY'S, OR IN INTERIOR TANKS WITH CONSTANT FLUID TEMPERATURES AND NON-FLUCTUATION LIQUID ELEVATIONS YEAR-ROUND.
 - 1.3. FRESHLY CAST CONCRETE HAS A MOISTURE CONTENT GENERALLY BETWEEN 6 TO 10 PERCENT. BOTH CEMENT HYDRATION AND EVAPORATION CONSUME / ALTER ABOUT 50 PERCENT OF THAT WATER, LEAVING BEHIND A MATERIAL WITH A MOISTURE CONTENT OF +/- 4 PERCENT OR LESS, DEPENDING UPON CURING AND ENVIRONMENTAL CONDITIONS. MOISTURE LOSS IN CONCRETE CREATES A THREE-DIMENSIONAL REDUCTION IN VOLUME. TYPICALLY, AREAS OF RESTRAINT, DIMENSIONAL CHANGE, AND INCREASED SECTIONAL STIFFNESS, CREATE STRESS CONCENTRATIONS AND ARE LOCATIONS FOR CRACK PROPAGATION. NOTE THAT STEEL REINFORCEMENT IS SUBJECT TO THERMAL MOVEMENT, HOWEVER, STEEL DOES NOT CHANGE IN VOLUME DURING WATER LOSS. CONCRETE WILL ABSORB WATER TO SOME DEGREE AND EXPAND IN MOIST ENVIRONMENTAL CONDITIONS. CRACK MOVEMENT CAN OCCUR FROM MOISTURE CONTENT CHANGES IN CONCRETE.
 - 1.4. EXTERNAL STRUCTURAL LIVE AND DEAD LOADS, VIBRATIONAL, SEISMIC, WIND, HYDROSTATIC, AND EARTH PRESSURE LOADINGS CAN INDUCE CRACK MOVEMENT. OTHER CONDITIONS SUCH AS CORROSION, ASR (ALKALI SILICA REACTIVITY), SULFATE ATTACK, CAN INDUCE CRACKING AND SUBSEQUENT MOVEMENT.

2. OLD OR NEW CRACKS:

FUNDAMENTALLY IN CHEMICAL GROUT MATERIAL SELECTION, IT IS DESIRABLE FOR THAT SELECTED MATERIAL TO ADHERE TO CRACK SIDEWALLS. GROUT ADHESION TO CRACK SIDEWALLS SIGNIFICANTLY IMPROVES ITS ABILITY TO RESIST HYDROSTATIC PRESSURE AND FUNCTION DURING MOVEMENT ACTIVITY. CRACK SIDEWALL CLEANLINESS IS SOMEWHAT DEPENDENT UPON AGE AND ENVIRONMENTAL EXPOSURE. THE pH OF MOISTURE ON CRACK SIDEWALL SURFACES WILL BE VERY HIGH IN SOME CONDITIONS (NEW CONCRETE) AND MUCH LOWER WHERE CARBONATION HAS BEEN OCCURRING.

- 1.1. OLD CRACKS ARE SUBJECT TO INTERNAL CARBONATION AND SALT ACCUMULATION WITHIN THEIR VOID VOLUME. BECAUSE OF CARBONATION ON CRACK SIDEWALLS, THE pH OF SAID SURFACES MAY BE RELATIVELY LOW COMPARED TO ADJACENT CONCRETE. DEPENDING UPON THE ENVIRONMENTAL EXPOSURE, A CRACK VOID CAN ACCUMULATE SOIL PARTICLES, FAILED WATERPROOFING RESIDUE, CHEMICAL BUILDUP OF SALTS LIKE SULFATES, CARBONATES, NITRATES, AND CHLORIDES, AND/OR CORROSION BYPRODUCTS. THESE MATERIALS MAY BE VERY POROUS AND WILL NOT ALLOW THE CHOSEN GROUT MATERIAL TO ADEQUATELY BOND TO CRACK SIDEWALLS. WATER ALONE MAY NOT BE SUFFICIENT TO FLUSH ACCUMULATED DEBRIS FROM CRACK SIDEWALL SURFACES.
- 1.2. NEW CRACKS MAY BE RELATIVELY CLEAN AND ABSENT OF DEBRIS ACCUMULATION ON SIDEWALLS. NEW SIDEWALL CRACKS CAN BE VERY HIGH pH (COMPARABLE TO CONCRETE +/- 12.5) AND WILL MAINTAIN THAT FOR SOME TIME. GROUT SELECTION REQUIRES MATERIALS THAT ARE INSENSITIVE TO HIGH pH AND CAPABLE OF BONDING TO WET SUBSTRATES. NEW CRACKS, WITH MANY EXCEPTIONS, GENERALLY ARE MUCH TIGHTER THAN OLD CRACKS.

ST JOB NO: 702736	
SPS JOB NO: 698217	
SHEET: 702736-D03-200	
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-650-7000 Fax: 410-650-4111	
DESIGN BY	BA
DRAWN BY	TB
ISSUED FOR REVIEW	0 1/23/2026
NO.	DATE
REVISIONS	BY

Safety Related
 Augmented Quality
 Non-Safety Related

SHELL NORCO ALKY SUMP

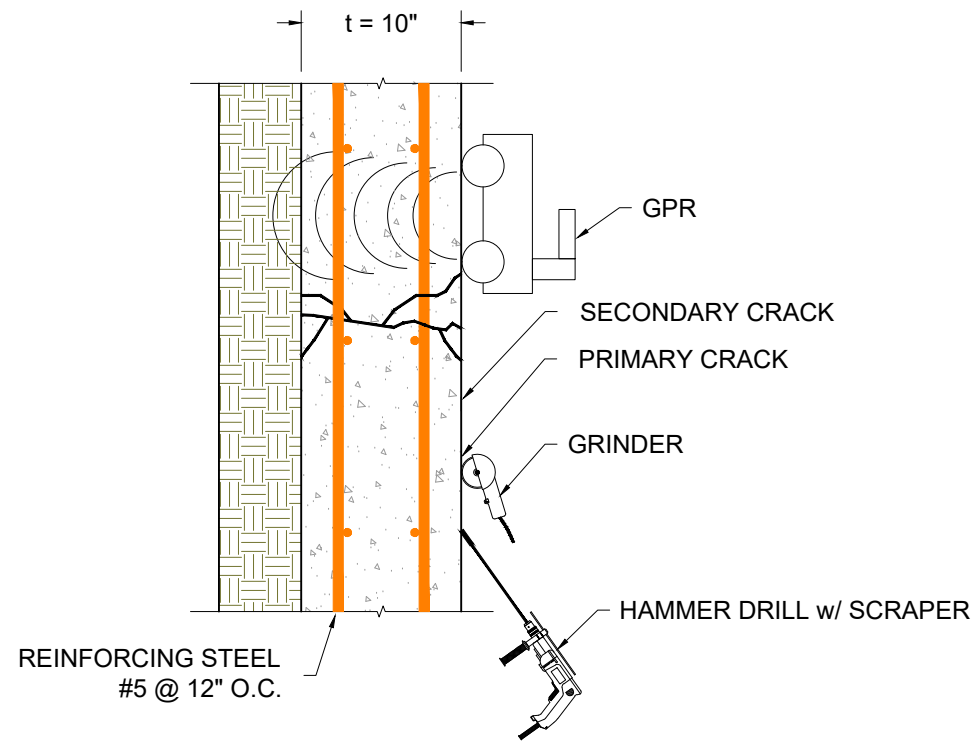
DEFINITIONS AND CONCEPTS

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

GENERAL COORDINATION AND PROJECT WORK SEQUENCE:

NOTES:

1. REVIEW ALL SAFETY PROTOCOLS PRIOR TO ENTERING WORK SITE AREA INCLUDING:
 - 1.1. REVIEW CONFINED SPACE REQUIREMENTS, PERMITS MAY BE REQUIRED,
 - 1.2. DRILLING AND GRINDING WILL REQUIRE A "HOT WORK PERMIT,"
 - 1.3. ENSURE ADEQUATE LIGHTING TO AVOID TRIP HAZARDS,
 - 1.4. REVIEW OSHA DUST REMOVAL CRITERIA WHEN GRINDING AND DRILLING,
 - 1.5. ENSURE GFCI CIRCUITS ARE IN PLACE, AVOID ELECTRICAL LINES IN PONDED WATER, AND
 - 1.6. AIR MONITORS MAY BE REQUIRED NEAR OPEN SUMP PITS IN CONCRETE FLOOR SLAB SURFACES DURING DRILLING AND INJECTION OPERATIONS.
2. THE CRACK INJECTION WORK SHALL BE GENERALLY DESCRIBED AS FOLLOWS:
 - 2.1. CLEAN TAIL OF EXISTING CRACKS A MINIMUM 16 INCHES ON EACH SIDE VIA SCRAPING, GRINDING, ABRASIVE BLASTING OR EQUAL.
 - 2.2. SURVEY WITH GPR (GROUND PENETRATING RADAR) FOR ANY BURIED UTILITIES AND REINFORCING BAR ITEMS ALONG CRACK LENGTH.
 - 2.3. USE ACOUSTIC IMPACT HAMMER TO SOUND AREA 16 INCHES ON EACH SIDE OF CRACK TO ENSURE NO DELAMINATION EXISTS.
 - 2.4. MARK DRILL-HOLE LOCATIONS ON EACH SIDE OF CRACK, (STITCHING PATTERN).
 - 2.5. DRILL INJECTION HOLES AT MARKED LOCATIONS 45 DEGREES FROM SURFACE.
 - 2.6. USE AIR PRESSURE OR VACUUM TO REMOVE DUST FROM DRILL HOLE(S).
 - 2.7. FLUSH DRILL HOLES WITH WATER AT 400 PSI GAUGE PRESSURE.
 - 2.8. SET INJECTION PACKERS IN DRILL HOLES AND SECURE INTO POSITION.
 - 2.9. WATER TEST PACKER AND DRILL HOLE FOR LEAKAGE AND CONTINUITY (FROM HOLE TO CRACK) AT 400 PSI GAUGE PRESSURE.
 - 2.10. SET UP ACRYLATE GROUTING EQUIPMENT AND MIX MATERIALS.
 - 2.11. INJECT ACRYLATE GROUT AT (200 - 700) PSI GAUGE PRESSURE.
 - 2.12. REMOVE PACKERS FROM DRILL HOLE AND REDRILL SAID HOLE TO A DEPTH OF 8 INCHES.
 - 2.13. FLUSH DRILL HOLE WITH WATER AT 400 PSI GAUGE PRESSURE A MINIMUM 8 INCHES.
 - 2.14. ENSURE DRILL HOLE IS CLEAN AND DRY-PACK SAID HOLE IN THREE LIFTS.
 - 2.15. EQUIPMENT CLEANUP AND SITE DEMOBILIZATION.



GENERAL CONDITIONS, INVESTIGATION, SURFACE CLEANING ALONG CRACKS:

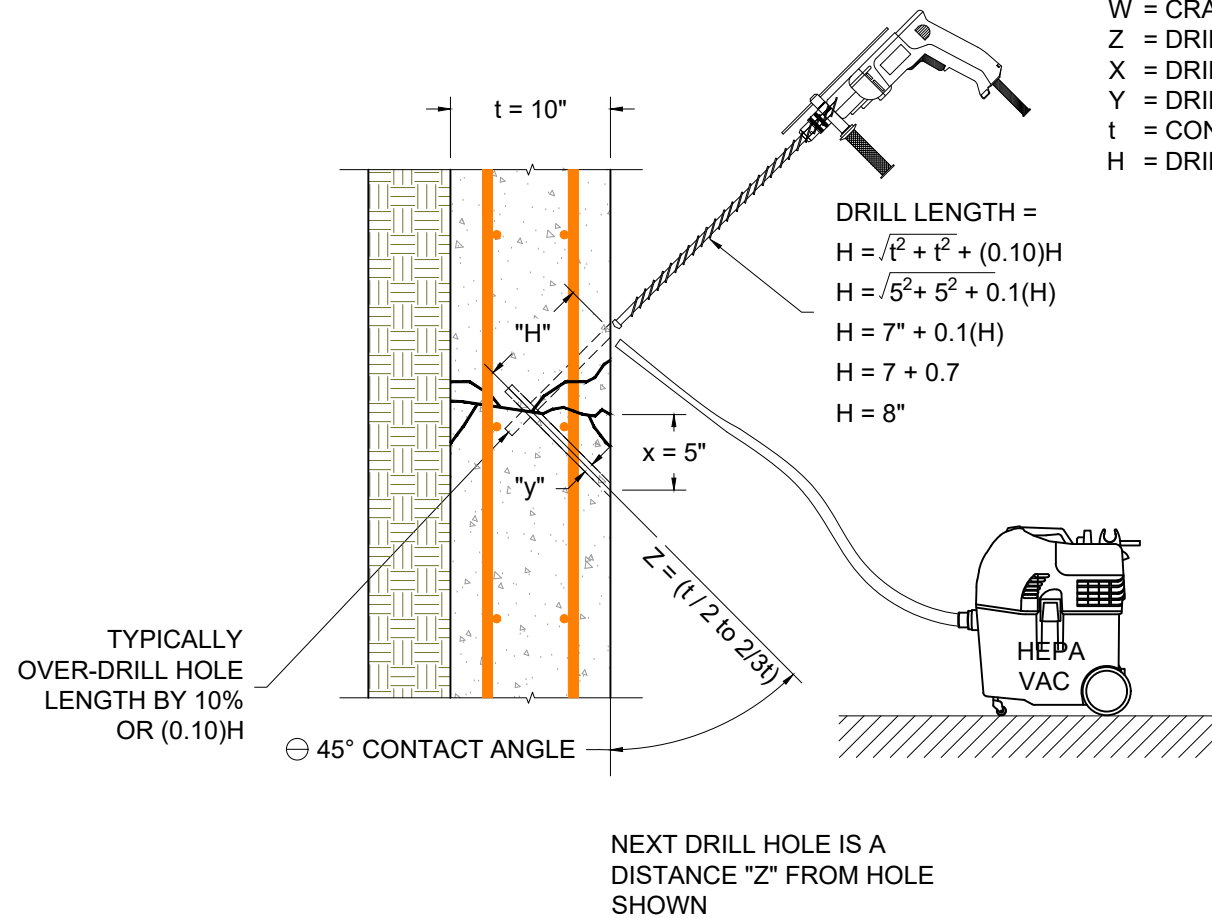
NOTES:

1. ENSURE SAFETY PROTOCOLS ARE REVIEWED IN 702736-D03-100 THRU 105 DRAWINGS.
2. WORK SCOPE CONSISTS OF CHEMICAL GROUT INJECTION OF LEAKING CRACKS. NOTE THE FOLLOWING:
 - 2.1. ENSURE A SAFETY PLAN IS DEVELOPED TO GAIN ACCESS TO WORK AREA.
 - 2.2. NOTE ANY OBSTRUCTIONS THAT MAY IMPACT INJECTION WORK.
3. COORDINATE AND ENSURE WITH OWNER WHERE UNDERGROUND AND BURIED UTILITIES EXTEND IN WALLS, UNDER FOOTINGS / WALLS, OR UTILITY PIPE AREAS TO BE TREATED, SEE LIST BELOW:
 - 3.1. FIRE SUPPLY, REPROCESS, AND / OR SERVICE WATER SUPPLY / DISCHARGE LINES,
 - 3.2. ELECTRICAL SERVICE, PROCESS CONTROL, SECURITY DEVICES, CONDUIT, OR MONITORING DEVICES AND / OR LINES,
 - 3.3. STORM AND SEWER PIPING / TUNNELS, OR SUBSLAB SURFACE DRAIN LINES,
 - 3.4. STEAM OR CONDENSATE DRAIN, OR CHEMICAL SUPPLY / DISCHARGE LINES, AND
 - 3.5. PRESSURIZED GAS, COMPRESSED AIR, OR TELCOM LINES.
4. IF UTILITY SERVICES ARE DISCOVERED, DETERMINE DEPTH AND ORIENTATION; COORDINATE WITH THE OWNER AND SME.
5. COORDINATE WITH THE OWNER FOR WORK ZONE CLEARANCE OF ANY DANGEROUS OVERHEAD ELECTRICAL, STEAM, PROCESS SERVICES, OR UTILITY LINES AFFECTING THE WORK AREA.
6. CLEAN CONCRETE SURFACES APPROXIMATELY 16 INCHES ON EACH SIDE OF CRACK VIA CHIPPING, GRINDING, ABRASIVE BLASTING, OR EQUAL.
7. USE GPR OR SIMILAR TO LOCATE STEEL IN SLAB / WALLS AND ANY EXISTING UTILITIES AND / OR SERVICES PRIOR TO DRILLING INTO WALLS.
8. SOUND CONCRETE SURFACES ON EACH SIDE OF CRACK TO ENSURE NO DELAMINATIONS EXIST.

1 CRACK PREPARATION
Scale 1/2"=1'-0"

DESIGN BY	DRAWN BY	CHECKED BY	DATE	NO.	ISSUED FOR REVIEW	REVISIONS	BY
BA	TB		1/23/2026	0	1/23/2026		TB
APP BY	IV BY						BY
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-850-7000 Fax: 410-850-4111							
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.							
<input type="checkbox"/> Safety Related <input type="checkbox"/> Augmented Quality <input type="checkbox"/> Non-Safety Related	SHELL NORCO ALKY SUMP INJECTION DETAILS						
ST JOB NO: 702736				SPS JOB NO: 698217			
SHEET: 702736-D03-201							

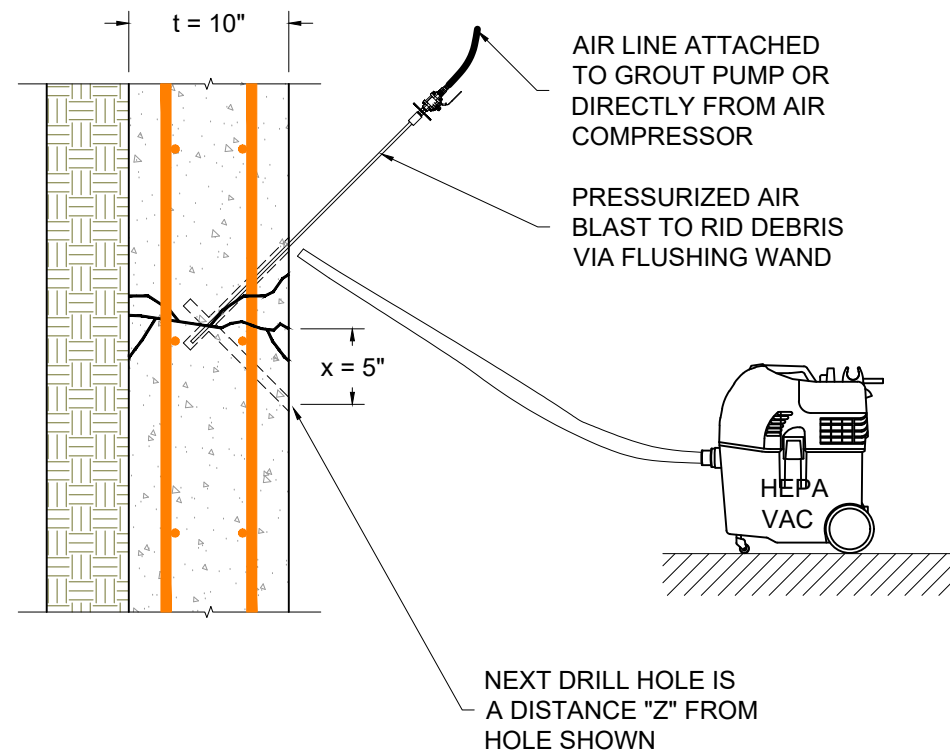
\ominus = DRILL HOLE ANGLE FROM SUBSTRATE
 W = CRACK WIDTH
 Z = DRILL HOLE SPACING ALONG CRACK = 7 INCHES
 X = DRILL HOLE DISTANCE OUT FROM CRACK = 5 INCHES
 Y = DRILL HOLE DIAMETER
 t = CONCRETE SECTION THICKNESS
 H = DRILL HOLE LENGTH + 0.10H



NOTES:

- ENSURE ALL TRADESMEN HAVE PROPER PPE, --- GLOVES, FACE SHIELDS, AND SAFETY GLASSES TO PROTECT FROM AIR-BORNE DRIVEN DRILLING DEBRIS.
- SET UP HAMMERDRILL EQUIPMENT WITH GFCI ELECTRICAL HOOK-UP.
- ENSURE ELECTRICAL CORDS DO NOT EXTEND ACROSS PONDED WATER.
- ENSURE DRILL HOLE DIAMETER TO MATCH WITH PACKERS.
- USE HAMMERDRILL WITH CLUTCH TO ENSURE REDUCED TORQUE IF BIT JAMMING OCCURS DURING DRILLING DUE TO SUDDEN REINFORCING BAR CONTACT.
- USE CONTROL JIG ON SLOPES IF NECESSARY TO ENSURE DRILLING AT SPECIFIED ANGLES TO THE SUBSTRATE.
- MANAGE DRILL HOLE DEBRIS AND COMPLY WITH SITE SPECIFIC OSHA DUST CONTROL. USE HEPA VACUUMS AND WATER MISTING PROTOCOLS AS NEEDED.
- USE PROGRESSING LENGTH DRILL BITS WHEN NECESSARY.
- DRILL BIT DIAMETER CAN VARY ALONG DRILL HOLE PATH. ACCEPTABLE DRILL HOLE DIAMETERS CAN VARY BETWEEN $(\frac{1}{4}$ TO $\frac{3}{4})$ INCHES.
- IF DRILL HOLE CONTACTS STEEL REINFORCING, CONSIDER SMALLER DIAMETER DRILL BIT OR MOVE DIAGONALLY AND REDRILL HOLE.
- REDRILLING CONSIDERATIONS --- NOTE THE FOLLOWING:
 - IF STEEL REBAR INTERRUPTS DRILL HOLE SPACING -- MOVE TO A NEW HOLE LOCATION \pm ONE TO FOUR (1 TO 4) INCHES IN ANY DIRECTION, NOTE THE LOCATION IN FIELD LOGBOOK.
 - MARK ANY DEAD HOLES ON CONCRETE SUBSTRATE IMMEDIATELY.
 - DEAD DRILL HOLES SHALL BE FILLED WITH HIGH STRENGTH CEMENTITIOUS GROUT IN FOUR INCH LIFTS AND DRY-PACKED WITH WOODEN DOWEL.
- THIS SPECIFICATION IS BASED ON 5/8 INCH DRILL HOLE DIAMETERS.
- NOTE IF ANY VOIDS OR IRREGULARITIES ARE OBSERVED DURING DRILLING OPERATIONS, RECORD IN LOGBOOK.
- IF VOID(S) ARE ENCOUNTERED SET UP BORESCOPE WITH LIGHT AND SCREEN, DROP-DOWN OR PUSH INTO DRILL HOLE. AND NOTE ITEMS IN LOGBOOK.
- NEVER DRILL DIRECTLY INTO CRACK TAIL UNDER ANY CIRCUMSTANCES FOR INTERCEPTION GROUTING UNLESS APPROVAL IS GIVEN BY SME.

3 **DRILLING TO INTERCEPT CRACK(S)**
 Scale 1/2"=1'-0"



NOTES:

- ENSURE ALL TRADESMEN HAVE PROPER PPE, GLOVES, FACE SHIELDS, AND SAFETY GLASSES TO PROTECT FROM AIR-BORNE DRIVEN DRILLING DEBRIS.
- SET UP HEPA OR SHOP VACUUM FOR REMOVING DUST FROM DRILL HOLES.
- ATTACH METAL TUBE TO END OF VACUUM LINE AND INSERT INTO DRILL HOLES.
- SET UP METAL TUBE AS AIR FLUSHING WAND FOR PRESSURIZED DUST REMOVAL FROM DRILL HOLES IF VACUUM / SUCTION IS NOT USED.
- ATTACH AIR FLUSHING WAND TO AIR LINE FROM AIR-COMPRESSOR OR FROM AIR AT GROUT PUMP HOOK-UP.
- REMOVE ALL DUST AND DRILLING DEBRIS FROM DRILL HOLES.

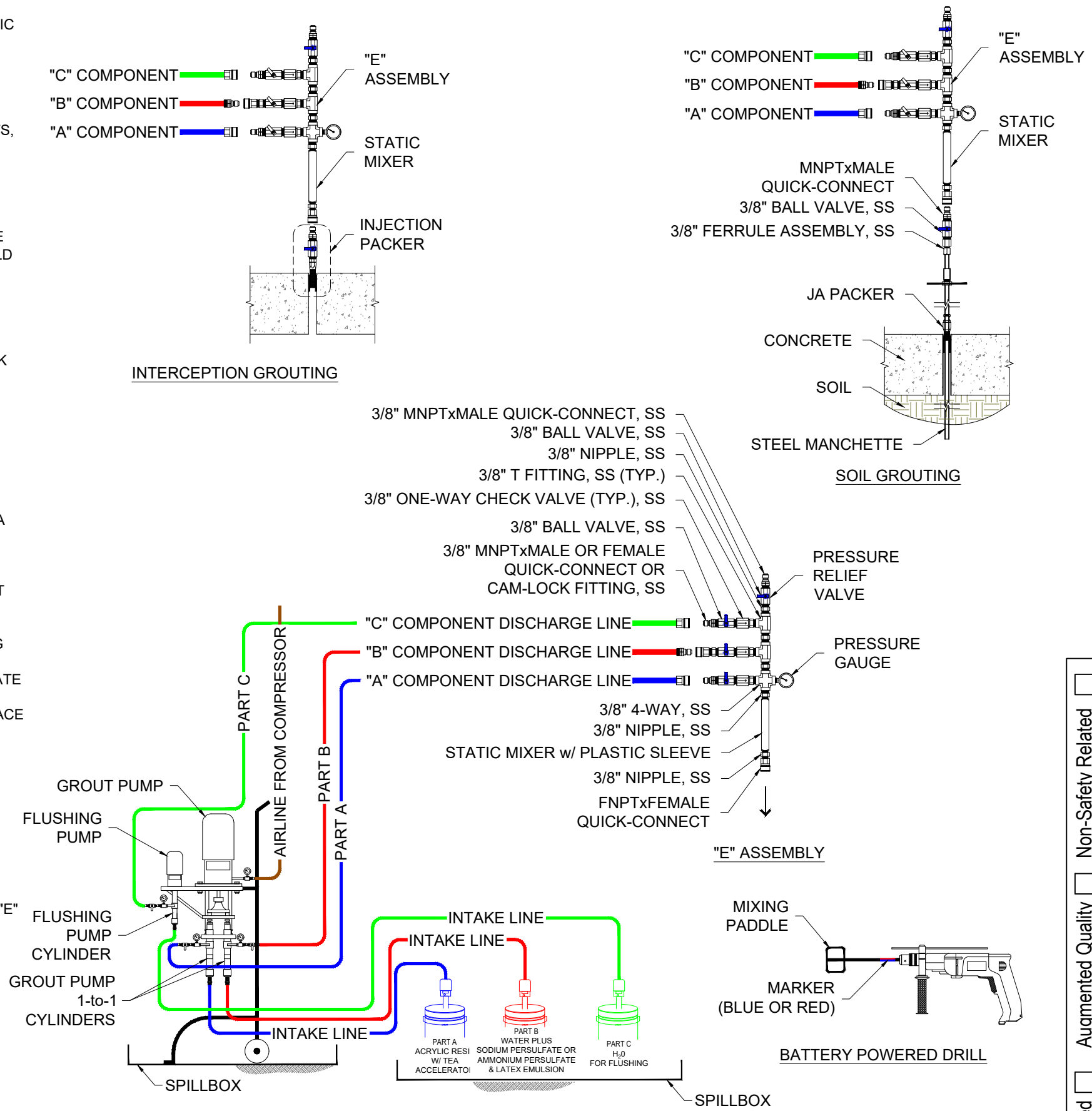
4 **AIR FLUSHING CRACK(S)**
 Scale 1/2"=1'-0"

Safety Related Augmented Quality Non-Safety Related

DESIGN BY		BA	DATE		1/23/2026	ISSUED FOR REVIEW		TB	BY
DRAWN BY		TB	NO.		0	REVISIONS			
CHECKED BY			DATE			REVISIONS			
APP BY			DATE			REVISIONS			
Structural TECHNOLOGIES STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-650-7000 Fax: 410-650-4111									
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.									
SHELL NORCO ALKY SUMP		INJECTION DETAILS							
ST JOB NO:		702736							
SPS JOB NO:		698217							
SHEET:		702736-D03-203							

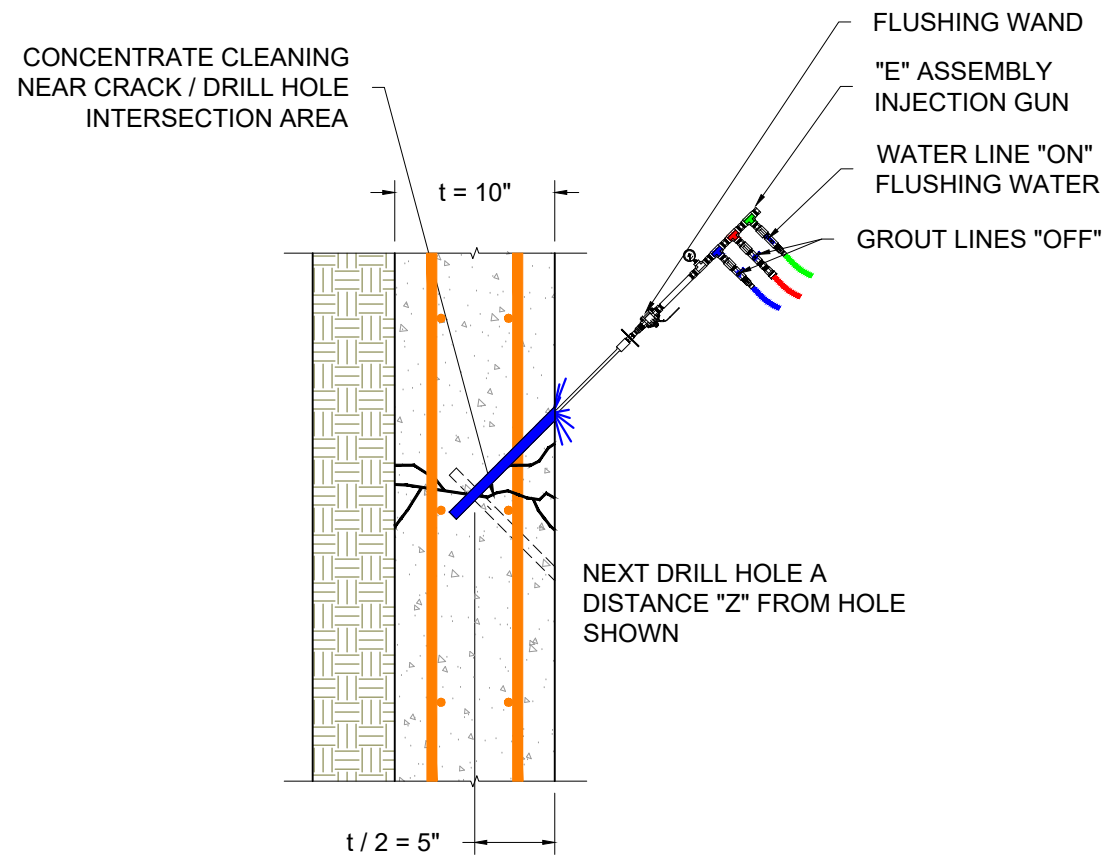
NOTES:

1. CHEMICAL GROUT INJECTION FOR INTERCEPTION GROUTING REQUIRES THE FOLLOWING BASIC EQUIPMENT AND ACCESSORIES, JOB SPECIFIC ITEMS MAY VARY:
 - 1.1. PUMP, 1-TO-1 RATIO, DUAL PISTON, AIR (PNEUMATIC) OR ELECTRIC DRIVE,
 - 1.2. FLUSHING PUMP, 1-COMPONENT, PNEUMATIC OR ELECTRIC DRIVE,
 - 1.3. ALL VALVES AND COMPONENTS IN CONTACT WITH OXIDIZER SHALL BE PLASTIC OR STAINLESS STEEL, -- INTAKE AND DISCHARGE LINES,
 - 1.4. ELECTRIC OR BATTERY OPERATED PORTABLE DRILLS FOR MIXING GROUT COMPONENTS,
 - 1.5. STAINLESS STEEL MIXING PADDLES FOR MIXING CHEMICAL GROUT COMPONENTS, AND
 - 1.6. INJECTION GUN, STATIC MIXER, AND ALL COMPONENTS SHALL BE STAINLESS STEEL.
2. CRACK INJECTION CHEMICAL GROUT PUMPS SHALL BE CAPABLE OF 1/2 GALLON PER MINUTE FLOW RATE AND A RANGE OF (1 TO 1,000) PSI GAUGE PRESSURE.
3. POLYACRYLATE GROUT PUMPS SHALL BE STAINLESS STEEL COMPONENTS THAT ARE IN CONTACT WITH OXIDIZER COMPONENTS. THIS WOULD INCLUDE PISTONS, CYLINDERS, INTAKE AND DISCHARGE FITTINGS, GAUGES, VALVES, AND REGULATORS; OTHER COMPONENTS COULD BE HIGH STRENGTH CARBON STEEL.
4. DISCHARGE LINES AND INJECTION GUN HARDWARE IN CONTACT WITH OXIDIZER (SODIUM OR AMMONIUM PERSULFATE) SHALL BE STAINLESS STEEL.
5. SET UP GROUTING EQUIPMENT AND ENSURE THE FOLLOWING:
 - 5.1. COORDINATE LOCATION OF GROUT PUMP AND ALL MIXING MATERIALS SUCH THAT BUCKETS AND TOTES CAN BE SUPPLIED AND REMOVED WITHOUT DISRUPTION TO WORK ZONE.
 - 5.1. EQUIPMENT AND MATERIALS ARE ON SPILL PAD,
 - 5.2. SET / PLACE SPILL PAD AS CLOSE TO WORK AREA AS PRACTICAL AND SUCH THAT MATERIAL CAN BE TRANSPORTED TO-AND-FROM SPILL PAD WITH ACCESSIBILITY EASE AND CLEARANCE.
 - 5.3. BUILD ANY TENTS AND ENCLOSURES AROUND EQUIPMENT AND MATERIAL TO PROTECT FROM DIRECT SUNLIGHT (UV CAN REACT RESINS), HOT OR COLD EXTREMES, GUSTS OF WIND, AND SPILLAGE; GROUTS ARE WATER BASED AND CAN FREEZE,
 - 5.4. COORDINATE GROUT PUMP LAYOUT AND DISCHARGE LINES EXTENDING TO WORK AREA TO MINIMIZE TRIP AND FALL HAZARDS.
 - 5.5. SET CHEMICAL GROUT PUMP ON SPILL PAD, CONNECT AIR COMPRESSOR LINE WITH SAFETY DEVICES TO GROUT PUMP.
 - 5.6. PROVIDE COMPRESSED AIR PRESSURE (100 PSIG AND 50 CFM) TO PUMPING EQUIPMENT FOR OPERATION AND MIXING.
 - 5.7. PROVIDE OIL SEPARATOR ON AIR COMPRESSOR IF WORKING IN COOL WEATHER CONDITIONS, THIS WILL PROTECT BOTH GROUT AND FLUSHING PUMPS FROM FREEZING DURING EXTENDED PUMPING OPERATIONS.
 - 5.8. NOTE THAT THE AIR-MOTOR DISCHARGE CYCLE IS A COOLING PROCESS AND CAN CREATE FROST ON GROUT PUMP CAUSING IT TO BE INOPERABLE.
 - 5.9. PLACE INTAKE LINES ON BOTTOM OF PUMP PISTONS INTO FLUSHING WATER PAILS. PLACE DISCHARGE LINES FROM TOP OF PUMP PISTONS INTO WASTEWATER PAILS.
 - 5.10. ENSURE WATER USED FOR MIXING IS CLEAN AND NEUTRAL pH.
 - 5.11. RUN WATER THROUGH ALL LINES TO ENSURE NO BLOCKAGE EXISTS, BE AWARE THAT VEGETABLE OIL MAY BE IN PUMPS FROM STORAGE.
 - 5.12. AFTER FLUSHING ALL OILY WATER FROM PUMP AND LINES, ATTACH "E" ASSEMBLY INJECTION HEAD TO LINES AND TURN OFF ALL VALVES. TURN GROUT PUMP ON AND PRESSURIZE LINES TO 400 PSI GAUGE.
 - 5.13. TURN PUMP ON AND MOVE WATER FROM PUMP TO "E" ASSEMBLY INJECTION GUN.
 - 5.14. ENSURE INTAKE / DISCHARGE LINES DO NOT LEAK AT CONNECTIONS, PERFORM PRESSURE TEST UP TO 400 PSIG.
 - 5.15. AFTER "E" ASSEMBLY GUN IS WORKING, TEST FLUSHING PUMP WITH WATER THROUGH "E" ASSEMBLY.
 - 5.16. ENSURE ALL TRADESMEN HAVE PROPER PPE, GLOVES, FACE SHIELDS, BOOTS AND SAFETY GLASSES IN PLACE DURING LOW OR HIGH PRESSURE INJECTION, AND
 - 5.17. ENSURE ALL TRADESMEN ARE TRAINED IN THE BASIC PROCEDURES OF INJECTION GROUTING OF CONCRETE CRACKS.



5 ACRYLATE GROUT PUMP SETUP FOR CRACK / JOINT INJECTION
Scale 1-1/2"=1'-0"

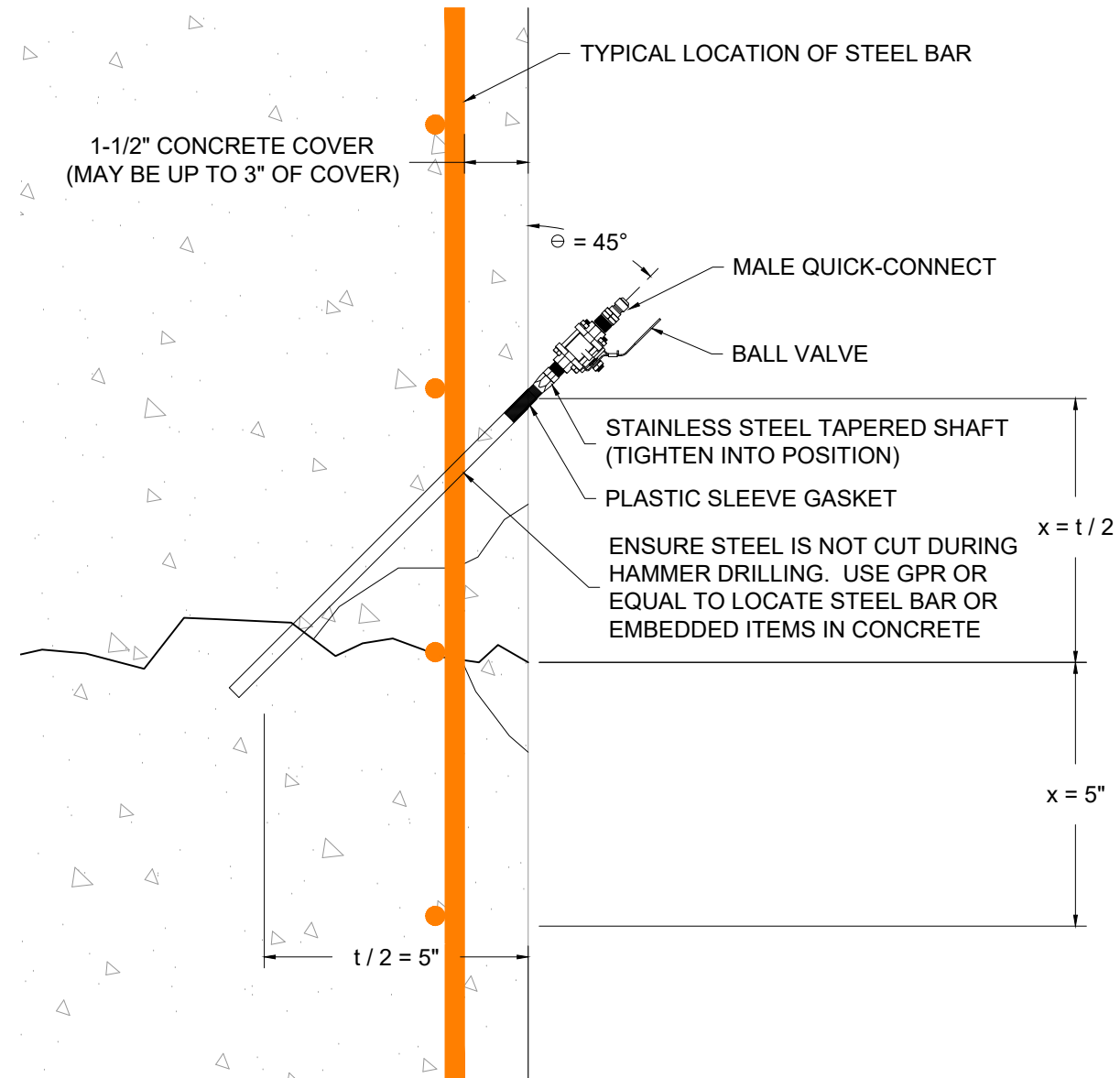
DESIGN BY	BA	DRAWN BY	TB	ISSUED FOR REVIEW	NO.	DATE	1/23/2026	REVISIONS	TB	BY
<p style="text-align: center;">structural TECHNOLOGIES</p> <p style="text-align: center;">STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-950-7000 Fax: 410-950-4111</p> <p style="font-size: small;">This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.</p>										
<input type="checkbox"/> Safety Related <input type="checkbox"/> Augmented Quality <input type="checkbox"/> Non-Safety Related										
SHELL NORCO ALKY SUMP INJECTION DETAILS										
ST JOB NO:										702736
SPS JOB NO:										698217
SHEET:										702736-D03-204



NOTES:

1. ENSURE ALL TRADESMEN HAVE PROPER PPE, GLOVES, FACE SHIELDS, AND SAFETY GLASSES ON TO PROTECT FROM AIR-BORNE / DRIVEN DRILLING DEBRIS.
2. CONNECT FLUSHING WAND TO "E" ASSEMBLY INJECTION GUN WITH END AND LATERAL HOLES NEAR TIP FOR FLUSHING DRILL HOLE ENDS AND SIDES WITH HIGH PRESSURE WATER.
3. WATER FLUSH WITH A MINIMUM OF 400 PSI GAUGE.
4. SET UP METAL TUBE AS AIR FLUSHING WAND FOR PRESSURIZED DUST REMOVAL
5. REMOVE ALL DUST AND DRILLING DEBRIS FROM DRILL HOLES.
6. NOTE THE FOLLOWING:
 - 6.1. DURING HAMMER DRILLING INJECTION HOLES PULVERIZED CONCRETE DEBRIS BUILDS UP ON THE DRILL HOLE SIDEWALLS. THIS PULVERIZED MATERIAL GETS PRESSED INTO THE CRACK WHERE THE TWO INTERSECT EACH OTHER.
 - 6.2. HIGH PRESSURE WATER REMOVES THAT DEBRIS WHICH LODGES INTO THE CRACK INTERFACE.

6 **WATER FLUSHING DRILL HOLES**
Scale 1/2"=1'-0"



NOTES:

1. INJECTION PACKERS COME IN NUMEROUS FRICTION FORMING CONFIGURATIONS AND ONE MADE WITH VARIOUS METAL AND PLASTIC COMPONENTS, ACCEPTABLE UNITS ARE AS FOLLOWS:
 - 1.1. CARBON STEEL, TAPERED, COARSE THREAD, SCREW-IN SHAFT, WITH BALL-VALVE AND 3/8 INCH DIAMETER HYDRAULIC QUICK-CONNECT FITTING.
 - 1.1.1. THESE INJECTION PACKERS CAN BE MADE OF PLASTIC, STAINLESS STEEL, ALUMINUM, OR BRASS, COMPONENTS,
 - 1.1.2. THESE INJECTION PACKERS CAN BE MADE TO FIT 3/8 TO 1.5 INCH DRILL HOLES, AND
 - 1.1.3. THESE PACKERS CAN BE FABRICATED WITH CAM-LOCK FITTINGS, ONE-WAY CHECK VALVES, OR ZERK, AND BUTTON, HEADS.
 - 1.2. EXPANDABLE RUBBER GASKET ON HOLLOW SHAFT CONNECTED TO A BUTTON OR GREASE ZERK HEAD END.
 - 1.2.1. THESE INJECTION PACKERS CAN BE FABRICATED WITH VARIOUS DIAMETERS, LENGTHS, AND MATERIALS, RANGING FROM PLASTIC TO STAINLESS STEEL DEPENDING UPON STRENGTH AND CHEMICAL RESISTANCE CRITERIA.
2. UNACCEPTABLE UNITS ARE AS FOLLOWS:
 - 2.1. SMOOTH WALL PLASTIC SHAFT WITH GREASE ZERK HEAD ARE HAMMERED OR TAPPED INTO DRILL HOLES. THESE PACKERS ARE NOT RECOMMENDED FOR PRESSURES OVER 100 PSI GAUGE.
3. THIS SPECIFICATION IS BASED ON A STAINLESS-STEEL INJECTION PACKER ASSEMBLY CONSISTING OF A COARSE THREADED TAPERED SHAFT STEM, CONNECTED TO A BALL-VALVE, WHICH CONNECTS TO A 3/8 INCH NATIONAL PIPE THREAD (NPT) HYDRAULIC QUICK CONNECT FITTING.
4. AFTER DRILLING DEBRIS REMOVAL FROM DRILL HOLE, PLACE INJECTION PACKER RECEIVING HARDWARE INTO 5/8 INCH DIAMETER DRILL HOLE WITH A 5/8 INCH DIAMETER PLASTIC SLEEVE.
5. PUSH AND SPIN THE INJECTION PACKER INTO DRILL HOLE. USE WRENCH TO TIGHTEN INTO PLACE.
6. OPEN BALL VALVE AFTER PACKER IS IN PLACE.

7 **INJECTION PACKER MATERIAL & INSTALLATION**
Scale 3"=1'-0"

Safety Related Augmented Quality Non-Safety Related

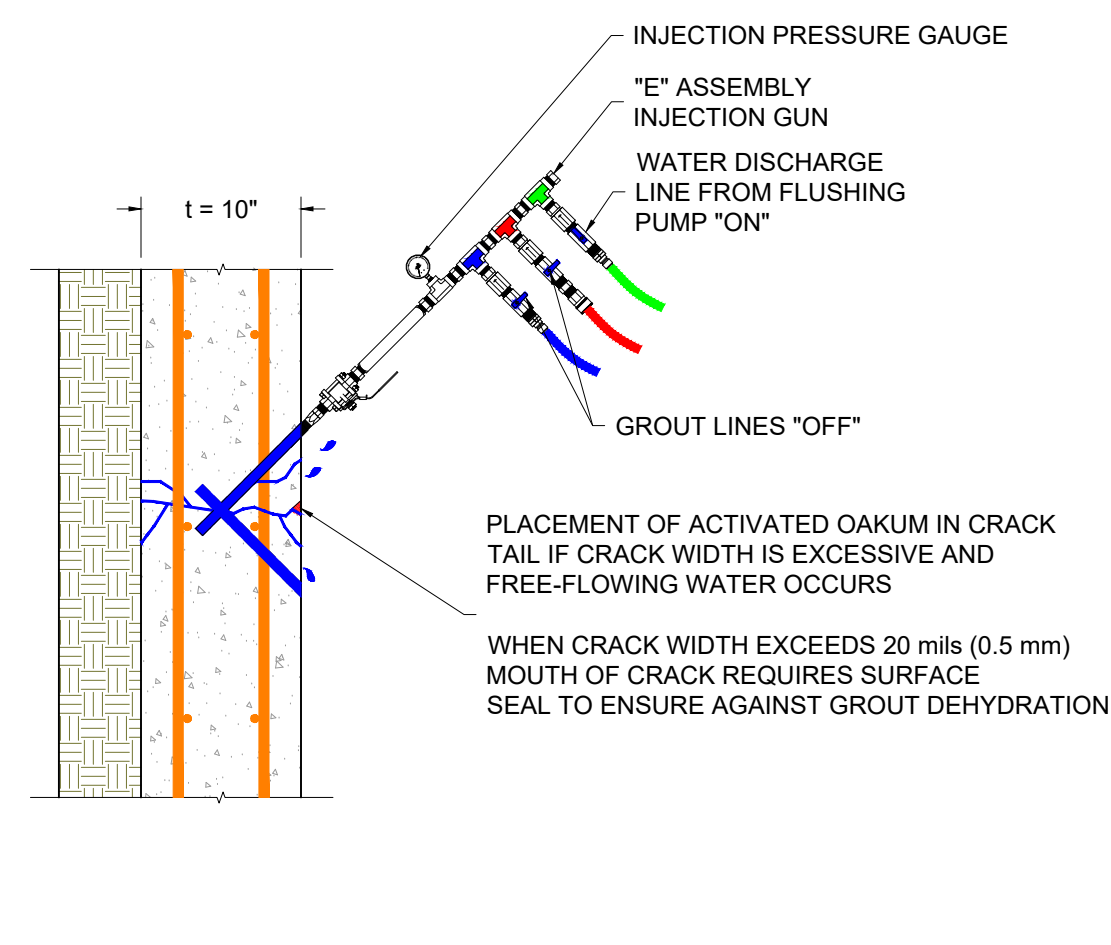
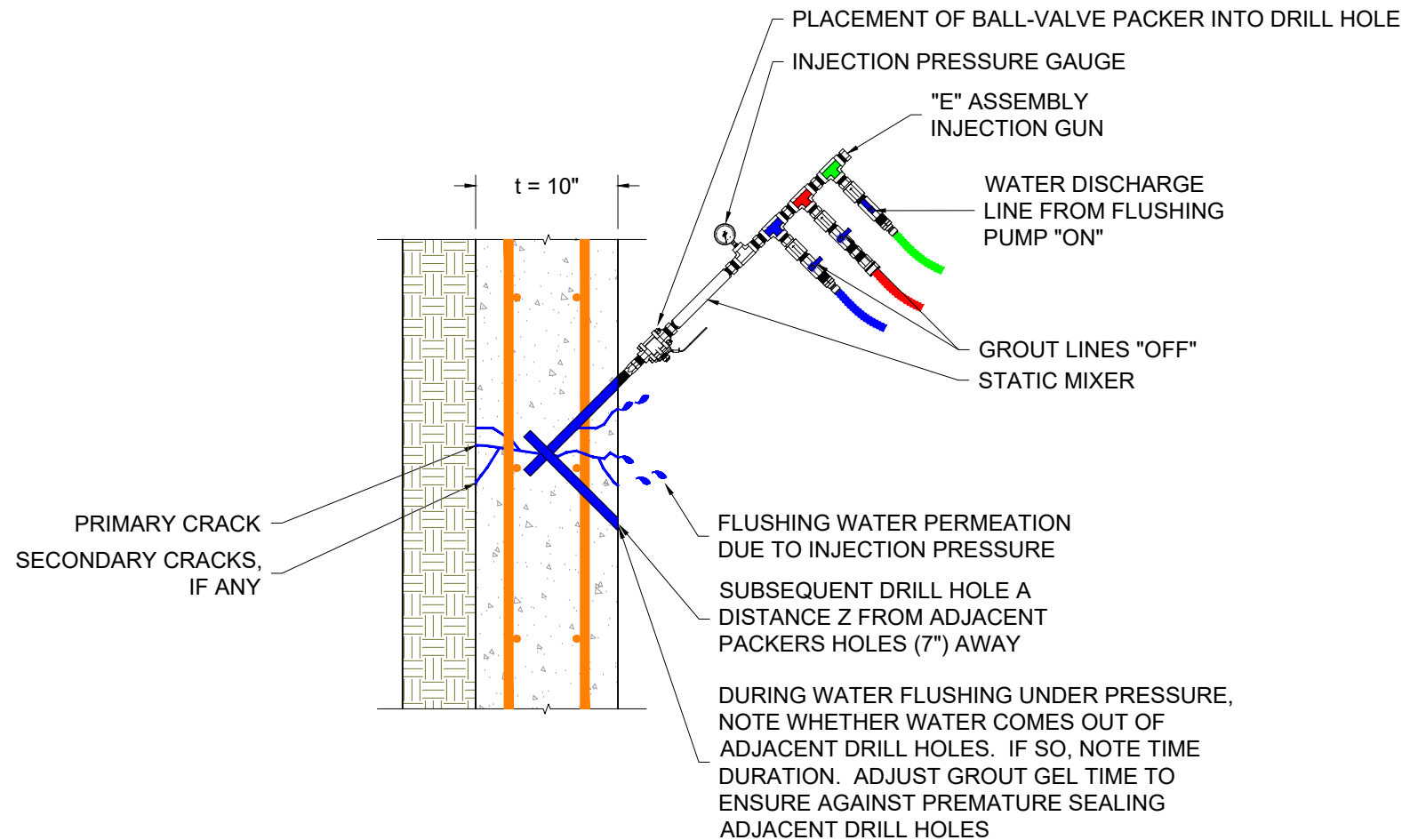
SHELL NORCO ALKY SUMP

INJECTION DETAILS

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

DESIGN BY	BA
DRAWN BY	TB
INVESTIGATED BY	
APPROVED BY	

NO.	0	DATE	1/23/2026	ISSUED FOR REVIEW	TB
REVISIONS					BY



- NOTES:
- ENSURE ALL PPE REQUIREMENTS ARE MET, PARTICULARLY THE EYE PROTECTION PROTOCOLS, ENSURE EYE WASH STATION IS IN CLOSE PROXIMITY TO WORK ZONE.
 - FABRICATE ENDS OF AIR LINES WITH BALL-VALVE AND HYDRAULIC QUICK-CONNECT ASSEMBLY FOR USE IN AIR TESTING DRILL HOLES AND CLEANING / FLUSHING.
 - HOOK UP AIR LINE FROM COMPRESSOR TO INJECTION PACKER QUICK CONNECT HARDWARE, OPEN VALVES AND BLAST 100 PSI GAUGE FOR 10 SECONDS INTO DRILL HOLE. OBSERVE WHETHER CONTINUITY BETWEEN DRILL HOLE AND CRACK EXIST. CONTRACTOR MAY PLACE WATER IN DRILL HOLE PRIOR TO AIR TESTING.
 - DISCONNECT AIR LINE, HOOK UP "E" ASSEMBLY TO INJECTION PACKER QUICK CONNECT, OPEN FLUSHING PUMP LINES AND PUMP WATER INTO PACKER AT 400 PSI GAUGE FOR 20 SECONDS OR MORE, ENSURE WATER COMES OUT FACE OF CRACK AND EXTENDS APPROXIMATELY 7 INCHES IN BOTH DIRECTIONS.
 - IF NO WATER OR AIR BUBBLES ARE EVIDENT ON CRACK TAIL, THE DRILL HOLE MAY HAVE MISSED THE CRACK AND THE HOLE IS CURRENTLY "DEAD." PERFORM THE FOLLOWING:
 - REMOVE INJECTION PACKER AND DRILL DEEPER HOLE TO POTENTIALLY INTERCEPT THE CRACK,
 - REPEAT DRILL HOLE FLUSHING AND PACKER INSTALLATION PROCESS,
 - IF DRILL HOLE AND CRACK DO NOT SHOW ANY SIGNS THAT THE HOLE AND CRACK HAVE INTERSECTED, MOVE DIAGONALLY AND REPEAT THE PROCESS OF DRILLING THE NEW INJECTION HOLE AND REPEAT THE FLUSHING PROCESS.
 - IF WATER IS NOT EVIDENT AT CRACK, HOOK UP AIR PRESSURE AGAIN AND PUMP AIR BEHIND THE WATER THAT WAS PREVIOUSLY INJECTED. AIR BUBBLES SHOULD APPEAR ON THE SURFACE.
 - IF SOIL PARTICLES OR MINERAL DEPOSITS FLOW FROM THE CRACK DURING AIR OR WATER FLUSHING, CONTINUE UNTIL WATER FLUSHING SHOWS NO SIGNS OF DEBRIS MOVEMENT.
 - AFTER ALL DRILL HOLES SHOW EVIDENCE OF WATER MOVEMENT THROUGH TAIL OF CRACK, CHEMICAL GROUT INJECTION CAN PROCEED.

8 WATER TESTING DRILL HOLES FOR CONTINUITY
Scale 1/2"=1'-0"

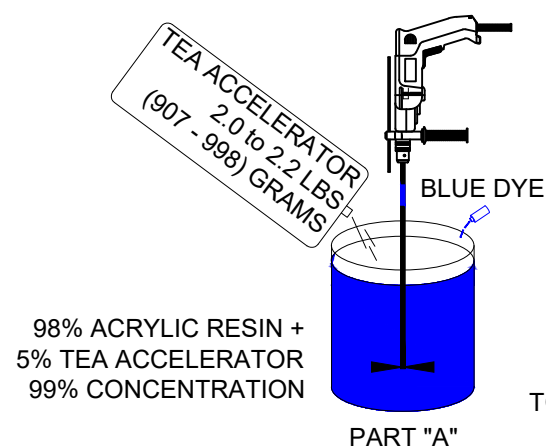
- NOTES:
- FOUR TYPICAL CONDITIONS ARISE WHEN PERFORMING CRACK INJECTION:
 - THE CRACK IS DRY AND NARROW,
 - THESE CONDITIONS SHOULD ALLOW ADJUSTMENT IN MATERIAL TEMPERATURE OF RESIN AND WATER, AND / OR TEA AND OXIDIZER (SP) PERCENTAGES TO INCREASE OR DECREASE GEL TIME.
 - THE CRACK IS DRY AND WIDE,
 - IF TEMPERATURE AND / OR REACTANT PERCENTAGES CANNOT ACCOMPLISH GEL TIME REQUIREMENTS, INSTALL EPOXY PASTE OVER TAIL OF CRACK WITH OR WITHOUT OPEN PORTS TO CONTAIN AND MONITOR GROUT FLOW.
 - THE CRACK IS WET (FLOWING WATER TO VARIOUS DEGREES) AND NARROW,
 - IF TEMPERATURE AND / OR REACTANT PERCENTAGES CANNOT ACCOMPLISH GEL TIME REQUIREMENTS, INSTALL FAST SETTING HYDRAULIC CEMENT OVER TAIL OF CRACK TO CONTAIN WATER.
 - THE CRACK IS WET (FLOWING WATER TO SOME DEGREE) AND WIDE.
 - IF TEMPERATURE AND / OR REACTANT PERCENTAGES CANNOT ACCOMPLISH GEL TIME REQUIREMENTS:
 - INSTALL FAST SETTING HYDRAULIC CEMENT OVER TAIL OF CRACK, OR
 - CHIP OR CUT TAIL OF CRACK OPEN ENOUGH TO INSTALL ADDITIONAL HYDRAULIC CEMENT OR PLACE OAKUM ROPE SOAKED IN HYDROPHILIC POLYURETHANE GROUT INTO TAIL OF CRACK, OR
 - EXTREME WATER FLOW CONDITIONS MAY REQUIRE CONTRACTOR TO DRILL IN BYPASS HOLES AT VARIOUS SPACINGS TO ALLOW SOME WATER FLOW DURING INJECTION. THESE BYPASS HOLES WOULD BE INJECTED AS A NEXT STEP IN THE PROCESS.
 - IF ALL METHODS FAIL TO ALLOW PROPER INJECTION PROTOCOLS, CONTACT SME FOR ASSISTANCE.

9 EXCESSIVE LEAKAGE FROM CRACK MOUTH
Scale 1/2"=1'-0"

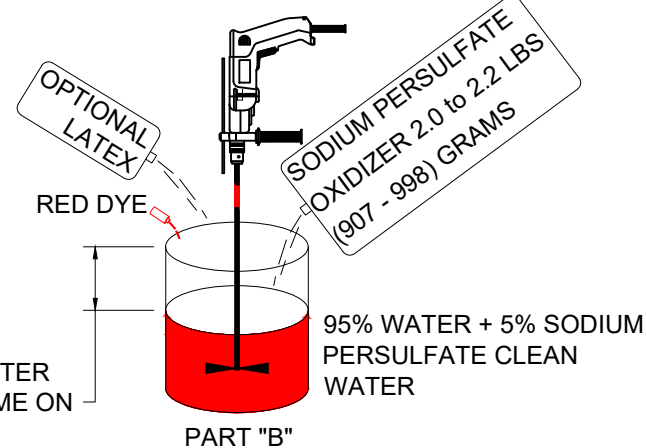
Safety Related <input type="checkbox"/>		Augmented Quality <input type="checkbox"/>		Non-Safety Related <input type="checkbox"/>	
SHELL NORCO ALKY SUMP		INJECTION DETAILS			
ST JOB NO:	702736	ISSUED FOR REVIEW	0	DATE	1/23/2026
SPS JOB NO:	698217	NO.	0	REVISIONS	TB
SHEET:	702736-D03-206	BY			

structural TECHNOLOGIES
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
 10150 Old Columbia Rd.
 COLUMBIA, MD 21046
 Phone: 410-695-7000
 Fax: 410-695-4111

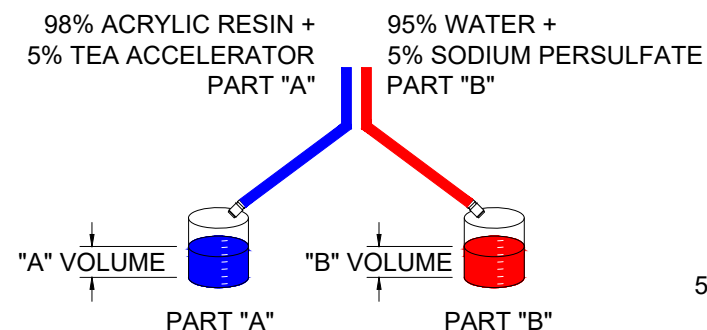
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended, or other impermissible use of this document or any information it contains.



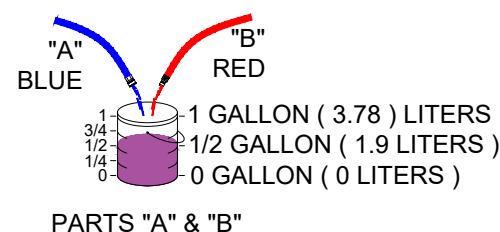
A "A" COMPONENT
 CRACK / JOINT INJECTION
 MIXING / FORMULATING A & B COMPONENTS



B "B" COMPONENT
 CRACK / JOINT INJECTION
 MIXING / FORMULATING A & B COMPONENTS

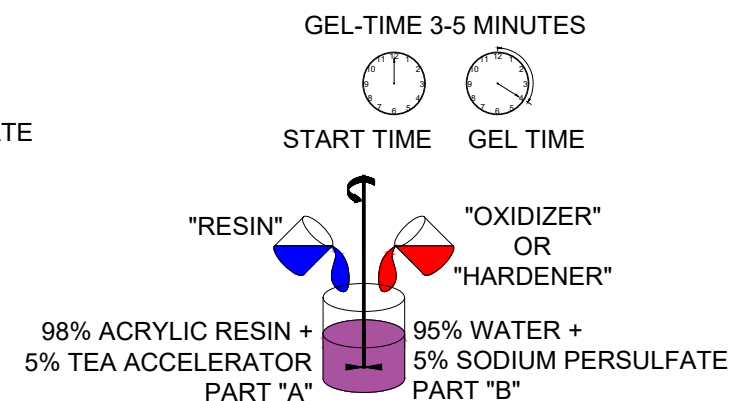


C RATIO CHECK
 CRACK / JOINT INJECTION
 QA/QC 1-to-1 RATIO

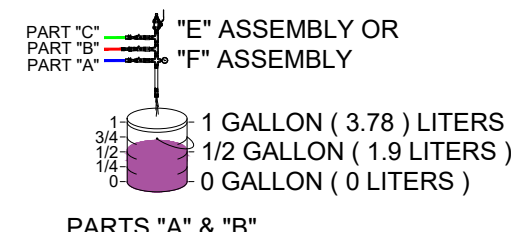


* NOTE: TO BE DONE WITH THE MATERIAL IN USE

E STROKE COUNT TO EQUAL 1 GALLON
 UNRESTRICTED



D GEL TIME CHECK
 CRACK / JOINT INJECTION
 GEL TIME CHECK



* NOTE: TO BE DONE WITH THE MATERIAL IN USE

F STROKE COUNT TO EQUAL 1 GALLON
 RESTRICTED

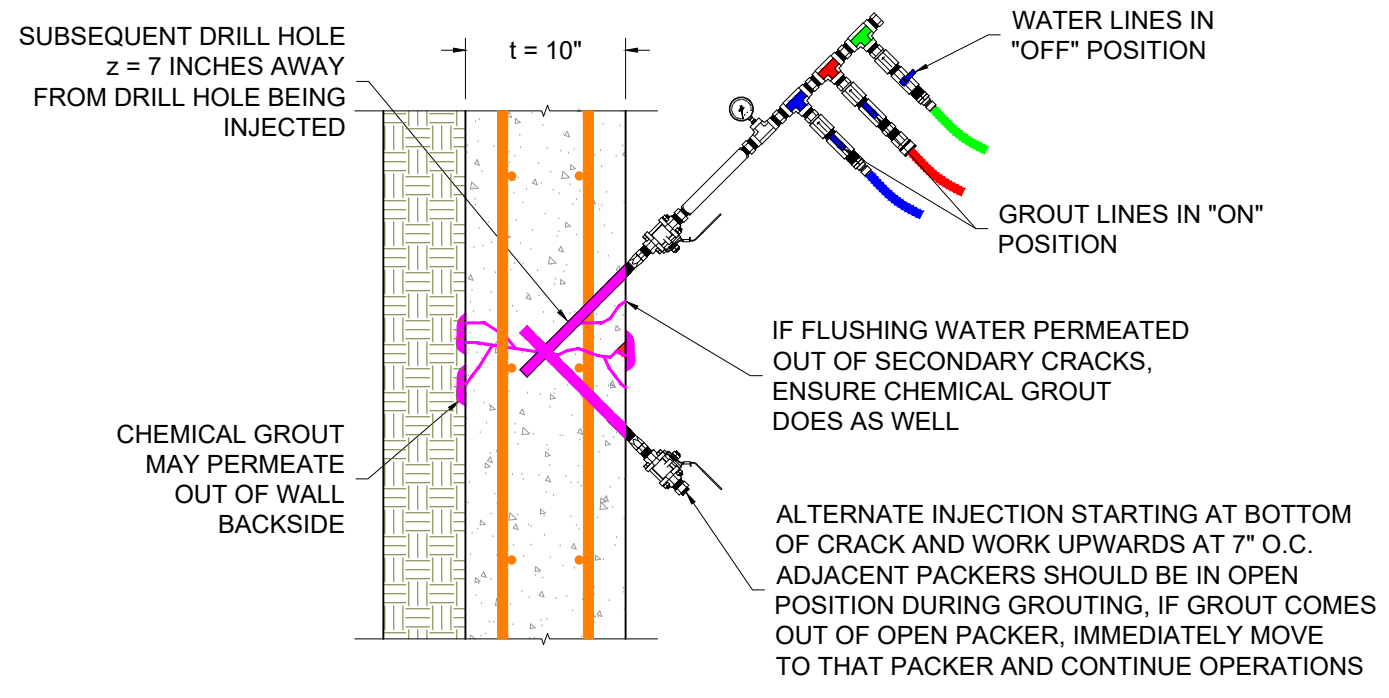
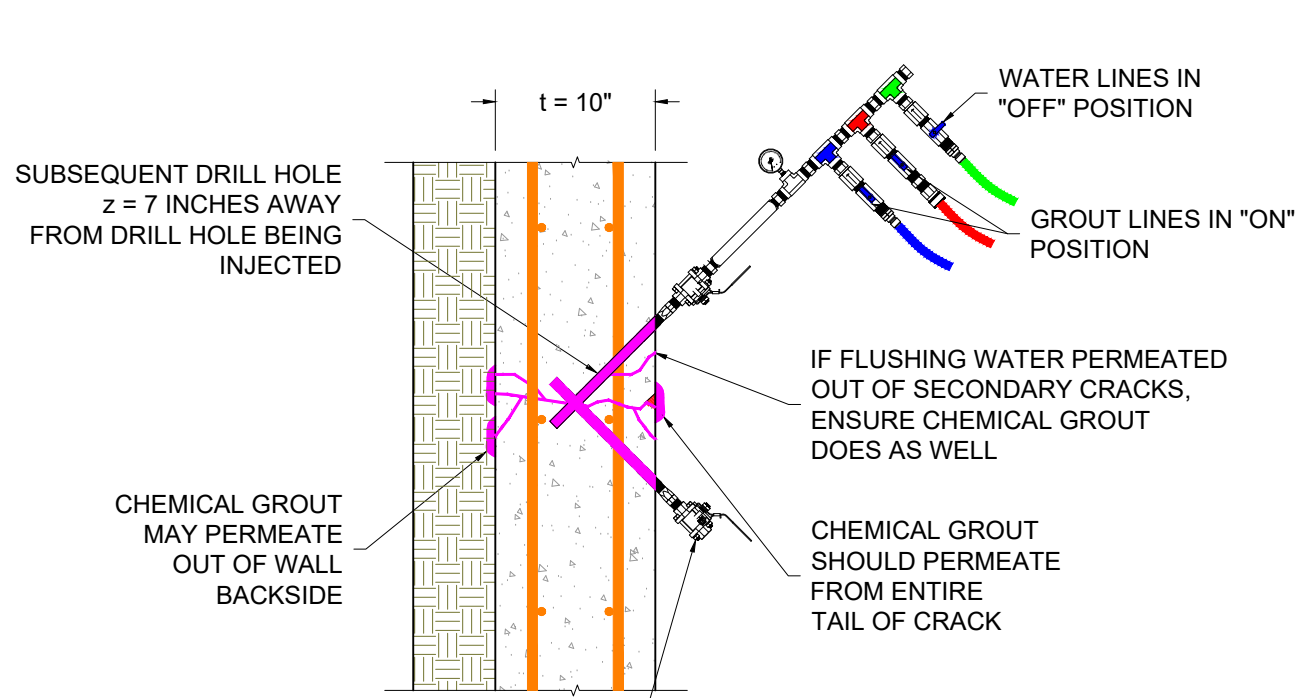
- NOTES:
- PLACE 5-GALLON PAIL OF ACRYLIC (ACRYLATE) RESIN ON SPILL PAD NEAR PUMP INTAKE.
 - MARK PART "A" RESIN PAIL BLUE,
 - MARK PADDLE TO MIX PART A RESIN WITH BLUE TAPE FOR IDENTIFICATION,
 - PLACE BLUE DYE IN LIQUID OR TABLET FORM IN PART A RESIN.
 - PLACE 5-GALLON PAIL OF CLEAN, NEUTRAL pH WATER ON SPILL PAD NEAR PUMP INTAKE.
 - MARK PART "B" OXIDIZER PAIL RED,
 - MARK PADDLE TO MIX PART B RESIN WITH RED TAPE FOR IDENTIFICATION,
 - PLACE RED DYE IN LIQUID OR TABLET FORM IN PART B OXIDIZER AND WATER.
 - MIXING IN 5-GALLON PAILS:
 - ACRYLIC RESIN ("A" COMPONENT) IS PART "A," AND IS A CLEAR LIQUID RESIN,
 - OPEN (2.2 LBS.) BOTTLE OF TRIETHANOLAMINE AND POUR INTO THE FIVE (5) GALLON PAIL OF PART "A",
 - MIX THE TRIETHANOLAMINE FOR 2 MINUTES INTO PART "A" RESIN,
 - PLACE (2) TWO GALLONS OF POTABLE WATER IN "B" COMPONENT PAIL,
 - PLACE (2.2 LBS.) OF SODIUM PERSULFATE (OXIDIZER) IN THE 2 GALLONS OF WATER AND MIX FOR 2 MINUTES,
 - MEASURE AND POUR 2 GALLON(S) OF LATEX EMULSION INTO PART "B" PAIL AND SLOWLY MIX INTO SOLUTION,
 - FILL PART "B" PAIL WITH WATER TO SAME ELEVATION AS PART "A" PAIL,
 - SLOWLY MIX COMPONENT "B" MATERIALS, AND
 - PLACE COVERS ON COMPONENTS "A" AND "B" WHEN NOT IN USE.
 - FILL 5-GALLON PAIL WITH CLEAN WATER FOR FLUSHING. PLACE GREEN DYE IN LIQUID OR TABLET FORM IN SAID PAIL.
 - PLACE INTAKE LINE FROM FLUSHING PUMP INTO FLUSHING WATER PAIL AND CLEAN LINE.
 - PLACE INTAKE LINES FOR PARTS "A" (BLUE) AND "B" (RED) INTO RESPECTIVE COLORED 5 GALLON PAILS.
 - OPEN BALL VALVE ON E-ASSEMBLY, PART "C" (GREEN), TO FLUSH OUT ANY OILS OR CONTAMINANTS IN PUMP AND / OR LINE.
 - OPEN BALL VALVES ON E-ASSEMBLY INJECTION GUN AND START PUMPING "A" AND "B" COMPONENTS THROUGH DISCHARGE LINES TILL IT COMES OUT INJECTION GUN ASSEMBLY.
 - WHEN GROUT FLOW LOOKS APPROPRIATE AND CONTINUOUS, START QA CHECKS.

- NOTES:
- PERFORM THE FOLLOWING TESTS PER MIXING INSTRUCTION SHOP DRAWINGS:
 - GEL-TIME TEST,
 - PART "A" & PART "B" RATIO CHECK, AND
 - VOLUME PER PUMP STROKE CALCULATION TESTS.
 - RUN WATER THROUGH ALL LINES TO ENSURE NO BLOCKAGE EXISTS.
 - ENSURE "E" ASSEMBLY IS IN GOOD WORKING ORDER, PRESSURIZE CHECK VALVES.
 - ACRYLIC POLYMER GROUT PRESSURES WILL BE IN THE RANGE OF (100 TO 700) PSI GAUGE, EXCESSIVE GROUT PRESSURE (IN EXCESS OF 750 PSI) WILL POTENTIALLY FRACK THE CONCRETE OR POTENTIALLY LEAK OUT OF THE PACKER, MONITOR THE SITUATION.
 - ACRYLIC POLYMER GROUT PRESSURES EXCEEDING 500 PSI GAUGE MAY BE INDICATIVE OF INJECTION INTO PREVIOUSLY INJECTED CRACK.
 - ACRYLIC POLYMER PUMP GROUT RATE SHALL NOT EXCEED 1/4 GALLONS PER MINUTE, ACCELERATED RATES WILL POTENTIALLY FRACK THE CONCRETE.
 - GROUT QUANTITIES MAY VARY BECAUSE CRACK WIDTH AND AGGREGATE INTERLOCK CAN VARY WITH DEPTH ALONG THE CONCRETE ELEMENT WIDTH AND LENGTH.
 - NOTE THAT IF GEL TIME IS 2 TO 5 MINUTES, MIXED GROUT IN INJECTION GUN COMPONENTS, STATIC MIXER, AND / OR PACKER WILL STIFFEN (INCREASE IN VISCOSITY) IN THAT TIME PERIOD, FLUSH INJECTION GUN AS REQUIRED TO ENSURE FLOW.
 - WHEN EVERYTHING IS WORKING CORRECTLY, ENSURE GROUT HOSE AND INJECTION HEAD ASSEMBLY EXTENDS TO WORK ZONE.

10 MIXING CHEMICAL GROUT IN 5-GALLON PAILS
 Scale 1/2"=1'-0"

11 CHEMICAL GROUTING PROCEDURES AND INJECTION
 Scale 1/2"=1'-0"

DESIGN BY	BA	DATE	0	1/23/2026	ISSUED FOR REVIEW	TB	BY
DRAWN BY	TB	NO.	0	1/23/2026	REVISIONS		
IN BY							
APP BY							
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-650-7000 Fax: 410-650-4111							
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.							
Safety Related <input type="checkbox"/>		Augmented Quality <input type="checkbox"/>		Non-Safety Related <input type="checkbox"/>		INJECTION DETAILS	
SHELL NORCO ALKY SUMP							
ST JOB NO: 702736							
SPS JOB NO: 698217							
SHEET: 702736-D03-207							



ALTERNATE INJECTION STARTING AT BOTTOM OF CRACK AND WORK UPWARDS AT 12" O.C. ADJACENT PACKERS SHOULD BE IN OPEN POSITION DURING GROUTING, IF GROUT COMES OUT OF OPEN PACKER, IMMEDIATELY MOVE TO THAT PACKER AND CONTINUE OPERATIONS

- NOTES:
- ENSURE ALL TRADESMEN HAVE PROPER PPE, GLOVES, FACE SHIELDS, BOOTS, AND SAFETY GLASSES IN PLACE DURING LOW-OR-HIGH-PRESSURE INJECTION.
 - ENSURE ALL TRADESMAN ARE TRAINED IN THE BASIC PROCEDURES FOR INJECTION GROUTING OF CONCRETE CRACKS.
 - ENSURE THE FOLLOWING:
 - ALL MIXING INSTRUCTIONS ARE FOLLOWED,
 - PROPER GEL TIME IS ESTABLISHED,
 - THE PUMP IS ON 1-TO-1 RATIO, AND
 - THE STROKE COUNT TO VOLUME IS KNOWN,
 - ATTACH E-ASSEMBLY TO INJECTION PACKER, OPEN PACKER VALVE, PERFORM THE FOLLOWING:
 - OPEN AIR REGULATOR VALVE TO SUPPLY AIR PRESSURE TO GROUT PUMP,
 - START AIR PRESSURE SUCH THAT GROUT DISCHARGE LINES READ 100 PSI GAUGE, CONTINUE AT THIS PRESSURE UNTIL PUMP PISTONS STOP,
 - INCREASE PUMP PRESSURE IN 100 PSI INCREMENTS UNTIL GROUT FLOWS FROM MOUTH OF CRACK, DO NOT EXCEED 700 PSI GAUGE.
 - ENSURE GROUT FLOW IS DETERMINED HALFWAY OR MORE TO ADJACENT PACKERS,
 - IF GEL TIME IS TOO LONG, EXCESSIVE GROUT LEAKAGE MAY OCCUR OUT OF CRACK MOUTH, GEL TIME MAY REQUIRE ADJUSTMENT.
 - CONTINUE UP CRACK LENGTH, CLOSE PACKERS AS REQUIRED.
 - REMEMBER THAT IF A PAUSE IN GROUTING OCCURS, THE GROUT WILL GEL IN THE E-ASSEMBLY IF NOT FLUSHED OUT WITH WATER IN A TIMELY MANNER.

- NOTES:
- CHEMICAL GROUTING IS A PROCESS THAT INVOLVES BOTH ENGINEERING DESIGN AND JUDGEMENT BY TRADESMEN IN THE FIELD BASED ON ACTUAL CONDITIONS.
 - ENGINEERING DESIGN INVOLVES ESTABLISHING CERTAIN CRITERIA TO ENSURE A QUALITY INSTALLATION, HOWEVER, CONDITIONS IN THE FIELD MAY DEMAND FROM TIME-TO-TIME THAT VARIANCE FROM ENGINEERING DESIGN IS REQUIRED.
 - COMMON FIELD JUDGEMENTS TO BE MADE AND VERIFIED BY ENGINEERING:
 - PORT-TO-PORT SPACING (Z DISTANCE) - OBSTRUCTIONS WHICH CANNOT BE MOVED THAT INTERFERE WITH THE DRILL HOLE PATTERN MAY REQUIRE ADJUSTMENTS IN SPACING. THE GOAL WOULD BE TO KEEP "Z" LESS THAN "t".
 - (DISTANCE X) FROM CRACK OR JOINT - SIMILAR TO 3.1 ABOVE, OBSTRUCTIONS MAY REQUIRE ADJUSTMENTS TO THE DISTANCE "X" FROM THE CRACK TO DRILL HOLE.
 - DRILL HOLE ANGLE FROM SUBSTRATE - SIMILAR TO 3.1 ABOVE, OBSTRUCTIONS MAY REQUIRE ADJUSTMENTS TO THE DRILLING ANGLE "θ" FROM THE CONCRETE ELEMENT SUBSTRATE TO DRILL HOLE DIRECTION.
 - WATER TESTING PRESSURES - THE GOAL IS TO KEEP WATER TESTING PRESSURES LESS THAN THE THEORETICAL RUPTURE STRENGTH OF CONCRETE. THE RUPTURE STRENGTH OF CONCRETE VARIES BETWEEN 7.5 TO 12 TIMES THE SQUARE ROOT OF CONCRETE COMPRESSIVE STRENGTH f_c , WHICH IS 450 TO 720 PSI GAUGE PRESSURE FOR 3,500 PSI COMPRESSIVE STRENGTH CONCRETE.
 - VOLUMETRIC QUANTITY OF GROUT PER HOLE - CRACK INJECTION TYPICALLY CONSUMES APPROXIMATELY 1/8 TO 3/8 GALLONS PER LINEAL FOOT OF CRACK LENGTH. DRILL DIAMETER "Y", DRILL LENGTH "H", CRACK WIDTH "W", AND CONCRETE ELEMENT THICKNESS "t", DICTATE UNIT GROUT VOLUME CONSUMPTION.
 - VOLUMETRIC RATE OF INJECTION - ENVIRONMENTAL TEMPERATURES OF CONCRETE AND GROUT MATERIALS MAY REQUIRE ADJUSTMENTS IN GEL TIME TO MINIMIZE GROUT LOSS FROM TAIL OF CRACK. DO NOT HEAT WATER OR RESIN TO TEMPERATURES ABOVE 120° F WITHOUT SME APPROVAL. PUMPING RATE OR GEL TIME ADJUSTMENTS CAN BE MADE TO MINIMIZE GROUT LOSS FROM CRACK TAIL.
 - MAXIMUM ALLOWABLE PRESSURE - CHEMICAL GROUT PRESSURES WILL VARY CONSIDERABLY DUE TO CRACK WIDTH, GROUT VISCOSITY, GEL TIME, AND CONCRETE WALL ELEMENT THICKNESS.
 - EXCESSIVE GROUT LOSS FROM HOLE DURING INJECTION -- IS INFLUENCED BY ITEMS NOTED IN 3.7 ABOVE.
 - IF IN THE EVENT CRACK TAKES WATER AND WILL NOT TAKE GROUT AT SIMILAR PRESSURES, CONTACT SME FOR DISCUSSION.
 - IF EXCESSIVE MATERIAL CONSUMPTION SEEMS TO BE OCCURRING, NOTE THE FOLLOWING:
 - THE CHEMICAL GROUT HAS FOUND A POROUS MEDIUM TO BYPASS THE CRACK, THESE MAY INCLUDE:
 - AN UNKNOWN CONDUIT / PIPE WITHIN THE CONCRETE ELEMENT,
 - AN UNKNOWN EXPANSION MATERIAL THAT COMPRESSES UNDER PRESSURE,
 - A LARGE VOID UNDER OR BEHIND THE STEEL BAR OR POST TENSIONED STRAND WITHIN THE CONCRETE ELEMENT,
 - EXCESSIVE LEAKAGE IS OCCURRING OUT THE BACKSIDE OF CRACK.
 - CONTACT SME FOR ANY UNUSUAL CONDITIONS DURING GROUTING PROTOCOLS.
 - OUR ESTIMATE ASSUMES 1/2 GALLON PER LINEAL FOOT OF CRACK. IF GROUT CONSUMPTION EXCEEDS 3/4 GALLON PER FOOT; CEASE INJECTION AND CONTACT ENGINEERING SME.

Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP

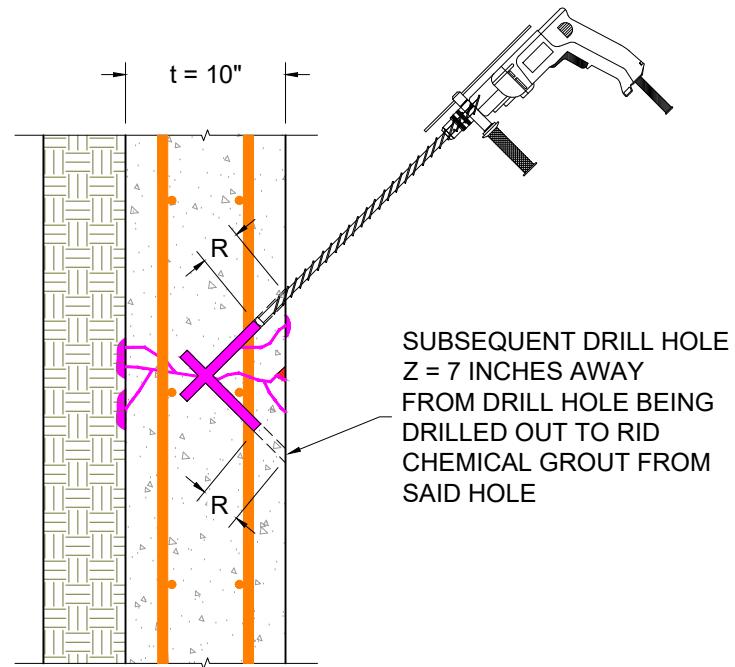
INJECTION DETAILS

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

structural TECHNOLOGIES
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
10150 Old Columbia Rd.
COLUMBIA, MD 21046
Phone: 410-650-7000
Fax: 410-650-4111

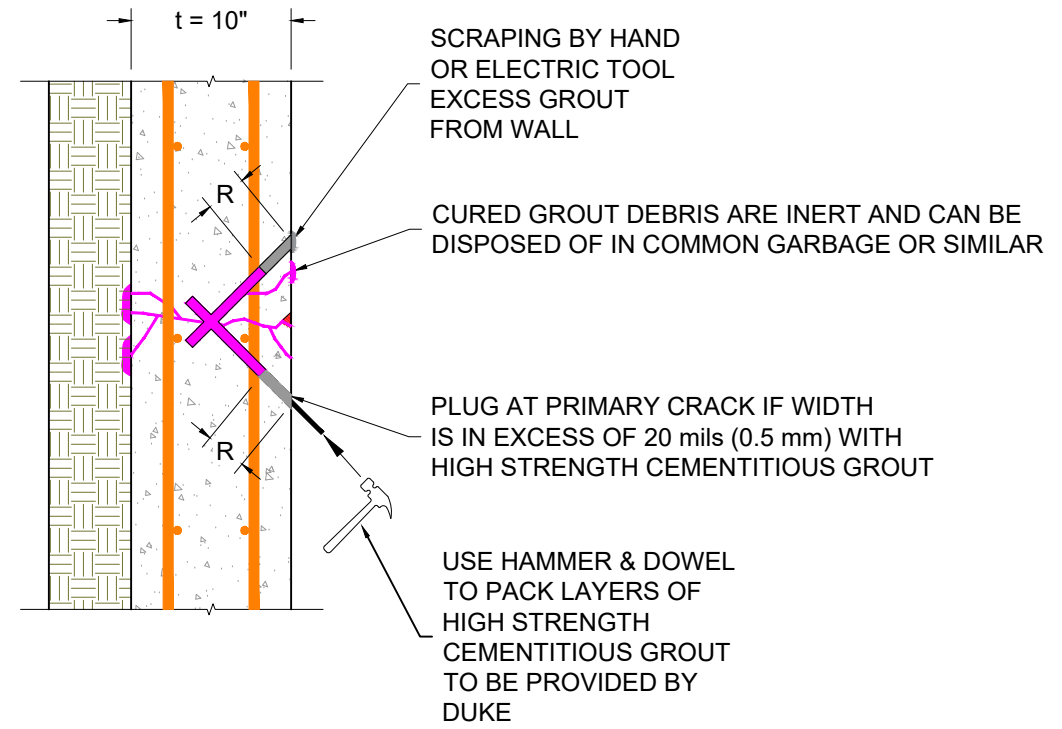
DESIGN BY	BA
DRAWN BY	TB
IN BY	
APP BY	
NO.	0
DATE	1/23/2026
ISSUED FOR REVIEW	TB
REVISIONS	BY

ST JOB NO:	702736
SPS JOB NO:	698217
SHEET:	702736-D03-208



SUBSEQUENT DRILL HOLE
Z = 7 INCHES AWAY
FROM DRILL HOLE BEING
DRILLED OUT TO RID
CHEMICAL GROUT FROM
SAID HOLE

R = DEPTH OF DRILL HOLE RESTORATION
R = t / 2 = 10' / 2 = 5" DEEP



- NOTES:
- ENSURE FIVE (5) INCH DEEP ZONE IN DRILL HOLE IS CLEAN, PERFORM THE FOLLOWING OPERATIONS:
 - MIX HIGH STRENGTH CEMENTITIOUS MORTAR WITH WATERPROOF ADMIXTURE IN A BUCKET AND PLACE (FIRST LIFT) OF FOUR INCH MORTAR IN DRILL HOLE,
 - USE WOOD DOWEL TO COMPACT MORTAR IN PLACE,
 - PLACE ANOTHER (SECOND LIFT) OF FOUR INCH MORTAR DOWN DRILL HOLE AND USE WOOD DOWEL TO COMPACT LIFT IN PLACE,
 - TOP OFF OR FLUSH SURFACE WITH FINAL INCREMENT OF MORTAR TO COMPLETELY FILL DRILL HOLE,
 - USE BRUSH TO GIVE TEXTURED FINISH TO MORTAR SURFACE.

- NOTES:
- AFTER COMPLETION OF CHEMICAL GROUT CRACK INJECTION, PERFORM THE FOLLOWING ITEMS:
 - REMOVE THE INJECTION PACKER FROM DRILL HOLES VIA REVERSE DIRECTION OF COARSE THREADING.
 - PLACE REMOVED PACKER IN BUCKET OF WATER OR REDRILL CURED GROUT OUT OF PACKER HOLLOW SHAFT FOR REUSE.
 - DRILL DOWN INJECTION GROUT HOLE TO A DEPTH OF FIVE (5) INCHES AND REMOVE ALL CURED POLYACRYLATE GROUT, A SLIGHTLY OVER SIZED BIT CAN BE USED TO ENSURE GROUT IS REMOVED FROM DRILL HOLE SHAFT.
 - USE HIGH PRESSURE WATER FLUSHING WAND (400 PSI GAUGE OR HIGHER) WITH LATERAL HOLE / PERFORATIONS TO RID ALL GROUT DEBRIS FROM DRILL HOLE.

15 **DRILL HOLE RESTORATION**
Scale 1/2"=1'-0"

16 **COMPLETION OF DRILL HOLE RESTORATION WORK**
Scale 1/2"=1'-0"

Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP

INJECTION DETAILS

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

structural TECHNOLOGIES
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
10150 Old Columbia Rd.
COLUMBIA, MD 21046
Phone: 410-650-7000
Fax: 410-650-4111

DSGN BY	BA
DWN BY	TB
IV BY	
APP BY	

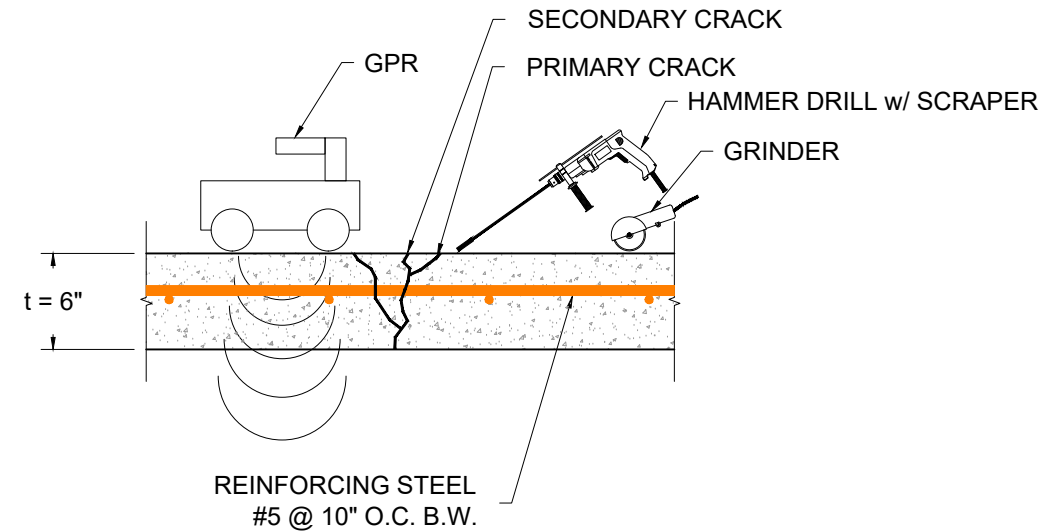
NO.	0	DATE	1/23/2026	ISSUED FOR REVIEW	TB
REVISIONS					BY

ST JOB NO: 702736
SPS JOB NO: 698217
SHEET: 702736-D03-209

GENERAL COORDINATION AND PROJECT WORK SEQUENCE:

NOTES:

1. REVIEW ALL SAFETY PROTOCOLS PRIOR TO ENTERING WORK SITE AREA INCLUDING:
 - 1.1. REVIEW CONFINED SPACE REQUIREMENTS, PERMITS MAY BE REQUIRED,
 - 1.2. DRILLING AND GRINDING WILL REQUIRE A "HOT WORK PERMIT,"
 - 1.3. ENSURE ADEQUATE LIGHTING TO AVOID TRIP HAZARDS,
 - 1.4. REVIEW OSHA DUST REMOVAL CRITERIA WHEN GRINDING AND DRILLING,
 - 1.5. ENSURE GFCI CIRCUITS ARE IN PLACE, AVOID ELECTRICAL LINES IN PONDED WATER, AND
 - 1.6. AIR MONITORS MAY BE REQUIRED NEAR OPEN SUMP PITS IN CONCRETE FLOOR SLAB SURFACES DURING DRILLING AND INJECTION OPERATIONS.
2. THE CRACK INJECTION WORK SHALL BE GENERALLY DESCRIBED AS FOLLOWS:
 - 2.1. CLEAN TAIL OF EXISTING CRACKS A MINIMUM 16 INCHES ON EACH SIDE VIA SCRAPING, GRINDING, ABRASIVE BLASTING OR EQUAL.
 - 2.2. SURVEY WITH GPR (GROUND PENETRATING RADAR) FOR ANY BURIED UTILITIES AND REINFORCING BAR ITEMS ALONG CRACK LENGTH.
 - 2.3. USE ACOUSTIC IMPACT HAMMER TO SOUND AREA 16 INCHES ON EACH SIDE OF CRACK TO ENSURE NO DELAMINATION EXISTS.
 - 2.4. MARK DRILL-HOLE LOCATIONS ON EACH SIDE OF CRACK, (STITCHING PATTERN).
 - 2.5. DRILL INJECTION HOLES AT MARKED LOCATIONS 45 DEGREES FROM SURFACE.
 - 2.6. USE AIR PRESSURE OR VACUUM TO REMOVE DUST FROM DRILL HOLE(S).
 - 2.7. FLUSH DRILL HOLES WITH WATER AT 400 PSI GAUGE PRESSURE.
 - 2.8. SET INJECTION PACKERS IN DRILL HOLES AND SECURE INTO POSITION.
 - 2.9. WATER TEST PACKER AND DRILL HOLE FOR LEAKAGE AND CONTINUITY (FROM HOLE TO CRACK) AT 400 PSI GAUGE PRESSURE.
 - 2.10. SET UP ACRYLATE GROUTING EQUIPMENT AND MIX MATERIALS.
 - 2.11. INJECT ACRYLATE GROUT AT (200 - 700) PSI GAUGE PRESSURE.
 - 2.12. REMOVE PACKERS FROM DRILL HOLE AND REDRILL SAID HOLE TO A DEPTH OF 8 INCHES.
 - 2.13. FLUSH DRILL HOLE WITH WATER AT 400 PSI GAUGE PRESSURE A MINIMUM 8 INCHES.
 - 2.14. ENSURE DRILL HOLE IS CLEAN AND DRY-PACK SAID HOLE IN THREE LIFTS.
 - 2.15. EQUIPMENT CLEANUP AND SITE DEMOBILIZATION.



GENERAL CONDITIONS, INVESTIGATION, SURFACE CLEANING ALONG CRACKS:

NOTES:

1. ENSURE SAFETY PROTOCOLS ARE REVIEWED IN 702736-D03-100 THRU 105 DRAWINGS.
2. WORK SCOPE CONSISTS OF CHEMICAL GROUT INJECTION OF LEAKING CRACKS. NOTE THE FOLLOWING:
 - 2.1. ENSURE A SAFETY PLAN IS DEVELOPED TO GAIN ACCESS TO WORK AREA.
 - 2.2. NOTE ANY OBSTRUCTIONS THAT MAY IMPACT INJECTION WORK.
3. COORDINATE AND ENSURE WITH OWNER WHERE UNDERGROUND AND BURIED UTILITIES EXTEND IN WALLS, UNDER FOOTINGS / WALLS, OR UTILITY PIPE AREAS TO BE TREATED, SEE LIST BELOW:
 - 3.1. FIRE SUPPLY, REPROCESS, AND / OR SERVICE WATER SUPPLY / DISCHARGE LINES,
 - 3.2. ELECTRICAL SERVICE, PROCESS CONTROL, SECURITY DEVICES, CONDUIT, OR MONITORING DEVICES AND / OR LINES,
 - 3.3. STORM AND SEWER PIPING / TUNNELS, OR SUBSLAB SURFACE DRAIN LINES,
 - 3.4. STEAM OR CONDENSATE DRAIN, OR CHEMICAL SUPPLY / DISCHARGE LINES, AND
 - 3.5. PRESSURIZED GAS, COMPRESSED AIR, OR TELCOM LINES.
4. IF UTILITY SERVICES ARE DISCOVERED, DETERMINE DEPTH AND ORIENTATION; COORDINATE WITH THE OWNER AND SME.
5. COORDINATE WITH THE OWNER FOR WORK ZONE CLEARANCE OF ANY DANGEROUS OVERHEAD ELECTRICAL, STEAM, PROCESS SERVICES, OR UTILITY LINES AFFECTING THE WORK AREA.
6. CLEAN CONCRETE SURFACES APPROXIMATELY 16 INCHES ON EACH SIDE OF CRACK VIA CHIPPING, GRINDING, ABRASIVE BLASTING, OR EQUAL.
7. USE GPR OR SIMILAR TO LOCATE STEEL IN SLAB / WALLS AND ANY EXISTING UTILITIES AND / OR SERVICES PRIOR TO DRILLING INTO WALLS.
8. SOUND CONCRETE SURFACES ON EACH SIDE OF CRACK TO ENSURE NO DELAMINATIONS EXIST.

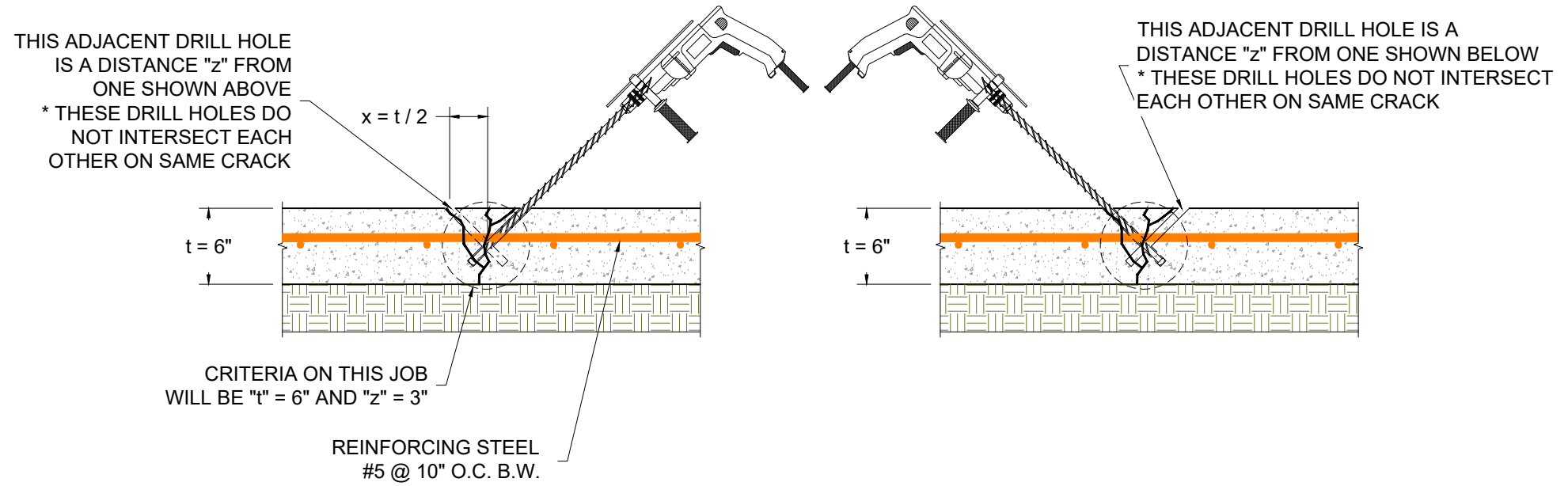
1 CRACK PREPARATION
Scale 1/2"=1'-0"

BA	TB			0	1/23/2026	ISSUED FOR REVIEW	TB
DESIGN BY	DRAWN BY	CHECKED BY	DATE	NO.	DATE	REVISIONS	BY
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-650-7000 Fax: 410-650-4111							
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.							
<input type="checkbox"/> Safety Related <input type="checkbox"/> Augmented Quality <input type="checkbox"/> Non-Safety Related	SHELL NORCO ALKY SUMP INJECTION DETAILS						
ST JOB NO: 702736				SPS JOB NO: 698217			
SHEET: 702736-D03-210							

NOTES:

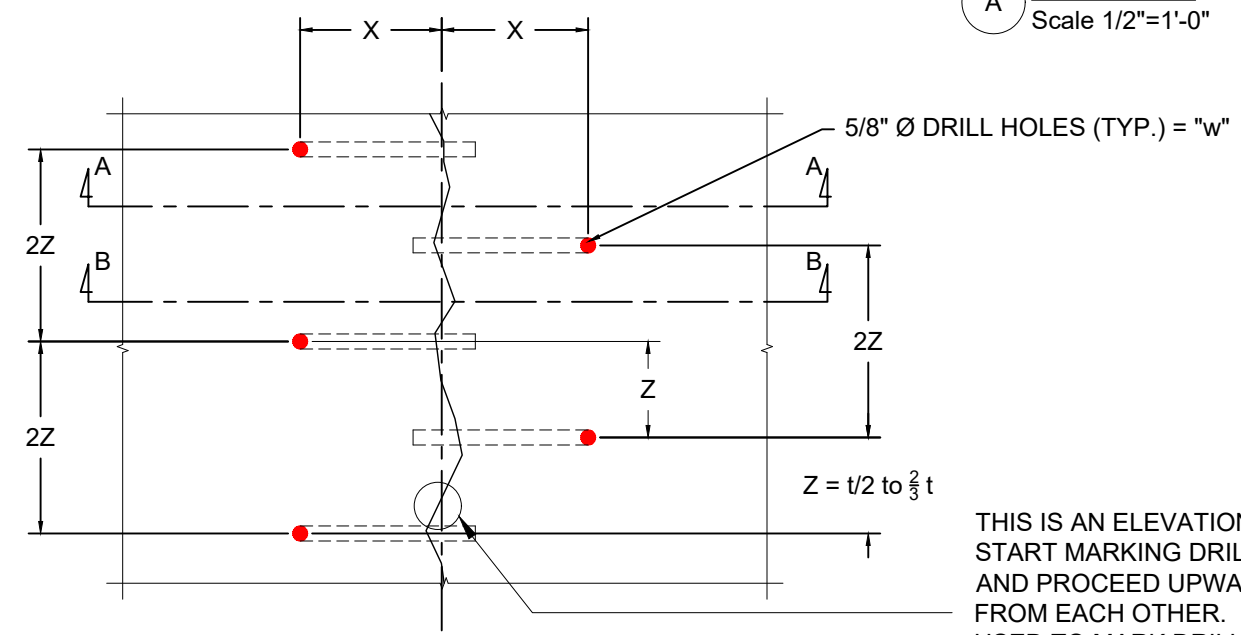
1. THE OBJECTIVE OF INTERCEPTION GROUTING IS TO INTERCEPT LEAKING CRACK(S) IN THE CONCRETE ELEMENT (WALLS) AT MID-DEPTH, THE THICKNESS OF CONCRETE ELEMENT IS CONSIDERED "t."
2. MID-DEPTH WALL INTERCEPTION REQUIRES A DRILLING ANGLE OF 45 DEGREES FROM THE SUBSTRATE AND OUT A DISTANCE "X" FROM THE CRACK, (1/2 THE ELEMENT THICKNESS) OR (t/2) FROM THE CRACK.
3. THE DISTANCE "X" SHALL NEVER BE CLOSER THAN FOUR (4) INCHES FROM THE CRACK, THIS WILL HELP AVOID CONCRETE HYDRAULIC FRACTURING DURING THE INJECTION PROCEDURES INVOLVING FLUID PRESSURES UP TO 750 PSI GAUGE.
4. THE DISTANCE "Z" FROM DRILL-HOLE-TO-DRILL-HOLE (DRILL HOLE SPACING) WILL VARY BETWEEN (t/2 TO 2t/3). THIS IS CONSIDERED "PORT-TO-PORT SPACING."
5. THIS SPECIFICATION IS BASED ON "Z" BEING 2/3 THE CONCRETE ELEMENT THICKNESS FOR DRILL HOLE SPACING (PORT-TO-PORT).
6. UTILITY OBSTRUCTIONS AND REINFORCING BARS CAN INTERFERE WITH THE THEORETICAL DIMENSIONS FOR DRILLING ("X" AND "Z"), ACCEPTABLE DRILLING ANGLES CAN VARY FROM 30 TO 60 DEGREES FROM THE CONCRETE SUBSTRATE AND INTERCEPTION SHALL BE WITHIN THE CENTER THIRD OF ELEMENT THICKNESS. PORT-TO-PORT SPACING SHOULD NEVER EXCEED THE CONCRETE ELEMENT THICKNESS. CONTACT SME FOR ANY EXCEPTIONS.
7. DRILLING CAN BE PERFORMED FROM ONE SIDE OF CRACKS OR CAN BE ALTERNATING BACK-IN-FORTH PATTERN (STITCHING PATTERN).
8. NEVER DRILL DIRECTLY INTO CRACK TAIL UNDER ANY CIRCUMSTANCES FOR INTERCEPTION GROUTING UNLESS APPROVAL IS GIVEN BY SME.
9. EXAMINE AREA FOR OVERHEAD CLEARANCE AND DETERMINE IF LONG DRILL BITS ARE REQUIRED TO PERFORM THE WORK. LONG BITS MAY REQUIRE ADDITIONAL LEAD TIME FOR PROCUREMENT.

- ⊖ = DRILL HOLE ANGLE FROM SUBSTRATE
- W = CRACK WIDTH
- Z = DRILL HOLE SPACING ALONG CRACK = 3 INCHES
- X = DRILL HOLE DISTANCE OUT FROM CRACK = 3 INCHES
- Y = DRILL HOLE DIAMETER
- t = CONCRETE SECTION THICKNESS
- H = DRILL HOLE LENGTH + 0.10H



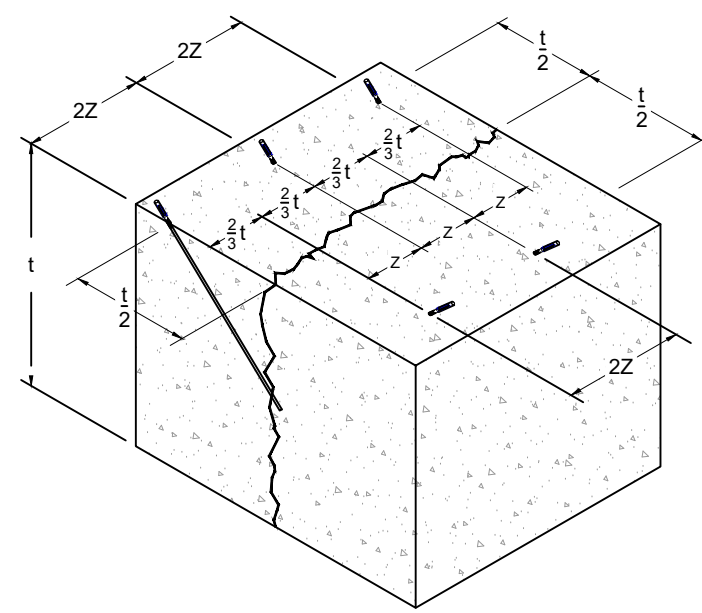
A SECTION
Scale 1/2"=1'-0"

B SECTION
Scale 1/2"=1'-0"



THIS IS AN ELEVATION VIEW OF A WALL CRACK. START MARKING DRILL HOLES 4" FROM FLOOR AND PROCEED UPWARDS A DISTANCE "Z" APART FROM EACH OTHER. IF STITCHING PATTERN IS USED TO MARK DRILL HOLES, THE SAID HOLES ARE 2Z APART FROM EACH OTHER MEASURED FROM ONE SIDE ONLY

2 ELEVATION OF WALL CRACK
MARK ALTERNATING HOLES ALONG CRACK
Scale 1/2"=1'-0"



C Z = PORT-TO-PORT SPACING

Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP

INJECTION DETAILS

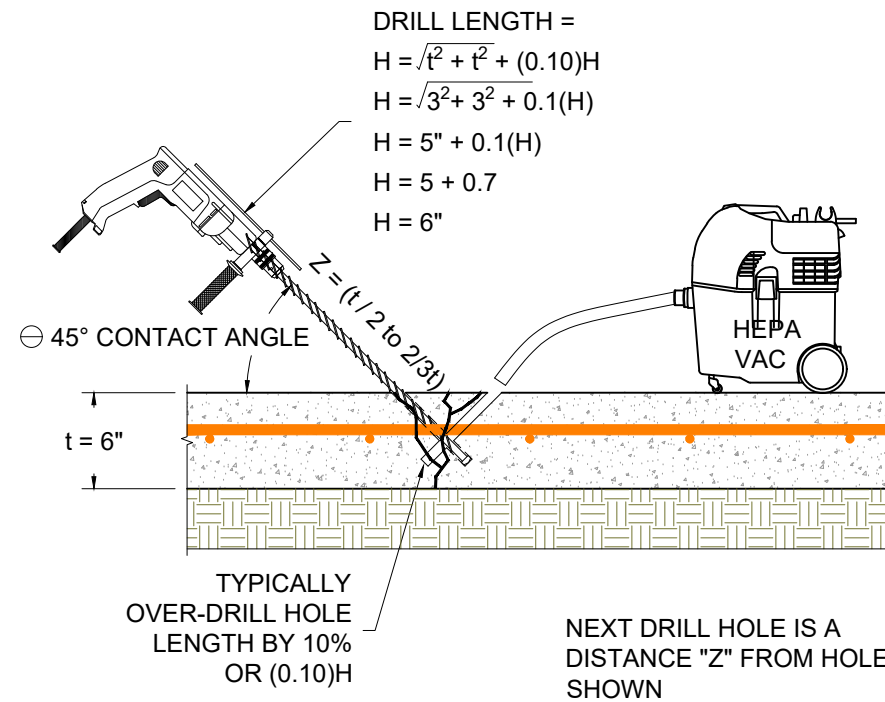
ST JOB NO: 702736
SPS JOB NO: 698217
SHEET: 702736-D03-211

structural TECHNOLOGIES
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
10150 Old Columbia Rd.
COLUMBIA, MD 21046
Phone: 410-850-7000
Fax: 410-850-4111

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

NO.	DATE	ISSUED FOR REVIEW	TB	BY
0	1/23/2026			
NO.	DATE	ISSUED FOR REVIEW	TB	BY

DESIGN BY	BA
DRAWN BY	TB
INVESTIGATED BY	
APPROVED BY	

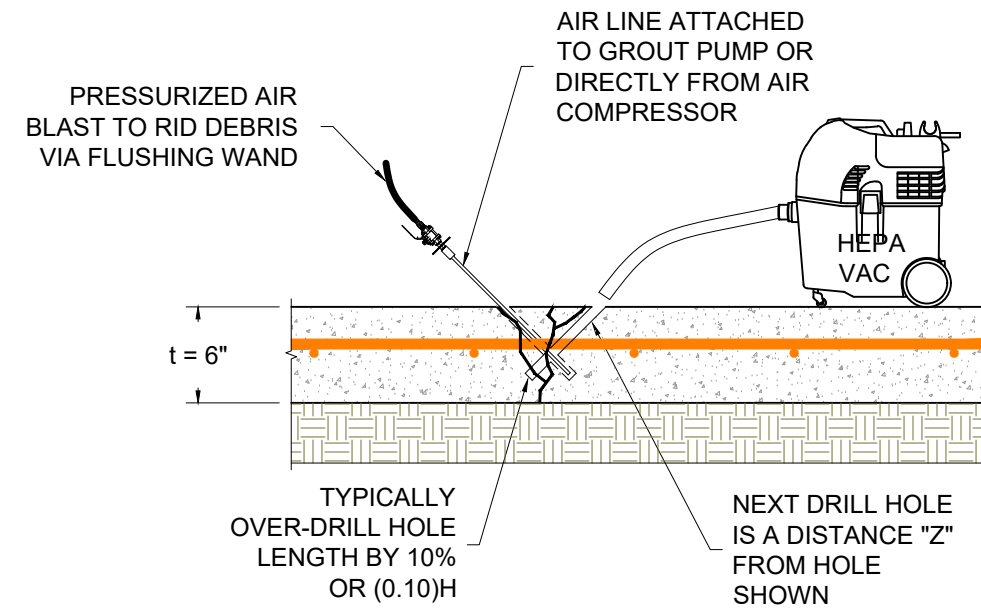


- ⊖ = DRILL HOLE ANGLE FROM SUBSTRATE
- W = CRACK WIDTH
- Z = DRILL HOLE SPACING ALONG CRACK = 3 INCHES
- X = DRILL HOLE DISTANCE OUT FROM CRACK = 3 INCHES
- Y = DRILL HOLE DIAMETER
- t = CONCRETE SECTION THICKNESS
- H = DRILL HOLE LENGTH + 0.10H

NOTES:

1. ENSURE ALL TRADESMEN HAVE PROPER PPE, --- GLOVES, FACE SHIELDS, AND SAFETY GLASSES TO PROTECT FROM AIR-BORNE DRIVEN DRILLING DEBRIS.
2. SET UP HAMMERDRILL EQUIPMENT WITH GFCI ELECTRICAL HOOK-UP.
3. ENSURE ELECTRICAL CORDS DO NOT EXTEND ACROSS PONDED WATER.
4. ENSURE DRILL HOLE DIAMETER TO MATCH WITH PACKERS.
5. USE HAMMERDRILL WITH CLUTCH TO ENSURE REDUCED TORQUE IF BIT JAMMING OCCURS DURING DRILLING DUE TO SUDDEN REINFORCING BAR CONTACT.
6. USE CONTROL JIG ON SLOPES IF NECESSARY TO ENSURE DRILLING AT SPECIFIED ANGLES TO THE SUBSTRATE.
7. MANAGE DRILL HOLE DEBRIS AND COMPLY WITH SITE SPECIFIC OSHA DUST CONTROL. USE HEPA VACUUMS AND WATER MISTING PROTOCOLS AS NEEDED.
8. USE PROGRESSING LENGTH DRILL BITS WHEN NECESSARY.
9. DRILL BIT DIAMETER CAN VARY ALONG DRILL HOLE PATH. ACCEPTABLE DRILL HOLE DIAMETERS CAN VARY BETWEEN (1/4 TO 3/4) INCHES.
10. IF DRILL HOLE CONTACTS STEEL REINFORCING, CONSIDER SMALLER DIAMETER DRILL BIT OR MOVE DIAGONALLY AND REDRILL HOLE.
11. REDRILLING CONSIDERATIONS --- NOTE THE FOLLOWING:
 - 11.1. IF STEEL REBAR INTERRUPTS DRILL HOLE SPACING -- MOVE TO A NEW HOLE LOCATION ± ONE TO FOUR (1 TO 4) INCHES IN ANY DIRECTION, NOTE THE LOCATION IN FIELD LOGBOOK.
 - 11.2. MARK ANY DEAD HOLES ON CONCRETE SUBSTRATE IMMEDIATELY.
 - 11.3. DEAD DRILL HOLES SHALL BE FILLED WITH HIGH STRENGTH CEMENTITIOUS GROUT IN FOUR INCH LIFTS AND DRY-PACKED WITH WOODEN DOWEL.
12. THIS SPECIFICATION IS BASED ON 5/8 INCH DRILL HOLE DIAMETERS.
13. NOTE IF ANY VOIDS OR IRREGULARITIES ARE OBSERVED DURING DRILLING OPERATIONS, RECORD IN LOGBOOK.
14. IF VOID(S) ARE ENCOUNTERED SET UP BORESCOPE WITH LIGHT AND SCREEN, DROP-DOWN OR PUSH INTO DRILL HOLE. AND NOTE ITEMS IN LOGBOOK.
15. NEVER DRILL DIRECTLY INTO CRACK TAIL UNDER ANY CIRCUMSTANCES FOR INTERCEPTION GROUTING UNLESS APPROVAL IS GIVEN BY SME.

3 **DRILLING TO INTERCEPT CRACK(S)**
Scale 1/2"=1'-0"



NOTES:

1. ENSURE ALL TRADESMEN HAVE PROPER PPE, GLOVES, FACE SHIELDS, AND SAFETY GLASSES TO PROTECT FROM AIR-BORNE DRIVEN DRILLING DEBRIS.
2. SET UP HEPA OR SHOP VACUUM FOR REMOVING DUST FROM DRILL HOLES.
3. ATTACH METAL TUBE TO END OF VACUUM LINE AND INSERT INTO DRILL HOLES.
4. SET UP METAL TUBE AS AIR FLUSHING WAND FOR PRESSURIZED DUST REMOVAL FROM DRILL HOLES IF VACUUM / SUCTION IS NOT USED.
5. ATTACH AIR FLUSHING WAND TO AIR LINE FROM AIR-COMPRESSOR OR FROM AIR AT GROUT PUMP HOOK-UP.
6. REMOVE ALL DUST AND DRILLING DEBRIS FROM DRILL HOLES.

4 **AIR FLUSHING CRACK(S)**
Scale 1/2"=1'-0"

Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP

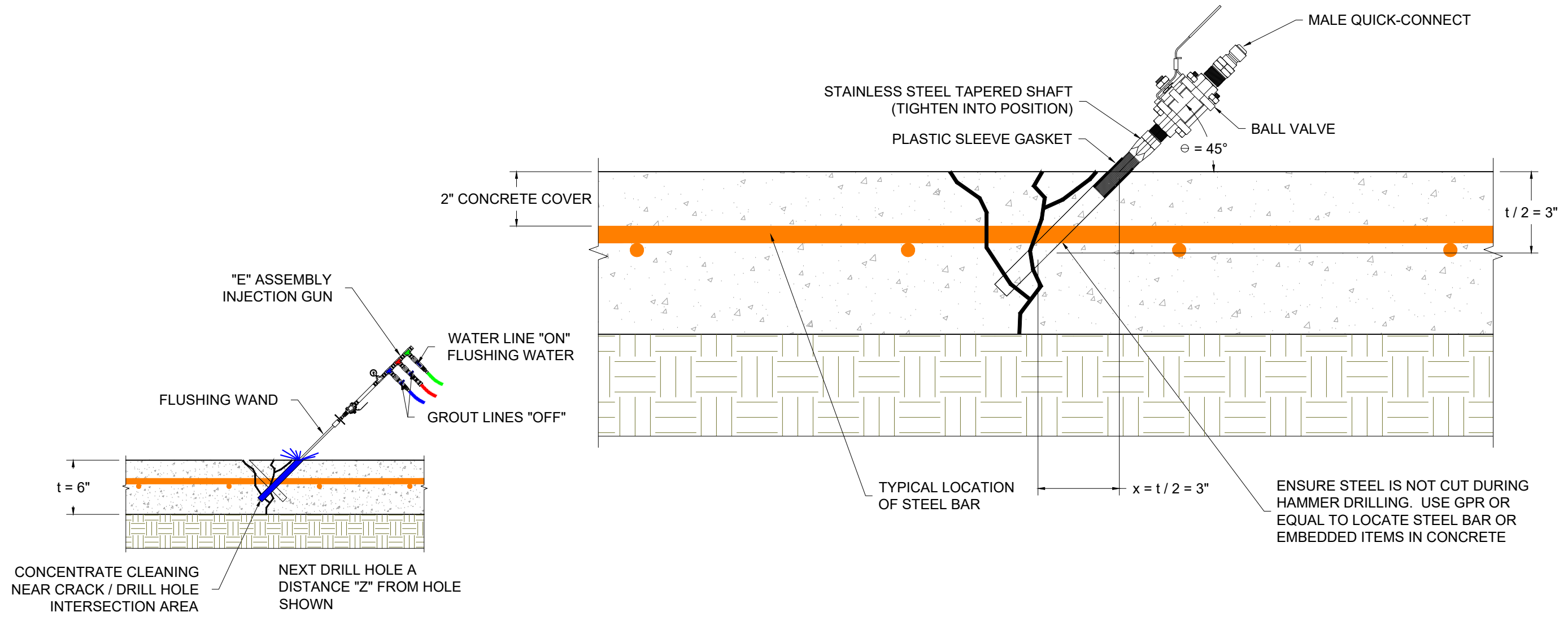
INJECTION DETAILS

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

structural TECHNOLOGIES
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
10150 Old Columbia Rd.
COLUMBIA, MD 21046
Phone: 410-850-7000
Fax: 410-850-4111

DESIGN BY: BA
DRAWN BY: TB
ISSUED FOR REVIEW: TB
DATE: 1/23/2026
NO. 0
REVISIONS: BY

ST JOB NO: 702736
SPS JOB NO: 698217
SHEET: 702736-D03-212



- NOTES:
- ENSURE ALL TRADESMEN HAVE PROPER PPE, GLOVES, FACE SHIELDS, AND SAFETY GLASSES ON TO PROTECT FROM AIR-BORNE / DRIVEN DRILLING DEBRIS.
 - CONNECT FLUSHING WAND TO "E" ASSEMBLY INJECTION GUN WITH END AND LATERAL HOLES NEAR TIP FOR FLUSHING DRILL HOLE ENDS AND SIDES WITH HIGH PRESSURE WATER.
 - WATER FLUSH WITH A MINIMUM OF 400 PSI GAUGE.
 - SET UP METAL TUBE AS AIR FLUSHING WAND FOR PRESSURIZED DUST REMOVAL
 - REMOVE ALL DUST AND DRILLING DEBRIS FROM DRILL HOLES.
 - NOTE THE FOLLOWING:
 - DURING HAMMER DRILLING INJECTION HOLES PULVERIZED CONCRETE DEBRIS BUILDS UP ON THE DRILL HOLE SIDEWALLS. THIS PULVERIZED MATERIAL GETS PRESSED INTO THE CRACK WHERE THE TWO INTERSECT EACH OTHER.
 - HIGH PRESSURE WATER REMOVES THAT DEBRIS WHICH LODGES INTO THE CRACK INTERFACE.

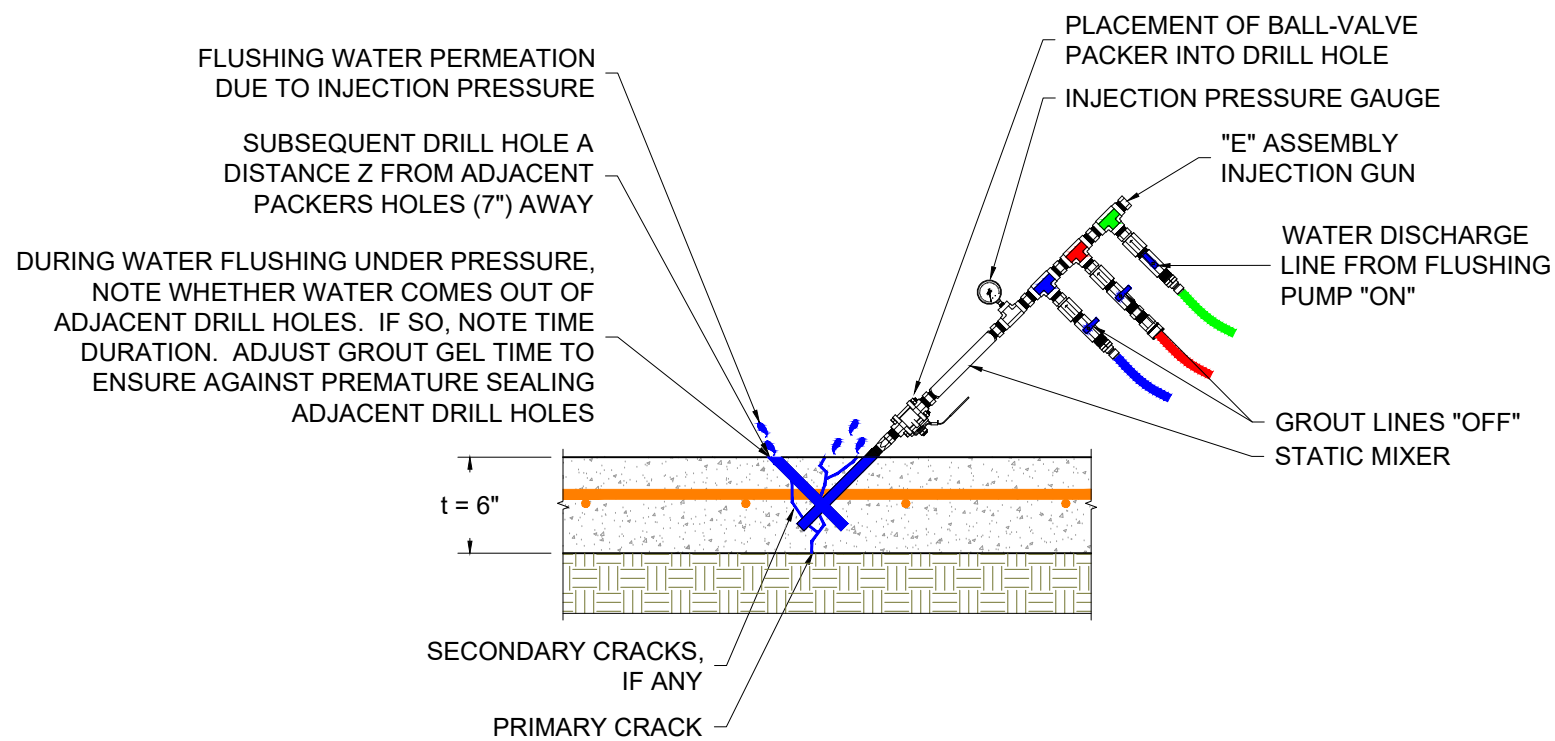
- NOTES:
- INJECTION PACKERS COME IN NUMEROUS FRICTION FORMING CONFIGURATIONS AND ONE MADE WITH VARIOUS METAL AND PLASTIC COMPONENTS, ACCEPTABLE UNITS ARE AS FOLLOWS:
 - CARBON STEEL, TAPERED, COARSE THREAD, SCREW-IN SHAFT, WITH BALL-VALVE AND 3/8 INCH DIAMETER HYDRAULIC QUICK-CONNECT FITTING.
 - THESE INJECTION PACKERS CAN BE MADE OF PLASTIC, STAINLESS STEEL, ALUMINUM, OR BRASS, COMPONENTS.
 - THESE INJECTION PACKERS CAN BE MADE TO FIT 3/8 TO 1.5 INCH DRILL HOLES, AND
 - THESE PACKERS CAN BE FABRICATED WITH CAM-LOCK FITTINGS, ONE-WAY CHECK VALVES, OR ZERK, AND BUTTON, HEADS.
 - EXPANDABLE RUBBER GASKET ON HOLLOW SHAFT CONNECTED TO A BUTTON OR GREASE ZERK HEAD END.
 - THESE INJECTION PACKERS CAN BE FABRICATED WITH VARIOUS DIAMETERS, LENGTHS, AND MATERIALS, RANGING FROM PLASTIC TO STAINLESS STEEL DEPENDING UPON STRENGTH AND CHEMICAL RESISTANCE CRITERIA.
 - UNACCEPTABLE UNITS ARE AS FOLLOWS:
 - SMOOTH WALL PLASTIC SHAFT WITH GREASE ZERK HEAD ARE HAMMERED OR TAPPED INTO DRILL HOLES. THESE PACKERS ARE NOT RECOMMENDED FOR PRESSURES OVER 100 PSI GAUGE.
 - THIS SPECIFICATION IS BASED ON A STAINLESS-STEEL INJECTION PACKER ASSEMBLY CONSISTING OF A COARSE THREADED TAPERED SHAFT STEM, CONNECTED TO A BALL-VALVE, WHICH CONNECTS TO A 3/8 INCH NATIONAL PIPE THREAD (NPT) HYDRAULIC QUICK CONNECT FITTING.
 - AFTER DRILLING DEBRIS REMOVAL FROM DRILL HOLE, PLACE INJECTION PACKER RECEIVING HARDWARE INTO 5/8 INCH DIAMETER DRILL HOLE WITH A 5/8 INCH DIAMETER PLASTIC SLEEVE.
 - PUSH AND SPIN THE INJECTION PACKER INTO DRILL HOLE. USE WRENCH TO TIGHTEN INTO PLACE.
 - OPEN BALL VALVE AFTER PACKER IS IN PLACE.

6 WATER FLUSHING DRILL HOLES
Scale 1/2"=1'-0"

7 INJECTION PACKER MATERIAL & INSTALLATION
Scale 3"=1'-0"

Safety Related Augmented Quality Non-Safety Related

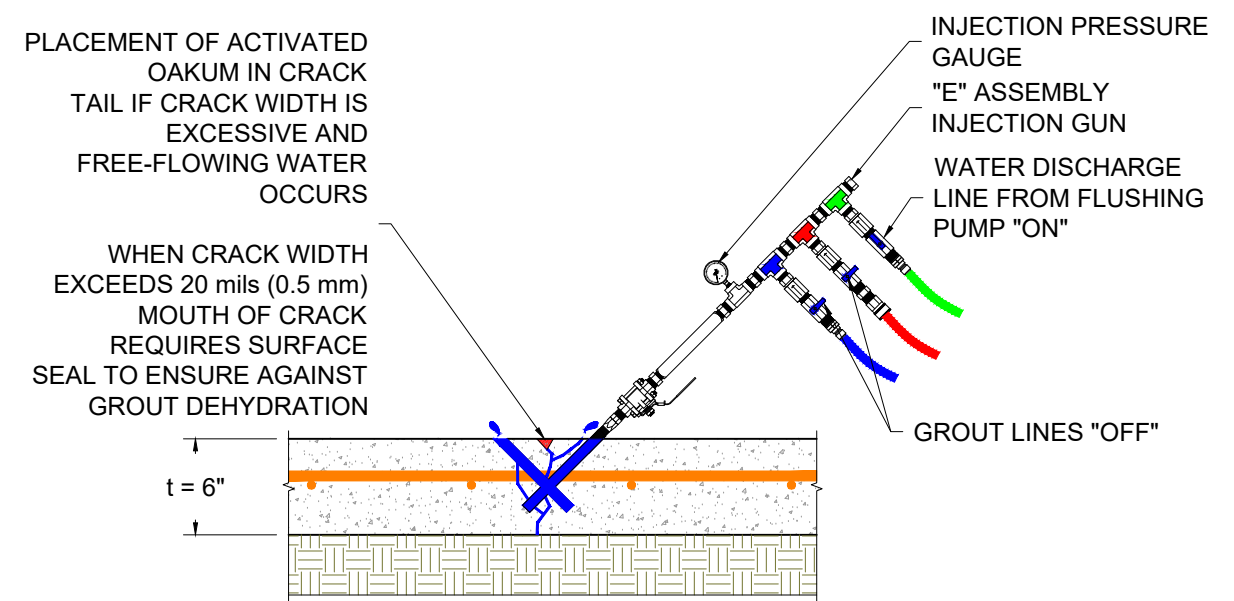
ST SHELL NORCO ALKY SUMP		INJECTION DETAILS	
ST JOB NO:	702736	ISSUED FOR REVIEW	TB
SPS JOB NO:	698217	NO.	NO.
SHEET:	702736-D03-214	DATE	REVISIONS
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-650-7000 Fax: 410-650-4111		DESIGN BY: BA DRAWN BY: TB INVENTED BY: IV APPROVED BY: APP	



NOTES:

1. ENSURE ALL PPE REQUIREMENTS ARE MET, PARTICULARLY THE EYE PROTECTION PROTOCOLS, ENSURE EYE WASH STATION IS IN CLOSE PROXIMITY TO WORK ZONE.
2. FABRICATE ENDS OF AIR LINES WITH BALL-VALVE AND HYDRAULIC QUICK-CONNECT ASSEMBLY FOR USE IN AIR TESTING DRILL HOLES AND CLEANING / FLUSHING.
3. HOOK UP AIR LINE FROM COMPRESSOR TO INJECTION PACKER QUICK CONNECT HARDWARE, OPEN VALVES AND BLAST 100 PSI GAUGE FOR 10 SECONDS INTO DRILL HOLE. OBSERVE WHETHER CONTINUITY BETWEEN DRILL HOLE AND CRACK EXIST. CONTRACTOR MAY PLACE WATER IN DRILL HOLE PRIOR TO AIR TESTING.
4. DISCONNECT AIR LINE, HOOK UP "E" ASSEMBLY TO INJECTION PACKER QUICK CONNECT, OPEN FLUSHING PUMP LINES AND PUMP WATER INTO PACKER AT 400 PSI GAUGE FOR 20 SECONDS OR MORE, ENSURE WATER COMES OUT FACE OF CRACK AND EXTENDS APPROXIMATELY 7 INCHES IN BOTH DIRECTIONS.
5. IF NO WATER OR AIR BUBBLES ARE EVIDENT ON CRACK TAIL, THE DRILL HOLE MAY HAVE MISSED THE CRACK AND THE HOLE IS CURRENTLY "DEAD." PERFORM THE FOLLOWING:
 - 5.1. REMOVE INJECTION PACKER AND DRILL DEEPER HOLE TO POTENTIALLY INTERCEPT THE CRACK,
 - 5.2. REPEAT DRILL HOLE FLUSHING AND PACKER INSTALLATION PROCESS,
 - 5.3. IF DRILL HOLE AND CRACK DO NOT SHOW ANY SIGNS THAT THE HOLE AND CRACK HAVE INTERSECTED, MOVE DIAGONALLY AND REPEAT THE PROCESS OF DRILLING THE NEW INJECTION HOLE AND REPEAT THE FLUSHING PROCESS.
6. IF WATER IS NOT EVIDENT AT CRACK, HOOK UP AIR PRESSURE AGAIN AND PUMP AIR BEHIND THE WATER THAT WAS PREVIOUSLY INJECTED. AIR BUBBLES SHOULD APPEAR ON THE SURFACE.
7. IF SOIL PARTICLES OR MINERAL DEPOSITS FLOW FROM THE CRACK DURING AIR OR WATER FLUSHING, CONTINUE UNTIL WATER FLUSHING SHOWS NO SIGNS OF DEBRIS MOVEMENT.
8. AFTER ALL DRILL HOLES SHOW EVIDENCE OF WATER MOVEMENT THROUGH TAIL OF CRACK, CHEMICAL GROUT INJECTION CAN PROCEED.

8 **WATER TESTING DRILL HOLES FOR CONTINUITY**
Scale 1/2"=1'-0"

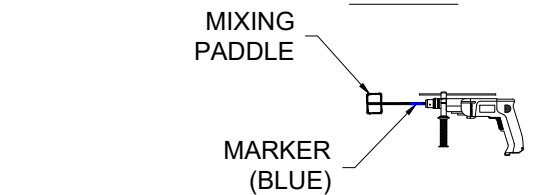
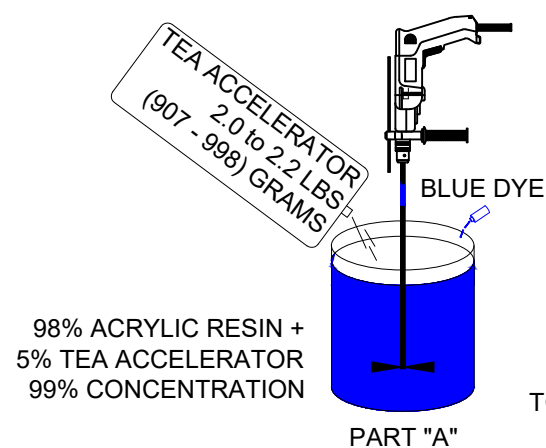


NOTES:

1. FOUR TYPICAL CONDITIONS ARISE WHEN PERFORMING CRACK INJECTION:
 - 1.1. THE CRACK IS DRY AND NARROW,
 - 1.1.1. THESE CONDITIONS SHOULD ALLOW ADJUSTMENT IN MATERIAL TEMPERATURE OF RESIN AND WATER, AND / OR TEA AND OXIDIZER (SP) PERCENTAGES TO INCREASE OR DECREASE GEL TIME.
 2. THE CRACK IS DRY AND WIDE,
 - 2.1. IF TEMPERATURE AND / OR REACTANT PERCENTAGES CANNOT ACCOMPLISH GEL TIME REQUIREMENTS, INSTALL EPOXY PASTE OVER TAIL OF CRACK WITH OR WITHOUT OPEN PORTS TO CONTAIN AND MONITOR GROUT FLOW.
 3. THE CRACK IS WET (FLOWING WATER TO VARIOUS DEGREES) AND NARROW,
 - 3.1. IF TEMPERATURE AND / OR REACTANT PERCENTAGES CANNOT ACCOMPLISH GEL TIME REQUIREMENTS, INSTALL FAST SETTING HYDRAULIC CEMENT OVER TAIL OF CRACK TO CONTAIN WATER.
 4. THE CRACK IS WET (FLOWING WATER TO SOME DEGREE) AND WIDE.
 - 4.1. IF TEMPERATURE AND / OR REACTANT PERCENTAGES CANNOT ACCOMPLISH GEL TIME REQUIREMENTS:
 - 4.1.1. INSTALL FAST SETTING HYDRAULIC CEMENT OVER TAIL OF CRACK, OR
 - 4.1.2. CHIP OR CUT TAIL OF CRACK OPEN ENOUGH TO INSTALL ADDITIONAL HYDRAULIC CEMENT OR PLACE OAKUM ROPE SOAKED IN HYDROPHILIC POLYURETHANE GROUT INTO TAIL OF CRACK, OR
 - 4.1.3. EXTREME WATER FLOW CONDITIONS MAY REQUIRE CONTRACTOR TO DRILL IN BYPASS HOLES AT VARIOUS SPACINGS TO ALLOW SOME WATER FLOW DURING INJECTION. THESE BYPASS HOLES WOULD BE INJECTED AS A NEXT STEP IN THE PROCESS.
5. IF ALL METHODS FAIL TO ALLOW PROPER INJECTION PROTOCOLS, CONTACT SME FOR ASSISTANCE.

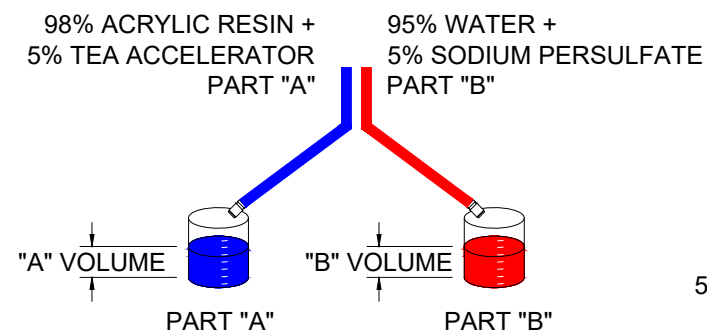
9 **EXCESSIVE LEAKAGE FROM CRACK MOUTH**
Scale 1/2"=1'-0"

DESIGN BY	DRAWN BY	CHECKED BY	ISSUED FOR REVIEW	DATE	NO.	REVISIONS	BY
BA	TB		0	1/23/2026			TB
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-850-7000 Fax: 410-850-4111							
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.							
Safety Related <input type="checkbox"/>	Augmented Quality <input type="checkbox"/>	Non-Safety Related <input type="checkbox"/>					
SHELL NORCO ALKYL SUMP							
INJECTION DETAILS							
ST JOB NO:				702736			
SPS JOB NO:				698217			
SHEET:				702736-D03-215			

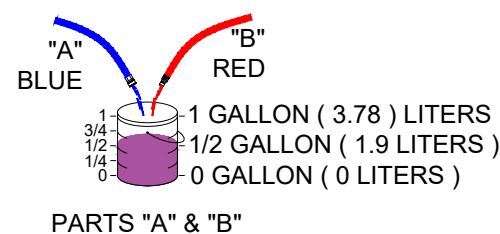


A "A" COMPONENT
 CRACK / JOINT INJECTION
 MIXING / FORMULATING A & B COMPONENTS

B "B" COMPONENT
 CRACK / JOINT INJECTION
 MIXING / FORMULATING A & B COMPONENTS

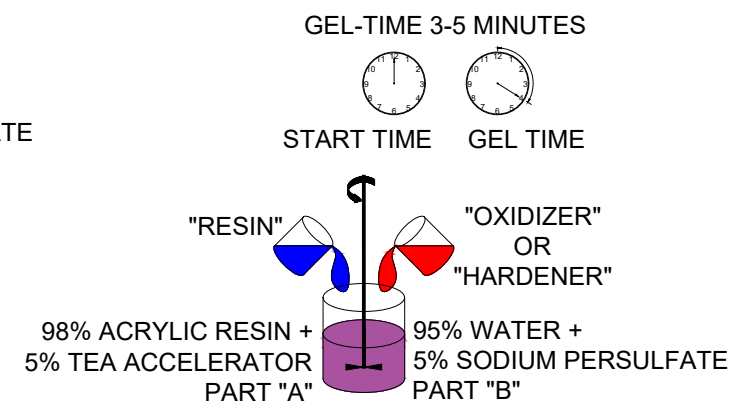


C RATIO CHECK
 CRACK / JOINT INJECTION
 QA/QC 1-to-1 RATIO

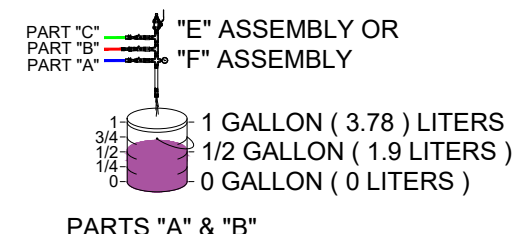


* NOTE: TO BE DONE WITH THE MATERIAL IN USE

E STROKE COUNT TO EQUAL 1 GALLON
 UNRESTRICTED



D GEL TIME CHECK
 CRACK / JOINT INJECTION
 GEL TIME CHECK



* NOTE: TO BE DONE WITH THE MATERIAL IN USE

F STROKE COUNT TO EQUAL 1 GALLON
 RESTRICTED

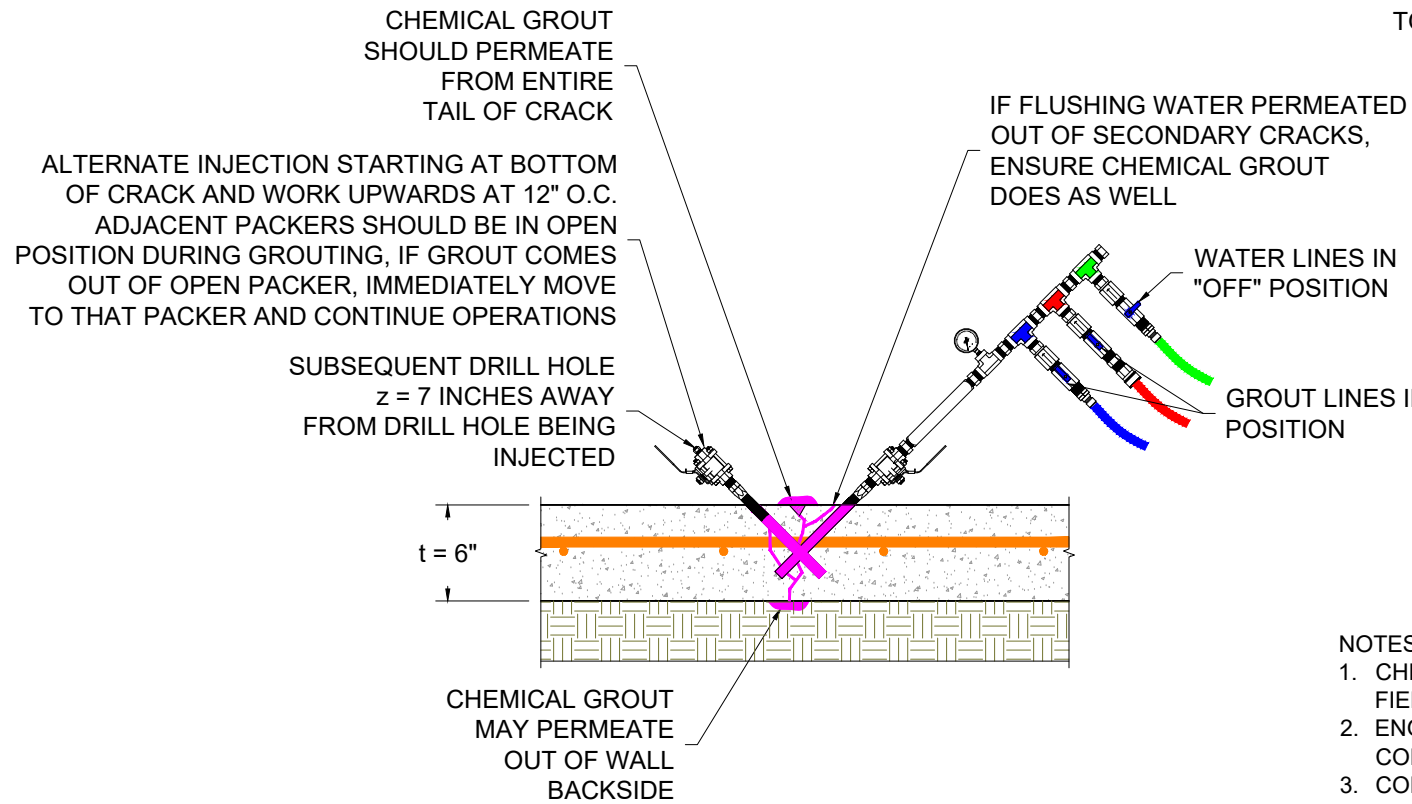
NOTES:

- PERFORM THE FOLLOWING TESTS PER MIXING INSTRUCTION SHOP DRAWINGS:
- GEL-TIME TEST,
- PART "A" & PART "B" RATIO CHECK, AND
- VOLUME PER PUMP STROKE CALCULATION TESTS.
- RUN WATER THROUGH ALL LINES TO ENSURE NO BLOCKAGE EXISTS.
- ENSURE "E" ASSEMBLY IS IN GOOD WORKING ORDER, PRESSURIZE CHECK VALVES.
- ACRYLIC POLYMER GROUT PRESSURES WILL BE IN THE RANGE OF (100 TO 700) PSI GAUGE, EXCESSIVE GROUT PRESSURE (IN EXCESS OF 750 PSI) WILL POTENTIALLY FRACK THE CONCRETE OR POTENTIALLY LEAK OUT OF THE PACKER, MONITOR THE SITUATION.
- ACRYLIC POLYMER GROUT PRESSURES EXCEEDING 500 PSI GAUGE MAY BE INDICATIVE OF INJECTION INTO PREVIOUSLY INJECTED CRACK.
- ACRYLIC POLYMER PUMP GROUT RATE SHALL NOT EXCEED 1/4 GALLONS PER MINUTE, ACCELERATED RATES WILL POTENTIALLY FRACK THE CONCRETE.
- GROUT QUANTITIES MAY VARY BECAUSE CRACK WIDTH AND AGGREGATE INTERLOCK CAN VARY WITH DEPTH ALONG THE CONCRETE ELEMENT WIDTH AND LENGTH.
- NOTE THAT IF GEL TIME IS 2 TO 5 MINUTES, MIXED GROUT IN INJECTION GUN COMPONENTS, STATIC MIXER, AND / OR PACKER WILL STIFFEN (INCREASE IN VISCOSITY) IN THAT TIME PERIOD, FLUSH INJECTION GUN AS REQUIRED TO ENSURE FLOW.
- WHEN EVERYTHING IS WORKING CORRECTLY, ENSURE GROUT HOSE AND INJECTION HEAD ASSEMBLY EXTENDS TO WORK ZONE.

10 MIXING CHEMICAL GROUT IN 5-GALLON PAILS
 Scale 1/2"=1'-0"

11 CHEMICAL GROUTING PROCEDURES AND INJECTION
 Scale 1/2"=1'-0"

DESIGN BY	BA	DATE	NO.	ISSUED FOR REVIEW	REVISIONS
DRAWN BY	TB	DATE	NO.	ISSUED FOR REVIEW	REVISIONS
INVESTIGATED BY		DATE	NO.	ISSUED FOR REVIEW	REVISIONS
APPROVED BY		DATE	NO.	ISSUED FOR REVIEW	REVISIONS
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-650-7000 Fax: 410-650-4111					
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.					
Safety Related <input type="checkbox"/>		Augmented Quality <input type="checkbox"/>		Non-Safety Related <input type="checkbox"/>	
SHELL NORCO ALKY SUMP		INJECTION DETAILS			
ST JOB NO: 702736					
SPS JOB NO: 698217					
SHEET: 702736-D03-216					



NOTES:

1. ENSURE ALL TRADESMEN HAVE PROPER PPE, GLOVES, FACE SHIELDS, BOOTS, AND SAFETY GLASSES IN PLACE DURING LOW-OR-HIGH-PRESSURE INJECTION.
2. ENSURE ALL TRADESMAN ARE TRAINED IN THE BASIC PROCEDURES FOR INJECTION GROUTING OF CONCRETE CRACKS.
3. ENSURE THE FOLLOWING:
 - 3.1. ALL MIXING INSTRUCTIONS ARE FOLLOWED,
 - 3.2. PROPER GEL TIME IS ESTABLISHED,
 - 3.3. THE PUMP IS ON 1-TO-1 RATIO, AND
 - 3.4. THE STROKE COUNT TO VOLUME IS KNOWN,
4. ATTACH E-ASSEMBLY TO INJECTION PACKER, OPEN PACKER VALVE, PERFORM THE FOLLOWING:
 - 4.1. OPEN AIR REGULATOR VALVE TO SUPPLY AIR PRESSURE TO GROUT PUMP,
 - 4.2. START AIR PRESSURE SUCH THAT GROUT DISCHARGE LINES READ 100 PSI GAUGE, CONTINUE AT THIS PRESSURE UNTIL PUMP PISTONS STOP,
 - 4.3. INCREASE PUMP PRESSURE IN 100 PSI INCREMENTS UNTIL GROUT FLOWS FROM MOUTH OF CRACK, DO NOT EXCEED 700 PSI GAUGE.
 - 4.4. ENSURE GROUT FLOW IS DETERMINED HALFWAY OR MORE TO ADJACENT PACKERS,
 - 4.5. IF GEL TIME IS TOO LONG, EXCESSIVE GROUT LEAKAGE MAY OCCUR OUT OF CRACK MOUTH, GEL TIME MAY REQUIRE ADJUSTMENT.
 - 4.6. CONTINUE UP CRACK LENGTH, CLOSE PACKERS AS REQUIRED.
 - 4.7. REMEMBER THAT IF A PAUSE IN GROUTING OCCURS, THE GROUT WILL GEL IN THE E-ASSEMBLY IF NOT FLUSHED OUT WITH WATER IN A TIMELY MANNER.

ALTERNATE INJECTION STARTING AT BOTTOM OF CRACK AND WORK UPWARDS AT 7" O.C. ADJACENT PACKERS SHOULD BE IN OPEN POSITION DURING GROUTING, IF GROUT COMES OUT OF OPEN PACKER, IMMEDIATELY MOVE TO THAT PACKER AND CONTINUE OPERATIONS

IF FLUSHING WATER PERMEATED OUT OF SECONDARY CRACKS, ENSURE CHEMICAL GROUT DOES AS WELL

WATER LINES IN "OFF" POSITION

GROUT LINES IN "ON" POSITION

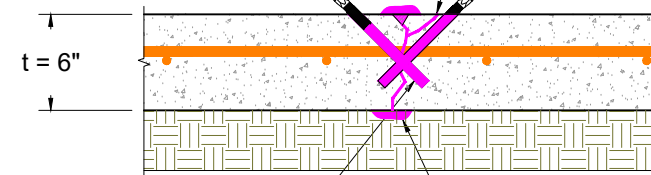
SUBSEQUENT DRILL HOLE z = 3 INCHES AWAY FROM DRILL HOLE BEING INJECTED

IF FLUSHING WATER PERMEATED OUT OF SECONDARY CRACKS, ENSURE CHEMICAL GROUT DOES AS WELL

WATER LINES IN "OFF" POSITION

GROUT LINES IN "ON" POSITION

CHEMICAL GROUT MAY PERMEATE OUT OF WALL BACKSIDE



NOTES:

1. CHEMICAL GROUTING IS A PROCESS THAT INVOLVES BOTH ENGINEERING DESIGN AND JUDGEMENT BY TRADESMEN IN THE FIELD BASED ON ACTUAL CONDITIONS.
2. ENGINEERING DESIGN INVOLVES ESTABLISHING CERTAIN CRITERIA TO ENSURE A QUALITY INSTALLATION, HOWEVER, CONDITIONS IN THE FIELD MAY DEMAND FROM TIME-TO-TIME THAT VARIANCE FROM ENGINEERING DESIGN IS REQUIRED.
3. COMMON FIELD JUDGEMENTS TO BE MADE AND VERIFIED BY ENGINEERING:
 - 3.1. PORT-TO-PORT SPACING (Z DISTANCE) - OBSTRUCTIONS WHICH CANNOT BE MOVED THAT INTERFERE WITH THE DRILL HOLE PATTERN MAY REQUIRE ADJUSTMENTS IN SPACING. THE GOAL WOULD BE TO KEEP "Z" LESS THAN "t".
 - 3.2. (DISTANCE X) FROM CRACK OR JOINT - SIMILAR TO 3.1 ABOVE, OBSTRUCTIONS MAY REQUIRE ADJUSTMENTS TO THE DISTANCE "X" FROM THE CRACK TO DRILL HOLE.
 - 3.3. DRILL HOLE ANGLE FROM SUBSTRATE - SIMILAR TO 3.1 ABOVE, OBSTRUCTIONS MAY REQUIRE ADJUSTMENTS TO THE DRILLING ANGLE "θ" FROM THE CONCRETE ELEMENT SUBSTRATE TO DRILL HOLE DIRECTION.
 - 3.4. WATER TESTING PRESSURES - THE GOAL IS TO KEEP WATER TESTING PRESSURES LESS THAN THE THEORETICAL RUPTURE STRENGTH OF CONCRETE. THE RUPTURE STRENGTH OF CONCRETE VARIES BETWEEN 7.5 TO 12 TIMES THE SQUARE ROOT OF CONCRETE COMPRESSIVE STRENGTH f_c , WHICH IS 450 TO 720 PSI GAUGE PRESSURE FOR 3,500 PSI COMPRESSIVE STRENGTH CONCRETE.
 - 3.5. VOLUMETRIC QUANTITY OF GROUT PER HOLE - CRACK INJECTION TYPICALLY CONSUMES APPROXIMATELY 1/8 TO 3/8 GALLONS PER LINEAL FOOT OF CRACK LENGTH. DRILL DIAMETER "Y", DRILL LENGTH "H", CRACK WIDTH "W", AND CONCRETE ELEMENT THICKNESS "t", DICTATE UNIT GROUT VOLUME CONSUMPTION.
 - 3.6. VOLUMETRIC RATE OF INJECTION - ENVIRONMENTAL TEMPERATURES OF CONCRETE AND GROUT MATERIALS MAY REQUIRE ADJUSTMENTS IN GEL TIME TO MINIMIZE GROUT LOSS FROM TAIL OF CRACK. DO NOT HEAT WATER OR RESIN TO TEMPERATURES ABOVE 120° F WITHOUT SME APPROVAL. PUMPING RATE OR GEL TIME ADJUSTMENTS CAN BE MADE TO MINIMIZE GROUT LOSS FROM CRACK TAIL.
 - 3.7. MAXIMUM ALLOWABLE PRESSURE - CHEMICAL GROUT PRESSURES WILL VARY CONSIDERABLY DUE TO CRACK WIDTH, GROUT VISCOSITY, GEL TIME, AND CONCRETE WALL ELEMENT THICKNESS.
 - 3.8. EXCESSIVE GROUT LOSS FROM HOLE DURING INJECTION -- IS INFLUENCED BY ITEMS NOTED IN 3.7 ABOVE.
4. IF IN THE EVENT CRACK TAKES WATER AND WILL NOT TAKE GROUT AT SIMILAR PRESSURES, CONTACT SME FOR DISCUSSION.
5. IF EXCESSIVE MATERIAL CONSUMPTION SEEMS TO BE OCCURRING, NOTE THE FOLLOWING:
 - 5.1. THE CHEMICAL GROUT HAS FOUND A POROUS MEDIUM TO BYPASS THE CRACK, THESE MAY INCLUDE:
 - 5.1.1. AN UNKNOWN CONDUIT / PIPE WITHIN THE CONCRETE ELEMENT,
 - 5.1.2. AN UNKNOWN EXPANSION MATERIAL THAT COMPRESSES UNDER PRESSURE,
 - 5.1.3. A LARGE VOID UNDER OR BEHIND THE STEEL BAR OR POST TENSIONED STRAND WITHIN THE CONCRETE ELEMENT,
 - 5.1.4. EXCESSIVE LEAKAGE IS OCCURRING OUT THE BACKSIDE OF CRACK.
6. CONTACT SME FOR ANY UNUSUAL CONDITIONS DURING GROUTING PROTOCOLS.
7. OUR ESTIMATE ASSUMES 1/2 GALLON PER LINEAL FOOT OF CRACK. IF GROUT CONSUMPTION EXCEEDS 3/4 GALLON PER FOOT; CEASE INJECTION AND CONTACT ENGINEERING SME.

Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP

INJECTION DETAILS

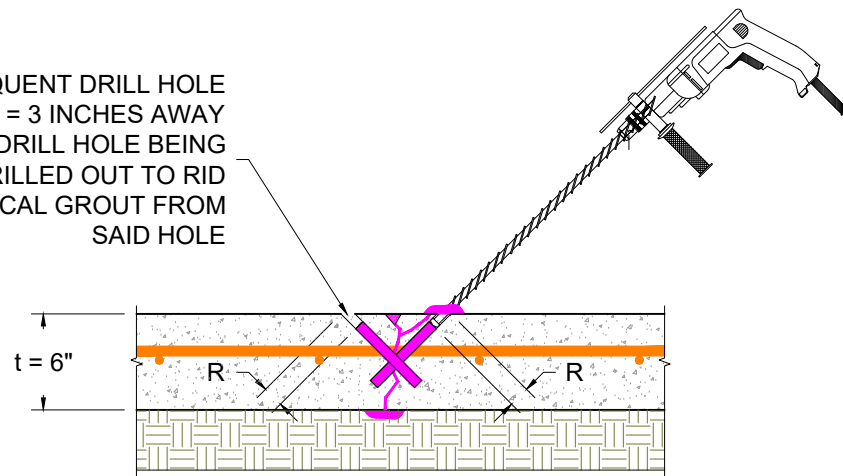
ST JOB NO: 702736
SPS JOB NO: 698217
SHEET: 702736-D03-217

DESIGN BY	BA	DATE	1/23/2026	NO.	0	ISSUED FOR REVIEW	TB	BY	
DWN BY	TB	DATE		NO.				REVISIONS	
IV BY		DATE		NO.					
APP BY		DATE		NO.					

structural TECHNOLOGIES
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
10150 Old Columbia Rd.
COLUMBIA, MD 21046
Phone: 410-650-7000
Fax: 410-650-4111

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

SUBSEQUENT DRILL HOLE
Z = 3 INCHES AWAY
FROM DRILL HOLE BEING
DRILLED OUT TO RID
CHEMICAL GROUT FROM
SAID HOLE



R = DEPTH OF DRILL HOLE RESTORATION
 $R = t / 2 = 3" / 2 = +/- 2"$ DEEP

NOTES:

1. AFTER COMPLETION OF CHEMICAL GROUT CRACK INJECTION, PERFORM THE FOLLOWING ITEMS:
 - 1.1. REMOVE THE INJECTION PACKER FROM DRILL HOLES VIA REVERSE DIRECTION OF COARSE THREADING.
 - 1.2. PLACE REMOVED PACKER IN BUCKET OF WATER OR REDRILL CURED GROUT OUT OF PACKER HOLLOW SHAFT FOR REUSE.
 - 1.3. DRILL DOWN INJECTION GROUT HOLE TO A DEPTH OF FIVE (5) INCHES AND REMOVE ALL CURED POLYACRYLATE GROUT, A SLIGHTLY OVER SIZED BIT CAN BE USED TO ENSURE GROUT IS REMOVED FROM DRILL HOLE SHAFT.
 - 1.4. USE HIGH PRESSURE WATER FLUSHING WAND (400 PSI GAUGE OR HIGHER) WITH LATERAL HOLE / PERFORATIONS TO RID ALL GROUT DEBRIS FROM DRILL HOLE.

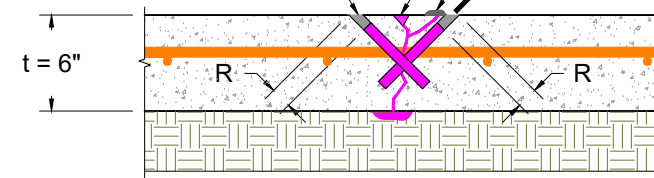
15

DRILL HOLE RESTORATION

Scale 1/2"=1'-0"

PLUG AT PRIMARY CRACK IF WIDTH IS IN EXCESS OF 20 MILS (0.5 mm) WITH HIGH STRENGTH CEMENTITIOUS GROUT
CURED GROUT DEBRIS ARE INERT AND CAN BE DISPOSED OF IN COMMON GARBAGE OR SIMILAR
USE HAMMER & DOWEL TO PACK LAYERS OF HIGH STRENGTH CEMENTITIOUS GROUT TO BE PROVIDED BY DUKE

SCRAPING BY HAND OR ELECTRIC TOOL EXCESS GROUT FROM WALL



NOTES:

1. ENSURE FIVE (5) INCH DEEP ZONE IN DRILL HOLE IS CLEAN, PERFORM THE FOLLOWING OPERATIONS:
 - 1.1. MIX HIGH STRENGTH CEMENTITIOUS MORTAR WITH WATERPROOF ADMIXTURE IN A BUCKET AND PLACE (FIRST LIFT) OF FOUR INCH MORTAR IN DRILL HOLE,
 - 1.2. USE WOOD DOWEL TO COMPACT MORTAR IN PLACE,
 - 1.3. PLACE ANOTHER (SECOND LIFT) OF FOUR INCH MORTAR DOWN DRILL HOLE AND USE WOOD DOWEL TO COMPACT LIFT IN PLACE,
 - 1.4. TOP OFF OR FLUSH SURFACE WITH FINAL INCREMENT OF MORTAR TO COMPLETELY FILL DRILL HOLE,
 - 1.5. USE BRUSH TO GIVE TEXTURED FINISH TO MORTAR SURFACE.

16

COMPLETION OF DRILL HOLE RESTORATION WORK

Scale 1/2"=1'-0"

Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP

INJECTION DETAILS

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410850-7000 Fax: 410850-4111		DESIGN BY	BA	DRAWN BY	TB	ISSUED FOR REVIEW	TB
		IV BY		NO.	0	DATE	1/23/2026
		APP BY		REVISIONS			BY

ST JOB NO: 702736
SPS JOB NO: 698217
SHEET: 702736-D03-218

ACRYLATE CRACK INJECTION:

1. PPE (PERSONAL PROTECTIVE EQUIPMENT) FOR CHEMICAL GROUTING:

1.1. PPE CHECKLIST:

- 1.1.1. PROTECTIVE COVER-ALL'S SHALL BE VAPOR TIGHT AND CHEMICAL RESISTANT.
- 1.1.2. TYPE OF RUBBER GLOVES SHALL BE RATED FOR CHEMICAL EXPOSURE.
- 1.1.3. EYE PROTECTION REQUIREMENTS:
 - 1.1.3.1. SAFETY GLASSES FOR GENERAL USE,
 - 1.1.3.2. GOGGLES FOR CONDITIONS OF INTENSE SPLATTER, BACK-SPRAY, OR VAPOR RELEASE,
 - 1.1.3.3. FACE-SHIELDS TO AUGMENT CASES WHERE EITHER GLASSES OR GOGGLES ARE WORN.
- 1.1.4. EAR PROTECTION REQUIRED DURING HAMMER-DRILLING INJECTION PORT HOLES.
- 1.1.5. HARD HATS REQUIRED WITH CHIN STRAP.
- 1.1.6. TOE PROTECTED SHOES.
- 1.1.7. FIRE RESISTANT CLOTHING (FRC) REQUIRED IN CERTAIN CHEMICAL PLANTS.
- 1.1.8. AIR MONITORING DEVICES (CO₂, O₂, H₂O) REQUIRED IN CERTAIN CHEMICAL PLANTS.
- 1.1.9. DETERMINE RESPIRATOR REQUIREMENTS:
 - 1.1.9.1. SILICA DUST, 3M TYPE P100 PARTICULATE FILTER CARTRIDGE (2091/07000),
 - 1.1.9.2. ORGANIC VAPORS, 3M TYPE 6001CN ORGANIC VAPOR CARTRIDGE.

2. GENERAL JOBSITE SAFETY PROTOCOLS:


- 2.1. VENTILATION CONSIDERATIONS.
 - 2.1.1. OUTSIDE CONDITIONS, OPEN AIR VENTILATION.
 - 2.1.2. INSIDE CONDITIONS, WITH GOOD MECHANICAL VENTILATION.
 - 2.1.3. INSIDE CONDITIONS, MINIMAL MECHANICAL VENTILATION.
- 2.2. WEATHER EXPOSURE:
 - 2.2.1. MATERIALS SHALL NOT BE EXPOSED TO DIRECT SUNLIGHT DURING OPERATION AND EXCESSIVE HEAT.
 - 2.2.2. STORE POLYACRYLATE SOLUTION IN OPAQUE CONTAINERS AND AVOID DIRECT SUNLIGHT EXPOSURE.
 - 2.2.2.1. DIRECT SUNLIGHT (UV EXPOSURE) CAUSES GELLING OF SOLUTION, AND
 - 2.2.2.2. STORAGE TEMPERATURES SHOULD BE BETWEEN (45-80) ° F.
 - 2.2.3. ALWAYS SEPARATE ACCELERATOR AND OXIDIZER ON THEIR OWN PALLETS AND LOCATIONS,
 - 2.2.3.1. DIRECT CONTACT OF OXIDIZER AND ACCELERATOR IS HIGHLY EXOTHERMIC AND POTENTIALLY A SEVERE FIRE HAZARD.
 - 2.2.4. COLD TEMPERATURES DELAY REACTIONS, WARM TEMPERATURES ACCELERATE REACTIONS.
 - 2.2.4.1. ETHYLENE GLYCOL CAN BE ADDED ON EITHER "A" OR "B" SIDE COMPONENTS TO STABILIZE MATERIAL AND LOWER FREEZING POINT (TEMPERATURE).
 - 2.2.5. COLD TEMPERATURES (ABOVE FREEZING) CAN FREEZE (CAUSE ICE BUILDUP) WITHIN AIR MOTORS ON GROUT AND FLUSHING PUMPS.
- 2.3. CONFINED SPACE REQUIREMENTS:
 - 2.3.1. CHECK OSHA REQUIREMENTS FOR DETERMINATION IF WORK AREA IS CONFINED SPACE.
 - 2.3.2. FOLLOW OSHA REGULATIONS FOR CONFINED SPACE MONITORING AND AIR SUPPLY.
- 2.4. SPILL-PADS:
 - 2.4.1. ALL MATERIALS, POWER, AND OPERATIONAL EQUIPMENT SHALL BE ORIENTED OVER SPILL PADS.
 - 2.4.2. PLACE SPILL PAD ON LEVEL SUBSTRATE.
 - 2.4.3. SPILL PAD SHOULD BE 1.5 TIMES THE VOLUME OF STORED MATERIALS.
 - 2.4.4. SPILL PADS SHOULD BE ONE OF THE FOLLOWING MATERIALS:
 - 2.4.4.1. HDPE-HIGH DENSITY POLYETHYLENE
 - 2.4.4.2. ELVALOY PVC-POLYVINYL CHLORIDE
 - 2.4.4.3. PP-POLYPROPYLENE
 - 2.4.4.4. RIGID PVC-POLYVINYL CHLORIDE
 - 2.4.4.5. EPDM-ETHYLENE PROPYLENE DIENE MONOMER
- 2.5. POWER EQUIPMENT:
- 2.6. AIR COMPRESSORS AND ASSOCIATED LINES SHALL BE EQUIPPED AS FOLLOWS:
 - 2.6.1. WITH MOISTURE SEPARATOR IF TEMPERATURES ARE BELOW 50°,

- 2.6.2. ANTI-WHIP LINES AT ALL CONNECTIONS,
- 2.6.3. PIN OR WIRE AIR LINE CONNECTIONS TO ENSURE NO SEPARATION OCCURS,
- 2.6.4. AIR MANIFOLDS SECURED TO GROUND ANCHORAGE, AND
- 2.6.5. ENSURE AIR LINES, IF IN DRIVE LANES, ARE PROTECTED AGAINST DAMAGE.
- 2.7. ELECTRIC GENERATORS AND CHORDS TO BE SET UP WITH GROUND FAULT INTERCEPTORS (GFI).
 - 2.7.1. ENSURE ELECTRIC LINES IF IN DRIVE LANES ARE PROTECTED AGAINST DAMAGE.
 - 2.7.2. ENSURE PROPER GROUNDING OF EQUIPMENT.
- 2.8. ELECTRIC POWER TOOLS.
 - 2.8.1. ELECTRIC HAMMER DRILLS EQUIPPED WITH CLUTCHES TO PROTECT AGAINST SUDDEN TORQUE.
 - 2.8.2. ELECTRIC GRINDERS EQUIPPED WITH OSHA APPROVED SHIELDS.
- 2.9. FIRE EXTINGUISHER:
 - 2.9.1. HAVE FIRE EXTINGUISHER NEAR PUMPING AREA AND ONE NEAR INJECTION AREA, AND
 - 2.9.2. BEST RESULTS ARE ACHIEVED WITH CO₂ TYPE EXTINGUISHER.
- 2.10. EYE WASH STATION:
 - 2.10.1. EYE WASH STATION SHALL BE LOCATED ON-SITE, AND
 - 2.10.2. IF ON-SITE STATION IS NOT AVAILABLE, CONTRACTOR SHALL SET UP PORTABLE STATION NEAR PUMPING AREA.

3. BASIC SELECTION REQUIREMENTS FOR CHEMICAL GROUT PUMPING EQUIPMENT:

- 3.1. THERE ARE SEVEN (8) TYPES OF RESINOUS, SOLUTION, OR CEMENTITIOUS, GROUTS COMMONLY USED.
- 3.2. THE EQUIPMENT REQUIREMENTS ARE GENERALLY AS FOLLOWS FOR EACH TYPE OF GROUT:
 - 3.2.1. HYDROPHOBIC POLYURETHANE WITH CATALYST ACTIVATOR PLUS +/- 5% WATER,
 - 3.2.1.1. ELECTRIC OR PNEUMATIC, 1-COMPONENT (SINGLE PISTON), CARBON STEEL, PUMP,
 - 3.2.1.1.1. "A" COMPONENT IS PARTIALLY CATALYZED DIISOCYANATE WITH POLYOL, AND
 - 3.2.1.1.2. "A" COMPONENT IS TDI OR MDI.
 - 3.2.2. HYDROPHOBIC POLYURETHANE WITH A 1-TO-1 RATIO OF "A" AND "B" COMPONENTS,
 - 3.2.2.1. ELECTRIC OR PNEUMATIC, 2-COMPONENT (DUAL PISTON), CARBON STEEL, PUMP,
 - 3.2.2.1.1. "A" COMPONENT IS DIISOCYANATE, TDI OR MDI, AND
 - 3.2.2.1.2. "B" COMPONENT IS POLYOL (POLYESTER OR POLYETHER).
 - 3.2.3. HYDROPHILIC POLYUREA/POLYURETHANE WITH A RATIO VARIANCE OF (1-TO-1) TO (20-TO-1),
 - 3.2.3.1. ELECTRIC OR PNEUMATIC, 2-COMPONENT (DUAL PISTON), CARBON STEEL, PUMP,
 - 3.2.3.1.1. FIXED RATIO PUMPS CAN BE 5-TO-1, 10-TO-1, 15-TO-1, OR 20-TO-1,
 - 3.2.3.1.2. "A" COMPONENT IS DIISOCYANATE, AND
 - 3.2.3.1.3. "B" COMPONENT IS WATER.
 - 3.2.3.2. ELECTRIC OR PNEUMATIC, 3-COMPONENT (MULTI-RATIO PISTON), CARBON STEEL, PUMP.
- 3.3. ACRYLAMIDE WITH A 1-TO-1 RATIO OF "A" AND "B" COMPONENTS,
 - 3.3.1. ELECTRIC OR PNEUMATIC, 2-COMPONENT (DUAL PISTON), STAINLESS STEEL, PUMP,
 - 3.3.1.1. "A" COMPONENT IS ACRYLIC RESIN + ACCELERATOR (TRIETHANOLAMINE) IN WATER, AND
 - 3.3.1.2. "B" COMPONENT IS OXIDIZER (AMMONIUM OR SODIUM PERSULFATE) IN WATER.
- 3.4. ACRYLATE WITH A 1-TO-1 RATIO OF "A" AND "B" COMPONENTS,
 - 3.4.1. ELECTRIC OR PNEUMATIC, 2-COMPONENT (DUAL PISTON), STAINLESS STEEL, PUMP,
 - 3.4.1.1. "A" COMPONENT IS ACRYLIC RESIN + ACCELERATOR (TRIETHANOLAMINE) IN WATER, AND
 - 3.4.1.2. "B" COMPONENT IS OXIDIZER (AMMONIUM OR SODIUM PERSULFATE) IN WATER,
- 3.5. EPOXY RESINS WITH A (1,2,3 OR 10-TO-1), RATIO OF "A" AND "B" COMPONENTS,
 - 3.5.1. ELECTRIC OR PNEUMATIC, 2-COMPONENT (DUAL PISTON), CARBON STEEL, PUMP,
 - 3.5.2. "A" COMPONENT IS BIS-PHENOL A AND/OR EPICHLOROHYDRIN, AND
 - 3.5.3. "B" COMPONENT CURING AGENT OR HARDENER IS ALIPHATIC OR AROMATIC AMINES, AND/OR CARBOXYLIC ANHYDRIDES.
- 3.6. SODIUM SILICATE WITH A 1-TO-1 RATIO OF "A" AND "B" COMPONENTS,
 - 3.6.1. ELECTRIC OR PNEUMATIC, 2-COMPONENT (DUAL PISTON), CARBON STEEL, PUMP,
 - 3.6.2. "A" COMPONENT IS LIQUID SODIUM SILICATE IN WATER, AND
 - 3.6.3. "B" COMPONENT IS OXIDIZER (TRIACETIN) IN WATER.
- 3.7. ULTRA OR MICROFINE CEMENT WITH WATER-TO-CEMENT RATIO RANGING FROM 0.45 TO 10.0,
 - 3.7.1. PNEUMATIC, HYDRAULIC, ELECTRIC, HIGH SHEAR, COLLOIDAL MIXER,
 - 3.7.2. MONO OR ROTO-STATER PUMPS RANGING FROM (100-400) PSIG PRESSURE INJECTIONS, AND
 - 3.7.3. DIAPHRAGM PUMPS RANGING FROM (5 TO 50) PSIG PRESSURE INJECTIONS.

Safety Related Augmented Quality Non-Safety Related

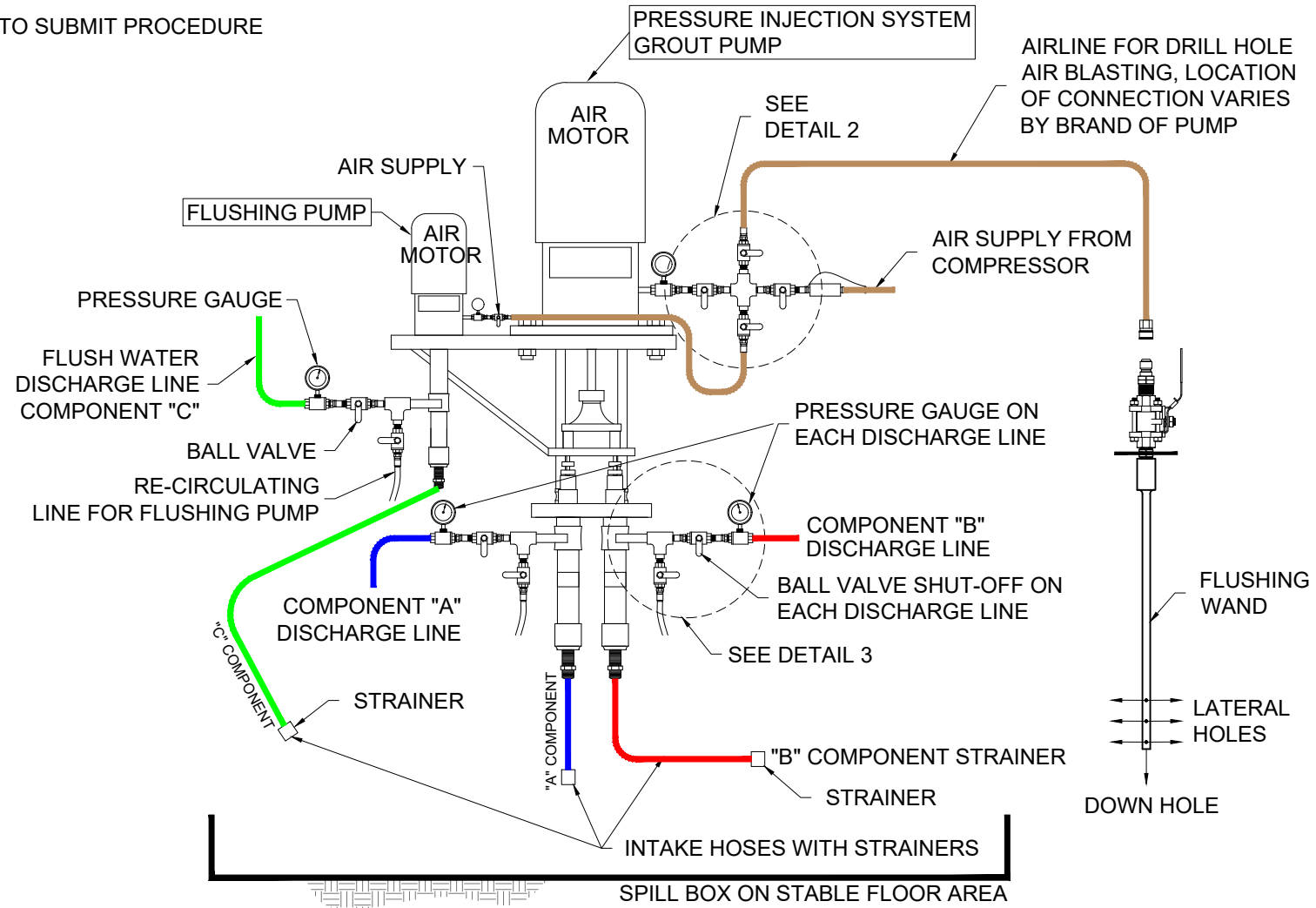
ST JOB NO: 702736		SPS JOB NO: 698217		SHEET: 702736-D03-300	
SHELL NORCO ALKY SUMP		ACRYLATE GENERAL NOTES		REVISONS	
DCGN BY	DWN BY	IV BY	APP BY	NO.	DATE
BA	TB			0	1/23/2026
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-692-7000 Fax: 410-692-4111		This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.		ISSUED FOR REVIEW	TB

**POLYACRYLATE GROUT EQUIPMENT AND PROCEDURES:
EQUIPMENT SETUP FOR CHEMICAL GROUT SYSTEM (CGS) - CLEANING, FLUSHING, PRESSURE INJECTION AND STORAGE**

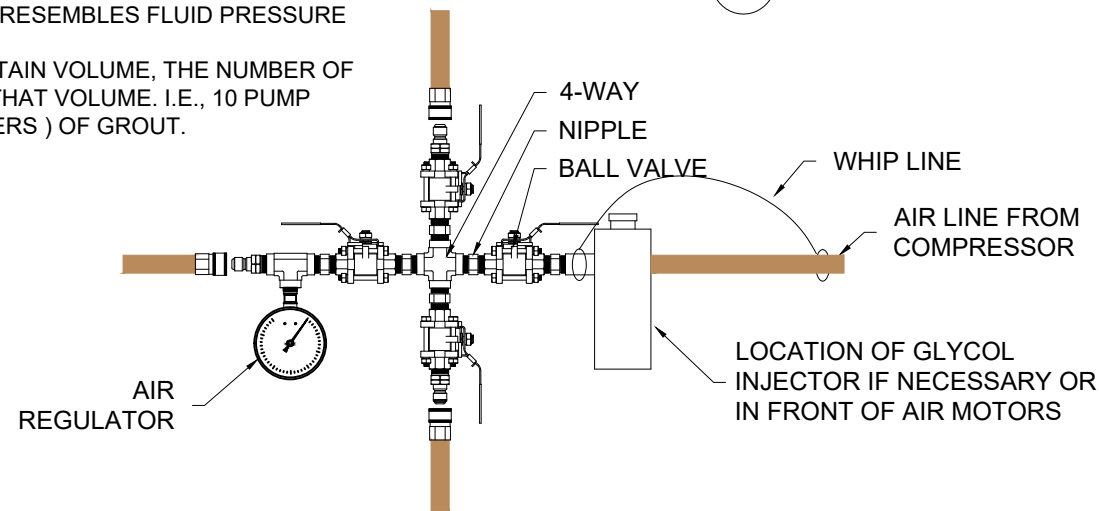
* GROUTING PROCEDURES AND EQUIPMENT SHOWN HERE ARE FOR REFERENCE. CONTRACTOR TO SUBMIT PROCEDURE AND EQUIPMENT (METHOD STATEMENT) FOR APPROVAL BEFORE PROCEEDING

1. PNEUMATIC POLYACRYLATE GROUT PUMP EQUIPMENT AND PROCEDURES:

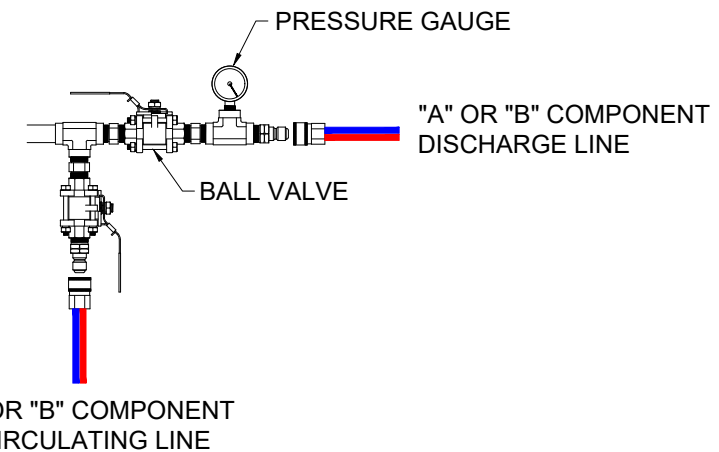
- 1.1. POLYACRYLATE PRESSURE INJECTION EQUIPMENT REQUIRES ALL STAINLESS-STEEL COMPONENTS, INCLUDING:
 - 1.1.1. 1-TO-1 RATIO (2-COMPONENT) RESIN PUMP, INCLUDING PISTONS AND ALL ATTACHED METAL ACCESSORIES IN CONTACT WITH LIQUID RAW MATERIALS,
 - 1.1.2. INTAKE LINES AND ACCESSORIES FROM LIQUID RAW MATERIALS TO PUMP PISTONS,
 - 1.1.3. DISCHARGE LINES AND ACCESSORIES FROM PUMP PISTONS TO INJECTION GUN, AND
 - 1.1.4. INJECTION GUN AND ACCESSORIES IN CONTACT WITH LIQUID RAW RESINS AND SOLUTIONS.
- 1.2. THE PREFERRED GROUT PUMP SET-UP INCLUDES A 1-TO-1 RATIO (2-COMPONENT) RESIN PUMP WITH 1- COMPONENT FLUSHING PUMP.
 - 1.2.1. NOTE: FLUSHING PUMP COULD BE CARBON STEEL COMPONENTS.
- 1.3. POLYACRYLATE GROUT PUMPING EQUIPMENT CAN BE PNEUMATIC OR ELECTRIC MOTORS.
- 1.4. THERE SHOULD BE AN OVERALL SHUT-OFF VALVE FOR COMPRESSED AIR TO PNEUMATIC GROUT AND FLUSHING PUMPS.
- 1.5. SEPARATE SHUT-OFF VALVES FOR COMPRESSED AIR SHOULD ALSO BE FABRICATED ON THE PUMPING SYSTEM LOCATED DOWNSTREAM OF THE MAIN SHUT-OFF VALVE.
- 1.6. POLYACRYLATE GROUT PUMPING SYSTEM SHOULD BE FABRICATED WITH AN ETHYLENE GLYCOL INJECTOR WHEN AIR TEMPERATURES ARE 50° F OR LESS.
- 1.7. ETHYLENE GLYCOL INJECTOR SHOULD BE LOCATED JUST DOWNSTREAM OF AIRLINE HOOK-UP TO AIR MOTOR ON 1-TO-1, PUMPING SYSTEM.
- 1.8. AIR-REGULATORS CONTROL PUMP STROKE FREQUENCY, (VOLUME), AND FLUID PRESSURE GENERATED.
- 1.9. CAUTION: AIR PRESSURE ON PUMP GAUGES DOES NOT ACCURATELY REPRESENT HYDRAULIC FLUID PRESSURE IN LINES OR HOSES.
- 1.10. AIR MOTORS ON PUMP SYSTEMS ARE RATED FROM 1-TO-1 UP TO ABOUT 50-TO-1.
- 1.11. FOR EXAMPLE: A 20-TO-1 AIR MOTOR WILL PRODUCE 20 PSIG (138 kPa) FLUID PRESSURE FOR EACH 1 PSIG INPUT OF AIR PRESSURE. I.E., 100 PSIG (690kPa) AIR PRESSURE WILL PRODUCE 2,000 PSIG (13,789kPa OR 138 BAR) FLUID PRESSURE.
- 1.12. DEPENDING UPON THE PUMP PISTON DIAMETER AND LENGTH, IT WILL BE RATED FOR A CERTAIN VOLUME CAPACITY PER UNIT STROKE.
- 1.13. MOST CHEMICAL GROUT PUMPS ARE EQUIPPED WITH AN OIL BATH NEAR THE PISTONS, REVIEW THE MANUAL FOR THE TYPE BEING USED.
- 1.14. PRESSURE GAUGES AT THE DISCHARGE LINES/HOSES TO THE INJECTION GUN ("E" ASSEMBLY) WILL CLOSELY RESEMBLE ACTUAL GROUT PRESSURE GOING INTO PACKER.
- 1.15. A PRESSURE GAUGE ON INJECTION GUN CLOSELY RESEMBLES FLUID PRESSURE GOING INTO PACKER.
- 1.16. A CALIBRATED BEAKER CAN BE MARKED TO A CERTAIN VOLUME, THE NUMBER OF GROUT PUMP STROKES CAN BE CORRELATED TO THAT VOLUME. I.E., 10 PUMP STROKES MAY CORRELATE TO 1 GALLON (3.78 LITERS) OF GROUT.



1 **ACRYLATE GROUT, CRACK / JOINT INJECTION**



2 **AIR LINE SET-UP**



3 **DETAIL OF DISCHARGE & RE-CIRCULATING LINES**

DESIGN BY	BA	DRAWN BY	TB	ISSUED FOR REVIEW	0	DATE	1/23/2026	NO.	REVISIONS	TB	BY
APPROVED BY		IV BY									
<p>Structural TECHNOLOGIES STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-650-7000 Fax: 410-650-4111</p> <p><small>This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.</small></p>											
<p>Safety Related <input type="checkbox"/> Augmented Quality <input type="checkbox"/> Non-Safety Related <input type="checkbox"/></p> <p>SHELL NORCO ALKY SUMP</p> <p>ACRYLATE DETAILS</p>											
ST JOB NO:										702736	
SPS JOB NO:										698217	
SHEET: 702736-D03-301											

1. SETTING UP THE GROUT PUMP:

- 1.1. PLACE SPILL-PAD IN ACCESSIBLE LOCATION TO CHEMICAL GROUTING WORK.
 - 1.1.1. FACILITY MANAGEMENT (MAY/OR MAY NOT) WANT SPILL-PAD LOCATED ADJACENT TO ANY SUMP PIT(S), STORM, OR SANITARY DRAIN(S).
 - 1.1.2. NOTE: SPILL-PAD(S) CREATE A SLIP AND FALL CONDITION WHEN WET.
 - 1.1.3. NOTE: SPILL-PAD(S) CREATE A TRIP HAZARD AT THEIR TURNED-UP SIDES, USE CAUTION WHEN HANDLING CHEMICALS AND STEPPING OVER SPILL PAD EDGES.
- 1.2. PLACE CHEMICAL GROUT PUMP ON SPILL PAD.
 - 1.2.1. DEVELOP COLLECTION PLAN FOR SPILLED MATERIALS AND LABELING, SUPPLEMENT PLAN WITH THE FOLLOWING:
 - 1.2.1.1. ABSORBENT GRANULES,
 - 1.2.1.2. ABSORBENT CLOTH BLANKETS, AND
 - 1.2.1.3. SHOP VACUUM DEVICES.
- 1.3. VEGETABLE OIL CAN BE DISPOSED OF PER SITE PROCEDURE.
 - 1.3.1. DEVELOP DISPOSAL PLAN FOR THE FOLLOWING:
 - 1.3.1.1. ACRYLIC RESIN,
 - 1.3.1.2. TRIETHANOLAMINE,
 - 1.3.1.3. SODIUM PERSULFATE,
 - 1.3.1.4. MOTOR OR HYDRAULIC OIL IF ANY, AND/OR
 - 1.3.1.5. MIXED COMBINATIONS THEREOF.
 - 1.3.2. GOOD RESULTS ARE ACHIEVED WHEN ALL HOSES/LINES AND MATERIAL ARE COLOR CODED BY CHEMICAL TYPE.
 - 1.3.3. STANDARD DESIGNATIONS FOR THIS WORK ARE AS FOLLOWS:
 - 1.3.3.1. BLUE TAPE, ACRYLIC RESIN, AND ACCELERATOR (TRIEHANOLAMINE), "A" COMPONENT MATERIALS OR PART "A",
 - 1.3.3.2. RED TAPE, OXIDIZER (AMMONIUM- OR SODIUM-PERSULFATE), AND WATER, "B" COMPONENT MATERIALS OR PART "B", AND
 - 1.3.3.3. GREEN TAPE, WATER OR SOLVENT FLUSHING MATERIAL, "C" COMPONENT MATERIALS OR PART "C".

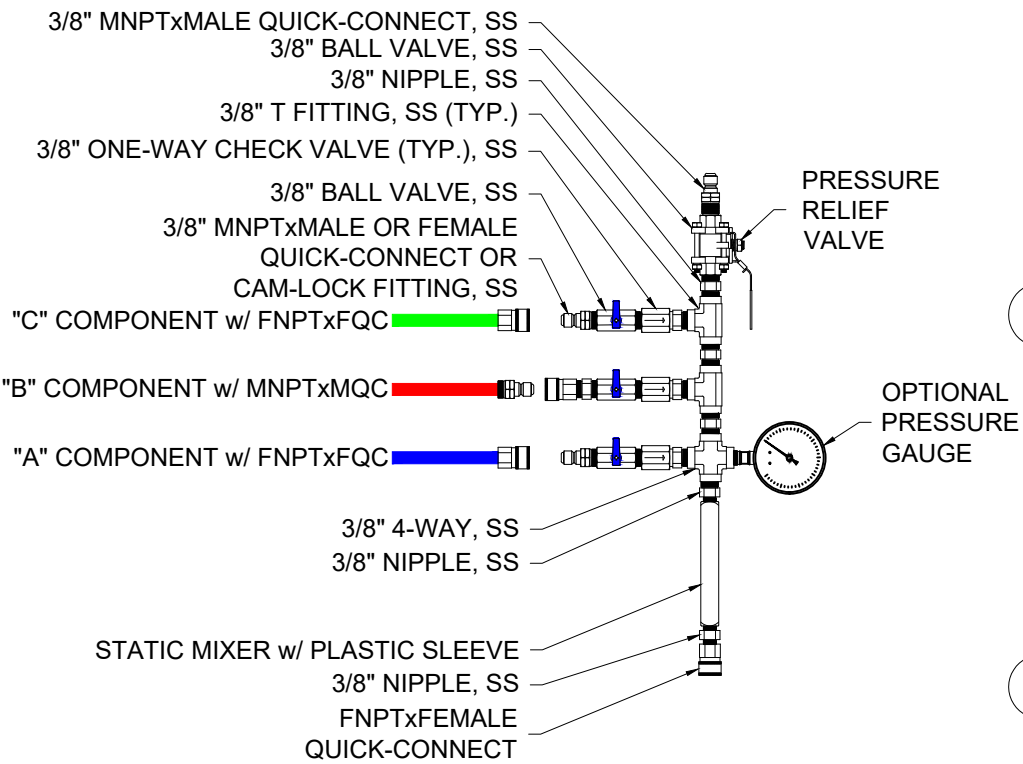
2. GROUT PUMP FLUSHING AND PRIMING:

- 2.1. AT THE START OF ANY JOB, GROUT PUMP SHALL BE FLUSHED WITH WATER OR SOLVENT TO RID VEGETABLE OR MOTOR/HYDRAULIC OILS FROM STORAGE.
- 2.2. ENSURE PUMP IS ON SPILL PAD.
- 2.3. CONNECT DISCHARGE LINES/HOSES TO PUMP PISTONS AND THEN TO INJECTION GUN "E" ASSEMBLY.
- 2.4. PLACE PAIL OF CLEAN WATER OR SOLVENT WITHIN SPILL PAD.
- 2.5. PLACE INTAKE LINES FOR "A", "B", AND "C" COMPONENTS INTO FLUSHING WATER OR SOLVENT.
- 2.6. TURN BOTH PUMPS ON AND AT A PRESSURE OF ABOUT (5 TO 25) PSIG (34.5 TO 172) kPa.
- 2.7. PUMP CLEAN WATER THROUGH DISCHARGE LINES UNTIL ALL EXISTING VEGETABLE, MOTOR, OR HYDRAULIC OIL HAS BEEN FLUSHED OUT INTO A TRASH BUCKET.
- 2.8. LABEL DEBRIS PAIL FOR LATER DISPOSAL.
- 2.9. VEGETABLE OIL CAN BE DISPOSED OF PER SITE PROCEDURE, MOTOR AND/OR HYDRAULIC OIL REQUIRES OIL RECYCLING PROTOCOLS.

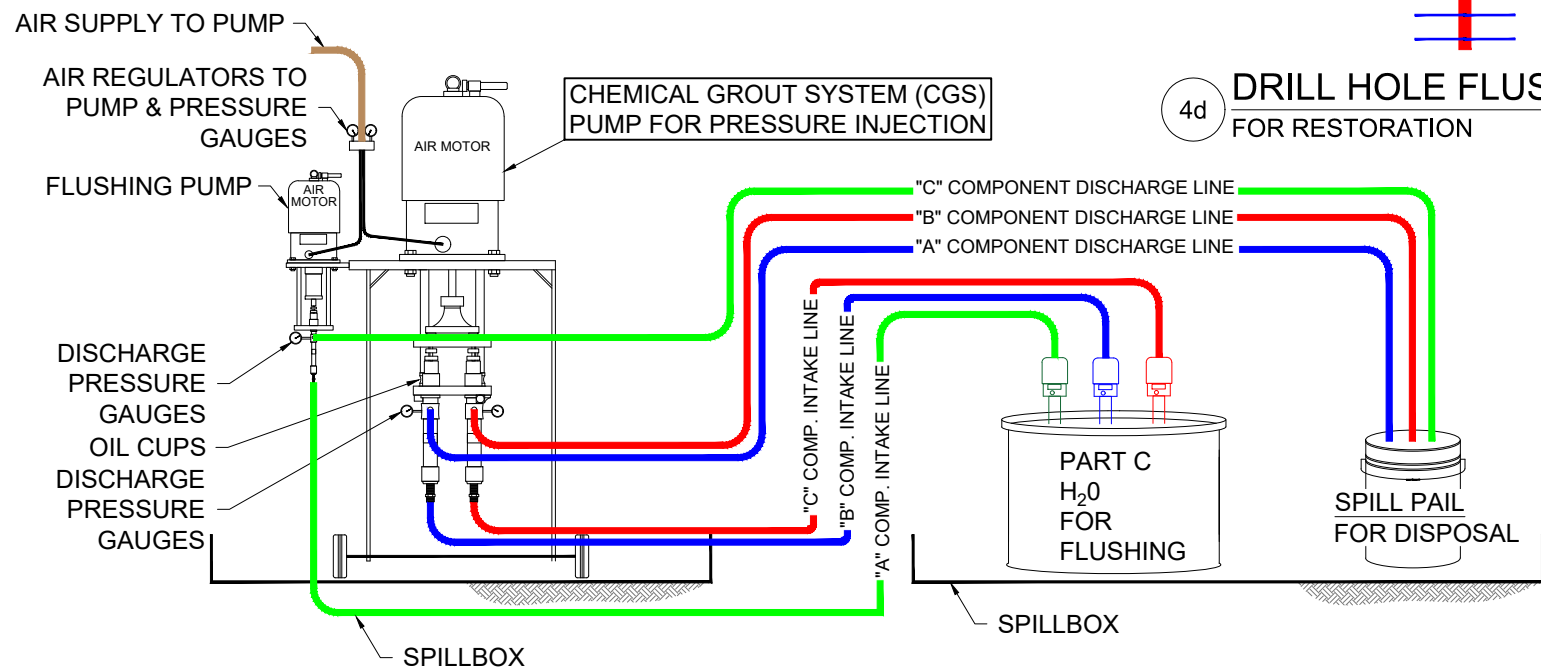
ABBREVIATIONS:	
CGS	= CHEMICAL GROUT SYSTEM
MNPT	= MALE - NATIONAL PIPE THREAD
FNPT	= FEMALE - NATIONAL PIPE THREAD
QC	= QUICK CONNECT FITTING
"E"	= INJECTION GUN
SS	= STAINLESS STEEL (316)
F	= FEMALE END
M	= MALE END

* NOTE:

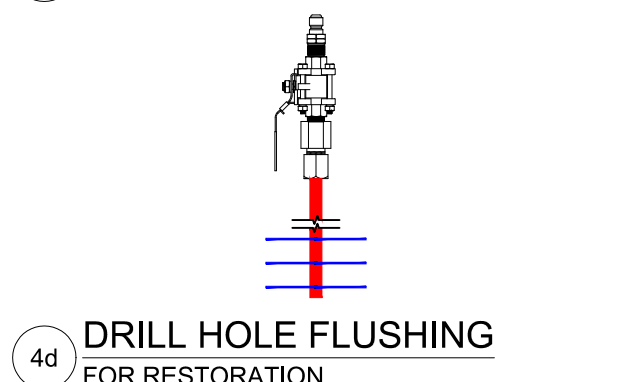
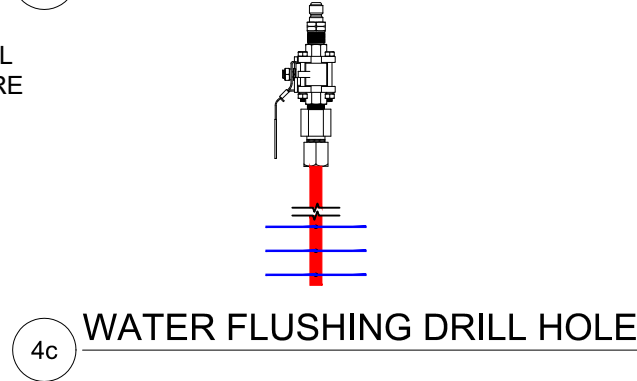
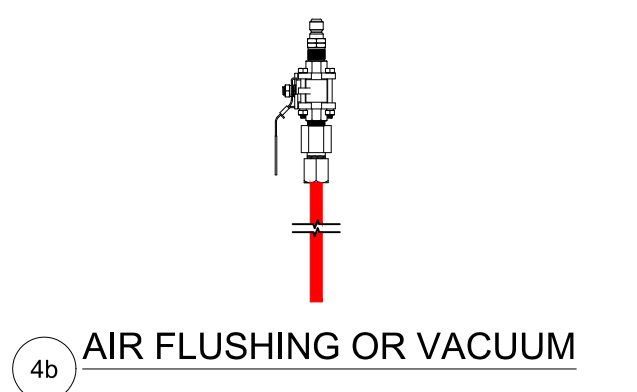
- RE-CIRCULATING DISCHARGE LINES NOT SHOWN FOR CLARITY
- PUMP IS USUALLY STORED WITH VEGETABLE OIL IN SYSTEM. THIS IS NON-HAZARDOUS AND CAN EASILY BE DISPOSED OF.



4a "E" ASSEMBLY



4 ACRYLATE GROUT, CRACK / JOINT INJECTION
PUMP FLUSHING OF STORAGE OIL OUT FROM SYSTEM
GROUT PUMP PREPERATION



Safety Related Augmented Quality Non-Safety Related

DESIGN BY		DWN BY		IV BY		APP BY	
BA		TB					
NO.		DATE		ISSUED FOR REVIEW		REVISIONS	
0		1/23/2026				TB	
BY							

structural TECHNOLOGIES	
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-690-7000 Fax: 410-690-4111	

SHELL NORCO ALKY SUMP	
ACRYLATE DETAILS	

ST JOB NO:	702736
SPS JOB NO:	698217
SHEET:	702736-D03-302

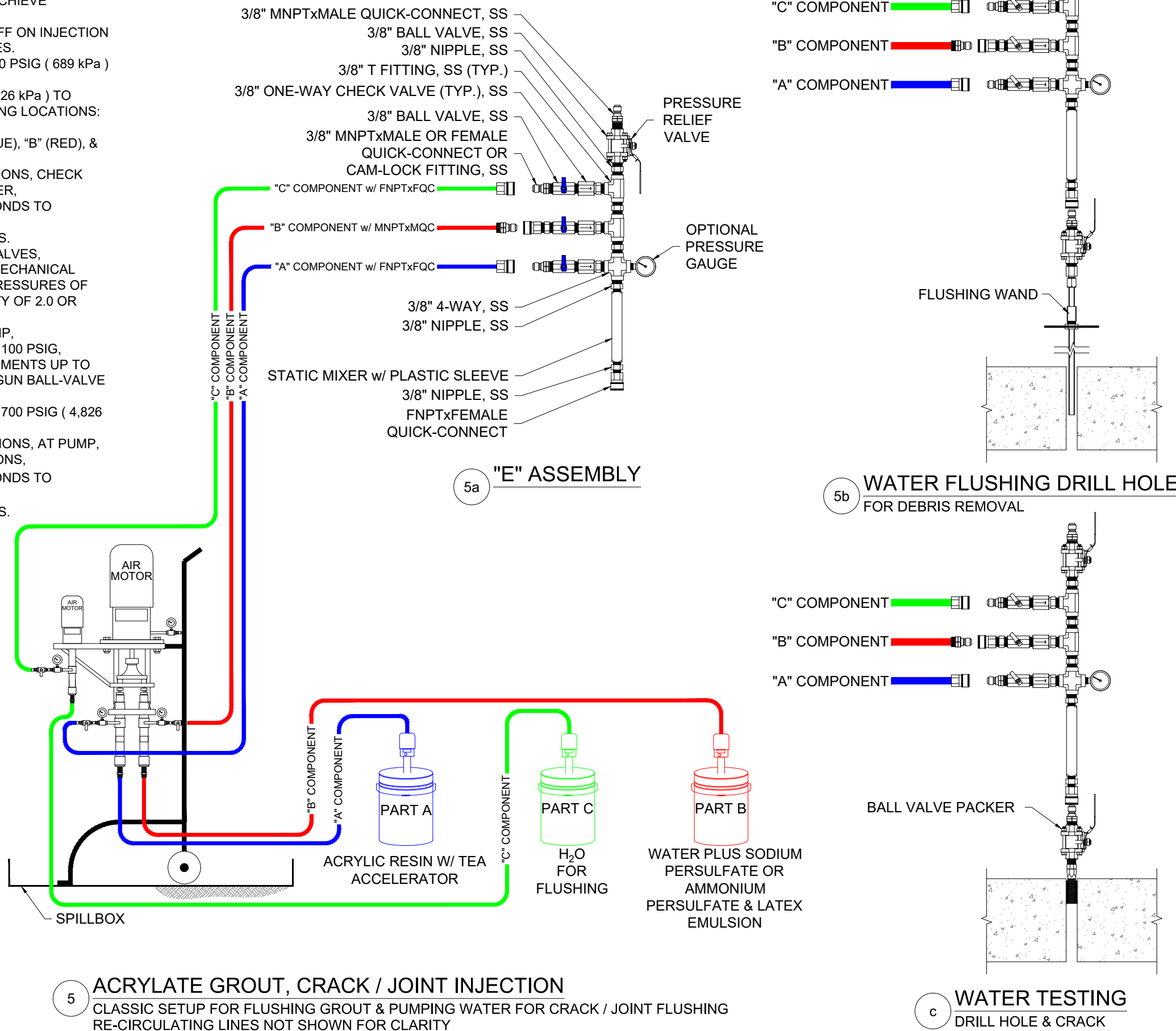
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unlicensed, or other impermissible use of this document or any information it contains.

1. SAFETY CHECK OF PNEUMATIC PUMP VALVES AND GAUGES:

- 1.1. CHECK PRESSURE GAUGES, SHUT-OFF VALVES, AND HYDRAULIC CONNECTIONS WITH PRESSURIZED CLEAN WATER.
- 1.2. ENSURE ALL EYE AND HAND PROTECTIONS ARE IN PLACE.
- 1.3. CHECK PRESSURE GAUGE(S) ON CHEMICAL GROUT PUMP.
 - 1.3.1. ADJUST AIR REGULATOR ON GROUT PUMP TO ACHIEVE PRESSURE OF 100 PSIG (689 kPa),
 - 1.3.1.1. WHILE DOING SO, TURN BALL-VALVES OFF ON INJECTION GUN TO HOLD PRESSURE IN LINES/HOSES.
 - 1.3.2. ADJUST AIR REGULATOR ON GROUT PUMP IN 100 PSIG (689 kPa) INCREMENTS UP TO 700 PSIG.
 - 1.3.3. HOLD GROUT PUMP PRESSURE AT 700 PSIG (4,826 kPa) TO ENSURE NO LEAKAGE OCCURS IN THE FOLLOWING LOCATIONS:
 - 1.3.3.1. AT PUMP DISCHARGE CONNECTIONS,
 - 1.3.3.2. AT DISCHARGE HOSE/LINES FOR "A" (BLUE), "B" (RED), & "C" (GREEN) COMPONENTS,
 - 1.3.3.3. AT "E" ASSEMBLY HYDRAULIC CONNECTIONS, CHECK VALVES, BALL-VALVES, AND STATIC MIXER,
 - 1.3.3.4. HOLD 700 PSIG (4,826 kPa) FOR 30 SECONDS TO ENSURE NO LEAKAGE OCCURS, AND
 - 1.3.3.5. TIGHTEN OR REPLACE LEAKING FITTINGS.
 - 1.3.4. ALL HYDRAULIC CONNECTIONS, HOSES, BALL-VALVES, CHECK-VALVES, PIPE FITTINGS, AND SIMILAR MECHANICAL HARDWARE SHALL BE RATED FOR GROUTING PRESSURES OF 700 PSIG (4,826K PA) WITH A FACTOR-OF-SAFETY OF 2.0 OR MORE 1,500 PSIG (10,342 kPa).
 - 1.3.5. CHECK PRESSURE GAUGE(S) ON FLUSHING PUMP,
 - 1.3.5.1. ADJUST FLUSHING PUMP PRESSURE TO 100 PSIG, INCREASE PRESSURE IN 100 PSIG INCREMENTS UP TO 700 PSIG (4,826 kPa) WHILE INJECTION GUN BALL-VALVE IS CLOSED,
 - 1.3.5.2. ADJUST FLUSHING PUMP PRESSURE TO 700 PSIG (4,826 kPa) TO ENSURE NO LEAKAGE OCCURS,
 - 1.3.5.2.1. AT DISCHARGE LINE CONNECTIONS, AT PUMP, AND "E" ASSEMBLY CONNECTIONS,
 - 1.3.5.3. HOLD 700 PSIG (4,826 kPa) FOR 30 SECONDS TO ENSURE NO LEAKAGE OCCURS, AND
 - 1.3.5.4. TIGHTEN OR REPLACE LEAKING FITTINGS.

ABBREVIATIONS:

CGS	=	CHEMICAL GROUT SYSTEM
MNPT	=	MALE - NATIONAL PIPE THREAD
FNPT	=	FEMALE - NATIONAL PIPE THREAD
QC	=	QUICK CONNECT FITTING
"E"	=	INJECTION GUN
SS	=	STAINLESS STEEL (316)
F	=	FEMALE END
M	=	MALE END



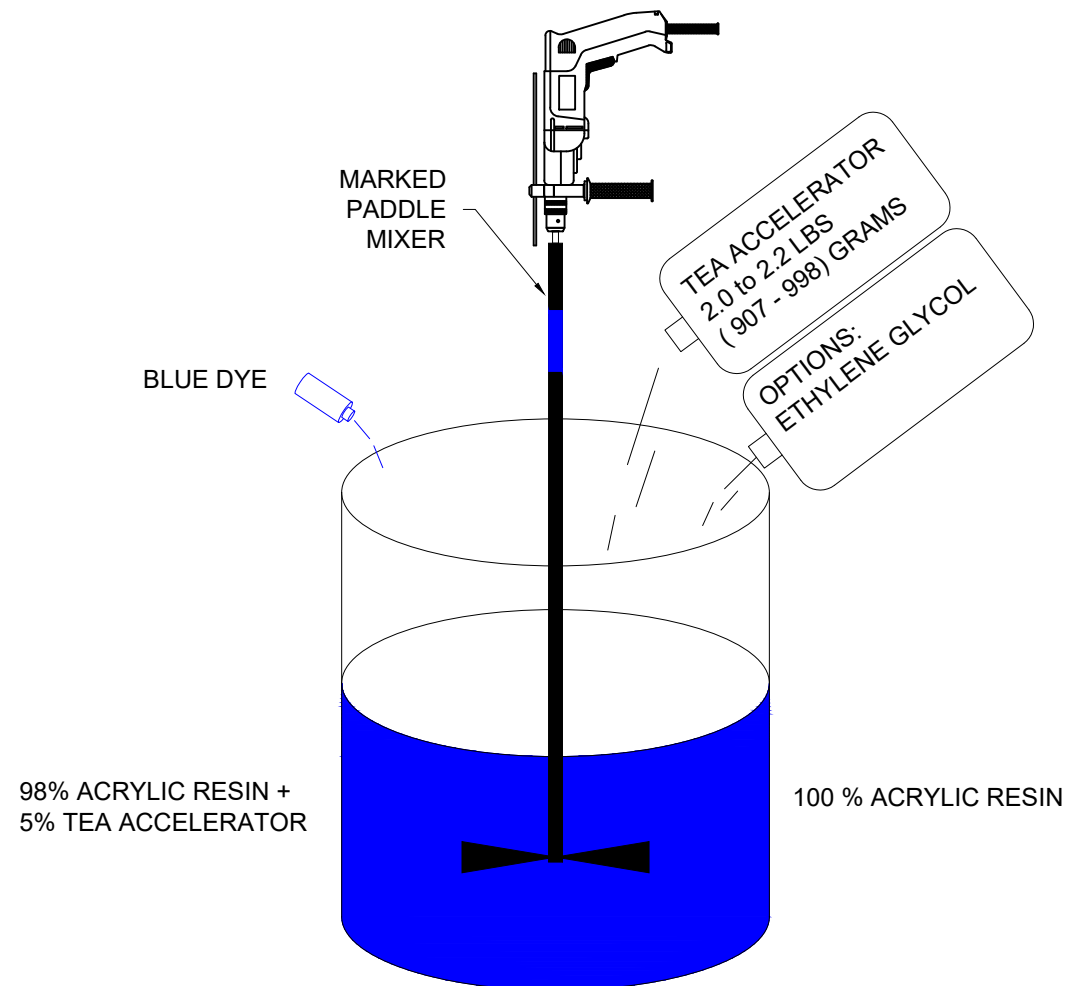
Safety Related	Augmented Quality	Non-Safety Related
SHELL NORCO ALKY SUMP		
ACRYLATE DETAILS		
ST JOB NO:	702736	
SPS JOB NO:	698217	
SHEET:	702736-D03-303	

DESIGN BY	BA	DATE	NO.	ISSUED FOR REVIEW	REVISIONS
DRAWN BY	TB	DATE	NO.	ISSUED FOR REVIEW	REVISIONS
IV BY		DATE	NO.	ISSUED FOR REVIEW	REVISIONS
APP BY		DATE	NO.	ISSUED FOR REVIEW	REVISIONS
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-850-7000 Fax: 410-850-4111					

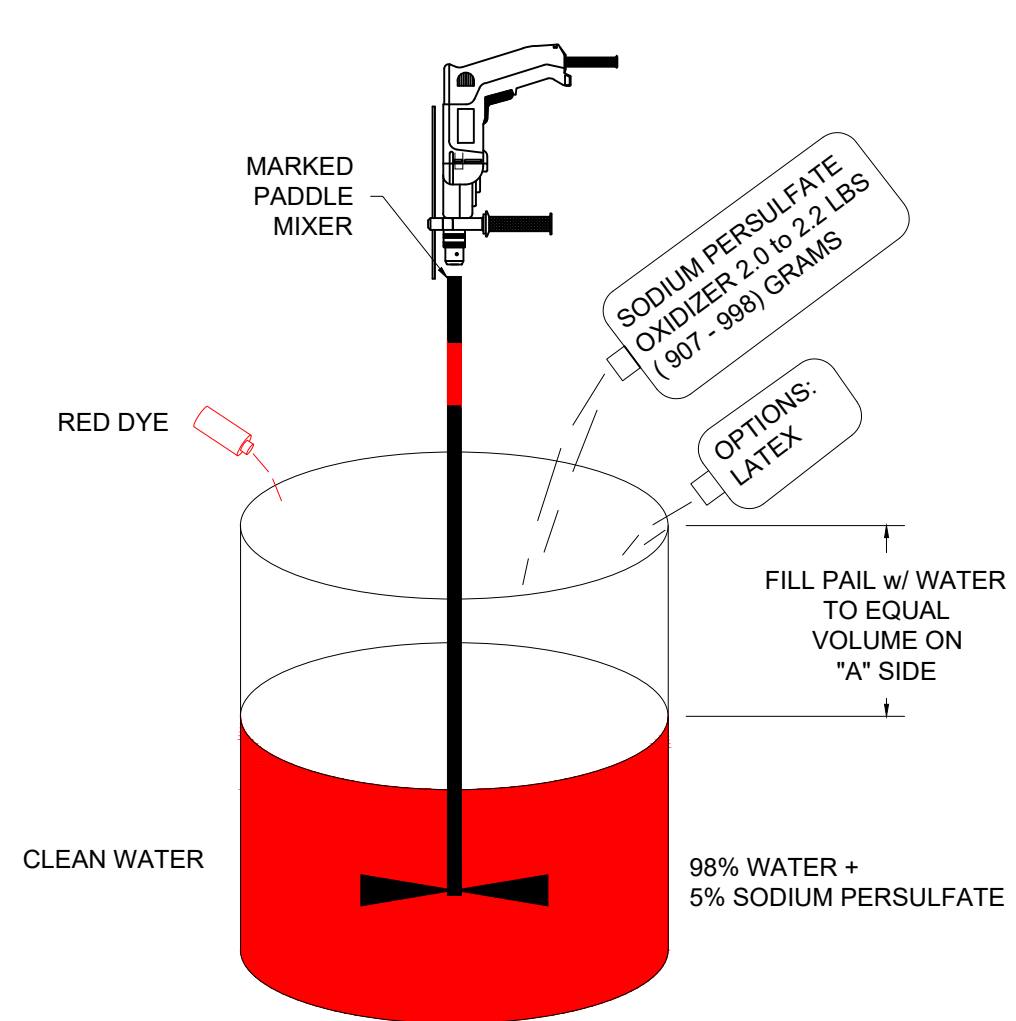
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

1. POSITION 100% ACRYLIC RESIN PAIL ON SPILL PAD
2. OPEN LID ON RESIN PAIL
3. ADD 1 BOTTLE 2.0 to 2.2 LBS (907 - 998) GRAMS OF BLUE ACCELERATOR TO RESIN PAIL
4. ADD 3-4 TEASPOONS (10 - 15) ML OF BLUE DYE TO RESIN PAIL
5. PLACE PADDLE IN "A" RESIN PAIL AND SLOWLY MIX FOR 2 MINUTES
6. MEASURE TEMPERATURE OF "A" COMPONENT RESIN
7. HEAT OR COOL IF NECESSARY
8. PLACE LID BACK ON PAIL UNTIL READY FOR USE
9. MARK "A" RESIN PADDLE WITH BLUE LABEL OR TAPE TO ENSURE AGAINST CROSS-CONTAMINATION IN "B" COMPONENT

1. POSITION OXIDIZER PAIL AND FILL WITH 4 GALLONS (15 LITERS) OF CLEAN WATER
2. ADD 1 BAG 2.0 to 2.2 LBS (908 - 998) GRAMS OF WHITE POWDER (SODIUM PERSULFATE) TO WATER
3. ADD 2-3 TEASPOONS (10 - 15) ml OF RED DYE TO OXIDIZER PAIL
4. PLACE PADDLE IN "B" COMPONENT PAIL AND SLOWLY MIX FOR 2 MINUTES
5. MEASURE TEMPERATURE OF "B" COMPONENT FLUID
6. HEAT OR COOL IF NECESSARY
7. PLACE LID BACK ON PAIL UNTIL READY FOR USE
8. MARK "B" COMPONENT PADDLE WITH RED LABEL OR TAPE TO ENSURE AGAINST CROSS-CONTAMINATION IN "A" COMPONENTS
9. FILL PAIL TO AN EQUAL VOLUME AS ON "A" SIDE



6 **ACRYLATE GROUT**
 CRACK / JOINT INJECTION
 MIXING / FORMULATING A & B COMPONENTS



7 **OXIDIZER SOLUTION**
 CRACK / JOINT INJECTION
 MIXING / FORMULATING A & B COMPONENTS

Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP

ACRYLATE DETAILS

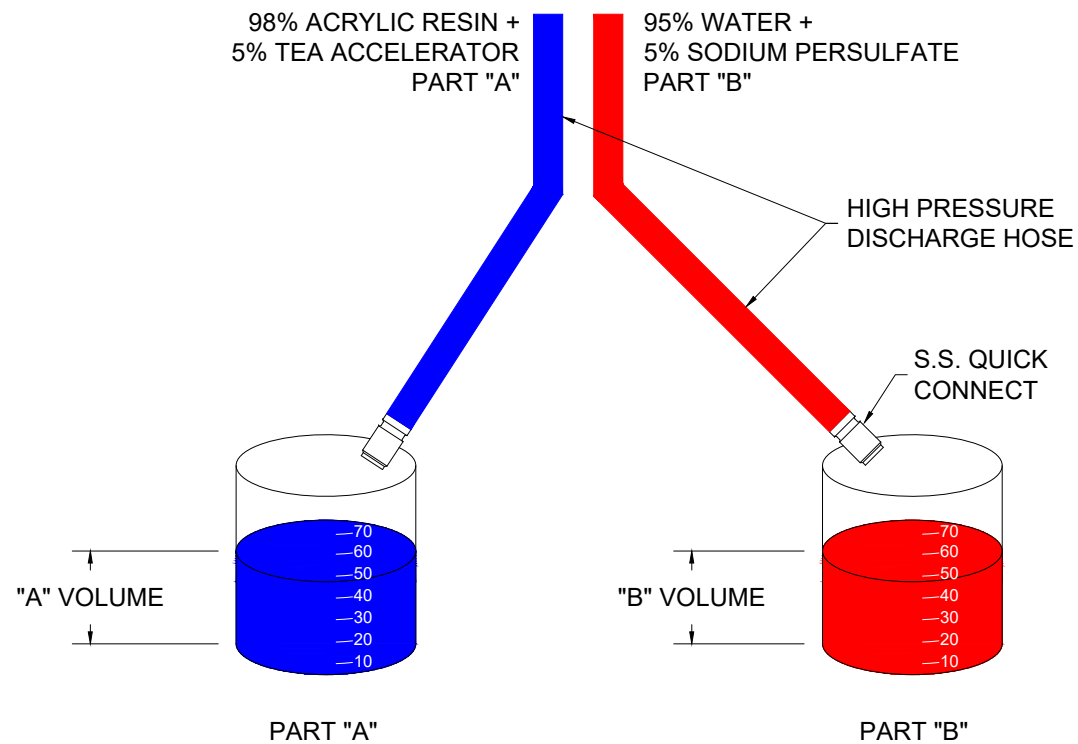
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

structural TECHNOLOGIES
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
 10150 Old Columbia Rd.
 COLUMBIA, MD 21046
 Phone: 410-650-7000
 Fax: 410-650-4111

DESIGN BY	BA
DRAWN BY	TB
ISSUED FOR REVIEW	TB
NO.	0
DATE	1/23/2026
REVISIONS	

1. GROUT PUMP CALIBRATION AND MATERIAL SET TIMES:

- 1.1. PLACE INTAKE LINES OF GROUT PUMP INTO "A" AND "B" COMPONENT PAILS.
 - 1.1.1. ENSURE "A" LINE IS MARKED BLUE AND "B" LINE IS MARKED RED, AND
 - 1.1.2. ENSURE STRAINERS OR FILTERS ON END OF INTAKE LINES ARE FREE AND CLEAR.
- 1.2. PLACE "A" AND "B" DISCHARGE LINES ONTO GROUT PUMP DISCHARGE VALVES ON PISTONS.
 - 1.2.1. ENSURE "A" LINE IS MARKED BLUE AND "B" LINE IS MARKED RED, AND
 - 1.2.2. PUMP "A" AND "B" COMPONENTS INTO A DEBRIS PAIL UNTIL HOSE VOLUMES LOOK EQUAL -- STOP.
- 1.3. RATIO CHECK:
 - 1.3.1. PLACE THE "A" COMPONENT LINE IN A CLEAN, CALIBRATED, BEAKER, TYPICALLY 2,000 ML.
 - 1.3.2. PLACE THE "B" COMPONENT LINE IN A CLEAN, CALIBRATED, BEAKER, TYPICALLY 2,000 ML.
 - 1.3.3. START SLOWLY PUMPING "A" AND "B" COMPONENTS INTO SEPARATE BEAKERS, WHEN ONE OR THE OTHER REACHES 1,000 ML STOP.
 - 1.3.4. COMPONENT'S "A" AND "B" SHOULD BE EQUAL VOLUME TO ACHIEVE 1-TO-1 RATIO. IF NOT, NOTE THE FOLLOWING:
 - 1.3.4.1. DEPENDING UPON THE "A" AND "B" COMPONENT CONCENTRATIONS, THE ENGINEER-OF RECORD (EOR) MAY ALLOW A 10% FLUCTUATION, OR UP TO A 20% DISCREPANCY. APPROVAL FROM EOR MUST BE OBTAINED IN WRITING,
 - 1.3.4.2. OFF-RATIO CALIBRATIONS USUALLY OCCUR BECAUSE SOME DEBRIS IS IN THE GROUT PUMP PISTON,
 - 1.3.4.3. TRY FLUSHING WATER THROUGH BOTH PISTONS VIGOROUSLY TO CLEAR THE DEBRIS,
 - 1.3.4.4. A BALL-VALVE CAN BE PLACED ON THE INTAKE LINE AND/OR DISCHARGE LINE TO PINCH-OFF SOME FLOW TO MATCH WITH THE OTHER GROUT COMPONENT SIDE,
 - 1.3.4.5. THE PUMP PISTON CAN BE DISMANTLED AND CHECKED FOR DEBRIS, GASKET WEAR, OR BALL-BEARINGS THAT ARE NOT FREE TO MOVE, AND
 - 1.3.4.6. DO NOT START CHEMICAL GROUT PRESSURE INJECTION UNTIL 1-TO-1 RATIO IS CORRECTED.

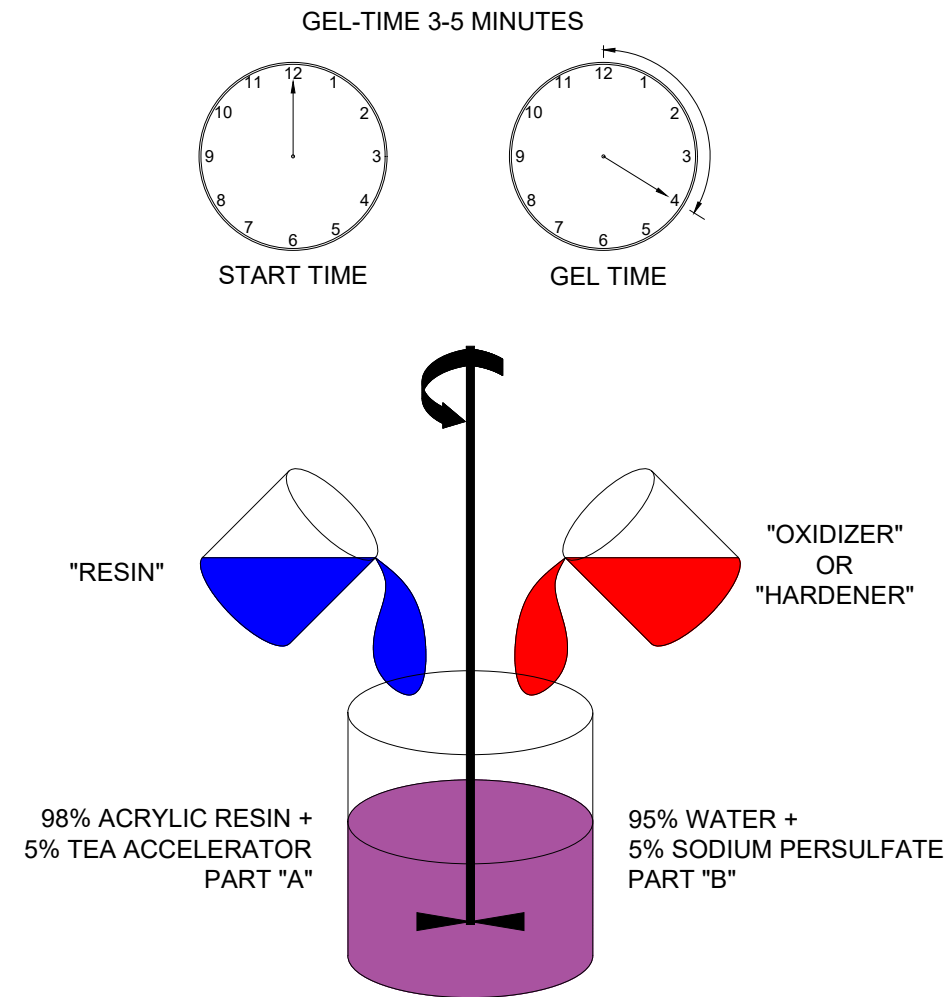


8 **ACRYLATE GROUT A & B COMPONENTS**
 CRACK / JOINT INJECTION
 QA / QC 1-to-1 RATIO

1. GEL TIME CALIBRATION:

- 1.1. USE INFRARED THERMOMETER TO MEASURE TEMPERATURE OF "A" COMPONENT.
- 1.2. USE INFRARED THERMOMETER TO MEASURE TEMPERATURE OF "B" COMPONENT.
- 1.3. PUMP EQUAL VOLUMES (ABOUT 500 ML) OF "A" AND "B" COMPONENTS INTO SEPARATE BEAKERS.
- 1.4. SET TIMER AND START MIXING THE "A" AND "B" COMPONENTS TOGETHER.
- 1.5. WHEN GROUT THICKENS AND GELS, NOTE GEL TIME, AND THE FOLLOWING:
 - 1.5.1. GEL TIME VARIES WITH TEMPERATURE OF LIQUIDS,
 - 1.5.1.1. HEATING OR COOLING "A" AND "B" COMPONENTS IS OFTEN PERFORMED ON SITE.
 - 1.5.2. GEL TIME CAN BE SHORTENED BY ADDING MORE TRIETHANOLAMINE (ACCELERATOR) TO "A" COMPONENT AND SODIUM PERSULFATE (OXIDIZER) TO "B" COMPONENT,
 - 1.5.3. GEL TIME CAN BE LENGTHENED BY REDUCING ACCELERATOR AND OXIDIZER.
 - 1.5.4. THE STANDARD CONCENTRATION OF ACCELERATOR AND OXIDIZER IS 5% BY WEIGHT,
 - 1.5.5. "A" AND "B" COMPONENTS CAN BE SUPPLEMENTED UP TO 10% ACCELERATOR AND OXIDIZER,
 - 1.5.6. COLD WATER IN "B" COMPONENT CAN BE USED TO DELAY GEL TIME, AND
- 1.6. DURING PRESSURE INJECTION THROUGH "E" ASSEMBLY (GUN), FLUSH GUN WITH WATER PRIOR TO GROUT GEL TIME, OTHERWISE PLUGGING WILL OCCUR IN STATIC MIXER.
- 1.7. PISTON STROKE COUNTS EQUATING TO VOLUME:
 - 1.7.1. DEPENDING UPON PUMP TYPE, IT TAKES 10 TO 50 STROKES TO EQUAL 1 GALLON (3.78) LITERS OF INJECTED GROUT.
 - 1.7.2. SET UP CALIBRATED BEAKER(S) TO EITHER 1/2 GALLON (1.9) LITERS DESIGNATIONS EACH OR 1 GALLON (3.78) LITERS DESIGNATION.
 - 1.7.3. COUNT PUMP STROKES TO EQUAL 2 BEAKERS AT 1/2 GALLON (1.9) LITERS EACH OR ONE BEAKER TO 1 GALLON (3.78) LITERS.

* HARDENER IS CALLED SODIUM PERSULFATE, ALSO CALLED "OXIDIZER"

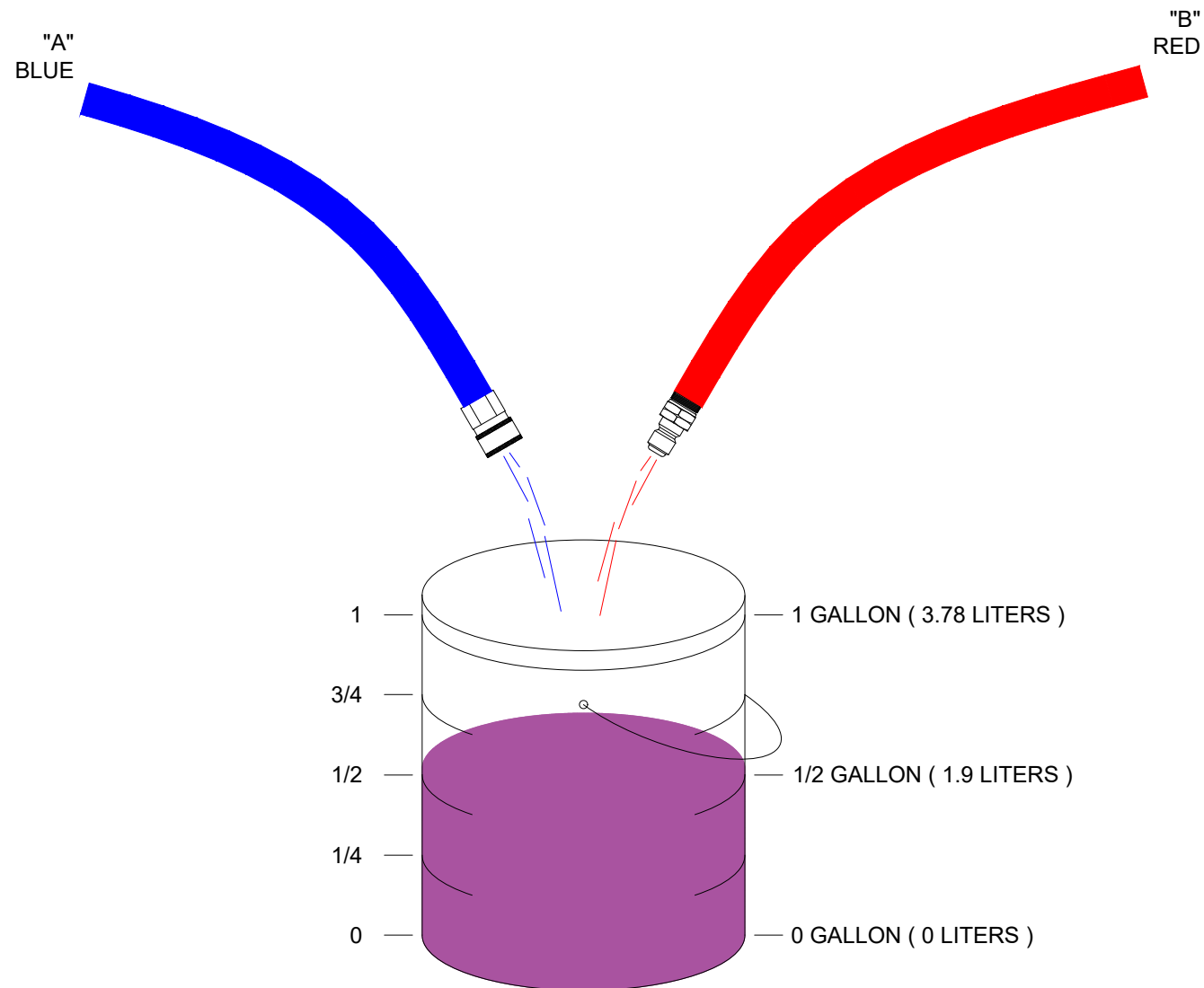


9 **POLYACRYLATE GROUT**
 CRACK / JOINT INJECTION
 GEL TIME CHECK

Safety Related Augmented Quality Non-Safety Related

ST. JOB NO: 702736		ISSUED FOR REVIEW		REVISIONS	
SPS JOB NO: 698217		NO. 0		DATE 1/23/2026	
SHEET: 702736-D03-305		NO.		DATE	
SHELL NORCO ALKY SUMP		IV BY		TB	
ACRYLATE DETAILS		APP BY		BY	
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.		STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-690-7000 Fax: 410-690-4111			

1. DISCONNECT THE "E" OR "F" ASSEMBLY FROM DISCHARGE LINES
2. PUMP LINES A & B INTO A MEASURING PAIL
3. COUNT THE NUMBER OF PUMP STROKES IT TAKES TO REACH THE 1/4 GALLON (946 ml) MARK & RECORD THE NUMBER
4. CONTINUE TO COUNT PUMP STROKES TO 1/2 GALLON (1.9 LITERS) MARK IS MET
5. THE NUMBER OF PUMP STROKES TO EQUAL 1 GALLON (3.78 LITERS) CAN BE DETERMINED BY CONTINUING THE PROCESS TO 1 GALLON (3.78 LITERS) OR DOUBLING THE 1/2 GALLON (1.9 LITERS) COUNT

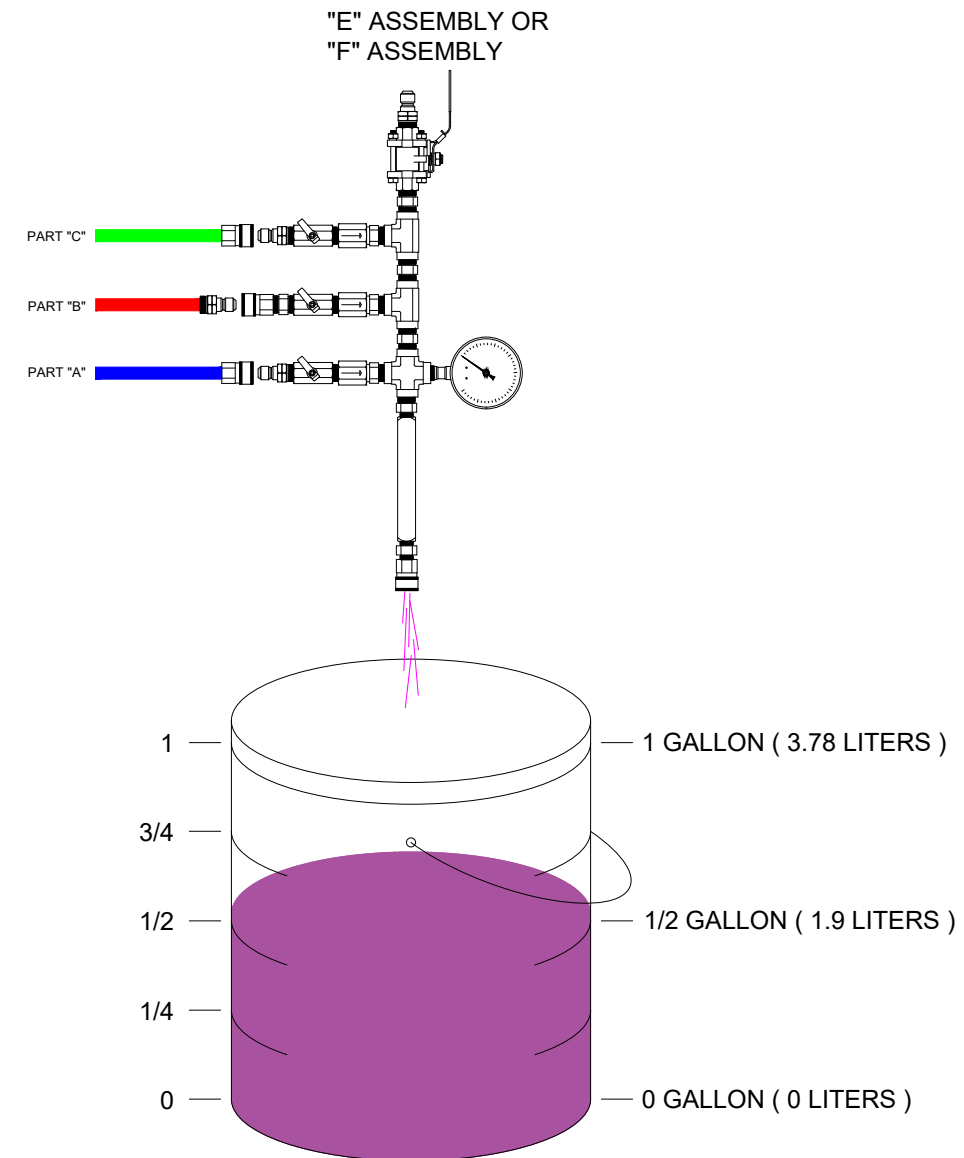


PARTS "A" & "B"

* NOTE: TO BE DONE WITH THE MATERIAL IN USE

10 STROKE COUNT TO EQUAL 1 GALLON (3.78 LITERS)
UNRESTRICTED

1. ATTACH DISCHARGE LINES TO THE "E" OR "F" ASSEMBLY
2. USE "E" ASSEMBLY GUN TO PUMP INTO METERED PAIL
3. COUNT THE NUMBER OF PUMP STROKES IT TAKES TO REACH THE 1/4 GALLON (946 ml) MARK & RECORD THE NUMBER BELOW
4. CONTINUE STEP 3 UP TO THE 1/2 GALLON (1.9 LITERS) MARK
5. THE NUMBER OF PUMP STROKES TO EQUAL 1 GALLON (3.78 LITERS) CAN BE DETERMINED BY CONTINUING THE PROCESS TO 1 GALLON (3.78 LITERS) OR DOUBLING THE 1/2 GALLON (1.9 LITERS) COUNT
6. PUMP STROKES PER GALLON SHOULD BE SAME WITH OR WITHOUT THE GUN
7. NOTE: THE PUMP CYLINDER DIAMETER AND STROKE LENGTH WILL DETERMINE THE VOLUMETRIC UNIT PER STROKE



PARTS "A" & "B"

* NOTE: TO BE DONE WITH THE MATERIAL IN USE

11 STROKE COUNT TO EQUAL 1 GALLON (3.78 LITERS)
RESTRICTED

Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP

ACRYLATE DETAILS

ST JOB NO: 702736

SPS JOB NO: 698217

SHEET: 702736-D03-306

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

structural TECHNOLOGIES

STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
10150 Old Columbia Rd.
COLUMBIA, MD 21046
Phone: 410-650-7000
Fax: 410-650-4111

DSGN BY: BA

DWN BY: TB

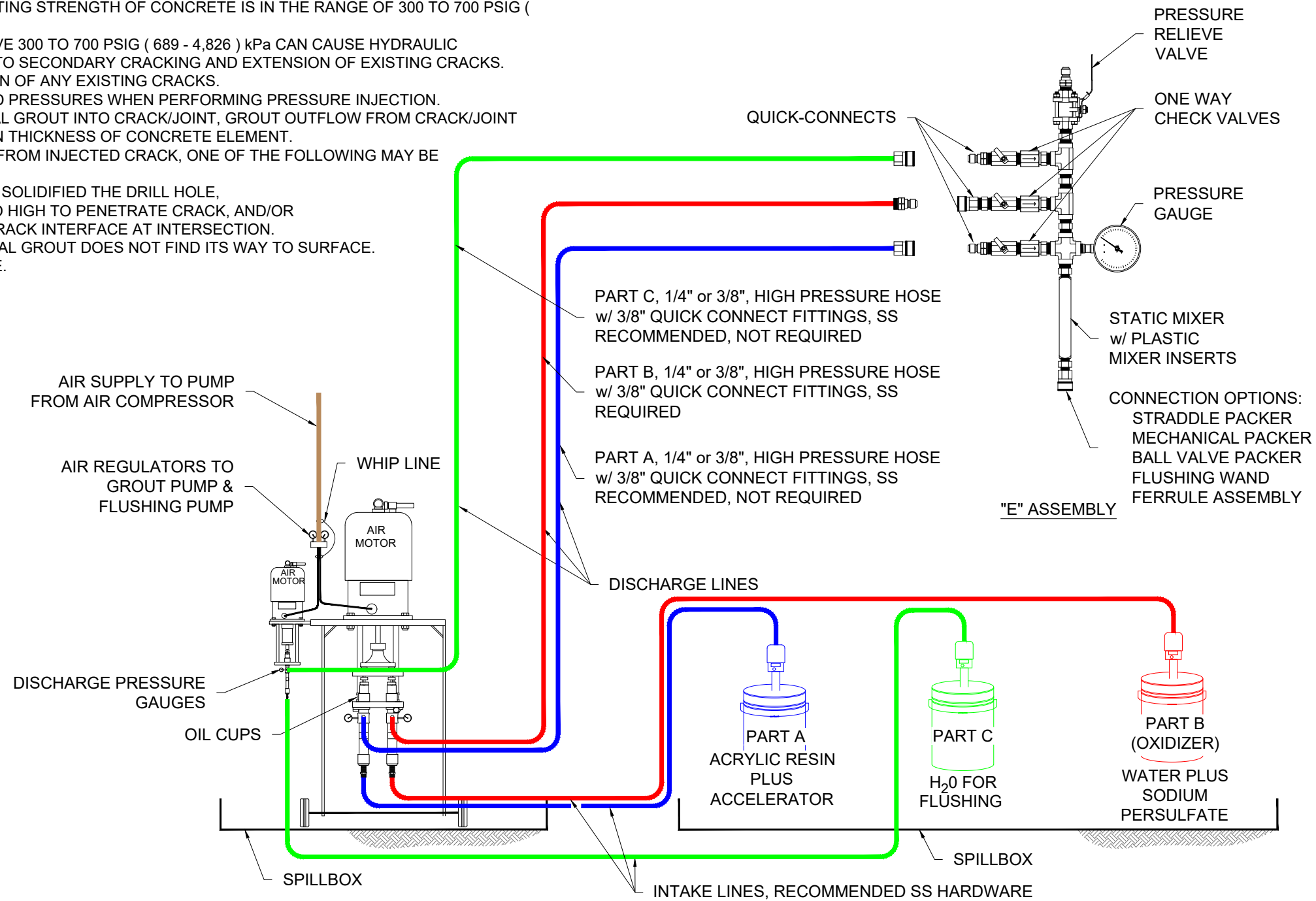
IV BY:

APP BY:

NO.	DATE	REVISIONS
0	1/23/2026	ISSUED FOR REVIEW
		TB
		BY

1. PRESSURE INJECTION PROCESS OF PACKERS:

- 1.1. PRESSURES OF 100 - 700 PSIG (689 - 4,826) kPa CAN CAUSE BACK SPLATTER OF GROUT AROUND PACKER.
 - 1.1.1. RESPIRATORY APPARATUS MAY BE REQUIRED DEPENDING UPON VENTILATION.
 - 1.1.2. EYE PROTECTION REQUIRED.
 - 1.1.3. SKIN PROTECTION REQUIRED, COVER-ALL'S, AND SIMILAR.
 - 1.1.4. ENSURE OSHA REQUIREMENTS FOR OPERATIONS ON LADDERS OR SCAFFOLDING ARE IN PLACE.
- 1.2. PRESSURE INJECTION OF CRACKS/JOINTS WITH CHEMICAL GROUT SHOULD START AT 100 PSIG (689) kPa AND PROCEED TO 500 PSIG (3,447) kPa; IF CRACKS ARE HAIRLINE (1-TO-4 MILS) 700 PSIG (4,846) kPa MAY BE REQUIRED DEPENDING UPON GROUT VISCOSITY.
- 1.3. DURING PRESSURE INJECTION OF GROUT, INCREASE PUMP PRESSURE IN 100 PSIG (689) kPa INCREMENTS.
 - 1.3.1. CAUTION: THE TENSILE OR RUPTURE/BURSTING STRENGTH OF CONCRETE IS IN THE RANGE OF 300 TO 700 PSIG (2,068 - 4,826) kPa.
 - 1.3.2. PUMPING FLUIDS INTO CRACKS AT OR ABOVE 300 TO 700 PSIG (689 - 4,826) kPa CAN CAUSE HYDRAULIC FRACKING OF CONCRETE; THIS WILL LEAD TO SECONDARY CRACKING AND EXTENSION OF EXISTING CRACKS.
 - 1.3.3. HYDRAULIC FRACKING WILL CAUSE DILATION OF ANY EXISTING CRACKS.
 - 1.3.4. DO NOT EXCEED 700 PSIG (4,826) kPa FLUID PRESSURES WHEN PERFORMING PRESSURE INJECTION.
 - 1.3.5. DURING PRESSURE INJECTION OF CHEMICAL GROUT INTO CRACK/JOINT, GROUT OUTFLOW FROM CRACK/JOINT SHALL BE IDENTIFIED AT LEAST 1/2 SECTION THICKNESS OF CONCRETE ELEMENT.
 - 1.3.6. NOTE: IF CHEMICAL GROUT CANNOT FLOW FROM INJECTED CRACK, ONE OF THE FOLLOWING MAY BE OCCURRING:
 - 1.3.6.1. CHEMICAL GROUT HAS GELLED AND SOLIDIFIED THE DRILL HOLE,
 - 1.3.6.2. CHEMICAL GROUT VISCOSITY IS TOO HIGH TO PENETRATE CRACK, AND/OR
 - 1.3.6.3. DRILLING DEBRIS STILL PLUG THE CRACK INTERFACE AT INTERSECTION.
 - 1.3.7. A NEW DRILL HOLE IS REQUIRED IF CHEMICAL GROUT DOES NOT FIND ITS WAY TO SURFACE.
 - 1.3.8. REPEAT PROCESS ON THE NEW DRILL HOLE.



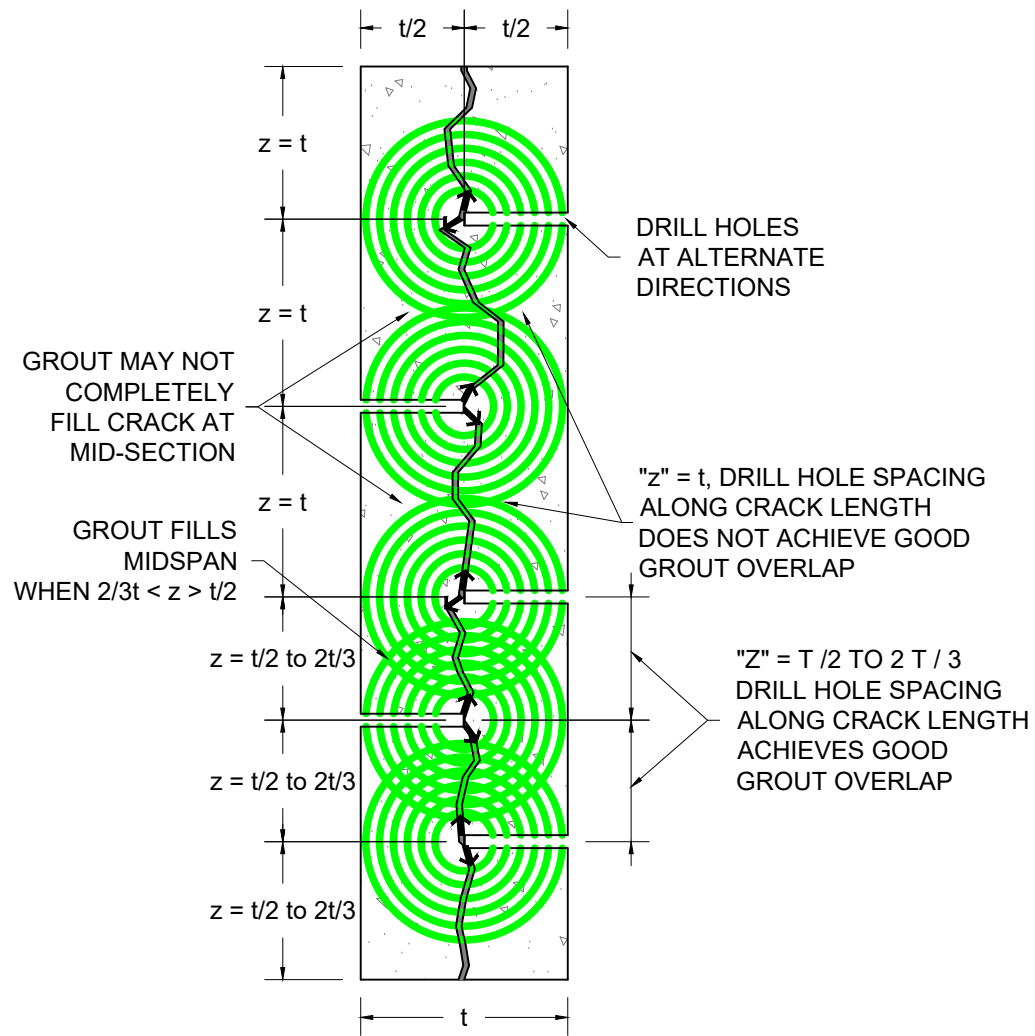
* NOTE - RE-CIRCULATING DISCHARGE LINES NOT SHOWN FOR CLARITY

Safety Related <input type="checkbox"/>	Augmented Quality <input type="checkbox"/>	Non-Safety Related <input type="checkbox"/>	DESIGN BY	BA	DATE	1/23/2026	ISSUED FOR REVIEW	TB	BY
			DRAWN BY	TB	NO.	0	REVISIONS		
			This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.						
			SHELL NORCO ALKY SUMP ACRYLATE DETAILS						
			ST JOB NO: 702736 SPS JOB NO: 698217 SHEET: 702736-D03-307						

structural TECHNOLOGIES
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
 10150 Old Columbia Rd.
 COLUMBIA, MD 21046
 Phone: 410-690-7000
 Fax: 410-690-4111

NOTES:

1. AT DRILL HOLE SPACING OF $z = t$, GROUT WILL EXTRUDE FROM CRACK SURFACE, HOWEVER, INSUFFICIENT CRACK FILL MAY OCCUR AT CONCRETE ELEMENT MID-SPAN
2. DRILL HOLE SPACING "z" ALONG CRACK LENGTH OF $t/2 - 2t/3$ ENSURES GOOD CRACK FILLING BETWEEN DRILL HOLES



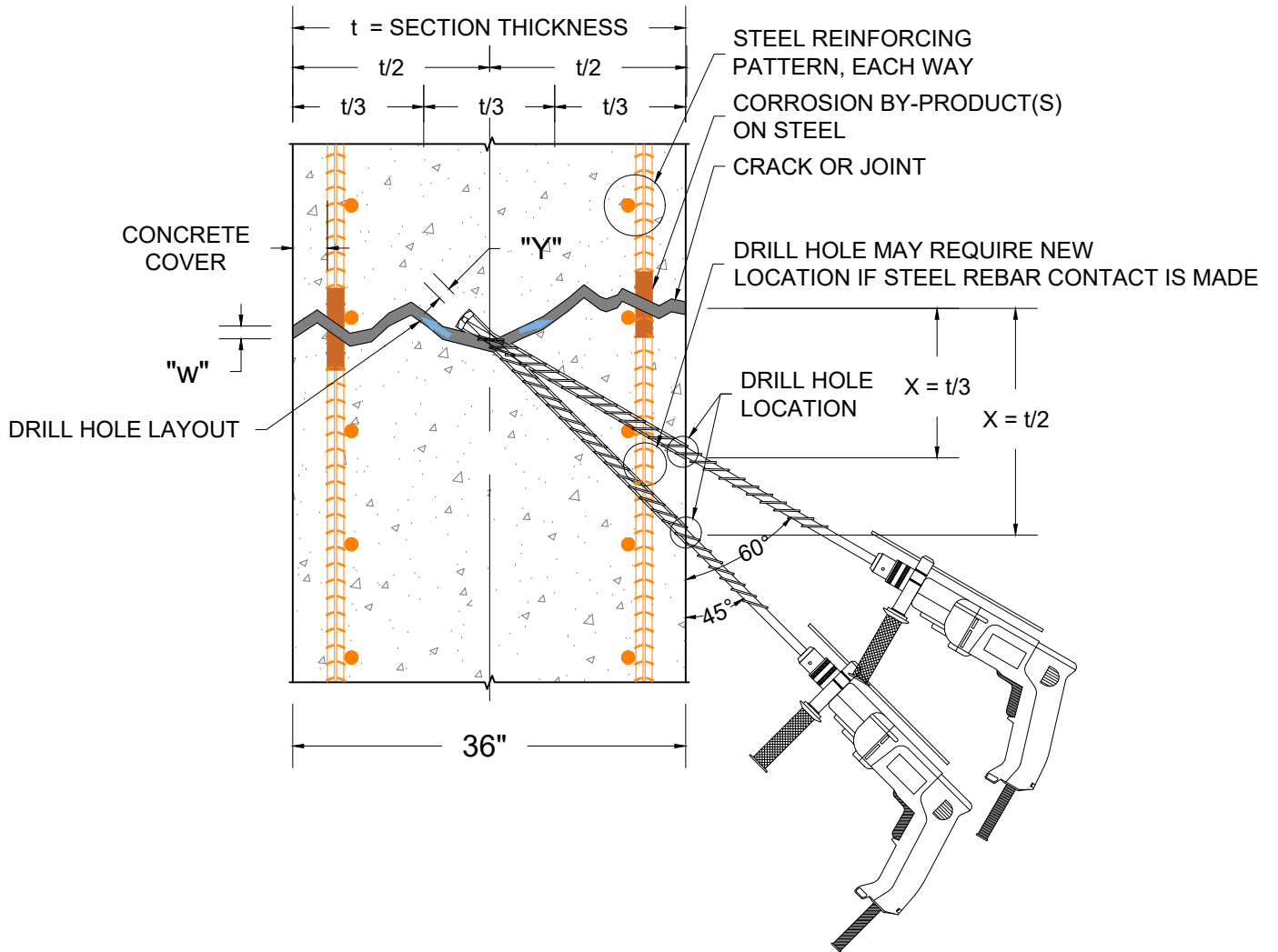
17 GROUT TRANSITION FROM PORT-TO-PORT ALONG CRACK

KEY:

- t = WALL / SLAB THICKNESS
- 1/3 t = INTERCEPTION ZONE AT CRACK SECTION
- X = MIN. DISTANCE FROM DRILL HOLE TO CRACK
- ⊖ = DRILLING ANGLE TO SUBSTRATE
- Y = DRILL HOLE DIAMETER
- t/2 = CENTER LINE OF ELEMENT W = CRACK WIDTH

NOTES:

1. INTERCEPTION GROUTING SHALL INTERSECT CENTER THIRD OF THE CONCRETE X-SECTION
2. DRILL HOLES ON CRACK SURFACE SHALL BE SPACED $2t/3$ TO $t/2$ APART
3. DRILL HOLES TYPICALLY ALTERNATE FROM SIDE-TO-SIDE, IF CRACK IS ANGULAR, DRILL HOLES CAN ALL BE FROM ONE SIDE. ACCESS MAY DICTATE THAT CONFIGURATION



18 DRILL HOLE ANGLE ADJUSTMENTS DUE TO OBSTRUCTIONS

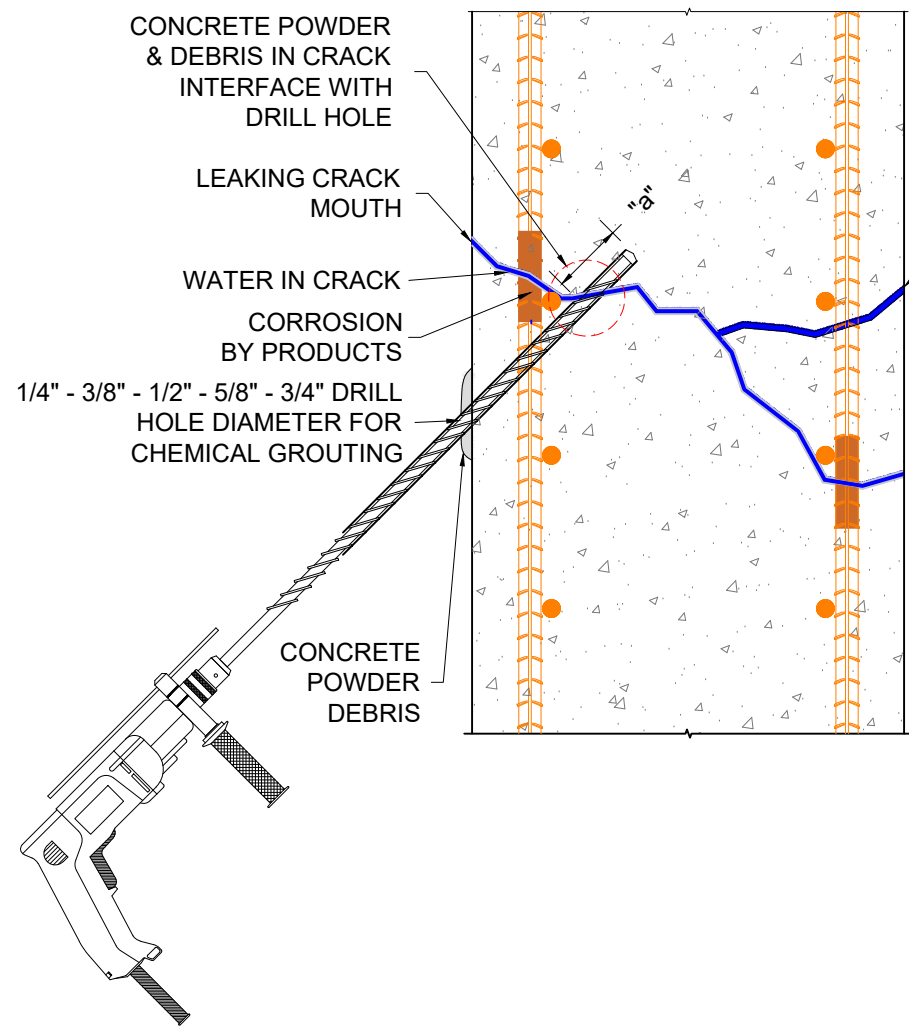
Safety Related <input type="checkbox"/>		Augmented Quality <input type="checkbox"/>		Non-Safety Related <input type="checkbox"/>	
SHELL NORCO ALKY SUMP		ACRYLATE DETAILS			
ST JOB NO: 702736		SPS JOB NO: 698217		SHEET: 702736-D03-309	
DESIGN BY: BA		DRAWN BY: TB		ISSUED FOR REVIEW: TB	
CHECKED BY: IV		APPROVED BY: APP		NO. 0	
DATE: 1/23/2026		DATE: 1/23/2026		REVISIONS	
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-650-7000 Fax: 410-650-4111					
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.					

KEY:

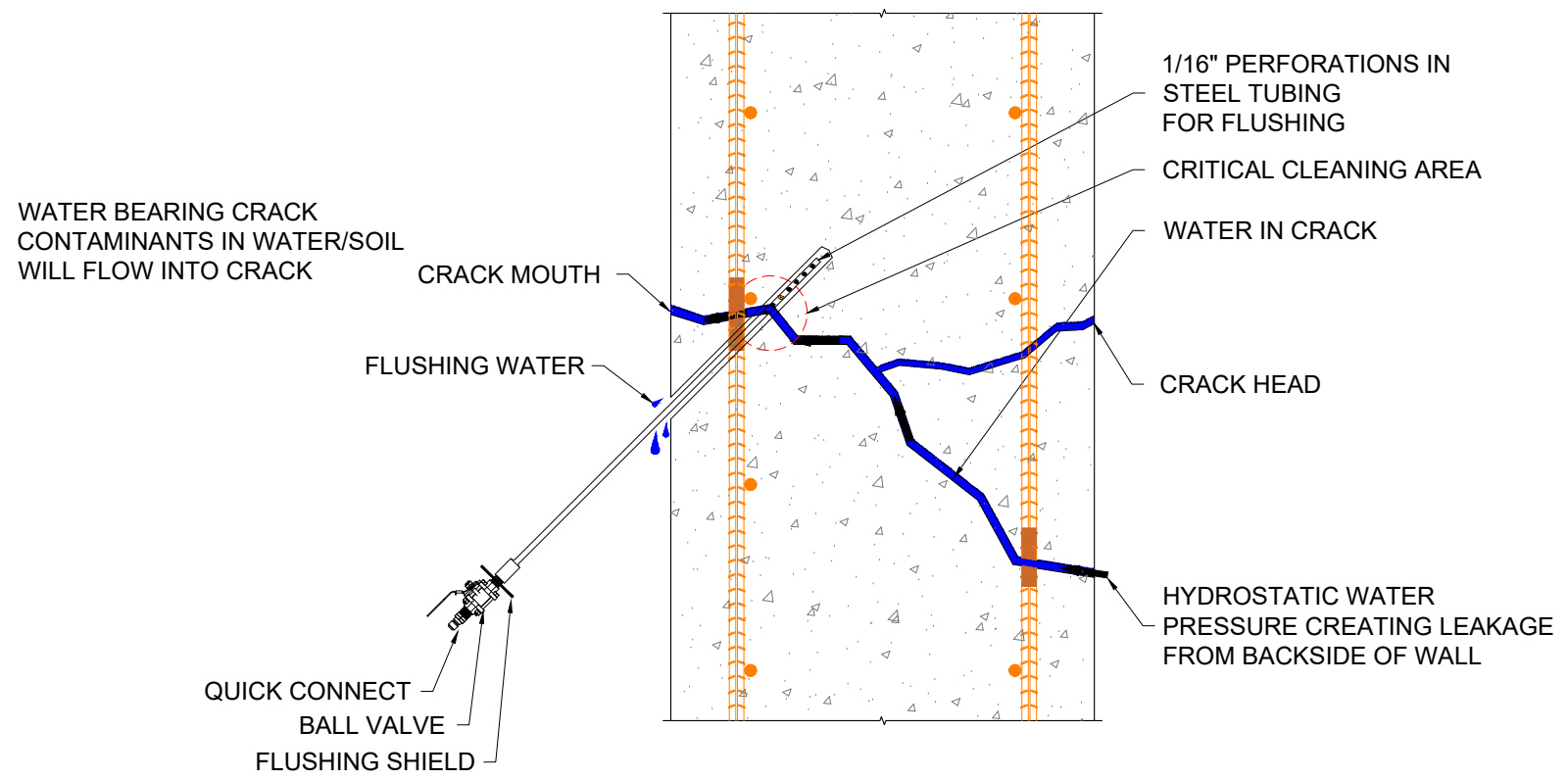
- t = WALL / SLAB THICKNESS
- 1/3 t = INTERCEPTION ZONE AT CRACK SECTION
- X = MIN. DISTANCE FROM DRILL HOLE TO CRACK
- ⊖ = DRILLING ANGLE TO SUBSTRATE
- Y = DRILL HOLE DIAMETER
- t/2 = CENTER LINE OF ELEMENT
- W = CRACK WIDTH

DRILL HOLE REQUIREMENTS:

1. DURING HAMMER DRILLING OPERATION OF DRILL HOLES, CONCRETE DEBRIS CAN BECOME LODGED IN CRACK SIDEWALLS, ESPECIALLY IF WET CONDITIONS EXIST.
2. CRACK SIDEWALLS CAN HAVE CLAY / SILT PARTICLES LODGED AT IRREGULARITIES.
3. CRACK SIDEWALLS NEAR STEEL REBAR MAY HAVE CORROSION BYPRODUCTS LODGED INTO IRREGULARITIES.
4. ASR BYPRODUCTS MAY BE PRESENT AT CRACK INTERFACES.
5. SULFATE AND CARBONATE CAN ACCUMULATE IN CRACKS.
6. BENTONITE CLAY PARTICLES AND ASPHALT RESIDUE FROM WATERPROOFING MEMBRANES CAN ACCUMULATE IN CRACK.



17 DRILLING PATTERN FROM PORT-TO-PORT ALONG CRACK



18 DRILL HOLE CLEANING

NOTES:

1. INSERT AIR FLUSHING WAND INTO DRILL HOLE
2. AIR BLAST HOLE TO RID DEBRIS
3. INSERT WATER FLUSHING WAND INTO DRILL HOLE
4. WATER BLAST HOLE TO RID DEBRIS
5. USE ABOUT 500 TO 1000 psi PRESSURE TO FLUSH DRILL HOLE

Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP
ACRYLATE DETAILS

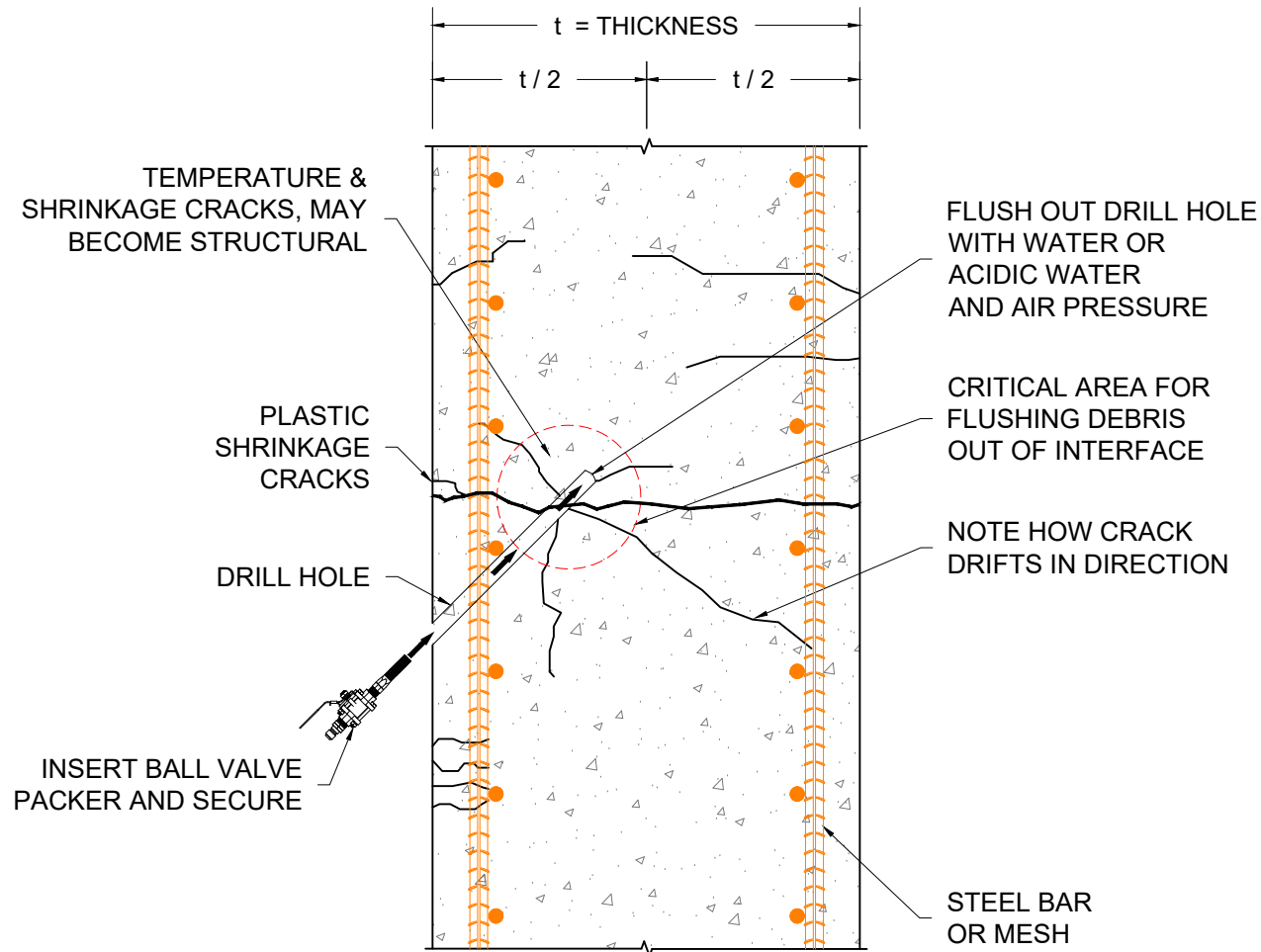
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

structural TECHNOLOGIES
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
10150 Old Columbia Rd.
COLUMBIA, MD 21046
Phone: 410-650-7000
Fax: 410-650-4111

DCSN BY	BA				
DWN BY	TB				
IV BY				ISSUED FOR REVIEW	TB
APP BY				REVISIONS	BY
				NO.	DATE
				0	1/23/2026

INSTALLATION OF INJECTION PACKERS OR PORTS:

1. SCREW PACKER INTO PLACE TO ENSURE LEAK-PROOF CONNECTION.
2. REMEMBER RING PRESSURE IS BEING EXERTED ONTO THE CONCRETE AREA DURING INSTALLATION, PRESSURES IN EXCESS OF 400 psi MAY CRACK CONCRETE.
3. BALL VALVE, RE-USABLE PACKERS ARE BEST TO USE FOR CHEMICAL GROUTING, ZERK PACKERS ARE ACCEPTABLE.
4. OPEN BALL VALVE ASSEMBLY AND ALLOW DRILL HOLE TO DRAIN WATER FROM LEAKING INTERCEPTED CRACK.

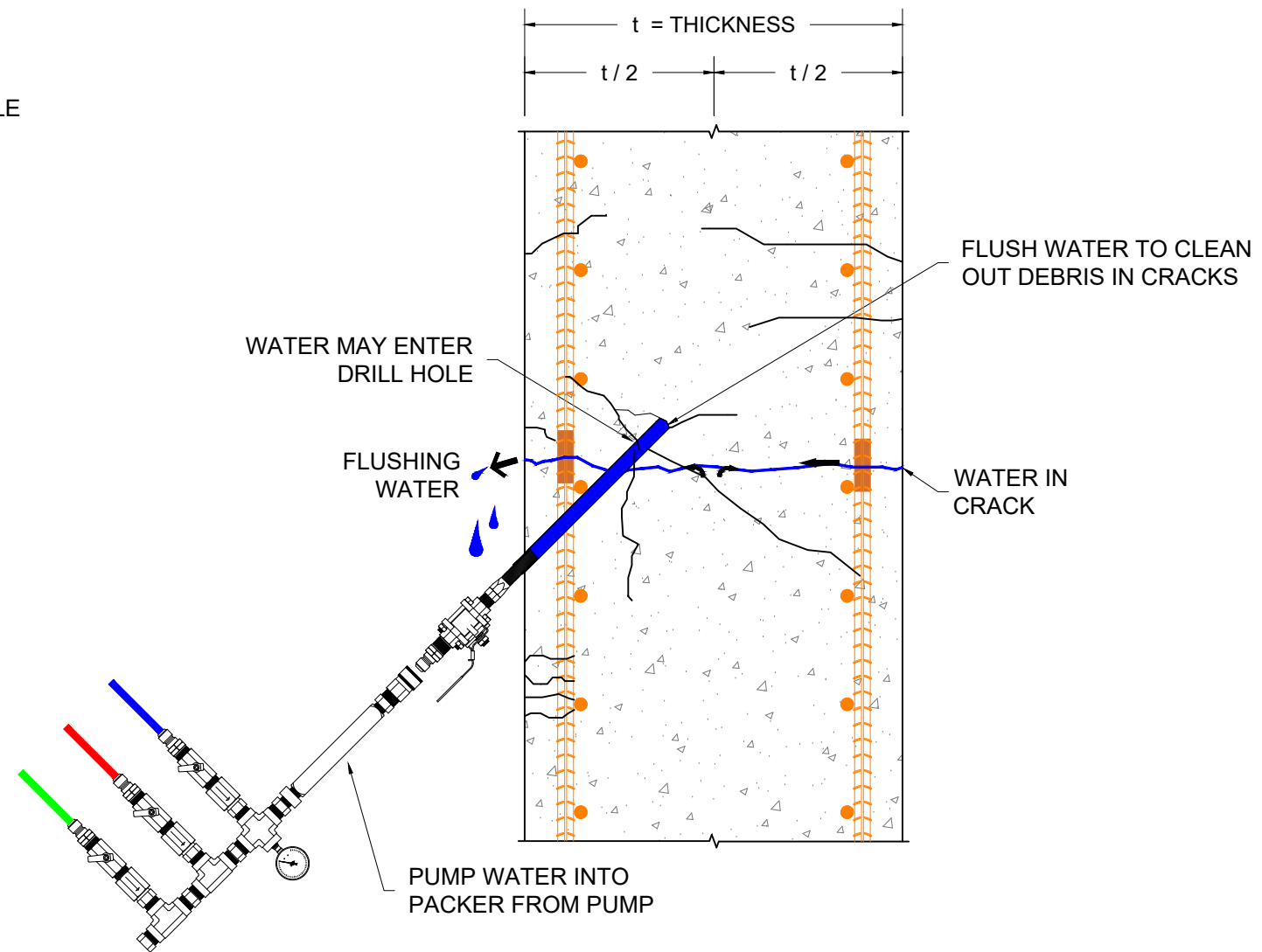


KEY:
 t = WALL / SLAB THICKNESS
 $1/3 t$ = INTERCEPTION ZONE AT CRACK SECTION
 X = MIN. DISTANCE FROM DRILL HOLE TO CRACK
 \ominus = DRILLING ANGLE TO SUBSTRATE
 Y = DRILL HOLE DIAMETER
 $t/2$ = CENTER LINE OF ELEMENT W = CRACK WIDTH

21 BALL VALVE PACKER

WATER FLUSHING THE DRILL HOLE AND CRACK:

1. AFTER AIR BLAST IS COMPLETED, FLUSH DRILL HOLE AND CRACK WITH SUFFICIENT WATER FOR 3 MINUTES TO ENSURE WATER TRANSLATES FROM DRILL HOLE TO DRILL HOLE AND EXTRUDES OUT MOUTH OF CRACK.
2. IF WATER DOES NOT EXTRUDE OUT MOUTH OF CRACK, DRILL NEW HOLE BECAUSE TRANSLATION IS NOT SATISFIED.
3. IF CRACKS DO NOT TAKE WATER AT 400 psi GAUGE PRESSURE, IT WILL NOT TAKE CHEMICAL GROUT AT SAFE GROUTING PRESSURES.
4. FLUSHING THE CRACK WITH WATER WILL ENSURE TRANSLATION FROM PACKER TO PACKER.
5. FLUSHING THE CRACK WILL PUSH DRILL HOLE DEBRIS, SILT / CLAY RESIDUE TRAPPED WITHIN CRACK TO MOUTH.
6. ACID FLUSH WITH MURIATIC ACID (5% SOLUTION) IS SOMETIMES DONE TO DISSOLVE CALCIUM CARBONATE RESIDUE NEAR MOUTH OF CRACK.
7. CRACKS MAY REQUIRE FLUSHING WITH 5% HCL OR PHOSPHORIC ACID AND 95% WATER TO DISSOLVE CALCITE / CARBONATE / SULFATE BUILDUPS.



22 DRILL HOLE FLUSHING WITH WATER AND ACIDIC ACID

Safety Related Augmented Quality Non-Safety Related

SHELL NORCO ALKY SUMP

ACRYLATE DETAILS

ST JOB NO: 702736
 SPS JOB NO: 698217
 SHEET: 702736-D03-311

structural TECHNOLOGIES
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
 10150 Old Columbia Rd.
 COLUMBIA, MD 21046
 Phone: 410-650-7000
 Fax: 410-650-4111

DESIGN BY	BA
DRAWN BY	TB
IN BY	
APP BY	
NO.	0
DATE	1/23/2026
ISSUED FOR REVIEW	TB
REVISIONS	BY

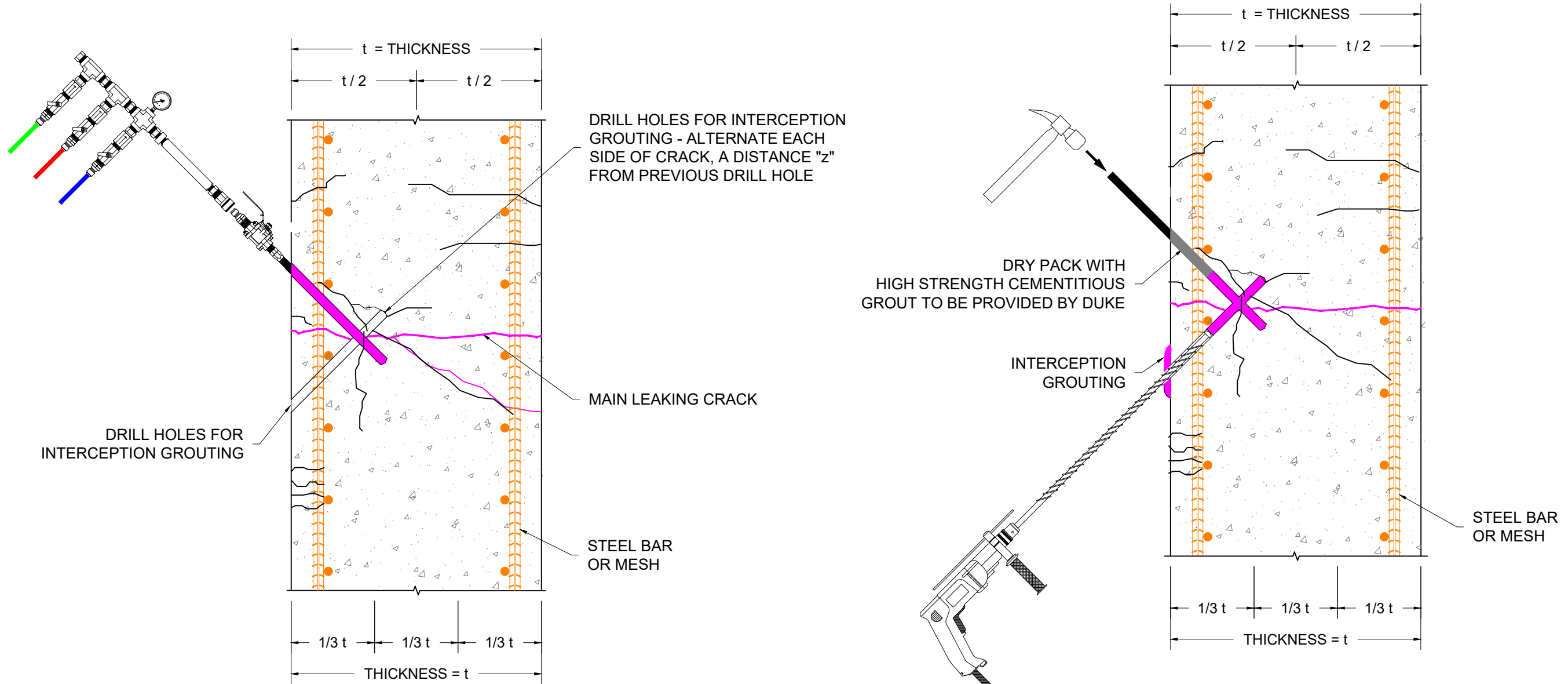
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

CRACK INJECTION PRESSURES:

1. PRESSURES REQUIRED FOR CRACK INJECTION DEPEND ON GROUT VISCOSITY AND CRACK WIDTH.
2. HYDRAULIC FRACKING STARTS TO OCCUR IN CONCRETE AT APPROXIMATELY 500 - 700 PSIG (3,447 - 4,826) kPa.
3. FORMULATE GEL / FOAM TIME OF GROUT TO ENSURE SUFFICIENT TIME DURING INJECTION.
4. START INJECTION AT 100 TO 200 PSIG (689 - 1,379) kPa, IF RESISTANCE OCCURS, INCREASE PRESSURE IN 100 PSIG (689) kPa INCREMENTS UNTIL FLOW OCCURS AT CRACK SURFACE.
5. ENSURE GROUT FLOWS TO ADJACENT PORT MID-SPACE.

DRILL HOLE RESTORATION:

1. INJECTION PACKERS SHALL BE REMOVED FROM THE DRILL HOLE.
2. DRILL HOLES SHALL BE RE-DRILLED AND FLUSHED WITH PRESSURIZED WATER TO RID DEBRIS, DRY PACK WITH HIGH STRENGTH CRYSTALLINE GROUT.
3. PLACE GROUT IN LIFTS AND PACK WITH ROUND METAL BAR OR WOOD DOWEL IN 2-4 INCH (50-100) MM LIFTS.
4. FLUSH OFF DRILL HOLE WITH CRYSTALLINE MORTAR AT WALL FACE.
5. FILL ALL UNUSED DRILL HOLES WITH HIGH STRENGTH CRYSTALLINE GROUT.



KEY:
 t = WALL / SLAB THICKNESS
 $1/3 t$ = INTERCEPTION ZONE AT CRACK SECTION
 X = MIN. DISTANCE FROM DRILL HOLE TO CRACK
 \odot = DRILLING ANGLE TO SUBSTRATE
 Y = DRILL HOLE DIAMETER
 $t/2$ = CENTER LINE OF ELEMENT W = CRACK WIDTH

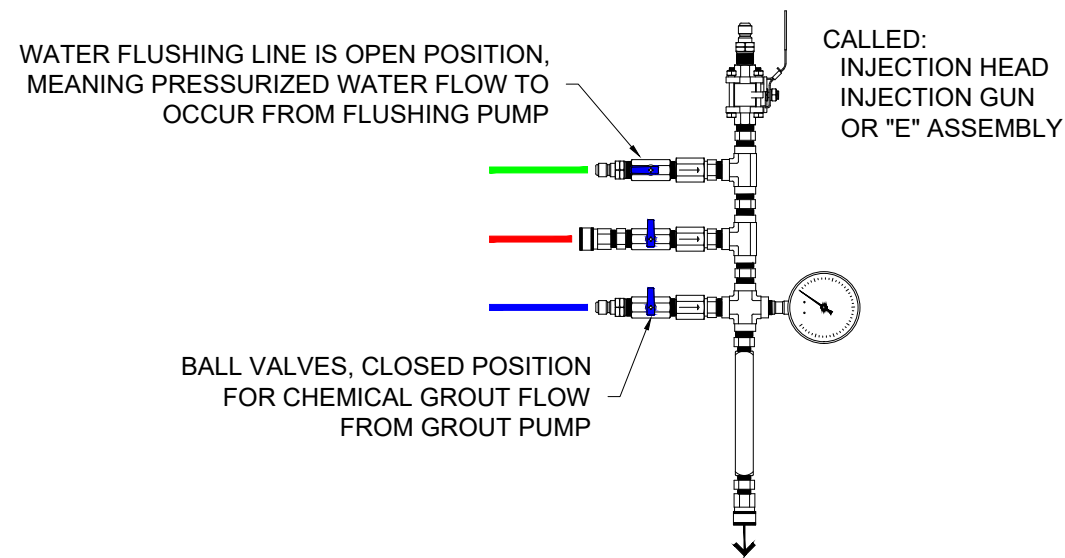
23 **TYPICAL DRILL HOLE RESTORATION**
 MULTIPLE CRACKS

24 **TYPICAL DRILL HOLE RESTORATION**
 MULTIPLE CRACKS

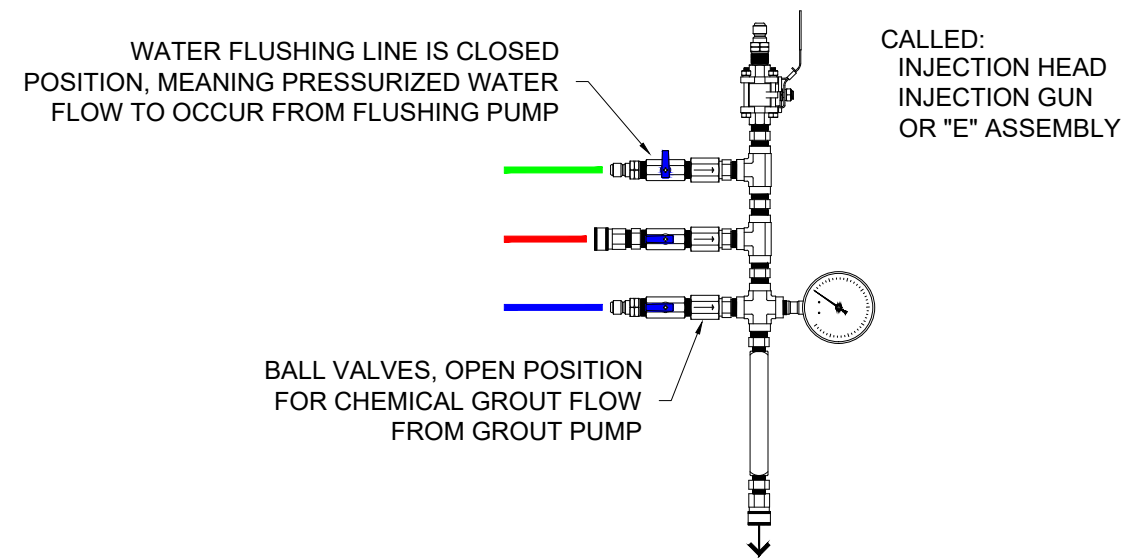
Safety Related <input type="checkbox"/>		Augmented Quality <input type="checkbox"/>		Non-Safety Related <input type="checkbox"/>	
SHELL NORCO ALKY SUMP		ACRYLATE DETAILS		REVISIONS	
ST JOB NO:	702736	ISSUED FOR REVIEW	NO.	DATE	BY
SPS JOB NO:	698217	0	1/23/2026	TB	
SHEET:	702736-D03-312				

structural TECHNOLOGIES
 STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
 10150 Old Columbia Rd.
 COLUMBIA, MD 21046
 Phone: 410-650-7000
 Fax: 410-650-4111

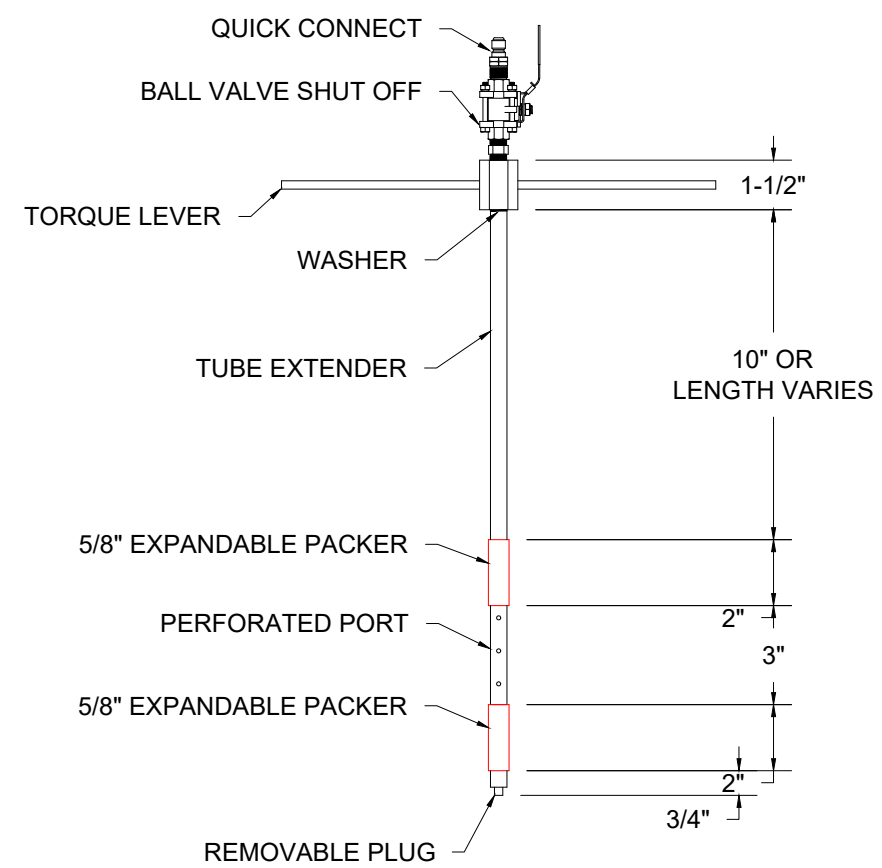
This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.



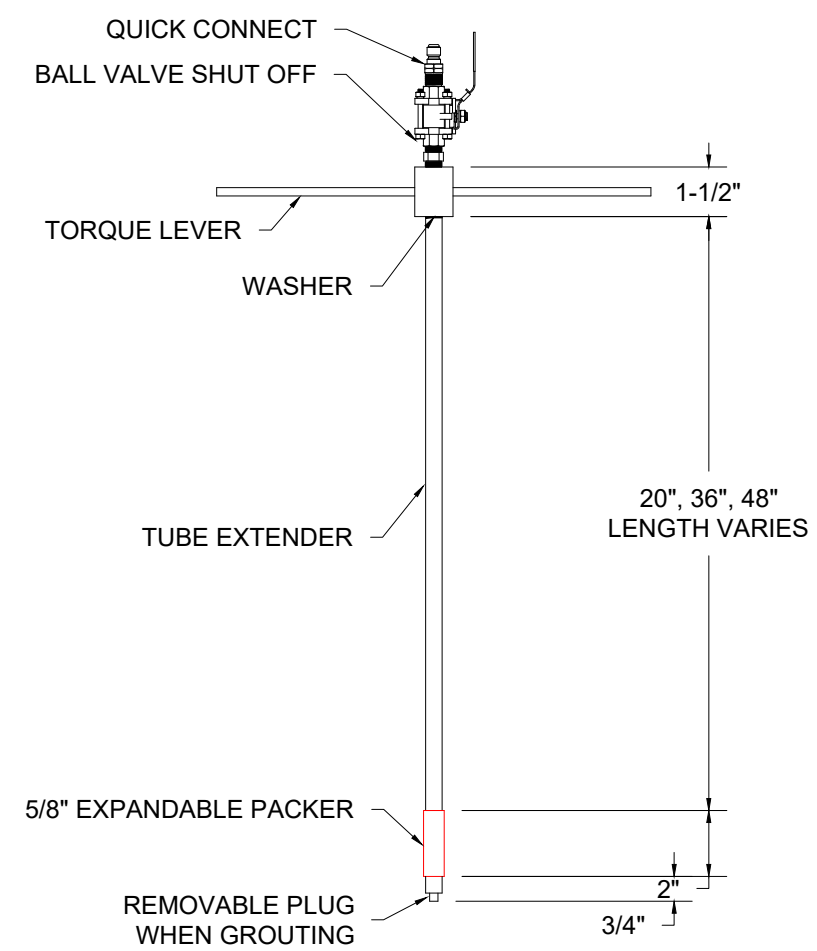
26 "E" ASSEMBLY



27 "E" ASSEMBLY



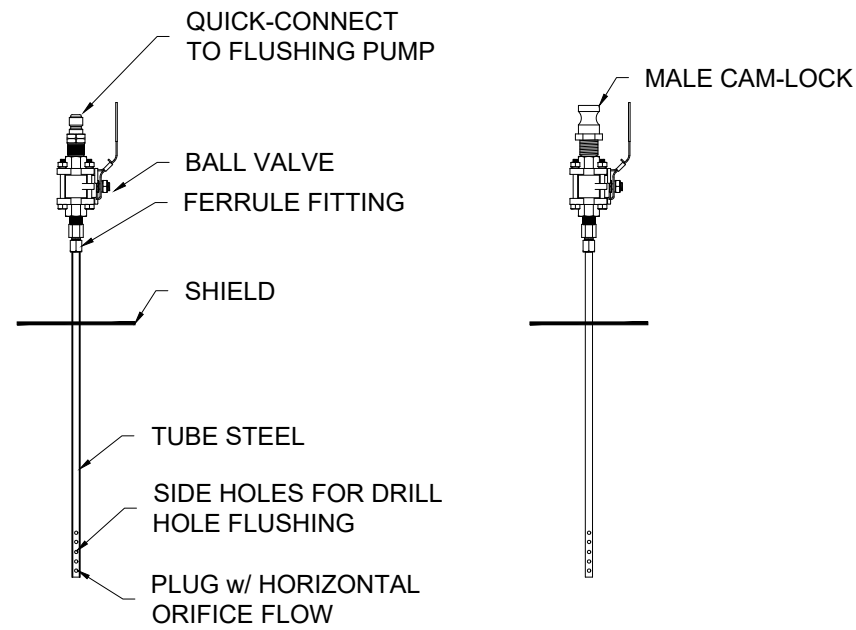
28 STRADDLE MECHANICAL PACKER



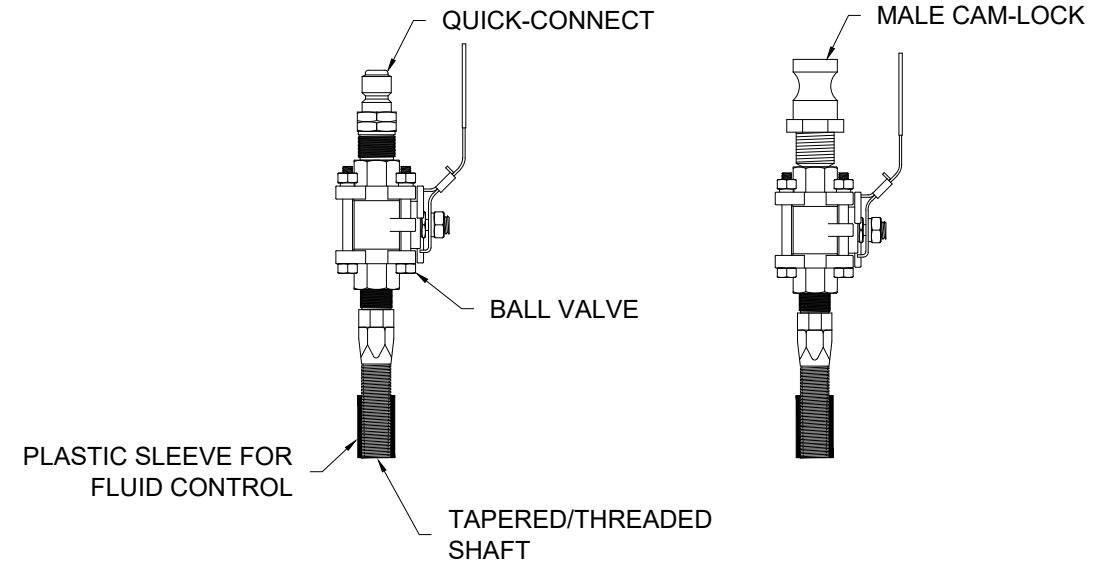
29 VARIABLE LENGTH MECHANICAL PACKER

30 POLYACRYLATE GROUT, CRACK / JOINT INJECTION
EXAMPLES OF GROUTING ACCESSORIES

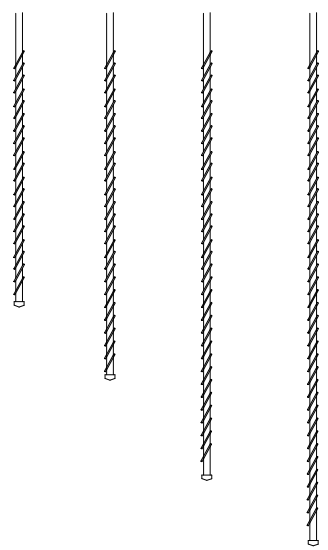
Safety Related <input type="checkbox"/>	Augmented Quality <input type="checkbox"/>	Non-Safety Related <input type="checkbox"/>	ST JOB NO: 702736	
			SPS JOB NO: 698217	
			SHEET: 702736-D03-314	
			ACRYLATE DETAILS	
<p>STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC. 10150 Old Columbia Rd. COLUMBIA, MD 21046 Phone: 410-650-7000 Fax: 410-650-4111</p>			DESIGN BY: BA	DATE: 1/23/2026
<p>This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.</p>			DRAWN BY: TB	NO. 0
			ISSUED FOR REVIEW	REVISIONS
			BY: TB	BY:



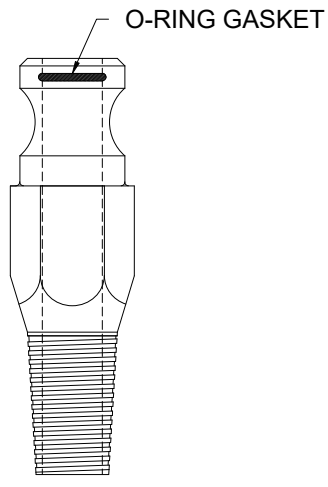
31 DRILL HOLE FLUSHING WANDS



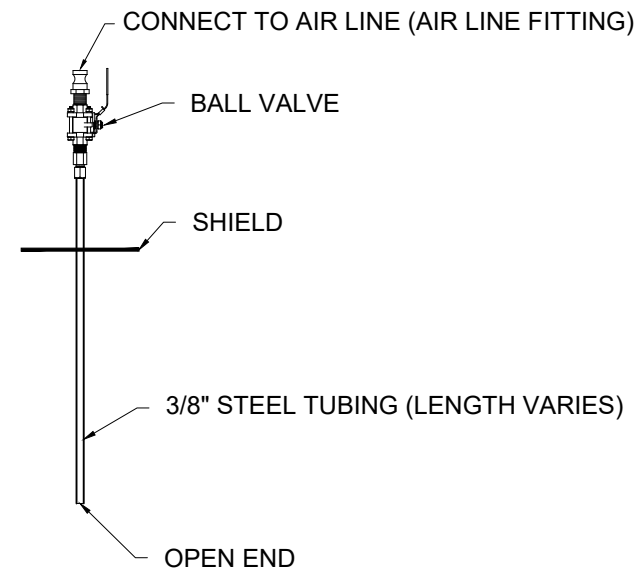
32 (TSBV) PACKERS
TAPARED SHAFT, BALL VALVE (TSBV)



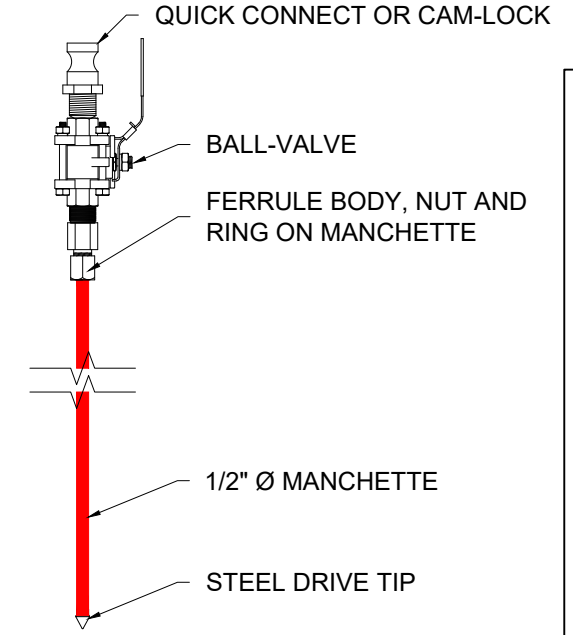
33 DRILL BITS OF VARIOUS LENGTHS & DIAMETERS



34 JA PACKER



35 AIR FLUSHING WAND
FOR INITIAL DRILL HOLE CLEANING



36 MANCHETTE HEAD ASSEMBLY

37 POLYACRYLATE GROUT, CRACK / JOINT INJECTION
EXAMPLES OF GROUTING ACCESSORIES

Safety Related Augmented Quality Non-Safety Related

This document, including any drawings, specifications, and calculations herein, contains information that is proprietary to Structural Technologies Solutions, LLC. This document and the information contained herein is confidential, and may not be reproduced or disclosed without the prior written consent of Structural Technologies Solutions, LLC. Further, the use of this document or any information presented herein is restricted to the specific project and purpose for which it was prepared. Any other use is strictly prohibited. Structural Technologies Solutions, LLC DISCLAIMS ANY LIABILITY for any unauthorized, unintended or other impermissible use of this document or any information it contains.

SHELL NORCO ALKY SUMP
ACRYLATE DETAILS

ST JOB NO: 702736
SPS JOB NO: 698217
SHEET: 702736-D03-315

DESIGN BY	BA
DRAWN BY	TB
ISSUED FOR REVIEW	TB
NO.	0
DATE	1/23/2026
REVISIONS	

structural TECHNOLOGIES
STRUCTURAL TECHNOLOGIES SOLUTIONS, LLC.
10150 Old Columbia Rd.
COLUMBIA, MD 21046
Phone: 410-650-7000
Fax: 410-650-4111