



ARCH CLEANING & RESTORATION

STANDARD OPERATING PROCEDURE



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SOP DOCUMENT

OVERVIEW

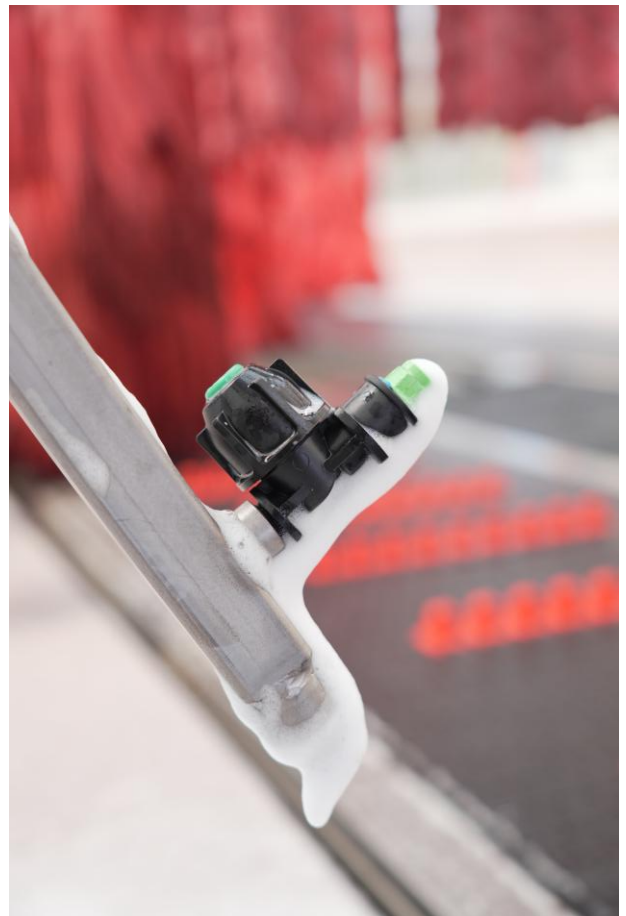
Introduction

Purpose

The goal of this SOP is to provide Tommy's Express locations with a single standard procedure for diagnosing, cleaning, restoring, and verifying arch components when coverage, foam quality, or spray performance is weak or inconsistent.

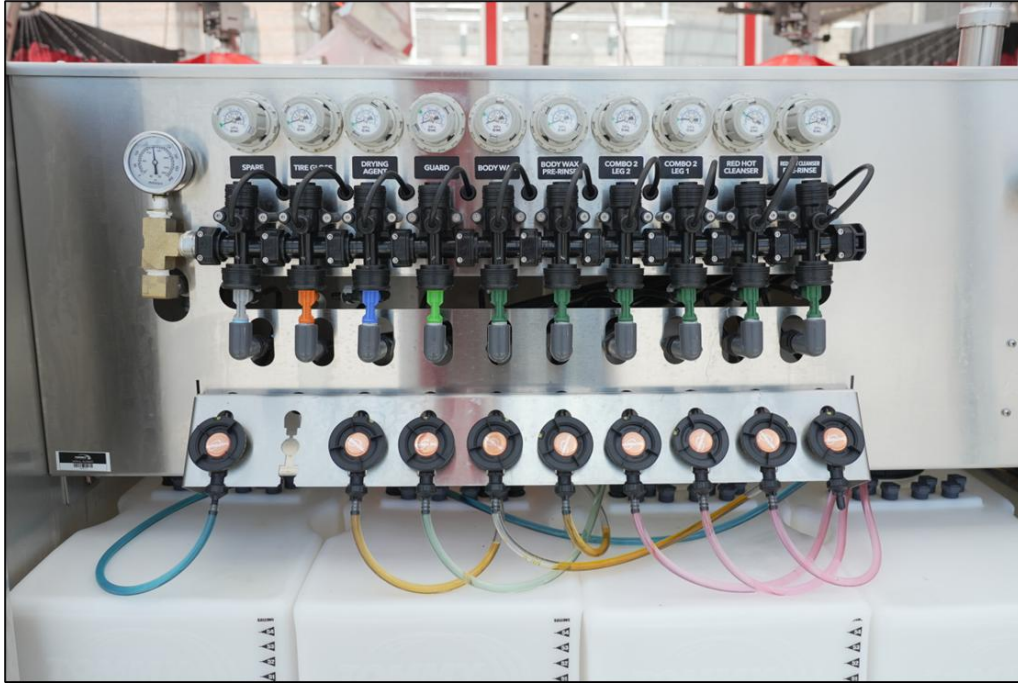
Use This SOP When

- Detergent foam coverage is uneven, watery, or subpar across the vehicle.
- Detergent is not pulled into the injector during operation.
- Nozzles or manifold holes are clogged and/or spraying irregularly.
- Foamers, ports, or tubing are suspected to be restricted.



Standard Detergent Flow

Foot Valve / 3/8" Polyline → Versadial / Hydra-Flex / Injector → 1/2" Stainless & Poly Tubing → Foam Generator → Rainbar / Arch Manifold → Check Valve / Nozzle



Cleaning Section Outline

Each cleaning procedure is organized into three progressive levels to standardize troubleshooting and ensure issues are addressed efficiently without unnecessary disassembly. Each level builds on the previous, moving from easily accessible components to deep cleaning manifolds.

This structure helps Team Members:

1. Follow a consistent, step-by-step approach.
2. Isolate the source of restriction or performance loss.
3. Avoid skipping critical checks or over-servicing components.
4. Escalate only when required based on system condition.

Cleaning Levels

Level 1 - Surface Cleaning

Level 1 is intended for fast, non-invasive correction of minor issues. This includes isolated clogged nozzles, slight spray pattern inconsistencies, or light debris affecting coverage. It should always be the first step before moving into more involved cleaning.

The goal is to restore a full, even spray pattern with minimal downtime. If proper coverage is not achieved after this step, Level 2 is required.

Level 2 - Component Cleaning

Level 2 is used when problems are more widespread or persistent. This includes multiple clogged ports, poor foam quality, heavy buildup in the manifold or rainbar, or recurring issues after Level 1 cleaning.

The goal is to restore consistent flow and proper detergent performance across the entire component. If flow issues or inconsistencies remain after reassembly and testing, the problem is likely deeper in the system and requires escalation to Level 3.

Level 3 - Line Clearing

Level 3 is reserved for situations where Levels 1 and 2 do not resolve the issue and a restriction within the supply lines is suspected. This typically presents as continued low flow, uneven distribution, or intermittent detergent delivery despite clean components.

The goal is to restore full, unrestricted flow throughout the system. Because this is the most invasive level, it should only be performed after confirming that the previous levels were completed correctly.



Safety Requirements

1. Ensure the wash is not running during deep cleaning.
2. Wear **required PPE** before handling nozzles, manifold components, tubing, detergent, or cleaning chemicals.
3. Confirm the discharge path is controlled before any manual test or line-clearing step.
4. Keep all Team Members clear of nozzles, open tubing ends, and manifold discharge points during testing.



WARNING: Failure to follow proper safety procedures may result in **serious injury** or exposure to chemicals.



Expanded Detergent Safety & Spill Response

Tunnel Detergent PPE

- Wear chemical-resistant gloves such as nitrile or neoprene when handling detergents or working inside the tunnel.
- Use safety goggles or a face shield anywhere splashing or overspray is possible.
- Use non-slip, detergent-resistant footwear in wet tunnel areas.
- If inhalation risk is present in an enclosed area, follow the SDS and site safety guidance for appropriate respiratory protection.



Spill Cleanup and Emergency Response

- Immediately contain spills with absorbent materials or spill-kit supplies from the detergent storage area.
- For spill cleanup, wear detergent-resistant gloves, goggles, a face shield, detergent-resistant footwear, and a full-body protective suit as needed for exposure level.
- Ventilate enclosed spaces during spill cleanup, dispose of contaminated material according to the SDS, and report/document the incident with a supervisor.
- Know the nearest eye wash station before beginning work. If detergent gets into the eyes, hold eyelids open and flush with water for at least 15 minutes, then seek medical attention immediately.

Digital
SDS DATABASE



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Pre-job Assessment

1. Identify the affected arch function.
2. Observe the issue: weak coverage, uneven pattern, dead holes in the manifold, poor foaming, or visible leaks.
3. Determine whether the issue appears isolated to one or two nozzles, a manifold section, the foamer assembly, or a major restriction within the tubing/polyline.
4. Begin with Level 1 unless the condition clearly requires Level 2.



Figure 1 - Tommy Guard® | 4 lb. Check Valve & K-Nozzle

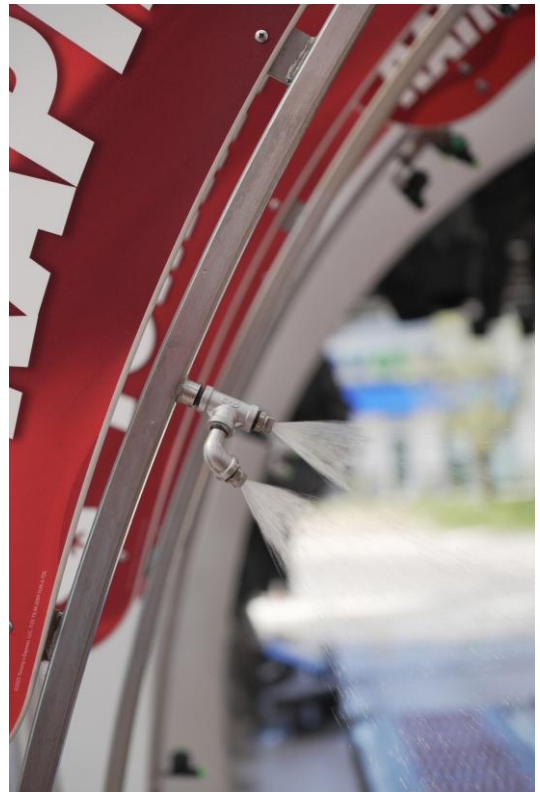


Figure 2 - Rapid Rinse | 1/4" 4010 Nozzle

Success Criteria

- No leaks are visible during function test
- Spray pattern and foam output are restored
- Coverage is even and consistent

Potential Replacement Parts

Category	Item	Part No.
Arch	10E80 1/4" Male PVDF Spray Nozzle	P-CHE-2108
Arch	03E80 1/4" Male PVDF Spray Nozzle	P-WAT-2135
Arch	10E40 1/4" Male PVDF Spray Nozzle	P-CHE-2107
Arch	05E80 1/4" Male PVDF Spray Nozzle	P-WAT-2133
Tommy Guard	1/4" Stainless "K" Design Spray Nozzle (1/4k-SS15)	P-CHE-2049
Rapid Rinse	4010 1/4" Stainless MEG Spray Nozzle	P-WAT-2192
Tire Gloss	11002: 1/4" Male Stainless H-VV Spray Nozzle (0.3 GPM)	P-WAT-2243
Wheel Blaster	Blast-Tec Pro 324 Rotating Turbo Nozzle	P-CHE-2138
Foamer	Twist n' Kleen Foam Generator	P-CHE-2132
Foamer	Twist N Clean Foam Generator Replacement Insert	P-CHE-2140



Level 1 - Nozzle Inspection & Cleaning

Required PPE, Tools, and Materials

PPE

- Safety glasses
- Gloves
- Hearing protection as required by site conditions

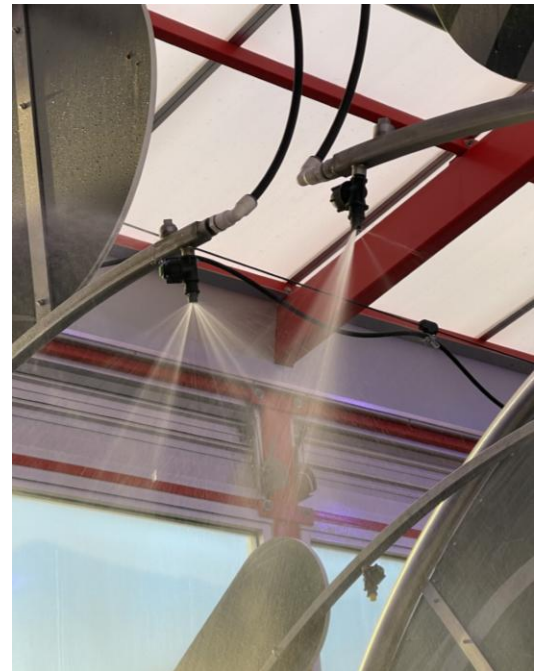
Tools and cleaning materials

- 9/16 in. wrench
- Adjustable wrench
- Pliers
- Various Replacement Nozzles
- Thread tape
- Small welding tip cleaner
- Ladder

WARNING: Keep all personnel clear of discharge ports and spray areas and avoid direct contact with detergents during operation or testing.

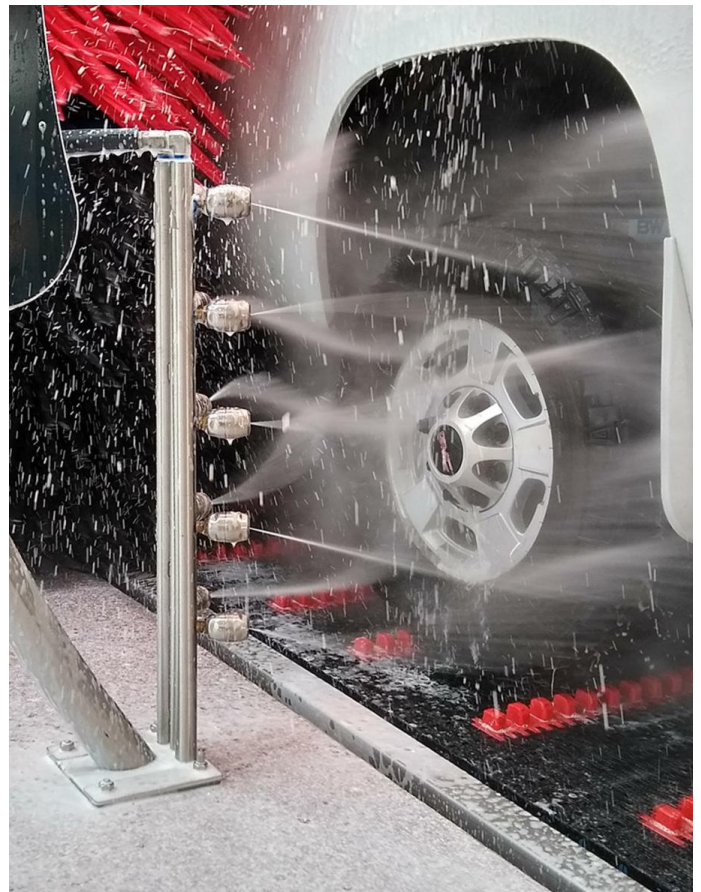
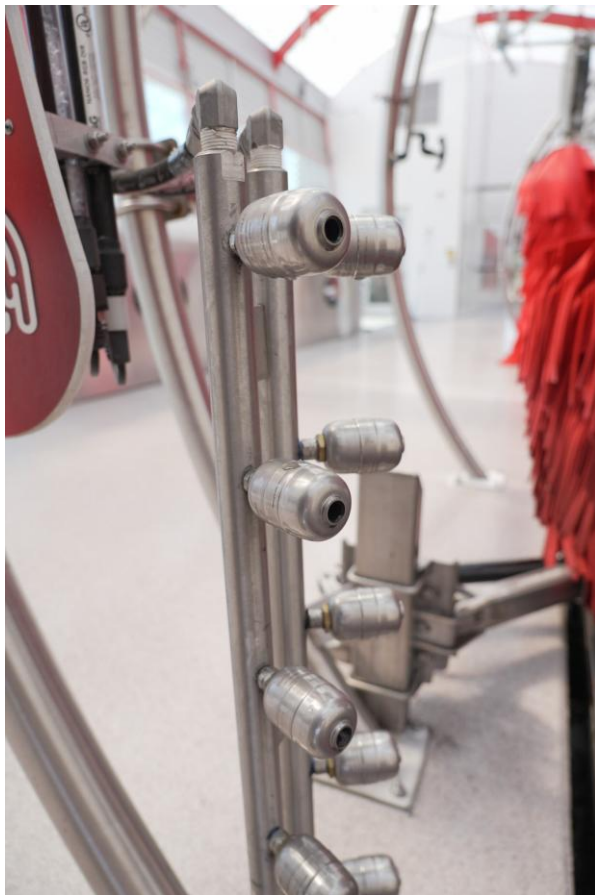
Standard Nozzles

1. Ensure the wash is not running.
2. Put on PPE.
3. Remove the clogged nozzle from the arch.
4. Rinse the nozzle with water.
5. Remove debris with a small welding tip cleaner.
6. **Do not blow on the nozzle.**
7. Apply thread tape to the nozzle threads, exposing the last few threads.
8. Reinstall the cleaned nozzle in the correct location.
9. Test the function manually.
10. Inspect for leaks and check spray pattern.



High-Pressure Nozzles

1. Ensure the wash is not running.
2. Remove the nozzle from the high-pressure blaster manifold.
3. Remove the dome screen and rinse thoroughly in the sink; replace if damaged.
4. Secure the nozzle halfway in a vise.
5. Use pliers to remove the stainless-steel cap.
6. Use two adjustable pliers or wrenches to loosen the thin retaining nut on the back of the nozzle.
7. Remove the remaining cap half.
8. Split the inner body and expose the internal components.
9. Clean and rinse each internal component individually.
10. Reassemble in reverse order.
11. Apply thread tape to the nozzle threads, reinstall the nozzle, and test for leaks.



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Nozzle Inspection & Cleaning Video (Including HPP)

Inspect, Clean, and Replace Nozzles in the Wash

 **Wash must be closed**

 **Upon Inspection**  **5 - 20 Minutes**
(Depends on Amount)

 **Tools Needed:**

- Gray 10E80 Nozzle (P-CHE-2108)
- Red 03E80 Nozzle (P-WAT-2135)
- Gray 10E40 Nozzle (P-CHE-2107)
- Yellow 05E80 Nozzle (P-WAT-2133)
- Stainless Steel High Pressure Rinse Nozzles (P-WAT-2192)
- Stainless Steel K-Nozzles (P-CHE-2049)
- Stainless Steel Tire Shine Nozzles (P-WAT-2243)

Helpful Documents

2025 Metering Tip Detergent Standard

2025 Versadial Detergent Standard

Level 1 Success: Spray pattern is restored, no leaks are present, and coverage is visibly improved. If not, move to Level 2.

Level 2 - Manifold, Rainbar, & Foamer Cleaning

Required PPE, Tools, and Materials

PPE

- Safety glasses
- Gloves
- Hearing protection as required by site conditions

Tools and cleaning materials

- C-Sprayer (P-M2086)
- Foam Generator (P-CHE-2132)
- Foam Generator Insert (P-CHE-2140)
- Bay Wash Gun
- Ladder

Procedure

1. Remove all foamers from the manifold.
2. Remove the foam inserts.
3. Clean the inserts or replace them depending on wear and age.
4. Clean the foam generators, with the insert removed, with a Scotch-Brite pad and Tommy Brite or Dawn dish soap.
5. Rinse the generators thoroughly in the sink.
6. Remove the black 9-hole foaming head.
7. Spray out both sprayers with the bay wash gun.
8. Flush the wax manifold starting at one end.
9. Repeat the flush from the opposite end.
10. Spray each hole from underneath the manifold.
11. Reinstall all foamers, fittings, and nozzles on the manifold.
12. Manually fire the affected function.
13. Check for correct coverage.
14. If coverage is still inconsistent, repeat cleaning once more before escalating to Level 3.



Manifold, Rainbar, & Foamer Cleaning Video

Body Wax Rain Bar Manifold

Wash must be closed

Inspect Monthly
clean out if needed

45 Minutes

Tools Needed:

- Power sprayer
- Ladder
- Scotch Brite pad
- Tommy Brite

Helpful Videos

Video: Foam Generator Clean Out

Video: Replace Foot Valve, Weights, and Draw line (Detergents)

Level 2 success standard: Manifold holes are open, foamers are reinstalled correctly, output is even, and coverage improves across the full target area.

Level 3 - Poly & Stainless Line Clearing

Use this procedure only if, after cleaning the nozzle, manifold, and foamer, the output has not been restored to proper levels.

Required PPE, Tools, and Materials

PPE

- Safety glasses
- Gloves
- Hearing protection as required by site conditions

Tools and cleaning materials

- Foam Ear Plugs
- Ladder
- 1/2" Black Nylon Tubing (P-WAT-3121)

Procedure

1. At the arch, disconnect the 1/2" polyline from the manifold that connects to the stainless-steel tubing.
2. At the POD, disconnect the 1/2" polyline from the injector.
3. Inspect the inner diameter of both polylines for buildup. If buildup is present, replace the 1/2" polylines.
4. Insert one foam earplug into the disconnected 1/2" polyline at the injector.
5. Reconnect the 1/2" polyline to the bottom of the injector.

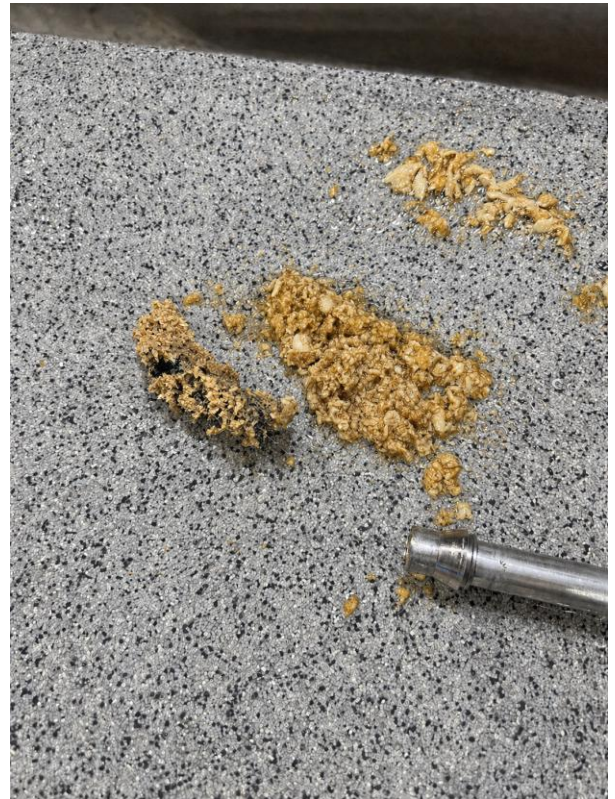
WARNING: This step uses system pressure to propel a foam ear plug through the tubing. Confirm that 1/2 Polyline is **disconnected on the manifold side**, with a controlled discharge path, and keep personnel clear of the line end before firing the function.

6. Manually activate the function until the ear plug exits the line.
7. Repeat steps 1 - 6 until the lines are clear of debris and buildup or detergent flow is restored. Always confirm that the ear plug has left the stainless tubing **before** reconnecting the 1/2" polyline to the manifold.
8. Manually test the function and inspect for:
 - Leaks
 - Improved Detergent Draw
 - Even Foam Coverage

Figure 1 - 1/2" Polyline Detergent Buildup



Figure 2 - 1/2" SS Tubing Detergent Buildup



Poly & Stainless Line Clearing Video

Poly and Stainless Line Clearing



Level 3 success standard: Flow improves, leaks are not present, and the manifold or rainbar returns to even application.



Final Testing & Verification

1. Confirm all nozzles, foamers, and lines are reinstalled securely.
2. Confirm thread tape has been applied where required, plastic-on-metal, metal-on-metal.
3. Manually fire only the affected function.
4. Watch for leaks at fittings, uneven output, clogged manifold holes, weak spray, or inconsistent foam.
5. Verify improved performance before returning the function to normal operation.

Verification Criteria

- No leaks are visible during function test
- Spray pattern is restored
- Foam density is consistent where applicable
- Coverage is even across the intended application area
- No obvious striping, gaps, or dead spots remain
- Flow is improved compared to the original condition

Escalation Guidance

1. Recheck nozzle condition and placement.
2. Recheck manifold holes and foamer assembly.
3. Inspect injectors and metering tips.
4. Inspect Versadial.
5. Inspect Hydra-Flex performance.
6. Inspect or replace foot valves as needed.
7. Verify air pressure settings.
8. Escalate to **Equipment Support** if the restriction/Issue cannot be isolated.





Detergent System Standards & Verification

The **2025 TX Detergent Handbook** provides critical reference standards for the detergent side of the system, including:

- Proper detergent application behavior and expected performance
- Correct nozzle and injector configurations for each function
- Pod operation, versadial performance, and detergent delivery consistency
- Water quality, pH balance, and system conditions that affect wash results

These checks should be verified before repeating cleaning procedures, replacing components, or escalating further. Many performance issues originate from incorrect setup, detergent imbalance, or system conditions rather than physical blockage.

Using this reference ensures that troubleshooting efforts are focused, accurate, and aligned with Tommy's Express system standards, preventing unnecessary disassembly, repeated line-clearing, and misdiagnosis.



Detergent / Arch Reference

Product	Typical Application in Tunnel	Why it Matters
Tommy's Express #1 (Presoak)	Bug Spray, Front/Center/Rear Presoak, Front/Rear Bumper Blaster, CTA 1, CTA 2	High-pH cleaner used early in the tunnel. Overapplication can reduce beading and dry quality; seasonal adjustments are common.
Tommy's Express #3 (Brite)	Rainbow Coat, Combo 1 Leg 1, Combo 1 Leg 2, Red Hot Cleanser, Combo 2 Leg 1, Combo 2 Leg 2	Low-pH cleaner that neutralizes Presoak. If applied too strong, spotting can increase.
Tommy's Express #5 (Ceramic Body Wax)	Ceramic Body Wax rain bar after the second set of combo legs	Foamy protectant that can harden in lines overnight; include in nightly hot-water flush routine.
Tommy's Express #6 (Tommy Guard)	Tommy Guard arch through K-nozzles	Silicone product that can harden in lines overnight; include in nightly hot-water flush routine.
Tommy's Express #7 (Drying Agent)	Hanging manifold directly before Spot Free Rinse	Key hydrophobic / defoaming step. If vehicles carry flat water into the blower room, verify draw, tip/dial setting, and suction at the versadial.
Tommy's Express #8 (Tire Gloss)	Tire Gloss manifold in the blower room, sprayed onto the rotating brush	Silicone Product applied through a Metering Tip- compatible injector. Flush nightly with hot water to prevent overnight hardening.
Tommy Line Cleaner	Detergent lines, ladder rack, and tunnel applications only	Used to break up buildup and minerals that cause loss of suction and back pressure. Do not use on tunnel equipment or to wash cars.
Tommy's Express #9 / #10	Maintenance pod bay wand, dry hugger cleaner, equipment / walls / floors	Use these for maintenance cleaning as directed. #10 must be thoroughly rinsed with water after application.

Nozzle / Injector Compatibility Checks

- Using incorrect nozzles can create back pressure, poor wash quality, and loss of detergent suction.
- Before sending an ear plug through the tubing, confirm that the total sum of nozzle flow rates on the affected function exceeds the injector size for that function.
- If the injector capacity is larger than the total nozzle capacity, loss of suction and back pressure can appear even when the line is not physically restricted.

Function	Quick Standard to Verify
Front / Rear Detox PreWash	(2) 10E80 top + (2) 03E80 side nozzles; 4 lb. check valves
Combo 1 & 2 Legs	(3) 05E80 top + (2) stainless plugs + (2) 10E40 side nozzles + (4) foaming head nozzles
Tommy Guard® Arch	(6) K-nozzles + (6) 4 lb. check valves + (4) stainless plugs
Rain Away Manifold	(6) 05E80 + (2) 10E40 on side elbows + (8) 4 lb. check valves
Pure Finish Arch	(12) 10E80 nozzles on 4 lb. check valves
Tire Gloss Manifold	(16) stainless 1/4 in. 110-degree 0.2 GPM nozzles + (16) 4 lb. check valves
Dry Hugger Cleaner	(6) 05E80 nozzles pointed directly at the cloth

*** Tire Gloss should only be applied through a Metering Tip-compatible injector. If the function has the wrong injector or nozzle setup, correct the standard before escalating to more aggressive cleaning.**



Water Quality, pH, and Wash-Quality Checks

After the hardware path is cleaned, use these handbook checks to confirm the chemistry side of the system is also in standard.

- Hard water above roughly 2-3 GPG (Grains of Hardness Per Gallon) reduces detergency, clogs foamers and applicators, and can leave hard-water spotting or white residue on equipment. True soft water is typically at or below 1 GPG.
- Pure Finish water should have a low TDS reading. If vehicles continue to spot after the final rinse, inspect RO performance and confirm outgoing Pure Finish water quality.
- Reclaim water is intended for pre-blaster, UnderFlush, dual-blaster, and belt-flush applications. Do not use reclaim water for detergent functions or final rinses.
- pH strip targets: Center Detox PreWash should typically read alkaline at 10-13, Combo 1 Leg 2 should typically read acidic at 5-6, and the vehicle should be neutral at 7 as it exits Spot Free Rinse.
- Water should bead as the vehicle enters the blower room. Flat water usually points to Rain Away draw issues, chemistry imbalance, overapplication of high-pH product, or suction problems at the injector / Versadial for Tommy Guard® or Rain Away.



Figure 1 - HANNA Chlorine Checker



Figure 2 - Water Hardness Test Kit

Quick Symptom-To-Check Guide

Symptom	Handbook-based Check
Weak suction / back pressure	Verify nozzle standard vs. injector size, then inspect Metering Tips, foot valves, draw lines, foam inserts, and stainless tubing.
Persistent spotting	Check Pure Finish TDS / RO water quality and confirm Foam Max & Presoak pH balance is not overconcentrated.
Flat water before the Blower Room / Tommy Dry™	Inspect Rain Away & Tommy Guard® draw, Metering Tip or Versadial setting, injector suction, and end-of-tunnel pH.
Repeated foamer or manifold clogging	Check hard water conditions, detergent buildup in foam inserts, and nightly flushing on #5 / #6 / #8 applications.
Detergent coverage still weak after cleaning	Compare the current pod setup to the site Metering Tip or Versadial standard, then perform volumetrics or titration if needed.



Figure 1 - New vs Old Hydrflex Cannon Plunger & Spring



Figure 2 - Dirty Foam Generator Insert Pad

Detergent Preventive Maintenance

Use the following preventive-maintenance checks to keep the manifolds, tubing, and pod components from repeatedly plugging or losing suction.

Item	Inspect / Replace When	Part No.
Detergent Draw Line	Replace when lines turn brown / black, swell, stiffen, crack, or begin breaking down.	P-CHE-2163
Metering Tip	Check twice per week for clogs, discoloration, or loss of suction; replace or clean immediately if suction loss is found.	P-HFI-268
Detergent Foot Valve	Inspect the foot valve screen monthly or as needed. If deteriorated, replace the foot valve	P-CHE-2003
Stainless-Steel Detergent Weight	Inspect for corrosion or debris issues at the bottom of the tote.	P-WAT-2106
Versadial Pre-Filter	Replace every 6 months on Detox PreWash and annually on other detergents, or sooner if suction declines.	P-CHE-2171
Versadial Device	Replace when worn or inconsistent; typical life is roughly 250,000-300,000 vehicles.	P-CHE-2172
Foam Inserts	Check monthly or as needed; replace when the buildup is excessive or the insert pads are breaking down.	P-CHE-2140
Check Valve Diaphragm Grommet	Replace if the check valve excessively weeps after shutoff and the rubber insert is damaged.	P-AIR-2265
4 lb. Check Valve Assembly	Replace when the valve will not hold correctly or continues to drip excessively.	P-CHE-2150
Water Hardness Test Kit	Use when hard water is suspected or when the overall foam quality is degraded.	P-SE-2178
TDS Meter	Use when Pure Finish quality or spotting is in question.	P-WAT-2836
pH Test Strips	Use when Detox PreWash / Foam Max pH imbalance or flat-water complaints are present.	P-CHE-2143
Titration Kit	Use to verify concentration on Presoak and Brite applications when chemistry is suspected to be out of standard.	P-DET-210

Preventive Maintenance Procedures

- 1. Nightly Hot-Water Flush:** Flush Tommy's Express #8 (Tire Gloss), #5 (Ceramic Body Wax), and #6 (Tommy Guard) with hot water every night before closing. Disconnect the draw line from the injector, run the function in manual for about 2-3 minutes, then return the function to auto and reconnect the line.
- 2.** If a POD function stays on after the output shuts off on the iPad, inspect the Hydra Cannon / HydraFlex valve. A sticking plunger or failed spring may require service or replacement (Hydra Cannon part no. P-HFI-265).
- 3.** If a detergent tote becomes contaminated, fully drain and rinse the tote before refilling with the correct product.
- 4.** Routinely inspect spray applicators and nozzles for clogs or damage. If damaged, replace with the same tip and verify the correct standard for that function.

Tommy Line Cleaner Detergent Utilization

This procedure is a **last resort cleaning method** and should only be performed **after Cleaning Levels 1-3 have been completed and detergent flow has not been restored.**

Tommy Line Cleaner is intended for **as-needed use only** for **severe buildup** that cannot be removed through the line-clearing procedure and should not be used as part of routine maintenance.

Use only where products are prone to buildup if not properly flushed, including:

- Tire Shine / Tire Gloss (#8)
- Ceramic Body Wax (#5)
- Tommy Guard (#6)
- Drying Agent (#7)



WARNING: Always wear proper PPE throughout the entire process. Tommy Line Cleaner is a **highly corrosive chemical** that can cause severe skin burns and eye damage, respiratory irritation or breathing difficulty, and damage from inhalation exposure

Procedure

1. Only perform this procedure after Cleaning Levels 1-3 have been completed and detergent flow has not been restored.
2. Disconnect the detergent draw line from the injector and position the line so discharge is directed away from team members and equipment.
3. Run clean water through the line for 2-3 minutes to remove residual product.
4. Connect Tommy Line Cleaner to the injector and apply at a dilution ratio of 1:4 to 1:20, depending on the severity of the clog.
5. Allow the diluted solution to remain in the line for 5-15 minutes to break down internal buildup.
6. Disconnect the line cleaner and flush the line with clean water for a minimum of 10 minutes, or until discharge is clear and unrestricted.
7. Thoroughly rinse the surrounding arch and components using a fire hose to remove any chemical residue.
8. Send a foam ear plug through the line and run the function until the plug exits the discharge to verify the line is fully cleared.
9. If flow is not restored, inspect for mechanical restrictions or replace the affected tubing or components.

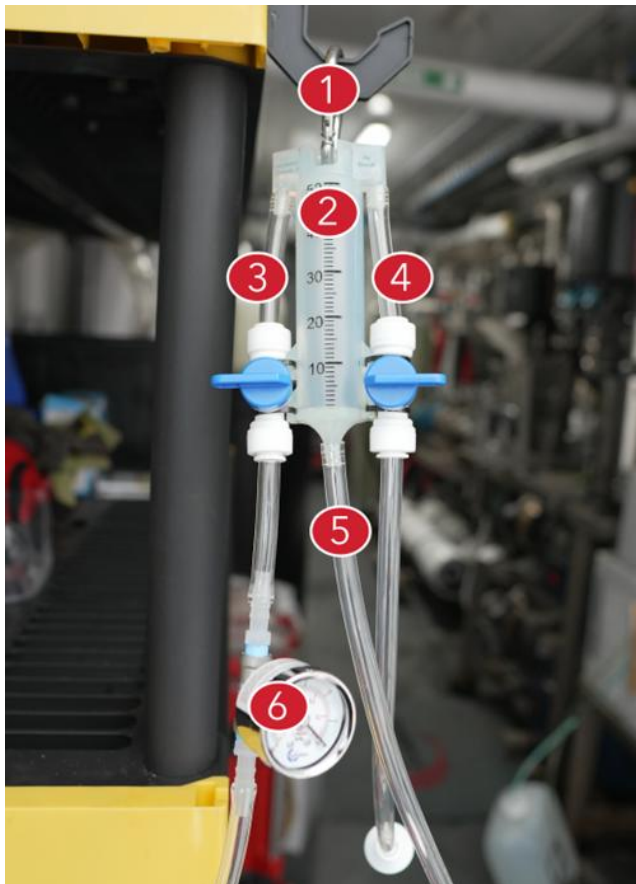


Volumetric Testing Tool Utilization

The volumetric tool is a diagnostic and verification tool that measures the volume of detergent consumed during a single wash. The result is recorded as mL per car and used to confirm whether the affected function is drawing detergent at the expected rate.

When to Use

- Detergent coverage remains weak after Cleaning Levels 1 - 3 have been completed.
- The function appears to have poor suction, inconsistent draw, or possible injector/Versadial performance issues.
- Detergent usage needs to be verified against the expected standard for the site or function.
- Gather data on the weekly price per car.



50 mL Volumetric Tool Key

1	Carabiner / Hanging Point Hang tool vertical during testing.
2	50 mL Graduated Body Large markings are in increments of 10.
3	Incoming Detergent Valve & Line Connects to the detergent draw line from tote.
4	Air Break Valve & Line Closed during priming; open during testing.
5	Detergent Outlet Line Connects to the versadial / injector being tested.
6	Vacuum Gauge Verifies injector pull and tool integrity.

Required PPE, Tools, and Materials

PPE

- Safety glasses
- Chemical-resistant gloves
- Hearing protection as required by site conditions

Tools and cleaning materials

- 50 mL Volumetric Tool (P-WAT-3746)
- Detergent draw line, foot valve, & weight
- Paper towel / absorbent material
- Documentation method for start and end readings

WARNING: Wear PPE and keep disconnected detergent lines controlled. Prevent spills and keep the work area clear while the function is being tested.

Volumetric Testing Procedure

Follow this procedure to measure detergent usage for one test wash. Readings must be taken carefully because air bubbles, incorrect valve position, or a tilted tool body will cause inaccurate results.

- 1.** Disconnect the detergent line currently connected to the injector that you wish to be tested.
- 2.** Then, connect that line to the hose barb on the detergent inlet valve on the left side of the volumetric tool.
- 3.** Connect the detergent outlet line from the graduated body to the versadial/injector being tested.
- 4.** Open the incoming detergent valve on the left side of the tool, while keeping the air break valve on the right side of the tool closed.
- 5.** Lower and rotate the tool so it is upside down, with the carabiner toward the ground.



- 6.** Turn on the detergent function to pull air out of the tool and replace it with detergent. Detergent should pull through the inlet tube, fill the main tool body, and eventually return to the injector.
- 7.** When the tool body is full and detergent has made it back to the injector, turn the function off.
- 8.** If the tool does not fill with detergent, check for a volumetric tool air leak, a failed injector/no vacuum condition, or a clogged detergent inlet tube.
- 9.** If needed, remove the injector tip or temporarily adjust the VersaDial up to fill the tool faster, then return the function to the correct setup before testing.
- 10.** Close the incoming detergent valve on the left side of the tool.
- 11.** Remove air bubbles from the detergent outlet tube and main tool body by gently shaking and adjusting the tool so bubbles float out. Do not begin the test with visible air bubbles in the outlet tube or main body.
- 12.** Turn the tool upright so the detergent outlet is toward the ground and the carabiner is toward the ceiling.
- 13.** Open the air break valve on the right side of the tool.
- 14.** Verify the tool body is vertical, then record the starting detergent level before the test wash.
- 15.** Wash one car using the function being tested.
- 16.** Record the new detergent level after the test wash.
- 17.** Calculate detergent usage by subtracting the ending level from the starting level.

Note: Air bubbles in the tube leading to the injector or inside the tool body will produce incorrect results because the injector can pull air instead of the detergent during the test.

Reading and Calculation

Starting mL Reading	Ending mL Reading	Final mL Used
46 mL	36 mL	10 mL used per car

Record the result as "mL per car" for the tested function. Compare the result against the site standard, Metering Tip / Versadial setup, or Equipment Support guidance.

Example: starting level 46 mL minus ending level 36 mL equals 10 mL used for the test wash.

Accuracy Note: For the most accurate result, **perform multiple test washes and average the mL-per-car readings.**

Detergent usage may vary slightly between vehicles due to vehicle length.

Volumetric Documentation Requirements

After testing, document:

- Date & time.
- Detergent function tested.
- Starting mL reading and ending mL reading.
- Calculated mL used per car.
- injector / Metering Tip / Versadial setup checked.
- whether vacuum gauge testing was performed and the result.
- corrective action taken or recommended next step.

$\text{Price per car} = \text{Average mL per car} \div 3,785 \times \text{Cost per gallon}$

Volumetric Reference Document

The reference document used for this chapter can be found here:

Volumetric Tool Manual



Documentation Requirements

Once the work is complete, the Team Member should document the following details: the date and time of service, the arch/function that was serviced, the issues observed, the level of cleaning performed, any parts replaced, whether leaks were detected, whether coverage has improved, any chemistry or pod checks completed, and whether further escalation is necessary.

Post-Service Checklist

Checklist item	Done
Affected function identified and isolated	☐
Nozzles inspected and cleaned	☐
Foamers / manifold cleaned as needed	☐
Line-clearing performed only if required	☐
All fittings reconnected and secure	☐
Manual function test completed	☐
No leaks present	☐
Coverage and foam quality restored	☐
Work documented in location records	☐
Nozzle standard confirmed for the affected function	☐
Metering Tip / Versadial checked for suction	☐
Water beading verified before blower room	☐
Nightly hot-water flush done for #5 / #6 / #8 when applicable	☐