

VEHICLE WRAP & PPF CONTRACTOR SCOPE OF WORK

50-Point Technical Verification & Operational Quality Control Audit Checklist

Vehicle Owner / Fleet:	_____	Contractor / Shop:	_____
VIN / Year, Make, Model:	_____	Target Install Date:	_____
Film Brand & Type:	_____	Shop Inspector Signature:	_____

INSTRUCTIONS FOR CONTRACTOR/INSTALLER: This 50-point technical checklist defines mandatory quality controls, surface prep standards, thermal post-heating targets, and substrate safety rules. Each item must be reviewed, verified, and signed off prior to vehicle release.

1. SURFACE PREPARATION & PRE-INSTALLATION INSPECTION

CRITICAL QUALITY GATE: Critical: Non-OEM paint or pre-existing chips carry high risks of paint lifting during removal or tenting during installation.

- [] Q1 Pre-Application Inspection Form —** *Do you require a formal pre-application inspection form signed prior to starting work?*
Expected Standard: Yes. Leading manufacturers (Avery Dennison, 3M) mandate a signed Pre-Application Examination form documenting existing paint defects, chips, rust, relative humidity, surface temperature, and film lot numbers to validate warranties.
- [] Q2 Handling Damaged Paint & Chips —** *How do you evaluate and handle pre-existing chipped paint, rust, or clear coat failure?*
Expected Standard: Pre-existing chips, rust, and peeling clear coats must be flagged and photographed during inspection. Wrapping over damaged paint causes compromised adhesion, tenting, and severe paint pulling upon graphic removal.
- [] Q3 Policy for Repainted / Non-OEM Panels —** *What is your policy for wrapping repainted or non-OEM painted panels?*
Expected Standard: Repainted panels must be fully cured per paint manufacturer drying specs (typically 30+ days) before wrapping. Non-OEM paint carries high risk of paint lifting during removal, explicitly excluded from manufacturer warranties.
- [] Q4 Multi-Step Surface Cleaning Protocol —** *What is your multi-step surface cleaning protocol prior to installation?*
Expected Standard: 1) Wash with commercial detergent & water to remove dirt. 2) Solvent wipe with Prep-Sol or Xylol to dissolve grease, oil, and wax. 3) Final wipe-down with 70% Isopropyl Alcohol (IPA) to eliminate solvent residues.
- [] Q5 Eliminating Trapped Seam Moisture —** *How do you ensure trapped moisture inside body seams and moldings is eliminated?*
Expected Standard: Body moldings, panel gaps, and crevices must be blown dry and allowed to air-dry. Installers carefully use a heat gun on low settings to evaporate hidden moisture before vinyl contact to prevent edge failure.
- [] Q6 Trimming Around Rubber Trim & Moldings —** *How do you trim around window rubber trim and plastic moldings?*
Expected Standard: Wrap graphics bond only to OEM painted surfaces, not plastic or rubber moldings. Installers precision-trim film flush along rubber weatherstripping to prevent edge lifting.

[] Q7 Removing Waxes, Sealants & Ceramic Coatings — *How are existing waxes, sealants, or ceramic coatings removed before wrapping?*

Expected Standard: All wax, polish, or hydrophobic ceramic coatings must be completely stripped using solvent degreasers and dedicated surface cleaners to allow pressure-sensitive acrylic adhesives to wet the substrate.

[] Q8 Overnight Drying Protocol — *Is the vehicle allowed to dry indoors overnight after washing?*

Expected Standard: Yes. If a vehicle undergoes a full wash, allowing it to dry indoors overnight ensures moisture inside hidden channels evaporates completely before vinyl application.

2. SHOP ENVIRONMENT & CLIMATE CONTROLS

CRITICAL QUALITY GATE: Environmental Control Target: Maintain shop temp between 65°F–80°F (18°C–27°C) and panel temp ≥60°F (15°C).

[] Q9 Ambient Bay Temperature Standard — *What ambient room temperature do you maintain in your installation bay?*

Expected Standard: The bay must be stabilized between 65°F and 80°F (18°C to 27°C). Below 60°F vinyl becomes brittle; above 95°F causes aggressive initial tack and uncontrolled stretching.

[] Q10 Minimum Vehicle Panel Temperature — *What is the minimum vehicle panel temperature required before starting application?*

Expected Standard: Metal and plastic panels must reach a minimum surface temperature of 60°F (15°C) before applying graphics. Colder substrates severely inhibit initial adhesive tack.

[] Q11 Managing Extreme Ambient Heat (>95°F / 35°C) — *What problems occur if the shop is too hot (above 95°F / 35°C)?*

Expected Standard: Heat excessively softens polymer, causes premature adhesive tacking ('pre-tack'), blocks air-release channels, traps micro-bubbles, and distorts graphic patterns.

[] Q12 Dust & Contamination Control — *How do you manage dust and airborne contamination during installation?*

Expected Standard: High-end shops use climate-controlled, enclosed bays with air filtration to eliminate dust particles that would otherwise create visual specks under clear PPF or thin cast vinyl.

[] Q13 Post-Install Indoor Dwell Period — *How long must the wrapped vehicle remain indoors post-installation before customer pickup?*

Expected Standard: Mandatory indoor dwell period of 12 to 24 hours post-installation. Allows pressure-sensitive acrylic adhesives to achieve viscoelastic wetting and build functional bond strength.

[] Q14 Film Selection for Harsh UV/Heat Climates — *How do you select vinyl specifically engineered for high heat/UV environments (e.g., Florida)?*

Expected Standard: Use premium cast vinyl or 100% aliphatic TPU PPF films with UV-stabilized acrylic adhesives designed to resist high heat degradation, intense UV radiation, and high humidity.

3. MATERIAL SELECTION: CAST PVC, CALENDERED VINYL & TPU PPF

CRITICAL QUALITY GATE: Material Rule: Cast PVC (2–3.5 mil) or Aliphatic TPU PPF (7.5–10 mil) must be used for full 3D vehicle wraps. Never use Calendered vinyl on 3D curves.

- [] Q15 Cast Vinyl vs. Calendered Vinyl Structural Difference — What is the structural difference between Cast Vinyl and Calendered Vinyl?**
- Expected Standard:** Cast vinyl (3M 2080, Avery SWF) is a premium thin (2–3.5 mil) liquid-cast film with no spatial memory, ideal for 3D curves. Calendered vinyl is thicker (3.5–4 mil), roller-extruded, retains memory, and shrinks/lifts in channels.
- [] Q16 Aliphatic TPU vs. Aromatic TPU for PPF — Why do you use Aliphatic TPU rather than Aromatic TPU for Paint Protection Film (PPF)?**
- Expected Standard:** Premium PPF (STEK) uses aliphatic TPU for high optical clarity, impact absorption, and non-yellowing UV resistance. Low-end aromatic TPU yellows quickly and becomes brittle under sunlight.
- [] Q17 Causes of Legacy PVC Cracking & Shrinkage — What causes legacy PVC wraps to crack and shrink over time?**
- Expected Standard:** Rigid PVC relies on added liquid plasticizers for flexibility. Thermal cycling and UV radiation cause plasticizer migration, leading to film embrittlement, severe shrinkage, and cracking.
- [] Q18 Film Thickness Comparisons — How do film thicknesses compare between Cast Vinyl, Clear PPF, and Colored PPF?**
- Expected Standard:** Cast PVC wraps: 3.0–4.0 mils (75–100 µm). Standard clear TPU PPF: 7.0–8.0 mils (175–200 µm). Colored/Patterned TPU PPF: 7.5–10.0 mils (190–250 µm).
- [] Q19 STEK DYNObcolor vs. XPEL STEALTH — What is the difference between STEK DYNObcolor and XPEL STEALTH?**
- Expected Standard:** STEK DYNObcolor incorporates automotive pigments directly into an aliphatic TPU core for color change + heavy impact protection. XPEL STEALTH is a clear satin TPU transforming factory gloss paint to satin.
- [] Q20 Factory Nano-Ceramic Topcoat Integration — Is your PPF topcoat factory-bonded or does it require an aftermarket ceramic coating?**
- Expected Standard:** Premium TPU PPFs feature a liquid-bonded nano-ceramic topcoat integrated into the TPU matrix during manufacturing, delivering permanent hydrophobicity without requiring immediate aftermarket ceramic applications.
- [] Q21 Special Precautions for Mirror Chrome Vinyl — What special precautions are required when installing Mirror Chrome vinyl?**
- Expected Standard:** Chrome (3M 2080-GC451) requires infrared/heat-gun heating (no open flame torches), wet felt squeegees, lower stretch limits, and avoiding alcohol usage while hot to prevent hazing.
- [] Q22 Overheating/Overstretching Textured Vinyl — What happens if Carbon Fiber or textured vinyl is over-stretched or overheated?**
- Expected Standard:** Overheating or over-stretching embossed/textured vinyl permanently flattens raised patterns, distorts weave alignment, and creates glossy hot spots.

4. INSTALLATION MECHANICS, TENSION MANAGEMENT & LAYING TECHNIQUES

CRITICAL QUALITY GATE: Application Rule: Color change vinyl must ALWAYS be applied dry. Overlaps must run rear-to-front and bottom-to-top (min 0.5 in).

- [] Q23 Surface Temp Range for Stretching Cast Vinyl — What is the correct surface temperature range for stretching cast vinyl during installation?**
- Expected Standard:** Cast vinyl becomes conformable for stretching at panel surface temperatures between 104°F and 140°F (40°C to 60°C). Avery SWF specifies 104–131°F (40–55°C).

[] Q24 Avoiding Concentrated Stretch Zones — How do you avoid concentrated stretch zones on bumper corners and complex curves?

Expected Standard: Installers warm broad sections of vinyl rather than isolated spots, anchoring film in low-tension areas and distributing stretch evenly across surrounding panels to prevent color thinning.

[] Q25 Dry vs. Wet Application for Color Change Wrap — Do you use dry or wet application methods for color-change vinyl wrap?

Expected Standard: Color-change vinyl wraps must ALWAYS be applied dry. Application fluids trapped under vinyl destroy pressure-sensitive acrylic adhesive contact.

[] Q26 Squeegee Angle & Pressure Standards — What squeegee angle and technique do you use to ensure 100% adhesive contact?

Expected Standard: Use felt-buffered squeegees held at a 50° to 70° angle with firm, overlapping horizontal strokes from center outward to evacuate air and achieve 100% adhesive wetting.

[] Q27 Handling Deep Concave Channels — How do you handle severe concave channels (e.g., Sprinter van walls) to prevent lifting?

Expected Standard: To prevent tenting or bridging in deep recesses, installers avoid over-stretching by feeding film naturally into channels, utilizing inlays/seams, or applying precise relief cuts along tension lines.

[] Q28 Panel Alignment & Flake Orientation on Metallics — How do you maintain panel alignment and roll direction on metallic/color-shift films?

Expected Standard: Installers mark roll direction on backing paper prior to cutting to ensure adjacent hood, fender, and door panels maintain identical flake orientation, preventing shading mismatches.

[] Q29 Multi-Panel Overlap Direction & Width — What is your multi-panel overlap standard and direction?

Expected Standard: Multi-panel graphic overlays must be installed starting from the rear of the vehicle forward, and from bottom to top, with a minimum overlap seam of 0.5 inches (13 mm) to shed wind and water.

5. PRECISION CUTTING STANDARDS & SUBSTRATE SAFETY

CRITICAL QUALITY GATE: ZERO TOLERANCE: Open razor blades must NEVER touch vehicle paint. Knifeless tape is mandatory for all trim lines.

[] Q30 Use of Open Blades Over Paint — Do you use open razor blades over painted vehicle surfaces?

Expected Standard: NO. Cutting vinyl directly on vehicle paintwork with razor blades creates microscopic clear coat score marks that trigger rust formation, paint peeling, and removal failure.

[] Q31 3M Finish Line Knifeless Tape Application — What is 3M Finish Line Knifeless Tape used for?

Expected Standard: 3M Finish Line Knifeless Tape features a 3.5 mm carrier tape with an embedded high-tensile filament designed to execute clean, razor-free shear cuts through vinyl along body lines and panel returns.

[] Q32 3M Design Line Knifeless Tape Specification — When is 3M Design Line Knifeless Tape specified?

Expected Standard: Design Line uses a pliable filament that allows installers to contour tight radii, freeform artwork, striping, and complex graphic accents around tight curves without binding.

[] Q33 3M Bridge Line Knifeless Tape Specification — What is the function of 3M Bridge Line Knifeless Tape?

Expected Standard: Bridge Line features a wide 12.7 mm (0.5 in) carrier width engineered to span open panel gaps (like door-to-fender seams), cutting both panel edges centered and parallel in a single pull.

6. THERMAL MEMORY RESET & POST-HEATING STANDARDS

CRITICAL QUALITY GATE: Mandatory Post-Heat Targets: Cast Vinyl 195°F–212°F (90°C–100°C); Digital Graphics 160°F–195°F; Chrome/Metallic 160°F–185°F. IR Thermometer required.

[] Q34 Polymer Spatial Memory Explanation — *What is 'polymer spatial memory' and why must it be reset?*

Expected Standard: Stretching vinyl uncoils polymer chains, storing elastic potential energy. Without thermal memory resetting, internal viscoelastic recoil forces continuously attempt to shrink film back to flat state, causing edge lifting.

[] Q35 Target Post-Heat Surface Temp for Cast Vinyl — *What surface temperature must standard Cast Vinyl reach during post-heating?*

Expected Standard: Standard cast vinyl requires a measured film surface temperature of 195°F to 212°F (90°C to 100°C) to break its spatial memory.

[] Q36 Target Post-Heat Surface Temp for Calendered Vinyl — *What is the target post-heating temperature for Calendered Vinyl?*

Expected Standard: Calendered vinyl (RAXTiFY) requires post-heating to a measured surface target of 190°F to 212°F (88°C to 100°C) on all stretched or high-tension areas.

[] Q37 Post-Heat Target for Digital Cast Graphics — *What post-heating temperature is specified for Laminated Digital Cast Graphics?*

Expected Standard: Laminated digital cast graphics (Avery MPI 1105 with DOL overlamine) require lower post-heat targets, typically 160°F to 195°F (70°C to 90°C), to prevent laminate delamination or optical hazing.

[] Q38 Post-Heat Limits for Chrome & Metallic Films — *What post-heating temperature limit applies to Specialty Chrome and Metallic films?*

Expected Standard: Chrome and specialty metallics must be post-heated within a restricted surface window of 160°F to 185°F (71°C to 85°C) to prevent irreversible clouding or loss of reflectivity.

[] Q39 Post-Heat Measurement Tooling — *How do you measure post-heating temperature during application?*

Expected Standard: Post-heating temperatures must be measured directly on the vinyl surface using an infrared (laser) thermometer, moving the heat gun stream away briefly before taking readings.

[] Q40 Mandatory Post-Heating Zones — *Which exact zones on a vehicle MUST undergo mandatory post-heating?*

Expected Standard: Post-heating is mandatory across deep recesses, channels, bumper corners, compound curves, mirror caps, door handle cups, wheel arches, wrapped panel returns, and seams.

[] Q41 Consequences of Skipping Post-Heating — *What specific failure occurs if post-heating is skipped or under-heated?*

Expected Standard: Skipping post-heat causes internal elastic recoil to overcome adhesive shear strength during thermal cycling, resulting in edge lifting, channel bridging, and recess popping within 2 to 6 months.

7. POLYMER CHEMISTRY & SELF-HEALING PPF KINETICS

CRITICAL QUALITY GATE: Self-Healing Threshold: Thermal activation occurs at 104°F–176°F (40°C–80°C). Cuts penetrating full film thickness cannot heal.

[] Q42 Macromolecular Kinetics of TPU Self-Healing — How does heat-activated self-healing work in TPU PPF at a macromolecular level?

Expected Standard: Automotive TPU has a low glass transition temperature (T_g between -40°C and -10°C). Scratches deform secondary hydrogen bonds in soft segments; applied thermal energy increases chain mobility, allowing chains to flow back into place.

[] Q43 Thermal Activation Threshold for PPF — What thermal threshold activates scratch self-healing on PPF?

Expected Standard: Thermal activation occurs between 104°F and 176°F (40°C to 80°C), triggered easily by direct sunlight ($113\text{--}149^{\circ}\text{F}$), engine heat, or warm water.

[] Q44 Unhealable Film Damage Boundaries — What types of damage CANNOT be self-healed by TPU PPF?

Expected Standard: Deep scratches, punctures, or rock gouges that physically cut through primary covalent backbones or slice completely through the 7.5–10 mil TPU thickness cannot heal.

[] Q45 Dynamic Covalent Chemistries in Modern TPU — What dynamic covalent chemistries drive next-generation self-healing polyurethanes?

Expected Standard: Advanced polyurethanes incorporate reversible dynamic linkages such as thermally exchangeable disulfide bonds, Diels-Alder adducts, or dynamic urea bonds enabling network reshuffling.

8. POST-WRAP CARE, SENSOR TESTING, MAINTENANCE & WARRANTY

CRITICAL QUALITY GATE: Post-Wrap Rule: Verify all ADAS/parking sensors. Hand wash only with pH 3–11 grit-free soap. No automated brush washes.

[] Q46 ADAS & Sensor Re-Calibration / Testing — Do you test all vehicle sensors and safety systems after wrapping?

Expected Standard: Yes. Installers must test all parking sensors, blind-spot radar, and safety equipment, carefully trimming film away from covered sensors to guarantee proper functioning before release.

[] Q47 Initial Care & Washing Restrictions — What are the washing and care restrictions immediately following installation?

Expected Standard: Vehicle must remain completely dry for 12 to 24 hours. Automated brush car washes and high-pressure power washing near film edges should be permanently avoided.

[] Q48 Recommended Cleaning Solutions & pH Range — What pH range and cleaning materials are recommended for maintaining wrapped vinyl?

Expected Standard: Cleaners must be grit-free with a neutral pH between 3 and 11. Washing should be performed using clean microfiber cloths or soft chamois, avoiding abrasive sponges or paper towels.

[] Q49 Care Protocols for Gloss vs. Matte Wraps — What waxes or sealants can be applied to gloss vs. matte wrap finishes?

Expected Standard: Gloss wraps benefit from liquid synthetic sealants (Meguiar's Ultimate Liquid Wax). Matte/satin wraps require specialized matte care products to prevent polishing gloss spots into the finish.

[] Q50 Warranty Coverage Boundaries & Exclusions — What is covered under manufacturer warranties versus what is excluded?

Expected Standard: Warranties cover material delamination, premature UV yellowing, bubbling, and cracking. Warranties explicitly EXCLUDE physical rock punctures, pressure-washer edge lifting, paint lifting on repainted surfaces, and chemical neglect.

CONTRACTOR QUALITY COMPLIANCE SIGN-OFF	
I, the authorized contractor/installer, hereby certify that I have reviewed all 50 technical requirements above. I confirm that all surface prep, environmental climate controls, knifeless tape cutting rules, post-heating temperature verification, and sensor testing protocols will be strictly adhered to for this installation.	
Lead Tech Signature: _____	Date: _____
Shop Manager Signature: _____	Date: _____