Why Our Materials — and Our Finishes

Meisterschaft Motorsport Engineering LLC adjustable control arms. The metal, the hardware, the bearings, and the anodize — what we build with, and the engineering reasons behind every choice.

DOCUMENT	MME-MAT-002	VERSION	A (customer edition of MME-MAT-001)
EFFECTIVE	August 2026	APPLIES TO	MME-branded control arms and suspension components

The short version: a suspension arm only fails three ways. The arm body cracks, the adjuster threads and spacers gall and pound out, or the bearing wears. We picked our materials to beat all three, and we picked our finishes to protect the surfaces that live under a wrench. Much of the market optimizes for cost or grams. We optimized for the failure modes that actually retire a part.

1. WHAT WE RUN VS. WHAT IS COMMON

COMPONENT	MEISTERSCHAFT	COMMON IN THE SEGMENT
Arm / rod body	AL-7050-T7452 (aerospace 7000-series)	6061-T6 or 6082-T6 on most billet arms; 2024 or 7075 on a few premium ones
Misalignment spacers (the part under the bearing)	17-4PH stainless, H900	Aluminum on most arms; annealed 316 stainless on some. The titanium or steel often advertised is the bolt hardware, not the spacer.
Rod ends / spherical bearings	3-piece, PTFE (Teflon)-lined, zinc-plated chromoly body, hard-chrome ball	The same proven architecture on premium arms; titanium-branded marketing claims on others
Finish	MIL-PRF-8625 Type III hard-coat anodize, glass-bead peened, satin graphite gray (Type II decorative anodize available as a lower-cost option)	Conventional Type II anodize, usually black dye; hard-coat is rare in the segment

2. THE ARM BODY: 7050-T7452

This is the part carrying every cornering, braking, and curb-strike load in fatigue, in the weather, for years. Strength alone does not keep it alive; toughness, fatigue life, and stress-corrosion resistance do.

ALLOY	YIELD / TENSILE	ENGINEERING REALITY
7050-T7452 (MME)	~69 ksi / ~78 ksi	Aerospace alloy developed for thick, highly-loaded structure. Overaged T74 temper: excellent fatigue, fracture toughness, and stress-corrosion-cracking (SCC) resistance.
6061-T6 (most common)	~40 ksi / ~45 ksi	Inexpensive, weldable, everywhere. Our arm stock is ~1.7x its yield strength.
6082-T6 (common on European billet arms)	~37 ksi / ~45 ksi	The European 6061 equivalent. Our arm stock is ~1.85x its yield strength — including on arms priced far above ours.
2024-T3 (premium alternative)	~50 ksi / ~70 ksi	A genuinely good fatigue alloy, but lower yield and poor bare corrosion resistance. We are ~1.4x its yield.
7075-T6 (premium alternative)	~73 ksi / ~83 ksi	~6% higher peak strength than 7050 — but the T6 temper has lower fracture toughness and worse SCC resistance. See honest tradeoffs.

Bottom line: against the 6061/6082 alloys that make up most of the market, our arm stock is roughly 70-85% stronger at yield. Against the high-end aluminums (2024, 7075) we are in the same league on strength — and we win on the durability properties that matter for a fatigue-loaded, road-exposed part.

3. THE ADJUSTERS: 17-4PH STAINLESS, H900

This is where inexpensive suspension parts quietly die. The misalignment spacers and threaded hardware see clamp load, vibration, and fretting at the bearing interface. Soft materials brinell (dent), gall (cold-weld), and back off.

SPACER / HARDWARE MATERIAL	YIELD / HARDNESS	ENGINEERING REALITY
17-4PH H900 (MME)	~170 ksi / 40-44 HRC	Precipitation-hardened martensitic stainless. Hard, strong, corrosion-resistant through the part. Will not brinell, gall, or pound out.
Aluminum, usually 6061 (most of the market)	~40 ksi / ~95 HRB (soft)	This is the spacer most arms actually run. ~4x lower yield, roughly 4x softer; it brinells and wears at the bearing load points.
Annealed 316 stainless (some premium arms)	~30-42 ksi / soft (~80 HRB)	Excellent corrosion resistance, but 4-5x lower yield than ours and prone to galling. Corrosion-first, not strength-first.

Spacers vs. hardware — do not let marketing blur the two. The titanium and chromoly you see advertised across the segment is usually the bolt hardware — bolts, pins, studs — not the misalignment spacer that actually carries the bearing. On the spacer itself, most of the field runs aluminum; we run 17-4PH stainless. And for what it is worth on hardware: titanium is light but galls and needs anti-seize on every thread, and plated chromoly is strong but starts corroding the day the coating wears through.

And our studs match. The load-bearing studs in the 14-16 mm Supra arms and the A90 and E9x fork and trailing arms are 17-4PH stainless (~170 ksi) as well — roughly 1.5x the yield strength of the quenched-and-tempered chromoly pins used elsewhere in the segment, and stainless all the way through rather than a plated steel that depends on its coating.

4. THE BEARINGS: PROVEN, NOT BUZZWORDS

We run 3-piece, PTFE (Teflon)-lined spherical rod ends with a zinc-plated chromoly body and hard-chrome ball — the same architecture the best arms in the segment use, because it is the correct answer. We do not claim a unique bearing edge; we match the best in class and we do not dress it up with marketing terms. (For reference: "TC4 titanium" sphericals are simply Ti-6Al-4V by another spec name — and titanium is a poor bearing-race material because it galls, so that is a marketing claim, not a bearing advantage.)

Where the value lands: premium arms in this segment, built on mid-strength 6082 bodies, sell for $579-999 per single arm. Every MME set is a complete pair of stronger 7050 arms priced at $550-850 regular price - a full pair for what the segment charges for one arm. (Pricing verified against posted regular prices, August 2026.)

5. THE FINISHES: TYPE III HARD-COAT VS TYPE II ANODIZE

Every arm is anodized; customers choose between two finishes at checkout. Both are defined by the same military specification, **MIL-PRF-8625 (formerly MIL-A-8625)** — Type II is the conventional sulfuric-acid anodize, Type III is the hard anodic ("hard-coat") process. Both are structurally identical arms with the same warranty. The difference is how the surface is prepared, how thick and hard the oxide layer grows, how it wears, and how it looks.

	TYPE III HARD-COAT (STANDARD, RECOMMENDED)	TYPE II ANODIZE (OPTION)
Spec	MIL-PRF-8625 Type III (hard anodic)	MIL-PRF-8625 Type II (sulfuric acid, conventional)
Process	Glass-bead peened first to lay down an even matte surface, then hard-coat anodized at low temperature and high current density	Conventional anodize over a polished surface
Layer thickness	~2 mil (~50 um) typical for wear applications; roughly half grows into the base metal	~0.3-1.0 mil (~8-25 um) typical; decorative class
Surface hardness	Ceramic aluminum-oxide layer, commonly rated around 60-70 HRC equivalent (converted from microhardness)	Much softer; marks anywhere a wrench touches
Appearance	Satin graphite gray, matte, uniform	Bright gray with a silver-blue hue; shows off the machining

	TYPE III HARD-COAT (STANDARD, RECOMMENDED)	TYPE II ANODIZE (OPTION)
Wear behavior	Resists galling, wrench marks, and abrasion on threads, jam-nut flats, and wear faces; holds its look through repeated setup changes	Sharpest-looking finish of the two, but the thin layer scratches and marks readily; stays at its best on a set-once build
Corrosion protection	Excellent; the thicker sealed oxide is the stronger barrier	Very good; standard sealed anodize
Best for	Drivers who adjust often: track cars, cars that see seasonal alignment changes	Set-and-forget street builds and show cars where appearance leads

Why Type III is the default: the surfaces that fail cosmetically and functionally on an adjustable arm are exactly the ones that live under a wrench — jam-nut flats, adjuster threads, and the faces around them. Hard-coat grows the surface itself into a ceramic far harder than the base aluminum, so those surfaces survive repeated adjustment instead of accumulating bare-metal wrench scars. Type II wins on two things only: initial brightness and price. If the arms will be set once and admired, it is a legitimate choice; if they will be worked on, Type III is the engineering answer.

Honest note: any anodic layer is a ceramic and slightly reduces fatigue margin at the surface of an aluminum part — a known, standard effect that our validation program accounts for (our 40,000-mile development car ran hard-coated arms). The wear-protection benefit on an adjustable, wrench-serviced component far outweighs the small difference between the two types on this score.

6. HONEST TRADEOFFS (BECAUSE ENGINEERS RESPECT THEM)

- **We are not the lightest.** Titanium hardware and the soft aluminums save grams. We chose 17-4PH stainless for durability and galling resistance over weight. On a street/track suspension arm, fatigue life and zero-maintenance threads beat shaving 50 grams.
- **7075-T6 edges us ~6% on peak yield.** We deliberately run 7050-T7452 instead, because its overaged temper resists fatigue cracking and stress-corrosion far better. We would rather build the part that survives 100,000 load cycles in the salt and grit than the one with a marginally higher number on a tensile chart.
- **Type II is the prettier finish on day one.** We say so plainly. It is also the one that shows every wrench mark by season two — which is why it is the option, not the standard.

SOURCES Alloy figures are standard published values: 7050-T7451/T7452 ~69 ksi yield / 78 ksi UTS; 6061-T6 ~40 ksi; 6082-T6 ~37 ksi; 2024-T3 ~50 ksi; 7075-T6 ~73 ksi; 17-4PH H900 ~170 ksi, 40-44 HRC; annealed 316 ~30-42 ksi; Ti-6Al-4V ~128 ksi. Anodize classes per MIL-PRF-8625; Type III thickness and hardness are standard values for wear applications, hardness converted from microhardness. Segment material comparisons reflect specifications published on competitor product pages, June-August 2026.