Understanding Undercoat Systems

General Information
Undercoats, or primers as they are often called, have evolved over recent years to become part of the "strength" of a finish instead of a "weakness". For generations, the automotive refinishing industry had to accept lacquer type undercoats that would shrink, soak up solvents, crack, and often peel in order to have workable surfacers that would sand and fill. This "compromise" is no longer acceptable thanks to the development of two component undercoats. These "2Ks" deliver much tighter films that resist shrinkage, have little solvent soak-up, have great sanding and filling ability, and rarely fail when applied correctly. The success of these new generation undercoats is not just due to great chemistry, but also it is the systems approach. This approach to priming considers all the needs of both the substrate and the topcoat finish. For example, etching primers like 88G016 followed with a 2K Polyurethane undercoat like 96N, enables us to address the surface imperfections that exist in bare metals. This system gives us non-shrinking filling while etching and converting the metal underneath. Advanced systems such as these highlight the need to concentrate on the undercoats of future coating systems, rather than dwell in the lacquer primers of the past.

There are two basic types of 2 component (2k) undercoat chemistries: Polyurethane and Epoxy. Within the polyurethane undercoat family, there are surfer/fillers and sealers. The epoxy undercoat family is broken into "automotive speed" and "extreme demand" primers.

2K Undercoats
Polyurethanes offer the fastest "workable" times. They lend themselves to quick sand times and deliver great filling and sealing characteristics. However, polyurethanes require better surface preparations than epoxies and for best results, exposed bare metal areas should be treated with etching primers/pretreatments before application of the polyurethane. This family of undercoats offers the best UV protection when used under transparent pearl colors. They are ideal for automotive applications. All of the following undercoats may be topcoated with any valspar Refinish topcoats.

#Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Color</th>
<th>Build</th>
<th>VOC(unreduced)</th>
<th>Rule Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>88G016</td>
<td>Green</td>
<td>Very Light</td>
<td>National Rule/Rule 1151</td>
<td></td>
</tr>
<tr>
<td>V880</td>
<td>Gray</td>
<td>Very Light</td>
<td>Calif. Code of Regulations Title 17, Art. 3, Section 94522(a)(3).</td>
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</tr>
</tbody>
</table>

Polyurethane Surfacer/Fillers
92B060 Buff (tintable) Medium National Rule
96N Gray (tintable) Heavy 3.5 lbs./National Rule
PR4 Black Medium 2.1 VOC
HS35 Neutral High 3.5 VOC

Sealers
092 ColorFil Multiple colors Light National Rule
87N Gray Medium National Rule/3.5 lbs.
98N Gray (tintable) Light 2.8 lbs.

Direct to Metal - Hybrid formula of epoxy and acrylic polymers that contain no isocyanates.
DTM 2004 Gray High All Rules
CPSDTM Neutral High All Rules

Epoxy undercoats are ideal in fleet/commercial applications. They offer outstanding adhesive properties and unsurpassed chemical and moisture resistance. They require less surface preparation than polyurethanes and are at their best over sand/bead blasted metals. They do not sand as easily as polyurethanes and provide little UV resistance and should have limited usage under transparent pearl or metallic colors.

#Products

Epoxy

<table>
<thead>
<tr>
<th>Product</th>
<th>Color</th>
<th>VOC To Topcoat</th>
<th>Rule Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP50 Series</td>
<td>Buff</td>
<td>2 hours</td>
<td>2.8/3.5 lbs.</td>
</tr>
<tr>
<td>CPSVP</td>
<td>Neutral</td>
<td>2 hours</td>
<td>2.1 lbs.</td>
</tr>
<tr>
<td>CPSVLP</td>
<td>Neutral</td>
<td>30 minutes</td>
<td>2.1 lbs.</td>
</tr>
</tbody>
</table>
2K Polyurethane Surfacer/Fillers

2K Polyurethane Undercoat Basics:
There are 3 basic polyurethane primer/surfacers offered in both non-compliant and national rule areas. These are HS35, 92B060, and 96N. Bare metal surfaces should be sand/bead blasted and etch primed with 88G016 before 2K polyurethane undercoats are applied.

2K Polyurethane Surfacer/Filler Basics:
Surfacer/Fillers contain inert fillers for easy sanding and filling characteristics. When using 2K polyurethane surfacer/fillers always allow each coat to "flash" dull before applying next coat. This prevents solvents from being trapped in the film and allows for easier sanding. Flex additives are not needed under normal automotive refinish urethane applications. These undercoats must be sanded before being topcoated when dry times exceed 24 hours.

Tech Tips:
• Allow each coat to "flash" dull before applying next coat.
• When spraying the above fillers with little or no reduction, gravity feed equipment with fluid nozzle sizes of 1.8 mm or larger is required.
• Use "Guide coat" surfacer with contrasting color to assist in filling awareness.
• Must be sanded if allowed to dry more than 24 hours.
• Tintable with Valspar Universal Tints (8 parts primer to 1 part tint)
• When tinting undercoats use dominant colored tint in topcoat formula.
• Flex additives not required under normal automotive urethane refinish applications.
• When using surfacers on flexible parts, do not exceed 2-3 coats.

2K Polyurethane Sealers

2K Polyurethane Undercoat Basics:
There is 1 basic polyurethane sealer offered in both non-compliant and national rule areas. 98N mixes 4:1 with HPC0, HPC1, HPC2, or HPC3 activator and may be reduced with either 170 Series urethane reducers or "X" series reducers (for VOC regulated areas).

2K Polyurethane Sealer Basics:
2K polyurethane sealers are designed to stop solvents from "soaking" into the substrate and becoming trapped. In turn the use of these sealers deliver maximum topcoat performance. Valspar Sealers offer the strongest sealing characteristics of the 2K polyurethane family. Flex additives are not needed under normal automotive refinish urethane applications. The following undercoats must be sanded before topcoating if allowed to dry more than 24 hours.

Tech Tips
• Best sealing characteristics are achieved in 1-2 coats.
• Must be sanded if allowed to dry more than 24 hours.
• Flex additives not required under normal automotive urethane refinish applications.
• When using surfacers on urethane parts, do not exceed 2-3 coats.
• Sealers may be sanded or nibbed if needed, but do not require sanding if topcoated within 24 hours.
**Etching Primers/Pretreatment**

**General Information**
This category of undercoats is often misunderstood. Etching primer/pretreatments were designed to replace old metal treatment processes. They play a very important role in automotive type refinishing and when used correctly are ideal for improving corrosion resistance on most repairs. Most etching primer/pretreatments are designed to provide a foundation for polyurethane undercoat systems and should be applied in only one to two coats (avoid excessive millage). They should never be used as a stand-alone primer. These undercoats are generally made from vinyl resins and are somewhat porous. When mixed they contain phosphoric acid, which etches and converts the metal into a consistent substrate to be coated. Due to their porous nature and because they contain acid, which can be hydrophilic (moisture absorbing), they should never be left exposed to moisture or weather. However, when used correctly, they work excellent as part of a polyurethane undercoat system. V880 and 88G016 should not be used under epoxy undercoats, such as VP50, nor should these products be used over a course profile sandblasted surface.

**Tech Tips:**
- May be nibbed sanded in 30 minutes.
- Should be topcoated with polyurethane undercoats in 20-30 minutes.
- May be topcoated within 24 hours without sanding.
- Must be scuffed/sanded (red scuff pad) if allowed to dry more than 24 hours.
- Avoid excessive millage.
- Avoid dry spraying.
- Avoid exposing to moisture and weather.
- Do not apply over course profile sandblasted surfaces.
- **Do not use under epoxy primers.**
- Clean aluminum surfaces with 170 AquaClean.
- Avoid cleaning aluminum with solvent cleaners.

**Direct To Metal Primer**

**General Information:**
Valspar’s DTM2004 and CPSDTM primers combine desirable aspects of epoxy chemistry including tenacious adhesion, and excellent corrosion resistance with acrylic chemistry that offers rapid dry, good cure response and excellent sandability. The marriage of these two chemistries offers refinishers unique properties which work to improve productivity resulting in faster throughput. In fact, in many cases, the combination of good corrosion resistance paired with good filling and sanding properties allows refinishers to replace two products with one resulting in fewer application steps and ultimately lower labor and product costs per unit. In addition, the DTM series contain no isocyanate chemicals which improves workplace safety. The polymer chemistry featured in Valspar’s DTM also has made it possible for coast to coast compliance with VOC regulations when used in typical automotive applications. In short, DTM is an economical, easy to use, compliant and high performance alternative to many traditional automotive refinishing primers.

**Epoxy Primers**

**General Information:**
Epoxy undercoats are ideal for many fleet/commercial applications. They offer outstanding adhesive properties and unsurpassed chemical and moisture resistance. They require less surface preparation than polyurethanes and are at their best over sand/bead blasted metals. They do not sand as easily as polyurethanes and display little UV strength and should have limited usage under transparent pearl colors.
Epoxies are occasionally used in automotive applications as a coating between bare metal and plastic fillers. This practice allows the metal to be “sealed” from moisture and air, but requires plastic filler to be applied after primer has reached proper cure stage, generally next day.
There are two basic types of epoxy primers, they are separated by time required to topcoat and overall durability. The slower drying epoxies traditionally will offer the best in overall durability and are referred to by Valspar Refinish as “Extreme Demand Undercoats.” The faster drying epoxies are referred to as “Automotive Speed”, due to their 30 minute to topcoat ability. Though these “automotive speed” epoxies do not offer the film strength of an “extreme demand”, they are more than adequate for most automotive refinishing applications.
Undercoat Overview:

**Polyurethanes**

**Strengths**
+ Tintable- May be tinted 8:1 w/universal tints.
+ Sands well quickly.
+ Outstanding U.V. strength.
+ Fast “to topcoat times”

**Weaknesses**
– Requires better surface preparations.
– Requires etching primer on bare metals.
– Traditionally shorter pot life times.

**Epoxies**

**Strengths**
+ Very Solvent and Moisture resistant.
+ Great adhesive properties.
+ Outstanding direct to bare metal characteristics.

**Weaknesses**
– Doesn’t sand well quickly.
– No U.V. strength.
– Limited colors.

**Systems:**

**Polyurethane Systems**

<table>
<thead>
<tr>
<th>HS35 or CPSHS</th>
<th>96</th>
<th>92</th>
<th>98N</th>
<th>092</th>
</tr>
</thead>
<tbody>
<tr>
<td>88G016</td>
<td></td>
<td>V880</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Bare Metal**

**Epoxy Systems**

<table>
<thead>
<tr>
<th>VP50 Extreme Demand or CPSVP</th>
<th>VP210 Extreme Demand or CPSVPLV</th>
<th>DTM 2004 or CPSDTM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bare Metal (Sand/Bead Blasted)</td>
</tr>
</tbody>
</table>

**Undercoat Safety:**

**Personal Protection while spraying:**
- Wear nitrile gloves
- Wear a NIOSH approved positive air respirator.
- Avoid skin exposure.
- Avoid spraying in areas where others may be unprotected.

**Personal Protection while sanding:**
- Wear nitrile gloves
- Wear a NIOSH approved dust respirator.
- Avoid skin exposure
- Avoid dry sanding undercoats that contain lead or chromates. (Valspar Refinish’s undercoats do not contain lead or chromates)