Low-odor alkyd resins with dearomatized fluids from ExxonMobil

Resins and hydrocarbon fluids are key ingredients that determine the quality of coating. Paint formulations that use alkyd resins are extensively used in surface coatings. Compared with acrylic binders, they provide:

- Good mechanical properties,
- Fast drying speed,
- High gloss, and
- Lower cost.

Paint users are increasingly demanding formulations that improve stringent OEL* durability and performance. A low-odor paint formulation provides balanced performance along with enhanced exterior weathering, durability and gloss retention.

The switch to a low-odor paint formulation requires both the availability of suitable low-odor alkyd resins, as well as an understanding of the benefits of low-odor paints.

ExxonMobil is a leading global hydrocarbon fluid manufacturer, providing high quality products to various resin suppliers and paint formulators.

To provide better solutions to our customers, we collaborated with PT Citra Resins Industries, a key regional resin supplier in Asia, to learn how dearomatized fluid Exxsol™ D40 can perform better in low-odor paint formulations.

ExxonMobil's dearomatized fluids enable PT Citra Resin Industries to offer a low-odor resin as a replacement for white spirit-based resin.

Lower odor, low aromatic; low VHR risks and a less stringent OEL*

Offers good paint performance: good flow-ability, brush-ability and drying time

Enhanced weathering, exterior durability and gloss retention

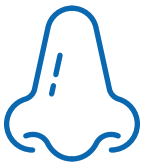
Maintain formulation cost effectiveness

*OEL: Occupational Exposure Limit
VHR: Vapor Hazard Ratio

For this study, Exxsol™ D40 fluid was selected to be used in a paint formulation with Citrakyd™ 1927, a long oil alkyd resin. Exxsol D40 is a proven solution that enables cost-efficient reformulations while balancing viscosity needs and performance. Exxsol D40 offers a less stringent OEL and lower VHR risks, odor, and aromatics versus white spirit.

17x lower in odor with good paint performance

Good flow-ability, brush-ability and drying time.



Recommendation	White spirit	Exxsol™ D40
Aromatic content, %	5 - 25%	< 0.001[1]
Color[2]	9.8	7.2
Odor[3]	Reference	Up to 17x lower
Occupational exposure limit (OEL)[4], mg/m³	300	1200
Vapor hazard ratio[5] (VHR) at 20°C	40	6
Pros	Lower viscosity	Lower odor Better OEL & VHR Better gloss Better exterior weathering

5-10% reduction in resin use

Maintain formulation cost with less paste/resin use[6].

Raw materials	Formula 1	Formula 2
Paste	60%	57%
Resin long oil alkyd*	25%	23%
Additives	3%	3%
Solvent	12% (white spirit)	17% (Exxsol D40 fluid)
Total	**100%**	**100%**

1 Test method: AMS 140.31, ExxonMobil data

2 Data source: Spectrocolorimeter PFXi from PT Citra

3 St Croix Sensory Solvent Odor Comparative Analysis, August 2016

4 ExxonMobil recommended OEL using Reciprocal Calculation Procedure. (A method for calculating Occupational Exposure Limits (OELs) for UVCB hydrocarbon solvents.) UVCB=Substances of unknown or variable composition, complex reaction products or biological materials. For more information about RCP, visit: https://www.esig.org/reciprocal_calculation_procedure_1/

5 Vapor hazard ratio (VHR) is a solvent's ability to evaporate as a ratio to the occupational exposure limit (OEL)

6 Standard formulation from PT Citra, only for reference

Note: Unless otherwise noted, all the test results are from PT Citra Resins; ExxonMobil only provides Exxsol™ D40 fluid, all the experimental data are generated by PT Citra Resins unless otherwise noted

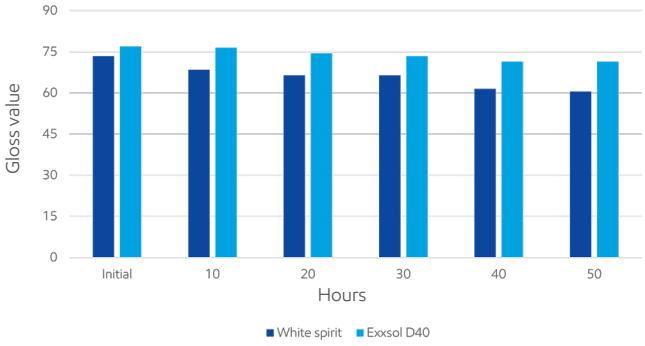
*Citrakyd™ 1927 specifications

Oil type	
Oil length	65%
Solid content	70%
Poliol type	Pentaerythritol

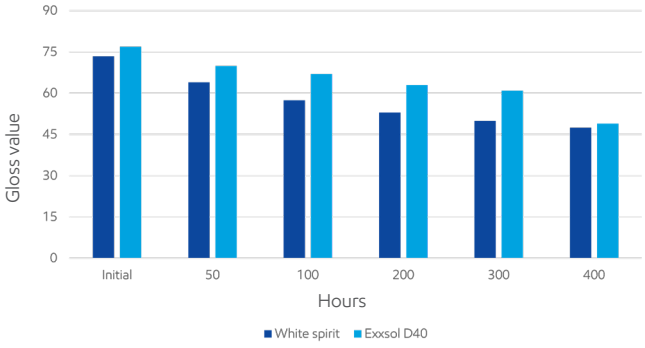
7-10% improved weathering

Achieve better gloss performance and weathering by using Exxsol D40 in the paint formulation.

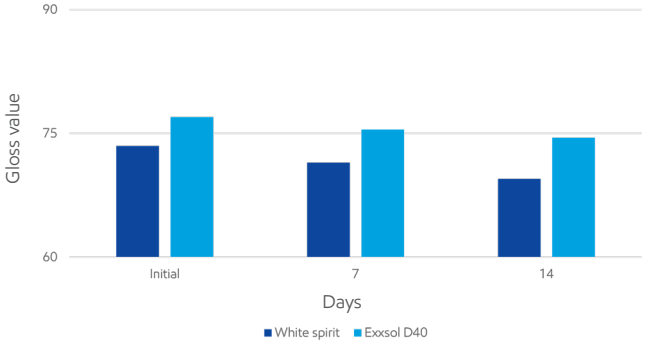
Gloss performance of paints
based on test method ASTM D523-08



Q-UV test (Gloss 60°)
based on test method ASTM D4587-11



Exterior weathering test (Gloss 60°)
based on test method ASTM G154



Technical question?
Connect directly with our technical experts at fluidsanswerperson@exxonmobil.com

exxonmobilchemical.com

citraresins.com

Scan to contact us

F0722-615E15