



ENVIRONMENTAL ANALYSIS FOR HEALTHCARE & EDUCATION

1. JFB HART TECHNOLOGY
2. ENVIRONMENTAL BENEFITS
3. VOLATILE ORGANIC COMPOUNDS (VOCs)
4. US GREEN BUILDING COUNCIL – LEED
5. ENVIRONMENTAL STUDY – VOC, WASTE & POLLUTION REDUCTION
6. AIR MONITORING
7. COST SAVINGS
8. SUMMARY

OCTOBER 2017

JFB HART TECHNOLOGY

JFB Hart Coatings, Inc. (“JFBHC”) developed a revolutionary technology for the next generation of high performance, environmentally friendly, water-based industrial coatings. This cutting edge, market-proven, “green” technology was developed using groundbreaking cross-linking chemistry in total water with no harmful co-solvents.

The products created from this technology have more than 15+ years’ market history with sales in the consumer, industrial maintenance coatings and commercial floor care markets. This “game changing” technology produces urethane and epoxy coatings that have been applied to all different type of substrates all over the world. Facilities no longer have to use every day, commodity, “me too” solvent-based or low performance water-based products.

What makes JFBHC’s urethanes different from other “water-based” urethanes in the market is that JFBHC’s urethanes are aliphatic polyester polyurethanes; which are known in the industry as the premium, highest of performance polyurethanes. Other manufacturing companies have not been able to figure out the chemistry in making true water-based aliphatic polyester polyurethane without the use of a co-solvent including all exempt solvents.

JFBHC has replaced the solvent with water and the results are coatings with equal to or superior performance, that are sustainable and green, and are cost competitive, in most cases significantly reducing the total overall costs.

KEY ENVIRONMENTAL BENEFITS

- Low to zero VOCs (all products less than 20 g/l)
- Less ozone pollution
- Virtually odorless
- Improved indoor air quality
- Does NOT contain prop 65 chemicals
- Low risk of health effects or chemical sensitivities
- No special equipment (i.e. breathing apparatus) for applications
- Reduces solid waste
- Meets US Green Building Council’s LEED Criteria
- Excellent performance properties, such as UV resistance, durability, or flexibility
- Does NOT contain banned toxic substances or toxic substances with material restrictions, including, but not limited to, zinc, mercury and lead

VOLATILE ORGANIC COMPOUNDS (VOCs)

Volatile Organic Compounds (VOCs) are found in everything from paints and coatings to underarm deodorant and cleaning product formulations. VOCs have been determined to be a major contributing factor to the formation of ground-level ozone, which has been proven to be a public health concern.

In order to reduce ground-level ozone, the U.S. Clean Air Act regulates or limits manmade emissions of VOCs. The U.S. EPA and numerous state agencies have issued regulations to reduce VOC emissions from a variety of sources, including paints and coatings. These regulations limit the amount of VOCs that can be used in the paints and coatings. The VOC regulations are constantly changing. New states are issuing VOC limitations, while states with existing limitations are expanding the reaches of their regulations as well as issuing more aggressive restrictions for existing products.

The South Coast Air Quality Management District (SCAQMD) in southern California is leading the charge for VOC regulations; followed by the California Air Resource Board (CARB), the Ozone Transport Commission (OTC) and Lake Michigan Air Directors Consortium (LADCO). Below is a table of the current VOC limits (in g/l) by various categories:

<u>Category</u>	<u>SCAQMD</u>	<u>CARB</u>	<u>OTC</u>	<u>LADCO</u>	<u>EPA</u>
Flat Coatings	50	50	50	100	250
Non-Flat Coatings	50	100	100	150	380
Non-Flat High Gloss Coatings	50	150	150	250	380
Floor Coatings	50	100	100	250	400
Industrial Maintenance	100	250	250	340	450

Third party, for profit companies that certify products as “green”, including Green Seal, Eco Logo and Greenguard, use one of the above VOC limits as their standard. CARB’s regulations are most often used.

The mixed VOCs for JFBHC’s urethanes are listed below. The colors range because different amounts of colorant are used to make the final color product.

<u>Product</u>	<u>Clear VOC (g/l)</u>	<u>Color VOC (g/l)</u>
HP-105 Gloss Clear	5.8	4-10
HP-300 Satin Clear	14.7	13-20
HP-300 Matte Clear	14.2	12-19

The SCAQMD has created a “Super Compliant” list of companies that have products where the VOCs are less than 10 g/l. ***JFBHC’s HP-105 Gloss Clear and Colors meet that criteria and are considered “Super Compliant”.*** Unfortunately, the HP-300 Satin and Matte while very close to meeting the Super Compliant criteria, they fall a little short.

As shown above in the two tables, ***JFBHC’s products meet the VOC limits*** and are well below ***from all of the different agencies*** including the U.S. EPA and most stringent South Coast Air Quality Management District.

U.S. GREEN BUILDING COUNCIL – LEED

LEED, or Leadership in Energy and Environmental Design, is the most widely used green building rating system in the world. Available for virtually all building, community and home project types, LEED provides a framework to create healthy, highly efficient and cost-saving green buildings. LEED certification is a globally recognized symbol of sustainability achievement. (Information from www.new.usgbc.org/leed)

The LEED Green Building Rating System is a voluntary, consensus-based, market-driven building rating system based on existing proven technology. It evaluates environmental performance from a whole building perspective over a building's life cycle, providing a definitive standard for what constitutes a "green building."

The rating system is organized into five environmental categories. The applicable category for JFBHC's urethanes is Indoor Environmental Quality, EQ Credit 4.2 – Low Emitting Materials—Paints and Coatings. EQ stands for environmental quality; which states:

"All paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011." – LEED EQ 4.2 (Low Emitting Coatings)

As shown in the VOC section above, **JFBHC's urethanes meet CARB, SCM and the SCAQMD's limits** and thus, **can be used to obtain LEED Credits**. Additional LEED Credit points may be available based on the new LEED v4 version. In this version, points can be provided for materials that reduces waste, usage, whole building life-cycle to reduce energy of materials and material transparency through environmental product declarations and ingredient reporting.

ENVIRONMENTAL STUDY – VOC, WASTE & POLLUTION REDUCTION

JFBHC completed an environmental study comparing its urethane coatings versus acrylic systems to calculate the amount of VOCs, waste and total pollution used. This study compares the pollution totals over a six (6) year period. The results showed there was a significant reduction in VOCs and solid waste when using JFBHC's Systems, including:

- **99% reduction in VOCs**
- **84% reduction in solid waste**
- **Total pollution reduction of 87%**

There are multiple reasons for the results. JFBHC's Systems require much lower rates of recoating, and no stripping as part of the normal lifecycle. Acrylic Systems require continuous recoating and stripping of the floor finish (wax). JFBHC's Systems will typically last up to 3 years before recoating is required with the exception of an estimated 5% of repairs. This means that for 2 years after application/recoating, there will be very minimal pollution generated with JFBHC. Acrylic Systems typically require scrub and recoats about 3 times per year and an annual strip. This results in continuous pollution generation each year.

Below are two charts that provide the calculations of an average hospital (75,000 sq. ft.) and an average school (125,000 sq. ft.). JFBHC can provide the full reports if requested.

75,000 sq. ft. Healthcare:

Year	ACRYLIC SYSTEM			JFBHC SYSTEM			Lbs. Difference	% Reduction
	lbs. VOC's	Solid Waste lbs.	Total Pollution	lbs. VOC's	Solid Waste lbs.	Total Pollution		
1	382	1,669	2,051	8	759	767	1,284	63%
2	382	1,669	2,051	0	19	19	2,032	99%
3	382	1,669	2,051	0	19	19	2,032	99%
4	382	1,669	2,051	8	759	767	1,284	63%
5	382	1,669	2,051	0	19	19	2,032	99%
6	382	1,669	2,051	0	19	19	2,032	99%
Total Life Cycle	2,292	10,014	12,306	17	1,595	1,612	10,695	87%

125,000 sq. ft. Education:

Year	ACRYLIC SYSTEM			JFBHC SYSTEM			Lbs. Difference	% Reduction
	lbs. VOC's	Solid Waste lbs.	Total Pollution	lbs. VOC's	Solid Waste lbs.	Total Pollution		
1	637	2,752	3,388	13	1,266	1,279	2,109	62%
2	637	2,752	3,388	0	32	32	3,356	99%
3	637	2,752	3,388	0	32	32	3,356	99%
4	637	2,752	3,388	13	1,266	1,279	2,109	62%
5	637	2,752	3,388	0	32	32	3,356	99%
6	637	2,752	3,388	0	32	32	3,356	99%
Total Life Cycle	3,820	16,510	20,330	28	2,658	2,686	17,644	87%

AIR MONITORING

JFBHC products are aliphatic polyester polyurethanes that use an isocyanate as the hardener or curing agent (Part B). The concern with isocyanates are the monomers omitted into the atmosphere during application and dry time. As products are applied and dry, those monomers attach themselves to the solvents in the coating and release into the air. However, since JFBHC's urethanes use water instead of solvents, these monomers are not able to attach themselves and are not released into the air.

JFBHC has extensively tested the exposure monitoring for applicators and facilities using independent third parties. These results are then compared against the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) (29 CFR 1910) and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs).

Multiple chemicals were monitored. **Traces of JFBHC's product were detected at levels well below OSHA limits.**

The charts below provides some data from various tests (JFBHC's results in yellow):

		<u>JFB Results</u>	<u>OSHA Standard</u>
<u>Chemical</u>	Result	8 hr. TWA	OSHA TWA PEL
	(ppm)	(ppm)	(ppm)
Dipropylene Glycol Methyl Ether	<2.5	<0.29	25
<u>Chemical</u>	Result	8 hr. TWA	OSHA TWA PEL
	(mg/m ³)	(mg/m ³)	(mg/m ³)
Hexamethylene Diisocyanate Monomer	<0.005 – 0.1	<0.0005	0.035
<u>Chemical</u>	Result	8 hr. TWA	OSHA TWA PEL
	(mg/m ³)	(mg/m ³)	(mg/m ³)
Hexamethylene Diisocyanate Isocyanurate	<0.01 – 0.1	<0.005	0.5

Atmospheric Concentration Testing:

	Methanol (ppm)	HDI (ppm)	IPDI (ppm)	MDI (ppm)
<u>Standard</u>				
OSHA PEL TWA	25	-	-	-
ACGIH Excursion Limit	-	0.025	0.025	0.025
<u>Results</u>				
Mixer	<0.51	<0.0073	<0.0097	<0.0065
Applicator & Clean Up	1.7	<0.0073	<0.0097	<0.0065

COST SAVINGS

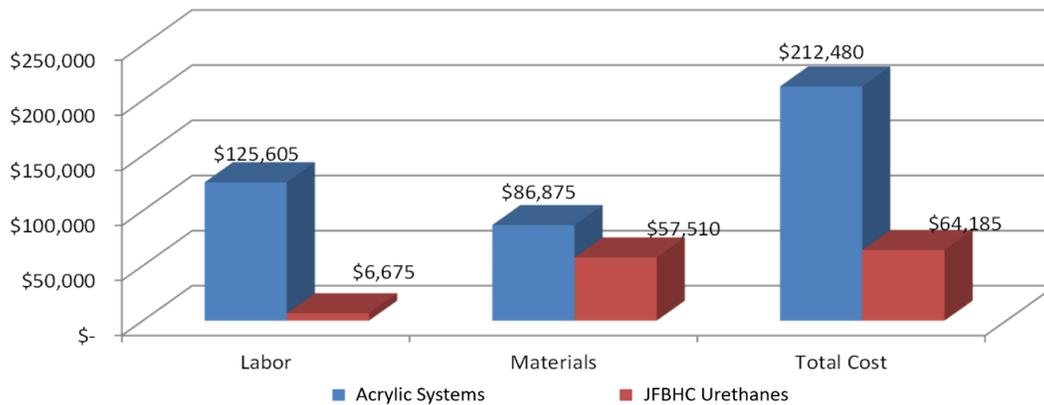
To compare the costs of JFBHC’s urethanes to Acrylic Systems, one needs to take into account the entire lifecycle. Acrylic Systems require frequent burnishing, buffing, scrubbing and recoats to revitalize the appearance of the floors. JFBHC’s urethanes are long-lasting and eliminate the burnishing, buffing and frequent recoats; which significantly reduces a facilities labor to maintain their floors.

The average hospital is ~75,000 sq. ft. and school is ~125,000 sq. ft. Like the Environmental Study, JFBHC’s Return on Investment (ROI) projects the costs over a six (6) year period. The ROI results were significant. By using JFBHC’s products, hospitals would see a:

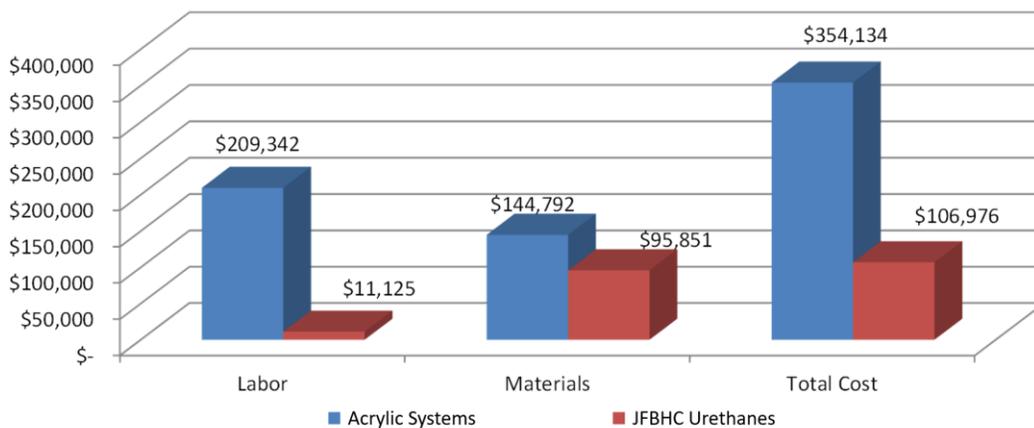
- **95% in labor savings**
- **34% in material savings**
- **70% in total floor care savings**

The charts below are the cumulative costs over the six (6) year period for an average size hospital and an average size school. Some variables include burnishing the Acrylic System once a week, a quarterly scrub that applies another coat of acrylic and an annual strip and recoat. The full ROI’s which includes all variables can be provided if requested.

75,000 sq. ft. Healthcare:



125,000 sq. ft. Education:



SUMMARY

JFBHC's urethane products are proven in the industry for their environmental / green attributes, as well as their overall performance and cost benefits. To recap, JFBHC's products:

1. Are true water-based systems that do NOT use solvents or exempt solvents.
2. Offer countless environmental benefits to better the ozone, air quality, reduce user risks and do NOT contain substances that are banned in any geographic area.
3. VOCs are lower than every government agency (U.S., state or local) limits – "Super Compliant" by the South Coast AQMD.
4. Allow facilities to obtain LEED Credits.
5. Significantly reduces the amount of VOCs, solid waste and overall pollution by 87%.
6. Have been extensively tested with exposure limits well below OSHA Permissible Exposure Limits.
7. Provide incredible financial savings – at least 70% total floor care savings; an estimated ~\$150,000 over 6 years per 75,000 sq. ft. (~250,000 over 6 years per 125,000 sq. ft.).