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SSPC
The Society for Protective Coatings

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# FEATURES





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## DEPARTMENTS



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# SSPC Fills Leadership Posts, Announces Promotions

The growth trend at SSPC: The Society for Protective Coatings continues in 2018 as the organization recently announced several staff additions, promotions and key changes related to its May 15 reorganization.

Key additions include the hiring of Kevin LaRue as the new director of technical services, and Greg Muha as the new director of member development and engagement.

LaRue joins the SSPC staff after several years as vice president of the Finishing Contractors Association International based in Oakbrook Terrace, Illinois. Previous to FCA, LaRue was national director of the Labor Management Cooperation Initiative (LMCI) in Hanover, Maryland and national recruitment manager for Finishing Trades Institute. With his experience as a painting contractor as well as his background as an instructor and training provider, SSPC expects LaRue's transition to be seamless. At SSPC, he will work closely with staff and members on the development of SSPC standards and training programs, as well as oversee the PCCP (QP) programs.

Kevin LaRue

Muha comes to SSPC after 20 years at SAE International, where he served in many leadership roles, including his most recent as director, strategic partnerships and business development. With his experience in establishing and fostering business relationships, SSPC expects Muha's leadership to be a valuable asset in improving upon the customer experience. At SSPC he will work closely with staff and members on implementing new member benefits and programs to better represent SSPC's global reach.

Greg Muha

In addition to these new hires, Jennifer Merck has been promoted to the new position of director of training and certification. Having been with SSPC more than 18 years, Merck has been an integral player in the growth of SSPC's training and certification programs, as well as a key component in maintaining DoD-funded contracts for SSPC to train and certify more than 3,500 military personnel. As training courses developed and grew to host over 7,000 students per year with an average of 50 training and certification programs being offered every month, it became necessary for a new and independent department to focus on maintaining that growth.

Longtime SSPC directors Terry Sowers and Michael Damiano are moving into senior advisory roles. Sowers, who has been with SSPC since 1989 and plans to retire in 2019, will be working in the role of senior member services advisor, and Damiano, who has been with SSPC since 1991, will be the senior technical advisor and lead special projects.

Since 2006, Sowers has been the director of membership services, where she has improved upon delivery of SSPC training programs, quality of the technical program of the annual conference, as well as the core values of both individual and organizational membership. Her extensive history with SSPC and its member base are a testimony to her dedication to both the organization and its valued members. In her new role as senior member services advisor, Sowers will take on special projects in membership development, and will continue promoting SSPC chapter events. In addition, she will work as an advisor to Muha as he steps into his new position.

Damiano joined SSPC as the manager of the Painting Contractor Certification Program (PCCP) and contractor pre-qualification before being named manager of technical services in 1994 and director of product development in 1997. In 2015, he was named the director of technical services. Over the years, he has directed activities to develop and validate SSPC certification programs, standards, publications and training programs. He has been a key figure in the growth of the PCCP (QP) program and an important leader and historian among SSPC staff. In his new role as senior technical advisor, he will take on special projects in training and program development, and will continue representing SSPC at meetings and events. In addition, he will work as an advisor to LaRue in his new position.

Other promotions announced by SSPC include Sara Badami assuming the role of training manager and Dustin Young taking on the role of training materials development manager.

Badami has been directly involved with SSPC's training and certification programs for the past 14 years. Under her leadership, the training staff has been better equipped to process the increase in programs being offered, all while maintaining a quality product and responsive customer service. Her managerial duties will include the growth of international training licensees as well as the promotion of SSPC training and certification programs domestic and abroad.

Young joined SSPC as a technical service specialist in May 2017. He has worked in and around the coatings industry since 2011, previously holding positions with Ferro Corp., a glass coatings manufacturer, and PPG Industries. In his new role, Dustin will oversee the development and revision of all SSPC training and individual certification materials to stay current with industry updates and trends.

# SC Bridge Reopens After Corrosion-Related Cable Failure

The James B. Edwards Bridge in Charleston, South Carolina, reopened June 2 after more than two weeks of work stemming from what officials now say was a cable failure caused by corrosion.

The bridge, which carries Interstate 526 over the Wando River, was closed by the South Carolina Department of Transportation on May 14 after a routine inspection uncovered a severed cable inside the westbound span of the twin-span concrete box-girder bridge. It was the second time in less than two years that a cable was found to have been damaged inside the structure.

SCDOT had a new cable installed to replace the damaged one, and fabricated and installed an additional cable for the sake of redundancy in case of any future cable problems. Officials had previously predicted the bridge would reopen June 11; the repair beat that time estimate by more than a week.

Photo: www.twitter.com/SCDOTPress

SCDOT said that an investigation had determined that corrosion caused by moisture intrusion had caused the cable failure, and that corrosion had also been to blame for the failure of another cable in the same span in 2016.

Moisture intrusion has been a known issue on the bridge since long before the 2016 incident. In 2011, a paper authored by a group of Clemson University engineers used the bridge as a case study, noting that SCDOT had identified problems including "improper grouting of ducts, leaky joints, debris in the box void, clogged drain holes (3/4-inch-diameter) and cracks in the piers."

The agency says testing was performed last year on seven of the main cables in the westbound span — not including the one installed just last year — but results are still pending in that investigation. "Preliminary information" indicates corrosion areas were found on two of the cables, the agency says.

# G.C. Zarnas Celebrates 70 Years

For the nationwide industrial and commercial coatings contractor G.C. Zarnas & Co., Inc., this year marks a significant milestone: the 70th year since the Bethlehem, Pa.-based company's founding in 1948.

G.C. Zarnas Vice President Dean Zarnas attributes the longevity and success of the company today all the way back to the company's founder, his grandfather, Gust C. Zarnas — a Greek immigrant and child of the Great Depression who became an All-American football player at Ohio State University and spent three years in the NFL before returning home and eventually entering the steel painting business.

Gust's father, who was then a paint superintendent at the nearby Allegheny Steel Mill, convinced Gust to get into the business himself, and in 1948, Gust started G.C. Zarnas after securing the then-booming Bethlehem Steel as the company's first client. Coincidentally enough, the purchasing agent at Bethlehem Steel was an Ohio State graduate who had keenly watched Gust's athletic exploits on the field back in Columbus, says Dean.

Though early operations ran out of the company's sole vehicle — a 1938 Ford truck, which Dean says the family keeps to this day — steady and successful jobs at Bethlehem Steel opened the door to work at other mills in Maryland, New York and Indiana. Gust's son Stephen was instrumental in developing partnerships beyond Bethlehem Steel with chemical and petrochemical giants and several power generation plants.

As the years went by, the company evolved from strictly performing maintenance to incorporating new construction projects, including commercial facilities such as arenas and hotels. In addition to surface prep and coating application, the company added lead abatement, fireproofing and other specialty services to its repertoire. This diversification of services proved crucial when the U.S. steel industry faltered in the 1970s and 1980s, as the company shifted work into other industry sectors.

Nowadays, G.C. Zarnas continues to operate in these arenas, all while adhering to developing standards, regulations and trends in the industry. Dean says the company has raised its quality standards to reflect these developments, earning SSPC-QP 1, 2 and 8 designations, as well as SSPC-QS 1 and NACE certifications.

As for the next 70 years, Dean; his brother, Lee, also a vice president; and their father, Stephen, company owner and president; hope for what Dean calls "sustained, modest growth."

"We don't strive to be the biggest company," says Dean. "We want to serve our existing customers well, while partnering with new clients that align with our high-quality standards."

And while Dean can point to a number of noteworthy projects the company has taken up over the past 70 years, the true highlight to him is the positive impact the company has had on its employees lives — to which Dean ultimately credits his grandfather.

"For him to earn a scholarship, get a degree, become a star athlete, start a company and create a livelihood for so many — that says a lot," says Dean. "It's a huge testament to his motivation."

## PAINTSQUARE COMMENTS

# In Response to "Pentagon Concerned About Gulf Offshore Expansion" (*PaintSquare News*, May 14)

The Pentagon said in a recent report to Congress that offshore drilling in the eastern Gulf of Mexico would cause problems for necessary military activities carried out in the region, and that any drilling conducted there would have to be placed under significant restrictions to prevent interference with military operations. That portion of the Gulf was deemed an "irreplaceable national asset," according to reports.

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***Robert Bullard:***
"This same situation may [relate] to the development offshore wind power development, especially as the industry matures to deeper-and-deeper-water operations."

***David Knuckey:***
"Why can't the Administration and the DoD get together and discuss these issues before going public? It really makes us look inept in the eyes of the world when things like this happen."

## Paint Poll

paintsquare.com/poll

**The U.S. military has expressed recently that it would like to block offshore drilling and wind projects in some U.S. waters where it operates. Should military exercises trump energy development at sea?**

**Maybe, but military exercises should be only one of the factors considered in permitting offshore development. 53%**

**Yes. Military security is crucial. 43%**

**No. Domestic energy development is important, and military exercises can be moved. 4%**

## Problem Solving Forum

### How do you best remove lubricants and other contaminants from field-bolted connections prior to painting?

***Jonathan Pavlik, PBI Custom Finishes:***
"Remove the material in accordance with SSPC-SP I, if specified. Water-soluble, environmentally friendly alkaline cleaners combined with elbow grease can provide a water-break-free surface suitable for surface-tolerant coatings."

***Trevor Neale, TF Warren Group:***
"Hundreds or thousands of field and/or shop bolt assemblies that require full corrosion protection can be found on bolted structures. SSPC-SP I is the minimum standard, but in some cases where galvanizing was specified, a special primer or treatment may be required and is rarely detailed in the specifications. This is a good example of the type of item to be discussed at the pre-job meeting."

## PAINTSQUARE NEWS TOP 10

paintsquare.com/news, May 6–June 3

1. Steel Used on $1.6B Subway Project Questioned
2. Hempel Acquires Majority of German Paint Firm
3. SC Bridge Closed After Cable Breaks
4. Report: FIU Bridge Showed Cracking 10 Days Before Collapse
5. Gordie Howe Progresses as Contractor Withdraws
6. Pentagon Concerned About Gulf Offshore Expansion
7. PPG Fires Controller Amid Accounting Investigation
8. Dubai Starts $107M Bridge Project
9. Report: Worker Fled FIU Bridge Collapse
10. SC Bridge with Snapped Cable Closed for 4 Weeks

# Delamination of Coating from a Ship's Hull

BY CHERYL ROBERTS, KTA-TATOR, INC.

Unlike many industrial structures, ships often contain a variety of multi-layer coating systems on a single vessel, and even on the exterior hull itself, often including a complex sequence of anticorrosive layers followed by antifouling layers. This article focuses on the recoating of a ship's exterior hull that resulted in catastrophic failure before the ship was ever returned to service.

## THE BACKGROUND

The exterior hull coating on a large ship was installed about 25 years after its initial launch. Specifications required blast cleaning to SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning." The hull was divided into three segments with each coating layer applied in a different color (Fig. 1).

The underwater hull was to be coated with two layers (red, then gray) of an anticorrosive (AC) polyamide/polyamidoamine-cured epoxy at 4-to-8 mils DFT followed by three layers (red, black, then red) of an antifouling (AF) polyamide cuprous oxide coating at 4-to-6 mils DFT.

The boot top was to be coated with two layers (red, then gray) of the AC coating at 4-to-8 mils DFT followed by three layers of the AF coating (red, then two coats of black) at 4-to-6 mils DFT. This layer of the hull is sometimes above the waterline and sometimes under water, depending on weight. The light-load line (LLL) is considered to be 6 inches above the underwater hull and the deep-load line (DLL) 6 inches below the freeboard.

The freeboard (above the waterline) was to be coated with two layers (red, then gray) of the AC coating at 4-to-8 mils DFT, followed by a topcoat of amine-cured polysiloxane (gray) at 5-to-8 mils DFT to provide UV resistance.

After the coating work was completed, the ship was removed from the dry-dock and secured to a pier in the shipyard. Shortly afterwards, spontaneous peeling of the AF coating system from the AC coating was observed at various locations of the boot top around the perimeter of the ship. The peeling was most prevalent in an area from the DLL down approximately 3-to-4 feet around the perimeter of the ship. The AC coating beneath was intact and no rusting or deterioration of the AC was evident at any location.

Additionally, delamination of the coating was observed on the freeboard in an area from the top of the boot top up approximately 1-to-2 feet. This area was to have been coated with only the AC epoxy system and polysiloxane; however, there appeared to be an extraneous coat of the AF coating applied between the epoxy and polysiloxane. Two feet above the DLL, this same coating system showed no delamination, peeling or other notable defects.

## FIELD INVESTIGATION

Samples were obtained from three locations within each area: a "lower" sample of the AF coating at or below the DLL and the intact AC coating beneath where the AF coating had been removed; a "middle" sample of any disbonded coating immediately above the DLL

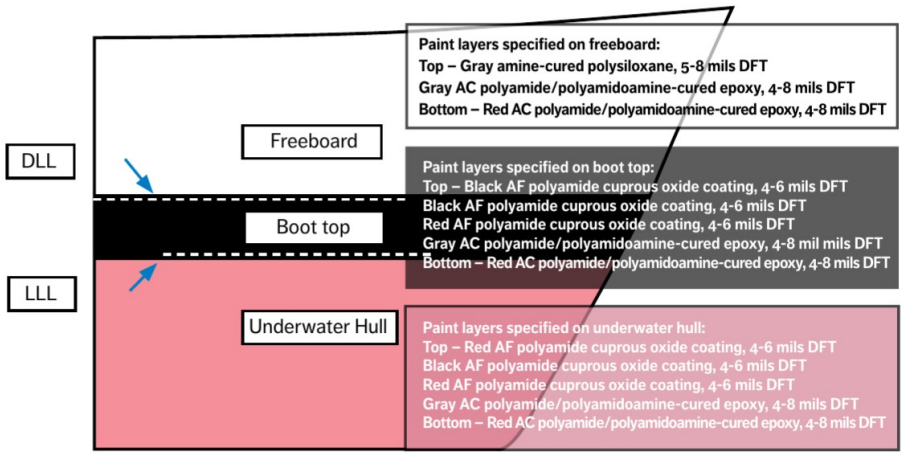


Fig. 1: An illustration of the hull of the ship with the deep-load line (DLL), light-load line (LLL) and specifications for the coating systems applied. Figures courtesy of the author.

Fig. 2: Lower, middle and upper sampling sites. The black area is the boot top.

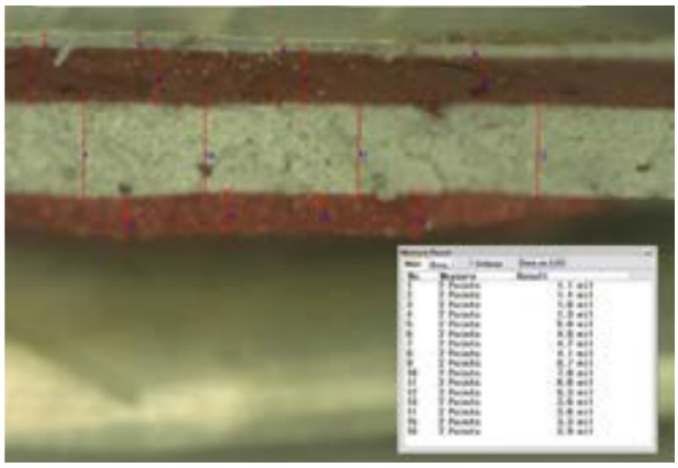

Fig. 3: Cross section of a paint chip obtained from within 1-½ feet above the DLL showing the extra red layer sandwiched between the gray layers at 200-times magnification.

and the AC coating beneath the disbonded coating; and an "upper" sample of the freeboard polysiloxane. Figure 2 depicts the lower, middle and upper sampling locations.

In every case, upper samples of the freeboard polysiloxane coating were tightly adherent with no loss of adhesion between coats or to the underlying substrate. The AC coating beneath any disbonded AF or polysiloxane coating was also tightly adhered with no loss of adhesion between AC coats or to the underlying substrate

The adhesion of the AF coating to the underlying AC coating was somewhat variable, ranging from tightly adherent to relatively poor. There were large areas where the AF coating could be easily and cleanly separated from the underlying AC coating by cutting or scraping.

## LABORATORY INVESTIGATION

The laboratory investigation focused on obtaining answers to two questions: I) why did the red AF coating disbond from the gray AC coating over a large portion of the ship, and 2) why did the gray polysiloxane coating disbond in the middle area extending from the top of the boot top to approximately I-to-I-½ feet above the DLL? The investigation consisted of microscopic examination, mix-ratio analysis by nitrogen content and infrared spectroscopy (IR), a recoat interval study, comparative batch composition testing, an analysis for the presence of an amine exudate (blush) and a solvent rub test.

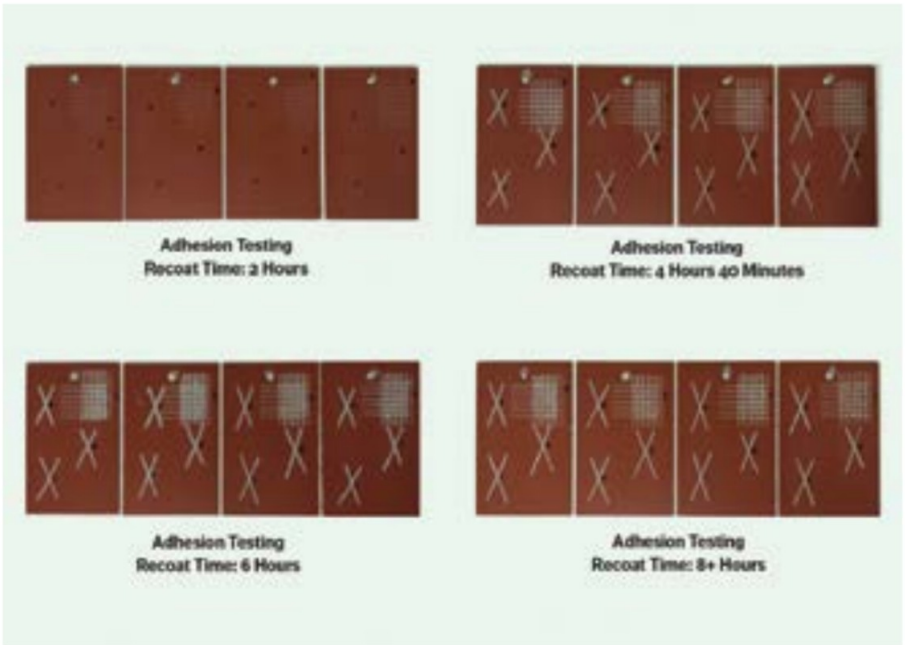


Fig. 4: Variations of adhesion with length of time between application of red AF and gray AC coating.

### Microscopic Examination

Cross-sectional microscopy of the samples collected during the field investigation revealed that the thickness of the gray AC coating ranged from 5.4-to-8.9 mils; the thickness of the red AF coating ranged from 3.2-to-7.7 mils.

The examination of coating chips from the middle area extending from the top of the boot top to approximately I-to-I-½ feet above the DLL revealed an additional red coating layer between the gray intermediate coat and gray topcoat. A photomicrograph of one such coating chip is shown in Figure 3.

### Solvent Rub Test

A methyl ethyl ketone (MEK) rub test was used as a qualitative method to determine what coating was present on the backsides of the chips. Because it was known that the AF coating readily dissolved in MEK but the red AC epoxy primer did not, it was concluded that disbonding occurred within the AF layer.

### Nitrogen Analysis: Mix Ratio

Nitrogen content analysis of the gray AC coating was performed to assess the mix ratio of the epoxy components. According to the

**Table 1: Results of Tack-Free Study.**

| Ratio of A to B | Substrate/Surface Preparation/ Application | Time from AC Application until No Longer Wet | Time from AC Application until No Longer Tacky |
|---|---|---|---|
| 1 : 1 | Same as Recoat Study (Steel panel/ Abrasive blast/ Airless spray) | 1 hour and 45 minutes | 4 hours and 15 minutes |
| 1.4 : 1 | Same as Recoat Study (Steel panel/ Abrasive blast/ Airless spray) | 2 hours | 3 hours |
| 1 : 1 | Glass panel/ Cleaned with solvent/ Drawdown | 1 hour and 45 minutes | 4 hours and 15 minutes |
| 1.05 : 1 | Glass panel/ Cleaned with solvent/ Drawdown | 1 hour and 45 minutes | 4 hours |
| 1.1 : 1 | Glass panel/ Cleaned with solvent/ Drawdown | 1 hour and 45 minutes | 4 hours |
| 1.4 : 1 | Glass panel/ Cleaned with solvent/ Drawdown | 1 hour and 30 minutes | 3 hours |

product data sheet, Part A of the gray AC coating contained polyamide and polyamidoamine, both of which contain nitrogen. The Part B component consisted of an epoxy resin. The analysis revealed that two of the seven gray AC paint chip samples had a proper I:I mix ratio, and that the other five samples tested had excess nitrogen, with mix ratios ranging from I.05:I to as high as 2:I. The infrared spectroscopic analysis was also performed but did not provide any further information.

### Recoat Interval Study

A study of the relationship between the application recoat interval and the adhesion of the red AF coating applied over the gray AC coating revealed that a two-hour recoat interval produced markedly better adhesion than did longer recoat intervals. The adhesion test involved making "X" cross-cut incisions through the coating layers of prepared and coated test panels, applying tape over the incisions and then removing the tape. The degree of

adhesion was evaluated based on how much coating was removed by the tape. Figure 4 (p. 10) shows the coated panels after the testing was complete.

**Tackiness/Tack-Free Test**

The time of tackiness was defined as the interval between when the coating was no longer wet (when paint ceased to transfer to a fingertip that lightly touched the surface) and when the coating was no longer tacky. The coating was considered no longer tacky when a light touch to the surface ceased to leave an impression on the surface.

The results of the tackiness/tack-free study established that at 80 F air temperature and 65-percent relative humidity (RH), the proper I:I mixed gray AC coating had a tack window of 2.5 hours (Table I, p. 11). Mix ratios of I.05:I and I.I:I had a tack window of 2.25 hours; and a mix ratio of I.4:I had a tack window of I-to-I.5 hours.

**Batch Composition Testing**

Paint retained from the original application was compared to control samples provided by the coating manufacturer, and compositional values were found to be reasonably consistent. Unfortunately, original samples of the red AF coating and the Part A component of the gray AC coating were not available for testing.

**Amine Exudate Analysis**

Infrared spectroscopic analysis was performed to determine if the gray epoxy AC coating had developed an amine exudate prior to application of the red AF coating that contributed to the poor adhesion characteristics. Because the surface of the gray epoxy was contaminated with trace residuals of the red AF containing a polyamide component, the presence or absence of amine blush could not be conclusively determined.

**Conclusions**

There were numerous areas around the perimeter of the ship, particularly on the port side but also on the starboard side and stern, where spontaneous disbonding and relatively poor adhesion of the black AF coating was occurring. This disbonding affected the greatest surface area and was the coating problem/failure of greatest concern.

During sampling, it was ascertained that adhesion of the AF coating system to the underlying AC coating system was variable, ranging from spontaneous disbonding in large areas to relatively tight adhesion in other areas.

It was concluded that the poor adhesion and disbonding occurred as a result of application of the red AF first coat over the gray epoxy AC topcoat, after the gray epoxy was no longer tacky.

The adhesion variability of the AF coating observed during the course of sampling, and at least visually on portions of the ship's hull, almost certainly was a result of the variable tackiness of the underlying gray AC topcoat. Where there was a long tack time, suitable adhesion occurred. Where the AF coating was applied after the tack time had been exceeded, there was moderate to lower adhesion.

Testing also established that when there was an excess amount of Part A in the mix, the tackiness time of the gray epoxy AC coating was reduced, effectively reducing the tack window and further aggravating the adhesion problem.

**SUMMARY**

The spontaneous disbonding that impacted the largest area occurred where the red AF coating was applied over the gray AC coating, in the area between the deep-load line (DLL) and the water. The cause of this problem was attributed to the application of the red AF coating after the tackiness window of the gray epoxy AC coating had expired. The recoat interval study of the red AF coating applied over the gray AC coating revealed that the red AF coating had markedly better adhesion when applied two hours after application of the gray AC coating than when applied four hours and 40 minutes, six hours or eight hours after application of the gray AC coating. The tackiness/tack-free test revealed that the tackiness window of the gray AC coating was 2.5 hours. A review of the painting records revealed that the red AF coating was often applied more than 2.5 hours after the gray AC coating. Adequate adhesion would not have been achieved in these areas.

Nitrogen and infrared spectroscopic analyses of samples of the gray AC coating and controls prepared at various mix ratios indicated that much of the gray AC coating applied to the hull had an excess amount of Part A, the pigment component that contained the polyamide and polyamidoamine resins and associated solvents. The tackiness/tack-free test established that when there was an excess amount of Part A, the tackiness time of the gray epoxy AC coating was reduced, further aggravating the adhesion problem.

A secondary coating problem was the spontaneous disbonding of the gray polysiloxane topcoat from the AC coating system in the area immediately above the DLL to approximately I-to-I-½ feet above the DLL. The adhesion of the gray polysiloxane topcoat to the gray AC coating was excellent in the areas above this region. Cross-sectional microscopic examination of coating chip samples revealed that one or more layers of the AF coating had been inadvertently applied to numerous areas above the DLL. When the polysiloxane was applied down to the DLL, the AF was not removed, but covered over. Disbonding occurred between the red AF layer and the gray epoxy topcoat of the underlying AC coating for the same reasons as described earlier for the spontaneous disbonding and poor adhesion of the AF coating to the underlying AC coating below the DLL.

**ABOUT THE AUTHOR**

Cheryl Roberts is a senior chemist with KTA-Tator, Inc. She holds Bachelor of Science and Master of Science degrees in chemical engineering and a Master of Science degree in colloids, polymers and surfaces. Roberts is an active member of ASTM International and is the secretary of the Pittsburgh Society for Coatings Technology.



# TIME AND TEMPERATURE: DON'T FORGET ABOUT HUMIDITY

**BY TROY FRAEBEL, ABKAELIN, LLC**

Most conversations about cure times naturally default to standard laboratory conditions of 77 F and 50-percent relative humidity (RH). However, this is seldom the case in the field. Variations in recoat windows, sweat-in or induction times and pot life due to material storage and mixing temperatures are often forgotten. Combine high humidity with low temperatures or low humidity with moisture-cured products and disasters can happen. Ever-changing weather conditions are the reason it's critical that the applicable product data sheet(s) be on the jobsite and a competent sales representative and/or technical service person be readily available.

## FINAL CURE

While some coatings cure by simple evaporation of a solvent, most involve a chemical reaction. Cure is defined as the coating changing from a liquid state into a dry, stable, solid protective film[1]. Both evaporation and chemical reactions are affected by temperature. As temperature increases, the speed of evaporation and chemical reactions also increases. Conversely, as the temperature decreases, the evaporation rate slows and virtually stops as is the case when water freezes. Chemical reactions require a minimum temperature to initiate and as the temperature drops, these reactions will slow and eventually stop.

Industrial coating data pages, especially

those for plural-component materials, will often list multiple temperature ranges. For example, the data page for a standard solvent-based epoxy tank lining lists a seven-day minimum cure at 77 F/50-percent RH before immersion. Reduce the temperature to 40 F and the listed cure time is now 14 days. Heating the tank to 100 F can reduce the cure time to four days. There are solvent-based epoxies that will cure down to 0 F, but beware of the cure time. While the listed time is still seven days at 77 F, it can take as long as 30 days at 0 F. Consulting the data page and testing for cure is critical. Especially in the case of potable water, the author strongly suggests testing in accordance with ASTM D5402, "Standard Practice for Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs," in addition to observing the published cure time.

**RECOAT WINDOW**

For multi-coat systems, one must consider the recoat window (a period beginning at a point when a coat of paint has dried or cured sufficiently to be topcoated and ending when the coating has reached a degree of cure that topcoating is not recommended without an additional surface preparation procedure[1]) before thinking about final cure. Two-component epoxy primers and intermediate coats have been and are still industrial workhorses, but care must be taken when topcoating, especially with a polyurethane. On a typical epoxy data sheet, the minimum recoat time is listed from seven to 32 hours depending on the temperature with the higher temperature, 90 F, requiring the shortest time and 50 F requiring the longest time (slowest cure). However, regarding the maximum recoat time before scarifying or using a tie-coat is required, only one interval (60 days) may be listed. If the maximum recoat time was tested in a laboratory at 77 F, how long could a painter wait before applying a polyurethane topcoat to the roof of an elevated water tank in Texas in the summer? Logically, it could be less than 60 days, as the speed of the chemical reaction would increase as steel temperatures reach well over 120 F in direct sunlight. The data sheet does, however, suggest that the painter contact the manufacturer's representative for specific recommendations.

Humidity also comes into play when topcoating ethyl silicate inorganic zinc-rich primers (IOZ). If one looks at the overcoat time intervals on a typical data sheet, they range from 1.5 hours at 104 F to 18 hours at 41 F, but IOZs require moisture to cure. When paint shops are heated in the winter, the relative humidity typically drops below the laboratory testing condition of 50-percent RH, thus slowing the cure. Paint shops often mist IOZs or wet the floors in the shop to help with the cure, but testing for cure is always a good idea before applying an epoxy or polyurethane intermediate or topcoat in the shop. The data sheet previously cited instructs the painter to test for cure according to ASTM D4752, "Standard Practice for Measuring MEK Resistance of Ethyl Silicate (Inorganic) Zinc-Rich Primers by Solvent Rub." Epoxy coatings do a very good job of preventing or slowing moisture from reaching the IOZ, which typically causes the uncured IOZ to split cohesively once stressed (e.g., strapped for loading or exposed to temperature changes). Shop-applied IOZs topcoated in the field typically see sufficient moisture to cure, so splitting is usually not encountered there.

As their name implies, moisture-cured urethanes (MCU) also require moisture to cure. As with IOZs, topcoating MCU primers with epoxy or other materials prior to cure can be disastrous because the lack of moisture essentially stops the curing process.

Painters must even be cautious with simple one-component waterborne commercial acrylic materials. Painting indoors with the HVAC system running typically yields close to laboratory conditions, so the one-hour-to-touch and four-hours-to-recoat times listed on the label can be trusted. Moving outdoors when the temperature is just above the 50 F minimum might delay the recoat until the next day. Commercial labels and data pages typically only list one temperature and humidity range, so contacting the manufacturer may be necessary when temperatures are above or below those listed.

**POT LIFE**

Epoxy, polyurethane, polysiloxane and other two-component materials have a limited pot life, the length of time after combining two or more components of a multiple-component coating system that the mixed coating can be successfully applied[1]. Since the mixed coating is reacting chemically, the length of the pot life is limited by the temperature. Reviewing the data sheet for a typical polysiloxane, one finds the pot life ranging from 6.5 hours at 50 F to only 1.5 hours at 86 F. Pot life is much more dependent on the temperature of the material than the temperature of the ambient air, so cooling the mixed material in an ice bath or chiller can help extend the pot life. Care must be taken to keep the material above the required reaction temperature.

**INDUCTION TIME**

Many two-component epoxies require time for the chemical reaction to begin prior to application. This is called the induction or sweat-in time. Again, this chemical reaction is accelerated at higher temperatures and retarded at lower temperatures, so looking at a data sheet for a low-temperature-cure epoxy, one finds sweat-in times ranging from only five minutes at 120 F to one hour at 0 F. What is not clear until one reads further, is that the material should be at least 40 F for optimal performance. Even for low-temperature-cure epoxies, it is best to store and mix them at higher temperatures to aid in initiating the chemical reaction. Epoxy chemical reactions are exothermic (they product heat), so the recommended practice is to measure the material temperature when the material is mixed and before its use. If the temperature has increased, that is a good indication that the chemical reaction has begun and the material can be successfully applied.

**HUMIDITY AND TEMPERATURE**

Most data pages restrict coating application to when the RH is 85 percent or below, and the air and surface temperature is at least 5 F above the dew point. Specifications often require that these conditions be maintained through final cure, but this requirement is unrealistic, for example, when final cure for a typical outdoor polyurethane can require 10 days at laboratory conditions. Consultation with the coating manufacturer is required to obtain more realistic limitations. That being said, aliphatic polyurethane topcoats applied for aesthetic purposes

can dull severely when exposed to early moisture. A by-product of the polyurethane reaction is the production of $CO_2$ gas. Moisture increases this reaction and tiny $CO_2$ bubbles, while not significantly detrimental to the film, are trapped in the film, reducing the sheen.

Amine-cured epoxies are subject to amine blush when exposed to condensing humidity. This is caused by the reaction of amine co-reactant with carbon dioxide and water[1]. The blush, an amine carbamate, may or may not be visible, but can usually be felt as a film on the surface. If topcoated, this film can adversely affect the adhesion of the next coat. The coating manufacturer should be consulted for removal methods. If untopcoated, amine blush is typically not an issue.

## CONCLUSION

It is critical to monitor ambient conditions (air temperature, relative humidity and dew point), surface temperature and material temperature during coating mixing, application and cure, especially when subsequent coats of paint are going to be applied. Relatively thin coatings quickly acquire the temperature of the surface to which they are applied regardless of the ambient air temperature or bulk material temperature. Recording surface temperature gauges are helpful in monitoring the progress toward full cure or recoat window minimums or maximums; however, when in doubt, test for cure per the ASTM or other applicable standards. Data sheets contain good information on time, temperature and humidity requirements, but only the coating manufacturer can fill in the gaps. Do not hesitate to call.

## ABOUT THE AUTHOR

Troy Fraebel is the vice president of Protective Coating Services for ABKaelin, LLC. He has 30 years of experience in the protective coatings industry including extensive experience in the water, wastewater, bridge, petrochemical, power, mining and metals, and marine markets. Fraebel is an SSPC Protective Coatings Specialist, a NACE-certified Coating Inspector Level 3 and an instructor for several SSPC training courses. Prior to joining ABKaelin, he was a project development manager for the Protective and Marine Division of The Sherwin-Williams Company. Fraebel developed the painting quality assurance and maintenance programs for Caldwell Tanks and was a voting member on the AWWA's D102 tank painting revision task force. He has authored, co-authored, presented and published multiple industry papers and holds a B.A. from Western Kentucky University and a Master's degree in education from William Paterson College.

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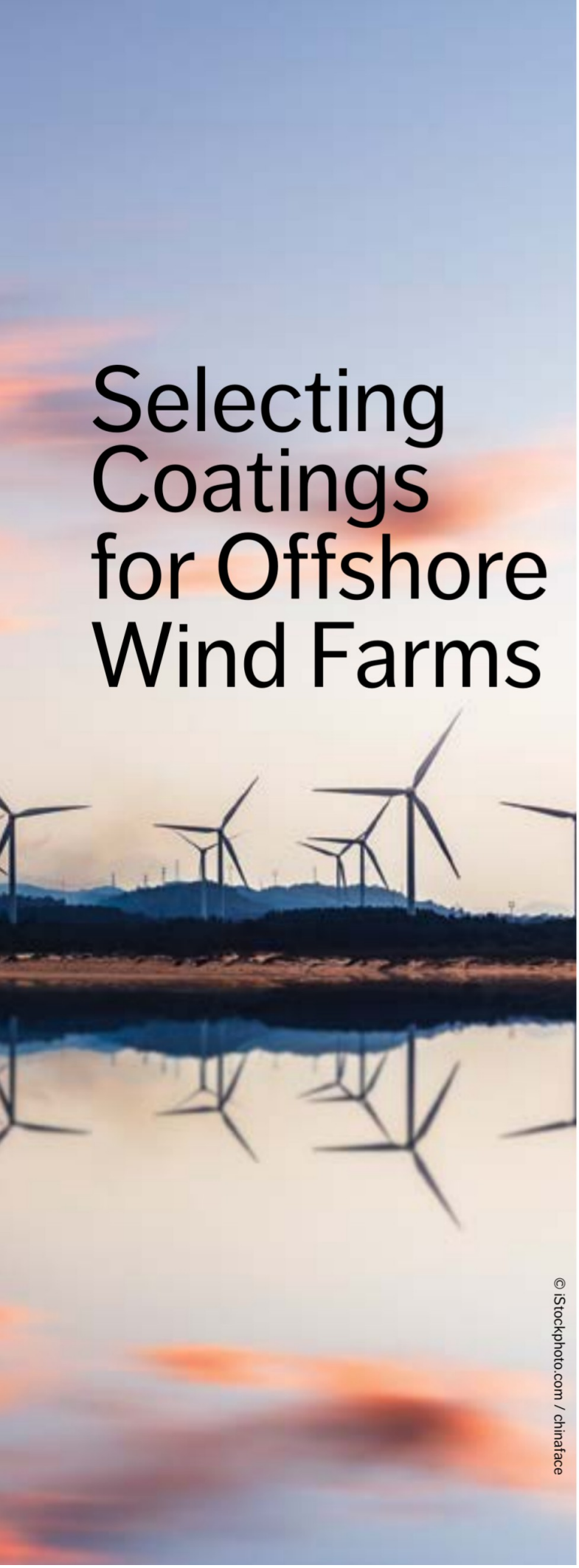
# Selecting Coatings for Offshore Wind Farms



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BY ANDERS VOLDSGAARD CLAUSEN, HEMPEL A/S

In 2017, 4,331 megawatts (MW) of wind power was installed globally — a 95-percent increase over the prior year, with 84 percent (15,780 MW) of all offshore facilities located off the coasts of 11 European countries and 16 percent mostly off the coast of China with the remainder in other Asian countries[1].

According to the U.S. Office of Energy Efficiency and Renewable Energy, the U.S. has 28 projects in progress and development totaling 23,735 MW of power. Those in the near term are primarily concentrated in the North Atlantic with others in various stages of evolution in the Great Lakes, the West Coast and Hawaii[2].

In Europe, 17 new wind farms were constructed in 2017, including 560 new offshore wind turbines, producing a record 3,150 MW of additional capacity. This positive growth in the European offshore sector has been driven by falling costs alongside advancements and innovation in cost-out measures (calculating total cost in advance) achieved through a greater understanding of the key risks in offshore wind tower construction, with larger projects leading to greater economies of scale and an oversupply in the wind turbine market. Offshore wind energy is projected to become Europe's fastest growing renewable source.

The rise in offshore wind energy has spurred a similar growth in related protective coatings. Although the offshore wind industry is known to be generally conservative, its search for cost savings has encouraged coatings manufacturers to research and develop new and innovative materials that can be applied more quickly, and that offer optimal protection.

## ABOVE- AND BELOW-WATERLINE COATINGS

Offshore wind farms undoubtedly face some of the most severe operational and environmental conditions on the planet, constantly exposed to a corrosive marine atmosphere. Due to their locations, these structures are often difficult to access and therefore, maintenance and recoating a structure in-situ can be extremely challenging and costly, making coating selection of the utmost importance.

Experience shows that to achieve maximum protection, wind farm tower foundations have been coated with a heavy-duty epoxy paint system, and the tower structure itself with a zinc-epoxy three-coat system.

An inspection was recently carried out at the Tunø Knob offshore wind farm in Denmark, one of the world's longest-serving installations. Four of the 10 turbines were chosen at random and evaluated via visual examination, photographic documentation and dry-film thickness (DFT) measurement. Despite being more than 20 years old, the inspection found that both the interior and exterior coating systems were in good condition and could be expected to remain so for at least another 10 years, demonstrating a practical coating lifetime of more than 30 years. In the same year, the Horns Rev 1 wind farm, located in the Danish waters of the North Sea, was also inspected. In this hostile region, the environment has been classified under the ISO 12944-Part 2 standard, "Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 2: Classification of environments" as C5M — a very highly corrosive marine environment with high salinity. Once again, four wind turbines were chosen at random and evaluated. The exterior and interior coated surfaces again were found to be in prime condition and from the overall results, it was estimated that the coating system would have a service life of at least 27 years in this environment.

Conventional zinc epoxy 986 hours. | Innovative zinc epoxy 986 hours. | Full system with conventional zinc epoxy 1,440 hours. | Full system with innovative zinc epoxy 1,440 hours.

Fig. 1: Coating comparison after salt-spray testing.
Figures courtesy of the author unless otherwise noted.

Typical three-coat systems that deliver protection in this tough offshore environment include a zinc-rich epoxy primer at 60-to-80 µm (2.4-to-3 mils) DFT, a two-component polyamide adduct-cured, high-solids, high-build epoxy intermediate at 140-to-180 µm (5.5-to-7.1 mils) DFT, followed by a two-component acrylic polyurethane topcoat, cured with aliphatic isocyanate at 60-to-80 µm DFT. This system method has been tried and trusted for many decades.

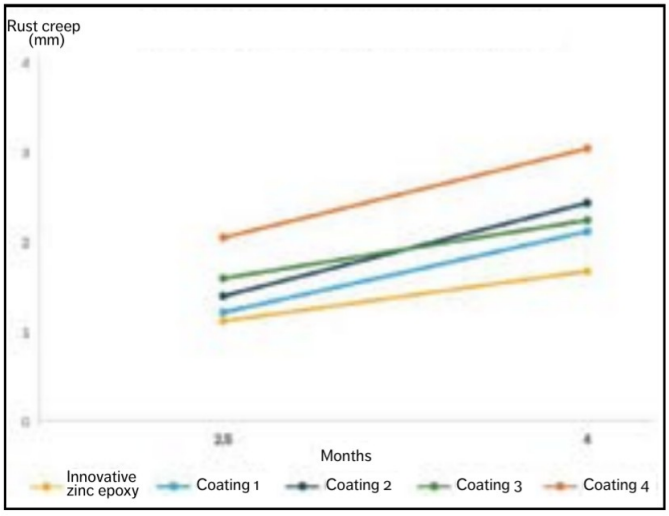


Fig. 2: Coating comparison after cyclic corrosion testing.

Although traditional zinc coatings have worked well, operators are always looking for systems that provide easier application without sacrificing corrosion protection. This article describes an innovative technology that has been developed to deliver improved corrosion resistance throughout the total lifetime of a turbine tower and meet the operator's precise requirements.

## INNOVATIVE TECHNOLOGY

Zinc-rich primers have been used for many years and have proven to be an established method of corrosion protection for steel.

These systems use high levels of zinc dust as a pigment in an organic binder (epoxy) or inorganic binder (silicates) to create a galvanic effect that protects the underlying steel substrate from corrosion. The zinc particles are more active than steel and act as anodes in the coating and corrode in place of the steel when exposed to water, oxygen and/or chlorides.

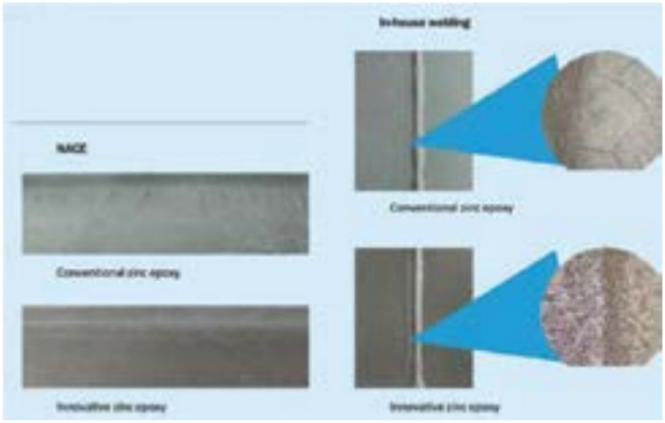


Fig. 3: Results of the NACE cracking test (TM0304-2004, "Offshore Platform Atmospheric and Splash Zone Maintenance Coating System Evaluation") and an in-house welding test.

Organic zinc-rich primers are often preferred over inorganic zinc-rich primers because they are less sensitive to surface preparation, over-application and humidity, making application easier. In 2007, research began to examine ways to improve the effectiveness of conventional zinc-rich epoxy coatings, and an important discovery was made. While a conventional organic zinc-rich epoxy coating contains approximately 80-weight-percent zinc, just one-third of that zinc actually contributes to corrosion protection. The research showed that only the zinc located in the 20-to-30 µms (0.8-to-1.2 mils) closest to the steel was consumed by the galvanic reaction in a zinc-rich coating with a DFT of 60-to-80 µm. Therefore, about 60 percent of the

zinc added to the primer was not used in the galvanic reaction.

This led to the development of an activated zinc-rich epoxy primer coating technology that incorporated tiny hollow glass spheres (approximately 40 µm [1.6 mils] in size) and a proprietary additive or "activator." Because of the synergy of these components, this coating is said to deliver three methods of corrosion protection: a galvanic effect, a barrier effect and an inhibitor effect.

For galvanic protection, the activator increases the zinc's ability to carry the corrosion current throughout the coating even if the zinc particles are not in direct contact with each other, improving the cathodic protection (CP) of the steel. The corrosion product of the zinc delivers the coating's barrier properties and self-healing characteristics. Typically, the corrosion product of a zinc-rich primer is zinc oxide. The corrosion product in this activated zinc-rich primer, however, created a more insoluble salt, zinc-chloride-hydroxide hydrate. This insoluble salt forms a uniform protective layer on the surface of the primer that acts as a barrier blocking water, oxygen and chlorides from reaching the steel surface. Additionally, by-products from the rapidly corroding activated zinc fill any cracks caused by mechanical damage in the coating, essentially enabling the coating to heal itself.

The hollow glass spheres improve the film's crack resistance by blocking the propagation of micro-cracks and contribute to the coating's low permeability.

Additionally, the glass spheres enhance the coating's inhibitor effect. An accumulation of insoluble complexes of zinc, oxygen and chlorides on the surface of the glass spheres becomes part of the coating instead of reaching the steel substrate. The zinc corrosion product created during galvanic corrosion also acts as an environmental scavenger by capturing chloride ions as they diffuse into the coating from the environment. This is the inhibitor effect, the third type of protection offered by the innovative coating.

Figure 1 compares this coating to conventional zinc epoxy after salt-spray testing (ISO 12944-6, "Paints and varnishes — Corrosion

protection of steel structures by protective paint systems — Part 6: Laboratory performance test methods"), as well as reduced rust creep and better protection in cyclic corrosion testing (ISO 20340, "Paints and varnishes — Performance requirements for protective paint systems for offshore and related structures," which was replaced in 2018 by ISO 12944-9, "Paints and varnishes — Corrosion protection of steel structures by protective paint systems — Part 9: Protective paint systems and laboratory performance test methods for offshore and related structures") and NORSOK Standard M-501 Edition 6 (2012), "Surface preparation and protective coating) (Fig. 2, p. 18).

This innovative epoxy technology has been designed to release the internal stresses of continual expansion and contraction of the metal surface and the coating. This low cracking tendency can be seen from the results of the NACE cracking test (TM0304-2004, "Offshore Platform Atmospheric and Splash Zone Maintenance Coating System Evaluation") and an in-house welding test at various film thicknesses (Fig. 3, p. 18).

## BEYOND SCIENCE: EFFICIENCY GAINS

With the need for superior protection, wind farm operators are increasingly demanding more efficient coating systems that are easy to apply and save time and money. This zinc-rich-based coating can be applied at high temperatures and humidity levels without blistering, has a recoat interval of one hour at 68 F (20 C) and dries 50 percent faster than most zinc-rich epoxy primers at similar temperatures. Its high DFT also means that it is less susceptible to cracking.

## CONCLUSION

Offshore wind farms require high-performance coatings that can protect the structures for their entire service lives with minimal or no maintenance. New and innovative paint technologies are being developed that deliver this requirement, enabling facility owners to reliably protect their assets.

## ABOUT THE AUTHOR

Anders Voldsgaard Clausen has over 10 years of experience in the wind industry, working with wind companies such as Siemens, MT Højgaard and, most recently, Hempel A/S.

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# Wastewater Clarifiers: Understanding Corrosion Mechanisms

BY D. A. SHERMAN, P.E. AND R. A. NIXON, CORROSION PROBE, INC.



Clarifier mechanisms have historically been fabricated from steel, utilizing a protective coating system in an attempt to prevent corrosion. Technological advances have resulted in coatings that last longer and require less maintenance. Over the years, hot-dip galvanized (HDG) coatings have competed with more traditional organic coatings. Even more current is the move to stainless steels, including austenitic (e.g., 304, 316) and duplex (e.g., 2205) alloys.

Each of these materials has advantages and disadvantages when it comes to performance, maintainability and life-cycle cost. Navigating these differences, along with comprehending the variability in clarifier environments, can make material selection quite complicated. Studying the corrosion mechanisms and root causes of numerous failed or severely corroded clarifier mechanisms has revealed several guidelines that should be understood and utilized by design engineers involved in new or rehabilitation design.

The first step is comprehension of material/environment interactions and how changes in either of them — sometimes even subtle changes — can have major consequences.

## GENERAL CLARIFIER ENVIRONMENT

Corrosion of carbon steel immersed in wastewater clarifiers is mainly oxygen-driven, so corrosion rates are largely determined by how much oxygen ($O_2$) gets to the surface of the metal. In general, aerated wastewater is only mildly oxidizing and, with wastewater temperatures rarely exceeding 100 F (38 C), oxygen-driven corrosion of bare steel is fairly slow, generally less than 0.01 inch per year (10 mils per year). Some treatment plant processes generate higher dissolved $O_2$ levels in the wastewater, such as pure oxygen treatment[1]. In these cases, carbon steel corrosion rates can be higher. Stainless steels generally do not corrode in such aerated, aqueous conditions at near-neutral pH, unless other conditions promote problems.

Where aeration is not assured, especially under deposits and in stagnant conditions, acidic environments can develop, often containing sulfide and other aggressive ions. In such conditions, microbiological reactions can create microenvironments corrosive to carbon steel and sometimes also to stainless steel. From a corrosion perspective, the most important types of bacteria in wastewater are those that metabolize sulfur compounds to produce acidic conditions that are corrosive to carbon steel and stainless steel. Some other bacteria oxidize ferrous ions to ferric ions, which makes the local environment more corrosive to carbon steel as well.

Differential aeration effects influence corrosion in wastewater treatment clarifiers. Aggressive cells can be established between the rake arm surfaces within the sludge layer and those rake arm surfaces above the sludge. The surfaces in the sludge corrode faster than the surfaces above the sludge because of differential aeration and/or concentration effects. These effects increase the open circuit potential difference between the two regions, one cathodic (passive) and the other anodic (active). "Potential" is the term used to describe the electromotive voltage of the metal at anodic or cathodic sites.

The pH of domestic wastewater normally is 6 to 8, running slightly on the alkaline side of neutral where there is higher use of soaps and household cleansing materials. Corrosion rates for steel tend to increase with decreasing pH. Dissolved carbon dioxide ($CO_2$) concentrations in wastewater can depress pH, especially where covered tanks do not allow the $CO_2$ to dissipate into the air, but rather remain dissolved as carbonic acid. This is common in pure oxygen reactors upstream of secondary clarifiers. A great deal of $CO_2$ also evolves from the bacterial metabolism of organic compounds during secondary biological treatment. Experience shows that dissolved $CO_2$ concentration has a greater impact on the corrosion of zinc than bare carbon steel.

The electrolyte is very conductive in both the primary and secondary stages of treatment. This conductivity increases with high dissolved chloride, sulfate and sulfide concentrations. Accordingly, wastewater treatment plants served by collection systems with greater coastal infiltration can suffer higher metal corrosion rates. Also, treatment plants that use more ferric chloride for promoting flocculation in the clarifiers, or for reducing dissolved hydrogen sulfide ($H_2S$) concentrations upstream of the clarifiers, will tend to have higher carbon steel and stainless steel corrosion rates.

Fig. 1: Pitting at breaches in the coating typically has relatively high corrosion rates due to the large cathodic (coated steel) area relative to the very small anodic (coating failure or lack of coating) area as shown. All figures courtesy of the author unless otherwise noted.

Corrosion rates for submerged steel tend to be greater at higher elevations in the wastewater, where dissolved $O_2$ contents are greater. Corrosion rates also increase with radial distance from the center of the clarifier, as the relative velocity between the rake arm and water increases. For example, an increase in velocity from 0 to 0.25 feet per second — which can occur between the center column and the tip of the rake mechanism — can double the corrosion rate of bare steel. Increasing velocities affect the ability of protective scales to form and remain adhered to the steel surface.

Fig. 2: This photo shows below-waterline corrosion at areas of coating failure.

The major difference in corrosion mechanisms between primary and secondary clarifiers involves biogenic sulfide corrosion. This is a gas-phase or vapor-phase corrosion problem whereby sulfuric acid is formed through the biogenesis of $H_2S$ by sulfur-oxidizing bacteria. This occurs in the aerated headspaces of covered primary clarifiers. Biogenic sulfide corrosion causes rapid corrosion rates of bare carbon steel in these clarifier headspaces.

By the time the wastewater reaches aeration or pure oxygen exposure in the secondary stage of treatment, the reducible $H_2S$ and other sulfur species are largely gone or have been reduced substantially upstream of the secondary clarifiers. In secondary clarifiers, the corrosion mechanisms above the waterline generally are oxygen-driven and influenced by weathering exposure and high humidity from the evaporative vapors from the wastewater.

## MATERIALS AND THEIR SPECIFIC ISSUES

Most of the information presented previously is with regard to the corrosion of bare carbon steel, which is not typically found in clarifiers,

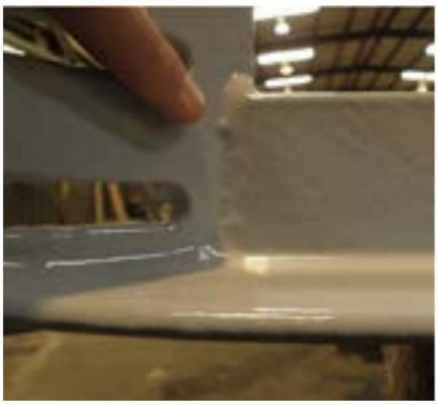

Fig. 3: Attention to detail is required to assure good film quality.

except where protective coatings have failed. Discussed later are organic and HDG coatings, along with solid stainless steel as alternatives to uncoated carbon steel.

**Coated Carbon Steel**

As discussed previously, the immersed components of coated steel mechanisms are prone to oxygen-driven electrolytic corrosion. Coated carbon steel below the waterline is also susceptible to under-deposit pitting corrosion in both primary and secondary clarifiers. This corrosion involves differential oxygen concentration cells and can be microbiological in nature, as well. Both mechanisms result in pitting corrosion, which occurs at breaches in the coating. This pitting typically has relatively high corrosion rates due to the large cathodic (coated steel) area relative to the very small anodic (coating failure or lack of coating) area as shown in Figure 1.

The organic resin-based coatings most widely used today on steel in clarifiers are based on epoxy and polyurethane chemistries. The epoxy-based coatings have mostly replaced coal-tar epoxy formulations, once the mainstay for clarifier steel corrosion protection. These newer epoxy coatings have good water resistance, excellent chemical resistance and good film-build properties (12-to-30 mils per coat). The epoxy products are mainly used below the waterline, while epoxy first coats followed by an acrylic aliphatic polyurethane finish coat are chosen for areas above the waterline. The polyurethane provides UV light resistance and good color/gloss retention where epoxies tend to chalk when exposed to sunlight. Some coating systems also utilize moisture-cured polyurethane primers followed by epoxy or polyurethane coats.

The main performance objective for coatings is to provide barrier protection and isolate the steel from the wastewater or headspace environment. To achieve this, the coating film quality must be ensured. This means minimizing pinholes or discontinuities in the film. This is difficult in clarifier construction because of the steel shapes used to fabricate rake arms and other clarifier mechanism components. Figure 2 demonstrates below-waterline corrosion at areas of coating failure. Angles, channels and other flanged shapes provide numerous edges, corners, nooks and crannies. Therefore, to achieve good film quality on these structures, great care must be taken in selecting and applying these coatings. Figure 3 demonstrates the attention to detail required for assuring good film quality. Coatings that provide better edge retention and film build per coat are the best choices. Stripe coating of the edges and corners is highly recommended to assure that good film quality and necessary film thickness are achieved (Fig. 4). Preventing pinholes, discontinuities and misses in the coating system is crucial for good barrier protection. This focus on film quality and proper surface preparation are the hallmarks of good coating system performance in clarifiers.

Most properly selected and installed organic coating systems perform well in clarifiers for about 15-to-18 years before major coating repair work or recoating is required. Ongoing coating system inspection and more frequent coating system repairs have been shown to extend system performance at a lower overall life-cycle cost for up to 25 years.

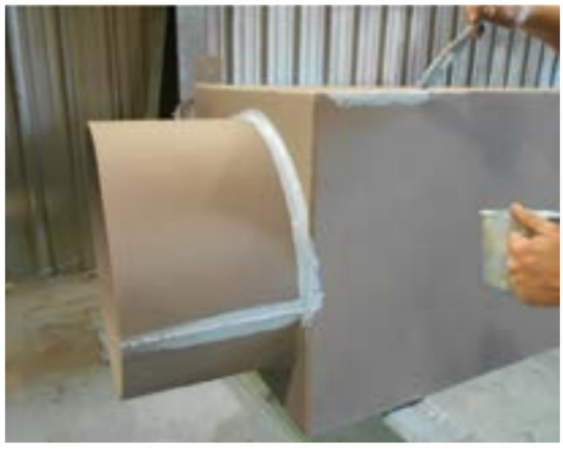

Fig. 4: Stripe coating the edges and corners is highly recommended to assure that good film quality and necessary film thickness are achieved.

Protective coatings do not tend to fail from chemical degradation over time in clarifier service. Rather, coatings tend to age-harden, embrittle or disbond due to undercutting corrosion that initiated at pinholes in the coating film.

**Hot-Dip Galvanizing (HDG)**

HDG represents the other most common corrosion barrier for carbon steel in general. HDG steel is a process whereby the steel is acid-pickled (to prepare the surface) and dipped in molten zinc to form a zinc and iron alloy that has very good adhesion to the steel surface. When cooled, there is not a clear line of demarcation between the zinc and the steel, but rather a gradual transition of the zinc and iron alloy (Fig. 5, p. 26). Starting at the bottom is the steel substrate. Next is a thin layer (gamma) that is typically 25-percent iron and 75-percent zinc, followed by the delta layer that is 90-percent zinc and 10-percent iron. Then comes the zeta layer that is about 94-percent zinc and 6-percent iron, with the final, eta layer at the top being 100-percent zinc. This is important to know because corrosion of the zinc and iron alloy can look like corrosion of the carbon steel base metal, especially at the lower layers (gamma and delta).

Zinc coatings are protective in two very different ways. First, they serve as a barrier coating to prevent the steel from contact with the electrolyte. Secondly, they act as a galvanic protector of the steel because they corrode preferentially to the steel when both metals are active in a common electrolyte and electrically coupled.

Zinc's corrosion resistance is owed to the formation of an

insoluble basic carbonate film in the case of atmospheric exposure. The contributing factors that affect the formation of that film follow.

- Duration and frequency of moisture contact (time of wetness).
- Rate of surface drying.
- Extent of exposure to corrodents.

In atmospheric exposures (that are not corrosive), zinc reacts with air to form zinc oxide (ZnO) and later zinc hydroxide ($Zn(OH)_2$). Ultimately, it reacts with atmospheric $CO_2$ to form zinc carbonate (the most protective film). If moisture is present, increasing times of wetness correlate to increasing corrosion. If the atmosphere is not especially aggressive, the zinc forms a white powdery corrosion product called white rust. It is voluminous and does not permit the formation of a tightly adhered oxide film. This is not necessarily a major corrosion concern, but it does prevent the formation of a good barrier and keeps moisture present. This means more time of wetness and, over time, more corrosion.

For submerged conditions, the corrosion of zinc in water is mostly related to the impurities in the water, although pH, time of exposure, temperature and motion (or agitation) are other contributing factors. As in atmospheric exposure, the corrosion resistance of zinc in waters largely depends on its initial ability to form a protective layer or film, such as calcium carbonate ($CaCO_3$). In the case of distilled water, for example, there is no chance of the formation of a protective scale. Hence, the access of $O_2$ to the zinc surface is unimpeded and corrosion is quite severe. The scale-forming capability of water depends for the most part on the three following factors.

- Hydrogen ion concentration (pH).
- Total calcium content.
- Total alkalinity.

If the pH of the water is below where the water can be in equilibrium with $CaCO_3$, the water will dissolve the scale rather than deposit the scale. And while hardness and alkalinity are very important, and harder waters are better than softer waters, other factors must be considered. For instance, it is known empirically that waters high in free $CO_2$ are aggressive toward zinc. Also, waters higher in dissolved $O_2$ are more aggressive to zinc than those with lower dissolved $O_2$. The corrosion of zinc in water follows this reaction.

$$Zn + 2H_2O \rightarrow Zn(OH)_2 + H_2$$

This reaction is complicated when lots of $O_2$ is present. The $O_2$ depolarizes and accelerates the corrosion reaction by combining with the evolved hydrogen. The end result is that the corrosion is largely driven by how much oxygen gets to the metal surface, which is the same driver of corrosion of uncoated steel in most waters. As reported in *Uhlig's Corrosion Handbook*[2], the effect of oxygen on the corrosion of zinc in distilled water is demonstrated in Table 1.

**Table 1: Effect of Oxygen on the Corrosion of Zinc in Distilled Water.**

| Test Condition | Temperature | Corrosion Rate, Micrometers/Year |
|---|---|---|
| Boiled distilled water – specimens in sealed flasks | 72 F | 25.4 (1 mpy)* |
| Oxygen slowly bubbled through distilled water | 72 F | 218.4 (8.6 mpy)* |

*mpy = mils (0.001 inch) per year

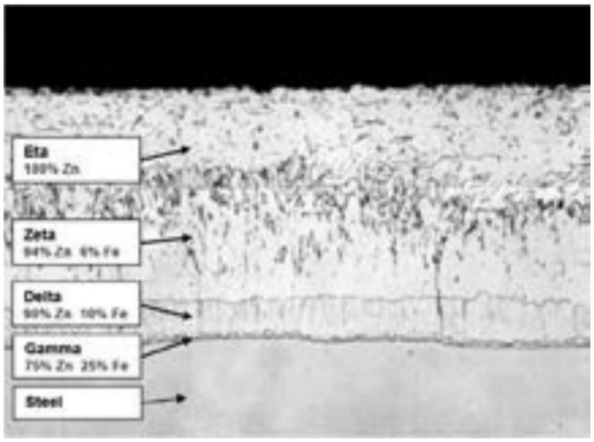


Fig. 5: HDG steel is a process whereby the steel is acid-pickled (to prepare the surface) and dipped in molten zinc to form a zinc and iron alloy that has very good adhesion to the steel surface. When cooled, there is not a clear line of demarcation between the zinc and the steel, but rather a gradual transition of the zinc and iron alloy.

Normal tap water at room temperature has a dissolved oxygen concentration of approximately 4-to-8 mg/L, which results in a theoretical corrosion rate for zinc of up to 3-to-4 mils per year. The zinc in the most aerated regions of clarifiers (typically near the inlet at the center well) would experience the highest corrosion rates where the dissolved oxygen concentration would likely be 8 or 10 mg/L.

As mentioned previously, the pH of the water is critical to zinc corrosion and scale formation. It has generally been shown that zinc performs well at a pH of between 6 and 12, assuming no other corrosion contributors are present. But, that is not the case in wastewater clarifiers.

HDG typically produces an approximate upper coating thickness range of 4-to-6 mils. ASTM A123 requires about 3-to-4 mils of total zinc coating thickness for steel components[3]. However, only the outer 1.5 mils or so of that represents pure zinc. Below that, the layers of the HDG come with increasing concentrations of iron and, once the iron-zinc layers of the HDG coating become exposed, the factors that influence carbon steel corrosion come into play as well.

An understanding of the combined influence of pH, calcium hardness, alkalinity, total dissolved solids concentration and temperature is essential in discerning the corrosiveness of any water towards zinc. Those parameters can be utilized to examine the $CaCO_3$ stability of the wastewater in accordance with the Langelier, Ryznar, and Practical Saturation Indices (calculations for the propensity for water to precipitate calcium carbonate onto the metal surface providing a protective barrier) to discern if the water would tend to form a protective $CaCO_3$

Fig. 6: HDG corrosion in the secondary clarifier rake mechanism. Note that the corrosion rate has varied in the various HDG layers.

scale on HDG steel. This is typically not the case in municipal wastewaters.

Another factor to consider for the corrosion of zinc includes chloride ion concentrations in the water. Where waters do not have the tendency to precipitate calcium carbonate scale, it has been reported that chloride ion concentrations of 50 mg/L or higher can be corrosive to zinc[4].

Repair of HDG steel generally requires blasting and coating using a suitable organic coating system. The damaged HDG layer must be removed in its entirety. Coating over galvanizing is fraught with problems. Repair of small areas of failed galvanizing with field-applied galvanizing products can be done successfully with the right products and surface preparation; however, wholesale galvanizing of large structures in the field should be avoided.

Figure 6 shows the active corrosion of HDG coatings in a secondary clarifier rake mechanism and stilling well after only one year in service. Where the HDG coating thickness was appreciably greater, the corrosion had not yet progressed into the lower delta or gamma layers.

**Stainless Steel**

In general, stainless steels avoid the general corrosion issues that plague bare or HDG steels in wastewater clarifiers. Stainless steels are iron-based alloys containing more than 11-percent chromium; this forms a thin, protective oxide film, which is the reason why this group of steels has their characteristic stainless nature or corrosion resistance. The ability of the oxide layer to heal itself (in most exposures) means that the steel is corrosion-resistant no matter how much of the surface is removed. This is not the case when carbon steel is protected from corrosion by HDG or organic coatings.

The passive oxide film on stainless steels prevents corrosion except where certain exposure conditions cause it to break down or where it cannot be restored naturally. The most notable examples of these conditions include exposure to certain concentrations of chloride ions and microbiologically influenced corrosion. In addition, the presence of crevices or rough edges exacerbates corrosion under these conditions[5].

Chromium, nitrogen and molybdenum contents in the alloy are largely what

differentiate types of stainless steel with respect to pitting and crevice corrosion resistance. The major compositional difference between Type 304 and Type 316 stainless steels is the molybdenum content: 304 contains no molybdenum whereas 316 contains 2-to-3 percent. This makes the localized chloride-related corrosion (pitting, crevice) resistance of 316 superior to that of 304, as demonstrated in Figure 7.

While pH and temperature affect stainless steel corrosion, chloride concentration is the factor that most significantly promotes the breakdown of passivity and enhances the corrosion rate in clarifiers. Pitting and crevice corrosion occur when the passive oxide film is disrupted or broken down by chloride ions or other chemical species aggressive to the passivity. Certain chloride ion concentrations have been shown to initiate pitting and crevice corrosion in various stainless steel alloys under specific pH and temperature conditions. Extensive metallurgical and electrochemical testing has demonstrated that there are critical pitting temperatures, critical crevice corrosion temperatures and corrosion threshold chloride concentrations for the different stainless steel alloys. These limits can be obtained from published data or laboratory corrosion testing. Also, corrosion engineers use a value called the pitting resistance equivalent number (PREN) to compare localized corrosion resistance for the various stainless steel alloys. This comparison is based on exposure to chloride-containing environments. Table 2 presents the PREN for the stainless steel alloys most likely to be considered for clarifiers, assuming neutral pH and a temperature of 90 F (35 C). Approximate limiting concentrations for the chloride ion and relative cost also are listed[6].

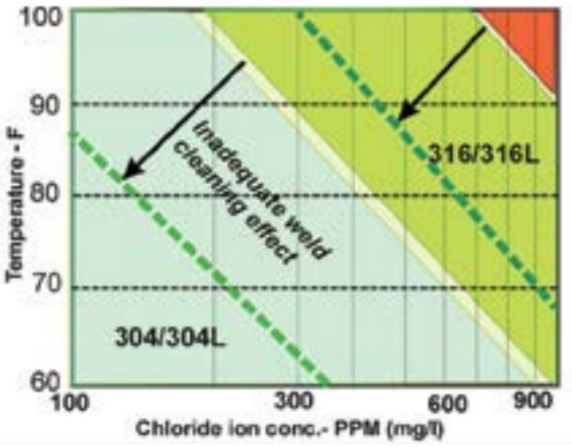


Fig. 7: This figure demonstrates general usage zones for 304/304L and 316/316L stainless steels in aerated, chloride containing natural waters with pH 5-9. Harmful effects of heat scales and surface contamination from welding on resistance to localized corrosion is mitigated to different degrees by different post-weld cleaning methods.

**Table 2: Stainless Steels: Chemistry, Chloride Pitting Resistance and Cost.**

| Stainless Grade Steel | UNS[1] Number | Cr % (Typ.) | Mo % (Typ.) | PREN[2] | Approx. $Cl^-$ Concentration Below Which Pitting Does Not Occur (ppm) [3] | Relative Cost (304 = 1.0) |
|---|---|---|---|---|---|---|
| 304L | S30403 | 18 | 0 | 18 | 300 | 1.00 |
| 316L | S31603 | 17 | 2.1 | 23 | 1,000 | 1.27 |
| 317LMN | S31726 | 18.5 | 4.1 | 32 | 5,000 | 2.28 |
| 2205 | S32205 | 22.5 | 3.3 | 34 | 5,000 | 1.24 |
| AL6XN | N08367 | 20.5 | 6.1 | 43 | Seawater level concentrations | 3.66 |

1 UNS = Unified Numbering System.
2 PREN = Pitting Resistance Equivalent Number; %Cr + 3.3·%Mo + 16·%N, based on minimum composition.
3 At 90 F.

Fig. 8: Chlorides concentrate on stainless steel surfaces, especially at the water line and where metal surfaces are hot from direct sunlight exposure.

Pitting corrosion of stainless steels typically begins where deposits attach to the metal surface or where rough areas, such as welds, exist. Roughness and crevices are ideal environments for localized pitting and crevice corrosion. The passivity of the metal surface at rough areas is breached more readily, and crevices and rough surfaces enable chlorides to concentrate. This creates localized places where the chloride concentrations can exceed the metal's pitting resistance. There are no better crevice conditions than threaded fasteners or flanged-gasketed connections.

In addition, pitting corrosion tends to initiate at welds for metallurgical reasons. Weld metals and the heat-affected zones associated with those welds are less corrosion-resistant than the base metal. This has to do with metallurgical alterations created by weld heat, including segregation of the chromium at the metal surface.

Various process conditions can result in concentration effects with chlorides. These conditions can include wet/dry cyclic conditions, particularly common at or just above the water line in uncovered clarifiers in arid climates. At such locations, the chlorides concentrate on the stainless steel surfaces, especially where metal surfaces are hot from direct sunlight exposure (Fig. 8). Where this concentration occurs, chloride levels can be many times greater than in the bulk wastewater. This can lead to severe pitting corrosion. Again, this is particularly problematic at crevice locations such as flanged connections or on threaded fastener surfaces.

Microbial action can also promote the corrosion of stainless steel. This generally involves bacteria that metabolize (by reduction) sulfur compounds to produce sulfides in local environments on the metal surface. The latter condition produces oxidizing corrosion potentials. These bacterial corrosion

processes drive microbiologically influenced corrosion (MIC). The sulfur-reducing environments produce highly acidic, under-deposit (beneath biofilm) conditions, which detrimentally affect passivity.

MIC occurs most often in primary clarifiers where stagnant or quiescent flow anaerobic conditions are present, at mostly ambient temperatures (within the sludge blanket). The corrosion rates can be extremely high. MIC also tends to develop at rough areas or at crevices, both of which are hospitable to microbial attachment and colonization. Typical examples include rough grind marks on rolled steel or stainless steel structural members, or the threads of fasteners.

The 300-series stainless steels and 2205 duplex stainless steel are susceptible to MIC. Immunity to MIC typically requires an alloy that has a PREN of at least 40. This brings us to very expensive stainless steel alloys such as the so-called six moly stainless steels (AL6XN or 254SMO) or super-duplex stainless steels such as Type 2507.

Stainless steels such as 304 and 316 tend not to suffer from localized corrosion when fluid velocity is at least 5 feet per second. Fluid velocity in clarifiers is rarely this high except at the center inlet area.

The corrosion resistance of welds is always lower than that of the same alloy's base metal. Thus consideration should be given to upgrading the weld filler metal to enhance the corrosion resistance of stainless steel welds. For example, 316 electrodes would be used for 304L welds and 317 electrodes for 316L welds.

Maximizing the corrosion resistance of stainless steel welds also necessitates proper post-weld surface preparation and cleaning during fabrication (shop) and erection (field). This starts with careful mechanical removal of all weld slag, including grinding to remove weld spatter and rough weld areas. Additionally, all heat tint (bluish hue on the metal surfaces) should be removed by grinding and/or grit/bead blasting, followed by acid pickling to remove any remaining free iron. If not properly cleaned, these areas will be susceptible to localized corrosion due to the reduced resistance of this chromium-depleted metal surface area.

## OTHER MATERIALS CONSIDERATIONS

### Galvanic Effects

Electrically connected, dissimilar metals immersed in either primary or secondary clarifiers create ideal conditions for galvanic corrosion. Galvanized steel generally does poorly in these environments and carbon steel readily corrodes preferentially to stainless steel.

As with all galvanic corrosion, the rate is mainly governed by the electrochemical potential difference between the two electrically continuous metals, their proximity to one another and the anode-to-cathode area ratio (a small anode with a large cathode is the worst combination).

The most common galvanic corrosion observed in wastewater clarifiers is localized pitting of carbon steel (at coating breaches) near stainless steel components like suction tubes. Because suction tubes cannot be recoated on the interior after initial construction, stainless steel has become the standard material of choice. Electrical isolation of the stainless steel suction tube from the coated carbon steel is necessary to prevent galvanic corrosion.

Sometimes, failed carbon steel structural members on rake arms are replaced with stainless steel, which will affect corrosion of connected carbon steel components.

The corrosion rate of the anodic material will generally be highest at the dissimilar metal connection and decrease with increasing distance away from the connection. Electrical isolation between dissimilar metals can be achieved at bolted connections by installing isolation bolt kits. However, the insulating spacers can degrade over time and re-introduce electrical continuity. If only welded connections exist, stainless steel in contact with coated carbon steel can be coated at the connection, plus some distance beyond the connection to achieve effective electrical isolation.

## SUMMARY

When selecting materials for construction for wastewater treatment plant clarifier mechanisms, one must understand the operating environment, the candidate materials and their properties, and the damage mechanisms caused by interaction between those materials and the environment. Also important are fabrication and erection practices and their effects on corrosion resistance of the materials.

Carbon steel protected by a suitable organic coating system remains a viable option for both new and rehabilitation construction. A tight and enforceable specification for the work, along with good quality control during fabrication and erection are crucial for long service life. Still, the nature of such coatings makes periodic inspection (with the associated costs for dewatering, cleaning and access) necessary, and the best coatings will likely last less than 20 years if not well-applied and well-maintained.

HDG steel is an alternative to coated steel, but will have a high susceptibility for failure in most wastewater clarifier environments. The fact that the coating is metallic brings into play more issues than for organic coatings, such as scale formation and galvanic effects. As with organic coatings, regular inspection is required. Additionally, when the galvanizing finally goes away, it cannot be replaced with new galvanizing. Using HDG for clarifier mechanism corrosion protection can be done if all the conditions are right, but it is very risky.

Stainless steels are a step above coated steel in most cases. The higher initial material costs are typically offset within the first 10 years of clarifier operation by lower inspection and repair costs. Stainless steels, though, can have issues — expensive ones — if not selected properly for the operating conditions and/or if not fabricated so as to eliminate those issues. Again, a tight and enforceable material and fabrication specification, along with good quality control during fabrication and erection, are crucial.

## ABOUT THE AUTHORS

Douglas Sherman is a principal consultant and vice president at Corrosion Probe, Inc. He has over 32 years of experience solving materials and corrosion issues for clients in a wide range of industries, including clean water and wastewater. Sherman's activities include design, construction QA/QC, condition assessment, failure investigation and project management. He has a bachelor's degree in metallurgical engineering and is a licensed professional engineer in the state of Texas. Sherman was a contributing author for Chapter 8 on *Design of Water Resource Recovery Facilities, MOP 8* in the recently updated 6th edition. He is also a member of the Asset Management and Odor and Corrosion Management Committees in the Water Environment Association of Texas.

Randy Nixon is president and founder of Corrosion Probe, Inc., which has been in business for over 30 years, specializing in corrosion and materials engineering, consulting, testing and inspection services. Nixon has more than 35 years of experience and has published over 60 technical papers and articles through SSPC, NACE, WEF, AWWA and TAPPI. He is widely recognized in the water/wastewater industry for his expertise and extensive experience in piping corrosion, concrete degradation evaluation, protective coatings and linings, and overall materials performance. Nixon is also president and owner of CTL, which provides corrosion and materials testing services.

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2018

# The Annual Equipment Buying Guide

The *JPCL* Equipment Buying Guide lists equipment and related supplies for protective and marine coating work from more than 350 manufacturers, distributors and rental companies, published annually to assist our readers in the identification of equipment and supplies for protective and marine coating operations.

On p. 32, you will find the Table of Contents, where generic products are listed under nine categories: Access; Application; Climate Control; Environmental Protection Equipment; Inspection; Laboratory Testing; Safety; Software; and Surface Preparation.

On p. 33, you will find the Index to the Buying Guide, where products are listed alphabetically in a single list. Individual company profiles with contact information can be accessed on p. 108.

In the Guide itself, which begins on p. 35, companies either displayed in boldface type or accompanied by boxed display ads have paid an advertising fee. Otherwise, a company's information appears free of charge.

The Guide is based on data obtained through a survey sent in April 2018 to companies known to *JPCL*. The print edition of the *JPCL* Guide includes the companies that completed the survey by the deadline for the June 2018 issue. This Guide is also available at www.paintsquare.com/bg, the online home of *JPCL*, where information is updatable throughout the year. To participate in the online edition of the Equipment Buying Guide between print editions, please contact Nichole Altieri, business administration manager, *JPCL*, at naltieri@paintsquare.com.

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BlastOne International
Bolair Fluid Handling Systems
Carlisle Fluid Technologies-Binks
CESCO - Aqua Miser
Corrosion Specialties Inc.
Dispensing Technology Corporation
EnDiSys
Glenn Saren & Assoc. Inc.
Graco Inc.
IDS Blast
Intech Equipment & Supply
Jadalc
Lesoon Equipment Pte. Ltd.
LS Industries, Inc.
Marco
Masterfield Industrial Equipment
Mattson Spray Equipment
MES Rentals
Midwest Surface Prep, LLC
Oak Ridge Foam and Coating Systems
The Paint Project, Inc.
Panblast Pte Ltd
Paul N. Gardner Co., Inc.
Quikspray, Inc.
Remote Orbital Installations, LLC
SIE Industrial Ltd.
Specialty Products, Inc. (SPI)
Spin Import Export
Surface Prep Supply
Surface Preparation-Texas, LLC
T Tex Industries LP
Temco Distributors
Titan Tool
TMS Metalizing Systems, Ltd.
Tritech Industries, Inc.
Uni-Royal Pack Co., Ltd.
Victory Air & Equipment, Inc.
VR Coatings Pvt. Ltd.
The Warehouse Rentals and Supplies
WIWA LLC

### SPRAY HOSES AND FITTINGS
Abrasives Inc.
Advanced Finishing Systems, Inc.
AirTech Spray Systems
American Spray Technologies
APE Companies
Arkco (Thailand) Co., Ltd.
Bittner's Spray Equipment Co.
Blasting Experts
Blastlink USA
BlastOne International
Bolair Fluid Handling Systems
Bon Tool Co.
Carlisle Fluid Technologies-Binks
CESCO - Aqua Miser



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Cincinnati Color Company
Corrosion Specialties Inc.
Dispensing Technology Corporation
DUX Technologies, Inc.
EnDiSys
Glenn Saren & Assoc. Inc.
Graco Inc.
Hanes Supply Inc.
IDS Blast
Intech Equipment & Supply
Jadalc
Jollyflex
Lesoon Equipment Pte. Ltd.
LS Industries, Inc.
Marco
Masterfield Industrial Equipment
MES Rentals
Midwest Surface Prep, LLC
Oak Ridge Foam and Coating Systems
The Paint Project, Inc.
Panblast Pte Ltd
Quikspray, Inc.
SIE Industrial Ltd.
Specialty Products, Inc. (SPI)
Spin Import Export
Surface Prep Supply
Surface Preparation-Texas, LLC
T Tex Industries LP
Temco Distributors
Titan Tool
Tritech Industries, Inc.
Uni-Royal Pack Co., Ltd.
Victory Air & Equipment, Inc.
VR Coatings Pvt. Ltd.
The Warehouse Rentals and Supplies
WIWA LLC

### SPRAY NOZZLES AND TIPS

Abrasives Inc.
Advanced Finishing Systems, Inc.
AirTech Spray Systems
American Spray Technologies
APE Companies
Arkco (Thailand) Co., Ltd.
Bittner's Spray Equipment Co.
Blasting Experts
Blastlink USA
BlastOne International
Bolair Fluid Handling Systems
Bon Tool Co.
Carlisle Fluid Technologies-Binks
CESCO - Aqua Miser
Cincinnati Color Company
Corrosion Specialties Inc.
Dispensing Technology Corporation
DUX Technologies, Inc.
EnDiSys
Glenn Saren & Assoc. Inc.
Graco Inc.
Hanes Supply Inc.
Hyde Group
IDS Blast
Intech Equipment & Supply
Jadalc
Lesoon Equipment Pte. Ltd.
Marco
Masterfield Industrial Equipment
MES Rentals
Midwest Surface Prep, LLC
Newstripe
Oak Ridge Foam and Coating Systems
The Paint Project, Inc.
Panblast Pte Ltd
Quikspray, Inc.
SIE Industrial Ltd.
Specialty Products, Inc. (SPI)
Spin Import Export
Surface Prep Supply
Surface Preparation-Texas, LLC
T Tex Industries LP
Temco Distributors
Titan Tool
TMS Metalizing Systems, Ltd.
Tritech Industries, Inc.
Uni-Royal Pack Co., Ltd.
Victory Air & Equipment, Inc.
VR Coatings Pvt. Ltd.
The Warehouse Rentals and Supplies
WIWA LLC

### SPRAY SYSTEMS, AIR

Abrasives Inc.
Advanced Finishing Systems, Inc.
AirTech Spray Systems
American Spray Technologies
APE Companies
Arkco (Thailand) Co., Ltd.
Bittner's Spray Equipment Co.
Blasting Experts
Blastlink USA
BlastOne International
Bolair Fluid Handling Systems
Carlisle Fluid Technologies-Binks
CESCO - Aqua Miser
Cincinnati Color Company
Corrosion Specialties Inc.
DUX Technologies, Inc.
EnDiSys
Glenn Saren & Assoc. Inc.
Graco Inc.
Hanes Supply Inc.
ICM - International Climbing Machines
IDS Blast
Intech Equipment & Supply
Jadalc
Lesoon Equipment Pte. Ltd.
Marco
Masterfield Industrial Equipment
Mattson Spray Equipment
MES Rentals
Midwest Surface Prep, LLC
Oak Ridge Foam and Coating Systems
The Paint Project, Inc.
Panblast Pte Ltd
SIE Industrial Ltd.
Specialty Products, Inc. (SPI)
Spin Import Export
Surface Prep Supply
Surface Preparation-Texas, LLC
T Tex Industries LP
Temco Distributors
Titan Tool
Uni-Royal Pack Co., Ltd.
Victory Air & Equipment, Inc.
VR Coatings Pvt. Ltd.
The Warehouse Rentals and Supplies
WIWA LLC

### SPRAY SYSTEMS, AIR-ASSISTED AIRLESS

Abrasives Inc.
Advanced Finishing Systems, Inc.
AirTech Spray Systems
APE Companies
Arkco (Thailand) Co., Ltd.
Bittner's Spray Equipment Co.
Blasting Experts
BlastOne International
Bolair Fluid Handling Systems
Carlisle Fluid Technologies-Binks
CESCO - Aqua Miser
Cincinnati Color Company
Corrosion Specialties Inc.
EnDiSys
Glenn Saren & Assoc. Inc.
Graco Inc.
IDS Blast
Intech Equipment & Supply
Jadalc
Lesoon Equipment Pte. Ltd.
Marco
Masterfield Industrial Equipment
MES Rentals
Midwest Surface Prep, LLC
Oak Ridge Foam and Coating Systems
The Paint Project, Inc.
Panblast Pte Ltd
Sulzer Mixpac USA, Inc.
Surface Prep Supply
Surface Preparation-Texas, LLC
T Tex Industries LP
Temco Distributors
Titan Tool
Uni-Royal Pack Co., Ltd.
Victory Air & Equipment, Inc.
VR Coatings Pvt. Ltd.
The Warehouse Rentals and Supplies
WIWA LLC

### SPRAY SYSTEMS, AIRLESS

Abrasives Inc.
Advanced Finishing Systems, Inc.
AirTech Spray Systems
American Spray Technologies
APE Companies
Arkco (Thailand) Co., Ltd.
Bittner's Spray Equipment Co.
Blastlink USA
BlastOne International
Bolair Fluid Handling Systems
Carlisle Fluid Technologies-Binks
CESCO - Aqua Miser
Cincinnati Color Company
Corrosion Specialties Inc.
Dispensing Technology Corporation
EnDiSys
Glenn Saren & Assoc. Inc.
Graco Inc.
Hyde Group
ICM - International Climbing Machines
IDS Blast
Intech Equipment & Supply
Lesoon Equipment Pte. Ltd.
Marco
Masterfield Industrial Equipment
MES Rentals
Midwest Surface Prep, LLC
Newstripe
Oak Ridge Foam and Coating Systems
The Paint Project, Inc.
Panblast Pte Ltd

SIE Industrial Ltd.
Specialty Products, Inc. (SPI)
Spin Import Export
Surface Prep Supply
Surface Preparation-Texas, LLC
T Tex Industries LP
Temco Distributors
Titan Tool
Tritech Industries, Inc.
Uni-Royal Pack Co., Ltd.
Victory Air & Equipment, Inc.
VR Coatings Pvt. Ltd.
The Warehouse Rentals and Supplies
WIWA LLC

### SPRAY SYSTEMS, ELECTROSTATIC

Abrasives Inc.
Advanced Finishing Systems, Inc.
AirTech Spray Systems
Arkco (Thailand) Co., Ltd.
Bittner's Spray Equipment Co.
BlastOne International
Bolair Fluid Handling Systems
Carlisle Fluid Technologies-Binks
CESCO - Aqua Miser
Corrosion Specialties Inc.
EnDiSys
Glenn Saren & Assoc. Inc.
Graco Inc.
IDS Blast
Jadalc
Lesoon Equipment Pte. Ltd.
Marco
Masterfield Industrial Equipment
Midwest Surface Prep, LLC
The Paint Project, Inc.
SIE Industrial Ltd.
Specialty Products, Inc. (SPI)
Spin Import Export
Surface Prep Supply
T Tex Industries LP
Temco Distributors
Titan Tool
Uni-Royal Pack Co., Ltd.
VR Coatings Pvt. Ltd.
The Warehouse Rentals and Supplies

### SPRAY SYSTEMS, HVLP

Abrasives Inc.
Advanced Finishing Systems, Inc.
AirTech Spray Systems
APE Companies
Arkco (Thailand) Co., Ltd.
Bittner's Spray Equipment Co.
BlastOne International
Bolair Fluid Handling Systems
Carlisle Fluid Technologies-Binks
CESCO - Aqua Miser
Corrosion Specialties Inc.
DUX Technologies, Inc.
EnDiSys
Glenn Saren & Assoc. Inc.
Graco Inc.
IDS Blast
Jadalc
Lesoon Equipment Pte. Ltd.
Marco
Masterfield Industrial Equipment
Mattson Spray Equipment
Midwest Surface Prep, LLC
The Paint Project, Inc.
Quikspray, Inc.


SIE Industrial Ltd.
Specialty Products, Inc. (SPI)
Spin Import Export
Surface Prep Supply
T Tex Industries LP
Temco Distributors
Titan Tool
Uni-Royal Pack Co., Ltd.
Victory Air & Equipment, Inc.
VR Coatings Pvt. Ltd.
The Warehouse Rentals and Supplies

### SPRAY SYSTEMS, PLURAL COMPONENT

Abrasives Inc.
Advanced Finishing Systems, Inc.
AirTech Spray Systems
APE Companies
Arkco (Thailand) Co., Ltd.
Arma Coatings
Bittner's Spray Equipment Co.
Blastlink USA
BlastOne International
Bolair Fluid Handling Systems


Carlisle Fluid Technologies-Binks
CESCO - Aqua Miser
Corrosion Specialties Inc.
Dispensing Technology Corporation
EnDiSys
Gaco Western
Glenn Saren & Assoc. Inc.
Graco Inc.
IDS Blast
Intech Equipment & Supply
Jadalc
Lesoon Equipment Pte. Ltd.
Marco
Masterfield Industrial Equipment
Mattson Spray Equipment
MES Rentals
Midwest Surface Prep, LLC
Oak Ridge Foam and Coating Systems
Pacific Roller Die Company, Inc.
The Paint Project, Inc.
Remote Orbital Installations, LLC
SIE Industrial Ltd.
Specialty Products, Inc. (SPI)
Spin Import Export
Surface Prep Supply
T Tex Industries LP
Temco Distributors
Titan Tool
Uni-Royal Pack Co., Ltd.
Victory Air & Equipment, Inc.
VR Coatings Pvt. Ltd.
The Warehouse Rentals and Supplies
WIWA LLC

### SQUEEGEE FLOOR COATING MACHINES

Bon Tool Co.
EnDiSys
Glenn Saren & Assoc. Inc.
Magnolia Brush
Quikspray, Inc.


SIE Industrial Ltd.
Surface Prep Supply
Victory Air & Equipment, Inc.
The Warehouse Rentals and Supplies

### STRAINERS

AirTech Spray Systems
American Spray Technologies
Arkco (Thailand) Co., Ltd.
Carlisle Fluid Technologies-Binks
CESCO - Aqua Miser
Cincinnati Color Company
Corrosion Specialties Inc.
Intech Equipment & Supply
Lesoon Equipment Pte. Ltd.
Marco
MES Rentals
Midwest Surface Prep, LLC
The Paint Project, Inc.
Paul N. Gardner Co., Inc.
SIE Industrial Ltd.
Surface Prep Supply
Surface Preparation-Texas, LLC
T Tex Industries LP
Trimaco, LLC
Uni-Royal Pack Co., Ltd.
Victory Air & Equipment, Inc.
The Warehouse Rentals and Supplies

### SUNDRIES

Advanced Finishing Systems, Inc.
APE Companies
CESCO - Aqua Miser
Cincinnati Color Company
Corrosion Specialties Inc.
Glenn Saren & Assoc. Inc.
Hyde Group
Lesoon Equipment Pte. Ltd.
Magnolia Brush
Marco
MES Rentals
Midwest Surface Prep, LLC
Mr. Shrinkwrap
Nour Trading House Inc.
The Paint Project, Inc.
Shur-Line
SIE Industrial Ltd.
Sunnyside Corporation/Back To Nature Products
Surface Prep Supply
Surface Preparation-Texas, LLC
T Tex Industries LP

Trimaco, LLC


Victory Air & Equipment, Inc.
The Warehouse Rentals and Supplies

### THERMAL SPRAY EQUIPMENT

AirTech Spray Systems
APE Companies
Arkco (Thailand) Co., Ltd.
BlastOne International
CESCO - Aqua Miser
EnDiSys
Glenn Saren & Assoc. Inc.
Jadalc
Lesoon Equipment Pte. Ltd.
Marco
MES Rentals
SIE Industrial Ltd.
Surface Prep Supply
Thermion
Titan Tool
TMS Metalizing Systems, Ltd.
Uni-Royal Pack Co., Ltd.
The Warehouse Rentals and Supplies

### TRAFFIC LINE STRIPERS

Abrasives Inc.
Absolute Equipment
AirTech Spray Systems
APE Companies
Bittner's Spray Equipment Co.
BlueGreen Technologies LLC
Bolair Fluid Handling Systems
Carlisle Fluid Technologies-Binks
Cincinnati Color Company
Corrosion Specialties Inc.
Dispensing Technology Corporation
EnDiSys
Glenn Saren & Assoc. Inc.
Intech Equipment & Supply
J.D. Honigberg International, Inc.
Jadalc
Lesoon Equipment Pte. Ltd.
Marco
Newstripe
The Paint Project, Inc.
SIE Industrial Ltd.
Surface Prep Supply
T Tex Industries LP
Titan Tool
Uni-Royal Pack Co., Ltd.
Victory Air & Equipment, Inc.
The Warehouse Rentals and Supplies

### TROWELS, HAND

Bon Tool Co.
HoverTrowel, Inc.
Hyde Group
Marco
MES Rentals
National Concrete Accessories
Nour Trading House Inc.
Seymour Midwest LLC
SIE Industrial Ltd.
Surface Prep Supply
The Warehouse Rentals and Supplies

### TROWELS, POWER

Central Texas Equipment
HoverTrowel, Inc.


J.D. Honigberg International, Inc.
MES Rentals
National Concrete Accessories
SIE Industrial Ltd.
Surface Prep Supply
The Warehouse Rentals and Supplies

### UNDERWATER APPLICATION EQUIPMENT

AirTech Spray Systems
Cygnus Instruments Ltd
J.D. Honigberg International, Inc.
SIE Industrial Ltd.
Surface Prep Supply

### COOLING EQUIPMENT
Aggreko
Arkco (Thailand) Co., Ltd.
Axxiom Manufacturing
BlastOne International
**Bullard**
CESCO - Aqua Miser
Corrosion Specialties Inc.
DeHumidification Technologies, LP
Dehumidifiers, Sales and Consulting, Inc.
DryAIR by TDM
ECS North America, LLC
GAL Power Systems Toronto
Lesoon Equipment Pte. Ltd.
Marco
MES Rentals
Munters Corporation
Panblast Pte Ltd
Pinnacle Central Co.
Polygon US Corporation
Pro-Tect Services, Inc.
Rapid-Prep, LLC
SIE Industrial Ltd.
Surface Prep Supply
Temco Distributors
Tioga HVAC Rentals & Sales

### DEHUMIDIFIERS
Absolute Equipment
Aggreko
Airblast B.V.
APE Companies
ARID-DRY by Controlled Dehumidification
Arkco (Thailand) Co., Ltd.
Axxiom Manufacturing
BlastOne International
CESCO - Aqua Miser
Clemco Industries Corp.
Corrosion Specialties Inc.
DeHumidification Technologies, LP



Dehumidifiers, Sales and Consulting, Inc.
DryAIR by TDM
ECS North America, LLC
GAL Power Systems Toronto
Lesoon Equipment Pte. Ltd.
Marco
Masterfield Industrial Equipment
MES Rentals
Munters Corporation
Panblast Pte Ltd
Pinnacle Central Co.
Polygon US Corporation
Pro-Tect Services, Inc.
Rapid-Prep, LLC
SIE Industrial Ltd.
Surface Prep Supply
T Tex Industries LP
Temco Distributors
Tioga HVAC Rentals & Sales
Uni-Royal Pack Co., Ltd.
Victory Air & Equipment, Inc.

### GENERATORS, PORTABLE
ABLE Equipment Rental
Absolute Equipment
Aggreko
AirTech Spray Systems
ARID-DRY by Controlled Dehumidification
BlueGreen Technologies LLC
Central Texas Equipment
CESCO - Aqua Miser
DeHumidification Technologies, LP
DryAIR by TDM
EnDiSys
Floorex Products
GAL Power Systems Toronto
Hanes Supply Inc.
Intech Equipment & Supply
The Paint Project, Inc.
Pinnacle Central Co.
Polygon US Corporation



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Pro-Tect Services, Inc.
SIE Industrial Ltd.
Surface Prep Supply
Tioga HVAC Rentals & Sales
Trask-Decrow Machinery, Inc.

**HEATERS**

ABLE Equipment Rental
Absolute Equipment
Aggreko
BlastOne International
Central Texas Equipment
CESCO - Aqua Miser
DeHumidification Technologies, LP
Dehumidifiers, Sales and Consulting, Inc.
DryAIR by TDM
ECS North America, LLC
EnDiSys
GAL Power Systems Toronto
Hanes Supply Inc.
Intech Equipment & Supply
Lesoon Equipment Pte. Ltd.
Marco
Munters Corporation
The Paint Project, Inc.
Pinnacle Central Co.
Polygon US Corporation
Pro-Tect Services, Inc.
Rapid-Prep, LLC
SIE Industrial Ltd.
SJS Equipment LLC
Surface Prep Supply
Tioga HVAC Rentals & Sales

**LIGHTING**

ABLE Equipment Rental
Absolute Equipment
AirTech Spray Systems
APE Companies
Arkco (Thailand) Co., Ltd.
Bell & MacKenzie Company Ltd.
BlastOne International
Central Texas Equipment
Corrosion Specialties Inc.
DryAIR by TDM
ECS North America, LLC
GAL Power Systems Toronto
Hanes Supply Inc.
ICM - International Climbing Machines
IDS Blast
Lesoon Equipment Pte. Ltd.
LPI Incorporated
Manus Abrasive Systems, Inc./Mod-U-Blast Mfg.
Marco
N.T. Ruddock Co.
Norton Sandblasting Equipment
The Paint Project, Inc.
Panblast Pte Ltd
Pinnacle Central Co.
Pirate Brand
Rapid-Prep, LLC
SAFE Systems, Inc.
Safety Lamp of Houston
SIE Industrial Ltd.
Southern Equipment Distribution, LLC
Stone Tucker Instruments Inc.
Surface Prep Supply
T Tex Industries LP
Temco Distributors
Trask-Decrow Machinery, Inc.
Victory Air & Equipment, Inc.

**LIGHTING, EXPLOSION-PROOF**
AirTech Spray Systems
APE Companies
Arkco (Thailand) Co., Ltd.
BlastOne International
Corrosion Specialties Inc.
Dawson-Macdonald Company
DryAIR by TDM
IDS Blast
Lesoon Equipment Pte. Ltd.
LPI Incorporated
Manus Abrasive Systems, Inc./Mod-U-Blast Mfg.
Marco
Masterfield Industrial Equipment
MES Rentals
N.T. Ruddock Co.
Norton Sandblasting Equipment
The Paint Project, Inc.
Rapid-Prep, LLC
Safety Lamp of Houston



SIE Industrial Ltd.
Southern Equipment Distribution, LLC
Stone Tucker Instruments Inc.
Surface Prep Supply
T Tex Industries LP
Temco Distributors
Victory Air & Equipment, Inc.

**AMBIENT AIR SAMPLERS, AREA MONITORING**
Arkco (Thailand) Co., Ltd.
Blasting Experts
BlastOne International
CESCO - Aqua Miser
Corrosion Specialties Inc.
DeHumidification Technologies, LP
ENMET
KTA-Tator, Inc.
Marco
MES Rentals
Panblast Pte Ltd
Pro-Tect Services, Inc.
Rapid-Prep, LLC
SIE Industrial Ltd.
Stone Tucker Instruments Inc.
Surface Prep Supply
T Tex Industries LP

**CAR COVERS**
Detroit Tarp, Inc.
Mr. Shrinkwrap
Pro-Tect Services, Inc.
Surface Prep Supply
Trimaco, LLC

**CONTAINMENT, OTHER MATERIALS AND EQUIPMENT**
AirTech Spray Systems
APE Companies
ARS Recycling Systems, LLC
BlastOne International
Buffalo Shrink Wrap
CESCO - Aqua Miser
Clothes Cleaning Systems
Corrosion Specialties Inc.
Detroit Tarp, Inc.
Dustless Technologies
Eagle Industries
Indian Valley Industries, Inc.
Marco
Masterfield Industrial Equipment
MES Rentals
Mr. Shrinkwrap
Newstripe
Pro-Tect Plastic and Supply, Inc.
Pro-Tect Services, Inc.
Rapid Deployable Systems
Surface Prep Supply
T Tex Industries LP
**Tarps Manufacturing, Inc.**

Tarps Manufacturing, Inc.™
217-584-1900 www.tarpsmfg.com

Total Enclosure Sail System, Inc.
Trimaco, LLC
Victory Air & Equipment, Inc.
Zip Wall Dust Barrier System

**CONTAINMENT, SCREENS**
APE Companies
BlastOne International
CESCO - Aqua Miser
Corrosion Specialties Inc.
Detroit Tarp, Inc.

Eagle Industries
IDS Blast
Indian Valley Industries, Inc.
Manus Abrasive Systems, Inc./Mod-U-Blast Mfg.
Marco
MES Rentals
Mr. Shrinkwrap
Pinnacle Central Co.
Pro-Tect Plastic and Supply, Inc.
Pro-Tect Services, Inc.
Surface Jet Inc.
Surface Prep Supply
T Tex Industries LP
Temco Distributors
Total Enclosure Sail System, Inc.
TST Sweden, AB
Victory Air & Equipment, Inc.
Zip Wall Dust Barrier System

### DRUM CRUSHERS

Airblast B.V.
CESCO - Aqua Miser
LS Industries, Inc.
SIE Industrial Ltd.
T Tex Industries LP
Temco Distributors

### DUST COLLECTORS - HAND HELD TOOLS

Abrasives Inc.
AirTech Spray Systems
Arkco (Thailand) Co., Ltd.
ARS Recycling Systems, LLC
Blasting Experts
BlastOne International
Central Texas Equipment
CESCO - Aqua Miser
Corrosion Specialties Inc.
CS Unitec, Inc.
Dawson-Macdonald Company
DeHumidification Technologies, LP
Dustless Technologies
Eagle Industries
ECS North America, LLC
Floorex Products
Hanes Supply Inc.
HoverTrowel, Inc.
IDS Blast
Jadalc
Julbert, Inc.
LS Industries, Inc.
Marco
The Marindus Company, Inc.
Masterfield Industrial Equipment
MES Rentals
Norton Sandblasting Equipment
Novatek Corporation
Panblast Pte Ltd
Rapid-Prep, LLC



SIE Industrial Ltd.
Stone Tucker Instruments Inc.
Surface Prep Supply
T Tex Industries LP
Temco Distributors
Trelawny Surface Preparation Technology
Uni-Ram Corporation
Victory Air & Equipment, Inc.

### DUST COLLECTORS, FILTERS

Abrasives Inc.
ABS Blast



Airblast B.V.
AirTech Spray Systems
ARID-DRY by Controlled Dehumidification
Arkco (Thailand) Co., Ltd.
ARS Recycling Systems, LLC
Atlantic Design Inc.
Blasting Experts
BlastOne International
CESCO - Aqua Miser
Clemco Industries Corp.
Clothes Cleaning Systems
Corrosion Specialties Inc.
Dawson-Macdonald Company
DeHumidification Technologies, LP
Eagle Industries
ECS North America, LLC
EnTech Industries
ESCA Blast
Floorex Products
Friess Equipment, Inc.
Goff, Inc.
Gritco Equipment B.V.
Hanes Supply Inc.
IDS Blast
Industrial Vacuum Equipment Corp.



J.D. Honigberg International, Inc.
Julbert, Inc.
Lesoon Equipment Pte. Ltd.
LS Industries, Inc.
Manus Abrasive Systems, Inc./Mod-U-Blast Mfg.
Marco
The Marindus Company, Inc.
Masterfield Industrial Equipment
Media Blast & Abrasives, Inc.
MES Rentals

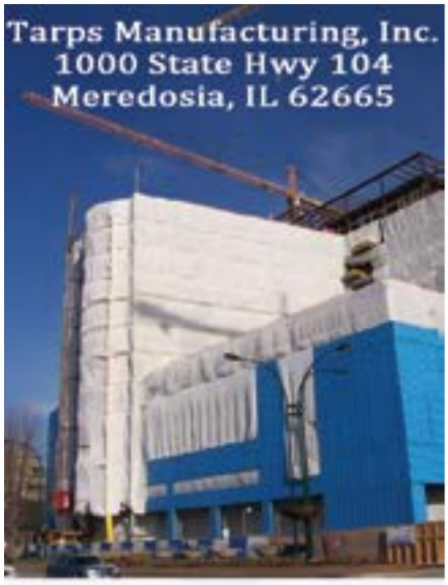


N.T. Ruddock Co.
The New York Blower Company
Norton Sandblasting Equipment
Novatek Corporation
The Paint Project, Inc.
Panblast Pte Ltd
Pirate Brand
Pro-Tect Services, Inc.
Rapid-Prep, LLC
RBW Enterprises, Inc.
Robovent
SAFE Systems, Inc.
SIE Industrial Ltd.
Southern Equipment Distribution, LLC
Surface Prep Supply
T Tex Industries LP
Temco Distributors
Trelawny Surface Preparation Technology
Victory Air & Equipment, Inc.

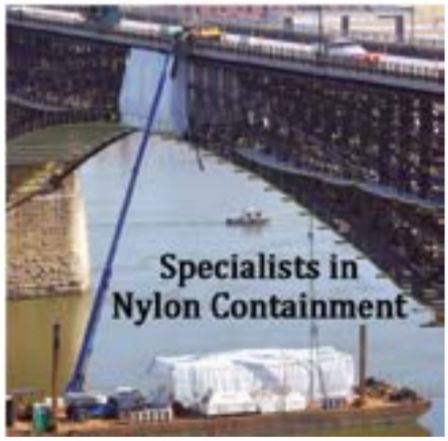
### SOLVENT RECOVERY SYSTEMS

AirTech Spray Systems
BlastOne International
CBG Biotech
CESCO - Aqua Miser
Corrosion Specialties Inc.










Diedrich Technologies Inc.
EnDiSys
Persyst Enterprises, Inc.
The Paint Project, Inc.
Pinnacle Central Co.
SIE Industrial Ltd.
Solvent Waste Management, Inc.
Southern Equipment Distribution, LLC
Surface Prep Supply
T Tex Industries LP
Temco Distributors
Uni-Ram Corporation
Victory Air & Equipment, Inc.

### TARPS

AirTech Spray Systems
APE Companies
Blasting Experts
BlastOne International
CESCO - Aqua Miser
Corrosion Specialties Inc.
Detroit Tarp, Inc.
Eagle Industries
Hanes Supply Inc.
IDS Blast
Indian Valley Industries, Inc.
KS International, Inc.
Manus Abrasive Systems, Inc./Mod-U-Blast Mfg.
Marco
MES Rentals
Mr. Shrinkwrap
Pro-Tect Plastic and Supply, Inc.
Pro-Tect Services, Inc.
SIE Industrial Ltd.
Surface Prep Supply
T Tex Industries LP
**Tarps Manufacturing, Inc.**


Total Enclosure Sail System, Inc.
Victory Air & Equipment, Inc.

### VENTILATION EQUIPMENT

ABC Industries, Inc.
ABS Blast
Absolute Equipment
Aggreko
Air Systems International
Airblast B.V.
AirTech Spray Systems
ARS Recycling Systems, LLC
Blasting Experts
BlastOne International
CESCO - Aqua Miser
Corrosion Specialties Inc.
CS Unitec, Inc.
Dawson-Macdonald Company
DeHumidification Technologies, LP

Dry Air Technology


Eagle Industries
ECS North America, LLC
EnTech Industries
GAL Power Systems Toronto
Hanes Supply Inc.
Hartzell Air Movement
IDS Blast
Intech Equipment & Supply
Jadalc
Julbert, Inc.
Lesoon Equipment Pte. Ltd.
Manus Abrasive Systems, Inc./Mod-U-Blast Mfg.
Marco
Masterfield Industrial Equipment
MES Rentals
Munters Corporation
The New York Blower Company
Norton Sandblasting Equipment
Novatek Corporation
The Paint Project, Inc.
Panblast Pte Ltd
Pinnacle Central Co.
Pro-Tect Services, Inc.
Rapid-Prep, LLC
Robovent
SAFE Systems, Inc.
SIE Industrial Ltd.
Southern Equipment Distribution, LLC
Surface Prep Supply
T Tex Industries LP
Temco Distributors
Tioga HVAC Rentals & Sales
Victory Air & Equipment, Inc.

### WASTE PAINT SOLIDIFIERS

CESCO - Aqua Miser
Corrosion Specialties Inc.
SIE Industrial Ltd.
Surface Prep Supply
T Tex Industries LP
Temco Distributors
Trimaco, LLC

### WATER FILTRATION PRODUCTS

Arkco (Thailand) Co., Ltd.
CESCO - Aqua Miser
EnDiSys
SIE Industrial Ltd.
Surface Jet Inc.
Surface Prep Supply

# **Equipment** Company Profiles

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## 3

**3M Company**
Bldg 223-6N-01
St. Paul, MN 55144
Manufacturer

## A

**Aargo Environmental Inc.**
35 Beechwood Hill Trail
Exeter, RI 02822
**Contact:** Ron Perry
**Phone:** 800-536-7711
aargotool@cox.net
www.aargotools.com
Manufacturer

**ABC Industries, Inc.**
301 Kings Hwy.
Winona Lake, IN 46590
**Contact:** Daren Maierle
**Phone:** 574-267-5166
sales@abc-industries.net
www.abc-industries.net
Manufacturer

**ABLE Equipment Rental**
1050 Grand Blvd.
Deer Park, NY 11729
**Contact:** Perry Rosen
**Phone:** 631-841-3333
perry@ableequipment.com
www.ableequipment.com
Rental Company

### Abrasiv Muta d.o.o - Slovenia
Koroska cesta 49
Muta, 2366 Slovenia
**Contact:** Customer Service
**Phone:** 386-2-87-20-671
contact.slovenia@wabrasives.com
www.wabrasives.com
Manufacturer

### Abrasives Inc.
4090 Highway 49
Glen Ullin, ND 58631
**Contact:** Scott Ressler
**Phone:** 701-348-3610
info@abrasivesinc.com
www.abrasivesinc.com
Manufacturer

### ABS Blast
250 S. Shiloh Road
Garland, TX 75042
**Contact:** Lance Gayle, Derek Pawlivsky
**Phone:** 972-205-9309
info@absblast.com
www.absblast.com
Manufacturer

### Absolute Equipment
3038 Babcock Blvd.
Pittsburgh, PA 15237
**Contact:** Fred Silhanek
**Phone:** 412-931-6655
absoluteequipment@absoluteequip.com
www.absoluteequip.com
Distributor / Rental Company

### Accumet Materials Co.
200 Executive Blvd., Ste. 200B
Ossining, NY 10562
**Contact:** Brenda Lyons
**Phone:** 914-762-1540
sales@accumetmaterials.com
www.accumetmaterials.com
Manufacturer

### ACT Test Panels LLC
273 Industrial Dr.
Hillsdale, MI 49242
**Contact:** sales@acttestpanels.com
**Phone:** 517-439-1485
sales@acttestpanels.com
www.acttestpanels.com
Manufacturer

### Advance Equipment Mfg.
4615 W. Chicago Avenue
Chicago, IL 60651
**Contact:** DeAnne Shallcross
**Phone:** 773-287-8220
sales@advance-equipment.com
www.advance-equipment.com
Manufacturer

### Advanced Finishing Systems, Inc.
2304 N. Killingsworth St.
Portland, OR 97217
**Contact:** Steve Edmondson
**Phone:** 503-285-0569
info@advancedfinishing.com
www.advancedfinishing.com
Rental Company

### Aggreko
15600 JFK Blvd., Ste 900
Houston, TX 77032
**Contact:** Corporate Office
**Phone:** 877-244-7356
aggreko@aggreko.com
www.aggreko.com
Rental Company

### Air Conditioner Rental and Leasing Inc.
1001 Freyburg Street
Pittsburgh, PA 15203
**Contact:** Scott Penner
**Phone:** 800-581-4844
sp@acrental.com
www.acrental.com
Manufacturer / Distributor / Rental Company

### Air Systems International
829 Juniper Crescent
Chesapeake, VA 23320
**Contact:** Customer Service
**Phone:** 800-866-8100
sales@airsystems.com
www.airsystems.com
Manufacturer

### Airblast AFC
250 Airport Parkway
Oroville, CA 95965
**Contact:** Jeremy Hagan
**Phone:** 800-331-7744
jeremy@afcfilters.com
www.airblastafc.com
Manufacturer / Distributor

### Airblast B.V.
PO Box 1075
Heerhugowaard, 1700 BB Netherlands
**Contact:** Mr. Nick Smith
**Phone:** 31-72-5718002
info@airblast.com
www.airblast.com
Manufacturer / Distributor

### Airtec Ltd.
Industriestrasse 40
Zunzgen, CH-4455 Switzerland
**Contact:** Thomas Wyser
**Phone:** 41-619769525
tom.wyser@airtec.ch
Manufacturer / Distributor / Rental Company

### AirTech Spray Systems
4303 Pinemont Dr.
Houston, TX 77018
**Contact:** Ronald Cradit
**Phone:** 713-681-0013
sales@airtechspray.com
www.airtechspray.com
Manufacturer / Distributor / Rental Company

### All Jetting Technologies, Inc.
2740 Martin Downs Blvd., #318
Palm City, FL 34990
**Contact:** Rodney Hardin
**Phone:** 772-286-1218
info@alljetting.com
www.alljetting.com
Manufacturer / Distributor

### American Spray Technologies
1807 Pike St. NW Suite 103
Auburn, WA 98001
**Contact:** William Saas
**Phone:** 253-833-4342
info@sprayrig.com
www.sprayrig.com
Manufacturer

### APE Companies
3009 Pasadena Freeway, Suite 100
Pasadena, TX 77503
**Contact:** Jon Randolph
**Phone:** 281-930-0808
jrandolph@apecompanies.com
www.APEcompanies.com
Distributor

### ARID-DRY by Controlled Dehumidification
5931 Ford Court
Brighton, MI 48116
**Contact:** Tom Haarla
**Phone:** 810-229-7900
sales@ctrdh.com
www.ctrdh.com
Manufacturer / Distributor

### Arkco (Thailand) Co., Ltd.
19/23 Moo 8 Suksawad Road SOI 84 Naiklongbangplakod Sub-District, Prasamutjedee District
Samutprakarn, 10290 Thailand
**Contact:** Kevin Yeo
**Phone:** 66-899202257
sales@arkcothailand.com
www.arkcothailand.com
Distributor

### Arma Coatings
5555 W. 11th Ave
Eugene, OR 97402
**Contact:** Brian Clements
**Phone:** 541-688-3500
sales@armacoatings.com
www.armacoatings.com
Manufacturer / Distributor

### Armex
Church & Dwight Co., Inc.
469 North Harrison Street
Princeton, NJ 08543
**Contact:** Sales
**Phone:** 800-332-5424
armex@churchdwight.com
www.armex.com
Manufacturer

### ARS Recycling Systems, LLC
4000 McCartney Rd.
Lowellville, OH 44436
**Contact:** Doug Reed
**Phone:** 330-536-8210
info@arsrecycling.com
www.arsrecycling.com
Manufacturer

### Ascent
206 Krishnadeep Towr Fatehganj
Vadodara, 390002 India
**Phone:** 91-11-47533108
Manufacturer

### AST/Adhesive Systems Technology Corp.
1600 Freeway Boulevard
Brooklyn Center, MN 55430
**Contact:** Stephen Hirt
**Phone:** 763-592-2060
sales@ast-corp.net
www.ast-corp.net
Manufacturer

### Atlantic Design Inc.
11505 Pocomoke Court
Baltimore, MD 21220
**Contact:** Russell Roden
**Phone:** 866-225-5234
info@calladi.com
www.atlanticdesigninc.com
Manufacturer

### Axxiom Manufacturing
11927 S. Highway 6
Fresno, TX 77545
**Contact:** Sales
**Phone:** 832-295-5200
sales@axxiommfg.com
www.schmidtabrasiveblasting.com
Manufacturer

# Equipment Company Profiles

## B

**Barton International**
Six Warren Street
Glens Falls, NY 12801
**Phone:** 800-741-7756
info@barton.com
www.barton.com
Manufacturer / Distributor

**Beardsley Sales**
4535 State Route 89
Seneca Falls, NY 13148
**Contact:** Dave Swenson
**Phone:** 315-549-2627
Dswenson@rochester.rr.com
Manufacturer

**Bell & MacKenzie Company Ltd.**
500 Sherman Ave. P.O. Box 844, LCD #1
Hamilton, ON L8N 3N9 Canada
**Contact:** Richard Bell
**Phone:** 888-794-5665
info@bellandmackenzie.com
Distributor

**Bellemare Abrasives& Minerals(SDF Abrasives, Inc.)**
8750 Boul. Industriel
Trois Rivieres, QC G9A 5E1 Canada
**Contact:** Allain Hache/Martin Cote
**Phone:** 506-380-4017 or 819-376-4366
mcote@groupebellemare.com
www.groupebellemare.com
Manufacturer

**Bittner's Spray Equipment Co.**
1301 Brummel Avenue
Elk Grove Village, IL 60007
**Contact:** Greg Bittner
**Phone:** 847-364-7661
zbitt@msn.com
www.BSEsprayit.com
Distributor

**Bix Manufacturing Company, Inc**
108 Cude Lane
Madison, WA 37115
**Contact:** Neheeh Kehrri
Manufacturer

**Blasting Experts**
241 West 16th St
Hamilton, ON L9C4C7 Canada
**Contact:** Eng. Mauricio Herrera
**Phone:** 905-297-5515
sales@blastingexperts.com
www.blastingexperts.com
Manufacturer / Distributor / Rental Company

**Blastlink USA**
11927 Windfern Road
Houston, TX 77064
**Contact:** Jeanne Haner
blastlink.usa@gmail.com
Distributor

**Blastman Robotics Ltd.**
Kaarnatie 40
Oulu, 90530 Finland
**Contact:** Sakari Veijola
**Phone:** 358-407616561
sakari.veijola@blastman.fi
www.blastman.fi
Manufacturer

**BlastOne International**
4510 Bridgeway Avenue
Columbus, OH 43219
**Contact:** Gavin Gooden
**Phone:** 614-476-3000
sales@blastone.com
www.blastone.com
Distributor / Rental Company

**BlastPro Mfg., Inc.**
6021 Melrose Lane
Oklahoma City, OK 73127
www.blastpromfg.com

**Blastrac**
13201 North Santa Fe Ave.
Oklahoma City, OK 73114
**Contact:** Customer Service
**Phone:** 800-256-3440
info@blastrac.com
www.blastrac.com
Manufacturer

**BlueGreen Technologies LLC**
1408 Hamlin Ave., Unit A
Saint Cloud, FL 34771
**Contact:** Craig Grason
**Phone:** 407-466-4427
craig@farrow4u.com
www.farrow4u.com
Distributor

**Bolair Fluid Handling Systems**
17 Brownridge Rd Unit 1&2
Halton Hills - Branch in Alberta and BC, ON L7G 0C6 Canada
**Contact:** Gregory Haddow
**Phone:** 877-326-5247
sales@bolair.ca
www.bolair.ca
Manufacturer / Distributor / Rental Company

**Bon Tool Co.**
4430 Gibsonia Rd
Gibsonia, PA 15044
**Contact:** sales@bontool.com
**Phone:** 724-443-7080
Manufacturer

**Brand Safway**
Infrastructure Services Group
Scotia-Glenville Industrial Park
Building 406
Scotia, NY 12302
**Contact:** Jerry Dolly
**Phone:** 518-381-6000
quikdeck@safway.com
www.quikdeck.com
Manufacturer / Rental Company

**Buffalo Shrink Wrap**
PO Box 537
Clarence, NY 14031
**Contact:** William Casilio Jr
**Phone:** 716-440-7708
orders@buffaloshrinkwrap.com
www.buffaloshrinkwrap.com
Distributor

**Bullard**
1898 Safety Way
Cynthiana, KY 41031
**Contact:** Steve Couture
**Phone:** 859-234-6616
info@bullard.com
www.bullard.com
Manufacturer

**BYK**
524 South Cherry Street
Wallingford, CT 06492
Manufacturer

**BYK-Gardner USA**
9104 Guilford Rd.
Columbia, MD 21046
**Contact:** Sherry Brown
**Phone:** 800-343-7721
info.byk.gardner.usa@altana.com
www.byk.com/instruments
Manufacturer

## C

**Carlisle Fluid Technologies-Binks**
16430 N. Scottsdale Rd. Suite 450
Scottsdale, AZ 85254
**Contact:** Jim Cardosi
**Phone:** 630-888-1138
info@carlisleft.com
www.binks.com
Manufacturer

**Cate Wyoming Equipment Company, LLC**
3002 Conestoga Drive
Gillette, WY 82718
**Contact:** Randy Hartley
**Phone:** 307-682-0571
Distributor

**CBG Biotech**
31075 Solon Industrial Parkway
Solon, OH 44139
**Contact:** Nancy Isom
**Phone:** 800-941-9484
info@cbgtechnologies.com
cbgbiotech.com
Manufacturer

**Central Texas Equipment**
1401 Central Commerce Circle
Pflugerville, TX 78660
**Contact:** Bob Henry
**Phone:** 512-442-2371
sales@ctegroup.net
www.ctegroup.net
Distributor

**CESCO - Aqua Miser**
7251 Cross County Rd.
N. Charleston, SC 29418
**Contact:** Karen Haun
**Phone:** 843-760-3000
info@BlastandPaint.com
www.blastandpaint.com
Manufacturer / Distributor / Rental Company

**Chesapeake Specialty Products, Inc.**
5055 North Point Blvd.
Baltimore, MD 21219
**Contact:** Kenneth Sanchez
**Phone:** 410-388-5055
info@chesprod.com
www.chesprod.com
Manufacturer

**CHLOR RID International Inc./ Borchers Americas Inc.**
811 Sharon Drive
Westlake, OH 44145
**Contact:** AZ Office
**Phone:** 480-821-0039
chlorrid@borchers.com
www.chlor-rid.com
Manufacturer

**Cincinnati Color Company**
1027 Dalton Street
Cincinnati, OH 45203
**Contact:** Doug Deifel
**Phone:** 513-241-1090
ddeifel@cincinnaticolor.com
www.cincinnaticolor.com
Distributor

### CLEARBLAST
706 Old Westtown Road Suite E
West Chester, PA 19382
**Contact:** Sales
**Phone:** 888-327-7698
info@clearblast.com
www.clearblast.com
Manufacturer

### Clemco Industries Corp.
One Cable Car Drive
Washington, MO 63090
**Contact:** Customer Service
**Phone:** 636-239-4300
info@clemcoindustries.com
www.clemcoindustries.com
Manufacturer

### Clothes Cleaning Systems
4475 Technology Drive
Wilson, NC 27896
**Contact:** Sam Bowling
**Phone:** 252-243-3752
sam@skbowling.com
www.clothescleaningsystems.com
Manufacturer / Distributor

### Cold Jet
455 Wards Corner Rd.
Loveland, OH 45140
**Contact:** Brian Allen
**Phone:** 513-831-3211
info@coldjet.com
www.coldjet.com
Manufacturer

### ColorTec & FORMULATOR Software
28 Center St.
Clinton, NJ 08809
**Contact:** J. DeGroff
**Phone:** 908-735-2248
sales@color-tec.com
www.color-tec.com
Manufacturer

### Corrosion & Protective Coatings S.A.
Av. Paseo La Castellana 814, Urb. La Castellana
Lima, 33 Peru
**Contact:** Gina Aliaga
**Phone:** 51-1-449-2006
galiaga@cpcinstrumentos.com
www.cpcinstrumentos.com
Distributor

### Corrosion Specialties Inc.
2221 Northmont Parkway Suite 200
Duluth, GA 30096
**Contact:** Matt Steinmann
**Phone:** 770-938-7263
msteinmann@corrosionspec.com
www.corrosionspec.com
Distributor

### Crawler
2354 North Lindberg Blvd.
St. Louis, MO 63114
**Contact:** Mark Chick
**Phone:** 314-428-4804
mark@crawlerusa.com
www.crawlerusa.com
Manufacturer

### CS Unitec, Inc.
22 Harbor Avenue
Norwalk, CT 06850
**Contact:** Kathy Delaney
**Phone:** 203-853-9522
www.csunitec.com
Manufacturer

### Cygnus Instruments Ltd
Cygnus House, 30 Prince of Wales Road
Dorchester, DT1 1PW United Kingdom
**Contact:** Graham Haines
**Phone:** 44-1305-265533
sales@cygnus-instruments.com
www.cygnus-instruments.com
Manufacturer

### Cygnus Instruments, Inc.
PO Box 6417
Annapolis, MD 21401
**Contact:** Rod Sanders
**Phone:** 410-267-9771
sales@cygnusinstruments.com
www.cygnusinstruments.com
Distributor

### Dawson-Macdonald Company
845 Woburn Street
Wilmington, MA 1887
**Contact:** Mike Stygles
**Phone:** 978-988-8034
info@dawson-macdonald.com
www.dawson-macdonald.com
Distributor

### DeFelsko Corporation
800 Proctor Ave.
Ogdensburg, NY 13669
**Contact:** Terry LaRue
**Phone:** 315-393-4450
techsale@defelsko.com
www.defelsko.com
Manufacturer

### DeHumidification Technologies, LP
6609 Avenue U
Houston, TX 77011
**Contact:** Brian Battle
**Phone:** 713-939-1166
bbattle@rentdh.com
www.rentdh.com
Rental Company

### Dehumidifiers, Sales and Consulting, Inc.
4319 Brook Shadow Dr.
Kingwood, TX 77345
**Contact:** Don Bechtol
**Phone:** 713-249-1615
dbechtol@dhsalesandconsulting.com
www.dhsalesandconsulting.com
Distributor

### Desco Manufacturing Company, Inc.
23031 Arroyo Vista
Rancho Santa Margarita, CA 92688
**Contact:** Ralph Fabian
**Phone:** 800-337-2648
info@descomfg.com
www.descomfg.com
Manufacturer

### Desmond Mfg. Co.
PO Box 30
Urbana, OH 43078
**Contact:** Robert McConnell
**Phone:** 937-653-7181
desmondmfg@ctcn.net
www.swirloff.com
Manufacturer

### Detroit Tarp, Inc.
6760 Metroplex Dr.
Romulus, MI 48174
**Contact:** Dennis Trezona
**Phone:** 800-457-5054
dennistrezona@hotmail.com
www.detroittarp.com
Manufacturer

### DevWave Software Inc
PO Box 28031
Victoria, BC V9B 6K8 Canada
**Contact:** Michael Brown
**Phone:** 888-739-4033
sales@devwave.com
www.devwave.com
Manufacturer

### Diamond Scaffold
2355 Hurricane Bay Dr.
Semmes, AL 36575

### Dickson Industries, Inc.
PO Box 684
Tecumseh, OK 74873
**Contact:** Wayne Dickson
**Phone:** 405-598-6547
dicksonparts@aol.com
www.roadproonline.com
Manufacturer

### Diedrich Technologies Inc.
310 Wayto Road
Schenectady, NY 12303
**Contact:** Ken Eglin
**Phone:** 800-283-3888
moreinfo@sandellmfg.com
www.diedrichtechnologies.com
Manufacturer

### Disnamair, S.A.
Jose Picon, 18
Madrid, 28028 Spain
**Contact:** Carlos Aguirre
**Phone:** 34-913611051
carlos@disnamair.com
www.disnamair.com
Distributor

### Dispensing Technology Corporation
5500 Adolfo Road
Camarillo, CA 93012
**Contact:** Todd White
**Phone:** 805-388-5575
sales@dispensingtech.com
www.dispensingtech.com
Manufacturer

### Doosan Portable Power
1293 Glenway Drive
Statesville, NC 28625
**Phone:** 800-633-5206
portablepowersales@doosan.com
www.doosanportablepower.com
Manufacturer

### Draygon LLC
313 Seaboard Avenue
Venice, FL 34285
**Contact:** Raymond E. VanKouwenberg
**Phone:** 585-329-9718
ray@draygon.com
www.draygon.com
Manufacturer

### Dry Air Technology
313 North Oak St.
Burlington, WA 98233
**Contact:** Lori Buswell
**Phone:** 360-755-9176
info@dryairtech.com
www.dryairtech.com
Manufacturer

# Equipment Company Profiles

**DryAIR by TDM**
52 US Route 1 #2
Scarborough, ME 04074
**Contact:** Mark Callahan
**Phone:** 800-287-1538
mcallahan@tdmgo.com
www.tdmgo.com
Manufacturer

**DuPont Protection Solutions**
PO Box 27001
Richmond, VA 23261
**Contact:** DuPont Personal Protection Customer Service
**Phone:** 800-931-3456
personalprotection.dupont.com
www.safespec.dupont.com
Manufacturer

**Dustless Blasting**
5711 Schurmier Rd.
Houston, TX 77048

**Dustless Technologies**
1285 E. 650 South
Price, UT 84501
**Contact:** Cameron Jaccard
**Phone:** 435-637-5885
orders@dustlesstools.com
www.dustlesstools.com
Manufacturer

**DUX Technologies, Inc.**
PO Box 1314
Seahurst, WA 98062
**Contact:** Brad Rice
**Phone:** 206-248-0808
brad.rice@duxtechnologiesinc.com
www.duxtechnologiesinc.com
Manufacturer

## E

**Eagle Industrial Equipment, Inc.**
230 N. Barrios St.
Lockport, LA 70374
**Contact:** Ben Ledet
**Phone:** 800-621-1511
bledet@eagleie.com
www.eagleie.com
Manufacturer

**Eagle Industries**
PO Box 10652
New Orleans, LA 70123
**Contact:** Patrick Calvo
**Phone:** 800-266-8246
patrick@eagleind.com
www.eagleind.com
Manufacturer

**ECCS**
6082 Anna Ct.
Eastvale, CA 92880
**Contact:** Eric Villasenor
**Phone:** 909-952-0745
eddycurrentguru@aol.com
www.eddycurrentandcoatingsales.com
Distributor

**Eco-Shell, Inc.**
5230 Grange Road
Corning, CA 96021
**Contact:** Helen Cantrell
**Phone:** 530-824-8794
sales@ecoshell.com
www.ecoshell.com
Manufacturer

**ECS North America, LLC**
148 Mill Rock Road East
Old Saybrook, CT 06475
**Contact:** Erin Bogan
**Phone:** 860-395-4760
erin@ecsone.com
www.ecsone.com
Rental Company

**Elcometer (Asia) Pte Ltd**
896 Dunearn Road, Sime Darby Centre, #03-09
Singapore, 589472 Singapore
**Contact:** Andy Foo
**Phone:** 656-462-2822
andy@elcometer.com.sg
www.elcometer.com.sg
Distributor

**Elcometer, Inc.**
1893 Rochester Industrial Drive
Rochester Hills, MI 48309
**Contact:** Sunny Nietubicz
**Phone:** 800-521-0635
sales@elcometerusa.com
www.elcometerusa.com
Manufacturer / Distributor

**ElektroPhysik Dr. Steingroever GmbH & Co. KG**
Pasteurstr. 15
Cologne, D-50735 Germany
**Contact:** Sales Dept.
**Phone:** 49-221-752040
info@elektrophysik.com
www.elektrophysik.com
Manufacturer / Distributor

**EnDiSys**
14329 Northdale Blvd.
Rogers, MN 55374
**Contact:** Scott L. Striggow
**Phone:** 763-428-5075
scottstriggow@endisys.com
www.endisys.com
Manufacturer / Distributor

**ENMET**
680 Fairfield Ct.
Ann Arbor, MI 48108
**Contact:** ENMET Customer Service
**Phone:** 800-521-2978
rkelley@enmet.com
www.enmet.com
Manufacturer

**EnTech Industries**
1109 10th St. NE
East Grand Forks, MN 56721
**Contact:** Mark LaPlante
**Phone:** 218-773-6602
mark@entechindustries.com
www.entechindustries.com
Manufacturer

**Enviro-Prep System - a product of hci**
310 S. Bellis St.
Wausau, WI 54403
**Contact:** Rachel Rohland
**Phone:** 715-845-7221
info@enviro-prep.com
www.enviro-prep.com
Manufacturer

**Envirosafe Stripping Inc.**
785 Arch Street
Carnegie, PA 15106
**Contact:** Mike Vorel
envirosafeindustrial@verizon.net
www.envirosafeindustrial.com
Manufacturer

**Epic Minerals LLC**
1260 Hawthorne Ridge Dr.
Brookfield, WI 53045
**Contact:** Tim Nechvatal
**Phone:** 414-331-6570
epicminerals@gmail.com
www.epicminerals.com
Distributor

**EPIC Supply, LLC**
45 Whitestone Lane
Lancaster, NY 14086

**Equipment Development Co., Inc.**
100 Thomas Johnson Drive
Frederick, MD 21702
**Contact:** Ray Tucker
**Phone:** 800-638-3326
sales@edcoinc.com
www.edcoinc.com
Manufacturer

**Ervin Industries, Inc.**
3893 Research Park Dr.
Ann Arbor, MI 48106
**Contact:** Joe McGreal
**Phone:** 800-748-0055
jmcgreal@ervinindustries.com
www.ervinindustries.com
Manufacturer

**ESCA Blast**
1330 Industry Road
Hatfield, PA 19440
**Contact:** Ed Swayze
**Phone:** 215-723-9000
www.escablast.com
Distributor / Rental Company

**Everblast Inc.**
820 McArdle Drive, Unit C
Crystal Lake, IL 60014
**Contact:** Chris Hindley
**Phone:** 815-788-8660
sales@everblast.com
www.everblast.com
Manufacturer

**ExakTime**
27001 Agoura Rd. Suite 280
Calabasas, CA 91301
**Contact:** Anthony Alexandre
**Phone:** 818-334-2576
anthony.alexandre@exaktime.com
www.exaktime.com
Manufacturer

## F

**Faulks Bros.**
E 3481 Hwy 22 & 54
Waupaca, WI

**Fehr Bros. Industries, Inc.**
895 Kings Hwy.
Saugerties, NY 12477
**Contact:** Paul Stauble
**Phone:** 800-431-3095
pstauble@fehr.com
www.fehr.com
Distributor

**Fischer Technology, Inc.**
750 Marshall Phelps Rd.
Windsor, CT 06095
**Contact:** Geoff Koehn / Juliann Goodwill
**Phone:** 860-298-6060
sales@fischer-technology.com
www.fischer-technology.com
Manufacturer

### Flashlights Unlimited
416 Mapmaker Ln
Savannah, GA 31410
**Contact:** Floyd Hacker
**Phone:** 912-999-6378
floyd@flashlightsunlimited.com
www.flashlightsunlimited.com
Manufacturer / Distributor

### Flat Rock Bagging
27938 Cooke St
Flat Rock, MI 48134
**Contact:** Mike Simonetti
**Phone:** 734-782-2073
mikesim@flatrockbagging.com
www.flatrockbagging.com
Manufacturer / Distributor

### Flexible Lifeline Systems
14325 West Hardy Rd.
Houston, TX 77060
**Contact:** Sales
**Phone:** 832-448-2900
info@flexiblelifeline.com
www.flexiblelifeline.com
Manufacturer

### Floorex Products
11-13 Jennings Road
Swan Hill, 3585 Australia
**Contact:** Sales Team
**Phone:** 61-3-5036-4000
sales@floorex.com.au
www.floorex.com
Manufacturer

### Franmar
PO Box 5565
Bloomington, IL 61701
**Contact:** Customer Service
**Phone:** 800-538-5069
custserv@franmar.com
www.franmar.com
Manufacturer / Distributor

### Friess Equipment, Inc.
2222 Akron-Peninsula Rd.
Akron, OH 44313
**Contact:** Jim Friess
**Phone:** 330-945-9440
friessequipment@sbcglobal.net
Manufacturer / Distributor

### FROHN North America Inc.
6289 Bankhead Hwy., Bldg. 11 A-D
Austell, GA 30168
**Contact:** Jed Palmer
**Phone:** 877-362-7336
jed.palmer@frohn.us
www.frohn.com
Manufacturer

### FS Solutions
1144 Expressway Drive South
Toledo, OH 43608
**Contact:** Craig Aspinall / David Brown
**Phone:** 888-415-4368
rentals@fssolutionsgroup.com
www.fssolutionsgroup.com
Rental Company

## G

### Gaco Western
200 W Mercer St., Suite 202
Seattle, WA 98119
**Contact:** Customer Service
**Phone:** 800-331-0196
customerservice@gaco.com
www.gaco.com
Manufacturer

### GAL Power Systems Toronto
217 Statesman Drive
Mississauga, ON L5S 1X4 Canada
**Contact:** Mr. Dustin Hubert
**Phone:** 855-563-7847
d.hubert@galpower.com
www.galpower.com
Rental Company

### Galeton Gloves and Safety Products
PO Box 336
Mansfield, MA 02048
**Contact:** Bill Forbes
**Phone:** 800-221-0570
galeton.com
Distributor

### GapVax Inc.
575 Central Avenue
Johnstown, PA 15902
**Contact:** Matt Hughes
**Phone:** 814-535-6766
mhughes@gapvax.com
www.gapvax.com
Manufacturer

### GBS Scaffolding and Services Corp.
38750 Webb Dr., Ste. 100
Westland, MI 48185
**Contact:** Steve Fenske
**Phone:** 888-868-1062
gbsscaffolding@gmail.com
www.gbsscaffolding.com
Manufacturer / Distributor / Rental Company

### General Lasertronics Corporation
830 Jury Court, Suite 5
San Jose, CA 95112
**Phone:** 408-947-1181
info@lasertronics.com
www.lasertronics.com
Manufacturer

### General Pump
1174 Northland Drive
Mendota Heights, MN 55120
**Contact:** Joe Campbell
**Phone:** 888-474-5487
sales@gpcompanies.com
www.generalpump.com
Manufacturer

### Glenn Saren & Assoc. Inc.
8460 NW 52nd Pl.
Coral Springs, FL 33067
**Contact:** Glenn Saren
**Phone:** 305-613-9323
gesaren@aol.com
www.glennsarenassoc.net

### GLOBAL Encasement, Inc.
701 E. Santa Clara St.
Ventura, CA 93001
**Contact:** George C. Keefe
**Phone:** 800-266-3982
service@encasement.com
www.encasement.com
Manufacturer

### GMA Garnet (Europe) GmbH UK Office
P.O. Box 9
Middlewich, CW10 9FD United Kingdom
**Contact:** Mike Crowe
**Phone:** 773-863-8966
sales@gmagarnet.co.uk
www.gmagarnet.co.uk
Manufacturer

### GMA Garnet (USA) Corporation
1800 Hughes Landing Blvd. Suite 350
The Woodlands, TX 77380
**Contact:** Pete Mitchell
**Phone:** 832-243-9300
petem@gmaamericas.com
www.garnetsales.com
Manufacturer / Distributor

### Goff, Inc.
12216 NS 3520
Seminole, OK 74868
**Contact:** David Zehren
**Phone:** 405-278-6200
goff@goff-inc.com
www.goff-inc.com
Manufacturer

### Graco Inc.
88 - 11th Ave. NE
Minneapolis, MN 55413
**Contact:** Courtney Beall
**Phone:** 612-208-5654
courtney_a_beall@graco.com
www.graco.com
Manufacturer

### Green Diamond Sand Products
PO Box D
Riddle, OR 97469
**Contact:** Kennette Wilson
**Phone:** 541-874-3111
kwilson@greendiamondsand.com
www.greendiamondsand.com
Manufacturer

### Greener Blast Technologies, Inc.
73 Progress Ave.
Tyngsboro, MA 01879
**Contact:** info@greenerblast.com
**Phone:** 978-649-5300
Info@greenerblast.com
greenerblast.com
Manufacturer

### Gritco Equipment B.V.
Klompenmakerstraat 16D
Ridderkerk, NL-2984 BB Netherlands
**Contact:** Sander van der Made
**Phone:** 31-180-412855
info@gritco.com
www.gritco.com
Manufacturer / Distributor

### Guzzler Manufacturing
1621 S. Illinois Street
Streator, IL 61364
**Contact:** Nick Bruhn
**Phone:** 815-672-3171
sales@guzzler.com
www.guzzler.com
Manufacturer

## H

### Hammelmann Corp.
436 Southpointe
Miamisburg, OH 45342
**Contact:** Ray Oetzel
**Phone:** 937-859-8777
mail@hammelmann.com
www.hammelmann.com
Manufacturer

# **Equipment** Company Profiles

**Hammelmann GmbH**
Carl-Zeiss-Str. 6-8
Oelde, 59302 Germany
**Contact:** Matthias Knoedler
**Phone:** 49-2522760
sales@hammelmann.de
www.hammelmann.com
Manufacturer

**Hanes Supply Inc**
55 James E Casey Drive
Buffalo, NY 14206
**Contact:** Eric Kuras
**Phone:** 716-826-2636
sales@hanessupply.com
www.hanessupply.com
Manufacturer / Distributor / Rental Company

**Harsco**
350 Popular Church Road
Camp Hill, PA 17010
**Contact:** Customer Service
**Phone:** 888-733-3646
reedcs@harsco.com
www.blackbeautyabrasives.com
Manufacturer

**Hartzell Air Movement**
910 S. Downing Street
Piqua, OH 45356
**Contact:** Local sales rep
**Phone:** 937-773-8494
info@hartzell.com
www.hartzell.com
Manufacturer

**Hawk Research Labs**
780 A.E.C. Drive
Wood Dale, IL 60191

**HERO Products Group a division of I.C.T.C. Holdings Corp.**
720 Eaton Way
Delta, BC V3M 6J9 Canada
**Contact:** Steve Babins
**Phone:** 604-523-3080
sbabins@hero.ca
www.hero.ca
Manufacturer

**Hertz Equipment Rental**
74-591 Honokohau St.
Kailua-Kona, HI 96740
**Contact:** Bobby Marks
**Phone:** 808-331-1304
Distributor

**HoldTight Solutions**
PO Box 27907
Houston, TX 77227
**Contact:** Ken Rossy
**Phone:** 832-633-0430
ken.rossy@holdtight.com
www.holdtight.com
Manufacturer / Distributor

**Honeywell Safety Products**
900 Douglas Pike
Smithfield, RI 02917
**Contact:** Mike Bennett
**Phone:** 513-703-9486
michael.bennett2@honeywell.com
www.honeywellsafety.com
Manufacturer

**HoverTrowel, Inc.**
5048 Spruce Lane
Mohnton, PA 19540
**Contact:** Drew Fagley
**Phone:** 610-856-1961
sales@hovertrowel.com
www.hovertrowel.com
Manufacturer

**Hyde Group**
54 Eastford Road
Southbridge, MA 01550
**Contact:** Customer Service
**Phone:** 800-872-4933
custrelations@hydetools.com
www.hydetools.com
Manufacturer

## I

**IBIX North America,Surface Tech. LLC**
2075 Lake Ave. NE
Largo, FL 33771
**Contact:** sales@ibixusa.com
**Phone:** 727-322-4611
sales@ibixusa.com
www.ibixusa.com
Distributor

**ICM - International Climbing Machines**
630 Elmira Road
Ithaca, NY 14850
**Contact:** Samuel Maggio
**Phone:** 607-288-4001
info@icm.cc
www.icm.cc
Manufacturer

**IDS Blast**
2717 Tobey Dr.
Indianapolis, IN 46219
**Contact:** John Heinzelman
**Phone:** 800-800-0665
johnh@idsblast.com
www.idsblast.com
Distributor

**IKK Shot Co., Ltd. - Japan**
412-4 Nunowari, Minami Shibata Machi
Tokai, Aichi, 476-0001 Japan
**Contact:** Customer Service
**Phone:** 81-52-307-8100
contact.japan@wabrasives.com
www.wabrasives.com

**INDCO, Inc.**
4040 Earnings Way
New Albany, IN 47150
**Contact:** Tricia Thien
**Phone:** 800-942-4383
info@indco.com
www.indco.com
Manufacturer

**Indian Valley Industries, Inc.**
5 Pine Camp Drive
Binghamton, NY 13904
**Contact:** Cord Pennell
**Phone:** 607-240-8407
cpennell@iviindustries.com
www.iviindustries.com
Manufacturer

**Industrial Mineral Co.**
1/1C Harbour Express Highway Road, Thermal Nagar I, Tuticorin
Tuticorin, Tamilnadu, 628006 India
**Contact:** Madhavan.K.
**Phone:** 91-461-2383001
madhavan@industrialmineral.in
www.industrialmineral.in
Manufacturer

**Industrial Vacuum Equipment Corp.**
N8150 Maple Street
Ixonia, WI 53036
**Contact:** Randy Bourdo
**Phone:** 800-331-4832
randy@industrialvacuum.com
www.industrialvacuum.com
Manufacturer

**Innovative Reach**
5505 Twin Knolls Dr
Cedar Rapids, IA 52411
**Contact:** Philip Koch
**Phone:** 319-573-3488
info@innovativereach.com
www.innovativereach.com
Rental Company

**Intech Equipment & Supply**
1921 W Grant St
Phoenix, AZ 85009
**Contact:** John Linn
**Phone:** 602-909-6822
johnl@intechequipment.com
www.intechequipment.com
Distributor

## J

**J.D. Honigberg International, Inc.**
155 North Pfingsten Road, Suite 150
Deerfield, IL 60015
**Contact:** Javier Guerrero
**Phone:** 224-804-6015
jguerrerl@jdhintl.com
www.jdhpowerequipment.com
Distributor

**Jadalc**
Calle los Nazcas, N 231 Urb. Maranga San Miguel
Lima, L-32 Peru
**Contact:** Jose Antonio De Amat Lacotera
**Phone:** 99-9976634
deamat@waterjetting.com.pe
www.waterjetting.com.pe
Distributor

**James Instruments Inc.**
3727 N. Kedzie Ave.
Chicago, IL 60618
**Contact:** Michael W. Hoag
**Phone:** 773-463-6565
773-463-6565
www.ndtjames.com
Manufacturer

**Jenny Products, Inc.**
850 North Pleasant Ave.
Somerset, PA 15501
**Contact:** Dan Leiss
**Phone:** 888-425-3669
info@jennyproductsinc.com
www.jennyproductsinc.com
Manufacturer

**Jet Edge**
12070 43rd St. NE
St. Michael, MN 55376
**Contact:** Barb Trushenski
**Phone:** 763-497-8700
sales@jetedge.com
www.jetedge.com
Manufacturer

**Jetstream of Houston**
5905 Thomas Road
Houston, TX 77041
**Contact:** Ron Felts
**Phone:** 832-590-1300
sales@waterblast.com
www.waterblast.com
Manufacturer

**Jollyflex**
Rubber Park, Valayanchirangara
Ernkulam, Kerala, 683556 India
**Phone:** 91-484-2655135
info@jollyflex.net
www.jollyflex.net
Manufacturer / Distributor

**Julbert, Inc.**
476 Shannon Lane
Priest River, ID 83856
**Contact:** Robert Fhuere
**Phone:** 208-448-4440
customerservice@julbertinc.com
www.julbertinc.com
Manufacturer / Distributor / Rental Company

# K

**Kee Safety**
100 Stradtman Street
Buffalo, NY 14206
**Contact:** John Baker
**Phone:** 716-896-4949
info@keesafety.com
www.keesafety.com
Manufacturer

**Kennametal Inc.**
2879 Aero Park Drive
Traverse City, MI 49686
**Contact:** Customer Service
**Phone:** 800-662-2131
k-trvr.service@kennametal.com
www.kennametal.com
Manufacturer

**Khushboo Scientific Pvt. Ltd.**
132 Princess Street, Govind Building, 2nd Floor
Mumbai, 400 002 India
**Contact:** Praveen Bachhawat
**Phone:** 91-98220037375
sales@khushbooscientific.com
www.khushbooscientific.com
Distributor

**Kovobrasiv (CZ)**
Praszka 905 252 10 Mnisek Pod. Brdy, Czech Republic
**Contact:** Customer Service
**Phone:** 420-318-533-037
contact.czech-republic@wabrasives.com
www.wabrasives.com

**KS International, Inc.**
PO Box 8835
Greenville, SC 29604
**Contact:** Nancy Hamilton
**Phone:** 864-370-9744
cleansafe@dropcloth.com
www.dropcloth.com
Distributor

**KTA-Tator, Inc.**
115 Technology Drive
Pittsburgh, PA 15275
**Contact:** Matt Fajt
**Phone:** 412-788-1300
mfajt@kta.com
www.ktagage.com
Distributor

# L

**Lesoon Equipment Pte. Ltd.**
81, Tuas South Street 5
Singapore, 637651 Singapore
**Contact:** Leow Kim Hock
**Phone:** 65-67902900
enquiry@lesoon.com.sg
www.lesoon.com.sg
Manufacturer / Distributor

**Lignomat USA Ltd**
14345 NE Morris Ct.
Portland, OR 97230
**Contact:** Grete Heimerdinger
**Phone:** 800-227-2105
sales@lignomat.com
www.lignomat.com
Manufacturer

**Lisbon Hoist, Inc.**
321 South Beaver St., PO Box 462
Lisbon, OH 44432
**Contact:** Connie Burlingame
**Phone:** 330-424-7283
connie@lisbonhoist.com
www.lisbonhoist.com
Manufacturer

**LPI Incorporated**
4404 Anderson Drive
Eau Claire, WI 54703
**Contact:** Ardy Robertson
**Phone:** 800-657-6956
sales@lpi-inc.com
www.lpi-inc.com
Manufacturer

**LS Industries, Inc.**
710 E. 17th
Wichita, KS 67214
**Contact:** Roger Carvalho
**Phone:** 316-265-7997
sales@lsindustries.com
www.lsindustries.com
Manufacturer

# M

**Magnolia Brush**
1001 N. Cedar St.
Clarksville, TX 75426
**Contact:** Glenn Guyette
**Phone:** 800-248-2261
sales@magnoliabrush.com
www.magnoliabrush.com
Manufacturer

**Manus Abrasive Systems, Inc./ Mod-U-Blast Mfg.**
1040 - 78 Avenue
Edmonton, AB T6P 1L7 Canada
**Contact:** Robin T. MacLean
**Phone:** 780-468-2588
macleanr@manusabrasive.com
www.modublast.com
Manufacturer / Distributor / Rental Company

**Marco**
3425 East Locust Street
Davenport, IA 52803
**Contact:** Marco
**Phone:** 800-252-7848
sales@marco.us
www.marco.us
Manufacturer / Distributor / Rental Company

**The Marindus Company, Inc.**
PO BOX 663
Englewood, NJ 7631
**Contact:** Jim Vann
**Phone:** 201-567-8383
info@marindusco.com
www.marindusco.com
Manufacturer / Distributor / Rental Company

**Masterfield Industrial Equipment**
17 Stanley Street
Silverwater NSW, 2128 Australia
**Contact:** Elicia Thornhill
**Phone:** 61-2-9193-9000
sales@masterfield.com.au
www.masterfield.com.au
Manufacturer / Distributor

**Mattson Spray Equipment**
230 W. Coleman St.
Rice Lake, WI 54868
**Contact:** Paul Lenzen
**Phone:** 800-877-4857
mse@mattsonspray.com
www.mattsonspray.com
Manufacturer / Distributor

**McClung-Logan Equipment Co.**
4601 Washington Blvd.
Baltimore, MD 21227
**Contact:** James Reid
**Phone:** 401-242-6500
jreid@mcclung-logan.com
www.mcclung-logan.com
Distributor

**MES Rentals**
32128 Broken Branch Circle
Spanish Fort, AL 36527
**Contact:** Chris Keenan
**Phone:** 888-281-2643
sales@mesrentals.com
www.mesrentals.com
Manufacturer / Distributor / Rental Company

**Metabrasive (UK)**
Ironmasters Way
Stillington, TS21 1LE United Kingdom
**Contact:** Customer Service
**Phone:** 44-1740-632-100
contact.united-kingdom@wabrasives.com
www.wabrasives.com
Manufacturer

**Metal Samples**
152 Metal Samples Rd.
Munford, AL 36268
**Contact:** Brenda Smith
**Phone:** 256-358-4202
msc@alspi.com
www.metalsamples.com
Manufacturer

**Michigan Ladder Co.**
12 East Forest Avenue P.O. Box 981307
Ypsilanti, MI 48198
**Contact:** Bob Hoernschemeyer
**Phone:** 734-482-5946
bobh@michiganladder.com
www.michiganladder.com
Manufacturer

**Midwest Mobile Waterjet**
555 Bardge Channel Road
Saint Paul, MN 55104
**Contact:** Brian Gleeson
**Phone:** 651-755-7089
bgleeson@mmwaterjet.com
www.mmwaterjet.com
Manufacturer

# Equipment Company Profiles

**Midwest Surface Prep, LLC**
PO Box 78551
Indianapolis, IN 46268
**Contact:** Sales Manager
**Phone:** 317-250-4734
quote@midwestafi.com
www.midwestsurfaceprep.com
Distributor

**Minerals Research, Inc.**
4620 South Coach Dr.
Tucson, AZ 85714
**Contact:** Mike McLouth
**Phone:** 520-297-4626
mike.mclouth@mineralsresearch.com
www.mineralsresearch.com
Manufacturer

**Mobile Abrasives Inc**
6927 Mac Drive
Theodore, AL 36582
**Contact:** Matt Serda
**Phone:** 251-694-0023
www.mobileabrasives.com
Manufacturer

**MONTI Tools Inc.**
10690 Shadow Wood Drive, Suite 113
Houston, TX 77043
**Contact:** info@monti-tools.com
**Phone:** 832-623-7970
info@monti-tools.com
www.monti-tools.com
Manufacturer

**Montipower, Inc.**
7677 Coppermine Dr.
Mannassas, VA 20109
**Contact:** Charles Lockard
**Phone:** 703-396-8777
clockard@mbxit.com
www.mbxit.com
Distributor

**Mr. Shrinkwrap**
PO Box 697
Media, PA 19063
**Contact:** Kevin Comerford
**Phone:** 610-566-5290
kevc@mrshrinkwrap.com
www.mrshrinkwrap.com
Distributor

**MSA**
1000 Cranberry Woods Dr
Cranberry Twp, PA 16066
**Contact:** Inside Sales
**Phone:** 800-672-9010
msainsidesales@msasafety.com
www.msasafety.com
Manufacturer

**MST, Inc. (Modern Safety Techniques)**
11370 Breininger Rd., PO Box 87
Hicksville, OH 43526
**Phone:** 800-542-6646
sales@modsafe.com
www.modsafe.com
Manufacturer

**Munters Corporation**
79 Monroe Street
Amesbury, MA 01913
**Contact:** Courtney Tyler
**Phone:** 978-241-1100
dhinfo@munters.com
www.munters.com
Manufacturer

# N

**N.T. Ruddock Co.**
26123 Broadway Ave.
Cleveland, OH 44146
**Contact:** Jim Ruddock
**Phone:** 440-439-4976
sales@ntruddock.com
www.ntruddock.com
Distributor

**National Concrete Accessories**
172 Bethridge Road
Toronto, ON M9W 1N3 Canada
**Contact:** Steve Kekewich
**Phone:** 416-245-4720
sales@nca.ca
www.nca.ca
Manufacturer / Distributor

**Nationwide Overspray**
P.O. Box 810513
Dallas, TX 75381
**Phone:** 972-243-8882
www.nationwideoverspray.com/
Distributor

**Natrium Products, Inc.**
58 Pendleton Street PO Box 5465
Cortland, NY 13045
**Contact:** Tim Herman
**Phone:** 800-962-4203
herman@natrium.com
www.natriumsodablast.com
Manufacturer

**NDT Systems**
5542 Buckingham Dr
Huntington Beach, CA 92649
**Contact:** Greg Smith
**Phone:** 877-455-4638
sales@ndtsystems.com
www.ndtsystems.com
Manufacturer

**Nelson Industrial Services**
6021 Melrose Lane
Oklahoma City, OK 73127
**Contact:** Paul Jackson
**Phone:** 405-495-9797
pjackson@nelsonindustrial.com
www.nelsonindustrial.com
Manufacturer

**The New York Blower Company**
7660 Quincy St.
Willowbrook, IL 60527
**Phone:** 800-208-7918
nyb@nyb.com
www.nyb.com
Manufacturer

**Newstripe**
1700 Jasper Drive Unit F
Aurora, CO 80011
**Contact:** Shawn Hunter
**Phone:** 303-364-7786
info@newstripe.com
www.newstripe.com
Manufacturer

**NGF Canada Limited**
Glass Flake Coatings Additives Division 255 York Road
Guelph, ON N1E 3G4 Canada
**Contact:** Ed Malison
**Phone:** 519-835-6422
ed.malison@ngfcanada.com
www.microglas.com and www.metalshine.com
Manufacturer

**NLB Corp.**
29830 Beck Road
Wixom, MI 48393
**Contact:** Andrew Chilkiewicz
**Phone:** 248-624-5555
nlbmktg@nlbusa.com
www.nlbcorp.com
Manufacturer / Rental Company

**Norton Sandblasting Equipment**
1006 Executive Blvd.
Chesapeake, VA 23320
**Contact:** Jason Eisel
**Phone:** 757-548-4842
info@nortonsandblasting.com
www.nortonsandblasting.com
Distributor / Rental Company

**Nour Trading House Inc.**
637 Colby Dr.
Waterloo, ON N2V1B4 Canada
**Contact:** Nour Fleifel
**Phone:** 226-929-2064
nourf@nour.com
www.nour.com
Manufacturer

**Novatek Corporation**
700 Schell Lane
Phoenixville, PA 19460
**Contact:** Sales Department
**Phone:** 610-363-7800
sales@novatekco.com
www.novatekco.com
Manufacturer

**NTI Global**
50 Willow St.
Amsterdam, NY 12010
**Contact:** Sarek Raeburn
**Phone:** 800-947-7767
sarek@ntiglobal.com
www.ntiglobal.com
Manufacturer

**Nueces Power Equipment**
PO Box 4789
Corpus Christi, TX 78469
**Contact:** Wes Danklefs
**Phone:** 361-289-0066
Distributor

**Nueces Power Equipment**
4501 US Hwy. 59
Victoria, TX 77905
**Phone:** 361-576-0066
Distributor

**Nueces Power Equipment**
5220 Expwy. 281S
Edinburg, TX 78539
**Contact:** Edward Dominguez
**Phone:** 956-702-0066
ednpowernequip@att.net
www.nuecespower.com
Distributor

**Nueces Power Equipment**
One Industrial Way
San Benito, TX 78586
**Contact:** Robert Zohrer
**Phone:** 956-361-0066
Distributor

**Nueces Power Equipment**
8241 S Desert Blvd
Vinton, TX 79821
**Contact:** Steve Donnelly
**Phone:** 915-541-0066
Distributor

**NZ Corrosion Services Ltd.**
751 Carrington Rd. RD1
New Plymouth, 4371 New Zealand
**Contact:** Sales@corrosion.co.nz
**Phone:** +64 6 7581745
Sales@corrosion.co.nz
www.corrosion.co.nz
Rental Company

## O

**Oak Ridge Foam and Coating Systems**
575 Commercial Ave
Green Lake, WI 54941
**Contact:** Rich Franklin
**Phone:** 800-625-9577
richf@oakridgepoly.com
www.oakridgepoly.com
Manufacturer / Distributor

**Opta Minerals Inc.**
407 Parkside Drive, PO Box 260
Waterdown, ON L0R 2H0 Canada
**Contact:** Customer Service
**Phone:** 800-743-0094
info@optaminerals.com
www.optaminerals.com
Manufacturer / Distributor

**Opti-Blast**
4032-B N. Jackson
Jacksonville, TX 75766
**Contact:** Chris Howard
**Phone:** 903-589-0452
choward@optiblast.com
www.optiblast.com
Manufacturer

## P

**Pacific Roller Die Company, Inc.**
1321 W. Winton Avenue
Hayward, CA 94545
**Contact:** Michael Kraut
**Phone:** 510-782-7242
michael@prdcompany.com
www.prdcompany.com
Manufacturer

**Paint Brush Corporation**
27 West Cherry St., PO Box 371
Vermillion, SD 57069
**Contact:** Jill VonEhwegen
**Phone:** 800-843-9930
jill@paintbrushcorp.com
www.paintbrushcorp.com
Manufacturer

**The Paint Project, Inc.**
71 West Street
Medfield, MA 02052
**Contact:** Bob Zaffino
**Phone:** 508-359-8003
bob@paintproject.com
www.paintproject.com
Distributor / Rental Company

**Panblast Pte Ltd**
2 Woodlands Sector 1 #5-06
Woodlands Spectrum I
Singapore, 738068 Singapore
**Contact:** Garry Simmons
**Phone:** 65-6586-1583
inquiries@panblast.com
www.panblast.com
Manufacturer

**Pangborn**
4630 Coates Drive
Fairburn, GA 30213
**Contact:** Greg Bowers
**Phone:** 800-638-3000
info@pangborn.com
www.pangborn.com
Manufacturer

**Paul N. Gardner Co., Inc.**
316 NE 1st St.
Pompano Beach, FL 33060
**Contact:** Jim Wick
**Phone:** 954-946-9454
gardner@gardco.com
www.gardco.com
Manufacturer / Distributor

**PCWI International Pty. Ltd.**
13 Alhambra Ave.
Cardiff, 2285 NSW Australia
**Contact:** Mark Clark
**Phone:** 61-2-4954-3900
sales@pcwi.com.au
www.pcwi.com.au
Manufacturer

**Pellets, LLC**
63 Industrial Drive
North Tonawanda, NY 14120
**Contact:** Mike Deakin
**Phone:** 716-693-1750
mdeakin@pelletsllc.com
www.pelletsllc.com
Manufacturer / Distributor

**Persyst Enterprises, Inc.**
4695 Melvin St.
Las Vegas, NV 89115
**Contact:** Mike Lawson
**Phone:** 702-362-9432
mike@solvent-recycler.com
www.solvent-recycler.com
Manufacturer / Distributor

**Pinnacle Central Co.**
103 Bryan St.
Jacksonville, FL 32202
**Contact:** Billy Porter
**Phone:** 904-354-5746
info@pinnaclecentral.com
www.pinnaclecentral.com
Distributor / Rental Company

**Pipeline Inspection Company**
1919 Antoine Dr
Houston, TX 77055
**Contact:** Ashlee Rogers
**Phone:** 713-681-5837
sales@picltd.com
www.picltd.com
Manufacturer / Distributor / Rental Company

**Pirate Brand**
2719 Tobey Dr.
Indianapolis, IN 46219
**Contact:** Dave Miller
**Phone:** 800-692-6223
sales@forecastsalesinc.com
www.pirate-brand.com/
Manufacturer

**Polygon US Corporation**
15 Sharpners Pond Road, Building F
North Andover, MA 01845
**Contact:** Summer Street
**Phone:** 800-422-6379
summer.street@polygongroup.com
www.polygongroup.us
Rental Company

**Potters Industries LLC**
300 Lindenwood Dr.
Malvern, PA 19355
**Contact:** Mark Shinners
**Phone:** 610-651-4652
mark.shinners@pottersbeads.com
www.pottersbeads.com
Manufacturer

**PreTox Products - NexTec, Inc.**
4050 Westmark Dr.
Dubuque, IA 52002
**Contact:** Dave Steffen
**Phone:** 800-338-8296
DaveS@PreTox.com
www.pretox.com
Manufacturer

**Pro-Am Safety, Inc.**
Thorn Hill Ind. Prk., 551 Keystone Dr.
Warrendale, PA 15086
**Contact:** Michael Arrisher
**Phone:** 412-491-5689
mikea@pro-am.com
www.proamsafety.com
Distributor

**Pro-Tect Plastic and Supply, Inc.**
PO Box 1377
Jacksonville, OR 97530
**Contact:** Sharri Griffin
**Phone:** 800-889-9727
sales@pro-tect.net
www.shrinkwrapcontainments.com
Distributor

**Pro-Tect Services, Inc.**
12235 Hwy. 105 East
Conroe, TX 77305
**Contact:** Steve Scott
**Phone:** 713-589-4638
sales@pro-tectservices.com
www.pro-tectservices.com
Distributor

**PTQ Safety**
8302 Almeda Genoa
Houston, TX 77075
**Contact:** Julie Todd
**Phone:** 713-504-8546
julie@ptqsafety.com
www.ptqsafety.com
Manufacturer

# Equipment Company Profiles

## Q

**Q-Lab Corporation**
800 Canterbury Road
Westlake, OH 44145
**Contact:** James Gauntner
**Phone:** 440-835-8700
info@q-lab.com
www.q-lab.com
Manufacturer

**Quikspray, Inc.**
PO Box 327
Port Clinton, OH 43452
**Contact:** Leah Barker
**Phone:** 419-732-2611
leah@quikspray.com
www.quikspray.com
Manufacturer

## R

**Radians, Inc.**
5305 Distriplex Farms Drive
Memphis, TN 38141
**Contact:** Jon Smith
**Phone:** 877-723-4267
sales@radians.com
www.radians.com
Manufacturer

**Radians, Inc. Latin America**
5305 Distriplex Farms Drive
Memphis, TN 38141
**Contact:** Juan David Herrera
**Phone:**901-388-7776
jd.herrera@radians.com
www.radians.com
Manufacturer

**Rapid Deployable Systems**
1005 Bankton Circle
Hanahan, SC 29410
**Contact:** Zeke Lowell
**Phone:** 843-323-8465
zeke@rapiddeployablesystems.com
www.rapiddeloyablesystems.com
Manufacturer

**Rapid-Prep,LLC**
44 Cross Park Ave.
North Kingstown, RI 02852
**Contact:** Mike Hogue
**Phone:** 877-529-2124
sales@rapidprep.com
www.rapidprep.com
Rental Company

**RBW Enterprises, Inc.**
136 Hillwood Circle
Newnan, GA 30263
**Contact:** John Vogel or Steve Meyers
**Phone:** 770-251-8989
jvogel@rbwe.com
www.rbwe.com
Manufacturer

**RCG America**
24624 N Interstate 45, Suite 200
Spring, Texas 77389
**Contact:** Scott Trom
**Phone:** 281-362-2801
strom@glassox.com
glassox.com

**Remote Orbital Installations, LLC**
429 Venture Court
Verona, WI 53593
**Contact:** Michael Kronz
**Phone:** 608-845-0360
mkronz@roi360.com
www.roi360.com
Manufacturer

**Ring Power Corporation**
500 World Commerce Parkway
St. Augustine, FL 32092
**Contact:** Micah Hughes
**Phone:** 904-494-1285
aircompressor@ringpower.com
www.compressedair.ringpower.com
Distributor / Rental Company

**Robovent**
37900 Mound Rd.
Sterling Heights, MI 48310
**Contact:** Trevor Hewitt
**Phone:** 248-275-3480
trevor.hewitt@robovent.com
www.robovent.com
Manufacturer

**Rodeco Company**
5811 Elwin Buchanan Drive
Sanford, NC 27330
**Contact:** Mark Lawrence
**Phone:** 800-849-0871
mark.lawrence@rodeco.com
www.rodeco.com

**RPB Safety**
2807 Samoset Road
Royal Oak, MI 48073
**Contact:** Kurt Ivory
**Phone:** 866-494-4599
kurt.ivory@rpbsafety.com
www.rpbsafety.com
Manufacturer

**RPR Technologies AS**
Nedre Kongerod 47
Skien, 3737 Norway
**Contact:** Tom Arne Baann
**Phone:** 47-91151007
info@rprtech.com
www.rprtech.com
Manufacturer

**RUSTECO LLC**
PO Box 11398
Torrance, CA 90510
**Contact:** Michael
**Phone:** 800-787-8326
rusteco@aol.com
www.rusteco.com
Manufacturer

## S

**Sabre Autonomous Solutions**
291 Milperra Road
Sydney, 2212 Australia
**Contact:** Damian Williams
**Phone:** 61-2-9792-2733
damian@sabreautonomous.com.au
www.sabreautonomous.com.au
Manufacturer

**SAFE Systems, Inc.**
18420 68th Ave S., #202
Kent, WA 98032
**Contact:** Glenn Seaverns
**Phone:** 425-251-8662
info@safesys.com
www.safesys.com
Manufacturer / Rental Company

**Safespan Platform Systems, Inc.**
252 Fillmore Avenue
Tonawanda, NY 14150
**Contact:** David Malcolm
**Phone:** 800-368-4010
dmalcolm@safespan.com
www.safespan.com
Manufacturer / Distributor / Rental Company

**Safety Lamp of Houston**
1816 Rotary Drive
Humble, TX 77338
**Contact:** Jim Reeves
**Phone:** 281-964-1019
sales@safetylampofhouston.com
www.safetylampofhouston.com
Distributor

**Scangrit**
Eastfield Road South Killingholme
Immingham, DN40 3NF United Kingdom
**Contact:** Gerry Bourke
**Phone:** 44-1469-574715
sales@scangrit.co.uk
www.scangrit.co.uk
Manufacturer / Distributor

**Sea to Sky Innovations Ltd**
Unit 204, 6741 Cariboo Road
Burnaby, BC V3N 4A3 Canada
**Contact:** Graham Sims
**Phone:** 604-420-7707
gsims@socomore.com
www.sea2skyglobal.com
Manufacturer

**SEMicro Div., M.E. Taylor Engr. Inc.**
15817 Crabbs Branch Way
Rockville, MD 20855
**Contact:** Kellie Taylor
**Phone:** 301-975-9798
sales@semicro.org
www.adhesiontesting.com
Manufacturer / Rental Company

**Seminole Equipment, Inc.**
204 Tarpon Industrial Circle
Tarpon Springs, FL 34689
**Contact:** Jim Klimis
**Phone:** 727-944-4481
jim3ds@hotmail.com

**Seoul Shot Industry Co., Ltd - South Korea**
58-1 Seongju-dong Seongsan-gu
Changwon, 641120 South Korea
**Contact:** Customer Service
**Phone:** 82-55-283-3735
contact.south-korea@wabrasives.com
Manufacturer

**Seymour Midwest LLC**
PO Box 1674
Warsaw, IN 46581
**Contact:** Ryan Miller
**Phone:** 800-815-7253
ryan.miller@seymour.midwest.com
www.seymourmidwest.com
Manufacturer

**Shanghai Shengchang Industry Equipment Co., Ltd.**
#58, Lane 7224, Hunan Rd., Pudong
Shanghai, 201314 China
**Contact:** Jinyan
**Phone:** 86-21-58204865
info@ssce.cn
www.ssce.cn
Manufacturer

**Shur-Line**
4051 South Iowa Ave
St. Francis, WI 53235
**Contact:** Amy Kansaku
**Phone:** 800-253-7856
shurline.customerservice@shurline.com
www.shurline.com
Manufacturer

**Siam IKK Co. Ltd - Thailand**
416 Bangpoo Industrial Estate Moo 4 Sukhumvit Rd
Samutprakan, 10270 Thailand
**Contact:** Customer Service
**Phone:** 66-27-05-71-00
Manufacturer

**SIBELCO / Eurogrit BV**
Noordhoek 7
Papendrecht, 3351 LD Netherlands
**Contact:** Jeroen Keswiel
**Phone:** 31-78-6546770
abrasives@sibelco.com
www.eurogrit.com
Manufacturer / Distributor

**SIE Industrial Ltd.**
Faraday House, Station Rd, Washington
Tyne & Wear, NE38 7LW United Kingdom
**Contact:** Gareth Bowen
**Phone:** 44-191-416-5127
info@sie-industrial.co.uk
www.sieindustrial.co.uk
Manufacturer / Distributor / Rental Company

**Sierra Machinery, Inc.**
939 Hawkins Blvd.
El Paso, TX 79915
**Contact:** Charlie Ward
**Phone:** 915-772-0613
www.sierraelpaso.com
Distributor

**SJS Equipment LLC**
101 Industrial Park Drive
Arma, KS 66712
**Contact:** Sheldon Bicknell
**Phone:** 620-347-8860
sheldon@sjsinc.net
www.sjsinc.net
Manufacturer

**Sky Climber, LLC**
1800 Pittsburgh Drive
Delaware, OH 43015
**Contact:** Todd King
**Phone:** 740-203-3931
info@skyclimber.com
www.skyclimber.com

**Solvent Kleene, Inc.**
119 Foster St. Bldg. #6
Peabody, MA 01960
**Contact:** Bob Sprei
**Phone:** 978-531-2279
sales@solventkleene.com
www.solventkleene.com
Manufacturer

**Solvent Waste Management, Inc.**
8103 Spring Cypress
Spring, TX 77379
**Contact:** Bill Palamountain
**Phone:** 281-379-3666
swm@solventwasher.com
www.solventwasher.com
Manufacturer

**Southern Equipment Distribution, LLC**
356 EMS Tower Road
Woodbine, GA 31569
**Contact:** Shannon Reifsnyder
**Phone:** 912-882-7803
sesdistribution@tds.net
www.southernequipment-distribution.com
Distributor

**Southern Industrial Supply, Inc.**
4216 Westcap Rd
Whites Creek, TN 37189
**Contact:** Steven Wadsworth
**Phone:** 800-202-3820
office@southern-industrial.com
www.southern-industrial.com
Distributor / Rental Company

**Specialty Products, Inc. (SPI)**
2410 104th St. Ct. S., Suite D
Lakewood, WA 98499
**Contact:** Chas Weatherford
**Phone:** 253-588-7101
info@specialty-products.com
www.specialty-products.com
Manufacturer

**Specialty Vacuum Inc.**
4533 Green Park Road
St. Louis, MO 63123
**Contact:** Noel Prudent
**Phone:** 800-448-2801
vacitall@aol.com
www.specialtyvacuum.com
Rental Company

**Spider By BrandSafway**
365 Upland Dr.
Seattle, WA 98188
**Contact:** Spider
**Phone:** 877-774-3370
spider@spiderstaging.com
www.spiderstaging.com

**Spin Import Export**
Calea Ferentari Nr 135
Bucuresti, 51857 Romania
**Contact:** 40-722258552
**Phone:** 40-214561226
office@pardoseli-industriale.com
www.sisteme-industriale.ro
Distributor

**Sponge-Jet, Inc.**
14 Patterson Lane
Newington, NH 03801
**Contact:** Michael Merritt
**Phone:** 603-361-7950
sjadmin@spongejet.com
www.spongejet.com
Manufacturer

**Spraytech, Inc., Global Spray Solutions**
15179 West Hwy. 54
Wichita, KS 67235
**Contact:** Dave Calvin
**Phone:** 316-943-3700
dcalvin@globalspray.com
www.globalspray.com
Manufacturer

**Starblast - by Chemours**
5222 Treat Road
Starke, FL 32091
**Contact:** Jessica Stacy
**Phone:** 904-964-1326
jessica.stacy@chemours.com
www.chemoursabrasives.com
Manufacturer

**Stone Tucker Instruments Inc.**
51 Scott Street West
St. Catharines, ON L2R 1E2 Canada
**Contact:** Tyler Heywood
**Phone:** 905-688-5800
info@stone-tucker.com
www.stone-tucker.com
Distributor

**Strategic Materials Inc.**
17220 Katy Freeway
Houston, TX 77094
**Contact:** Sales
**Phone:** 281-647-2700
abrasives@strategicmaterials.com
www.truabrasives.com
Manufacturer

**Sulzer Mixpac USA Inc.**
8181 Coleman Road
Haslett, MI 48840
**Contact:** Kari Holcomb
**Phone:** 800-822-8114
ct_sms_ame_sales_hs@sulzer.com
www.cox-applicators.com
Manufacturer

**Sunnyside Corporation/Back To Nature Products**
225 Carpenter Avenue
Wheeling, IL 60090
**Contact:** Adam Newman
**Phone:** 847-541-5700
anewman@sunnysidecorp.com
www.sunnysidecorp.com
Manufacturer

**Surface Jet Inc.**
PO Box 9747
New Iberia, LA 70562
**Contact:** Jeff Cole
**Phone:** 504-491-1329

**Surface Prep Supply**
#2 US Hwy. 17-92 North
Haines City, FL 33844
**Contact:** Derek Newberry
**Phone:** 863-419-9673
dnewberry@prepsupply.com
www.prepsupply.com
Manufacturer / Distributor / Rental Company

**Surface Preparation-Texas, LLC**
5973 South Loop East
Houston, TX 77033
**Contact:** Customer Service
**Phone:** 800-374-4043
info@surfacepreparation.com
www.surfacepreparation.com
Distributor

# Equipment Company Profiles

**SURFACE Worldwide, LLC**
561 Keystone Avenue #317
Reno, NV 89503
**Contact:** Ron Benson
**Phone:** 612-338-1377
info@surfaceprep.com
www.surfaceprep.com
Manufacturer

## T

**T Tex Industries LP**
8302 Almeda Genoa
Houston, TX 77075
**Contact:** Darrell Todd
**Phone:** 800-367-7306
sales@ttexindustries.com
www.ttexindustries.com
Distributor

**Target Products Ltd.**
9503 87th Ave
Morinville, AB T8R 1K6 Canada
**Contact:** Neil Moore
**Phone:** 780-939-3033 or 800-575-0500
nmoore@targetproducts.com
www.targetproducts.com
Manufacturer / Distributor

**Tarps Manufacturing, Inc.**
1000 State Hwy 104
Meredosia, IL 62665
**Contact:** Rich Ott
**Phone:** 877-584-1900
irctom@ircgrp.com
www.tarpsmfg.com
Manufacturer

**TCR Blast Abrasives**
5737 West Park Ave.
St. Louis, MO 63110
**Contact:** Keith Gabbard
**Phone:** 314-241-5333
keith@tcrcoatings.com
www.blastabrasives.com
Distributor

**The TDJ Group, Inc.**
18-6 E. Dundee Rd., Suite 100
Barrington, IL 60010
**Contact:** James Lively
**Phone:** 800-252-7869
tdj@blastox.com
www.blastox.com/
Manufacturer

**Techni-Quip Inc.**
256 Wanaque Ave., Ste. 201
Pompton Lakes, NJ 07442
**Contact:** Paul Helleren
**Phone:** 973-835-6500
blastgrit@gmail.com
blastgrit.com
Distributor

**Temco Distributors**
3 Forge Street
Welshpool, 6106 Australia
**Phone:** 61-8-9350-5940
sales@temco.com.au
temco.com.au
Distributor

**Tennant Coatings**
2454 Louisiana Av N
Golden Valley, MN 55427
**Contact:** Coatings Sales
**Phone:** 800-540-1299
www.tennantcoatings.com
Manufacturer

**Testex**
303 Markus Court
Newark, DE 19713
**Contact:** Mary Ellen Stachnik
**Phone:** 302-731-5693
mestachnik@testextape.com
www.testextape.com
Manufacturer

**Texan Stone LLC**
11806 Wilcrest Drive, Suite 202
Houston, TX 77031
**Contact:** Mani Palani
mani@texanstone.com
www.texanstone.com
Distributor

**Thermion**
PO Box 780
Silverdale, WA 98383
**Contact:** Dean Hooks
**Phone:** 360-692-6469
dhooks@thermioninc.com
www.thermioninc.com
Manufacturer

**Thomas Abrasives (Pty), Ltd - South Africa**
29 Smits Street
Germiston, Gauteng Province, 1401 South Africa
**Contact:** Customer Service
**Phone:** 27-11-821-2813
contact.south-africa@wabrasives.com
www.wabrasives.com
Manufacturer

**Tioga HVAC Rentals & Sales**
4810 Lilac Drive North
Minneapolis, MN 55429
**Contact:** Greg Gundrum
**Phone:** 763-525-4000
ggundrum@tiogaairheaters.com
www.tiogaairheaters.com
Manufacturer / Rental Company

**Titan Tool**
1770 Fernbrook Lane
Minneapolis, MN 55447
**Contact:** Kevin Coleman
**Phone:** 229-726-6823
colemank@titantool.com
www.titantool.com
Manufacturer / Distributor / Rental Company

**TMS Metalizing Systems, Ltd.**
7765 NW Eldorado Blvd #101
Bremerton, WA 98312
**Contact:** Dave Wixson
**Phone:** 360-692-6656
info@tmsmetalizing.com
www.tmsmetalizing.com
Manufacturer / Distributor / Rental Company

**Total Enclosure Sail System, Inc.**
7106 Northaven Dr.
Dallas, TX 75230
**Contact:** Bret Walton
**Phone:** 800-724-5710
bret@sailsystem.com
www.sailsystem.com
Manufacturer / Distributor / Rental Company

**Tower Sealants / M-D Building**
2095 Memorial Park Rd.
Gainesville, GA 30504
**Contact:** Ray Heck
**Phone:** 405-557-3557
heckr@mdteam.com
www.towersealants.com
Manufacturer

**TQC Sheen**
Molenbaan 19
Capelle aan den Ijssel, 2908LL Netherlands
**Contact:** Esther Krijgsman
**Phone:** 31-10-7900100
info@tqcsheen.com
www.tqcsheen.com
Manufacturer / Distributor

**TQC Sheen USA**
3689 Hadley Road
Metamora, MI 48455
**Contact:** Joel Bialek
**Phone:** 810-678-2400
joel@tqc-usa.com
www.tqc-usa.com
Manufacturer / Distributor

**Tractel Inc.**
51 Morgan Dr. Suite 1
Norwood, MA 02062
**Contact:** Sales department
**Phone:** 800-421-0246
tractel.usa-east@tractel.com
www.tractel.com
Manufacturer / Distributor

**Tramex Meters**
Unit F Glencormack Business Park Kilmacanogue
County Wicklow, A98D9K3 Ireland
**Contact:** Sales Team
**Phone:** 800-234-5849
sales@tramexmeters.com
www.tramexmeters.com
Manufacturer

**Trask-Decrow Machinery, Inc.**
52 US Route 1 #2
Scarborough, ME 4074
**Contact:** Mark Callahan
**Phone:** 800-287-1538
mcallahan@tdmgo.com
www.getdryair.com
Distributor

**Trelawny Surface Preparation Technology**
13 Highdown Road, Sydenham Industrial Estate
Warwickshire, Leamington Spa, CV31 1XT United Kingdom
**Contact:** Kevin Sharrock
**Phone:** 44-1926-883781
sales@trelawny.co.uk
www.trelawny.co.uk
Manufacturer / Distributor

**Trimaco, LLC**
2300 Gateway Centre Blvd, Suite 200
Morrisville, NC 27560
**Phone:** 314-534-5005
customerservice@trimaco.com
www.trimaco.com
Manufacturer

**Tritech Industries, Inc.**
610 Rahway Avenue
Union, NJ 07083
**Contact:** Dan Hosley
**Phone:** 908-378-1080
dhosley@tritechindustries.com
www.tritechindustries.com
Manufacturer

**TriVitro Corporation**
150 Nickerson Street Suite 107
Seattle, WA 98109
**Contact:** Jeff Freas
**Phone:** 888-301-0181
info@trivitro.com
www.glassabrasive.com
Manufacturer

**Tronox**
1735 Market Street
Philadelphia, PA 19103
**Contact:** Linda Conners
**Phone:** 215-845-4536
linda.conners@tronox.com
alkali.tronox.com
Manufacturer

**TST Sweden, AB**
Prastgatan 12
SE-511 54 Kinna, Sweden
**Contact:** Peder Lindstrom
**Phone:** 46-320-20-58-72
peder@tst-sweden.se
www.tst-sweden.com
Manufacturer

**Turtle Creek Software**
119 S Cayuga St #304
Ithaca, NY 14850
**Contact:** Casey McD
**Phone:** 607-220-4514
info@turtlesoft.com
www.turtlesoft.com
Manufacturer

## U

**U.S. Metals, Inc.**
3180 S State Road 19
Mentone, IN 46539
**Contact:** James L Green II
**Phone:** 800-433-6244
usmetals@comcast.net
www.usmetalsinc.com
Manufacturer

**Unified Technologies**
3015 Center Dr.
Cleveland, OH 44134
**Contact:** Art Koch
**Phone:** 440-897-5226
artkoch123@gmail.com
www.ut-unifiedtechnologies.com
Distributor

**Unimanix**
2205 Chemin St-Francois
Dorval, QC H9P 1K3 Canada
**Contact:** Nazareth Tankarian
**Phone:** 514-550-0809
nt@unimanix.com
www.unimanix.com
Manufacturer

**Uni-Ram Corporation**
381 Bentley St.
Markham, ON L3R 9T2 Canada
**Contact:** Jay Farquharson
**Phone:** 800-417-9133
jay@uniram.com
www.uniram.com
Manufacturer

**Uni-Royal Pack Co., Ltd.**
3, Soi Pattanakarn 50, Pattanakarn Rd.
Suanluang, Bangkok, 10250 Thailand
**Contact:** Tanasit Asawakanoksilp
**Phone:** 66-2-720-4400
urpgroup@truemail.co.th
www.uniroyalpack.com
Distributor

**United Abrasive, Inc.**
N1534 Sturgeon Mill Road; PO Box 98
Vulcan, MI 49892
**Contact:** Bill Paupore or Becky Langin
**Phone:** 800-228-2925
uainc@uplogon.com
Manufacturer / Distributor

**Universal Acoustic & Emission Technologies, Inc.**
Avenida Mantenimiento No. 130
San Luis Potosi, 78395 Mexico
**Contact:** Antonio Duran
**Phone:** 52-444-870-47-00
aduran@universalaet.com
http://www.universalaet.com
Manufacturer

**URACA GmbH & Co. KG**
Sirchinger Str. 15
Bad Urach, 72574 Germany
**Contact:** Herbert Queiser
**Phone:** 49-7125-133-0
h.queiser@uraca.de
www.uraca.de
Manufacturer

**US Minerals**
18635 West Creek Drive
Tinley Park, IL 60477
**Contact:** Jason Vukas
**Phone:** 708-623-1943
jvukas@us-minerals.com
www.blackdiamondabrasives.com
Manufacturer / Distributor

## V

**Van Air Systems**
2950 Mechanic St.
Lake City, PA 16423
**Contact:** Sales
**Phone:** 800-840-9906
info@vanairsystems.com
www.vanairsystems.com
Manufacturer

**Vector Technologies Ltd.**
8301 W. Parkland Court
Milwaukee, WI 53223
**Contact:** David Mitchell
**Phone:** 800-832-4010
inquiry@vector-vacuums.com
www.vector-vacuums.com
Manufacturer

**Victory Air & Equipment, Inc.**
P O Box 3584
Victoria, TX 77903
**Contact:** Danny Hanselman
**Phone:** 361-573-0819
dhanselman@victory-air.net
victory-air.net
Distributor

**VitaFlex USA**
1305 Graham Street
Burlington, NC 27216
**Contact:** Flora Lin
**Phone:** 888-616-9948
sales@vitaflexusa.com
www.vitaflexUSAstore.com
Manufacturer

**VLN Advanced Technologies Inc.**
1166 Rainbow Street
Ottawa, ON K1J 6X7 Canada
**Contact:** Willie Bloom
**Phone:** 613-747-0107
wbloom@vln-tech.com
www.vln-tech.com
Manufacturer

**VR Coatings Pvt. Ltd.**
J-138, Bhosari Industrial Area, MIDC Bhosari
Pune, 411026 India
**Contact:** Mr. A A Dighe
**Phone:** 91-20-27130331
sales@vrcoatings.com
www.vrcoatings.com
Manufacturer

**Vulkan Blast Shot Technology**
10 Plant Farm Blvd., Unit 2
Brantford, ON N3S 7W3 Canada
**Contact:** Customer Service
**Phone:** 800-263-7674
vulkan@vulkanshot.com
www.vulkanshot.com
Manufacturer / Distributor

## W

**W Abrasives**
1 Abrasive Avenue
Bedford, VA 24523
**Contact:** Michael Cagnoli
**Phone:** 800-207-4691
contact.united-states@wabrasives.com
www.wabrasives.com
Manufacturer

# **Equipment** Company Profiles

**WA Kurgan - Russia**
12/1, 3 Floor, Office 303 Sibirsky Trakt Street
Ekaterinburg, 620100 Russia
**Contact:** Customer Service
**Phone:** 7-352-265-35-05
contact.russia@wabrasives.com
www.wabrasives.com

**The Warehouse Rentals and Supplies**
1335 S. Main Street
Greensburg, PA 15601
**Contact:** Sales Department
**Phone:** 800-621-2777
sales@twrs.com
www.twrs.com
Manufacturer

**Washington Air Compressor Rental Co.**
1800 4TH Street, NE
Washington, DC 20002
**Phone:** 202-635-1500
Distributor

**Washington Air Compressor Rental Co.**
44180 Wade Dr.
Chantilly, VA 20152
**Phone:** 703-742-6200
Distributor

**Washington Air Compressor Rental Co.**
7304 Grove Road
Frederick, MD 21704
**Phone:** 301-662-7711
Distributor

**Washington Air Compressor Rental Co.**
12529 Parklawn Dr.
Rockville, MD 20852
**Contact:** Steve Cranford
**Phone:** 301-230-5800
Distributor

**Water Canadanon**
4300 W. Lake Mary Blvd Units 1010-424
Lake Mary, FL 32746
**Contact:** Mark Williams
**Phone:** 800-333-9274
sales@watercannon.com
www.watercannon.com
Distributor

**Wegener Welding LLC**
16W301 S. Frontage Rd.
Burr Ridge, IL 60527
**Contact:** Liz Turner
**Phone:** 630-789-0990
info@wegenerwelding.com
www.wegenerwelding.com
Distributor

**WerkMaster Grinders & Sanders Inc.**
1448 Charlotte Rd.
North Vancouver, BC V7J 1H2 Canada
**Contact:** Gord Siddall
**Phone:** 604-629-8700
Sales@werkmaster.com
www.werkmaster.com
Manufacturer

**Westech**
1002 15th Avenue
Nisku, AB T9E 7S5 Canada
**Contact:** sales@westechvac.com
**Phone:** 780-955-3030
sales@westechvac.com
www.westechvac.com
Manufacturer / Distributor

**Winoa Canada Inc. - Canada**
650 Rusholme Rd
Welland, ON L3B5N7 Canada
**Contact:** Customer Service
**Phone:** 800-207-4691
contact.canada@wabrasives.com
Manufacturer

**Winoa China**
Suite 1209-1210 Bldg 1 - City Center 166 Min Hong Rd
Shanghai, 201100 China
**Contact:** Customer Service
**Phone:** 86-21-5219-88-77
contact.china@wabrasives.com
Manufacturer

**Winoa Deutschland**
August-Schanz-Straaye 27b

**Frankfurt, 60433 Germany**
**Contact:** Customer Service
**Phone:** 49-0-76-66-93-26-813
contact.germany@wabrasives.com
www.wabrasives.com
Manufacturer

**Winoa FRANCE**
528 Avenue de Savoie
Le Cheylas, 38570 France
**Contact:** Customer Service
**Phone:** 33-0-4-76-92-92-61
contact.france@wabrasives.com
www.wabrasives.com
Manufacturer

**Winoa Iberica SA - Spain (TFM)**
Paseo de la Magdalena, 28
Balmaseda, 4800 Spain
**Contact:** Customer Service
**Phone:** 34-94-68-02-938
contact.spain@wabrasives.com
www.wabrasives.com
Manufacturer

**Winoa Mexico**
105 Av. Las Palmas
Monterrey, 66368 Mexico
**Contact:** Customer Service
**Phone:** 52-818-032-8318
contact.mexico@wabrasives.com
www.wabrasives.com
Manufacturer

**Winoa Middle East & Africa**
P.O. Box 293586 Bldg. 4W-Block A, Office 508
Dubai, United Arab Emirates
**Contact:** Customer Service
**Phone:** 971-4-295-2241
contact.uae@wabrasives.com
www.wabrasives.com
Manufacturer

**WIWA LLC**
107 N. Main street
Alger, OH 45812
**Contact:** Caleb Meacham
**Phone:** 567-674-1907
sales@wiwalp.com
www.wiwausa.com
Manufacturer

**The Wooster Brush Company**
604 Madison Ave., PO Box 6010
Wooster, OH 44691
**Contact:** Mary Stark
**Phone:** 800-392-7246
customerservice@woosterbrush.com
www.woosterbrush.com
Manufacturer

## Z

**Zibra**
172 Broad Sound Place
Mooresville, NC 28117
**Contact:** Mike Sherman
**Phone:** 704-271-4500
mikesherman@enjoyZibra.com
www.enjoyzibra.com
Manufacturer

**Zip Wall Dust Barrier System**
37 Broadway, #2
Arlington, MA 02472
**Contact:** Matt Hete
**Phone:** 302-344-8988
info@zipwall.com
Manufacturer

## 77 F & 50% RH

Cure times most often defaulted to in standard laboratory conditions.
See page 13.

## 2.5 hours

The recoat window, which was exceeded, causing adhesion problems between an anticorrosive coating and an antifouling coating on a ship's hull.
See page 9.

## 28

The number of wind power projects that the U.S. has in progress according to the U.S. Office of Energy Efficiency and Renewable Energy, totaling 23,735 MW of power.
See page 16.

## 70

Years since the founding of G.C. Zarnas & Co., Inc., in 1948 by former college football All-American Gust C. Zarnas.
See page 6.

## 31

The number of product categories listed in the annual *JPCL* Equipment Buying Guide.
See page 31.

## 0 to 2.5 feet per second

The increase in velocity between the rake arm and the water in a wastewater treatment clarifier that can double the corrosion rate of bare steel.
See page 21.