SPECIFICATION COMPLIANCE:
A PLANT'S BEST PROTECTIVE SURFACING WARRANTY

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Abstract: Given a choice between specification compliance or warranty, specification compliance produces protective surfacing projects with better likelihood of consistent quality. Warranty enforcement after project completion and final payment may be difficult.

INTRODUCTION

Contractors are responsible to comply with specifications provided in contract documents which are incorporated into an executed agreement. Owners and specifiers are responsible to enforce compliance with the specifications during performance of a project. Owners and specifiers who choose to enforce protective surfacings specifications help to improve industry-wide quality: their own projects are more likely to be executed with consistently good workmanship and correct materials; post-installation claims against manufacturers are fewer; unqualified contractors are encouraged to develop installation skills if they are to remain in business .

Intent of a warranty assumes best efforts have been made to perform work correctly. Owners who purchase surfacings installations assume the work will be accomplished correctly. Specifiers assume the work will be executed according to their documents. Manufacturers assume their products will be installed according to their directions and recommendations. Without performance of qualified inspection during installation, the probability of these assumptions becoming reality on a consistent basis is unlikely. Without real-time quality inspection during performance of the work, the tangible or intangible value of the post-construction warranty may be suspect, especially if retainage has been paid and the contractor is not otherwise induced to return to the site to perform corrective work.

It behooves an owner to be concerned about the quality of the installation even with warranty provisions in place. Failures cost everyone involved real money.[1] Warranty inclusion, without qualified inspection of the work as it is being installed, may essentially be an impotent security blanket.

CONTINGENT LIABILITY— COSTLY EXCLUSION

Few, if any warranties cover contingent liability. Exhibit A typifies this common exclusion. "*Neither Manufacturer nor Contractor shall in any event be liable or responsible for any loss or damage, either direct, incidental or consequential, resulting from or arising out of or in connection with any defects of the material of said installation, including any defects of the material of said installation, including such defects as Manufacturer and Contractor have agreed to repair as provided herein.*"

Uncovered contingent costs precipitated by coating problems are a plant's real failure-expense. Repair costs of improperly installed surfacing systems are often minimal compared to a plant's lost production income and costs of making areas available to execute warranty work. In the rail car industry, it has been reported that lining failure on the interior of a food or chemical tank can readily be 200 times the cost of the installation price.[2] Failures in pharmaceuticals, food and chemical plants, could easily cost far more than that amount in lost production time or product contamination due to lining failure.

WARRANTY EXECUTION

Enforcing specification compliance is easier than enforcing warranty compliance. Contractors are usually more amenable about correcting defective work while they are in process of doing it, and before they are paid, than after projects are complete. Some contractors willingly return to correct work under warranty. Others return under duress. A few may not return at all without legal inducement.

Even if a contractor is willing to return, most warranty language, with conditions and exclusions, place an owner at a disadvantage. Stipulations about proper notice, use, and other conditions may be contained in the warranty document. Many warranties can be voided if conditions are not precisely followed. Exhibit A illustrates such conditions found in most coatings warranties, with specific burdens of proof placed on warrantees.

Contractor legal obligation under a warranty is often far less than owner expectation. Unless a contractor is a willing participant in the agreement and believes in the original "intent" of the warranty despite the language, owners are sometimes disappointed with the final resolution. "The warranty concept has merit. However, while warranties offer some protection, it is always better to install a coating system correctly the first time than to repair it in the field. Field repairs are never as good as original work." [3]

Time is a critical element in the overall scheme of warranty consideration. Warranties are in effect for a finite period, most often for one year. Whether a warranty period is one year or more, owners generally expect an installation to function properly beyond the end of the warranty term. The value of the owner and specifier relying solely on de facto use of warranties as a quality control tool often becomes glaringly deficient after expiration of the warranty.

OWNER RESPONSIBILITIES

Owners help to determine the final quality of surfacings applications by deciding whether to specify performance, fund inspection and by deciding whether to use qualified, full-time inspection. Inspection is an additional cost beyond specification development. Owners may choose to not spend money for inspection, believing the specifications to be sufficient to achieve quality. Depending upon the project size, owners may require the architect, engineer or general contractor to inspect surfacing applications, as part of the general inspection process.

Knowledgeable third party inspectors who work for the owner, having no affiliation with the material supplier or applicator, generally serve the owner well. Unlike inspectors having a vested interest in the work, third party inspection would likely be more objective and unbiased, due to the absence of obligation or allegiance to the parties involved in the execution of the work. Qualified inspectors who are responsible in their duties to enforce specification compliance can often provide high value and return on investment.

In reality, many architects, engineers and general contractors are neither prepared nor staffed to implement full-time, qualified coatings inspection. Trained and experienced coatings inspectors may be better qualified to carry out required testing and inspection procedures in critical applications. It is the writer's opinion that few architects, engineers and general contractors have adequate staff that are specifically trained and experienced about surfacings behavior and application requirements.

For example, lack of qualified inspection seems to have played a role in the case history of a coating of water tanks in Austin, Texas. In his argument for the value of one year anniversary warranty inspections, Tracy Owen Dubcak, PE of the Water and Wastewater Utility, Austin, TX described in detail failures found at the end of one year. Chalk was found between delaminated field-applied linings and shop primed steel. According to Dubcak, the presence of the chalk indicated portions of the shop-primed steel were not properly blasted prior to the application of the coating system. [4]

The City of Austin employed consultants to perform testing and inspection during the construction of the tanks and application of the coating system. One wonders if full-time inspection was being provided, how the chalk marks could have been missed. Further, Mr. Dubcak also admits "paint coating application can be a complicated process, requiring specialized knowledge." [5] Left to unqualified inspectors, discovery of problems will almost always occur after completion, instead of before.

Owners benefit by taking an active role in decisions when critical surfacings applications are specified in a project. If owners understand that warranties alone do not assure high quality surfacings applications, their interest in pursing alternate mechanisms for determining adequacy of the application will be more acute. Unless the owner is uniquely qualified, third party inspection should be considered a necessary cost to ensure return on the coatings investment. Qualified coatings inspectors who understand the intricacies of the work, and properly perform their duties may provide a value-added function to increase quality even more.

Owners sometimes think coating manufacturer's representatives can provide no-cost inspection. They can. However, value received generally has a direct relationship to the dollars spent. Although the representative is concerned about proper surface preparation and application of the provided coating, one should not expect that the representative will stay on the job, from beginning to end, 8 hours per day, checking preparation, mixes and application. They will not likely document details, nor should they be expected to come forward on the owner's behalf to indicate a problem with the coating material or the application, unless, of course, they are in the process of looking for another job.

If specifications require manufacturers to inspect the work, manufacturer's representatives have been known to breeze in and out a few times while the work is in progress, bringing donuts and coffee for the contractor's personnel. Remember, it is the contractor who is paying them for their materials. Unless the work is drastically and obviously wrong, most representatives may not be aware of inconsistencies in the specifications and the way the work is being performed, or worse yet, they may see a problem and not

say anything. They may also be relying on the limited warranty as a vehicle to acquire quality.

EFFECTS OF SPECIFICATION UNENFORCEMENT

Used alone as the sole quality control tool, warranties do not assure consistent high quality contractor workmanship. When their workmanship is neither inspected nor required to conform to specifications, contractors often believe their work is "standard in the industry" or better than standard, regardless of actual quality.

"Too often, owners and facility operators are driven by price in their search for contractors. Unfortunately, there are facility owners who regard industrial painting as little more than a commodity and who are unwilling to pay reasonable premiums to hire accomplished workers. This approach is unfair to legitimate contractors because it encourages unqualified firms to offer lower bids for jobs that are beyond their technical capabilities. It also exposes the facility owner to protracted field problems associated with poor quality control and extended delivery schedules." (6)

Unless contractors' work is required to conform to carefully written performance specifications, standards and manufacturer's requirements, they simply assume their work is acceptable. Contractors often refer to their methods and workmanship as meeting "standards of the industry." In fact, in their minds they are correct. Standards are not industry standards, however, unless they are written, definable and reproducible.

Good contractors benefit by inspection, because their goal is to execute the work properly, safely, profitably and to the satisfaction of the owner. Inspectors assist conscientious contractors by helping to discover and remedy non-compliant application issues before they turn into problems. Contractors who intend to honor warranties would rather correct deficient work while in progress, than after completion. Deficiencies with this caliber of contractors generally result from oversight rather than intended non-compliance.

Furthermore, contractors who produce marginal quality may be more likely than others to not include enough money in their estimates to comply with specifications. Should these contractors' work be inspected with regularity, their quality would improve or they would go out of business. Either way, owners, specifiers and the surfacings industry would benefit: Installations would last longer. Plant down-time as a result of surfacings failures would be reduced. Warranties could function as a safety net after the application, rather than as a hopeful means to engender quality.

Manufacturers participate in warranties with the understanding their materials have been applied according to specifications and their written requirements. Their formulations and testing are based on certain parameters of surface condition, surface preparation, environmental conditions during application, correct mixing and application requirements. If the foregoing prerequisites are not met, the manufacturer's warranty obligation is usually voided.

Disputes can result between contractor and manufacturer while the owner is caught in the middle, waiting for repairs to happen. After the fact, manufacturers become very active in testing and investigation when they may become obligated to participate in surfacings replacement. With their laboratory and testing resources, manufacturers generally have the advantage over owners and contractors to determine if their requirements had been met.

If the substrate is concrete, was moisture testing done before application? Was the substrate properly prepared and cleaned? Did the concrete substrate meet manufacturer requirements in tensile and compressive strength? Was it tested before application?

Were steel substrates properly prepared according to SSPC, NACE or ISO standards? Were the substrates cleaned properly? Were coatings applied during inappropriate environmental conditions? (There are meteorological records).

Were surfacings components mixed properly? Was too much solvent used in the mix? Was the proper solvent used in the mix? Are the surfacings applied too thin or thick?

All these questions and more can be answered after project completion. Any of these answers could void the manufacturer's obligation to participate in the warranty.

If the manufacturer's obligation is voided, then the owner is left with the contractor to supply material and make the repairs. In some cases, the contractor will honor the obligation without question, and be financially able to honor the commitment. In other cases, the contractor may not have the financial resources or desire to honor the commitment. If the latter, the best-case scenario is the owner sues the contractor and ends up owning a failing construction company.

WARRANTIES USED AS MAINTENANCE CONTRACTS

Design and competitive bidding are geared to provide maximum protection for the least cost. No one wants to pay needlessly for over-engineered services or goods. Some specifiers spend a great deal of time, however, trying to find "luxury" systems at "discount" prices to satisfy owner's demands. Radical compromise may inadvertently

come into play. Installed systems, when selections are driven by price first, rather than performance first, typically are short-lived.

"There is a correlation between a comprehensive coating specification and a successful coating installation." [7] Probability of failures and problems increases when surfacing systems are cheapened. In these cases, warranties become attractive, because likelihood of using them is high. Inspection probably will be of less value in this case, since marginally structured surfacing systems may not function for long periods regardless of the degree of inspection provided.

Specification skimping has been found by the writer in government-mandated applications such as secondary containment and FDA and USDA inspected facilities. Some owners and design firms will specify the minimum potentially acceptable system, and try to have it installed with a long-term warranty requirement. At times, manufacturers and contractors in their zeal to acquire the work, will acquiesce in agreeing to the terms. Experienced contractors who take warranties seriously, generally avoid these projects.

Warranties, when used as maintenance contracts, either intentionally or not, really are in no party's best interests. Plant use of the areas is disrupted during repair with some consequential cost to the owner. Contractors, obviously suffer financial loss, as well manufacturers.

CASE HISTORIES

"XYZ Foods"

XYZ Foods, a Fortune 200 food processing company, specified an extensive floor rehabilitation project in which floor areas were required to be re-sloped to new floor drains and overlaid with a heavy duty protective surfacing. Depending solely upon the warranty to attain quality, this project represents an obvious lesson in the need for active plant engineering management and inspection to achieve specification compliance.

Descriptively and thoroughly written, the specification clearly detailed by both generic resin type and by manufacturer standard products to be used for waterproof membrane, novolac epoxy mortar sloping material and novolac epoxy ¼" overlay. Manufacturer's products and systems were specified as standards for the generic descriptions, with equals being acceptable, subject to plant engineering approval.

Three bids were received, two from contractors with previous acceptable on-site experience and one from a new contractor. The new contractor's price was $135,000, and the others were $212,000 and $237,000 respectively. All bids, according to specification, required a written one year warranty where "contractor shall replace at contractor's cost deficiencies resulting from improper workmanship and defective materials, including, but not limited to leakage, cracking, delamination and disbonding." Warranty form was written by the owner and executed by the contractor at the end of the job.

Isolated failures and leakage began to occur within five weeks after completion. Cracks developed in the composite system and topcoats were beginning to delaminate from the overlay. In addition, some of the aggregate used for slip resistance began to disbond from the overlay composite, causing slippery conditions. The contractor returned several times to make repairs. After three months the numbers and sizes of repairs began to escalate and the contractor, initially reliable, became increasingly unresponsive.

Subsequent to a USDA inspection, the facility was ordered to make necessary repairs or be shut down. The gravity of the situation compelled the owner call in consultants for repair evaluation. Failure analysis revealed some startling revelations.

Plant engineering had no records of work progress or workmanship--only submittals of materials accepted as equals. Ten mil flexiblized penetrating epoxy primer was substituted for specified 30 mil fiberglass-reinforced flexible epoxy membrane. 80% solids epoxy coating, combined with sand was substituted for 100% solids novolac epoxy resins blended with an engineered aggregate mortar. 88% amine epoxy was substituted for 100% solids novolac epoxy grout (intermediate) coat and finish coat.

Using 2 inch dimensional lumber ripped to varying elevations, the contractor used the wood as screeds to achieve proper pitch to drains. Apparently too difficult to remove, the wood screeds were left buried in the epoxy mortar, and the entire composite over coated with the overlay.

Hot water (±180°F) and cleaning-in-place (CIP) chemicals were dumped on the floor three times per week from four 500 gallon tanks. Forklift traffic also crossed the floor with regularity, carrying 2,000 lb loads. Cracking developed over the wood screeds left in the flooring system and continual thermal shock destroyed the resin system which, according to the manufacturer, was never intended to be used as a mortar nor intended for use under those exposures. Liquids easily found their way to the concrete substrate. Without an effective waterproof membrane in place under the system, liquids easily found their way through the slab, leaking into production areas below.

Unable to force the contractor to return in a timely manner and needing to expedite remediation of the unsanitary conditions, another contractor was paid to make con-

tinuous temporary repairs for about another year. Legal action against the contractor was initiated, but dropped months later for unexplained reasons. Finally, after reaching such a deteriorated state, the system was removed and installed according to original specification at a cost of $240,000.

Typical Examples of "Warranted Failures"

Sole reliance upon the warranty, even if the warranty were enforced to the maximum degree possible, would not have relieved this facility from the burden of time and expense to satisfy the USDA. Had the contractor returned as the plant expected, though less costly, the plant still would have spent additional time and expense to make areas available for repair, as well as management time to deal with the USDA inspector.

Less obvious omissions occur with regularity, negating the value of warranties—especially one year warranties. Improper surface preparation prior to surfacing application is the most common item which leads to premature surfacing failures. Many high performance surfacings, depending on conditions, may not manifest problems until well after a year or two following completion, after the warranty period has ended. If any one area requires inspection more than any other—this is it.

Properly applied surfacings fail prematurely with regularity. Floor surfacings subjected to chemical attack and/or heavy traffic exhibit faster failure rates than those applied in less aggressive exposures. Disbonding and delamination, however, still are often not noticed until after the warranty period expiration. Dirt and dust adhered to the undersides of a disbonded floor or wall surfacings are not unique revelations discovered during failure analyses. Most readers have seen this phenomenon, but some may not realize warranties do not necessarily eliminate the problem.

Based simply on experience without empirical backup, improper surface preparation causes inordinate amounts of money to be wasted on surfacings that fail a year or two beyond the warranty period. These same installations would have had otherwise functioned longer had the substrates been correctly conditioned. Plant engineering personnel can save their companies great expense by investigating and inspecting substrate preparation before any surfacing is applied.

Improper substitution of specified materials is another area where failures are commonly created. When manufacturers are involved in warranties they generally make certain, either before or after a problem occurs, that sufficient materials are ordered to produce the system. When a contractor runs out of material, though, conditions are ripe for non-specified products to be substituted to complete the work. This type of situation occurs less often when manufacturers are signatory or co-signatory to warranty agreements. This type of situation does, however, happen and if the substituted materials are not compatible, failures can result—in various time frames.

Failure analysis of a chemical resistant fiberglass reinforced lining at a chemical plant revealed an interesting improper substitution. The specified system required a manufacturer-specific moisture intrusion inhibitor to be first applied to the prepared concrete. Substituting another manufacturer's moisture inhibitor, the lining began to delaminate 10 months after installation.

Called in to repair the problem under the terms of the one year warranty, the contractor repaired the delaminations, which accounted for about 1% of the floor area. Fourteen months following the original completion date and two months following the end of the warranty period, the floor began to grossly lose bond. Blisters as large as 4 feet in diameter domed 3 inches above the substrate developed over approximately 40% of the area.

Refusing to repair the problem, citing the warranty term, the contractor walked away. The corporate legal department sent a few letters to the contractor, but eventually dropped the issue. They felt the potential aggregate cost to litigate, including plant engineering time, would be excessive as well as disruptive.

Production demands required the failed system to be removed and re-installed. Construction costs, alone, exceeded the original contract price. Down-time and added plant personnel labor added insult to injury. Obviously, the warranty proved to be useless.

WARRANTIES ARE MEANINGFUL WHEN DESIGN AND APPLICATION ARE HARMONIOUS

Successfully completed surfacings installations are critically dependent upon specification and application quality. Design professionals must recommend appropriate systems, materials and products to combat corrosive reagents. Their choices and decisions are often made more difficult by substrate and substrate condition, multiple reagent exposures, environmental and statutory requirements. Specifiers' primary hurdle, however, is trying to determine appropriate protective systems which will perform their intended uses in specific environments.

Correct installation methods must complement properly researched and specified surfacing systems to complete the protection effort. Knowledgeable inspection aids in the completion by integrating specification intent and the final product. Warranties are meaningful only when design and application are harmonious.

Should design and application not be consistent, the owner or the warrantee is simply the holder of an ineffectual promise for a limited period. Failures resulting from poorly designed systems can be repaired again and again with the same consequence. Poor workmanship most often results in isolated failures where only part of an installation is repaired. In both scenarios, the warranty serves as false security. After the warranty period, this false security generally turns into realization that the surfacing system was defective from the beginning.

BEST WARRANTY

The best warranty is the one never needed. Conformance to specifications and manufacturer's instructions improves application quality and reduces failure rates. "Comparison of the results obtained when proper inspection has been carried out during coating application has shown that the life expectancy of the finished coating can be increased by a factor of two or three by the introduction of proper inspection procedures." [8] Responsible, full-time inspection of a reliable contractor's work increases the probability of attaining good long-term protection. Need to activate the warranty is lessened and a plant can operate without disruption.

Given a choice between specification enforcement during application or warranty, an owner would be better suited to choose specification enforcement. This concept is very difficult for many specifiers and owners to heartily embrace. Were owners able to embrace the concept, they would receive far greater value for dollars spent compared to benefits derived by warranty.

The good news is choice between specification enforcement and warranty is not required. One can easily have both. An owner can choose to enjoy the long term benefits of a correctly installed surfacing system and be comforted with a written warranty, which in the best case will not be needed.

CONCLUSION

Consultants and design firms can play pivotal roles in quality attainment by strongly recommending full-time inspection of surfacing applications; but the owner is ultimately responsible for exercising this option. The owner has to live with project quality and be affected by the results. Use of warranties for quality control reduces project capital expenditures, but may drastically impact plant operations and profits during the life of the surfacing system. As evidenced by case histories presented herein, maintenance costs of poorly performing systems can easily exceed capital construction costs.

Specification enforcement is the most reliable method by which an owner can receive best value for dollars spent. Unless specifications are enforced, however, only random successes may be realized—with or without a warranty.

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Note:

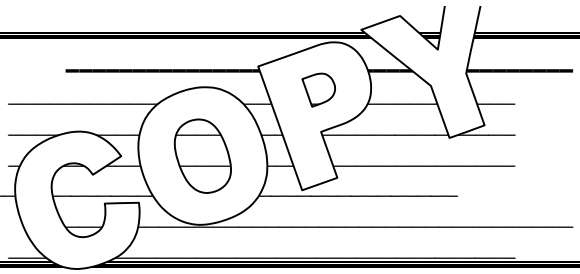
Exhibit A has been copied verbatim, leaving out any manufacturer identification. Four other “joint warranties” from different manufacturers were evaluated and are very similar in wording. Only one warranty is included to save space.

Exhibit #1, for the purposes of this paper, is offered as an example of a “typical” warranty.

EXHIBIT "A"

Joint Warranty Agreement

PROJECT
ADDRESS:
CITY, STATE, ZIP
APPLICATION OF:
OWNER:
DATE OF COMPLETION:
SIGNATURE/DATE:



CONTRACTOR

The undersigned Contractor, warrants to the Owner, subject to the limitations, exclusions, terms and conditions contained herein and on the reverse hereof, the above installation against proven improper workmanship for one year from the date of completion of the installation or the time the Owner allows occupancy of the space, whichever occurs first.

Contractor shall not be responsible under this Limited Warranty to bear the cost of any repairs which, in the aggregate, exceed the full amount of the Project contract price paid to the Contractor and Manufacturer.

No employee, agent or representative of the Contractor is authorized to bind the Contractor by any agreement, warranty, promise or understanding not herein expressed. The performance of repairs under this warranty will not alter the warranty period. This Limited Warranty is made and given in lieu of any and all other warranties and guarantees either expressed or implied, including warranties of merchantability and fitness for any particular purpose.

Approved Contractor:

Company:
Signature: _____ Address:
City, State, Zip:
Date: _____ Phone:

MANUFACTURER

XXXXXXXXXXX (the manufacturer), warrants to the Owner, subject to the limitations, exclusions, terms and conditions contained herein and on the reverse hereof, that the material supplied by the Manufacturer, XXXXXXXXXXXXXXXXXXX will be free from manufacturing defects for one year following the date the Contractor completes installation of the material or the time the Owner allows occupancy of the space, whichever occurs first.

The Manufacturer's maximum responsibility under this Limited Warranty shall be limited to the replacement of the material in a quantity not in excess of the quantity of material furnished by the Manufacturer in connection with the project listed above.

No employee, agent or representative of the Manufacturer is authorized to bind the Manufacturer by any agreement, warranty, promise or understanding not herein expressed. The performance of repairs under this warranty will not alter the warranty period. This Limited Warranty is made and given in lieu of any and all other warranties and guarantees either expressed or implied, including warranties of merchantability and fitness for any particular purpose.

Manufacturer:

Signature: _____

Date: _____

JOINT WARRANTY AGREEMENT

LIMTED WARRANTY – No warranty shall be effective until the payment terms and conditions of sale have been met. The separate Limited Warranties given by the contractor and the Manufacturer, respectively, to the Owner, set forth on the reverse hereof, are subject to the following.

Exclusion of all other warranties – The Expressed Limited Warranties contained on the reverse hereof are in lieu of all other warranties, guarantees, expressed or implied, including any warranties of merchantability and fitness for any particular purpose.

LIMITED WARRANTY COMMENCEMENT – The Limited Warranty period commences on the date of completion or installation. For the purpose of this document, completion is defined as the date that the Contractor completes the installation of the material or the time the Owner allows occupancy of the space, which ever occurs first.

DEFECTS – Defects covered by these Limited Warranties are limited to cracking, delaminating and blistering of a XXXXXXXXXX Product(s). **Defects must result from proven faulty materials or workmanship resulting from normal and ordinary wear and tear from the intended use and environmental exposure. For material to be proven at fault it must be tested and inspected by an independent testing laboratory or other qualified individual and certified defective, with the cause of defect clearly defined. The testing laboratory or individual shall be agreed upon by the Owner, Contractor and Manufacturer. Defects covered by these Limited Warranties shall be repaired during normal working hours.**

NOT COVERED BY LIMITED WARRANTY – These Limited Warranties do not cover defects that are the result of abuse, structural deficiencies or any other than ordinary wear. Neither the Manufacturer or the Contractor shall be responsible for defects caused by abnormal or abusive traffic; environmental conditions; accidents, acts of God; undetected moisture; defects induced by faulty substrate or structural design; slab or building alterations, cracks or ruptures in the structure; or any other cause beyond the control of the Manufacturer or Contractor. In addition, these Limited Warranties do not cover defects attributed to bridging moving expansion and isolation joints.

DISCOVERY AND NOTIFICATION OF DEFECTS – **It is the responsibility of the Owner or his authorized representative to notify the Manufacturer and Contractor in writing of the need for any repairs, whether or not covered by these Limited Warranties. Failure to notify the Manufacturer and the Contractor of defects or having said defects repaired without notice to Manufacturer or Contractor shall result in rendering both these Limited Warranties null-and-void. All notices, requests, complaints or demands of papers shall be duly mailed by registered or certified mail, postage prepaid, addressed as to the Manufacturer and Contractor**.

REPAIRS – Any defects not covered by these Limited Warranties shall be corrected at the Owner's expense by the Contractor or other contractor authorized by the Manufacturer.

After providing Manufacturer and Contractor with notice of the need for any repairs as provided above, whether or not covered by these Limited Warranties, Owner shall promptly arrange for the Contractor, or another contractor authorized by the Manufacturer, to make any and all repairs so as to not allow for further deterioration or propagation of the condition needing such repair; subject to delays caused by strikes, acts of God or other causes beyond the reasonable control of Contractor or such authorized contractor.

Manufacturer's and Contractor's responsibility and obligation for repair shall become effective only upon full payment of the Manufacturer and the Contractor by Owner for the completed installation in accordance with the terms of the installation contract and becomes null-and-void if anyone not expressly authorized by the Manufacturer performs any repairs during the period of the Limited Warranties.

The Owner shall provide free and unencumbered access to all areas to be repaired and to bear the entire cost of repairs caused by ... or other ... outside of the scope of these Limited Warran-

EXCLUSIVE REMEDY/DISCLAIMER OF DAMAGES – The Contractor's sole obligation under this Limited Warranty shall be to make the repairs referred to herein for defects in workmanship, provided, however, Contractor shall not be responsible for any repairs in excess of the original contract price paid to the Contractor. Manufacturer's sole responsibility under this Limited Warranty shall be to provide replacement material for the material found to be defective, provided, that the Manufacturer shall not be responsible for the replacement of any material in excess of the original contracted amount of material. **Neither Manufacturer nor Contractor shall in any event be liable or responsible for any loss or damage, either direct, incidental or consequential, resulting from or arising out of or in connection with any defects of the material of said installation, including such defects as Manufacturer and Contractor have agreed to repair as provided herein. Consequential damages for purposes hereof shall include, without limitation, loss of use, income or profit, or losses sustained as the result of injury (including death) to any person, or loss of or damage to property. Owner shall indemnify Contractor and Manufacturer against all liabilities, cost or expense, including reasonable attorney's fees, which may be sustained by Contractor or Manufacturer on account of any such loss, damage or injury.**

HOUSEKEEPING – Owner will take responsibility to reduce degradation of the material by keeping the surface and surrounding area free of debris, which may prove deleterious by periodic cleaning, and maintenance. Defects resulting from a failure to employ good housekeeping standards shall be considered as abuse.

ALTERATION and INVALIDATION OF LIMITED WARRANTY – These Limited Warranties may not be changed or altered in any way except in writing containing a reference to these Limited Warranties and signed by an officer or principal of the Manufacturer, Contractor and Owner. If any provision of these Limited Warranties is held to be in conflict with any applicable statute or rule of law, or is otherwise held to be unenforceable for any reason whatsoever, such circumstances shall not have the effect of rendering the other provision or provisions herein contained invalid, inoperative, or unenforceable to any extent whatsoever. The invalidity of any one or more phrases, sentences, clauses or sections of these Limited Warranties, shall not affect the remaining portions of these Limited Warranties or any part thereof.

These Limited Warranties are made and entered into in the State of XXXXXXXXXX and shall in all respects be interpreted, enforced and governed under the law of said state.

These Limited Warranties supersede all prior communications, either written or oral, and all previous agreements, if any, between the parties with respect to subject matter hereof, and set forth the complete understanding of the parties with respect thereto.

No affirmation by the Contractor or the Manufacturer, by word(s) or action, other than as set forth in these Limited Warranties, shall constitute a warranty.

No delay or omission on the part of the Contractor or the Manufacturer in exercising any right or remedy provided herein shall constitute a waiver of such right or remedy and shall not be considered as a bar to, or a waiver of, any such right or remedy of any future occasion. These Limited Warranties are nontransferable and, as such, will be regarded as null-and-void upon a change in ownership of the facility.