

# THINKING BEYOND STANDARD MITIGATION SYSTEMS

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- | Passive & Active Systems
- | Pre-Emptive Systems
- | Radon Ready Systems
- | World-Class VI Experts



 CUPOLEX®

# VAPOUR INTRUSION MITIGATION

CUPOLEX® is the leading global manufacturer of concrete cast-in-place aerated floor forming solutions for VI mitigation systems. CUPOLEX® pioneered the use of passive and active aerated floor VI mitigation systems using our proprietary form-base methodology. CUPOLEX® mitigation designs provide a continuous void space below concrete floor slabs by manipulating the geometry of concrete – creating an aerated floor that provides better venting and protection at lower cost than traditional systems.

CUPOLEX® Aerated Floors are the modern systems that use open space rather than soil to vent the slab, resulting in a highly efficient transmission of vacuum and air flow.

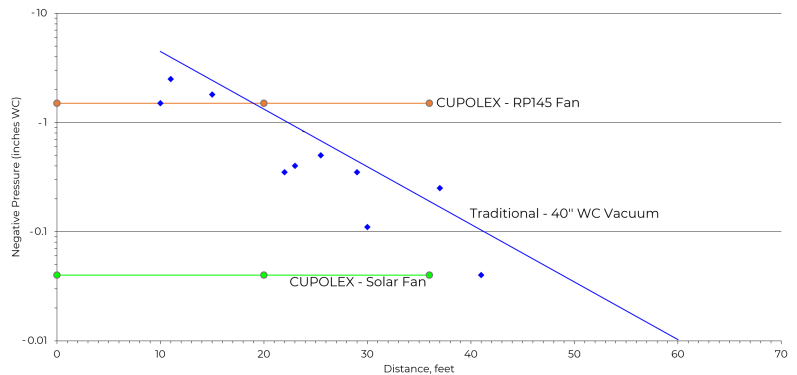
## DESIGN FEATURES

CUPOLEX® aerated floor systems control vapour intrusion by either diluting sub-slab concentrations to levels of no concern (the innate attenuation that any reasonable slab provides means that sub-slab concentrations do not have to be reduced to indoor air action levels), or by depressurizing the sub-slab void space to prevent upward flow of air into the building.

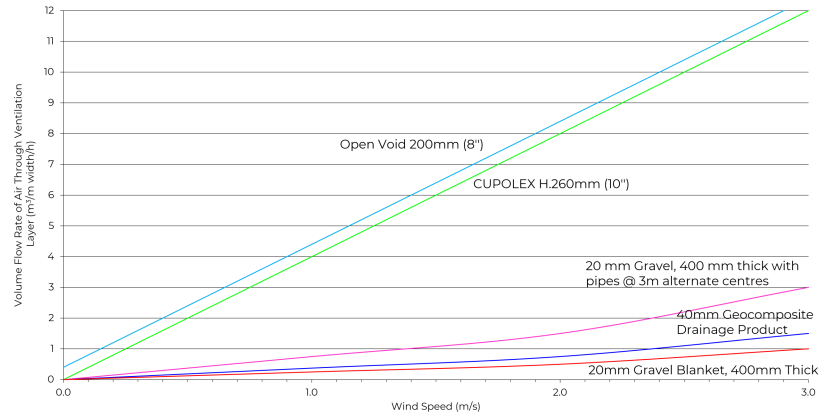
## ADVANTAGES

- Provides a substantially more efficient under-slab void network than less efficient pipe and gravel venting layers
- More efficient venting
- Passive venting potential
- CUPOLEX® floors do not require membranes
- Low capital cost
- Fast assembly and can be installed by any concrete slab or forming contractor
- The ability to cut the slab at any location and easily repair
- The ability to easily test, monitor and enhance performance

Negative Air Pressure Over Distance from Suction Point



Volume Flow Rate v Wind Speed for 30m Wide Foundation



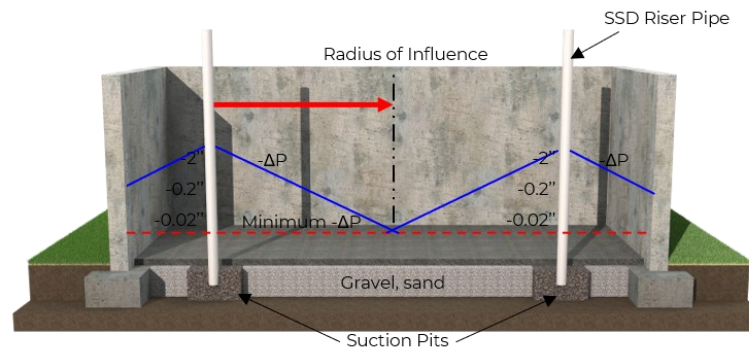
## APPLICATIONS

- Grade supported Floor Slabs
- Slab on grade PT foundations
- Raised floor slabs on Raft Foundations
- Foundation supported structural floor slabs

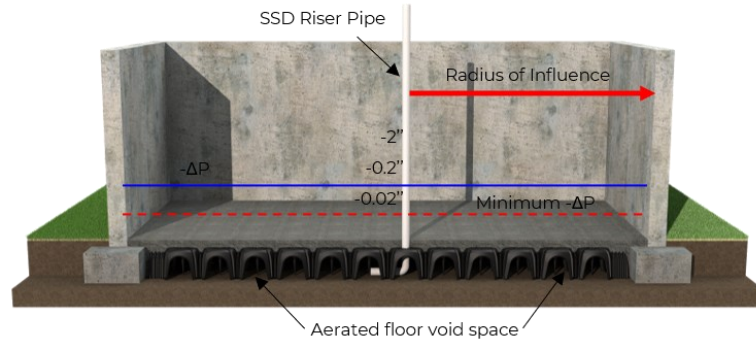
CUPOLEX® aerated floor systems can be designed for any type of building foundation construction. CUPOLEX® provides excellent flexibility in working with new construction or remodeled building layouts. The main characteristics of the forming system are speed and simplicity, with maximum benefits being realized when the CUPOLEX® system is engineered during the early design stages in assessing site and soil conditions and considering elevations of various sections of the slab area that may have to be raised. For example, if strip footings, walls or other typically formed sections can be incorporated within the system, cost savings and environmental benefits can be realized.

# HOW CUPOLEX® MITIGATION SYSTEMS PROTECT BUILDINGS FROM VAPOUR INTRUSION

- Provides a highly efficient under-slab void network for a more effective application of SSD, at a lower cost than the less efficient pipe and gravel venting layers.
- Provides a far more efficient, effective, and predictable medium for moving air than soil.
- Provides new opportunities for passive venting, with a network of open voids that allows air to move much more easily under natural thermal gradients or wind.
- Aerated floor system that rely on ventilation or depressurization (diverting and diluting the vapours) do not require membranes.
- Mitigation systems that result in the dilution of vapours below the floor and whose performance can be monitored and controlled (e.g., through fan operation and pressure measurements) have the advantage of not allowing vapour concentrations and pressures to build immediately below the building, which is not always the case with barrier systems.
- CUPOLEX® can provide cost effective pre-emptive mitigation control measures in new buildings and homes while saving concrete usage, reducing building cycle time, and minimizing engineered fill requirements.



**Conventional Gravel System**

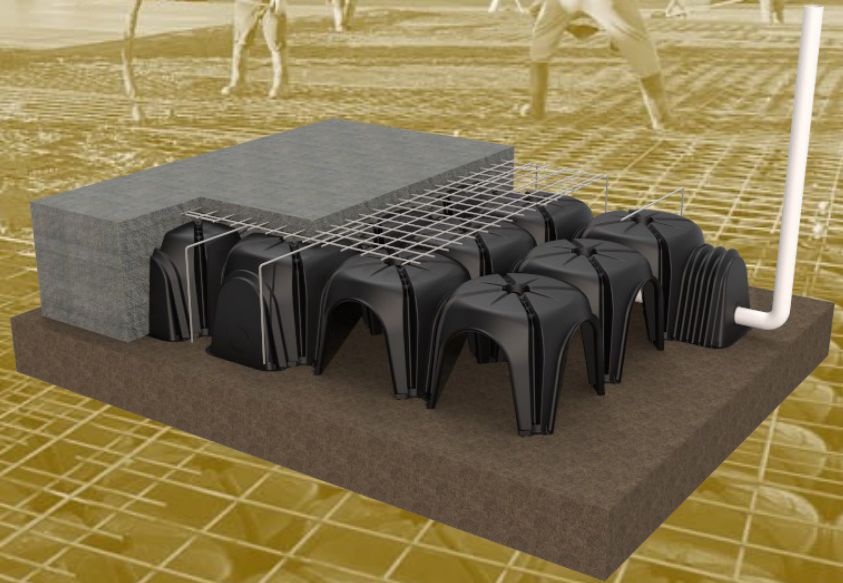


**CUPOLEX® Aerated Floor**

CUPOLEX® aerated concrete floors provide a sustainable approach for soil gas mitigation and are more permeable than gravel layers, and thus are more efficient in term of venting characteristics.

While there are numerous reasons why the CUPOLEX® system outperforms the standard liner or gravel layer SSV system, there are three critical factors that make the CUPOLEX® system the superior system for your project.

- More effective venting
- Constructability
- Minimal long-term maintenance costs





# EFFICIENT INNOVATIVE & GREEN

We deliver value engineered and cost-effective vapour intrusion mitigation design solutions for converting challenging sites such as brownfield developments into productive properties. From coast to coast, we lead the industry with the most aerated floor systems designed, installed, and operating efficiently.

CUPOLEX® is a proprietary patented plastic concrete forming system manufactured by Pontarolo Engineering Inc. The concrete forms are part of a design package provided by CUPOLEX®. Our engineers design the aerated floor slab using CUPOLEX® structural dome technology. We select the type and size of CUPOLEX® forms that will provide the ultimate performance for your specific project. CUPOLEX® supplies the forms to contractors to assemble the system as to the design and specifications provided by the CUPOLEX® design engineers.

The resulting product is an engineered sealed concrete slab foundation capable of providing any required design load-bearing capacity. CUPOLEX® concrete slab foundations can be designed at various depths to suit any site conditions or venting mitigation requirements.

**With thousands of commercial, industrial, and residential buildings mitigated using CUPOLEX® within the last 20 years, our professional CUPOLEX® engineers know where to find cost-saving opportunities while maintaining or improving system effectiveness.**

## CUSTOMIZED DESIGN PACKAGE

- **Design**  
CUPOLEX® mitigation designs provide creative ways to redevelop sites. We design passive or active systems to reduce operating costs and we offer real-time system monitoring.
- **Value Engineering**  
One step for evaluation of vapour control options, including remediation, mitigation, and institutional controls. CUPOLEX® engineers review each project, provide value engineering and identify the type and size of CUPOLEX® for every project. When mitigation is necessary, we use focused designs to minimize the system footprint and energy use, reduce iterative system testing, and lower overall life cycle costs.
- **Preliminary drawings**  
Design coordination, , cost estimate conceptual designs, sections and details provided to environmental consultants and real estate developers.
- **Engineered design drawings**  
Expert design of CUPOLEX® sub-slab depressurization, sub-slab venting, and other systems such as pre-emptive and “Radon Ready” mitigation systems. PE stamped design drawings and specifications issued for construction (IFC)
- **CUPOLEX® installation shop drawings**  
Issued to contractor with detailed CUPOLEX® formwork and venting system installation procedures
- **On-site Support**  
Construction training, monitoring and inspections
- **Testing, reporting & monitoring**  
Diagnostic testing to improve design efficiency and effectiveness with certification and reporting for regulatory compliance where required, ongoing system operation, maintenance, and monitoring.