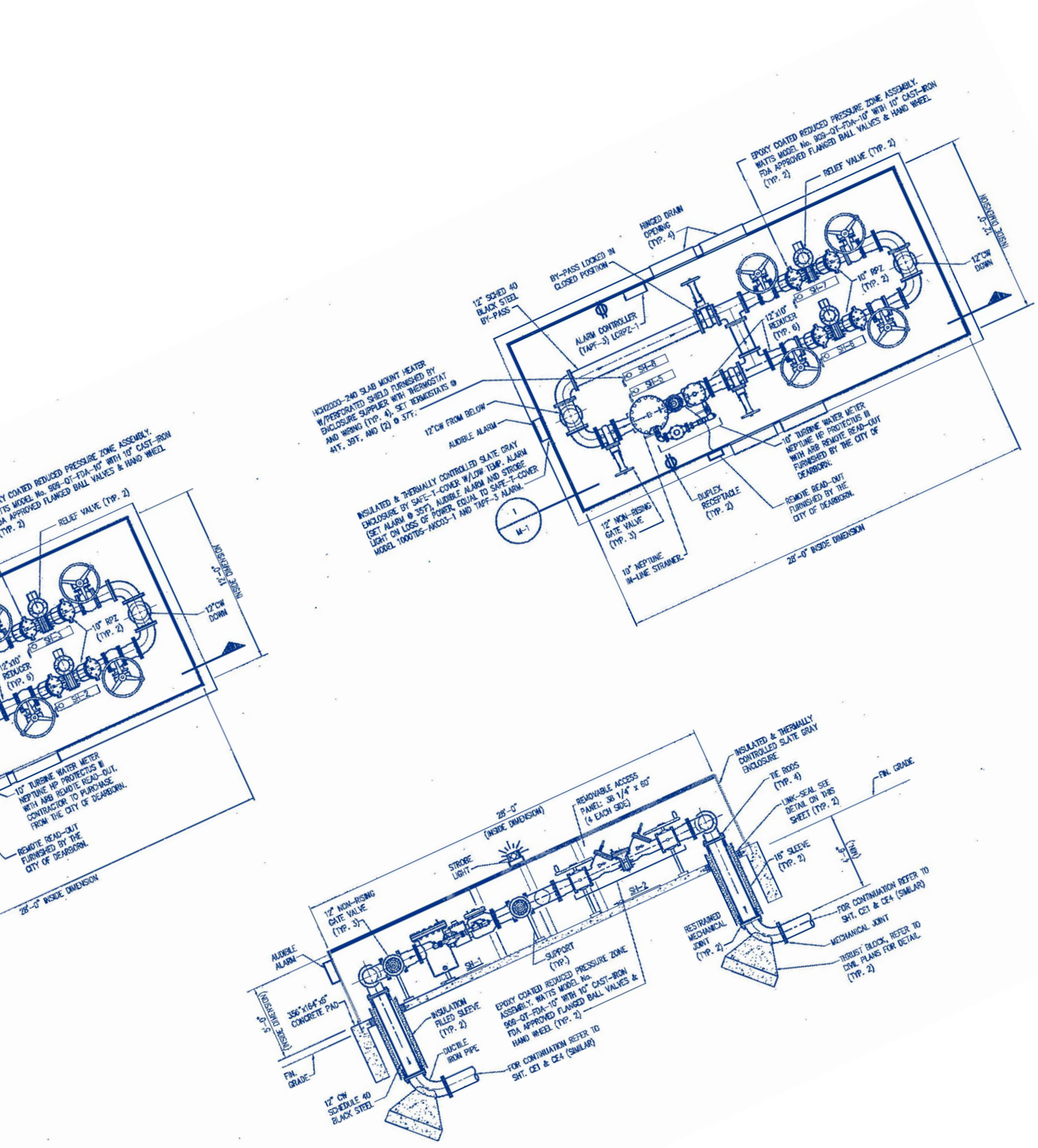


Designing and Specifying the optimal enclosure for industrial equipment

A Project Engineer's Guide
to shelters for valves, pumps and
other critical industrial infrastructure

SAFE-T-COVER®

If it's worth protecting, it's worth protecting properly

You may receive a drawing calling out some generic enclosure or "hotbox." Or you may have an operational, maintenance or protection challenge with some critical equipment. Either way you're likely going to have to research and specify some sort of enclosure solution.

And as you inquire of colleagues and search online you'll find plenty of them. From stock aluminum or fiberglass enclosures for common applications like above ground valves, to custom buildings or prefab concrete structures for large installations like complex pump skids, today's engineer has a wide range of options to consider.

So for a project engineer faced with deadlines, this ancillary component ends up getting less attention than the core components of the project. That's understandable - but it may mean that an expedient solution isn't the right long-term solution.

This handbook is intended to help busy project engineers quickly understand the range of enclosure options and considerations - and particularly increase awareness of the affordability and ease of implementing custom engineered and designed solutions.

After all, so much attention goes into the device - isn't it important to protect it as well as you design it?

Five key design guidelines

With an engineering team that's reviewed thousands of enclosure applications, we've been able to identify common sets of requirements and questions for most equipment sheltering projects.

They fall into five main categories which include:

- Size & Strength
- Climate Control
- Aesthetics & Protection
- Access & Maintenance
- Application Flexibility

Let's take a quick dive into each - what's possible, what's appropriate and what your project plan might be overlooking...

Size & Strength

This may seem straightforward, but might not be. Here's why.

Traditionally enclosures have been designed to accommodate the equipment, and some space around it to allow for maintenance access. That's been the starting point, and often that's then compared to stock sizes that are available (for small installations) or building dimensions for permanent structures. By definition though, that approach results in an enclosure that is larger than it needs to be all the time, to accommodate occasions when maintenance is required. That carries a procurement cost implication as well as creates excessive climate control demands when heating and/or cooling are required.

A custom enclosure allows multiple doors or panels to be placed with size and location as required for direct access to maintenance points. That means the enclosure can be sized for the actual devices to be protected (with consideration to slab exposure and any standoff required for other reasons).

Strength requirements are typically wind and snow load related. For water related applications ASSE Standard 1060 serves as a guideline. For other applications requirements will differ. But some enclosures are simply meant to obscure or shield equipment from view and may not offer adequate strength. Further, some modular systems may compromise structural integrity for flexibility in construction. Specifically research the strength specifications required and suggested.

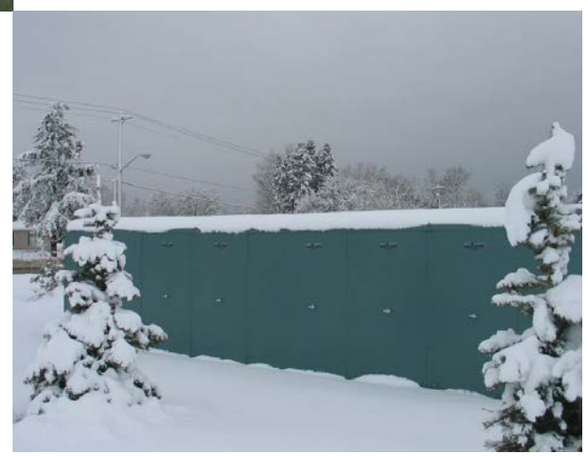
Climate control

Traditionally enclosures have been seen as a winterization tool. And they work well for that - without requiring wrapping in blankets or other seasonal solutions. Considerations include expected outside temperature extremes and minimum internal requirements. Insulation can be adapted for particularly demanding requirements. Heaters are available, and for water applications specifically, it's important to plan for heating solutions that are designed for wet/damp environments, and ideally heating elements that heat the slab for effective radiant heat of the interior and to protect pipes passing through the slab.

Of course maintaining minimum temperature to prevent water freezing isn't the only requirement. Other processes are substantially impacted by variations in viscosity of other fluids (oil for instance) and in many cases maximum temperatures are also a consideration.

Designs should incorporate louvers and fans for venting when that is adequate, and even air conditioning when the climate is particularly hot or the equipment requires maximum ambient operating temperatures lower than venting will provide. Incorporated electronics and controls are increasingly common in industrial equipment installations and they are often prone to failure when overheated.

In both cases of cooling and heating, remote monitoring of ambient temperature may be indicated.



Aesthetics & Protection

Nearly every enclosure is intended to protect some device. Typically those devices are operationally critical, expensive capital equipment and complex looking. Often installations incorporate lot's of metal and may offer access points to protected systems such as drinking water or hazardous chemicals.

Protection against a range of threats, in addition to climatic conditions, should be engineered into an enclosure.

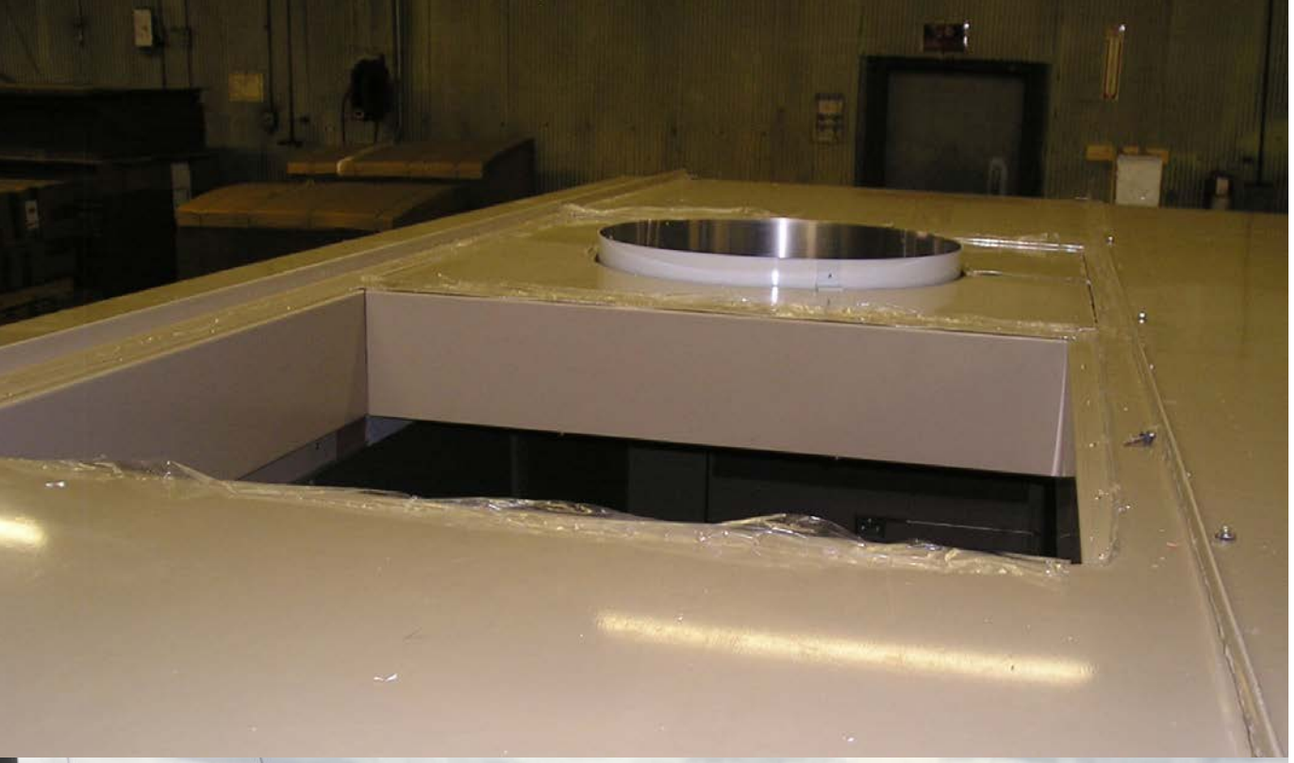
Examples include:

- weather and elements
- vandalism
- theft (scrap metal)
- terrorism

Most enclosures provide protection from the weather and elements. And protection from deliberate threats like terrorism require lockable, secure and innocuous enclosures.

Interestingly, protecting against theft and vandalism often rely on customizing an enclosure so that it's not very noticeable. Simply avoiding attention prevents most issues. Proper size, custom color and plain exterior are important design features which provide passive protection against vandalism and theft. Of course a robust structure and locking doors provide active protection against such threats.

Those passive features tie in closely with the aesthetic objective of most enclosure designs. The ideal enclosure is functionally invisible. Of course when you know where to look it's there. But designed properly (size, color, simplicity) it tends to simply blend in. This is important because it opens up a range of applications where aesthetic demands have traditionally required below grade vaults. Wet environments, maintenance challenges and OSHA confined space regulations create operational challenges. Innocuous, above ground enclosure solutions provide vastly improved operational flexibility while minimizing common objections around aesthetics.



Access & Maintenance

Equipment requires maintenance. And the ease with which maintenance can be performed often dictates the consistency of PMs and the down-time implications of break-fix repairs.

Enclosure design should plan for both types of maintenance access. As noted regarding sizing, enclosures can have panels and doors placed to provide direct access to critical maintenance points
(drain cocks, changeable filters, gauges, power supplies, etc.).

Often overlooked….until a failure occurs, is roof access to allow equipment to be hoisted in or out. Most enclosure systems simply preclude roof access. Buildings with fixed roofs, molded fiberglass and even modular structures typically can't be accessed from above.

Further, properly designed enclosures eliminate the complexity and associated training and operational costs related to confined space work.

Maintenance teams will live with the consequences of enclosure design for years. Due consideration of these features up front will pay long term dividends. The equipment will likely last longer since PMs will be far more feasible.

Application Flexibility

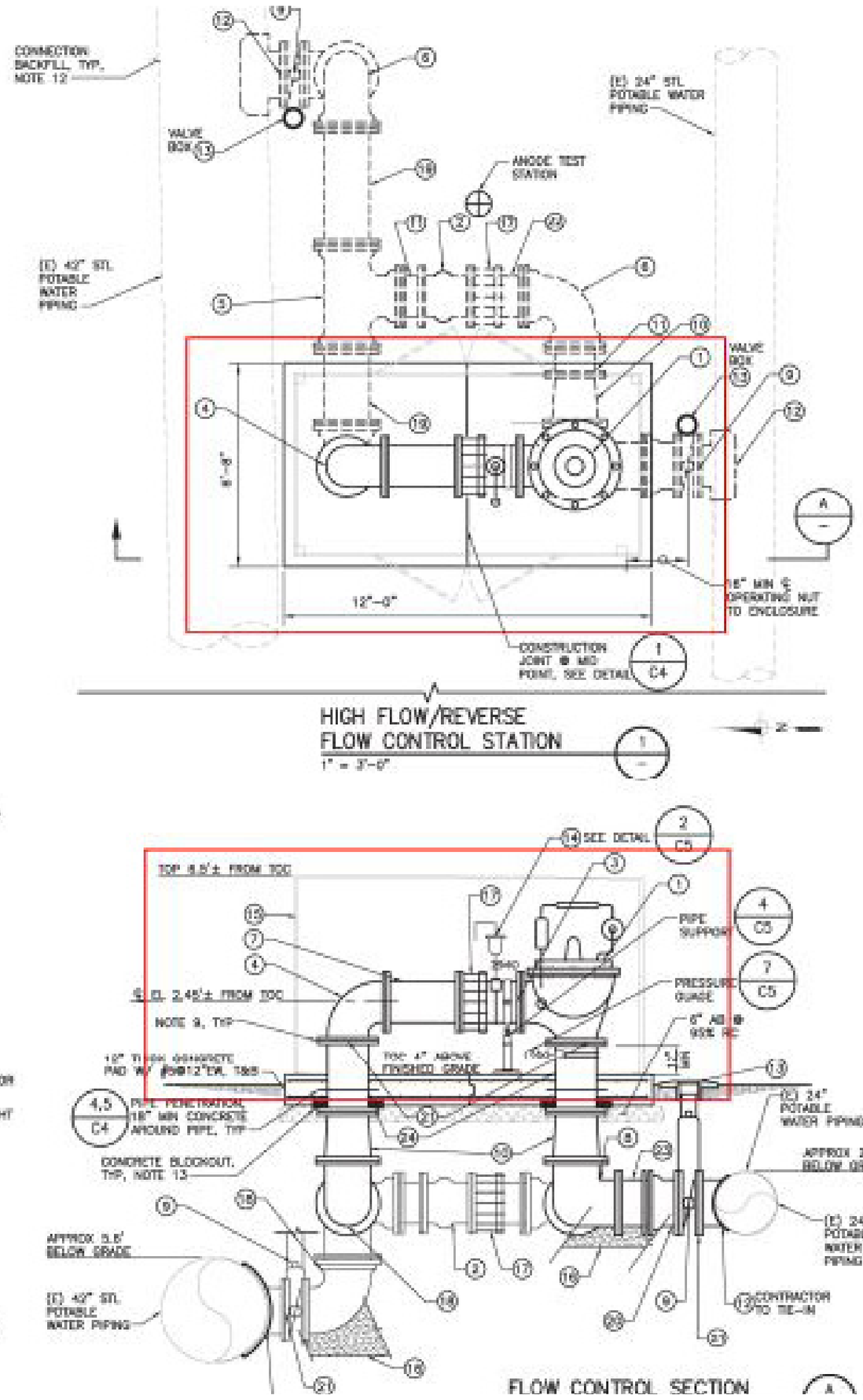
Most importantly, make sure the enclosure meets your requirements rather than dictates your design. It's amazing how often this is inverted!

An enclosure should be able to be installed over existing piping. Custom penetrations (diameter and location) should be completely feasible.

Modular construction should allow adaptation of any element or requirement.

Don't settle for a standard configuration. Your project deserves the right configuration.

But with all these design considerations and customizable features, the alarm bells are probably going off. After all you need to cross this item off a long list of components which are demanding your time. So let's look quickly at what you should demand of any enclosure provider.



What you should expect in the custom design, specification and installation process

We get it. You hear custom and you automatically assume high price, long lead-time and hassle. We've all been there.

But it's not necessarily so when it comes to equipment enclosures. Of course there are suppliers that have methodologies (such as precast concrete or standard fiberglass molds) or business models (high volumes of specific stock sizes for common applications) which are not easily adapted or customized. However certain enclosure types are actually ideally suited to extensive application specific customization.

Evaluate suppliers for these capabilities:

Modular design and construction

allows for easy adaptation

In house engineering experience

they should have worked with similar applications in the past and have the ability to produce drawings to address your requirements

Rapid turn on pricing and drawing

you don't have time to wait or chase them down. Make sure they can deliver the information you need in a day or two (this will help you gauge just how focused their business is on delivering custom solutions)

OEM customers

OEMs are demanding. Any purchased components must be hassle free, properly priced and the suppliers must be reliable and easy to work with

Standard designs

depending on your project type, a strong custom enclosure vendor will likely even have drawings of standard valve and pump configurations which can simplify your work substantially - not just the right enclosure, but the system design. Ask them! They may even have a standard detail to save you drawing time.

Compare stock and custom lead times

while you could have a stock enclosure overnight, you shouldn't have to wait more than a couple weeks to have the ideal enclosure.

Price

they should be able to tell you quickly and accurately what it's going to cost. If they build custom enclosures routinely, they'll have the application experience to quote quickly.

An enclosure is a decision for decades – not an impulse buy

Maintenance and engineering teams are going to live with the consequences of an enclosure decision, good or bad, for a decade or more.

Traditionally project managers have had to settle for an adequate solution to keep a project on schedule and on budget. That's not the case any more.

Custom enclosures are feasible for a wide range of applications - quickly and affordably.

Don't settle when you can specify!

Designing and Specifying the optimal enclosure for industrial equipment

A Project Engineer's Guide to shelters for valves, pumps and other critical industrial infrastructure

25 Applications for Equipment Enclosures

1. noise mitigation for generators
2. valve house
3. freeze protection
4. booster pumps
5. pump skids
6. fire pumps
7. irrigation pumps
8. oil pumps
9. reciprocating generators
10. compressor covers
11. control valves
12. pressure reducing valves
13. floating enclosures
14. deluge valves
15. vandalism protection
16. theft protection
17. pressure boosters
18. backflow preventers
19. railroad switches
20. wastewater pumping
21. tank warming house
22. wastewater treatment blower covers (for activated sludge treatment plants)
23. backup battery storage building
24. cooling/climate control for remote equipment
25. mitigate aesthetic impact of industrial installations in community environments

SAFE - T - COVER • 2710 Landers Avenue • Nashville, TN 37211 • (800) 245-6333