



# SMICOMPANIES

## Smart-Iron Technologies™

Thank you for your interest in our products and services. They come with our commitment to be the very best. The design, manufacture, installation, automation and support for these cement bulk plants comes entirely from the employees of SMI Companies.

We've named the technology Smart-Iron because it does a lot of the thinking for you. What we've done is committed the time to write twenty-five years of knowledge and experience into software language. We've been fortunate to have many opportunities to put it in service and work all the bugs out. Smart-Iron is now a mature, stable operating system. We see it run everyday and listen to what our customers say to make it better.

As new upgrades to the operating system come out they are made available to all our customers.

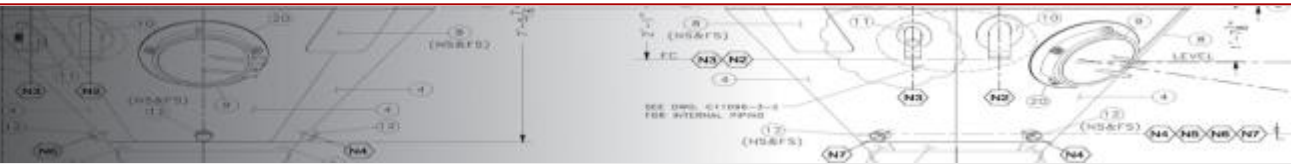
SMI engineers write the Smart-Iron software. They are experienced, licensed integrators fluent in Allan Bradley/Rockwell hardware and software applications. They can answer any question and resolve almost any issue. Their support is 24/7 and they are never far away via telephone and the internet.

As you will see, these plants really do think for themselves. They make your job easier and more profitable.

We look forward to a call from you. A fast courteous response is guaranteed.

1456 Hwy. 317 South Franklin, LA – USA  
Phone: 800-264-9894 Website: [www.smicompanies.com](http://www.smicompanies.com)

# From Design

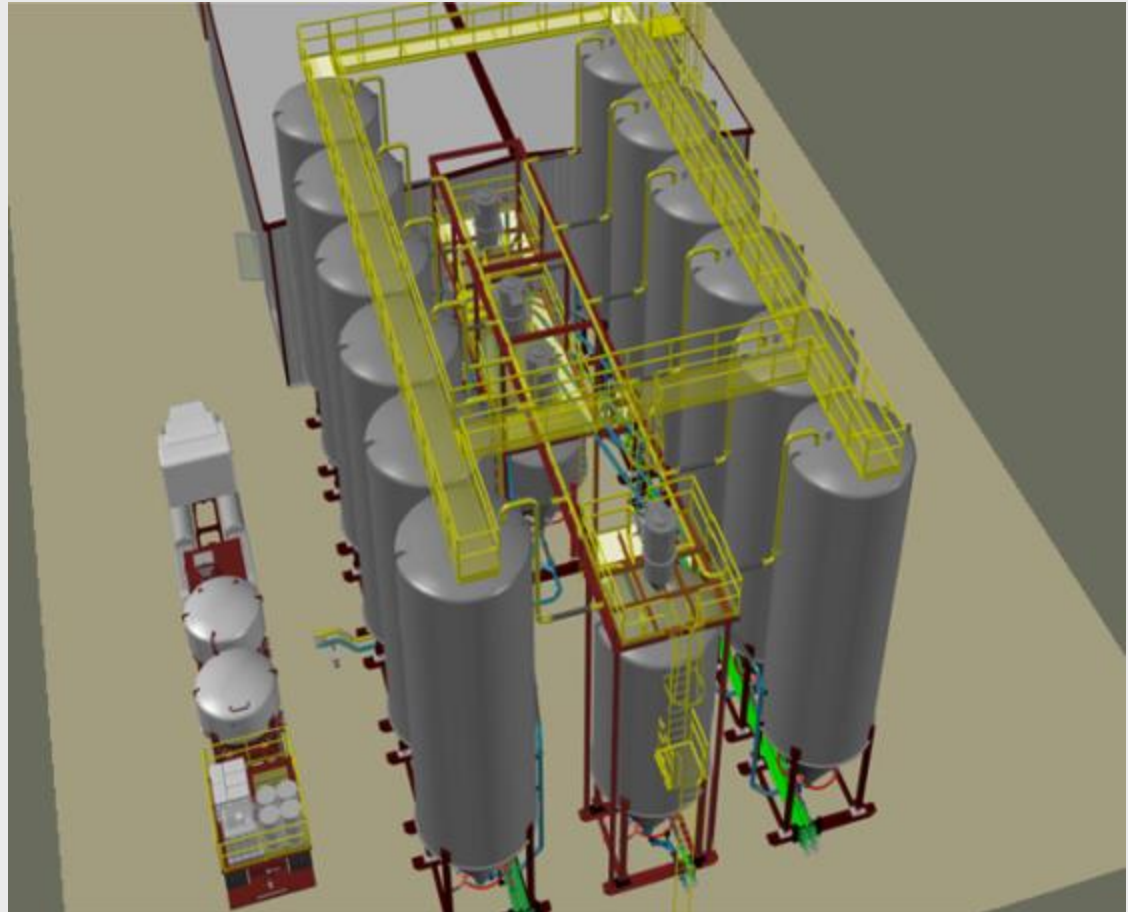


Utilizing 3D design software each plant is laid out in exacting detail and reviewed with the client to insure all process conditions and client expectations are met before manufacturing begins.

## Smart-Iron Technologies™

The 3D environment allows us to optimize the design in many ways.

- All walkways and work platforms are integrated allowing operator access to any area of the plant from a single ladder climb.
- Multiple ingress and egress points are provided. All ladder cages, platforms and handrails meet OSHA requirements.
- All piping and electrical is neatly routed using a rack system creating easy access and leaving aisles clear for walking.



# To Return on Investment

We understand things have to move quickly in the oil and gas industry. Responsive service and attention to detail are the name of the game. “You don’t make money building bulk plants, you make money blending cement”.

When your plant arrives on site it’s ready to go. All the thinking has been done and erection is easy:

*Simply stand the vessels on centerline, follow the piece marking sequence for the structural, piping and controls and bolt it together. It’s a full scale model of the original design in kit form.*



We’re not the biggest, but we **are** the best!

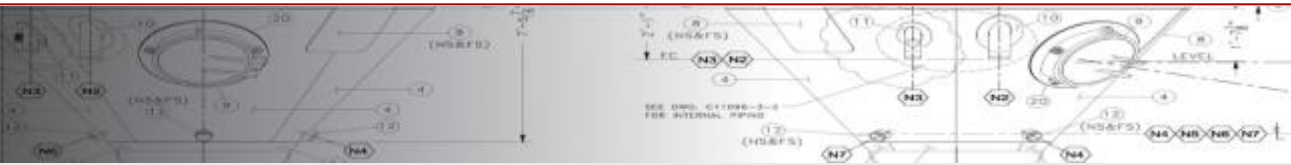
Here’s what customers say:

**“ I’ve run bulk plants for 17 years. This is the best one I’ve ever had.”**

*Michael Koster  
Bulk Plant Manager  
Cibolo, TX*

# Control Room

Smart-Iron Technologies™



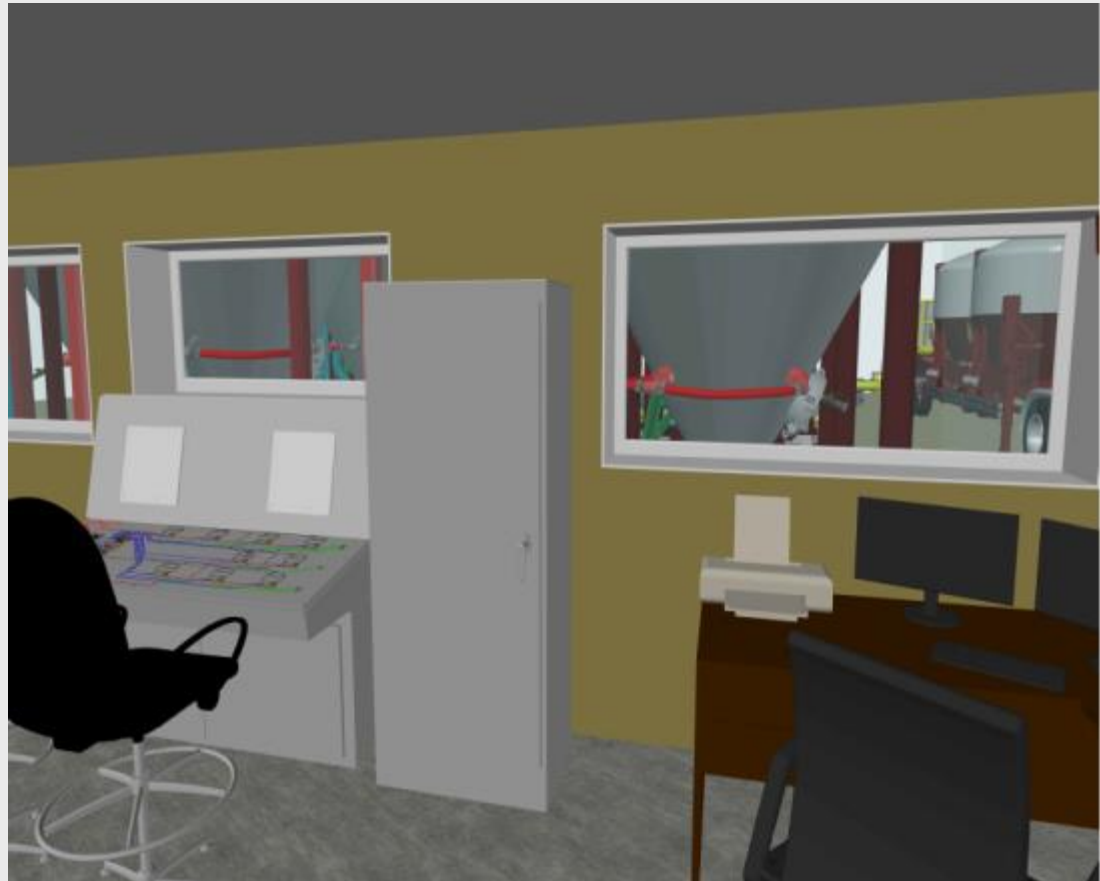
The control room is the center piece of the plant. Everyone tends to gravitate to it including your customers. We want you to make a good impression.

Our control rooms are spacious, approximately 24' wide and 20' in depth, clean and well lighted. The windows are positioned to give clear line of sight to all the operations of the plant.

From the PLC console the operator can see his silos and blend train, additive station, truck loading, sample catching and raw material deliveries.

Pull out keyboards on the console allow him to write batch recipes and edit them if necessary before printing. The shipping documents are recorded automatically and print on the printer to his right.

On busy days ticket printing can be done at this desktop work station by a second operator to increase productivity.





# PLC Console

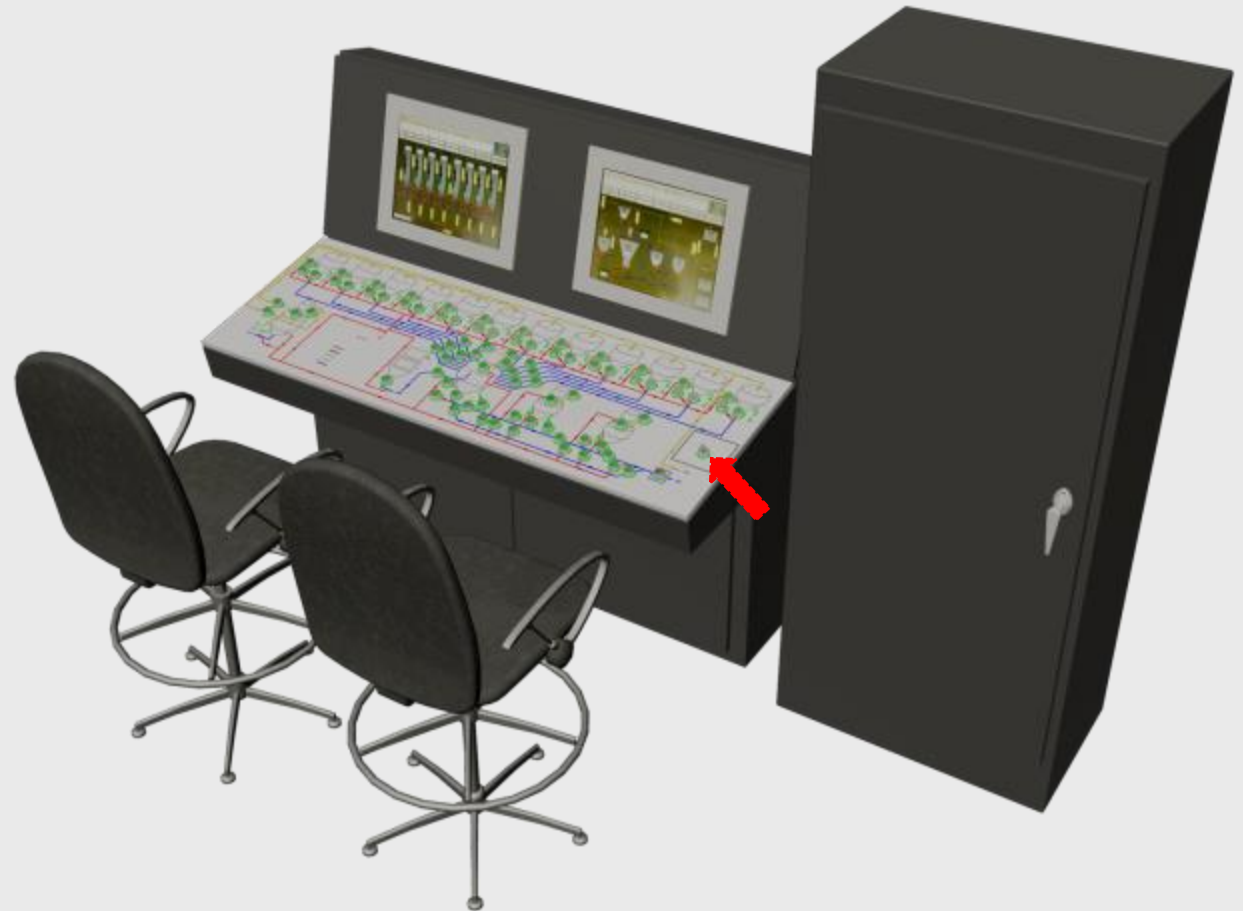
Smart-Iron Technologies™

Our consoles and PLC cabinets are manufactured from the finest quality components available. Each one is custom built to represent the actual plant process it controls.

The lighted push buttons and touch screen monitors control the plant in Manual mode. Pull out keyboards are used to write batches or recall them from previous orders in Auto mode.

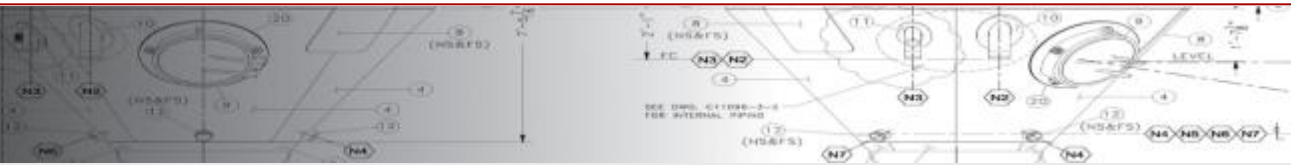
Auto, Manual and Pause modes can be selected with the switch indicated by the red arrow. In either case all transactions are recorded including operator ID.

Weights, pressures, compressor status and sampling are displayed and recorded in real time.



# Automation

Smart-Iron Technologies™



The Smart-Iron cement bulk plant process is fully automated. Batch recipes are written from pre-programmed menu screens containing all the products in the plant. Quantities for each ingredient are selected by weight. The system displays the batch as it was written for review and approval before the batch is placed in queue. When you are ready to pull, blend and load the batch you simply press the start button. The real time graphics and lighted push buttons on the desktop PFD (process flow diagram) show you what the plant is doing during the computer controlled process. The process is recorded and the shipping papers are generated automatically.

There is also a manual mode for operating the plant. It is there primarily for training purposes. In manual mode operators will know immediately how to run the plant and they will be very confident. The lighted push buttons on the PFD and touch screens resemble what they are used to seeing. It's a simple but powerful interface.

In the first phase of training we let the operators run the plant in manual mode and they really like it, in fact they like it so much that they don't want to run in auto because they have to use the pull out key boards to write the batch recipes. This is new to them and depending on their lifestyle (whether they are familiar with computers or not) tells us how to proceed.

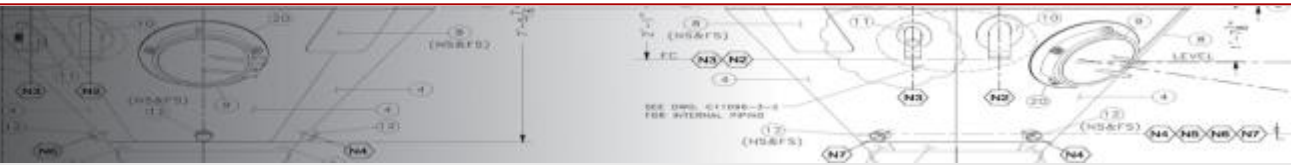
Here's a typical case history:

*We have an "old school" operator running in manual mode and he doesn't see why he should run in auto because he's doing a fine job. Someone walks in the door and asks him a question while he's pulling a silo ingredient to the weigh batcher. He turns to answer the question and when he looks back at the weigh batcher scale he has overrun the ingredient by 10 sacks (Cement is moving at 50 sacks per minute. This happens in 12 seconds). He immediately closes the silo discharge valve and now has to purge the line from this silo to the weigh batcher, maybe another 5 sacks. He shrugs his shoulders and says, "well, it's a 400 sack blend, this won't matter".*

*This happens all too often in manual plants. We ask him if the bulk plant manager would agree that it doesn't matter and he doesn't answer. We tell him that data acquisition has recorded the event and the system is running on his password. The guy is old school but he's not dumb. The next few words he says aren't worth mentioning but now he's ready to learn auto mode.*

*Auto is easy. The average operator will have no problem learning how to do it. It's just different.... but no more mistakes, everyone wins.*

*Now when he sees 6 or 8 valves open and close at the same time as the process shifts from the weigh batcher to blend one and the next batch in queue immediately begins to enter the weigh batcher he and the bulk plant manager both watch in amazement. We just tell them, "that's Smart-Iron".*



## Here are three things to consider before upgrading your process controls:

1. Choose your controls company carefully. Some integrators can only support certain hardware and software products.

We use Allan Bradley PLC's with Rockwell Control Logix software because it is an American made product and best performs to SMI requirements. We are not reps. for any manufacturer's products. We are able to select the best components available for each process application.

2. Think about how you will use the information from the system throughout your company. Systems integration allows access and visibility to information that can make your organization more aware, responsive and efficient.
  - Managers will be able to see product movement by customer and real time inventories. This can be done from a computer or with any smart device such as iPads and smart phones.
  - Batch recipes can be written remotely and downloaded to the PLC at the plant for processing.
  - Vendors can see the product inventory levels they are responsible for and get reminders when more is needed. This is called VMI (vendor managed inventory). These are just a few examples of what process integration can do.

The transaction information coming from the plant can be programmed to upload to your corporate file server at a convenient time and on a daily basis. The information is compatible with all major operating systems.

3. Think about security. What levels of access do you want your personnel and managers to have on the system?

We will show and guide you through the decision making process with your new system. Process integration mapping is unique to every business.

# Bulk Storage Silos

Smart-Iron Technologies™



The silos in our pressure/vacuum plants are non – ASME Code vessels. They are open vented to the dust collection system and are never placed under pressure or vacuum. They are secondarily protected by high capacity pressure and vacuum breakers.

Silos are available in various sizes, and quantities, 1,800 to 4,000 CF. These shown are 3,000 CF. They are standard with electronic scales and overfill protection.

This twelve pack of 3,000 CF silos will hold 36,000 sacks of inventory. Silos are available to suit your application needs.





# 3,000 CF Silo

Smart-Iron Technologies™



- Capacity ----- 3,000 CF
- Total Volume ----- 3,273 CF
- Certification ----- Non-Code
- Diameter ----- 11' 0"
- O A Height ----- 43' 6"
- Material ----- ¼" – A36 Steel
- Base Skid ----- W10x39 Beam
- Support Legs ----- 8" Sch. 80 Pipe
- Discharge Outlet ----- 1 - 5" Sch. 40
- Vent Outlet ----- 1 - 5" Sch. 40
- Fill Inlet ----- 1 - 5" Sch. 40
- Aeration System ----- 4 – 2" Sch. 40
- Flanges ----- 150# ANSI
- Electronic Scales ----- 4 – 150k ea.
- Manway ----- 1 – 20" Cam-bolt
- P/V Breakers ----- 3" – 750 SCFM
- Inspection Hatch ----- 4" Sch. 40



# Blend Train & Waste Tank

Smart-Iron Technologies™

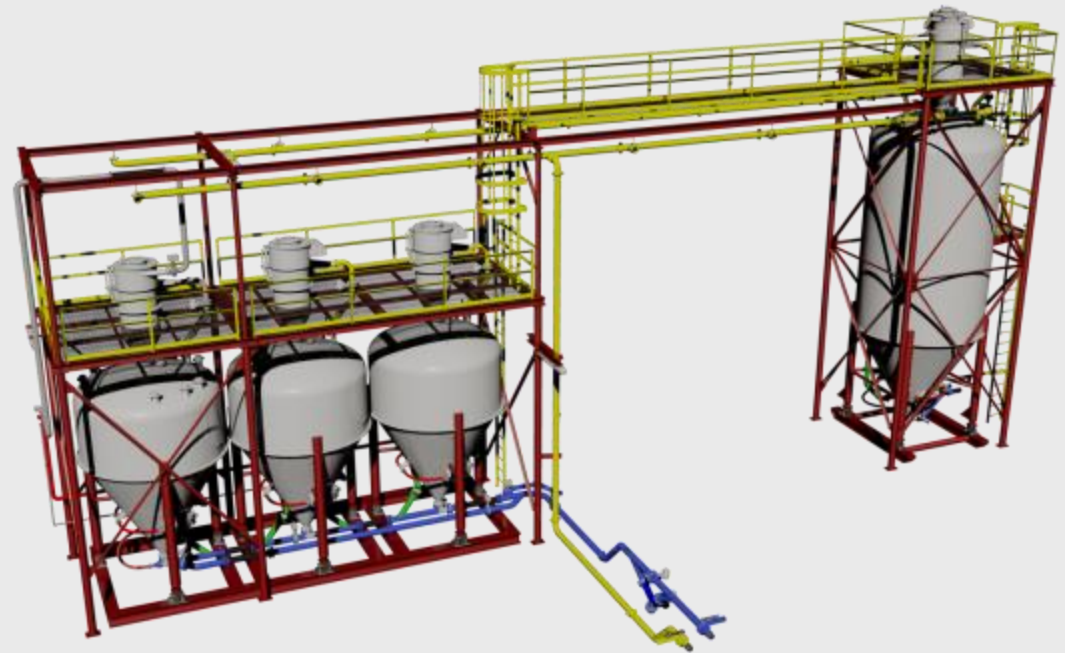
The Smart-Iron blend train uses a pneumatic three transfer blending process beginning with stacked and layered ingredients in the weigh batcher.

The PLC loads the weigh batcher with the silo ingredients and additives with great precision and speed.

Once the batch is transferred to the first blender the PLC begins to pull the ingredients for the next batch into the weigh batcher and will continue to process this way as long as there are batches in queue.

Each blend train vessel has a Metroplex dust collector on top. The dust collected in each transfer is returned to the process so there are no dust losses.

The waste tank collects the dust from raw purchases loaded into the silos and blended cement loaded into transports.



*The blend train featured here is designed for use in land based bulk plants loading trucks that must stay under DOT weight limitations (Approx. 400 CF batches). The process is scalable for applications where larger batches are necessary.*

# Blend Train w/ Dust Collectors

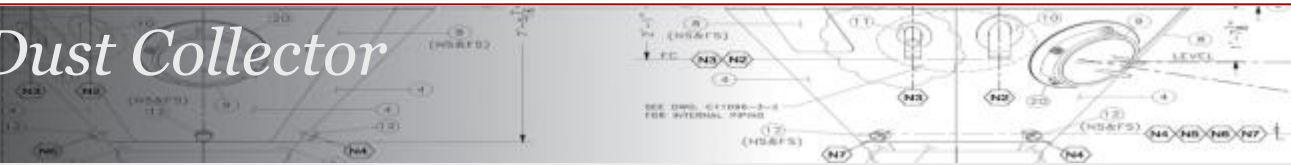
Smart-Iron Technologies™

Capacity ----- 500 CF Each  
Total Volume ----- 1,500 CF  
Certification ----- ASME U Stamp  
Diameter ----- 9' 0"  
O A Height ----- 24' 6"  
OA Width ----- 10' 0"  
Material ----- ¼"– 516-70  
Base Skid ----- W10x39 Beam  
Support Legs ----- 6" Sch. 80 Pipe  
Discharge Outlet ----- 1 - 5" Sch. 40  
Vent Outlet ----- 1 - 5" Sch. 40  
Fill Inlet ----- 1 - 5" Sch. 40  
Aeration System ----- 4 – 2" Sch. 40  
Flanges ----- 150# ANSI  
Electronic Scales ----- 3 – 30k ea.  
Manway ----- 1 – 20" Cam-bolt  
Dust Collectors ----- Metroplex



# Waste Tank w/ Dust Collector

Smart-Iron Technologies™



- Capacity ----- 1,800 CF
- Total Volume ----- 1,975 CF
- Certification ----- ASME U Stamp
- Diameter ----- 11' 0"
- O A Height ----- 37' 4"
- Material ----- ¼" – 516-70
- Base Skid ----- W10x39 Beam
- Support Legs ----- 8" Sch. 80 Pipe
- Discharge Outlet ----- 1 - 5" Sch. 40
- Vent Outlet ----- 1 - 5" Sch. 40
- Fill Inlet ----- 1 - 5" Sch. 40
- Aeration System ----- 4 – 2" Sch. 40
- Flanges ----- 150# ANSI
- Electronic Scales ----- 4 – 100k ea.
- Manway ----- 1 – 20" Cam-bolt
- Inspection Hatch ----- 4" Sch. 40
- Dust Collector ----- Metroplex



# Vacuum Additive Hopper

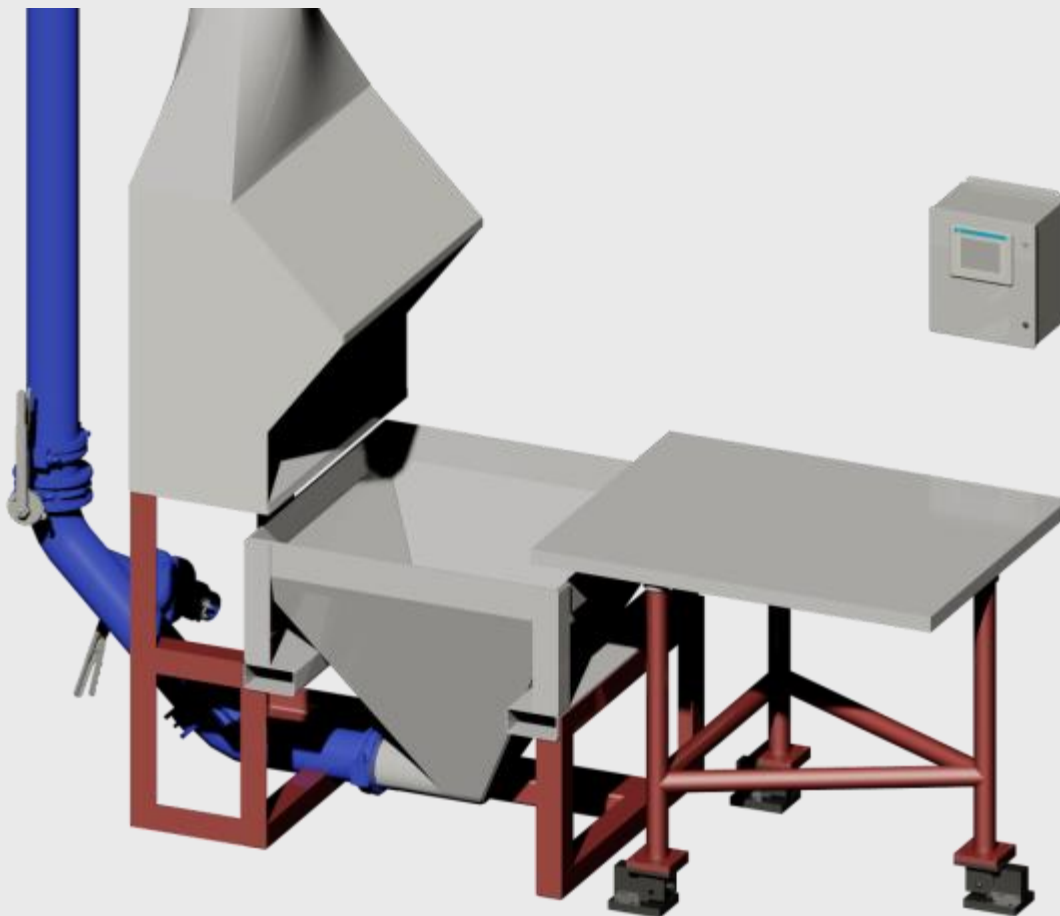
Smart-Iron Technologies™

The vacuum additive hopper sets up right outside the control room and is visible through the window to the operators left. It is integral to the Smart-Iron process via the scale table and the panel view touch screen interface. The dry add ingredients and weights appear on the panel view touch screen to be weighed in, confirmed and sent to the weigh batcher. The process is manual but directed by the PLC for the batch that is being run.

The hopper itself holds 10 to 12 sacks of material and is easily removed for cleaning.

## Safety Features

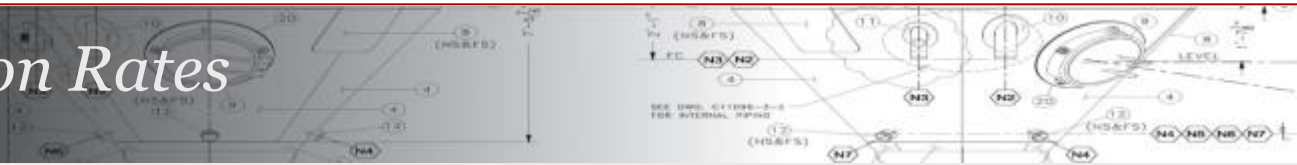
- The dust exhaust hood has a variable speed fan to safely remove transient dust from the area.
- The add hopper discharge valve has a vacuum verification feature in the PLC that prevents it from opening unless there is vacuum in the weigh batcher.





# Proven Production Rates

Smart-Iron Technologies™



*This narrative uses the term “sack of cement” to communicate concepts and express formulas: 1 sack (sk) = 1 CF (Cubic Foot) and 1 CF = 100 lbs. Cements and additives have differing specific gravities that are not being considered here. Factoring all the complexities of the differing specific gravities is exactly what Smart-Iron Technologies does.*

These production rates come from running plants that are achieving them on a daily basis with a single blend train.

Material will move at a minimum of 50 sks per minute through the process (Silos to WB, WB to B1, B1 to B2 and B2 to transport (*provided line sizes are not reduced on the transport*)). As a batch leaves the WB to B1 the second batch starts into the WB while the first is blending. This simultaneous operation doubles the rate of material being moved through the plant to 100 sks per minute.

Using the 100 sks per minute number divided by 4 (into WB then B1 then B2 then to truck)  $100/4 = 25 \times 60$  you get 1,500 sks per hour and 36,000 sks in 24 hours of continuous production.

The 36,000 sks per day is a pure number and is unachievable. The following considerations must be accounted for:

- **Cycle times** – are the time it takes a blend train vessel to go from 0 PSI to 15 PSI or 15 Hg. Cycle times are approximately 60 to 90 seconds and there are four of them per batch.
- **Cutting in additives** – takes a little training. It’s a two man operation and once the operators become efficient a 20 sk add can be done in 3 to 5 minutes. Most of this work is done while material is moving through the process.
- **Truck scheduling** – is not considered, though it can greatly affect production rates field blend silos can be used to eliminate any delays it may cause.

## For loading single air slide transports with 400 sks of blended cement weighing 40,000 lbs.

400 sks @ 25 sks per minute will take 16 minutes

Plus cycle times                      6 minutes

Plus cutting additives                5 minutes

27 minutes to load truck

1 truck every 27 minutes = 53 trucks or 21,200 sks per day (24 hours).

## For loading twin tank ABT’s with 400 sks of blended cement (200 sks lead & 200 sks tail) weighing 40,000 lbs.

200 sks @ 25 sks per minute will take 8 minutes

Plus cycle times                      6 minutes

Plus cutting additives                5 minutes

19 minutes per side x 2 = 38 minutes

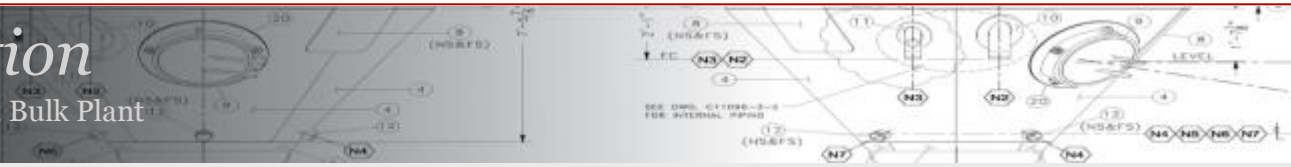
1 truck every 38 minutes = 38 trucks or 15,200 sks per day (24 hours).

A couple points worth mentioning are:

- In auto operation batches are written ahead of time or called back from previous jobs and put in queue to run consecutively. The process never stops.
- In auto operation consistent accuracy is assured by the PLC based process controls. Ticket printing is done automatically.

# Theory of Operation

Automated Pressure/Vacuum Cement Bulk Plant



Main ingredients such as Class A, C and H cements are purchased and stored in the silos and dry additive ingredients such as retarders, loss circulation materials and salts are stored in the warehouse in 50 lb. sacks. The PLC weighs and records each silo ingredient purchase and charges the material out to jobs as they are loaded (by volume not by price). Dry additive transactions are weighed and recorded as they are sold (put into the add hopper).

Real time inventory of silo ingredients is displayed at all times (eliminating the need for the dry erase board that is typical in most bulk plants). Silo inventories can be sent to vendors in real time with set point reminders that tell them when to refill.

In Auto mode the process begins by pulling the weigh batcher down to 15Hg. (This is a set point and can be assigned any value.) When it is reached the discharge valve on the appropriate silo is opened and half of the amount of material from the silo is pulled to the weigh batcher. This process is repeated for all silo material in the batch. Once half of all silo ingredients are in the weigh batcher the monitor will prompt you to put in the additives. As each additive is put on the scale its weight and identity is confirmed on the panel view touch screen at the add hopper station. Additives can be sent to the weigh batcher all at once or one at a time.

The Smart-Iron operating system has a safety feature called “vacuum verification”. The add hopper discharge valve will not be allowed to open unless there is vacuum present in the weigh batcher. This safety feature prevents the operator from opening the discharge valve to a pressurized weigh batcher and causing a blow back against a full or partially loaded add hopper.

Once the dry adds are in the process resumes in auto and pulls the second half of the silo ingredients into the weigh batcher. When all ingredients are in the weigh batcher the process shifts from vacuum to pressure and when it reaches 15 PSI the weigh batcher discharge valve is opened and the batch enters the first blender.

As soon as the first batch is out of the weigh batcher it shifts to vacuum again and begins to pull the silo ingredients for the next batch that is in queue.

The first batch will continue to move through blend 1 and blend 2 then it is ready to be loaded into the transport. The process will stop here and the blend 2 graphic on the monitor will flash in red, indicating the batch is ready for loading. With the truck in position, the fill and vent lines are connected and a sample bag is put in place. The final discharge valve is manually opened to load the truck.

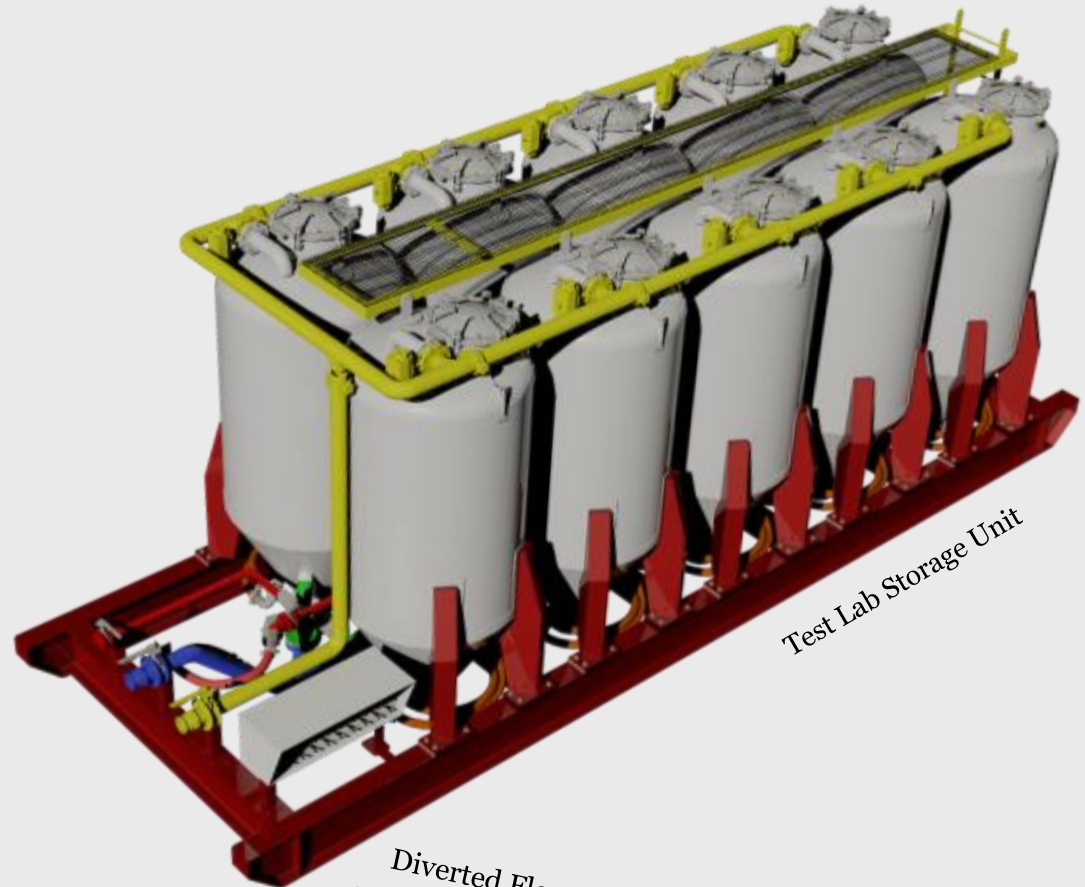
# Quality Assurance

Smart-Iron Technologies™

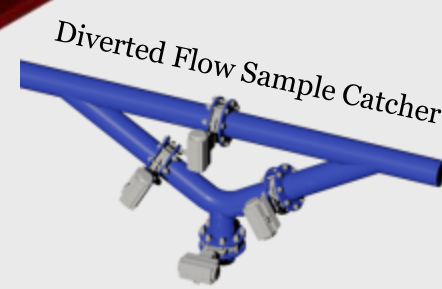
The SMI **Test Lab Storage Unit** and **Diverted Flow Sample Catcher** are the absolute best way to insure your plant is producing consistently homogenous blended batches of oilfield cement every time.

The storage unit comes complete with 10 – 100 CF ASME Code certified vessels, 20” cam-bolt manways, all process piping, pneumatic control panel and cam-lock connectors to tie right into your new or existing blend train.

The diverted flow sample catcher comes complete with its own controller to be installed on your existing blend train or it can be incorporated into the Smart-Iron control system. It takes a .25 CF sample (per API specs.) and gives you a true indication of blend consistently.



Test Lab Storage Unit



Diverted Flow Sample Catcher

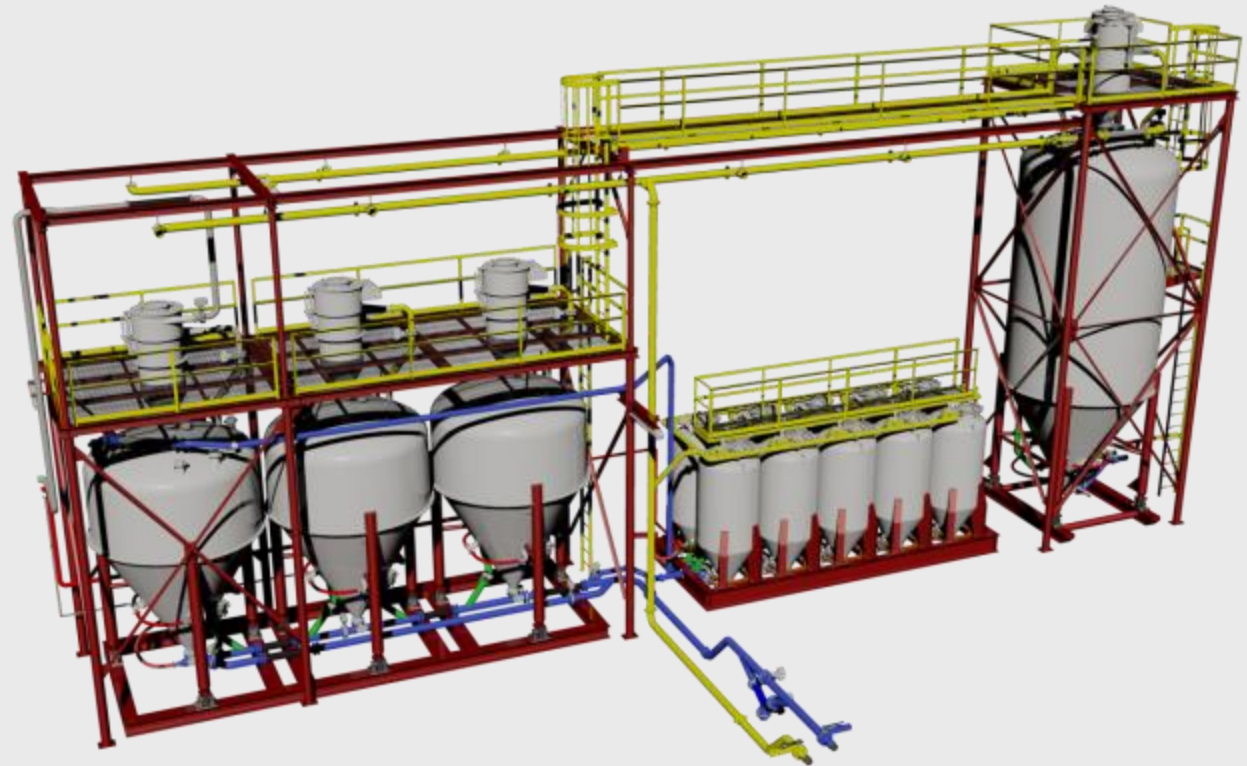
# Blend Train w/Test Lab Storage Unit

Smart-Iron Technologies™

Each Smart-Iron blend train is designed to have the test lab storage unit installed as shown in this graphic.

The unit can be part of the Smart-Iron operating system or it can stand alone with its own pneumatic control panel.

With or without a Smart-Iron plant, the test lab storage unit can be integrated into your blend train along with a diverted flow sample catcher.



# Standardization & Visibility

Smart-Iron Technologies™

SMI builds cement bulk plant facilities based upon standard parts designed for optimal performance in their particular part of the overall system. Multiple plant facilities then have major cost benefits with a single maintenance program, operator training program, safety program, common business controls, common operating reports and only one spare parts inventory need. Business controls impacted by Smart-Iron Technologies include:

- Minimal operating crew size. It only takes three personnel to run a Smart-Iron plant.
  - ❖ Reduced worker's compensation insurance and benefits package cost.
  - ❖ Reduced liability and product liability due to consistency of automated processes.
- Improved site safety and environmental exposure (OSHA and regulatory compliance)
- Consistent SOP's (standard operating procedures) applicable to all facilities.
- Consistent operators training for all facilities.
- Standard Maintenance procedures at all facilities.

**Visibility** comes with internet connectivity. Managers and operators are now integrated into the system. This visibility makes a big difference.

- Visibility allows operators and managers to see the plant's activity remotely, inventory levels, job status, maintenance reports for instance are all visible.
- Visibility holds people accountable for plant maintenance, inventory management and productivity.



# Cement Bulk Plant (Problems)

Smart-Iron Technologies™

We are in bulk plants for one reason or another on a regular basis. Here are some of the common problems we encounter:

- Air compressors overheating
- Vacuum pumps damaged by cement dust
- Dust collectors overburdened
- Cement bridging in silos and blenders
- Cement and additives blocking up in piping
- Maintenance is lacking

These problems lead to major equipment damage, down-time, low production rates, inconsistent blending, higher maintenance costs and disappointed customers.

Our Smart-Iron plants are designed to eliminate all of these problems and give you many years of reliable service and consistently reliable results.

If you are experiencing any of these problems or others in your plant, the good news is they're all correctable. Give us a call and we'll schedule a visit to your facility for an assessment. We'll give you a written report on your plant's condition, strengths and weaknesses and our recommendation as to what needs to be done to bring it up to your standards. Best of all this service will not cost you anything!

# Automation Solves Problems

Smart-Iron Technologies™

Bulk cements and additives have differing specific gravities. These materials range from as little as 20 lbs. per cubic foot to as much as 100 lbs. per cubic foot or more. Because they are in powder form weight is the means used to determine the quantity of each ingredient in a batch and the total batch volume. Both math calculations are confusing to all but the most skilled operators.

In a manual bulk plant the operator is the quality control point. He is responsible for bringing the right ingredients in the right proportions from the silos and the add hopper to the weigh batcher and processing them through the blend train. Operating precision is difficult and consistency errors are not uncommon. He does this by feel and knowing the plant.

SMI's Smart-Iron Software is programmed to know the weight of each ingredient, where it is in the plant and the length of piping between the ingredient source and its destination is calibrated. In Auto mode the process runs with greater precision and speed than a human operator. The software automatically prints the shipping documents (with preview option) and records each transaction.

Whether in Manual or Auto mode the software knows the size of all the vessels in the plant and will prevent an operator from running a quantity that is too large by volume into any vessel.

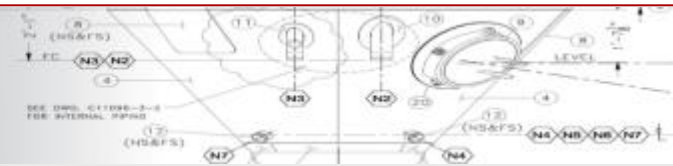
In light of recent events in the Gulf blend consistency and other bulk plant procedures are being paid particular attention by the major oil companies. Just getting the ingredients and proportions right for a given batch does not guarantee a homogenous blend. Inconsistently blended material causes many problems as this incident revealed.

To promote homogenous blending Smart-Iron Software looks at bulk plant ingredients in two ways, main ingredients and additives. Main ingredient totals are split in half while additives (usually only 2 to 5% of a given batch) are taken as a whole. For instance, if a batch calls for 200 sacks of Class H as a main ingredient, 100 sacks would be pulled, the additives brought in and the remaining 100 sacks stacked on top. This layering of ingredients followed by three consecutive vessel to vessel transfers will produce consistent results.

Accurate sampling and lab testing using consistent procedures will insure a correct process exists for on-spec, homogenous blends every time. Sampling that is done in multiple small increments throughout the loading process will tend to give favorable lab results but may not catch blending inconsistencies. The best way to obtain true results on blending efficiency is to use a *diverted flow sample catcher* and trend the results taken over several batches. SMI manufactures the diverted flow sample catchers and the *test lab storage units* as part of our Quality Assurance Program for its clients.

# Operator Interface - Main Screens

Smart-Iron Technologies™

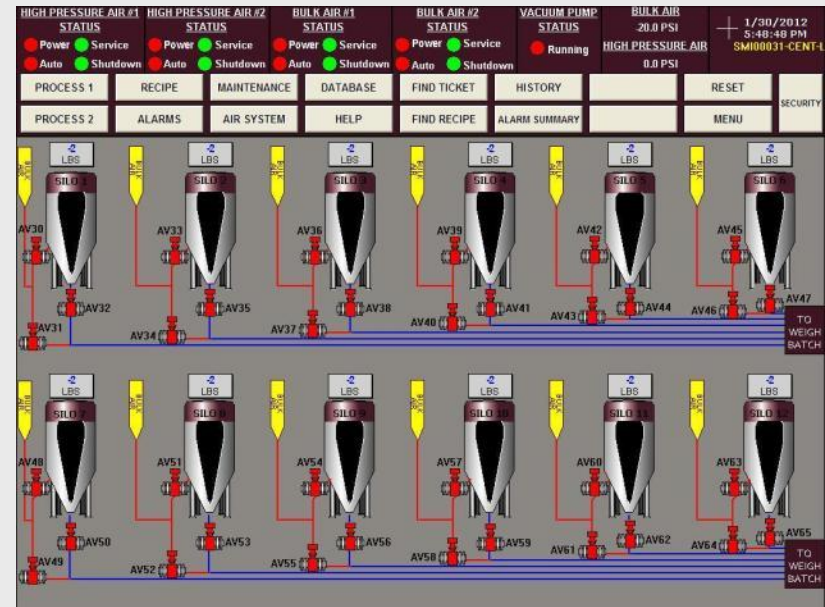
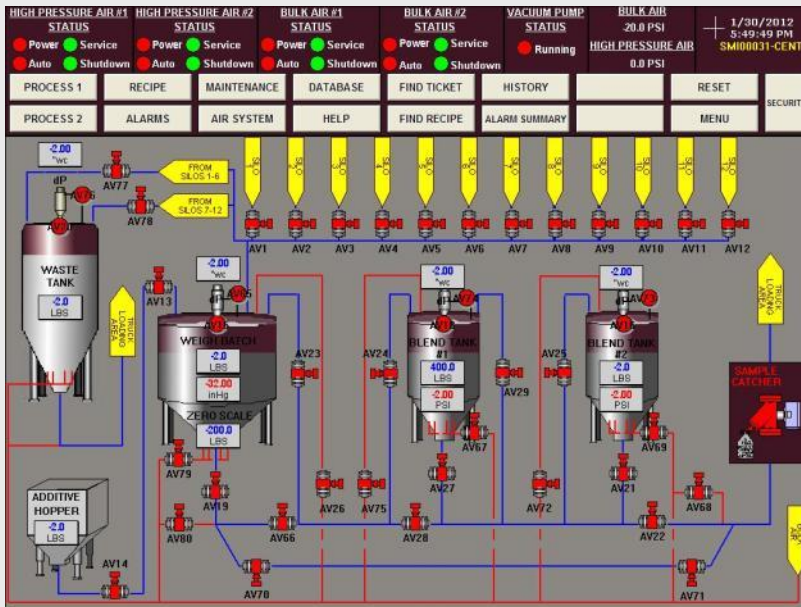


The Smart-Iron operating system has two modes of operation “manual” and “auto”. In either operating mode the process screens, safety features, maintenance bulletins, reports and security settings function the same way and can be set up to your preferences.

During plant operation, two primary screens (below) are in display – left “blend train screen” - right “silos screen”.

All weights and pressures are displayed in real time. The valves are operable from the screens or the push buttons on the desktop in manual mode.

All other screens are available and can be displayed at any time by selecting them from the tool bar menu. Air system status is displayed above the tool bar.





# Operator Interface – Shipping Tickets

Smart-Iron Technologies™

Shipping tickets are automatically populated with the batch ingredients entered from the recipe screens. As a batch is loaded the shipping papers will appear on one of the monitors for review and editing if necessary before printing.

The shipping papers document is custom formatted to your preferences. Each shipping document is numbered and can be tracked or sorted in the system numerically or by any other information field.

The screenshot shows a control panel with the following elements:

- Status Indicators:** Four sets of indicators for High Pressure Air #1, #2, Bulk Air #1, and #2. Each set includes temperature (0.0 Deg F) and pressure (0.0 PSI) readings, and three status lights: Power (red), Service (green), and Auto/Shutdown (green).
- Vacuum Pump:** A 'Running' indicator.
- System Time:** 8/3/2012 1:59:48 PM.
- User:** VIN-THINK engineer.
- Navigation Menu:** Buttons for SILOS, RECIPE, MAINTENANCE, DATABASE, FIND TICKET, HISTORY, SHIPPING TICKET, RESET, SECURITY, WEIGH / BLEND, ALARMS, AIR SYSTEM, HELP, FIND RECIPE, ALARM SUMMARY, REPORTS, and MENU.
- SHIPPING TICKETS Screen:**
  - PLC Clock:** 01 - 01 - 0000, 00 : 00 : 00.
  - SHIPPING TICKET 1 and 2:** Two identical forms with columns for 'INGREDIENT' and 'WEIGHT'. Each form has a 'RESET RECIPE' button.
  - Form Fields:** CUSTOMER, LOCATION, WELL NAME, and DEPTH.
  - Totals:** 'TOTAL BATCH WEIGHT 0 LBS' at the bottom of each form.

| SHIPMENT NO.  |  | OPERATOR ORDER NO. |                               | DATE SHIPPED          |                           | REGISTRY NO. |                          |
|---|--|--------------------|-------------------------------|-----------------------|---------------------------|--------------|--------------------------|
| 2301  |  |                    |                               |                       |                           | PAGE 1 OF 1  |                          |
| TRUCK NO. MOTOR VESSEL NAME   | TRAILER NO.  | CUSTOMER           | JOB LOCATION (PLANT OR FIELD) | WELL NAME OR JOB NAME |                           |              |                          |
| SPECIAL INSTRUCTIONS  |  |                    |                               |                       |                           |              |                          |
| PLC/MOTOR REQUIRED: TRUCK   |  | TRAILER            |                               | PORTABLE TANKS        |                           |              |                          |
| UN  | DOT SHIPPING DESCRIPTION (SHIPPING NAME, HAZARD CLASS, UN & PACKAGE GROUP) | CHEMICAL NAME      | WT. (LBS)                     | TYP. PACKAGE          | NO. OF PACKAGES           | UNIT         | QUANTITY RETURNED        |
|   |  | Class C            | 9440                          | TANK                  | 1                         | PF-903       |                          |
|   |  | Calcium Chloride   | 188                           | TANK                  | 1                         | PF-001       |                          |
|   |  | Class C            | 9520                          | TANK                  | 1                         | PF-903       |                          |
| UNIT  |  |                    | DESCRIPTION                   | WEIGHT                | UNIT                      |              |                          |
|   |  |                    |                               |                       | Total Weight 19148.00 LBS |              |                          |
| THIS IS TO CERTIFY THAT THE ABOVE NAMED MATERIALS ARE PROPERLY CLASSIFIED, DESCRIBED, PACKAGED, MARKED AND LABELED AND ARE IN THE PROPER CONDITION FOR TRANSPORTATION ACCORDING TO THE APPLICABLE REGULATIONS OF THE U.S. DEPARTMENT OF TRANSPORTATION OR LOGGED TO THE SATISFACTION OF THE CUSTOMER. |  |                    |                               |                       |                           |              |                          |
|   |  |                    |                               |                       |                           |              | CERTIFIED BY (SIGNATURE) |



# Training, Commissioning & Support

Smart-Iron Technologies™

Training begins when your plant arrives on-site. It is important that your bulk plant manager and one or two lead operators are involved in the assembly process. By observing the assembly process they will know where everything is and better understand how the process works. Once the installation is complete we spend the first week of operation on-site with you commissioning the plant. Training is accomplished while producing and selling product and insuring that your operators are proficient at running the plant.

Once our presence at the site is no longer necessary our continued support is provided by telephone and the internet. We can answer any question and address almost any condition.

For example, while talking to you on the phone we take over your monitor using VPN access software and show you how to correct a problem or change a set point. This support is available to you 24/7 and is free for your first year's operation. Subsequent years can be purchased at your option. We support all of our plants this way.

Here's what customers say:

**“Our plant has been in operation for two and a half years. When we call for assistance or with a question or problem SMI's response is fast and professional. They do a good job supporting their products.”**

Brian Watson  
Bulk Plant Manager  
Artesia, NM

# Clean Dry Air Supply

Smart-Iron Technologies™

Air is the motive force in a cement bulk plant. There are three types used in a pressure/vacuum plant, **instrument air** (operates the butterfly valve actuators and pulses the dust collectors), **bulk air** (moves product through the blending process and out the truck or marine vessel) and **vacuum** (pulls batch ingredients from the silos and additive hopper to the weigh batcher).

The process requires three different types of air machines and because a bulk plant is dead in the water if any of them fail, SMI's Smart-Iron air package has 100% redundancy built in. Down time is eliminated.

Air compressors are designed to run at a given pressure and volume. In a cement bulk plant they have to sit at idle for long periods and then run at 100% capacity to fill a large vessel from 0 PSI to approximately 15 PSI or 15Hg. It's a rough service life and compressors tend to overheat in hot weather.

In the Smart-Iron air package each machine is designed to run at the specific pressure and volume required by the plant for optimum performance. The compressor room is insulated, sound attenuated and ventilated. Hot air from each machine's oil cooler is dumped outside. Fresh air is brought into and taken out of the compressor room by VFD controlled blowers to maintain temperature.

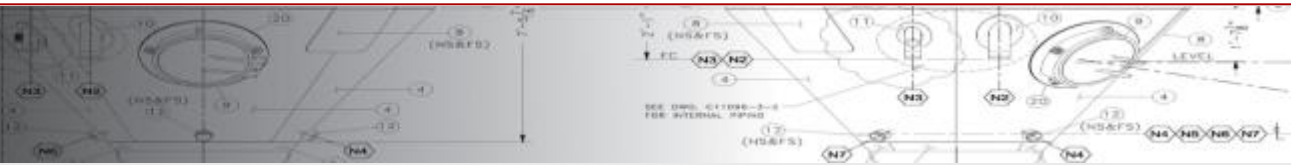
Each machine is protected from dusty air by a properly sized filtration system that is specifically rated to its requirements.

All compressors are controlled and monitored by the PLC. Maintenance bulletins and system alerts are displayed and recorded at the operator's console to insure required maintenance is performed.

Our air systems run reliably in hot desert environments with no overheat issues.

# Compressor Room

Smart-Iron Technologies™



The graphic to the right gives you a perspective of the front a typical dry storage warehouse with our control room, add hopper station and compressor room in place. Our equipment takes a foot print of approximately 70' W (across the front) x 25' deep.

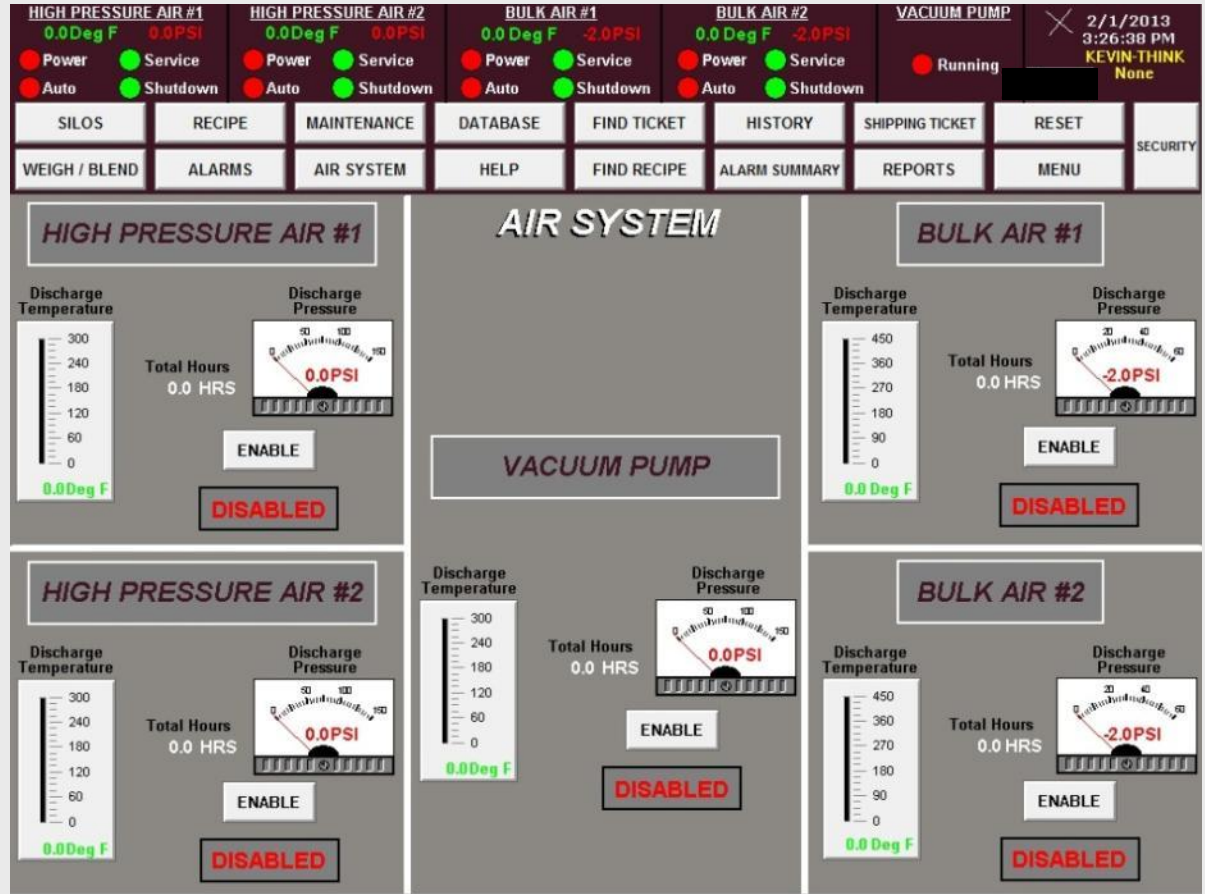
The profile of the compressor room shows the exterior wall with the 3/4" dry wall, 4" mineral wool insulation and the perforated interior panel.

With all the machines running and all doors closed sound levels are 72 db (decibels) at 36" inside the warehouse. This is the equivalent volume of the normal human voice



# Compressor Screen

Smart-Iron Technologies™



The air supply system is the single most expensive component in the plant.

In a Smart-Iron plant the air machines are controlled and monitored from the control console.

By selecting the “air system” button on the tool bar this screen will be displayed.

Air system status is displayed above the tool bar at all times.

# System Integrity Testing

Smart-Iron Technologies™

In a cement bulk plants butterfly valves are used to direct the flow of material. All valves are subject to abrasive wear and have an operating life. To insure product quality and efficiency it is critical to know valve condition at all times.

System integrity testing is an automatic function performed by the Smart-Iron software. Selecting the “Integrity Test” button from the tool bar menu initiates the testing sequence. The sequence is a one hour comprehensive test resulting in a status and record of the test run.

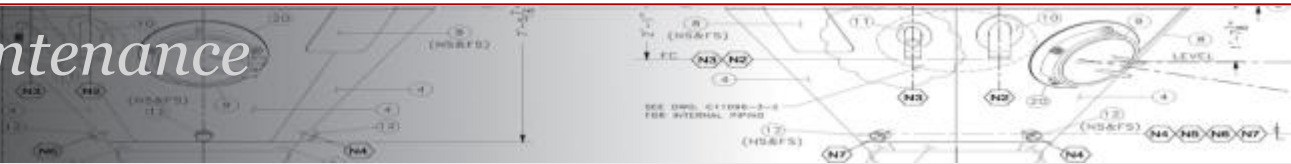
Silo primary discharge valves are tested individually. Weigh batcher and blender valves are tested as a group. Leaking valves are identified and the severity of the leak is shown in CFM. This information is interpreted by the software and a report addressing necessary corrective actions is generated.

Smart-Iron software gathers and records the volume of material that passes through each valve and pipe section and compares it to the known wear rates for each location. With this information the software builds a report called “Valve Life” that is available for review at any time. It is displayed as a bar chart indicating the total life expectancy of each valve v/s its current condition.



# Preventative Maintenance

Smart-Iron Technologies™



Maintenance schedules are programmed into your Smart-Iron software for all the major components of the plant. Routine service intervals for your compressors are set based on run time and will display on the screens in the control room and be recorded as service bulletins. Service bulletins can be postponed (by operators with security clearance) if plant demands dictate but will continue to reappear and be recorded until the scheduled maintenance is performed.

Compressor temperatures are monitored and will send alerts if set point values are exceeded. Alerts are recorded and can be used for analysis and trouble shooting. If temperatures reach high/high set points the machines will shut down until the condition is addressed.

Product flow is measured and recorded through each valve and pipe section. The valve life report can be programmed to give pop up service bulletins.

Differential pressure is measured across the filters in all dust collectors to indicate efficiency. Set points can be programmed from this information to give pop up service bulletins. This monitoring capability can make the difference in States where air permits are hard to get.

The Smart-Iron process uses visibility and accountability to promote a reliable preventative maintenance program.

# All Things Considered

“A bulk plant is an investment. Our goal is to build a plant that makes your investment back quickly.”

**Here are some ways we do this:**

▪ **Reduce Labor Cost 30%**

➤ The optimal crew size to run a Smart-Iron plant is three properly trained personnel including the supervisor. In Auto mode one man can effectively run the plant when necessary.

▪ **Reduce Maintenance Cost 15%**

➤ Maintenance costs are significantly reduced by the preventative maintenance features built into our operating system. This savings is magnified when there are multiple plants running a standard process.

▪ **Reduce Production Cost 20%**

➤ Simply put, on a busy day no human operator can match the speed and accuracy of the Smart-Iron operating system. Process errors and the liability they cause are virtually eliminated.

**These are major points but there are many ways Smart-Iron Technologies make you money. This state of the art technology is driven by a knowledgeable and experienced team of professionals who are dedicated to being the very best.**

## Our services include:

**Plant Design**  
**Manufacturing**  
**Construction**  
**Automation**  
**Process Controls**  
**Plant Assessments**  
**Trouble Shooting**  
**Upgrades**  
**Expansions**

**Site Surveys**  
**Facility Acquisition**  
**Facility Design**  
**Cost Analysis**  
**Project Planning**  
**Project Management**  
**Permitting**  
**Licensing**

# *Leasing Programs*

SMI Smart-Iron Technologies <sup>TM</sup> cement bulk plants can be leased in many circumstances, particularly in multiple plant strategic programs.

SMI leasing resources can be made available as an integral part of new facility construction.

Contact us at our offices in Franklin, Louisiana at (337) 836-9894 or call me directly at (337) 578-2086.

Thanks,  
Benny Splane  
Director of Sales and Marketing

