
BULK PLANT TRAINING MANUAL



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Abbreviations

ASM	Anti-settling material
BWOC	By weight of cement
BWOW	By weight of water
CDF	Cement defoaming agent
CDM	Cement density modifier
CFL	Cement friction reducer
EA	Expansion additive
ERP	Emergency Response Plan
FA	Foaming additive
FLEX	Functional Injury Prevention Training; Sanjel's pre-work stretching program
FS	Foam stabilizer
FWC	Free water control
GCA	Gas control additive
GSS	Gel slurry stabilizer
HSEP	Health Safety and Environment Practices
HTR	High temperature retarder
IPG	Invert preflush gellant
LCC	Lost circulation composite
LCG	Lost circulation granular additive
LCL	Lost circulation lamellar additive
LOTO	Lock Out Tag Out
LTR	Low temperature retarder
MCR	Multipurpose cement retarder
NaOH	Sodium hydroxide
PPE	Personal protective equipment
PRV	Pressure relief valve
psi	Pounds per square inch
QSR	Quick set retarder
SBS	Microsoft Dynamics AX software for purchasing/inventory management
SCA	Sanjel cement accelerator
SDS	Safety Data Sheet
SPC	Self-pressurizing cement
TDG	Transportation of dangerous goods
WG	Water gellant
WWS	Water wet surfactant



1 Introduction to the Bulk Plant

Role of the Bulk Plant Operator

The bulk plant operator manages all aspects of the bulk plant by taking care of all blending, loading, and inventory management. One of the most important duties of the bulk plant operator is to correctly blend products and load bulk trucks. Secondly, the bulk plant operator must ensure that the plant has sufficient inventory for upcoming work so that all blending can be done in an orderly and efficient manner.

The role of the bulk plant operator is vital to the company's success and is a large responsibility. Simple mistakes made in the bulk plant can lead to job failures resulting in millions of dollars of damages. It is important that the bulk plant operator understands their position, and is vigilant in their work.

The bulk plant runs 24 hours a day, and usually has a day shift and night shift operator. Each operator is expected to have the ability to run the plant efficiently without any issues. To do so, the operator must understand their role, understand how the plant works, and how to troubleshoot issues. This manual will give new operators a head start in learning how to run their plant properly.

Operator Career Path

Operators at Sanjel grow their career over time and take many different positions within the company. Every employee starts off in training, and continues to move along the career path of their choosing. Sanjel has many different paths for operators to chose, and room to grow in each path.

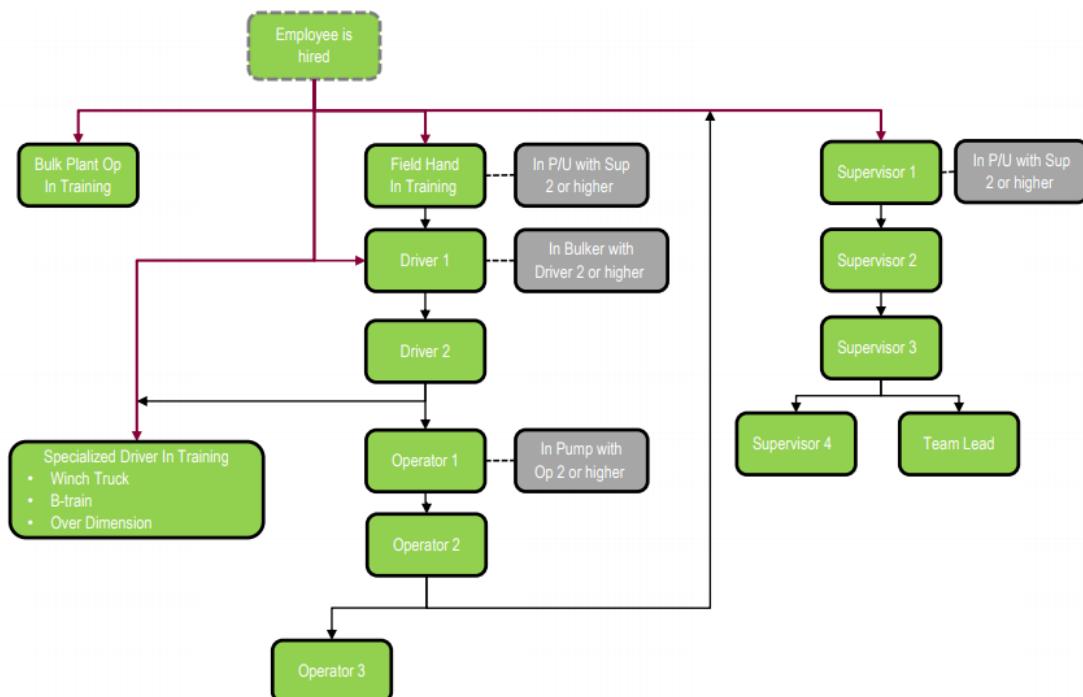


Figure 1-1 Operator Career Path



Bulk Plant Components

The bulk plant consists of many individual components that combine to make the plant operational. Each component is important in its own way and all parts must be understood and maintained to keep the bulk plant in working order. Below are some of the main components that make up a bulk plant:

- Storage Silos – store large amounts of cement or chemicals
- Product Lines/Load lines – the piping used to move dry bulk
- Air Supply Lines – provide pressure/air to move cement
- Vent Lines – allow a route for pressure to bleed off
- Dust Collector – a silo where vented dust can be collected
- Admix Bottle – where additives are added to the blend
- Weight Silo/Weigh Scale – used to weigh products (additives or cement)
- Storage facility – where chemicals and other materials are stored
- Blower – used to supply air
- Pressure Relief Valves (PRV) – relieve components of excess pressure
- Temperature Gauges – give a temperature reading of cement
- Grounding Cable – allows grounding of the system
- Ladders – allow staff to get to tops of silos



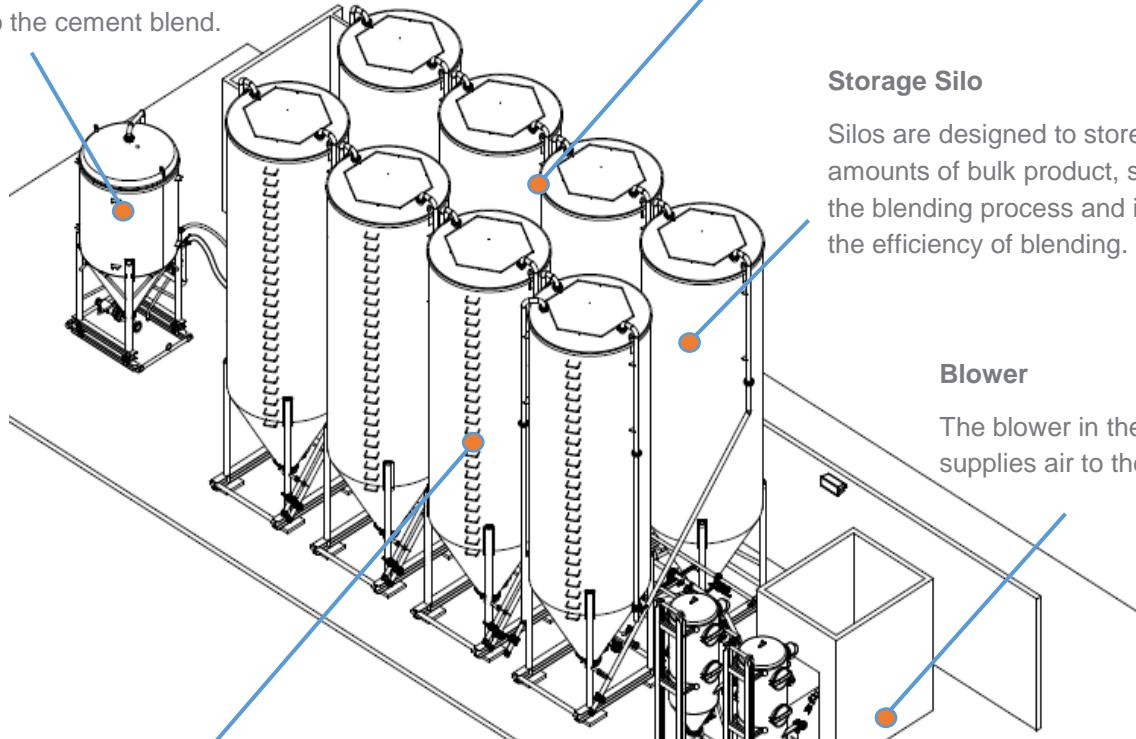
Figure 1-2. The Bulk Plant

The basic layout of a bulk plant consists of multiple storage silos positioned in two rows side by side and connected to one another by product lines. Near the storage silos and plumbed together by the product lines are the dust collector(s) and weigh silo. A storage facility which houses all the bulk plant's chemical is positioned close to the weigh silos. Inside the warehouse is the admix bottle, which is also plumbed into the product line going to the weigh silo. Air and ventilation lines run to each silo in the plant from the blower and dust collectors.



Weigh Silo

The weigh silo sits on a scale to allow the bulk plant operator to accurately add bulk and chemicals to the cement blend.



PRV

Pressure relief valves are devices used to limit the amount of pressure in the silos

Storage Silo

Silos are designed to store large amounts of bulk product, simplify the blending process and increase the efficiency of blending.

Blower

The blower in the bulk plant supplies air to the plant.

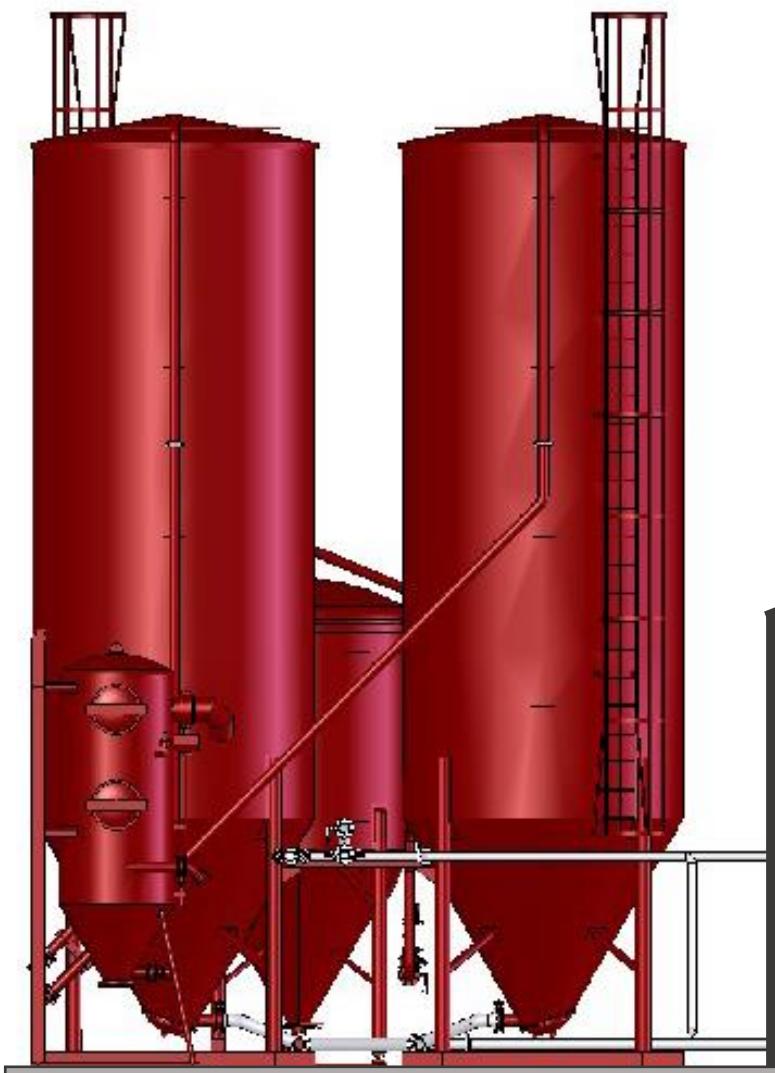
Ladders

Ladders are permanently fixed and allow access to the top of the silos

Dust Collectors

A dust collector is an air filter system, consisting of a series of socks, which capture the dust particles from vented air before the air exits into the atmosphere.

Figure 1-3. Isometric View of a Bulk Plant



Admix Bottle

The admix bottle is used to add chemicals to the rest of the blend. Chemicals are added by the operator then blown into the weigh silo

Warehouse

The Warehouse is constructed near the silos and houses all the chemicals needed for the bulk plant. The Admix bottle is inside the warehouse as well

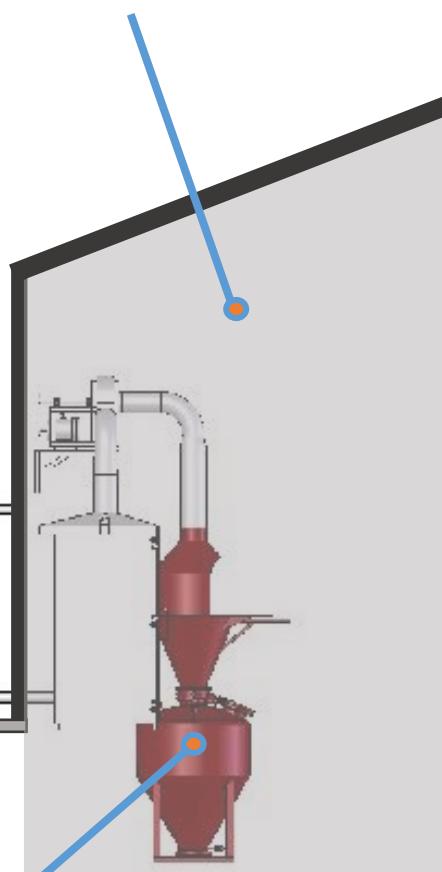
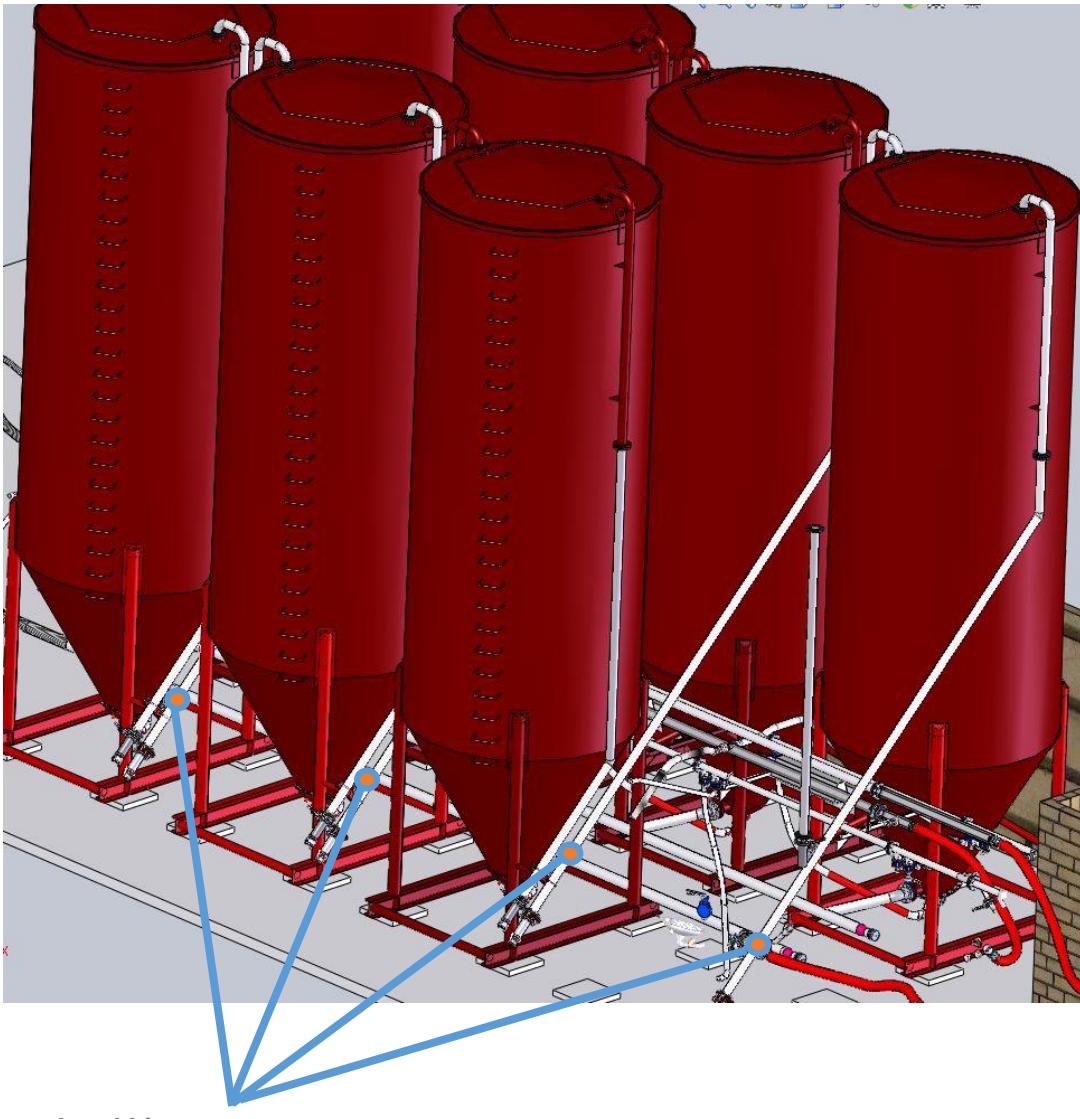


Figure 1-4. Silos and Warehouse

**Load Lines**

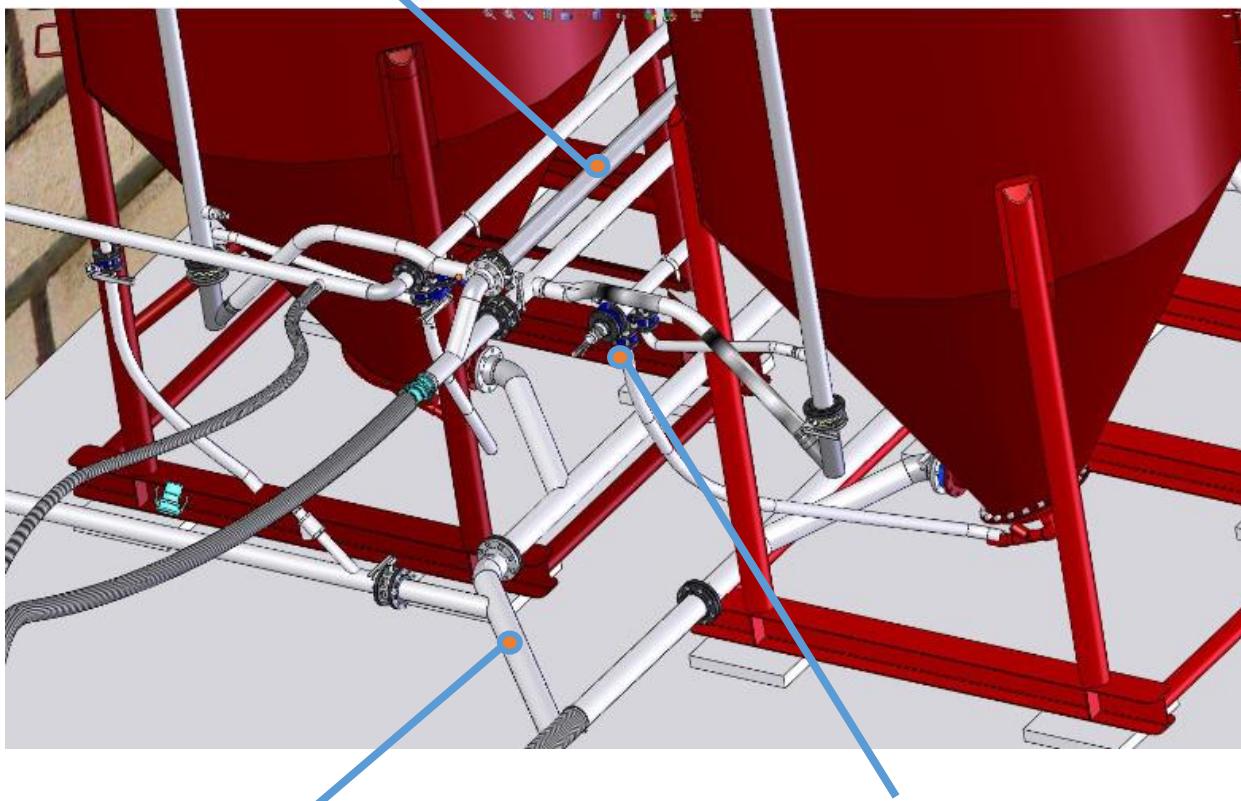
Load Lines are used to fill storage silos with product. The load lines are labeled for each silo and positioned so trucks can easily spot and fill from the outside of the plant.

Figure 1-5. Silo Load Lines



Air/Vent Lines

Designed to supply air and ventilation to silos for the purpose of moving bulk



Product Line

Steel lines, called product lines, are used to plumb the silos together. Each silo tees into the main product line running the length of the bulk plant.

Butterfly Valve

Butterfly valves are used to isolate lines from either product, air, or ventilation. Many valves varying in size and purpose are found throughout bulk plants.

Figure 1-6. Silo Air and Vent Lines



Each part of the bulk plant is described in more detail below to help get a better understanding of how all the components work together.

Silos

- Silos (Figure 1-7) are designed to store large amounts of bulk product, simplify the blending process and increase the efficiency of blending. Each Silo is labeled (Figure 1-8) to show which product it contains, and shows the corresponding MSDS for that product.
- A silo uses gravity and air pressure to unload product.
- The base of the silo is cone shaped with a canvass to help unload the product.
- When air is applied to the canvass, it vibrates allowing the product to exit through a butterfly valve into the product line.
- The silos must be bled down (air pressure bled down to 0 psi) when not in use



Figure 1-7. Storage Silos



Figure 1-8. Storage Silo Labels

GOOD TO KNOW

Most of Sanjel's silos are called "90 t" silos because they will hold approximately 90 t of 0-1-0 G cement. This does not mean that each silo will hold 90 t of other products. For example, the silo will only hold 9 tonnes of CDM glass spheres bubbles.

Note: It is important to know how much of each product a silo will hold (covered in depth in the bulk plant math section)



Product Lines

- Steel lines, called product lines (Figure 1-9), are used to plumb the silos together. Each silo tees into the main product line running the length of the bulk plant.
- These lines can become “washed out” over time, meaning small holes in the piping start to form and shoot bulk outward under pressure. It is important to inspect the product lines regularly, especially in problematic areas such as corners and T's where cement is forced to change directions. (These holes can usually be fixed by a welder)



Figure 1-9. Product Lines



Load Line and Load Line Lockout



Figure 1-10. Load Line/Load Line Lockout

- Load Lines are used to fill storage silos with product. The load lines are labeled for each silo and positioned so trucks can easily spot and fill from the outside of the plant.
- Load lines must be locked out at all times to prevent loading into the wrong silo. The bulk plant operator will keep the keys for locking out the lines, and they will unlock and ensure the correct line is being loaded when needed.

Air Supply Lines



Figure 1-11. Air Supply Lines

- Dry bulk systems use air pressure to move the product from one place to another. Both steel lines and hoses are used for supplying air pressure.
- A large hose feeds air into the top of the silo from the steel supply line.
- A smaller hose feeds air into the bottom of the silo's canvass from the steel supply line.



- A separate hose (purge line) supplies air from the steel supply line to ports along the product line. This air, combined with the air from the silo, moves the product to the weigh silo.
- Most of the air lines have a valve (Figure 1-12) to control how much air is supplied through each line. Moving bulk most efficiently is usually achieved by fine tuning these air valves.



Figure 1-12. Purge Line Control Valve

Note: When air is pressurized it heats up, and this can make the air supply lines very hot while in use, use your proper PPE when working in the bulk plant to avoid injury!

Vent Lines

- Ventilation is one of the fundamentals of the bulk plant. Without ventilation, product will not move from one silo to another.
- When loading dry product with air pressure, pressure must be vented off, otherwise back pressure in the silo being loaded will prevent you from moving the product.
- All vent lines have valves in order to stop ventilation, which allows pressure to build in a silo when supplied with air, which is needed to move bulk.
- All vent lines are routed to a “dust collector”, which traps dust (dry bulk) and allows air to exit into the atmosphere.



Figure 1-13. Ventilation and Air Control Valves



Product Hose

- The product hose (Figure 1-14) is used to deliver a cement blend from the weigh silo (or blend train) to the truck being loaded.
- The product hose is a dry cement line rated to 150 psi. Inspect all hoses for cracks and tears regularly.

SAFE WORKING

Camlocks must have a self-locking ears and be in good condition.



Figure 1-14. Camlock Fittings and Product Hose

Weigh Silo

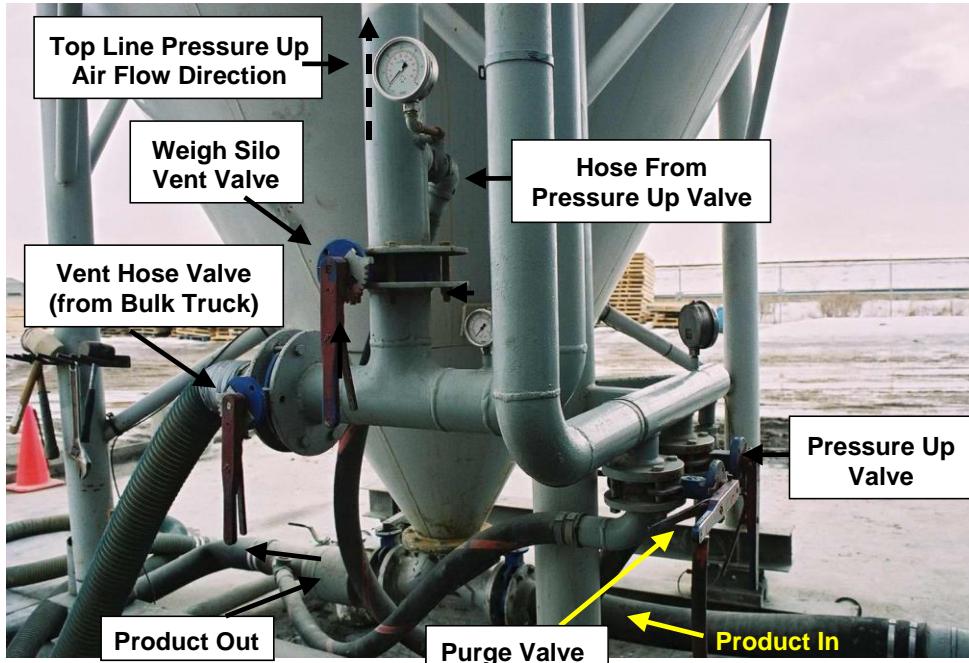


Figure 1-15. Weigh Silo with Air Control Valves

- The weigh silo (Figure 1-15) is different from the other silos.
- The weigh silo has separate product-in and product-out lines, with valves controlling each line.
- The weigh silo is mounted on a weigh scale (thus its name).



Ensure:

- The main base is level.
- There is no debris between mounts.
- That the scale is grounded
- In order for the scale to work properly, the main base and silo base must not bind or have any obstructions.
- Before loading the weigh silo, ensure the silo is empty by hitting it with a rubber mallet, and then check the electronic weight indicator to ensure it is reading zero.
- Scales are to be calibrated every year by a third party inspector or whenever there is a problem.
- Make sure your scale is reading in kilograms (kg).



Figure 1-16. Weigh Silo Scale

- Ensure the sample catcher is clean and working properly.
- Make sure the load screen is in good shape and not plugged.
- The screen catcher must be in place to stop any product lumps or foreign objects (e.g., bag fragments) from entering the trailer.

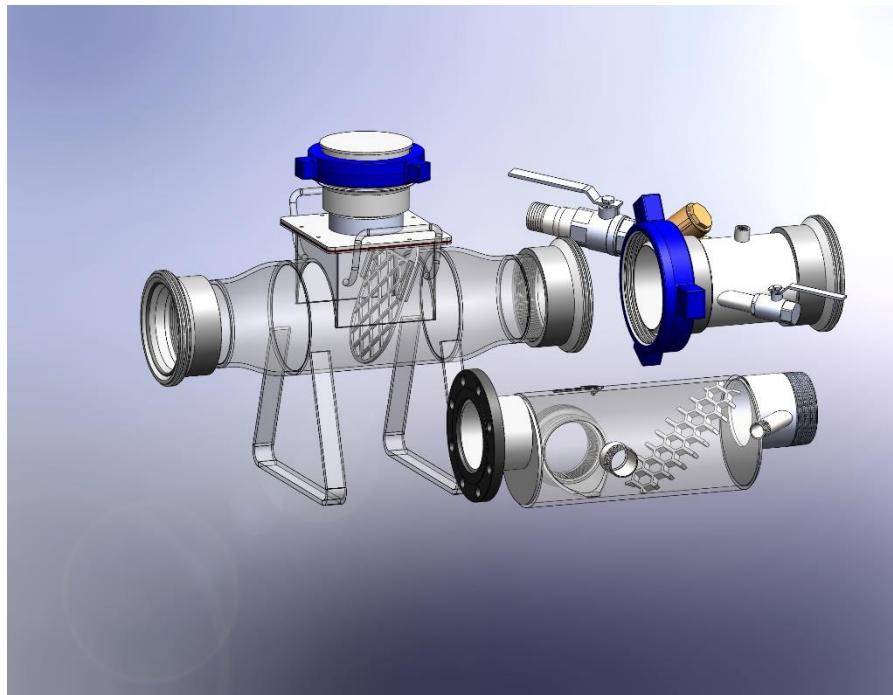


Figure 1-17. Screen Catcher

Dust Collectors

- A dust collector is an air filter system, consisting of a series of socks, which capture the dust particles from vented air before the air exits into the atmosphere.



Figure 1-18. Dust Collectors

- Venting to the atmosphere creates considerable dust, causing a great deal of pollution and a mess. In order to combat this, a dust collector is used. Everything must be vented through a dust collection system.



- A dust collector consists of 24-30 socks. These socks allow air to travel through them, but not dust particles. The socks have to be inspected regularly and either cleaned or replaced. Make sure to use the right size sock for the dust collector you have.
- If a large amount of dust is coming out the vent, the socks (Figure 1-19) need to be checked.
- To replace socks, the dust collector must be empty. When emptying the dust collector, close the dust collector vent line (to atmosphere). Air up the dust collector and empty the contents into the Class R silo. After the dust collector is empty, slowly release pressure then open hatch and clean or replace socks.



Figure 1-19. Dust Collector Socks

Admix Bottle



- The admix bottle (Figure 1-20) is a small silo where the bulk plant operator adds chemical by hand and blows the contents into the weigh silo.
- The admix bottle is below ground level to make adding chemical easier
- A fume hood ventilates chemical dust that is created when adding chemicals

Note: A full respirator is to be worn when using the admix bottle

Figure 1-20. Admix Bottle and Fume Hood



Storage Facility



The storage facility (Figure 1-21) is the main building which houses the chemicals for the bulk plant. Also found inside the storage facility is the bulk plant office, the admix bottle, and parking for the fork lift. Anything that needs to remain indoors is kept in the storage facility.

Figure 1-21. Storage Facility

Blower



- The blower in the bulk plant supplies air to the plant (Figure 1-22).
- Like all Sanjel's equipment, the blower is equipped with a pressure relief valve.
- The pressure relief valve is set to 18 psi (there is a pressure gauge attached).
- Allow blower to warm up before use by directing air through the bypass valve at an idle for 10 minutes.

Figure 1-22. Blower Compressor and Motor



Pressure Relief Valves (PRV)

- Pressure relief valves (Figure 1-23) are devices used to limit the amount of pressure in a system. PRV's are designed to release pressure at a set point either into the atmosphere or into an auxiliary system.
- Sanjel uses PRVs that are preset by the manufacturer to 15 psi. If air is added to a silo past 15 psi, these valves vent air out of the silos to the atmosphere. All silos must be equipped with pressure relief valves.
- It is important to make sure these valves work properly, and should be tested regularly.



Figure 1-23. Pressure Relief Valve

Temperature Gauges

- All silos are equipped with temperature gauges (Figure 1-24).
- Knowing the temperature of the product is very important for the crew mixing on location. (Temperature is a factor in time it takes for cement to set. Typically the warmer the bulk, the faster the cement will set)
- Write the temperature on the load ticket and the call sheet for supervisor.
- Check the temperature within the first 1 to 2 t of product transferring to get an accurate reading.



Figure 1-24. Temperature Gauge



Grounding Cable

- Grounding cables are used to keep the bulk plant grounded in the case of a lightning strike.
- Each silo must be grounded with proper grounding cable and stake.



Figure 1-25. Grounding Cable

Ladders

- Ladders are permanently fixed and allow access to the top of the silos
- These ladders allow the bulk plant operator to perform maintenance on components at the top of silos (PRV's, piping)

SAFE WORKING

Before climbing ladders, ensure you use fall protection and have fall protection training.



Figure 1-26. Silo Ladder



Third Party Drivers

- Third party drivers are often at bulk plants to deliver product and chemicals
- When offloading from a third party carrier at a Sanjel facility, a bulk plant operator must be present to validate the product ID and ensure the proper silo will be loaded. If the load cannot be verified, it must be returned to the vendor
- Third party drivers must use chock blocks when on Sanjel property



Figure 1-27. Third Party B-train

Small Weigh Scales

- All bulk plants have small weigh scales (Figure 1-28) for weighing chemicals accurately when portions of chemical bags are used.
- Keep the base clean of any debris.
- Use a clean pail and weigh the pail empty.
- When filling the pail, remember there is no vent to remove the dust and dust will travel up and out of the bucket.



Figure 1-28. Small Weigh Scale



2 Safety Procedures and Considerations

The bulk plant contains objects and areas that can pose a hazard if not dealt with in a safe manner. Everyday tasks can become dangerous if a safety culture isn't included in your work. This section covers common hazards found in the bulk plant, and the proper Personal Protective Equipment (PPE) and methods to mitigate these hazards.

REFERENCE

All referenced HSEP documents are found in SCORE on the Sanjel Portal.

Minimum PPE Requirements

While working in the bulk plant, some PPE is required at all times. The following is a list of the minimum requirements:

- Hard hat
- Safety Glasses
- Coveralls
- Steel Toed Boots
- Gloves: Cut resistant, Impact resistant, Rubber, Winter (task specific)

Other tasks include additional PPE. The following list is PPE for task specific protection:

- Full face respirator
- Hearing protection
- Boot spikes (winter only)
- Face Shield
- Chemical Goggles
- PPE for acid (covered later)



Figure 2-1. PPE Warning Sign

REFERENCE

For more information reference HSEP 009 – Personal Protective Equipment (PPE).



Crystalline Silica and Chemical Inhalants

The bulk plant has many powdered products and chemicals that easily create a breathing hazard when released into the air. These products contain crystalline silica or other harmful products damaging to your lungs.

A full face respirator must be worn whenever working:

- With dry cement/sand particulates/dust in the air
- In close proximity to any operation that produces particulate dust.
- In an area with the risk of potential exposure to harmful substances that may exceed occupational exposure limits.
- When a SDS requires (ex. If you are transferring a product where the SDS requires a respirator, then one must be worn).



Figure 2-2. Full Face Respirator

REFERENCE

For more information, reference
HSEP 012 – Crystalline Silica.

Pinch Points

Pinch points are present wherever an object can trap parts of your body and cause crushing injuries. Examples of pinch points in the bulk plant are product lines and valves (when changing out for maintenance), using a hammer, and the sliding door on the garbage compactor.

Impact resistant gloves are required when hammering or when working with heavy objects.



Figure 2-3. Hazard Identification Sign



Rotating Equipment

Rotating equipment possesses a serious hazard if part of your body or clothing is caught in it, or when an object comes in contact with the equipment and becomes a projectile. All rotating equipment should have a guard place (Figure 2-4). The air blower for the bulk plant is driven by a driveshaft from an engine; this rotating assembly is a common hazard at bulk plants.



Figure 2-4. Rotating Equipment Guard

Pressure

Pressure can be present in many areas in the bulk plant, and if not dealt with carefully can cause an incident or injury. All silos, dust collectors, and the admix bottle can contain pressure, and must be bled down properly. When not in use, all silo vent lines should be open. When maintenance is being performed on the plant, all pressure must be bled down and the blower (or air compressor) should be locked and tagged out.



Figure 2-5. Pressure Gauge

Safe Lifting

Lifting objects is a common activity at the bulk plant and doing so improperly can cause injuries throughout your body. Sustained work is much easier and safer using proper lifting methods, such as:

- Using a physical lifting aid, such as the forklift, if appropriate
- Plan a route and the final placement of the load
- Maintain a neutral spinal alignment throughout the lift



- Keep the load tight to the body
- Avoid rotating/twisting at the back

Warming your body up by stretching helps prevent injuries, always FLEX before starting a task involving lifting.



Figure 2-6. Safe Lifting Practices

Slips Trips and Falls



Slip, trip, and fall hazards are found everywhere and it is important to identify where they may be present. Employees should be conscious of environmental conditions to help prevent an injury. Employees should also have good housekeeping practices (do not leave tools lying around, shovel snow, etc.) to eliminate additional hazards. Some examples of slip, trip, and fall hazards at the bulk plant are:

- Tripping over product, air, and vent lines around the bulk plant.
- Slipping in icy conditions on ladders or stairs
- Falling off silos or piping while performing maintenance

Figure 2-7. Tripping Hazards



Safety Knives

Utility knives are used in the bulk plant to cut plastic wrap off pallets and for bags of chemical. Utility knives possess a sharp edge which can severely cut someone. Cut resistant gloves must be worn when using utility knives (Figure 2-8).



Figure 2-8. Safety Knife and Cut Resistant Gloves

Forklift



Figure 2-9. Bulk Plant Forklift

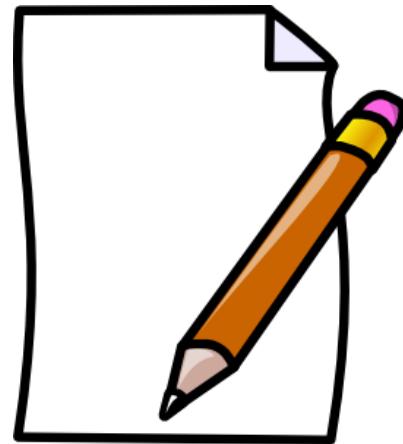
REFERENCE

HSEP 020 – Forklift Safety for more information.



Safety Training Requirements

Working in the bulk plant requires certain safety training courses before an operator may work there. The list of courses that are required for a bulk plant operator can be found in the Sanjel Portal under “Training” then “Training matrix.”



First Aid, Eye Wash, Fire Extinguisher



Figure 2-10. Emergency Eye Wash Station

All bulk plants contain first aid kits, eye wash stations (Figure 2-10), and fire extinguishers to be used when needed. Know where all of these stations are.

All eye wash stations must be inspected by a third party every 3 months (this is set up by each district)



Safety Data Sheet (SDS)

The Safety Data Sheet (SDS), also known as the Materials Safety Data Sheet (MSDS), is a book containing information regarding hazards of all chemicals in the bulk plant. Each chemical in the plant must have information present in the SDS for the following categories:

1. Product Identification
2. Composition/Information on Ingredients
3. Hazard Identification
4. First Aid Measures
5. Fire Fighting Measures
6. Accidental Release Measures
7. Handling and Storage
8. Exposure Controls/Personal Protection
9. Physical and Chemical Properties
10. Stability and Reactivity
11. Toxicological Information
12. Ecological Information
13. Disposal Considerations
14. Transport Information
15. Regulatory Information
16. Other Information

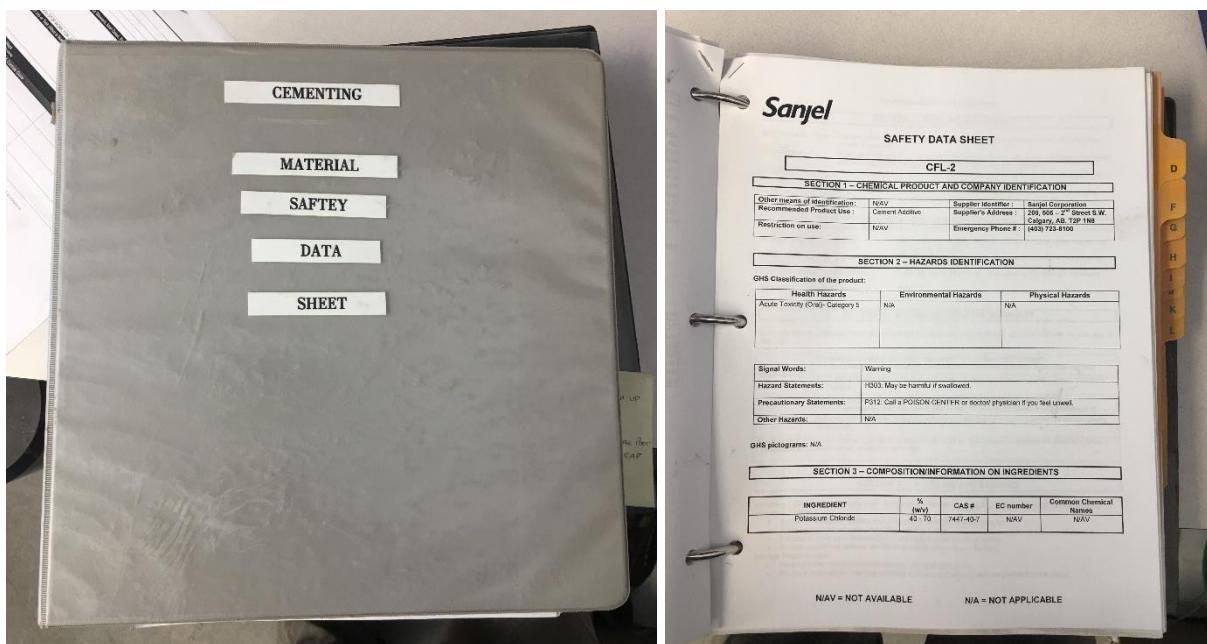


Figure 2-11: SDS Book

The SDS needs to be kept up to date. If a new product comes into your plant, SDS sheets can be found on the “Sanjel Portal” under the “ENG” tab (Use your email log in to access the site), then open the “Safety Data Sheets” folder and find the product in the list.



Lock Out Tag Out (LOTO)

Lock Out Tag Out (LOTO) is a safe work procedure used when servicing and maintaining equipment. It isolates and controls the release of hazardous energy that could potentially injure personnel.

REFERENCE

For more information, reference HSEP 15 – Lock Out Tag Out (LOTO).

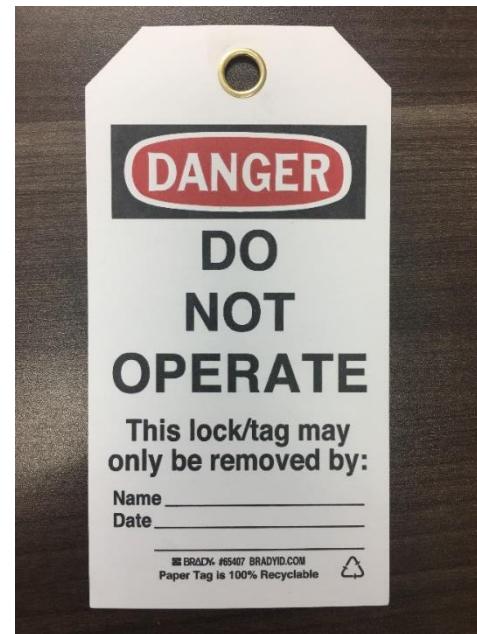


Figure 2-12. Lock Out Tag Out Identification

Emergency Response Plan (ERP)

In case of an emergency, every district office and bulk plant has an emergency response plan. The ERP contains information on what to do in an emergency, and phone numbers of who to call in certain situations. Know where your ERP is in the bulk plant.



Figure 2-13. Emergency Response Plan (and Other Equipment)



Safety and NSC Training Matrix

A training matrix can be found online on the “Sanjel Portal” which contains information on which safety training is required and encouraged for bulk plant operators prior to working in the bulk plant. This matrix must be read and understood, and any uncompleted training that is required needs to be brought up with your district managers.

The Training Matrix can be seen on the next page



Qualification R = Required E = Encouraged	Wellsite Ops: Execution Staff	Wellsite Visits: District Mgmt Team	Bulk Plant Team	Maintenance Team	District Admin.	Logistics Coordinators	Lab and EOS Teams	Head Office Team	Head Office: Wellsite visits	Retraining	Delivery Method	Qualification Abbreviation ⁷
NSC Training												
TDG	R		R	E			E			3 years	Online	TDG
Hours of Service	R	R		E		R				3 years	Sanjel	HOS
Fatigue Management	R	R	R	E		R	E			3 years	Sanjel / Online	Fatigue
Pre / Post Trip			E	E						no expiry	Sanjel	PrePost
Cargo Securement ¹	R									3 years	Sanjel / Online	Cargo
ODA / GODI ²	R									3 years	3rd Party	ODA or GODI
Light Vehicle Assessment ²	R	R	R ²	R ²		R ²	R ²	R ²	R ²	3 years	Sanjel	LV1
Heavy Vehicle Assessment ²	R									3 years	Sanjel	LV2
PickUp with Trailer Assessment ²	E ²									3 years	Sanjel	LV3 (PU Tr)
Yard Assessment			R	R						3 years	Sanjel	LV3 (Yard)
Bed Truck Assessment				E (Yard)						3 years	Sanjel	LV3 (Bed Trk)
8-Train Assessment										3 years	Sanjel	LV3 (Btrain)
Over-Dimensional Assessment										3 years	Sanjel	LV3 (OD)
Safety Testing												
Pre-Hire Drug & Alcohol Testing	R	R	R	R		R				as required	OHS 3rd Party	N/A - Confidential
Silica Testing			R							2 years	OHS 3rd Party	N/A - Confidential
Fit Testing	R		R			R				1 year	OHS 3rd Party	N/A - Confidential
Hearing (Audiometric) Testing	R	R	R	R						1 year	OHS 3rd Party	N/A - Confidential
Safety Training												
WHMIS	R	R	R	R	R	E	R	E	R	3 years	Online	WHMIS
1st Aid	R	R	R	R		E		R		3 years	3rd Party	1st Aid (Std or Lvl 1 or Class A)
H ₂ S Alive	R	R		E		E		R		3 years	3rd Party	H2S
eGSO/PST/BSO	R	R		R		E		R		no expiry	Online	eGSO
Fall Arrest ³	E		R	E						3 years	3rd Party	Fall Arrest
Forklift ³	E ³		R	E ³						3 years	3rd Party	Forklift
Confined Space Pre Entry	R									3 years	Online	Confined Space Pre Entry
Confined Space Entry ³	E		R	R						3 years	3rd Party	Confined Space Entry
Confined Space Rescue ³	E		R	R						3 years	3rd Party	Confined Space Rescue
Radiation Tier 1 ⁴	D.S ⁴	D.S ⁴	D.S ⁴	D.S ⁴	D.S ⁴		D.S ⁴		D.S ⁴	3 years	Online	Rad T1
Radiation Tier 2 ⁴	E			E						3 years	Online	Rad T2
Radiation Tier 3 ⁴				E						3 years	Online	Rad T3
Fire Extinguisher	E	E	E	E			E			3 years	3rd Party	Fire Extinguisher
Bear Awareness	E	E		E						no expiry	Online	Bear Aware
Hazard Awareness	R	R	R	R		E	R	E	E	no expiry	Online	Haz Aware
Iron Restraint Training ⁵	R ⁵									no expiry	Sanjel	Iron Restraint
Other examples												
SCM Operator Training ²	R										Sanjel	SCM Op
Supervisor Training ²	R										Sanjel	Sup Trg
Client Specific Training ⁶	R	R		R					R	as required	Sanjel	Client name



3 Blending

Receiving the Call Sheet

The first step before a bulk plant operator begins blending is receiving confirmation from dispatch that a job is to be loaded. This part of the job is one of the most important steps, as any miscommunication can cause the wrong blend to be loaded. The following is the procedure you will follow with dispatch:

1. Receive a confirmation email from dispatch, attached is a call sheet (generated by dispatch) and a program (generated by client solutions). Dispatch will check both the call sheet and the program to ensure the two blends match, but it is also the responsibility of the bulk plant operator to double check the two blends after receiving the call sheet/program.
2. With the call sheet, the bulk plant operator can now create a plan to blend the desired load using the bulk plant calculator (found in the Sanjel Portal under Ops). The bulk plant calculator will use information such as the base blend, % additives, and total tonnage to create a list of the chemicals the bulk plant operator will add. The calculator will also create a list of the number of bags of chemical to be cut.

The completed list must be emailed back to dispatch, so they can confirm the blend is correct. NO blending will start until dispatch has given the go ahead after this step!

Bulk Plant Math

Cement blends are made by weighing additives in two ways, either “By Weight of Cement” (BWOC) or “By Weight of Water” (BWow). These are two methods used to find the weight of additives with respect to cement or water. Most additives are weighed BWOC, and a concentration is considered BWOC unless explicitly stated as BWow. Salts, such as Sodium Chloride (NaCl) and Potassium Chloride (KCl), are typical additives that are weighed BWow since they dissolve in the mix water at a required concentration.

By Weight of Cement (BWOC)

When doing calculations for additives by weight of cement there are two different methods. The first is the “One-Tonne Method” where all additives are included in the tonnage. This method is used in proprietary blends with no extra additives. The second method is the “One-Tonne Plus” method, where the additives are calculated over and above the tonnage of the base blend. Each method is outlined below:

One-Tonne Method:

This method is where the entire base blend and additives are contained in the stated tonnage. This method is not commonly used, but is used when proprietary blends without additives are made. An example to illustrate this method is shown below:

A blend of 1 t of Sanjel’s RAS II needs to be created, which consists of 0-1-0 ‘G’ with 0.5% CFR-2, 0.25% CFL-3 and 1% CaCl₂. (this is not a true blend, but is only being used as an example)

First, the additives must be weighed out. The formula for finding the mass of an additive needed is:

$$\text{mass}_{\text{additive}} = \text{Total Blend Mass} \times \text{Concentration}_{\text{additive}}$$



To find the mass of CFR-2 needed for this blend (at 0.5%) , the calculation would go as follows:

$$\text{mass}_{CFR-2} = \text{Total Blend Mass} \times \text{Concentration}_{CFR-2}$$

Remembering 1 t = 1 000 kg

$$\text{mass}_{CFR-2} = 1\,000 \text{ kg} \times 0.5 \%$$

$$\text{mass}_{CFR-2} = 1\,000 \text{ kg} \times 0.005$$

$$\text{mass}_{CFR-2} = 5 \text{ kg}$$

Similarly,

$$\text{mass}_{CFL-3} = 2.5 \text{ kg}$$

$$\text{mass}_{CaCl_2} = 10 \text{ kg}$$

With the additives weighed, we need to find the weight of 'G' to bring the total blend weight up to 10 t.

$$\text{mass}_{0-1-0,G} = 1\,000 \text{ kg} - \text{Mass}_{\text{Total Additives}}$$

$$\text{mass}_{0-1-0,G} = 1\,000 \text{ kg} - (10 \text{ kg} + 5 \text{ kg} + 2.5 \text{ kg})$$

$$\text{mass}_{0-1-0,G} = 982.5 \text{ kg}$$

This method was used in the past in conjunction with "One Tonne Blend Sheets". A one tonne blend sheet would show the kilograms of each component used and make one tonne of a blend, which would then be multiplied by the total tonnage needed. The one tonne blend sheet for the previous example would be:

$$\text{mass}_{0-1-0,G} = 982.5 \text{ kg}$$

$$\text{mass}_{CaCl_2} = 10 \text{ kg}$$

$$\text{mass}_{CFR-2} = 5 \text{ kg}$$

$$\text{mass}_{CFL-3} = 2.5 \text{ kg}$$

If you needed to make a 10 tonne blend, you would simply take the one tonne blend sheet, and multiply each component by 10.

One-Tonne Plus Method:

The one-tonne plus method is most commonly used when calculating the weight of additives for blends. This method starts with the required amount of base blend, which is used to find the mass of additives added on top. Say the same blend is to be created in the example before, but this time using the one-tonne plus method. This example blend is to be made with 1 t of base blend 'G' with additives on top shown below:

We know the base blend 0-1-0 'G' tonnage is 1 t, so:

$$\text{mass}_{0-1-0,G} = 1\,000 \text{ kg}$$



Next, the mass of CFR-2 needed is found as:

$$\text{mass}_{\text{CFR-2}} = \text{mass}_{0-1-0 \text{ 'G'}} \times \text{Concentration}_{\text{CFR-2}}$$

$$\text{mass}_{\text{CFR-2}} = 1\,000 \text{ kg} \times 0.5\%$$

$$\text{mass}_{\text{CFR-2}} = 1\,000 \text{ kg} \times 0.005$$

$$\text{mass}_{\text{CFR-2}} = 5 \text{ kg}$$

Similarly,

$$\text{mass}_{\text{CFL-3}} = 2.5 \text{ kg}$$

$$\text{mass}_{\text{CaCl}_2} = 10 \text{ kg}$$

So the total weight of the blend can be added up as:

$$\text{mass}_{\text{Blend}} = \text{mass}_{0-1-0 \text{ 'G'}} + \text{mass}_{\text{Additives}}$$

$$\text{mass}_{\text{Blend}} = 1\,000 \text{ kg} + 10 \text{ kg} + 5 \text{ kg} + 2.5 \text{ kg}$$

$$\text{mass}_{\text{Blend}} = 1\,017.5 \text{ kg}$$

By Weight of Water

Additives that are mixed by weight of water are calculated based off the total water weight needed to mix the dry bulk into slurry. For BWOW calculations the additive weight is found by multiplying the total weight of dry cement bulk without additives (t) by the correct water requirement (m^3/t), the density of water (kg/m^3), and the required amount of additive (%). (Note: make sure the correct units are used or the answer will be wrong). An example of this can be found below:

1 t of 0-1-0 'G' with 0.5% CFR-2, 0.25% CFL-3 and 1% CaCl_2 from the previous example will be used again, but 18% (BWOW) NaCl will be added this time. For the example, we will say the water requirement for this blend is 0.415 m^3/t . (This is a made up number, the real number is different for each blend and is found on the job program which is emailed to the bulk plant operator by dispatch for each load)

Finding the BWOC chemicals first, we see:

$$\text{mass}_{0-1-0 \text{ 'G'}} = 1\,000 \text{ kg}$$

Next, the mass of CFR-2 needed is found as:

$$\text{mass}_{\text{CFR-2}} = \text{mass}_{0-1-0 \text{ 'G'}} \times \text{Concentration}_{\text{CFR-2}}$$

$$\text{mass}_{\text{CFR-2}} = 1\,000 \text{ kg} \times 0.5\%$$

$$\text{mass}_{\text{CFR-2}} = 1\,000 \text{ kg} \times 0.005$$

$$\text{mass}_{\text{CFR-2}} = 5 \text{ kg}$$

Similarly,

$$\text{mass}_{\text{CFL-3}} = 2.5 \text{ kg}$$

$$\text{mass}_{\text{CaCl}_2} = 10 \text{ kg}$$



Next, the BWOW additives are found using the following formula:

$$\text{mass}_{\text{Additive}} = \text{mass}_{\text{cement (in kg)}} \times \text{Water Requirement} \times \text{Concentration}_{\text{Additive}}$$

Using this formula to find the mass of NaCl:

$$\text{mass}_{\text{NaCl}} = 1000 \text{ kg} \times 0.415 \frac{\text{m}^3}{\text{t}} \times 0.18$$

$$\text{mass}_{\text{NaCl}} = 74.7 \text{ kg}$$

The total weight of the blend is found by adding the weight of the additives:

$$\text{mass}_{\text{Blend}} = \text{mass}_{\text{o-1-o',G'}} + \text{mass}_{\text{Additives}}$$

$$\text{mass}_{\text{Blend}} = 1000 \text{ kg} + 10 \text{ kg} + 5 \text{ kg} + 2.5 \text{ kg} + 74.7 \text{ kg}$$

$$\text{mass}_{\text{Blend}} = 1092.2 \text{ kg}$$

Density and Weight

Knowing how density affects weight is very important in the bulk plant. Knowing the difference means you understand that two objects, which may weigh the same, can also take up a different amount of physical space, known as volume.

The volume taken up by an object for a given density can be found as follows:

$$\text{Volume (m}^3\text{)} = \frac{\text{Mass (kg)}}{\text{Density } \left(\frac{\text{kg}}{\text{m}^3}\right)}$$

This formula allows you to find the volume taken up by an object (in m³) if you know its mass (in kg) and its density (in kg/m³).

Take for example two identical empty storage silos, and you wish to fill one with 80 tonnes of oilwell 'g' and another with 80 tonnes of silica flour. We can say for sure that both silos will weigh the same, but the two materials may have a different density and take up a different amount of volume in the silo.

Sanjel has many different kinds of products, each of which has a unique density. The charts below contains the densities for all additives and blends:

**Table 3-1. Bulk Density for Sanjel Cement Additives**

Cement Additive	Bulk Density (kg/m ³)
ASM-3	920.45
ASM-5	656.9
ASM-6	709.3
Barite	1563.3
CaCl ₂	765
CDF-6P	483.3
CDM-5	179
CDM-6	252.6
CFL-10	510.15
CFL-3	582
CFL-4	334
CFL-6	531
CFL-7	743
CFL-8	518
CFR	690
CFR-2	637
CFR-5	428
EA-1	1305
EA-3	1389
Flyash	1111.1
FWC-2	321.3
GCA-1	1205.2

Cement Additive	Bulk Density (kg/m ³)
GSS-1	788.1
Hematite	1963
HTR	576
HTR-2	858.1
HTR-3A	1028.85
KCl	1235
LCC-1	1070
LCF-7	90
LCG-1	1284
LCG-2	972
LCG-4	1554
LCG-5	1471
LTR	500.3
MCR-7	1199.4
NaCl	1169.7
QSR-II	1163.6
SCA-5	419
SCA-6	1031.7
SCA-7	1471.5
Silica Flour	1129.9
SPC-II	1149.8
WG-6P	709.3
WIE-1	349.9

**Table 3-2. Bulk Density for Sanjel Blends**

Blend	Bulk Density (kg/m ³)
0:1:0 'A'	1440
0:1:0 'C'	1510
0:1:0 'G'	1440
0:1:12 'G'	1440
0:1:2 'G'	1440
0:1:4 'G'	1440
0:1:6 'G'	1440
0:1:8 'G'	1440
0:1:12 'G'	1440
1:1:0 'G'	1290
1:1:0 'G' (Sask)	1350
1:1:12 'G'	1290
1:1:12 'G' (Sask)	1350
1:1:2 'G'	1290
1:1:2 'G' (Sask)	1350
1:1:4 'G'	1290
1:1:4 'G' (Sask)	1350
1:1:6 'G'	1290
1:1:6 'G' (Sask)	1350
1:1:8 'G'	1290
1:1:8 'G' (Sask)	1350
1:1:12 'G'	1290
2:1:0 'G'	1160
2:1:0 'G' (Sask)	1360
2:1:12 'G'	1160
2:1:12 'G' (Sask)	1360
2:1:2 'G'	1160
2:1:2 'G' (Sask)	1360
2:1:4 'G'	1160
2:1:4 'G' (Sask)	1360

Blend	Bulk Density (kg/m ³)
2:1:6 'G'	1160
2:1:6 'G' (Sask)	1360
2:1:8 'G'	1160
2:1:8 'G' (Sask)	1360
ASC (IV)	1350
Expandomix	1420
Expandomix HT	1220
Expandomix HT (SK)	1280
Expandomix LWL	1420
Glacial Mix	1520
iBond	1240
iGain (SK)	1200
iGain(AB)	1290
iPrime (AB)	1190
iPrime (SK)	1250
LCS 1600	1190
LCS 1820	1410
LDP-C-1316	1125
LITEmix 1325 (AB)	1107.5
LITEmix 1325 (SK)	1052.9
LITEmix 1400 (AB)	1115.8
LITEmix 1400 (SK)	1128.4
PRODUCTIONmix 1500 PRO	1217
PRODUCTIONmix 1600	1163.3
PRODUCTIONmix 1600 (SK)	1177.1
PRODUCTIONmix 1725	1166
PRODUCTIONmix LW	1191.1
PRODUCTIONmix THX	1091
Proteus Core	1330

Blend	Bulk Density (kg/m ³)
Proteus LCS	1320
Proteus Pro	1330
RAS II	1250
SanSeal	1010
SanSeal HT	720
SSi	1410
Superlite 13	934.8
Superlite 13 (CDM-5)	895.6
SUPERLITEMix PRO HT	787
SUPERLITEMix PRO	730
SURFACEmix LW (SK)	1170
SURFACEmix LW PRO	1190.5
SURFACEmix LW PRO (SK)	1200
SURFACEmix PRO	1220
SURFACEmix PRO SL	1027
SURFACEmix SLW	710.5
SurfLite (SK)	1370
Thermal 40	1350
Thermal 40 EXP	1340
THERMAmix EC EXP	1105
THERMAmix LT	1210
THERMAmix SLW	1100
ThixLite HT (AB)	1110
ThixLite HT (SK)	1260
SURFACEmix LW PRO SL	999
LDP-C-0117	1719
LDP-C-1616	920



With these numbers, we can now find how much volume will be taken up by the two products in our example. We know each mass to be 80 tonnes, and from the tables we can find that oilwell 'G' has a density of 1440 kg/m³ and silica flour has a density of 1129.9 kg/m³.

Using the volume formula we find:

$$V_{oilwell\ G} = \frac{80\ 000\ kg}{1440\ kg/m^3} = 55.6\ m^3$$

And similarly,

$$V_{silica\ flour} = \frac{80\ 000\ kg}{1129.9\ kg/m^3} = 70.8\ m^3$$

Now we need to examine the volume capacity of the silos to see whether or not our entire product fits or not. Below is a table of the volumes of different storage tanks Sanjel uses:

Table 3-3. Bulk Storage Unit Capacities

Name	Cubic Feet	Dimensions LxWxH (ft)	m ³
Bulk Plant			
90 ton Silo	2100	10'x10'x32'11"	59.47
50 ton Silo	1200	10'x10'x24'1"	33.98
43 ton Silo	1050	10'x10'x21'8"	29.73
Blend Tanks	562	8'x8'x18'4"	15.91
Field Bins			
Mega Silos	2850	12x12'8"x35'7"	80.70
40 ton P-Tank	1000	10'x10'x21'6"	28.32
Air Slide Bin	1000	10'3"x10'3"x22'6"	28.32
Portable Bulk Plant			
Pig	4100	53'11.5"x9'6"x13'6"	116.10
Laydown (3)	950	38'x12'1"x13'9"	26.90
Bulk Transportation			
Bulker	1000	62'x13'2"	28.32
Super B (2)	1100	82'x8'6"x13'2"	31.15
Baby Bulker	700	51'x8'6"x13'2"	19.82

According to the chart, a 90 t storage silo has a maximum volume capacity of 59.47 m³. This means that the 80 tonnes of oilwell 'G' will fit in its silo, while 80 tonnes of silica flour greatly exceeds the limit and will overflow. This is why it is important to know how different products take up more space than others. This needs to be kept in mind when ordering more product for the plant, since ordering is done by tonnage and not by volume.

It is also important to know how much you can blend at a time according to the volume of the weigh silo. If you are concerned about whether a load will fit in a silo, do the calculation yourself or ask for help from an experienced bulk plant operator.



If the entire blend does not fit in the weigh silo, it will have to be blended in batches. It is important to plan how many batches it will take to complete your blend.

If the blend has to be split up, so does the chemicals that go into the blend. The number of batches will determine how you split the amount of bulk/additives per batch. Use the following formula to find the weight of an additive per batch. (Do so for each component of the blend)

$$\text{Weight of Additive per Batch} = \text{Weight of Batch} \times \text{Concentration}_{\text{Chemical}}$$

For example, if a 40 tonne load was requested, but the weigh silo could only hold 30 tonne, the load can be split into two 20 tonne batches. If you needed 2 % CaCl₂ for the whole blend, the required CaCl₂ **per batch** would be found as:

$$\text{mass}_{\text{CaCl}_2} = 20\,000 \text{ kg} * 0.02 = 400 \text{ kg}$$

Bulk Plant Calculator / Bag List

Instead of doing the calculations by hand for each load, a “bulk plant calculator” was developed to find the weight of additives with simple inputs on a computer by the bulk plant operator. The bulk plant calculator is a tool provided on the Sanjel Portal for all bulk plants. The calculator is an excel file programmed with all up to date blends and additives Sanjel uses. The calculator takes inputs found on the call sheet (% chemical and salt loadings, mix water requirement, programmed density, base blend tonnage) and outputs the required kgs for each product needed. The program also allows the bulk plant operator to create a bag list by inputting the bag size, then outputs the total number of bags needed for the blend.

To create a blend using the calculator, first download the bulk plant calculator from the Sanjel Portal and open the file (see the screenshot on the following page).

With the file open, click enable content and begin to create a blend. For this example, we will blend 4 tonne of Thermal 40 with additives for a plug job.

The call sheet, which will be attached on an email from dispatch, contains the information needed for the calculator. Open the file and search for blend information, which will look similar to Figure 3-1 in the following screenshot.



MASTER BULK PLANT CALCULATOR (1) - Excel

File Home Insert Page Layout Formulas Data Review View Add-ins DYMO Label Dynamics AX BI360 REPORTING ACROBAT Tell me what you want to do... Craig Kunz Share

SECURITY WARNING Some active content has been disabled. Click for more details. Enable Content

A2 Version 2.8.17

BULK PLANT CALCULATOR

CONTENT MUST BE ENABLED FOR THE SPREADSHEET TO WORK!

MUST ENTER WEIGHT FOR OUTPUT ON LOADING PAGE
MUST ENTER MIX WATER FOR SALT BLENDS
ENTER PROGRAMMED BLEND DENSITY HERE

Double Click on Dropdown menu to use "Autofill"

Section Used If "Per Batch" Loading Desired

District	
Weigh Silo Size (m ³)	Functionality Coming
Maximum Usable Volume (m ³)	Functionality Coming
Maximum Allowable Tonnage	Functionality Coming
Required Number of Loads	
Number of Required Batches	Functionality Coming
Average Batch Size (Tonnes)	Functionality Coming
Desired Batch 1 Size (Tonnes)	
Desired Batch 2 Size (Tonnes)	
Desired Batch 3 Size (Tonnes)	
Desired Batch 4 Size (Tonnes)	
Desired Batch 5 Size (Tonnes)	
Required Blend Tonnage	Enter Base Blend Tonnage
Tonnage Remaining to Blend	



POZMIX BASE BLEND GEL LOADINGS ARE NOW AUTOMATICALLY ACCOUNTED FOR - ONLY EXTERNAL ADDITIVES MUST BE ADDED ON TOP OF THE BLEND

0:1:0 'G'

Dryblended BWOC Additives

Additive Drop Down	% Loading (BWOB)	kg/t	Specific Gravity	Absolute Volume (L)

Bulk Plant Input Bulk Plant Loading ADDITIVE INCOMPATIBILITIES ADDITIVE NAME CROSS-REFERENCE +

Ready

Figure 3-1. Bulk Plant Calculator Main Page

**UNITS/PERSONNEL**

Truck Unit	Type	Tractor Unit	Type	De:	Employee Name	Work Shift
740098	SCM Single				McRae, Jason (24038)	
740098	SCM Single				Parish, Jordan (27849)	
446166	Cement Bulk Transport	746166	Tandem - Tractor		Garfield, Webb	

WELL PROFILE

	Casing:	Size(mm)	From(m)	To(m)	Grade	Weight(kg/m)
	String 1	177.8			Unknown	34.23
	Tubing:	Size(mm)	From(m)	To(m)		
	String 1	73				

PRODUCTS**Treatment Interval 1 : -- m to -- m**

Lead 1: 4 t of Thermal 40, Density = 1885 kg/m³,
+ 0.1 % of CFR-5,
+ 0.6 % of CFL-3,
+ 1.5 % of FWC-2,
+ 0.1 % of LTR,
+ 0.15 % of CDF-6P

Service Ticket #: _____

- Verified Service Report data with Client Program
- Verified fluid requirements (as per #3 in *Sanjel Pumping Services Pre-Job Checklist*)
- Discussed and verified job information (as per #4 in *Sanjel Pumping Service Pre-Job Checklist*)

The client has verified the above information prior to the job execution.

Client Signature: _____

Date: _____ Time: _____

WARNING: THERMAL WELL OR AREA

Figure 3-2. Call Sheet Blend Information



We can see the base tonnage is 4 tonnes of Thermal 40 at a density of 1885 kg/m³. The additives are 0.1% of CFR-5, 0.6% of CFL-3, 1.5% of FWC-2, 0.1% of LTR, and 0.15% CDF-6P. The white cells in the bulk plant calculator are areas where the bulk plant operator will add information, and the grey areas are filled in by the calculator.

After filling in the information in the calculator, the page should look like Figure 3-3.

GOOD TO KNOW

The mix water requirement is not on the call sheet, this is found on the job program and also attached in the email from dispatch. This information is only needed if the job requires salt additives and the total mix water is required.

The screenshot shows a Microsoft Excel-like spreadsheet application titled "B10" in the top-left corner. The top row contains cells A1 through G1 with empty content. Row 2 has cells A2 through G2 with empty content. Row 3 has cells A3 through G3 with empty content. Row 4 has cells A4 through G4 with empty content. Row 5 has cells A5 through G5 with empty content. Row 6 has cells A6 through G6 with the value "Enter Date:" in A6 and "2-Jun-2017" in B6. Row 7 has cells A7 through G7 with the value "Enter MTS#:" in A7 and "c1234567" in B7. Row 8 has cells A8 through G8 with the value "Enter Base Blend Tonnage (t):" in A8 and "4.000" in B8. Row 9 has cells A9 through G9 with the value "Enter Mix Water (m³/t):" in A9 and "0.420" in B9. Row 10 has cells A10 through G10 with the value "Enter Programmed Density (kg/m³)" in A10 and "1885" in B10. Row 11 has cells A11 through G11 with empty content. Row 12 has cells A12 through G12 with the value "Std Density (kg/m³):" in A12 and "1700" in B12. Row 13 has cells A13 through G13 with the value "Sack Weight (kg/t):" in A13 and "1024.5" in B13. Row 14 has cells A14 through G14 with the value "Bulk Density (t/m³):" in A14 and "1.350" in B14. Row 15 has cells A15 through G15 with the value "Total Blend Weight (t):" in A15 and "4.098" in B15. Row 16 has cells A16 through G16 with the value "Total Water Requirement (m³):" in A16 and "1.680" in B16. Row 17 has cells A17 through G17 with the value "Total Bulk Volume (m³):" in A17 and "3.036" in B17. Row 18 has cells A18 through G18 with empty content. Row 19 has cells A19 through G19 with the value "Thermal 40" in A19. Row 20 has cells A20 through G20 with empty content. Row 21 has cells A21 through G21 with the value "Dryblended BWOC Additives" in A21. Row 22 has cells A22 through G22 with the value "Additive Drop Down" in A22, "% Loading (BWOB)" in B22, "kg/t" in C22, "Specific Gravity" in D22, and "Absolute Volume (L)" in E22. Row 23 has cells A23 through G23 with the value "CFR-5" in A23, "0.100" in B23, "1.000" in C23, "1.015" in D23, and "0.99" in E23. Row 24 has cells A24 through G24 with the value "CFL-3" in A24, "0.600" in B24, "6.000" in C24, "1.287" in D24, and "4.66" in E24. Row 25 has cells A25 through G25 with the value "FWC-2" in A25, "1.500" in B25, "15.000" in C25, "2.353" in D25, and "6.37" in E25. Row 26 has cells A26 through G26 with the value "LTR" in A26, "0.100" in B26, "1.000" in C26, "1.273" in D26, and "0.79" in E26. Row 27 has cells A27 through G27 with the value "CDF-6P" in A27, "0.150" in B27, "1.500" in C27, "1.695" in D27, and "0.88" in E27. Row 28 has cells A28 through G28 with empty content. Row 29 has cells A29 through G29 with empty content. Row 30 has cells A30 through G30 with empty content. At the bottom of the form, there are tabs labeled "Bulk Plant Input" (highlighted in blue), "Bulk Plant Loading" (highlighted in orange), "ADDITIVE INCOMPATIBILITIES", "ADDITIVE NAME CROSS-REFERENCE", and a plus sign icon.

Figure 3-3. Filled in Bulk Plant Calculator

The calculator has built in alerts, which are triggered when a blend contains inputs that are outside the normal range of the blend. We can see one alert in Figure 3-3 above showing the density is outside the optimal range. When a warning is displayed, be sure to check both the call sheet and job program to make sure they match. (In this case they match, and this is the intended design of the blend).

Other alerts arise when chemical loadings are off the normal range, for example, if I had accidentally entered 1% loading of LTR instead of 0.1% this alert shows up:

The screenshot shows a table titled "Dryblended BWOC Additives" with columns: Additive Drop Down, % Loading (BWOB), kg/t, Specific Gravity, and Absolute Volume (L). The rows contain data for CFR-5, CFL-3, FWC-2, LTR, and CDF-6P. The LTR row has a red border around it. A red warning message "Abnormal LTR loading - Confirm blend with client solutions" is displayed below the table.

Additive Drop Down	% Loading (BWOB)	kg/t	Specific Gravity	Absolute Volume (L)
CFR-5	0.100	1.000	1.015	0.99
CFL-3	0.600	6.000	1.287	4.66
FWC-2	1.500	15.000	2.353	6.37
LTR	1.000	10.000	1.273	7.86
CDF-6P	0.150	1.500	1.695	0.88

Figure 3-4. Chemical Loading Warning



Always double check you have entered the blend correctly, but if you have any concerns, call dispatch or client solutions. It is always better to make a phone call to confirm a blend then to not call and have a major job problem.

On the bottom of the calculator page is the "Bulk Plant Loading" tab, click on this tab to show the information you will need for blending.

A	B	C	D	E	F	G	H	I	J	K
3	Client:					Unit #:				
4	Location:					Journal Movement #:				
5						Blend Temp:				
6										
7						Thermal 40				
8										
9		CFR-5	0.10	%						
10		CFL-3	0.60	%						
11		FwC-2	1.50	%						
12		LTR	0.10	%						
13		CDF-6P	0.15	%						
14										
15										
16		Mix Water (m³/t):	0.420			Base Blend (t):	4.00			
17		Sack Weight (kg/t):	1024.5			Total Weight (t):	4.10			
18										
19										
20		BASE BLEND								
21		Material	Required (kg)	Loaded (kg)		Lot #		Bag Size (kg)		# of Bags
22		Class G	2,856.0							
23		Silica Flour	1,144.0							
24										
25		ADDITIVES								
26		Additive Name	Required (kg)	Loaded (kg)		Lot #		Bag Size		# of Bags
27		CFR-5	4.0							
28		CFL-3	24.0							
29		FwC-2	60.0							
30		LTR	4.0							
31		CDF-6P	6.0							
32										
33										
34										
35										
36										
37										
38										
39		BP Op #1:				Disp:				
40										
41		BP Op #2:								

Figure 3-5. Bulk Plant Loading Page

The Calculator has calculated the amount of base blend needed for 4 tonne of thermal 40, and also calculated the kg of each additive. From district to district, the bag sizes of chemicals change (different suppliers), find the sizes of bags at your district, input them in the calculator to find how many bags you will need to cut (see Figure 3-6).



ADDITIVES					
Additive Name	Required (kg)	Loaded (kg)	Lot #	Bag Size	# of Bags
CFR-5	4.0			20	0.2
CFL-3	24.0			20	1.2
FWC-2	60.0			20	3.0
LTR	4.0			20	0.2
CDF-6P	6.0			20	0.3

Figure 3-6. Bag List

Unfortunately, not all bags work out to round numbers. When partial bags are to be used, the small scale should be used to measure out the proper amount of additive needed. Using your “best judgement” of 0.2 bags of LTR in this example might be close and might work for the blend, but some chemicals have tight tolerances for accuracy and need to be measured. Taking the time to measure out chemicals must be taken to ensure problems are not encountered. Table 3-4 is a tolerance chart to reference when dealing with additives with tight tolerances.

When you have completed the blend recipe with the calculator, send the file to dispatch so they can confirm the blend is correct. **Do not start blending until the blend is confirmed!**

Class R Cement Blends

Non-critical surface cement jobs can be blended with up to 5% Class R cement. This is done to help reduce the build up in the Class R silos around the districts and save on costs associated with disposal.

If it is determined you can use Class R cement in your blend, inform dispatch with the % loading you will be using, and take that % off the mass of the calculator you send in.

Example: a 20t blend with 5% Class R cement

5% of the 20t blend works out to 1t, therefore you will use 1t of class R cement, and 19t of the desired blend.

To blend this, use the bulk plant calculator to find the products needed for 19t of the blend, and then simply add 1t of Class R cement to the blend.

Note: Use the same blending procedure and add the 1t of Class R cement as a “base blend”.



Blended Product Summary

A file called the “Blended Product Summary”, which is found in the P:\Operations\Cementing Services Services folder, shows a summary of pre-blended products at each plant around the company. Products often return to bulk plants, which was not pumped on jobs, but can be used later. Bulk plant operators are responsible for storing these products, and updating the blended product summary sheet when pre blended products are either used or stored.

Bulk plant operators need to be aware of these products at their plant and should be used up when they can. If a blend request comes in that is a match (or close resemblance) to one of the stored products, ask dispatch if it can be used before blending any new product.

Note: Some blends that don't exactly match a blend request can still be pumped for a job, but these requests have to go through client solutions to get approval. Never assume it is “close enough” to the blend requested!

**Table 3-4. Cement Additive Tolerances**

Product Name	Tolerance (+/- kg)		
	1 Tonne	1-5 Tonne	5-10 Tonne
Bulk Additives			
Cement	5	25	50
Flyash	3	15	30
SanLite	1	5	30
Silica Flour	2	10	20
Gypsum (Greater than 100 kg in one tonne blend)	1	5	10
Gypsum (Less than 100 kg in one tonne blend)	0.25	1.25	2.5
Ceramic Spheres	1	5	10
HGS 2000 Bubbles	0.25	1.25	2.5
HGS 5000 Bubbles	0.25	1.25	2.5
HGS 10000 Bubbles	0.25	1.25	2.5
Additive Package			
SG 1500 AP 1	0.5	2.5	2.5
Accelerators			
CaCl2	1	5	10
KCl	1	5	10
NaCl	1	5	10
LWA	0.5	2.5	5
Gypsum	0.25	1.25	2.5
PA-1	0.5	2.5	5
SMS	0.25	1.25	2.5
Retarders			
LTR	0.25	1.25	2.5
HTR	0.25	1.25	2.5
iCR	0.25	1.25	2.5
CR-2	0.25	1.25	2.5
QSR-2	0.1	0.5	1
Sodium Citrate	0.1	0.5	1
Fluid Loss Additives			
CFL-3	0.25	1.25	2.5
CFL-4	0.25	1.25	2.5
CFL-5	0.25	1.25	2.5
Dispersants			
CFR	0.5	2.5	5
CFR-2	0.5	2.5	5
CFR-5	0.25	1.25	2.5
Free Water Control			
FWCA	0.5	2.5	5
FWCA-H	0.5	2.5	5
FMC	0.25	1.25	2.5
Density Modifiers			
Bentonite (Gel)	0.5	2.5	5
SMS	0.25	1.25	2.5
Barite	1	5	10
Hematite	1	5	10



Pre-Blending Procedures

While waiting for confirmation from dispatch, it is a good idea to check the bulk plant over. The plant should be ready from when the last blend was made, but it's better to know for sure of any problems before a blend is started. The bulk plant operator should always:

1. Start the blower at an idle and let the motor/air compressor warm up
2. Check the weigh silo, making sure no product is in the tank (hammer check) and that the scale is reading zero.
3. Check the dust collector(s) are empty.
4. Ensure product lines are clear by purging out the lines (into the weigh silo, then junk silo)
5. Make sure all valves are in good working condition

Moving Product

The theory of moving bulk in any bulk plant is to have bulk move from a silo of high pressure to a silo of low pressure. Pressurizing a silo involves adding air and closing the ventilation line on a silo, while having a low pressure silo involves adding no air and leaving the vent line open, which keeps the silo at atmospheric pressure.

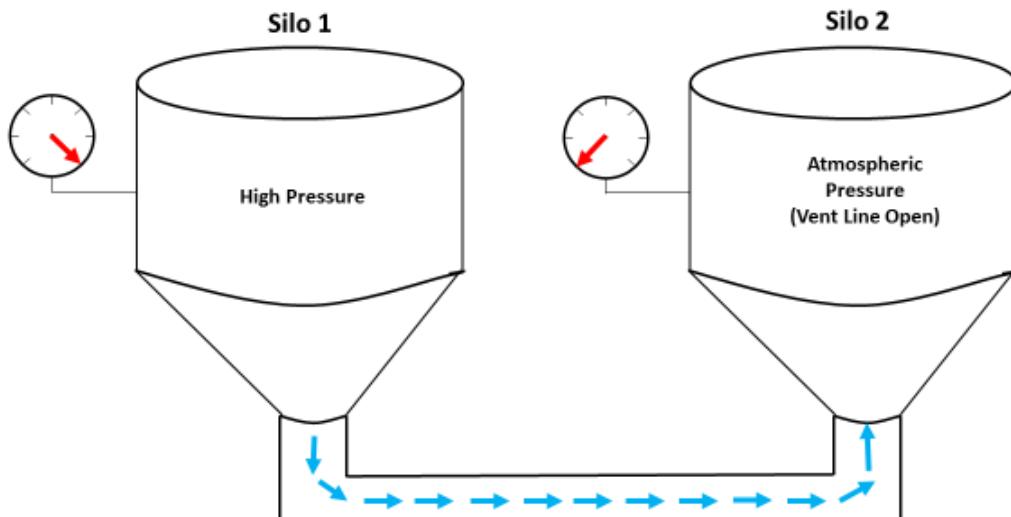


Figure 3-7. Transferring Bulk Between Two Silos

Take for example moving product from silo 1 into silo 2 in Figure 3-7. To pressurize Silo 1, we would need to add air into Silo 1 and close its vent line. In order for Silo 2 to receive bulk, all internal pressure would have to be bled down by opening the vent line and closing any air valves going into the silo. To move product from one silo to the next, the operator would open the product valve on Silo 2 and open the product valve on Silo 1. Opening the product line connects the two silos of different pressure, allowing air and product to flow from one silo to the other.



This method is how all bulk is moved in the plant for silos, the admix bottle, and dust collectors. Additional valves, such as purge valves, will also help the operator move bulk throughout the plant; he/she will find every product moves differently and will learn how to fine tune valves that work best. Purge valves can make a huge difference for moving bulk when used correctly. Learning which purge valves to use and how much purge is needed is something that comes with experience. Try playing with the valves and find what works best for you at your bulk plant.

Weigh Silo and Admix

With confirmation made from dispatch, blending can begin. Blending begins with weighing out more critical aspects of the blend that are stored in the silos (for example, gypsum). This is done so product can be moved back into a product silo (or waste silo) if too much is added. Once that is weighed out, the correct procedure to add material into the weigh silo is as follows:

1. Transfer 1 tonne of the base cement
2. Transfer all of the chemical additives from the admix bottle
3. Transfer all cement additives from silos
4. Transfer the remaining required base cement

Base cement will come out of the storage silos, while admix bottle additives will be added by the bulk plant operator into the admix bottle. Add 1 tonne of base cement into the weigh silo, then move towards adding chemicals. Chemicals can be brought to the admix bottle on pallets using a forklift operated by the bulk plant operator. This task must be taken with care, as a number of things could go wrong if an operator is not paying attention. Ensure the work area is clear of obstacles and other workers, and make sure a proper pre trip is done on the forklift before beginning this task.

The admix bottle has a tendency to “plug off” if chemicals are added in certain ways. Materials that are more compressible (powders, fluffy, or fiber based chemicals) will plug off if they are added in the admix bottle first, then compacted with the weight of other chemicals on top. For this reason, it is best to add the more dense materials first (such as sand or granular chemicals) and have the lighter materials added last on top; although this helps prevent plugging off, the lighter materials on top may get caught on the walls of the admix while emptying the silo which will then have to be scraped off.

Note: Since each bulk plant uses different chemicals more than others, it is best to ask an experienced bulk plant operator at your district for advice when it comes to adding chemicals to the admix. There is no set way to add chemicals, just best practices.



Figure 3-8. Admix Bottle with Fume Hood



The chemicals you need to add will be shown on the “bag list” you made with the bulk plant calculator. The amount you need has been confirmed with dispatch, now the important part is to keep track of chemicals as you are adding it. Layering chemicals will cause confusion as to the number of bags of each chemical you have cut; the solution to this is to keep track of empty bags of chemical. Once a bag has been cut, leave the empty bag off to the side to keep track of amounts, and as a final check to make sure all chemicals have been added. If too much chemical, or the wrong chemical has been added, call dispatch immediately to work on a solution.



Figure 3-9. Chemical Screen

The admix bottle may not fit all the required chemicals in one batch. If this is the case, simply empty the full admix bottle into the weigh silo, then continue adding chemicals into the admix again.

Some chemicals can clump together while sitting in storage at the bulk plant (ex. Calcium Chloride). The admix will have a removable screen that captures clumps which is to be used when cutting these types of chemicals (it is best to use the screen at all times). It is important no clumps are present in the blend, which could cause problems later.

Once all the chemical have been added and blown over to the weigh silo, the admix bottle needs to be scraped and purged. With a long handled scraping tool, scrape the inside walls of the admix bottle to knock down any material hung up on the sides. Once this is done, purge

by pressuring up the admix bottle, then opening the admix header to the weigh silo, releasing the pressure down the line and carrying the last bit of material with it. Purge the admix bottle for a minimum of 5 times, then inspect the tank with a flashlight to ensure all the chemicals have been transferred.

Any additional chemicals stored in silos can now be added to the weigh silo, taking extra care to not add too much of one product to the mix. After that, the rest of the base blend can be added to the mix, completing the total amount of materials needed to make the blend.



Blending

Each bulk plant has a slightly different set up, which changes how the cement will be mixed. Some bulk plants have a “blend train”, while others blend in the weigh silo by “Rolling” the cement.

Blend Train

Blending via a blend train consists of blowing the cement from one silo to another silo, which helps distribute the chemicals in the blend better over the course of the transfer. Blend trains consist of the weigh silo, and at least two more tanks to be sequentially blown into. A minimum of two transfers ensures the blend is fully mixed to Sanjel's standards.

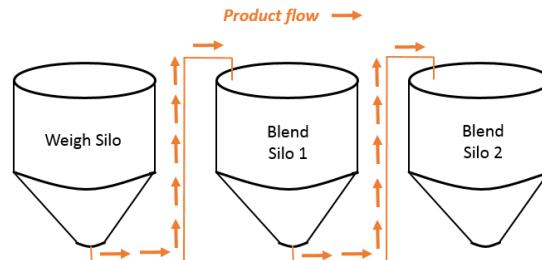


Figure 3-10. Blending via a Blend Train

Rolling

Rolling is a method of mixing by blowing air into the weigh silo's discharge (located at the bottom of the silo) which causes the cement to circulate within the silo, mixing the blend together. Sanjel's policy for rolling is to roll for 1 minute per ton of the total blend (i.e., For a 20 t blend, you must roll for 20 minutes minimum) or for a minimum of 5 minutes for blends less than 5 t.

Once the blend is complete, the truck can be loaded with cement.

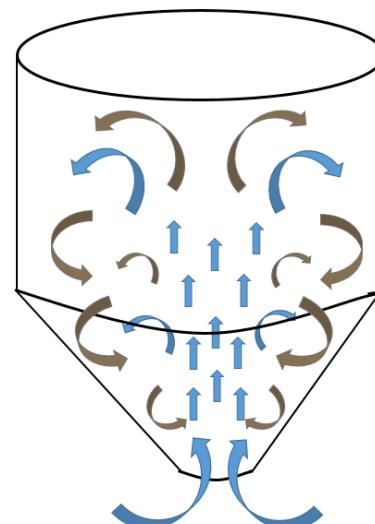


Figure 3-11. Mixing by Rolling



4 Loading Trucks

Loading bulkers and B-trains is the last step in handling a blend for the bulk plant operator. Loading involves driving the truck over to the bulk plant, attaching load and vent lines to the truck, and accurately loading product into the truck. Trucks are often loaded close to the legal weight roads allow, which is why accurately loading pods is a crucial step in the process. An improperly distributed load will cause certain axles to be overweight, which can lead to fines to the bulk truck driver. Ultimately, it is the bulk plant operator's responsibility to load trucks correctly.

Set Up

The first step in the process is finding out which truck will be loaded. The call sheet provided by dispatch, which was printed off earlier, will contain a truck list from which you can find the unit number of the truck to be loaded.

Before the unit is started and moved, a pre-trip inspection is required. The bulk plant operator must do a full walk around of the unit to ensure the truck is operationally ready and safe to drive. The operator must look under the vehicle to ensure nothing has gone under the unit since it was parked. The operator should also inspect the pods for any external damage that may cause an issue while loading cement, and also hammer on the pods to ensure they are empty.

The bulk plant operator needs to park the unit close enough to the plant to hook up the load and vent lines. Both bulk trucks and B-trains are loaded through the discharge of the truck; the discharge on a bulker is at the back of the trailer, while the discharges on a B-train are found on the passenger side of both the lead and pup trailers (2 separate discharges). Use a spotter if backing up is required. If you are alone, line up the truck to back up straight, and set a pylon where you need to stop.

Once the unit is parked in the proper position, turn the truck off and lay down chock blocks for the unit.



Figure 4-1. Chock Blocks



Connecting Lines

In order to load the truck, a product hose and a vent hose will be used. The product hose goes from the bulk plant (outlet of the blend train or weigh silo) to a camlock end onto the truck being loaded. The vent hose connects from the bulk plant ventilation line and attaches similarly by a camlock fitting onto the vent line of the truck. Once the vent line is attached, slowly open the hand valve to the release any trapped pressure from inside the bulk truck into the dust collector. Bulkers and B-trains have a "Blowdown Valve" to release pressurized air from inside the pods to the atmosphere, which is located along the truck's vent line, and needs to be closed before loading; this is to ensure all dust produced by loading goes through the dust collector and not released into the air creating a breathing hazard.

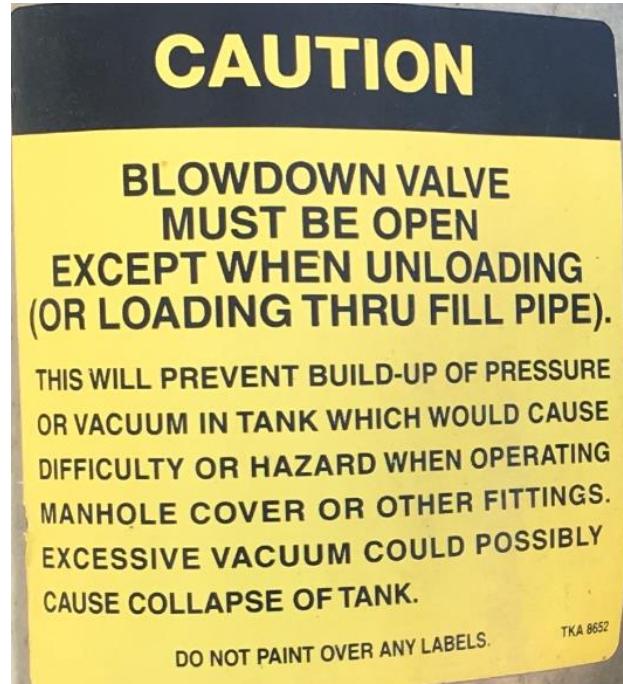


Figure 4-2. Blowdown Valve and Warning Label

Next the product valves on the truck need to be set. Bulkers and B-trains are filled by filling the closest pod to the discharge first, and moving in order to the next furthest pod and so on. This is done so the full length of the belly line on the bulk or B-train is cleared by purging once loading is complete.

Before these valves are set to be loaded, a pressure test on the product valves will be completed. The pressure test is conducted as follows:

- After both load line and the vent line are attached close all pod discharge valves and ensure that the discharge line valve (where the product line attaches to the truck) is open and the vent line is open

GOOD TO KNOW

Some bulkers are loaded with multiple blends at the same time; make sure the blend which will be loaded at the back pod of the bulk is blended first and loaded first and the line is cleared before loading the second blend into the middle/front pods. The cement loaded in the back pod will be the "lead cement" for the job, and will be pumped first on location.



- Using the purge line from the plant add air to the product hose. Listen for air movement through the pods or through the blower line
- Maintain 15psi for a minimum of 3 minutes
- If nothing is heard, open each pod individually to ensure air is flowing to each

If the pressure test fails, inform dispatch, there may be another truck available.

Loading the Truck

With the truck hooked up and pressure tested, the bulk plant operator can load the truck with the blend. It is important to watch the weight scale of the silo product is moving from to know how much product will be in each pod. When the desired amount of product in a pod is reached, the operator will shut in bulk at the bulk plant, purge the product line, and switch product valves on the bulker/B-train to the next pod before continuing loading product again.

The amount of product per pod depends on how much product has been blended and/or if there is multiple blends to be loaded. Loading a truck to the legal limit has a set procedure, while loads that contain less than the legal limit have more variance. The following figures demonstrates common bulker/B-train loading weights that comply with road limits.

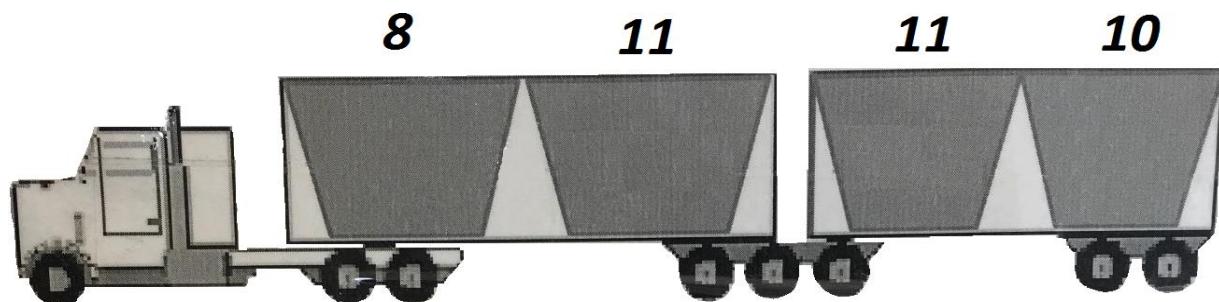


Figure 4-3. B-Train: 40 Tonne Max Loading

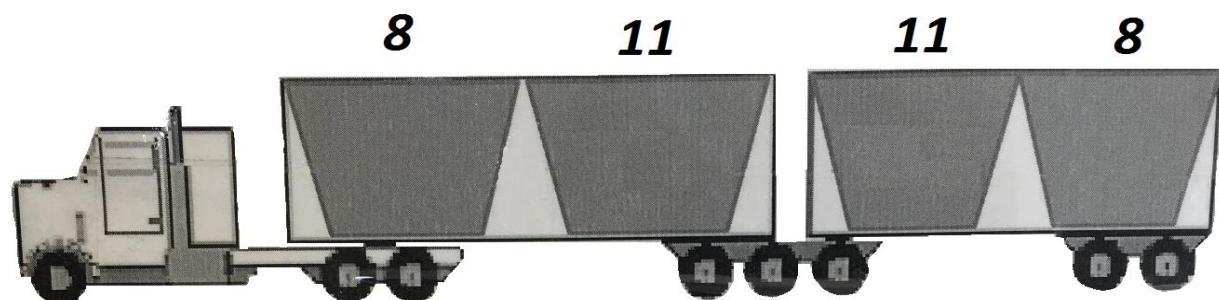


Figure 4-4. B-Train: 38 Tonne Loading

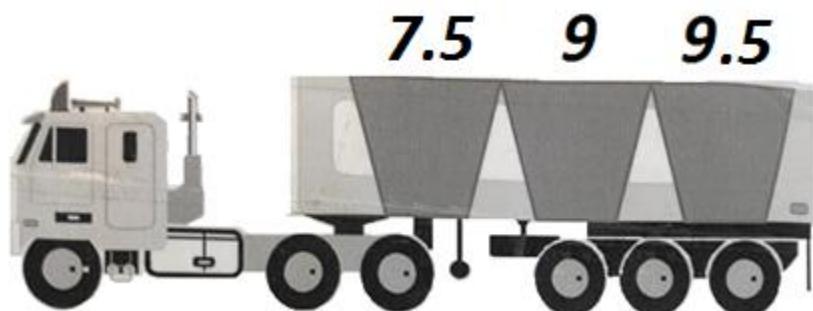


Figure 4-5. Bulker (Tridem): 26 Tonne Max Loading

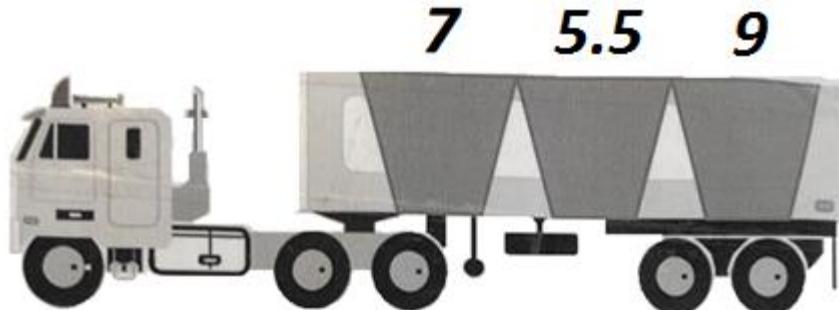


Figure 4-6. Bulker (Tandem): 21.5 Tonne Max Loading



During the spring time, road bans may be present due to soft roads. During this season it is important to ask dispatch if a truck will be going down a road with a road ban. The following charts below show how much cement each kind of truck can carry with a certain road ban in effect (in tonnes).

Table 4-1A & 4-1B. Road-Ban Bulker Weight Limits

Tandem Bulker					Tridem Bulker				
	100%	90%	75%	50%		100%	90%	75%	50%
Front Pod	7	5	4	2.5	Front Pod	7.5	6.5	4	1.5
Middle Pod	5.5	5.5	3.5	1.5	Middle Pod	9	7	5	2
Back Pod	9	7	5	2	Back Pod	9.5	7.5	6	3
Total	21.5	17.5	12.5	6	Total	26	21	15	6.5

Bulk Samples

Samples of bulk need to be taken for each load by the bulk plant operator. In case of a job issue, dry bulk samples (and cement samples in the field) are utilized at the Sanjel lab to determine if a problem was due to a blend or some other factor.

Samples can be taken out of the 1 inch sample port located directly after the weigh silo screens. A work instruction has been created to show how to take samples, which can be found in SCORE on the Sanjel Portal. A summary of the work instruction is shown below:

1. Prior to retrieving product sample ensure you have the following:
 - Sanjel approved sample bag (with template)
 - The template is fully labeled
 - Required WHMIS label to attached to sample bag
 - With no pressure on the system function test the sample catcher valve to ensure functionality
2. After the cement batch has been fully blended, commence transferring the product to the bulk delivery unit.
3. Allow one tonne of product to be transferred into the bulk delivery unit prior to retrieving sample.
4. Samples must be captured through the one inch sample catcher port - located immediately after the weigh silo screens.
5. Allow one kilogram of product to flow through the sample tube and discard this cement.



Figure 4-7. Sample Port and Hand Valve



6. Obtain small periodic / intermittent samples throughout the load process to ensure the sample is a true representation of the entire blend.
 - I.e.: Fill the sample bag in 10% intervals throughout the entire load.
 - A 10 tonne job would mean you capture 10 times (every 1 tonne)
 - A 20 tonne job would mean you capture 10 times (every 2 tonne)
7. Ensure that the Sanjel approved sample bag is at least 75% full. This supplies the cement laboratory sufficient product should multiple tests be required. Utilize a twist tie to seal the plastic bag from leaking.
8. Ensure the bulk cement sample is immediately transferred to the cement storage rack

SAFE WORKING

A respirator must be worn while taking samples.

The temperature of the load can be found easiest by taking a temperature reading of the bulk sample. This temperature will need to be recorded and written on the MTS sheet for the haul. Temperature is important to the crew on location, and plays a major role in how fast cement will harden. **If the bulk temperature is above 35 °C, make sure to notify either Dispatch or Client Solutions.** If the temperature exceeds 40 °C, a blend change will likely be required.

Rig Out

Once the truck is loaded with cement, the bulk plant operator can rig out the truck to have it ready for the road. The load and vent lines need to be disconnected and all bulk line caps will have to be fastened back on the truck. Before taking the lines off, all pressure must be bled out of the lines and truck. The following steps show how this process is achieved:

- Shut the product valve at the bulk plant and any product line purge valves that are open
- Allow pressure in the truck's pods to travel through the vent line
- After waiting for pressure in the pods to empty, open the blowdown valve to make sure no residual pressure was built in the dust collectors (if there is excess pressure in the ventilation, find the source of air and shut it off)

At this step, the load line may still have pressure from when the line was purged,

- Slowly open the sample catcher valve to release air pressure in the product line. (make sure this is done after the pressure in the pods is bled down, if a discharge valve leaks and has pressure behind it product will come back from the truck and out of the sample catcher valve, refilling the load line with cement)
- Finally, with all pressure bled down, disconnect the lines and replace with the line caps. Ensure no tools are left behind on the truck.



SAFE WORKING

Never unhook a camlock fitting unless it is known for sure no pressure is on the line. Make sure to also wear a dust mask



Figure 4-8. Vent Line Cap

Informing Dispatch Truck Is Ready

Bulk truck and B-train drivers are given a wake up call when their truck is ready, and it is the bulk plant operators job to inform dispatch when that is. When dispatch calls a driver, they are given one hour to arrive at the shop to be ready for work. Typically, bulk plant operators give dispatch the notice while loading the truck, and have the truck ready to go shortly before the driver arrives. This saves time getting bulk to a location, and during busy times is important.

GOOD TO KNOW

Only call ahead with experience in knowing how long it will take to load a truck. If a driver arrives before the truck is loaded, it will affect his/her hours of service and limit how long they can drive in a day. Every bulk plant is different, and take more or less time to load a truck, so be comfortable knowing this time before calling dispatch early.

Unloading the Dust Collectors

Over the course of loading and blending the cement product, the dust collector(s) gather some of the product through the vent lines. Dust collectors must be emptied into the Class R silo regularly, but not for every load. Be sure to monitor the level in the dust collectors by using a rubber mallet and to not exceed the height of the lower cone portion of the silo. It is best to unload the dust collectors during any down time.

The dust collectors are emptied like any other silo by first unloading the contents, then purging the dust collector line by pressuring up the silo and releasing the pressure into Class R silo.



5 Material Transfer Sheet (MTS)

MTS Information

An MTS is a document used to verify load contents and weight distribution on a bulk truck. An MTS is legally required in the vehicle when a bulk truck is hauling a load to its destination. Filling out the sheet properly and accurately is the job of the bulk plant operator.

An MTS consists of 3 pages:

1. A white page containing all information to be filled
2. A yellow carbon copy page
3. A pink carbon copy page

To fill out an MTS, fill in the all the blanks on the white page with the information pertaining to that load. The yellow and pink pages will be “carbon copies” of the white page, and anything written on the white page will be transferred to the yellow and pink pages behind it.

Note: Make sure to use the cardboard divider on the back of the MTS book so only the one MTS will be carbon copied, and not the whole booklet.

Once filled out, the white and yellow copies will be detached from the booklet. The white copy will be scanned to a PDF and emailed to dispatch. Afterward, the **white and yellow** copies are stapled to the call sheet, and left on the drivers seat of the bulk truck which was loaded. The pink copy remains in the MTS booklet, and more information will be added to it. (Reviewed later)

Scanning and Saving Documents:

When bulk plant operators scan MTS sheets to send to dispatch, they are automatically saved to the file location P:\Operations\Bulk Plant*YOUR DISTRICT*. This is set up to make scanning documents and saving information for each bulk plant centralized. All paperwork in and out of the plant (such as MTS sheets, BOL's, Receipts, Transfers, and TDG forms) needs to be scanned and saved to the folder.



A blank MTS can be seen below in Figure 5-1:

					DATE _____																																				
					UNIT NO. _____																																				
					DRIVER _____																																				
					STATION _____																																				
					SERV. TKT # _____																																				
<table border="1"><tr><td colspan="5">Customer/District</td></tr><tr><td colspan="5">Customer Representative</td></tr><tr><td colspan="5">Rig/Hauling Company</td></tr><tr><td colspan="5">Location No.</td></tr><tr><td colspan="5"><input type="checkbox"/> Inter-Company Product Haul</td></tr></table>						Customer/District					Customer Representative					Rig/Hauling Company					Location No.					<input type="checkbox"/> Inter-Company Product Haul															
Customer/District																																									
Customer Representative																																									
Rig/Hauling Company																																									
Location No.																																									
<input type="checkbox"/> Inter-Company Product Haul																																									
F R O N T	Tonne	Blend	kg.	Additives	Total Tonnes																																				
M I D D L E																																									
B A C K																																									
<table border="1"><tr><td>Tonne</td><td>Product</td><td>kg.</td><td>Additives</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">BLENDING AREA</td><td colspan="3">TOTAL BLEND</td><td></td></tr></table>						Tonne	Product	kg.	Additives																											BLENDING AREA		TOTAL BLEND			
Tonne	Product	kg.	Additives																																						
BLENDING AREA		TOTAL BLEND																																							
BLENDED/ LOADED BY _____			DISPATCHED BY _____																																						
6006CDN REV.1, 08/12																																									

Figure 5-1: Blank White Copy of MTS Sheet

All the blanks will be filled by the bulk plant operator for each load using information from the call sheet provided by dispatch. To understand how to fill in the information on this sheet easier, we can break it up into sections.



Section 1

Sanjel

DATE _____
UNIT NO. _____
DRIVER _____
STATION _____
SERV. TKT # _____
Customer/District
Customer Representative
Rig/Hauling Company
Location No.
<input type="checkbox"/> Inter-Company Product Haul

Figure 5-2: Section 1 of MTS Sheet

Section 1 of the MTS sheet seen above in Figure 5-2 is all information that is found on the call sheet. The only information which does not need to be filled out is the SERV. TKT # (service ticket number). The service ticket number is filled out by the supervisor when the cement is on location (Note: the Location No. will be the downhole LSD). An example of section 1 filled out can be seen below in Figure 5-3:

Sanjel

DATE	MAY 25 / 17
UNIT NO.	746705
DRIVER	BRENT
STATION	LLB
SERV. TKT #	_____
Customer/District	MEG ENERGY
Customer Representative	RAY
Rig/Hauling Company	AKITA 25
Location No.	101/4-13-77-6W4M
<input type="checkbox"/> Inter-Company Product Haul	_____

Figure 5-3: Completed Section 1 of MTS



Section 2

Next we can look at Section 2 of the MTS, shown below in Figure 5-4. This section shows how the bulk truck was loaded, for both weight distribution and product.

	Tonne	Blend	kg.	Additives	Total Tonnes
FRONT					
MIDDLE					
BACK					

Figure 5-4: Blank Section 2 of MTS

The layout of the table was made to show the distribution of product in the three silos of a bulker, but it can also be used to show how a B-train was loaded by using the "Front" section as the lead trailer, and the "Back" section as the pup trailer. Tonnages in the "Tonne" column are for the blend before additives, while the "Total Tonnage" column is the tonnage of the blend plus additives. The information for each pod or trailer must be filled in as it was loaded. **This section is VERY important when using multiple blends, as it will show the field crew which pod has what cement.** It is critical the bulk plant operator writes this information down correctly. An example of this section completed for both a B-train and a bulker can be seen below in Figure 5-5 and Figure 5-6.

	Tonne	Blend	kg.	Additives	Total Tonnes
FRONT	18.3	PROTEUS PRO		0.1% CFR-2 0.5% CFL-3	19
MIDDLE				1% CaCl ₂ 2% FWC-2	
BACK	11.57		↓	0.15% CDF-6P	12

Figure 5-5: Completed Section 2 for a B-Train Load



Note: For this particular load, the lead trailer was loaded to the legal limit (9 tonne in front, 10 tonne in back) and only 12 tonne in the pup trailer. The downward arrow was used to show the blend and the additives remained the same throughout the truck.

	Tonne	Blend	kg.	Additives	Total Tonnes
FRONT	1.3	THERMAL 40 EXP		NEAT	1.3
MIDDLE					
BACK	1.3	THERMAL 40 EXP		0.4% LTR 0.5% CFL-4 0.15% CDF-6P 1% FWC-2 0.25% SCA-6	1.33

Figure 5-6: Completed Section 2 for a Bulker

Note: For this load, only the front and back pods were loaded. The front pod was loaded with thermal 40 EXP neat (no chemical additives), while the back was loaded with thermal 40 EXP with additives.

Section 3

Tonne	Product	kg.	Additives
BLENDING AREA		TOTAL BLEND	
BLENDED/ LOADED BY _____		DISPATCHED BY _____	

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Figure 5-7: Section 3 of the MTS



Section 3 of the MTS is the summary of the blend loaded on the truck. It includes the tonnage of base blend, the mass (in kilograms) of additives on the truck, and the total tonnage. Base blend is filled in under the product section and any additives in that blend are included in the additives section. At the bottom of the MTS, the bulk plant operator will include their name in the "Blended/loaded by" section, and include the name of the dispatcher on the call sheet in the "dispatched by" section. An example of the filled out section is shown below in Figure 5-8.

Tonne	Product	kg.	Additives
29.9	PROTEUS Pro	45	CDF-6P
		30	CFR-2
		150	CFL-3
		299	CaCl ₂
		598	FWC-2
BLENDING AREA		TOTAL BLEND	
BLENDED/ LOADED BY		DISPATCHED BY	
<u>SAM</u>		<u>CRAIG</u>	

6008CDN REV.1, 08/12

Figure 5-8: Completed Section 3 of MTS

With the MTS complete, the bulk plant operator can now email a scanned PDF of the MTS to dispatch, then place the stapled white and yellow copies of the MTS to the Call Sheet in the cab of the bulk truck. The PDF file name should be saved as the following:

"Company" "Well Location" "MTS #" "Date".pdf

For Example:

Imperial Oil 6-20-70-4W4M MTS c178558 May 30th 2017.pdf

Pink Copy Record Keeping

The pink copy of the MTS sheet is kept in the MTS booklet, and completed booklets are kept at the district. The last step in completing the MTS for a load is to write down the call sheet number and inventory journal number on the pink copy of the MTS. This is done to help find any errors in the month end inventory conducted. The inventory journal number is the number created in the PROD Dynamics AX program once a "movement journal" is made; this is covered in depth in the SBS section.

A completed pink sheet will look as follows in Figure 5-9:



MATERIAL TRANSFER SHEET																																										
Sanjel		TEMP 28°C	C 177981																																							
			DATE	May 27 / 17																																						
			UNIT NO.	746166																																						
			DRIVER	RYAN																																						
			STATION	LLB																																						
SERV. TKT # _____																																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Customer/District</td> <td colspan="4">IMPERIAL OIL</td> </tr> <tr> <td>Customer Representative</td> <td colspan="4">DEAN</td> </tr> <tr> <td>Rig/Hauling Company</td> <td colspan="4">CONCORD 119</td> </tr> <tr> <td>Location No.</td> <td colspan="4">101/13-31-64-3W4M</td> </tr> <tr> <td colspan="5"><input type="checkbox"/> Inter-Company Product Haul</td> </tr> </table>					Customer/District	IMPERIAL OIL				Customer Representative	DEAN				Rig/Hauling Company	CONCORD 119				Location No.	101/13-31-64-3W4M				<input type="checkbox"/> Inter-Company Product Haul																	
Customer/District	IMPERIAL OIL																																									
Customer Representative	DEAN																																									
Rig/Hauling Company	CONCORD 119																																									
Location No.	101/13-31-64-3W4M																																									
<input type="checkbox"/> Inter-Company Product Haul																																										
FRONT	Tonne	Blend	kg.	Additives																																						
6.8	THERMAL 40		0.1% CFR-5 0.6% CFL-3	Total Tonnes 7.02																																						
MIDDLE	6	↓	2% FWC-2 0.2% SCA-6	6.19																																						
BACK	6	▽	0.15% LTR 0.15% CDF-6P	6.19																																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Tonne</td> <td style="width: 40%;">Product</td> <td style="width: 15%;">kg.</td> <td style="width: 25%;">Additives</td> </tr> <tr> <td>18.8</td> <td>THERMAL 40</td> <td>18.8</td> <td>CFR-5</td> </tr> <tr> <td></td> <td></td> <td>112.8</td> <td>CFL-3</td> </tr> <tr> <td>CS</td> <td>1073755 (LLB)</td> <td>376</td> <td>FWC-2</td> </tr> <tr> <td></td> <td></td> <td>37.6</td> <td>SCA-6</td> </tr> <tr> <td></td> <td>I J008975</td> <td>28.2</td> <td>LTR</td> </tr> <tr> <td></td> <td></td> <td>28.2</td> <td>CDF-6P</td> </tr> <tr> <td colspan="2" style="text-align: center;">BLENDING AREA</td> <td style="text-align: center;">TOTAL BLEND</td> <td colspan="2" style="text-align: center;">19.4</td> </tr> <tr> <td colspan="2" style="text-align: center;">BLENDED/ LOADED BY</td> <td style="text-align: center;">SAM</td> <td colspan="2" style="text-align: center;">DISPATCHED BY CRAIG</td> </tr> </table>					Tonne	Product	kg.	Additives	18.8	THERMAL 40	18.8	CFR-5			112.8	CFL-3	CS	1073755 (LLB)	376	FWC-2			37.6	SCA-6		I J008975	28.2	LTR			28.2	CDF-6P	BLENDING AREA		TOTAL BLEND	19.4		BLENDED/ LOADED BY		SAM	DISPATCHED BY CRAIG	
Tonne	Product	kg.	Additives																																							
18.8	THERMAL 40	18.8	CFR-5																																							
		112.8	CFL-3																																							
CS	1073755 (LLB)	376	FWC-2																																							
		37.6	SCA-6																																							
	I J008975	28.2	LTR																																							
		28.2	CDF-6P																																							
BLENDING AREA		TOTAL BLEND	19.4																																							
BLENDED/ LOADED BY		SAM	DISPATCHED BY CRAIG																																							
©CONCDN REV1.08/12																																										

Figure 5-9: Completed Pink MTS Sheet

Additional Chemicals

If the call sheet requires additional chemicals be hauled that are not included in the blend, a separate MTS will be required for the haul. Supervisors will often carry chemicals in their truck to job sites for pre-flushes, spacers, lost circulation additives, ect. To fill out an MTS for these chemicals, follow the same procedure as before, but section 2 can be left blank.



6 SBS Instructions

How to Order Bulk: Release a Purchase Order From a Purchase Agreement

To order bulk from the SBS server, you will need to first go to the Procurement and Sourcing section, then click on Purchase Agreements under the Purchase orders tab:

The screenshot shows the Microsoft Dynamics AX application window titled "Microsoft Dynamics AX - Sanjel Group Ltd [SANJEL06; Session ID : 18] - [1 - sesi]". The left sidebar navigation bar is visible, with the "Procurement and sourcing" section expanded. Under "Common", the "Purchase agreements" option is highlighted with a red box. The main content area displays several sections: "Common" (with "Purchase orders" expanded), "Journals" (with "Product receipt multiple" listed), "Reports" (with "Vendors", "Status", and "Statistics" listed), "Setup" (with "Policies" listed), "Inquiries" (with "Purchase orders", "Vendors", "Journals", and "History" listed), and "Periodic" (with "Post the purchase journal" and "Purchase orders" listed). The status bar at the bottom right shows "(0) CAD sesi".

Next you will have to click on the Purchase Agreement you want to order from. The Purchase Agreement will be labeled with the company you are ordering from and the location you are ordering for. For this example we will order cement from Lehigh for Lac La Biche.

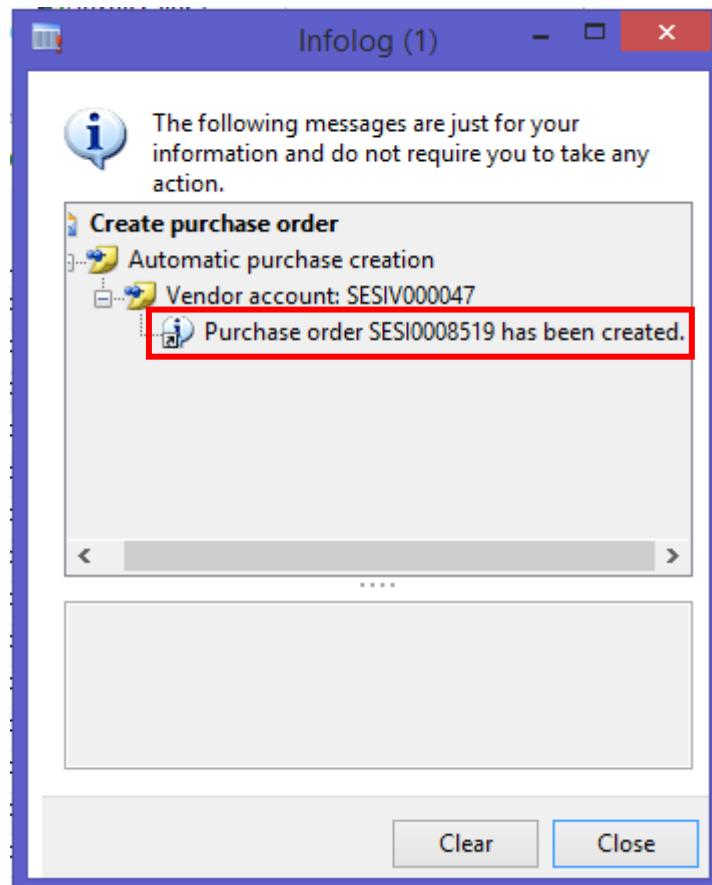


Single click to highlight the Purchase Agreement you need to order from, then in the top left of the page click on "Release Order New".

The screenshot shows the Microsoft Dynamics AX - Sanjel Group Ltd [SANJEL06; Session ID - 16] - [1 - sesi] interface. The user is in the 'Purchase agreements' screen under 'Purchase orders'. The 'Release order New' button in the toolbar is highlighted with a red box. A red box also highlights the row for Purchase Agreement ID PPA000009, which is for Lehigh Inland Cement Ltd. The table lists various purchase agreements with columns for Purchase agreement ID, Vendor account, Name, Status, Workflow status, Document title, Currency, and Agreement classification.

In the Purchase quantity column, click on the empty box and type the quantity of cement you need to order, then click create at the bottom right to create a purchase order.

The screenshot shows the 'Create release order (1 - sesi) - Purchase agreement ID: PPA000009, SESIV000047' dialog box. The 'Dimensions display' section shows two items: IIN023074 (Cement, Class G) and IIN023116 (Cement, Inter...). The 'Purchase quantity' field for IIN023074 is highlighted with a red box. At the bottom right of the dialog box, the 'Create' button is also highlighted with a red box.



The newly made purchase order will produce a “Purchase Order number”. Write this number down for future reference, then click on the purchase order number to open the purchase order in a new window.



With the Purchase Order open, select the Edit button at the top of the page, then select Header View.

The screenshot shows the 'Purchase order (1 - sesi)' window with the title bar 'Purchase order (1 - sesi) - Purchase order: SESI0008519, Lehigh Inland Cement Ltd, Purchase order: SESI0008519'. The ribbon tabs include Purchase order, Purchase, Manage, Receive, Invoice, and General. Under the Purchase order tab, the 'Edit' button is highlighted with a red box. Below the ribbon, the 'Purchase order header' section is visible, followed by the 'Purchase order lines' section. The 'Line view' tab is highlighted with a red box. On the right side, there is a sidebar titled 'Latest purchase orders' listing several purchase orders with their status (e.g., Open, Ope, Rec). The main content area shows a grid of purchase order lines with columns for confirmed delivery date, type, budget check results, line number, item number, product number, product name, procurement category, quantity, and unit.

Header View allows you to add dimensions you will need for the purchase order. Under the General tab, go to Storage Dimensions and fill in the Site and Warehouse numbers which the bulk will be delivered to.

The screenshot shows the 'Purchase order (1 - sesi)' window with the title bar 'Purchase order (1 - sesi) - Purchase order: SESI0008519, Lehigh Inland Cement Ltd, Purchase order: SESI0008519'. The ribbon tabs are the same as the previous screenshot. The 'Edit' button is highlighted with a yellow box. The 'Header view' tab is highlighted with a yellow box. The main content area is divided into sections: General, Vendor, and Delivery. The General section contains fields for Purchase order (SESI0008519), Name (Lehigh Inland Cement Ltd), Purchase type (Purchase order), Calculated net amount (9,492.00), and Contact. The Vendor section contains fields for One-time supplier, Vendor account (SESIV000047), Invoice account (SESIV000047), and Contact. The Delivery section contains fields for Status (Open order), Document status (None), Approval status (Approved), Header budget check results, Quality order status, and Direct delivery. On the right side, there is a sidebar titled 'Latest purchase orders' listing several purchase orders with their status. The bottom of the screen shows navigation icons and a message 'Toggle the form between view and edit modes'.



Purchase order (1 - sesi) - Purchase order: SESI0008519, Lehigh Inland Cement Ltd, Purchase order: SESI0008519

File Purchase order Purchase Manage Receive Invoice General

New Edit Request change Header view Line view From all From journal Totals View Generate from template Attachments Confirm Delivery Date Confirm date

SES10008519 : SESIV000047 - Lehigh Inland Cement Ltd

General Contact information Status Reasons Reference

Storage dimensions

Site: Warehouse:

Internet address: E-mail: Document status: None Reason: Reason comment: Vendor reference: RMA number:

Status: Open order Approval status: Approved Document budget check results: Quality order status: Direct delivery: 5/18/2017 CAD N45 CADCHK_ATB

V000047 V000047

Setup Address Delivery Price and discount Foreign trade Financial dimensions

Toggle the form between view and edit modes

Open order Latest purchase orders

Purchase order Stat SESI0008519 Ope SESI0008518 Ope SESI0008517 Ope SESI0008516 Ope SESI0008486 Rec ... Totals

Once the Storage Dimensions are filled, select the Purchase tab at the top of the screen, then click "Confirm".

Purchase order (1 - sesi) - Purchase order: SESI0008519, Lehigh Inland Cement Ltd, Purchase order: SESI0008519

File Purchase order Purchase Manage Receive Invoice General

Maintain charges Multiline discount Sales tax Total discount Prepayment Remove prepayment Purchase inquiry Confirmation Pro forma confirmation Distribute amounts View distributions Accounting Purchase Purchase order inquiry Journals

Charges Tax Calculate Prepay Confirm Finalize

SES10008519 : SESIV000047 - Lehigh Inland Cement Ltd

General Purchase order Contact information Storage dimensions

Storage dimensions

Site: Warehouse:

Purchase order: SESI0008519 Internet address: E-mail: Document status: None Reason: Reason comment: Vendor reference: RMA number:

Name: Lehigh Inland Cement Ltd Document budget check results: Quality order status: Direct delivery: 5/18/2017 CAD N45 CADCHK_ATB

Purchase type: Purchase order Approval status: Approved

Calculated net amount: 9,492.00

Vendor One-time supplier: Vendor account: Invoice account: Contact:

One-time supplier: SESIV000047 Invoice account: SESIV000047 Contact:

Setup Address Delivery Price and discount Foreign trade Financial dimensions

Select a template for distribution of amounts into financial dimensions

Open order Latest purchase orders

Purchase order Stat SESI0008519 Ope SESI0008518 Ope SESI0008517 Ope SESI0008516 Ope SESI0008486 Rec ... Totals

At this point, you may now call the company from which you ordered product from and inform them of the purchase. They will require the Purchase Order number you generated.



Email the bulk plant email and your cross shift, and write the expected delivery time and the purchase order number somewhere in the bulk plant, this helps make sure your cross shift member knows you ordered bulk and when it is expected (Miscommunication here could lead to multiple bulk orders). You can also print the PO and save it in the plant for future reference. To do so, single click to highlight the PO you wish to print and click on “Purchase order confirmations” under the “Purchase tab”

The screenshot shows the Microsoft Dynamics AX interface for Sanjel Group Ltd. The title bar indicates the session ID is SANJEL26. The main menu path is Procurement and sourcing > Common > Purchase orders > All purchase orders. The left sidebar navigation includes Home, Accounts payable, General ledger, Procurement and sourcing (selected), Product information management, Master planning, Production control, Inventory management, and Sales and marketing. The central workspace displays a list of purchase orders with a red box highlighting the 'Purchase order confirmations' button in the toolbar. The details pane shows the purchase order for Lehigh Inland Cement Ltd with a total amount of 9,966.60 CAD.

In the new window, single click on “Preview/Print” and select “Original Preview” in the drop down menu

The screenshot shows the 'Purchase order confirmations' window. The 'Preview/Print' tab is selected. The main area displays a table with the following data:

Purchase order	Purchase journal	Date	Buyer group	Currency	Amount in transaction currency
SESI0008519	SESI0008519-1	5/18/...		CAD	9,966.60

At the bottom, there is a note: "Purchase number that the invoice is attached to." The status bar at the bottom right shows 0 notifications, CAD currency, and the session identifier sesi.

From here, you can select “File” and “Print” in the new pop up window



View original (1)

File ▾

1 of 2 | Find | Next

PURCHASE ORDER

MAY 18, 2017	PAGE	1 OF 2
PURCHASE ORDER NUMBER	ENTITY	DISTRICT
SESI0008519	SESI	D606

BILL TO:
Sanjel Energy Services Inc.
Suite 1400, 700-9th Ave. SW
Calgary, AB T2P 3V4
CAN

MAIL INVOICE TO:
Sanjel Energy Services Inc.
Suite 1400, 700-9th Ave. SW
Calgary, AB T2P 3V4
CAN

Telephone: Fax:
Email invoice to: ap@sanjel.com

VENDOR ADDRESS
Lehigh Island Cement Ltd
C/O Lockbox 310170 PO Box 578 STNM
Calgary, AB T2P 2J3
CAN

Telephone: Fax:
Vendor Contact: Email:
Vendor number: SESIV000047

SHIP-TO ADDRESS
Sanjel Energy Services Lac La Biche
220, 14245 Highway 55
Lac La Biche, AB T0A 2C0
CAN

Telephone: Fax:
Ship to contact: Email:
Sanjel Buyer Contact: CRAIG KUNZ
Delivery Terms:

LINE	ITEM NUMBER	DESCRIPTION	DELIVERY	QUANTITY	UNIT	PRICE UNIT	UNIT PRICE	AMOUNT
1	IIN023074	Cement, Class G Cement, Class G	5/18/2017	42.00	mt	1.00	226.0000	9,492.00

COMMENTS:
PO Terms and Conditions attached
Purchase agreement:
Trade agreement:

SUBTOTAL	9,492.00
CHARGES	0.00
TOTAL TAX	474.60
TOTAL PURCHASE ORDERS	9,966.60

Close

How to Receive Bulk: Closing out a Purchase Order

To receive bulk that was ordered to your district, first you will need to find the corresponding purchase order for that delivery. Go to Procurement and Sourcing, and click on “All Purchase Orders”

You can search for the Purchase Order you are looking for in the search area shown below (type in the last 4 numbers of the purchase order, select “Purchase Order” in the drop down tab, and hit Enter)



This screenshot shows the Microsoft Dynamics AX interface for managing purchase orders. The main window displays a grid of purchase orders with various columns including Purchase order number, Vendor account, Name, Invoice account, Purchase type, Approval status, Status, Direct delivery, Orderer, Requester, and Totals. A red box highlights the 'Name' column header. The left sidebar navigation includes categories like Procurement and sourcing, Common, and Purchase orders.

With the purchase order found, single click the purchase order to highlight the line, then go to the “Receive” tab and select “Product Receipt”. (Note how the status of the PO says “Open Order”, more on this will be covered in a couple pages)

This screenshot shows the Microsoft Dynamics AX interface with the 'Receive' tab selected. The ribbon has tabs for Purchase order, Purchase, Manage, Receive, Invoice, and General. A red box highlights the 'Product receipt' button in the ribbon. The 'Product receipt' section is expanded, showing a list of receipts. The 'All purchase orders' grid shows one highlighted row. The left sidebar navigation includes categories like Procurement and sourcing, Common, and Purchase orders.

In the new open window, enter the “Bill of Lading” number (BOL) in the Product receipt box (the BOL is a receipt saying that the shipment was delivered. The BOL number will be found on the receipt given by the delivery driver).



Posting product receipt (1 - sesi)

Parameters Other

Parameters

Quantity: Ordered quantity
Posting:

Print options

Print: Current
Print product receipt:
Use print management destination:
Print sales documents:
Print shelf labels:
Print product labels:

Select
Arrange
Totals
Sales tax
Printer setup >

Overview Setup Lines Line details Purchases Fixed assets

New Delete

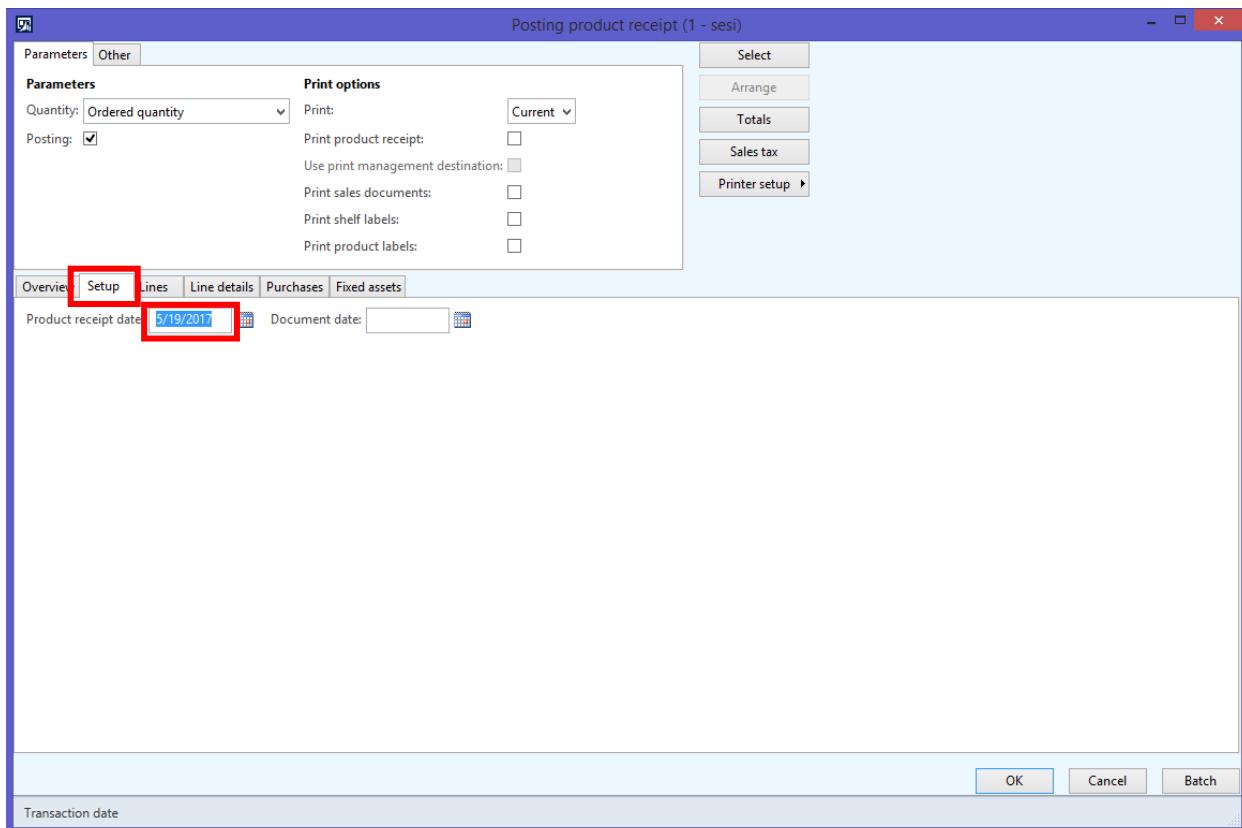
	Update	Purchase order	Name	Product receipt
<input type="checkbox"/>	<input checked="" type="checkbox"/> Product rec...	SESI0008424	Diversity Technologies Corporation (DI-CO...)	<input type="text"/>

OK Cancel Batch

Packing slip number



Next, click on the Setup tab, and enter the date of the product receipt



Next, select the lines tab. The BOL will show the amount of product shipped, and this is to be entered under the quantity box(es). This example shows three different chemicals being received.

The next step is very important. If all the product has been shipped and received, you will need to “Close the PO”, and select the “Close for Receipt” boxes for each product received. The only time you do not select the close for receipt boxes is if another delivery is bringing the rest of your shipment. If the box is left unchecked, the PO will remain as an “Open Order”, as was shown on an earlier page.



Posting product receipt (1 - sesi)

Parameters Other

Parameters

Quantity: Ordered quantity Print: Current

Posting: Print product receipt:

Use print management destination:

Print sales documents:

Print shelf labels:

Print product labels:

Print options

Select

Arrange

Totals

Sales tax

Printer setup >

Overview | Setup | **Lines** | Line details | Purchases | Fixed assets

X Delete Purchase order line Inventory Update line

Purchase order	Line number	Item number	Procurement category	Text	Quantity	Unit price	Line net amount	Close for receipt	Backorder	Quali
SESI0008424	1	IIN023122	Chemicals	Lost Circulation, LCC-1, LDP-C-1210	4,800.00	0.5235	2,512.80	<input checked="" type="checkbox"/>		
SESI0008424	2	IIN023099	Chemicals	Free Water Control, FWC-2, Undenified	4,490.64	778.2190	3,494.70	<input checked="" type="checkbox"/>		
SESI0008424	3	IIN023054	Chemicals	Accelerators, CaCl2 (Calcium Chloride) 2	3,492.72	549.3830	1,918.84	<input checked="" type="checkbox"/>		

OK Cancel Batch

Deliver remainder is set to 0 for a partial update

With the quantities entered and the order closed for receipts, select OK to finish. (Note: The Purchase Order will now say "Received" in the Status column now. It will still say "Open Order" if the closed for receipts box is left unchecked)

Microsoft Dynamics AX - Sanjel Group Ltd [SANJEL06; Session ID - 3] - [1 - sesi]

File Purchase order Purchase Manage Receive Invoice General

Receipts list Product receipt Pro forma receipts list Generate Receipts list Non conformances Quality orders Manage quality Product receipt Journals

All purchase orders (Unsaved filter) 8424 Purchase order

Calculated net amount	Purchase order	Vendor account	Name	Invoice account	Purchase type	Approval status	Status	Direct delivery	Ordered by	Totals
7,926.34	SESI0008424	SESV000006	Diversity Technologies Corporation (DI-CO...)	SESV000006	Purchase order	Confirmed	Received	<input type="checkbox"/>	Ferdina	Currency: CAD Line discount: 0.00 Subtotal amount: 7,926.34 Total discount: 0.00 Charges: 0.00 Sales tax: 396.32 Round-off: 0.00 Total amount: 8,322.66 Cash discount: 0.00 Latest purchase orders Related information

SESI0008424
Purchase order: SESI0008424
Calculated net amount: 7,926.34
Currency: CAD
Name: Diversity Technologies Corporatio

Line number	Item number	Product name	Procurement category	Quantity	Unit	Unit price	Net amount
1	IIN023122	Lost Circulati...	Chemicals	4,800.00	kg	0.5235	2,512.80
2	IIN023099	Free Water C...	Chemicals	4,490.64	kg	778.2190	3,494.70
3	IIN023054	Accelerators, ...	Chemicals	3,492.72	kg	549.3830	1,918.84

Identification of the purchase.



Attach Scanned BOL to the Purchase Order

When a load is brought in from a vendor, they bring a bill of lading (BOL). The bill of lading is a document that states the shipment was delivered, which will be found on the receipt given by the delivery driver. Each of these BOL's need to be scanned, and saved digitally onto SBS.

First, scan the BOL which will automatically save to the P:\Operations\Bulk Plant*YOUR DISTRICT* file location. With the file saved, search for the PO you would like to attach the BOL to but searching for the last four numbers in the PO number in the search bar and selecting "Purchase Order" in the drop down menu.

The screenshot shows the Microsoft Dynamics AX interface for managing purchase orders. The main window title is "Microsoft Dynamics AX - Sanjel Group Ltd [SANIEL26: Session ID - 52] - [1 - sesi]". The top navigation bar includes links for SESI, Procurement and sourcing, Common, Purchase orders, All purchase orders, and a search bar. Below the navigation is a toolbar with icons for Purchase order, Purchase, Manage, Receive, Invoice, General, and various data entry and reporting functions. A left-hand sidebar lists navigation categories such as Procurement and sourcing, Vendors, Journals, and Inquiries. The main content area displays a grid of purchase orders. A red box highlights the search bar at the top right of the grid header. The grid columns include Calculated net amount, Purchase order, Vendor account, Name, Invoice account, Purchase type, Approval status, Status, Direct delivery, Orderer, Requester, and Totals. The bottom part of the screen shows a detailed view of a selected purchase order with columns for Line number, Item number, Product name, Procurement category, Quantity, Unit, Unit price, and Net amount. The status bar at the bottom indicates "This grid is empty."



With the purchase order found, single click the line to highlight the line and select “Attachments” in the top row.

The screenshot shows the Microsoft Dynamics AX interface for Purchase Orders. The main grid displays two purchase orders: SESI0002701 and SESI00012701. The 'Attachments' button in the toolbar is highlighted with a red box. A detailed view of SESI0012701 is open in a pop-up window, showing the purchase order header and a single line item for 'Bull Additive, Chemicals'.

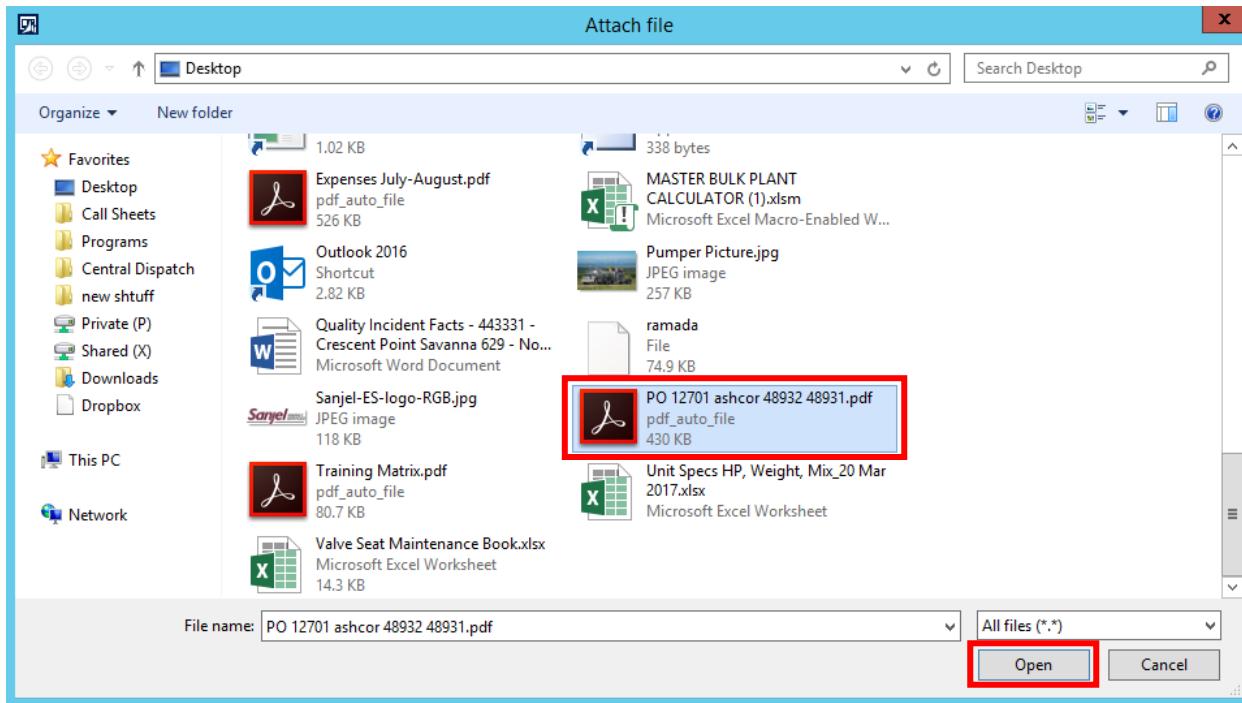
Line number	Item number	Product name	Procurement category	Quantity	Unit	Unit price	Net amount
1	INV023001	Bull Additive, Chemicals		40.00	mt	125.0000	\$2,500.00

In the new pop up window, select “New” in the top left corner, and select “File” in the drop down menu.

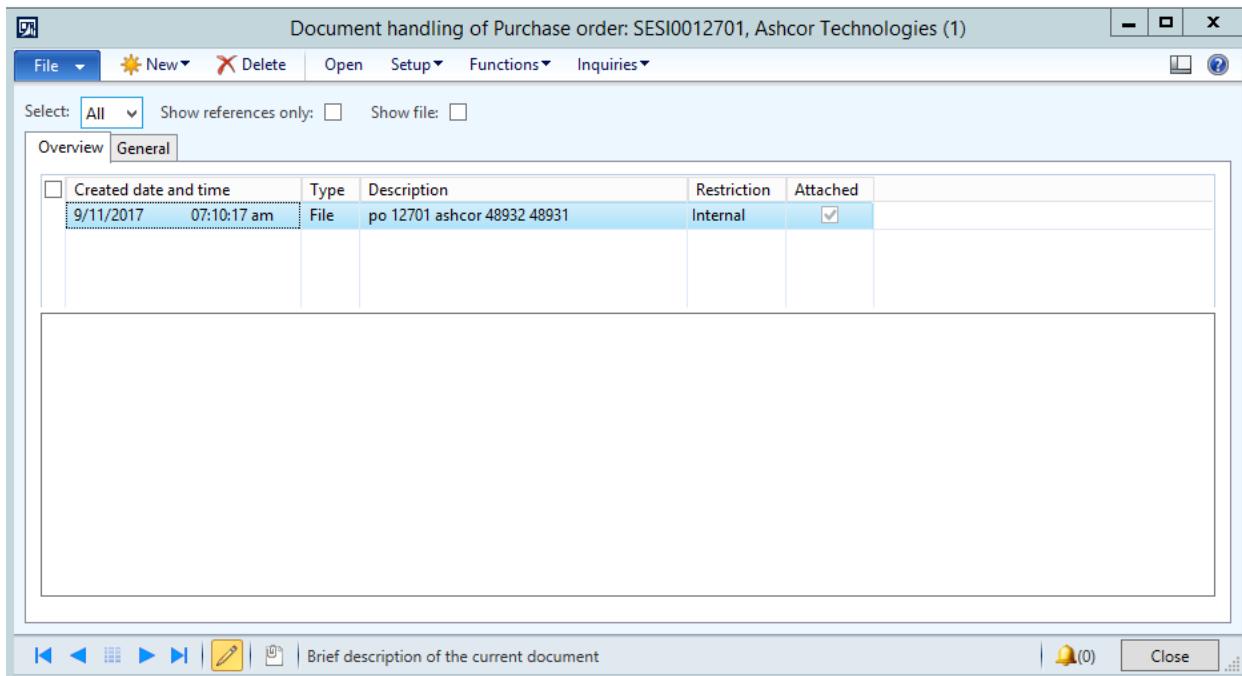
The screenshot shows the 'Document handling of Purchase order: SESI0012701, Ashcor Technologies (1)' dialog box. The 'New' button in the top left is highlighted with a red box. The 'File' dropdown menu is open, showing 'New' as the selected option. The main area displays an empty table for attachments, and a note at the bottom says 'Note for reference transaction'.



Now, search for the PDF file of the scanned BOL you made. When found, single click the file and click "Open" on the bottom left of the window



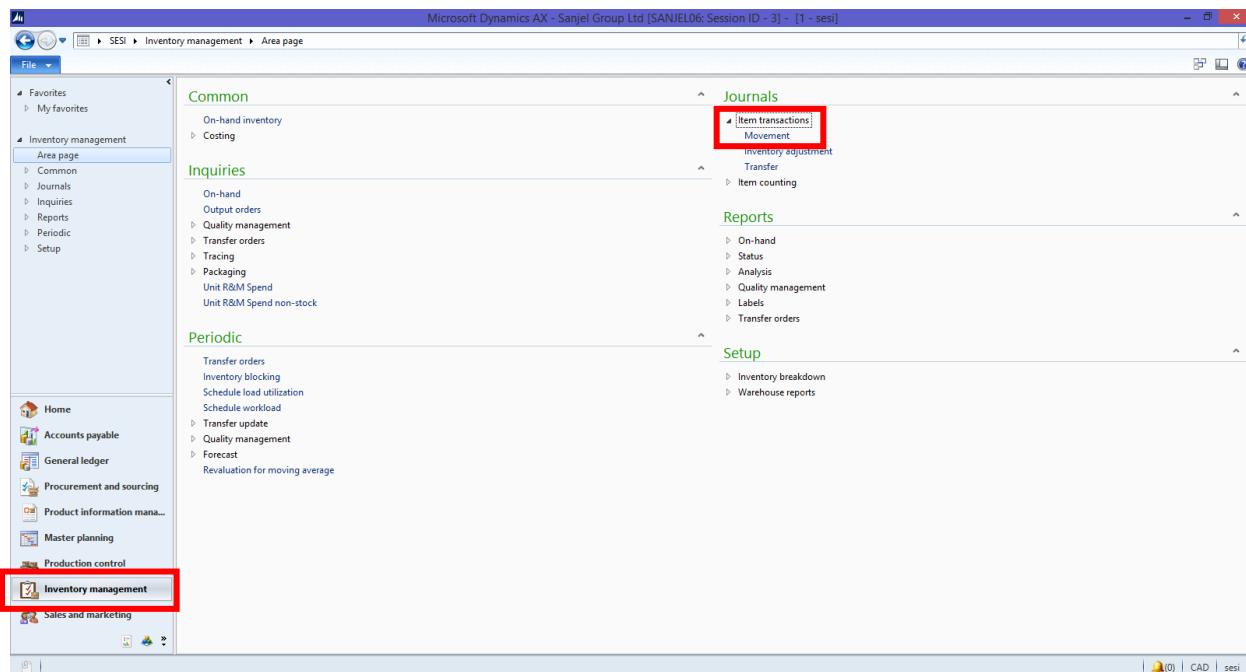
Now the file will be attached in the window as shown below:





Issue Out Materials for a Job:

When a blend is created and being shipped out on a bulker or a B-train the inventory of the bulk plant needs to be adjusted. To do so, the bulk plant operator has to “Issue Out Materials” from the bulk plant. To issue out materials, first go to the “Inventory Management” section, and select “Movement” under the “Item Transaction” tab.



With a new window open, select “New” at the top to create a new “Movement Journal”. A new line will appear with an associated movement journal number.

Name	Journal	Call Sheet #	Description	Lines	Posted	In use
UJ008795			Issue Out - Parts			
ISSUE...	UJ008777					
ISSUE...	UJ008781	1073553	K+S 3c2-19-19-24w2 176...			



Under the "Name" drop down menu, select "ISSUEMAT" or "Issue Out – Materials". Next fill in the call sheet number for the job the blend was made for. Then under Description, name the movement journal as follows:

"Company" "Well Location" "MTS #"

For Example:

Imperial Oil 6-20-70-4W4M MTS c178558

Note: This is similar to how the PDF file for the MTS was named, and is done to show all relevant information on the movement journal if someone has to look back for any issues.

Name	Journal	Call Sheet #	Description	Lines	Warehouse	Posted	In use
ISSUEMAT	IJ008795	1073671	MEG - Akita #21, 2-12-77-6W4, MTS C178532		50620		
ISSUEPARTS	IJ008777		Issue Out - Parts				
ISSUEMAT	IJ008781	1073553	K+S 3c2-19-19-24w2 176543		61720		



Next select the “Financial Dimensions” tab, and fill in the financial dimensions for the district that is entered as the “Service Point” on the call sheet. Errors often occur at this stage due to complacency! Not always are you blending for your own district, so double check the call sheet!

Movement (1 - sesi) - Posted: NoJournal type: Movement, New Record

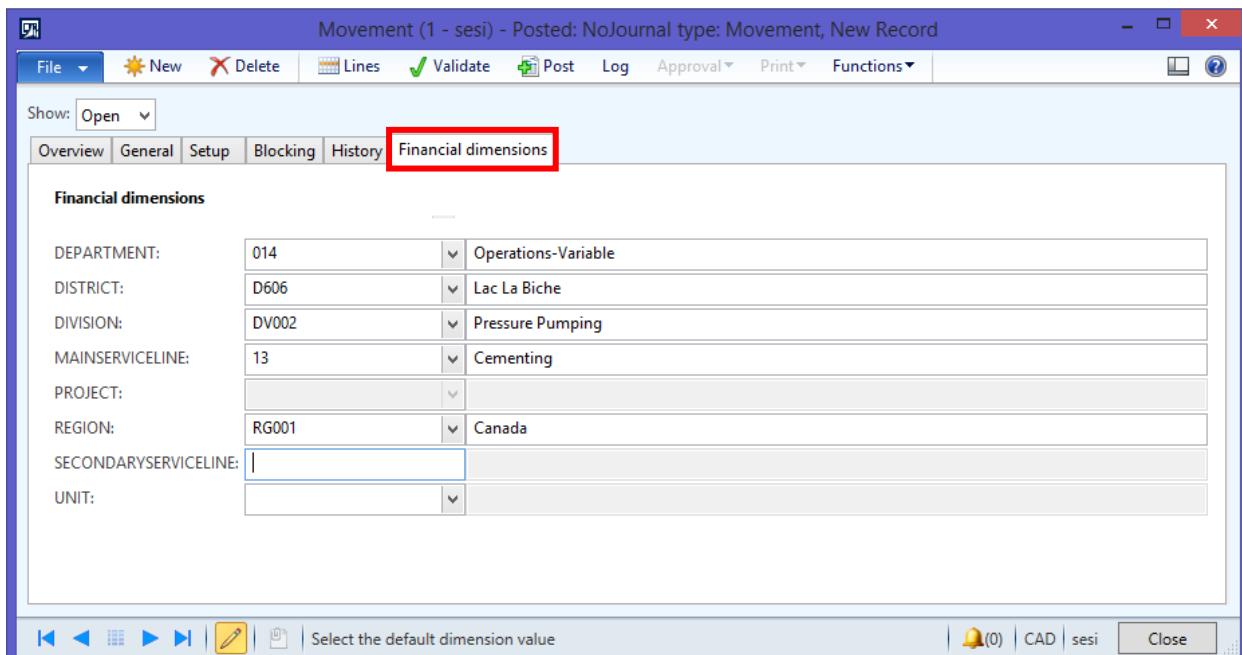
File New Delete Lines Validate Post Log Approval Print Functions

Show: Open Overview General Setup Blocking History Financial dimensions

Financial dimensions

DEPARTMENT:	014	Operations-Variable
DISTRICT:	D606	Lac La Biche
DIVISION:	DV002	Pressure Pumping
MAINSERVICELINE:	13	Cementing
PROJECT:		
REGION:	RG001	Canada
SECONDARYSERVICELINE:		
UNIT:		

Select the default dimension value | CAD sesi | Close



Next select “Lines” at the top of the window. This page is where all the materials that are being issued out will be entered.

Movement (1 - sesi) - Posted: NoJournal type: Movement, New Record

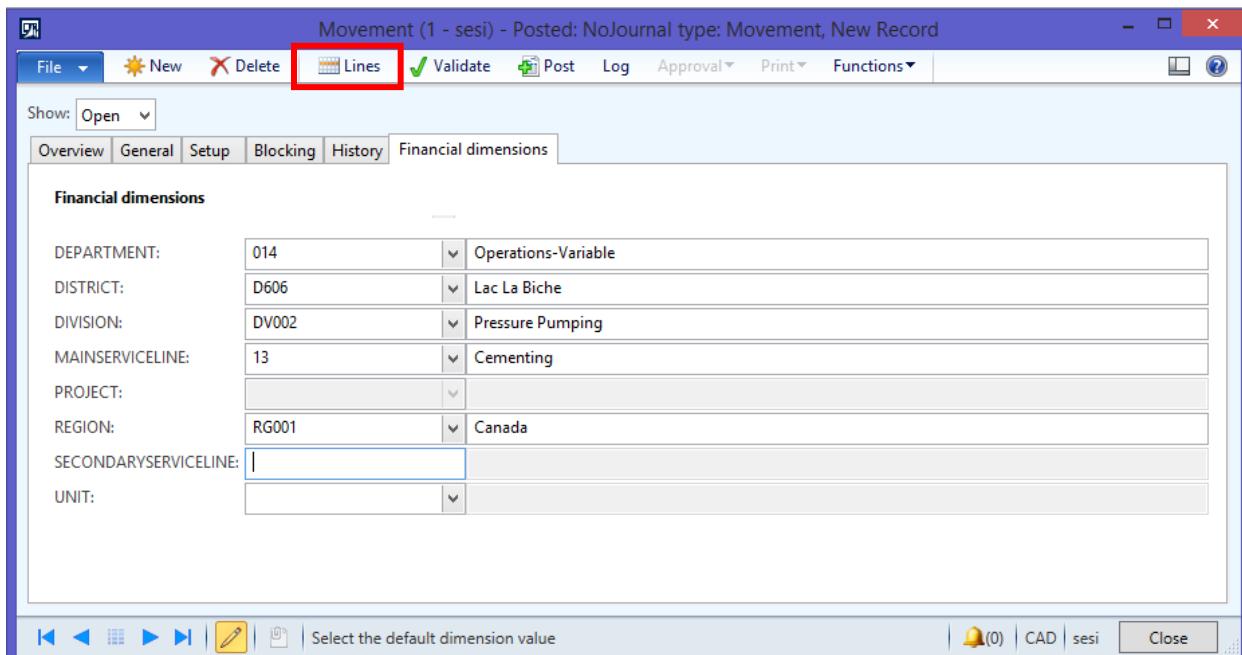
File New Delete Lines Validate Post Log Approval Print Functions

Show: Open Overview General Setup Blocking History Financial dimensions

Financial dimensions

DEPARTMENT:	014	Operations-Variable
DISTRICT:	D606	Lac La Biche
DIVISION:	DV002	Pressure Pumping
MAINSERVICELINE:	13	Cementing
PROJECT:		
REGION:	RG001	Canada
SECONDARYSERVICELINE:		
UNIT:		

Select the default dimension value | CAD sesi | Close





Select "New" to start a line entry, then enter the "Item Number", "Warehouse", and "Quantity" for each item used in the blend.

A helpful tip for this section is to use the drop down menu for item number, and search for the item by name. Select the "Item Number" drop down menu, then hit "Ctrl" and "g" at the same time on your keyboard to bring up a search bar. Type in the item name, and hit the "Down" arrow on your keyboard and select "Contains". This will search for item names that contains what you typed. Select the correct item when found, and enter the warehouse and quantity used.

Note: Warehouse is always your own district, even if the "service point" is different, keep in mind items are leaving YOUR bulk plant. Also keep in mind the "Unit" each item will be in, some chemicals will be in tonnes, others in kg. Any mistakes here will cause your inventory count to be wrong.

Journal lines, inventory (1 - sesi) - Journal: IJ008795, New Record

New Delete Validate Post Log Approval Inventory Functions

Date	Item number	Product number	Product name	Warehouse	Quantity	Unit	Cost price	Cost amount	Offset account	Log
2017							0.00	40000		

Transaction date applying to the journal line. | (0) CAD sesi Close

Enter all the items used in the blend and the amount of product used. Make sure to input the amount used with the corresponding units (SBS tracks weights of products, not number of bags), then click "Validate" at the top of the window

Journal lines, inventory (1 - sesi) - Journal: IJ008795, New Record

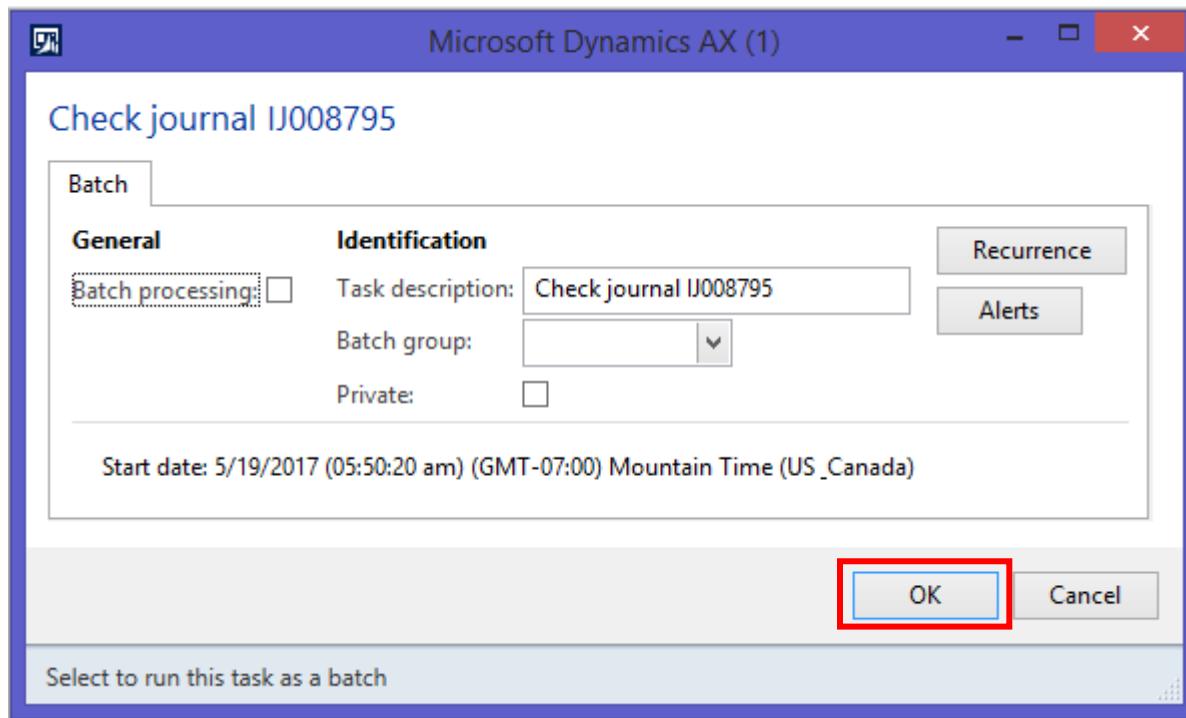
New Delete Validate Post Log Approval Inventory Functions

Date	Item number	Product number	Product name	Warehouse	Quantity	Unit	Cost price	Cost amount	Offset account	Log
5/19/...	IIN023116	PPN023116	Cement, Intercem	60620	-20.40	mt	193.00	-3,937.20	40000	
5/19/...	IIN054769	PPN054769	Cement, Silica Flour 200	60620	-6,100.00	kg	0.18	-1,107.15	40000	
5/19/...	IIN023102	PPN023102	Accelerators, SCA-1 (Gypsum W-60)	60620	-650.00	kg	0.36	-236.28	40000	
5/19/...	IIN023222	PPN023222	EA-3 (SEA-3), Bond Enhancer	60620	-200.00	kg	1.31	-262.00	40000	
5/19/...	IIN023054	PPN023054	Accelerators, CaCl2 (Calcium Chloride)	60620	-272.40	kg	0.55	-149.66	40000	
5/19/...	IIN023099	PPN023099	Free Water Control, FWC-2, Undensified Sil...	60620	-408.60	kg	0.78	-318.18	40000	
5/19/...	IIN023050	PPN023050	Lost Circulation, LCG-2 (CalCarb 325)	60620	-380.00	kg	0.15	-58.14	40000	
5/19/...	IIN023052	PPN023052	Lost Circulation, LCG-5 (CalCarb SuperCal...)	60620	-380.00	kg	0.14	-54.34	40000	
5/19/...	IIN023203	PPN023203	Sil 1	60620	-272.40	kg	0.20	-53.66	40000	
5/19/...	IIN023204	PPN023204	Sil 4	60620	-272.40	kg	0.16	-42.49	40000	
5/19/...	IIN023122	PPN023122	Lost Circulation, LCC-1	60620	-280.00	kg	0.52	-146.58	40000	
5/19/...	IIN023060	PPN023060	Fluid Loss Additive, CFL-3	60620	-150.00	kg	3.75	-562.50	40000	
5/19/...	IIN023068	PPN023068	Dispersants, CFR-2	60620	-25.00	kg	2.80	-70.09	40000	
5/19/...	IIN052225	PPN052225	Defoamer, CDF-6P	60620	-36.00	kg	2.54	-91.59	40000	

Unit symbol | (0) CAD sesi Close

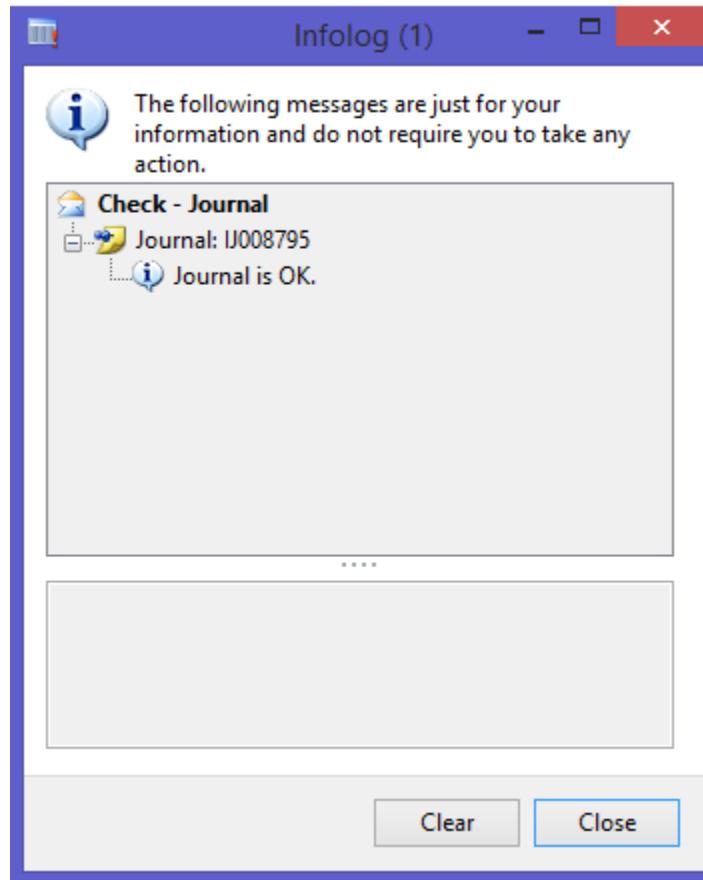


“Validate” checks the inventory that SBS has on record and validates that you have the chemicals you have entered in your movement journal. Click OK in the new window to validate your movement journal





If what you entered passes the validation, a new window will say Journal is OK. Any errors that arise here may be due to a mistake in the journal entries you just made, double check your work.

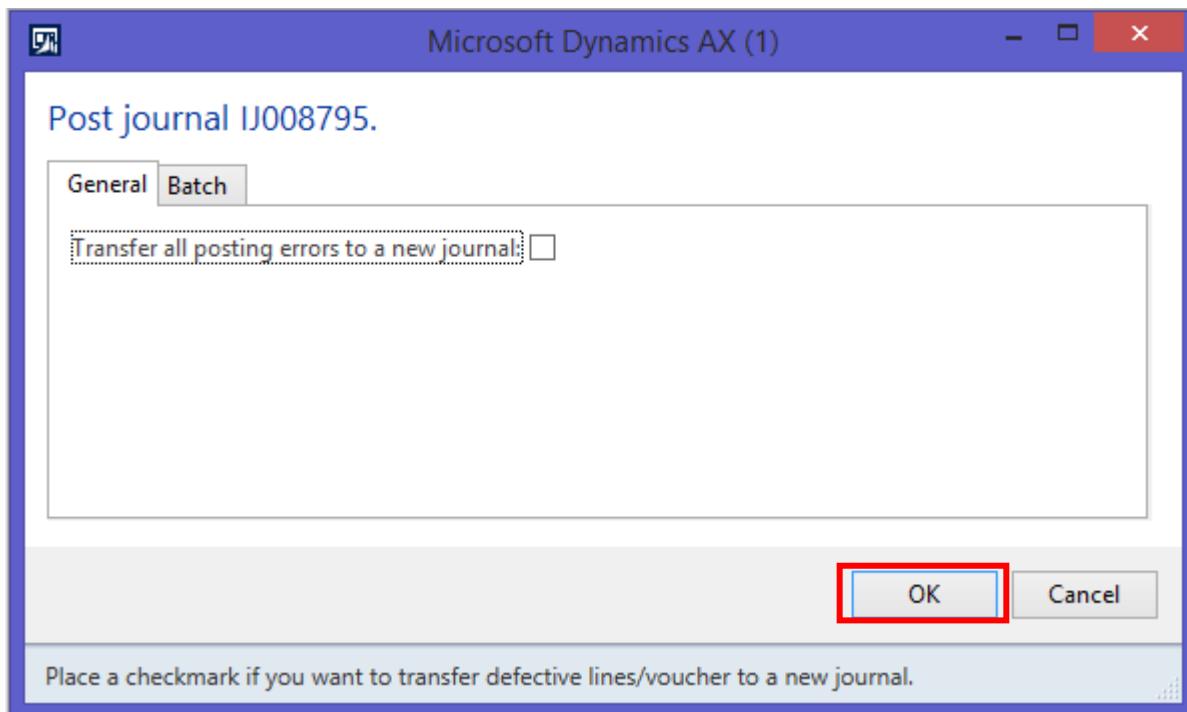


Back on the lines window, you can now click “Post” to post your movement journal

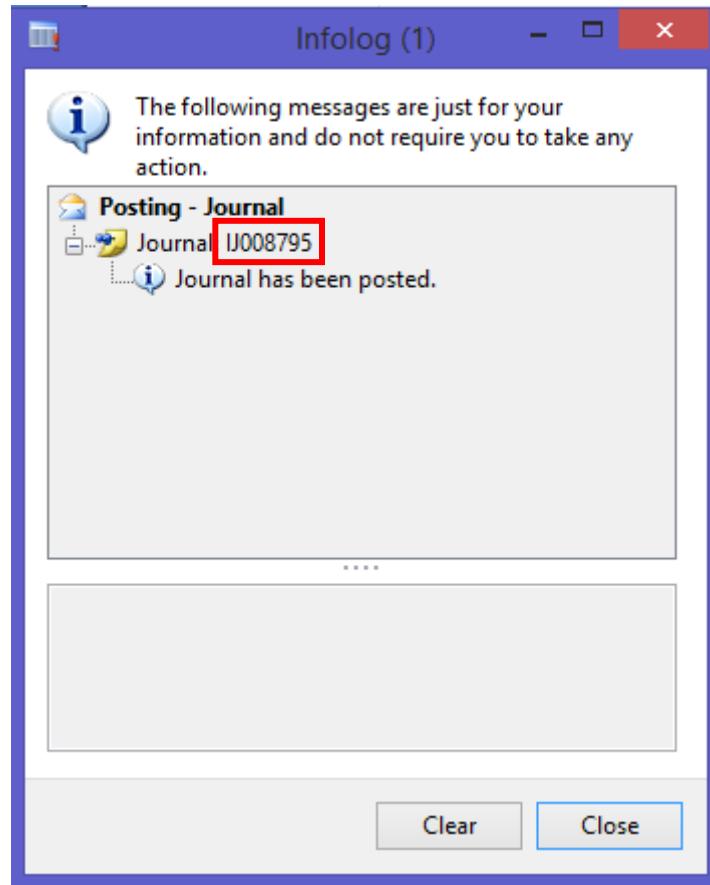
Date	Item number	Product number	Product name	Warehouse	Quantity	Unit	Cost price	Cost amount	Offset account	Log
5/19/...	IIN023116	PPN023116	Cement, Intercem	60620	-20.40	mt	193.00	-3,937.20	40000	
5/19/...	IIN054769	PPN054769	Cement, Silica Flour 200	60620	-6,100.00	kg	0.18	-1,107.15	40000	
5/19/...	IIN023102	PPN023102	Accelerators, SCA-1 (Gypsum W-60)	60620	-650.00	kg	0.36	-236.28	40000	
5/19/...	IIN023222	PPN023222	EA-3 (SEA-3), Bond Enhancer	60620	-200.00	kg	1.31	-262.00	40000	
5/19/...	IIN023054	PPN023054	Accelerators, CaCl2 (Calcium Chloride)	60620	-272.40	kg	0.55	-149.66	40000	
5/19/...	IIN023099	PPN023099	Free Water Control, FWC-2, Undensified Sil...	60620	-408.60	kg	0.78	-318.18	40000	
5/19/...	IIN023050	PPN023050	Lost Circulation, LCG-2 (CalCarb 325)	60620	-380.00	kg	0.15	-58.14	40000	
5/19/...	IIN023052	PPN023052	Lost Circulation, LCG-5 (CalCarb SuperCal...)	60620	-380.00	kg	0.14	-54.34	40000	
5/19/...	IIN023203	PPN023203	Sil 1	60620	-272.40	kg	0.20	-53.66	40000	
5/19/...	IIN023204	PPN023204	Sil 4	60620	-272.40	kg	0.16	-42.49	40000	
5/19/...	IIN023122	PPN023122	Lost Circulation, LCC-1	60620	-280.00	kg	0.52	-146.58	40000	
5/19/...	IIN023060	PPN023060	Fluid Loss Additive, CFL-3	60620	-150.00	kg	3.75	-562.50	40000	
5/19/...	IIN023068	PPN023068	Dispersants, CFR-2	60620	-25.00	kg	2.80	-70.09	40000	
5/19/...	IIN052225	PPN052225	Defoamer, CDF-6P	60620	-36.00	kg	2.54	-91.59	40000	



Select OK in the pop up window to post the journal



The final window is confirmation the journal has been posted, and that the items will be removed from the bulk plants inventory.



In the MTS section, the last step was to write down the movement journal number on the pink copy of the MTS. That number can be found on the confirmation window; write it down and close the window.

Note: For inventory count purposes, only post inventory journals for jobs that will be completed in the same month that they were blended.



Issue In Materials

Similar to issuing out materials, issuing in materials is entering what is returned from a job onto SBS. This is just as important as issuing out materials to keep an accurate inventory count.

Issuing in materials starts the same as before by clicking “Movement” in “Inventory Management” under “Item Transactions”

Select “New” at the top to create a new movement journal

Movement (1 - sesi) - Posted: NoJournal type: Movement, New Record

File **New** Delete Lines Validate Post Log Approval Print Functions

Show: Open

Overview General Setup Blocking History Financial dimensions

Name	Journal	Call Sheet #	Description	Lines	Posted	In use
	IJ008795					
ISSUE...	IJ008777		Issue Out - Parts			
ISSUE...	IJ008781	1073553	K+S 3c2-19-19-24w2 176...			

Identification of the journal name. CAD sesi Close

Under Name, select RETURNMAT or Return - Materials and fill in the call sheet number and description similarly to before.

For this example, the description is Imperial Oil 6-20-70-4W4M CS 1073823 MTS c178558



Next click "Lines" at the top to make your return entries.

The screenshot shows a software interface for managing material movements. The title bar reads "Movement (1 - sesi) - Posted: NoJournal type: Movement, New Record". The menu bar includes File, New, Delete, Lines (which is highlighted with a red box), Validate, Post, Log, Approval, Print, Functions, and Help. Below the menu is a toolbar with icons for New, Delete, Lines, Validate, Post, Log, Approval, Print, and Functions. A dropdown menu "Show: Open" is open. The main area has tabs: Overview, General, Setup, Blocking, History, and Financial dimensions. The Overview tab is selected. A table displays journal lines:

Name	Journal	Call Sheet #	Description	Lines	Warehouse	Posted	In use
RETURNMAT	IJ009087	1073823	Imperial Oil 6-20-70-4W4M CS 1073823 MTS ...	60620			
ISSUEMAT	IJ009072	1073815	Whitecap 3B5-25-13-20w3 176620	61720			

At the bottom, there are navigation icons (Back, Forward, Home, etc.), a pencil icon, and a "Number of journal lines" field. On the right, there are status indicators for CAD (0) and sesi, and a Close button.

Similar to before, select the "Financial Dimensions" tab, and fill in the financial dimensions for the district that is entered as the "Service Point" on the call sheet.

The screenshot shows the same software interface, but the "Financial dimensions" tab is now selected. The title bar and menu bar are identical to the previous screenshot. The "Financial dimensions" tab is highlighted with a red box. The main area displays a form for entering financial dimensions:

DEPARTMENT:	014	Operations-Variable
DISTRICT:	D606	Lac La Biche
DIVISION:	DV002	Pressure Pumping
MAINSERVICELINE:	13	Cementing
PROJECT:		
REGION:	RG001	Canada
SECONDARYSERVICELINE:		
UNIT:		

At the bottom, there are navigation icons, a pencil icon, and a "Select the default dimension value" field. On the right, there are status indicators for CAD (0) and sesi, and a Close button.

Next select "Lines" at the top of the window. This page is where all the materials that are being returned will be entered.



Enter the materials you are returning line by line by clicking “New”, filling in the “Item Number” from the drop down menu and searching for the product name, the warehouse number, and the quantity returned. (keeping in mind the units of the item being returned)

Journal lines, inventory (1 - sesi) - Journal: IJ009087, New Record

Date: 01/06/2017

Quantity: 1.00

Date	Item number	Product number	Product name	Warehouse	Quantity	Unit	Cost price	Cost amount	Offset account	Log
					0.00		40000			

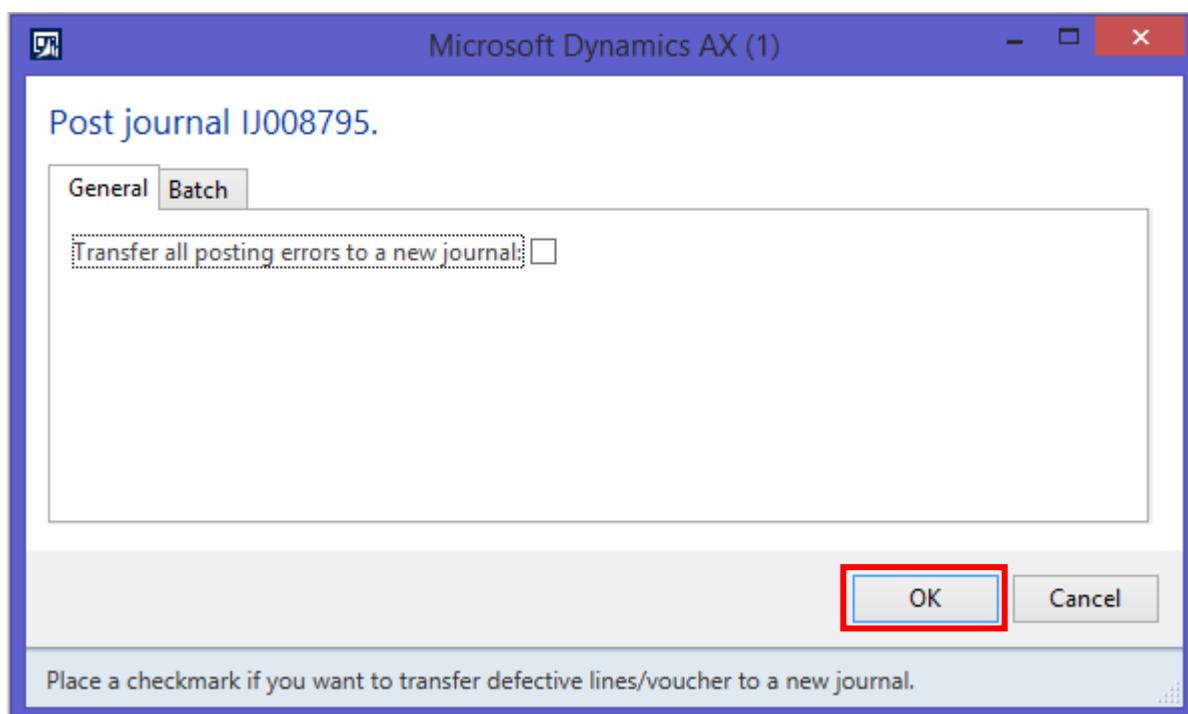
With all the items entered correctly, click post at the top of the window

Journal lines, inventory (1 - sesi) - Journal: IJ009087, New Record

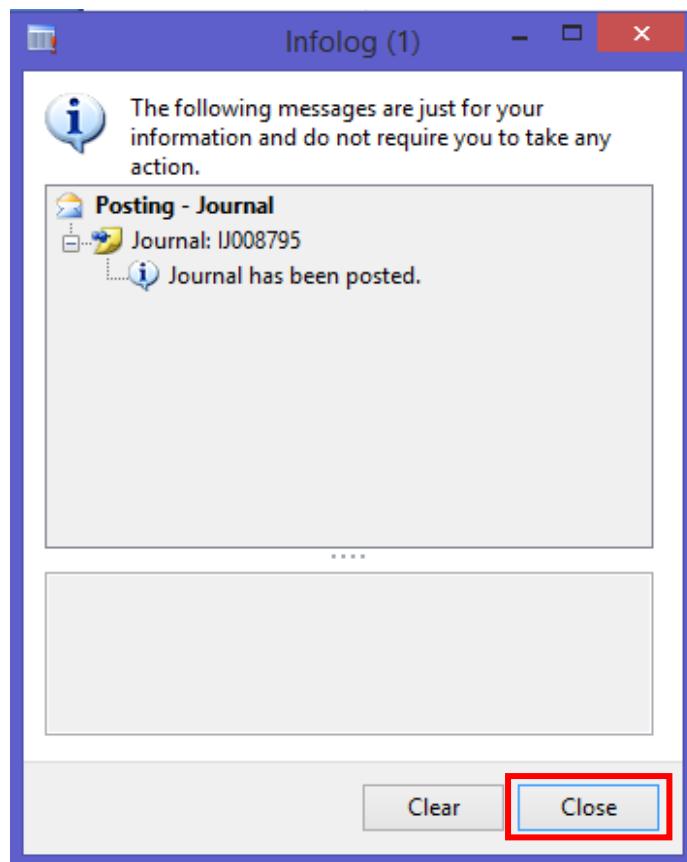
Post

Date	Item number	Product number	Product name	Warehouse	Quantity	Unit	Cost price	Cost amount	Offset account	Log
6/1/...	IIN023428	PPN023428	Plug, Wood, 406.4 mm - 16"	60620	1.00	ea	433.32	433.32	40000	
6/1/...	IIN049713	PPN049713	Cementing, LCF-7	60620	25.00	kg	14.30	357.49	40000	

Then select OK to finish the inventory journal



Close the confirmation window





Intercompany Movement Journals

An Intercompany Movement Journal must be completed when one district ships materials to another. Creating the Intercompany transfer order will more conveniently take care of financials and inventory for both bulk plants.

To view intercompany movement journals select “Inventory Management” then “Transfer Orders” under the “Periodic Tab”

The screenshot shows the Microsoft Dynamics AX - Sanjel Group Ltd [SANJEL06; Session ID - 3] - [1 - sesi] interface. The left sidebar has a tree view with 'Favorites', 'Inventory management' (selected), and 'Periodic' (selected). Under 'Periodic', 'Transfer orders' is highlighted with a red box. The main area shows sections for 'Common', 'Inquiries', and 'Periodic'. In the 'Periodic' section, 'Transfer orders' is expanded, showing sub-options like 'Inventory blocking', 'Schedule load utilization', 'Schedule workload', etc. On the right, there are sections for 'Journals', 'Reports', and 'Setup'.

If you are the bulk plant shipping items to another bulk plant, you will need to create a new transfer order; if you are receiving items from another bulk plant, you will need to find the transfer order already created by the other bulk plant.



Let us first look at creating a transfer order as if you were shipping items to another bulk plant. Click "New" at the top of the window to start a new transfer order

The screenshot shows the 'Transfer orders (1 - sesi)' window. At the top, there is a toolbar with 'File', 'New' (highlighted with a red box), 'Delete', 'Inquiries', 'Posting', 'Print', 'Change Warehouse', and 'Copy'. Below the toolbar is a navigation bar with tabs: 'Overview' (selected), 'General', 'Setup', 'Delivery', 'From warehouse', 'To warehouse', and 'History'. The main area contains a grid of transfer order data:

Transfer number	From warehouse	To warehouse	Transfer status	Ship date	Receipt date
ITN000728	61221	60620	Received	5/26/20...	5/26/2017
ITN000730	60721	60620	Received	5/27/20...	5/27/2017
ITN000731	60721	60720	Received	5/28/20...	5/28/2017
ITN000732	61221	60720	Cancelled	5/30/20...	5/30/2017
ITN000734	61220	60620	Received	5/30/20...	5/30/2017
ITN000736	60721	60620	Received	5/30/20...	5/30/2017
ITN000737	61220	60620	Received	5/31/20...	5/31/2017
ITN000738	61220	60720	Received	5/31/20...	5/31/2017
ITN000739	61221	61520	Created	5/31/20...	5/31/2017
ITN000741	60721	60720	Received	5/31/20...	5/31/2017
ITN000745			Created	6/1/2017	6/1/2017
ITN000743	61221	60720	Shipped	5/30/20...	5/30/2017

Below the grid, there is a 'Lines' tab and a 'General' tab. The 'General' tab is selected, showing a table with columns: Item number, Transfer quantity, Ship date, Receipt date, Product name, and Reserve items automatically. A message 'This grid is empty.' is displayed below the table.

At the bottom of the window, there are navigation icons (Back, Forward, Home, Print, etc.), a status bar with 'Identification of the transfer order.', and a system tray with a bell icon, CAD, sesi, and Close buttons.



Fill in your warehouse under “From warehouse” and the warehouse you are shipping to under “To warehouse”. Then click “Add” on the bottom section of the window to add items you are shipping.

The screenshot shows a Microsoft Windows application window titled "Transfer orders (1 - sesi)". The window has a standard menu bar with File, New, Delete, Inquiries, Posting, Print, Change Warehouse, and Copy. Below the menu is a toolbar with Overview, General, Setup, Delivery, From warehouse, To warehouse, and History tabs. The main area displays a grid of transfer orders with columns: Transfer number, From warehouse, To warehouse, Transfer status, Ship date, and Receipt date. Several rows are listed, including ITN000728 through ITN000743. The row for ITN000745 is highlighted with a red box around the "From warehouse" and "To warehouse" fields, both of which contain the value "60620". At the bottom of the window, there is a toolbar with Add, Remove, and Inventory buttons. The "Add" button is highlighted with a red box. Below this is a table for adding new transfer lines, with columns for Item number, Transfer quantity, Ship date, Receipt date, Product name, and Reserve items automatically. The "Add" button is located at the top left of this table. The bottom of the window features standard Windows-style navigation buttons (back, forward, search, etc.) and status indicators for CAD and sesi.

Search for the item number you are looking to ship using the drop down menu and search function, and fill the quantity you are shipping.



With all the items being shipped listed, click “Posting” at the top of the window and select “Ship Transfer Order”

The screenshot shows a software interface for managing transfer orders. At the top, there's a menu bar with File, New, Delete, Inquiries, Posting (which is highlighted with a red box), Print, Change Warehouse, and Copy. Below the menu is a toolbar with buttons for Add (+), Remove (X), and Inventory. A tabs section includes Overview, General, Setup, Delivery, From warehouse, To warehouse, and History. The main area displays a grid of transfer orders:

Transfer number	From warehouse	To warehouse	Transfer status	Ship date	Receipt date
ITN000728	61221	60620	Received	5/26/20...	5/26/2017
ITN000730	60721	60620	Received	5/27/20...	5/27/2017
ITN000731	60721	60720	Received	5/28/20...	5/28/2017
ITN000732	61221	60720	Cancelled	5/30/20...	5/30/2017
ITN000734	61220	60620	Received	5/30/20...	5/30/2017
ITN000736	60721	60620	Received	5/30/20...	5/30/2017
ITN000737	61220	60620	Received	5/31/20...	5/31/2017
ITN000738	61220	60720	Received	5/31/20...	5/31/2017
ITN000739	61221	61520	Created	5/31/20...	5/31/2017
ITN000741	60721	60720	Received	5/31/20...	5/31/2017
ITN000745	60620	60610	Created	6/1/2017	6/1/2017
ITN000743	61221	60720	Shipped	5/30/20...	5/30/2017

Below this, a detailed view of a transfer order is shown:

Item number	Transfer quantity	Ship date	Receipt date	Product name	Reserve items automatically
IIN023116	10.00	6/1/2017	6/1/2017	Cement, Intercem	<input type="checkbox"/>

At the bottom of the window, there are navigation icons (back, forward, search, etc.) and buttons for Ordered transfer quantity, Close, and other functions.

A new window will open for “Posting”



In the new window, select the box “Edit Lines”

The screenshot shows a software interface for managing shipments. The main title bar reads "Shipment (1 - sesi) - Transfer number: ITN000745, Shipment, Parameter ID: BSID0117740Parameter ID: ...". The top navigation bar has tabs for "Overview" and "General". Under "General", there is a table with columns: Transfer number, Update, Posting date, Tracking ID, Edit lines, Explode lines, Autoreceive, and Print transfer. The "Edit lines" column contains a checkbox, which is highlighted with a red box. A warning icon (yellow triangle with exclamation mark) is next to the transfer number. Below this is a grid titled "Lines" with tabs for "General" and "Dimensions". The grid is empty and displays the message "This grid is empty.". At the bottom of the window are buttons for "OK", "Cancel", "Batch", and "Inventory". A status message at the bottom left says "Make the selection of data later in the process".



Then select the “General” tab

Shipment (1 - sesi) - Transfer number: ITN000745, Shipment, Parameter ID: BSID0117740Parameter ID: ... □ X Select

Parameters

Late selection:

Overview General General

Options

Edit lines: Printer setup
Explode lines: Dimensions display
Autoreceive:
Print transfer shipment: Update: **Ship now**
Print product labels: Posting date: **6/1/2017**
Print shelf labels: Tracking ID:
Worker: **Craig Kunz**

Shipment

Lines General Dimensions

<input type="checkbox"/>	Item number	Product name	Ship quantity	Close
This grid is empty.				

OK Cancel Batch Inventory ▶

Which quantity should be shipped?



Under the “Ship now” drop down menu, select “All”

The screenshot shows the 'Shipment (1 - sesi)' dialog box. In the 'General' tab of the 'Parameters' section, the 'Update' dropdown under the 'Shipment' group is highlighted with a red box and contains the value 'All'. Other options like 'Posting date' and 'Worker' are also visible. Below this, the 'Lines' tab is selected, showing a single item row: IIN023116 (Cement, Intercem) with a Ship quantity of 10.00. At the bottom, there are buttons for OK, Cancel, Batch, and Inventory.

Then select OK to approve the transfer order.

The last step in sending an inter-company transfer is to email the other bulk plant the inventory transfer number, and when to expect the shipment. (Include purchasing in the email)



Receiving a transfer order is very similar to sending one. Instead of creating a new transfer order, find the transfer order you are looking to receive under the list of transfer orders. (Note: the “Transfer status” will say “Shipped”)

The screenshot shows a software interface for managing transfer orders. At the top, there's a toolbar with buttons for File, New, Delete, Inquiries, Posting (which is highlighted with a red box), Print, Change Warehouse, and Copy. Below the toolbar is a navigation bar with tabs: Overview, General, Setup, Delivery, From warehouse, To warehouse, and History. The main area is a grid table showing transfer orders. The columns include Transfer number, From warehouse, To warehouse, Transfer status, Ship date, and Receipt date. The transfer order ITN000743 is selected and highlighted with a red box. The status for this order is 'Shipped'. The 'Inventory' tab is selected in the bottom navigation bar, and the 'Lines' tab is active in the sub-navigation. The 'Lines' tab has its own toolbar with Add, Remove, and Inventory buttons. Below the toolbar is another navigation bar with tabs: Lines, General, Setup, Ship now, Receive now, and Dimensions. The 'Receive now' tab is selected. The main grid table under 'Lines' shows a single item row: IIN023222, Transfer quantity 3,000.00, Ship date 5/30/2017, Product name EA-3 (SEA-3), Bond Enhancer, and a Reserve items auto... checkbox.

With the correct transfer order selected, click “Posting” at the top of the window and click “Receive”



A new window will open for “Posting”

Receive (1 - sesi) - Transfer number: ITN000743, Receive, Parameter ID: BSID0117745Parameter ID: BSID0117745

Parameters

Late selection:

Overview General

<input type="checkbox"/> Transfer number	Update	Shipment voucher	Posting date	Tracking ID	Edit lines	Explode lines	Print transfer receipt
! ITN000743	Receive now		6/1/2017		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Lines General Dimensions

<input type="checkbox"/> Item number	Product name	Receive quantity	Scrap quantity
This grid is empty.			

OK Cancel Batch Inventory ▶ Inventory ▶

Make the selection of data later in the process



Similarly to sending a transfer order, you will have to click the “Edit lines” check box

Receive (1 - sesi) - Transfer number: ITN000743, Receive, Parameter ID: BSID0117745Parameter ID: BSID0117745

Parameters

Late selection:

Select

Overview General

<input type="checkbox"/>	Transfer number	Update	Shipment voucher	Posting date	Tracking ID	Edit lines	Explode lines	Print transfer receipt
!	ITN000743	Receive now		6/1/2017		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Lines General Dimensions

<input type="checkbox"/>	Item number	Product name	Receive quantity	Scrap quantity
This grid is empty.				

OK Cancel Batch Inventory > Inventory >

Should it be possible to edit the lines before posting and updating?



Then click on the “General” tab

Receive (1 - sesi) - Transfer number: ITN000743, Receive, Parameter ID: BSID0117745Parameter ID: BSID0117745

Parameters

Late selection:

Select

Overview **General**

Options **Receive**

Edit lines: Update: **Receive now**
 Explode lines: Shipment voucher:
 Print transfer receipt: Posting date: **6/1/2017**
 Print product labels: Tracking ID:
 Print shelf labels: Worker: **1230**

Printer setup
Dimensions display

Lines **General** **Dimensions**

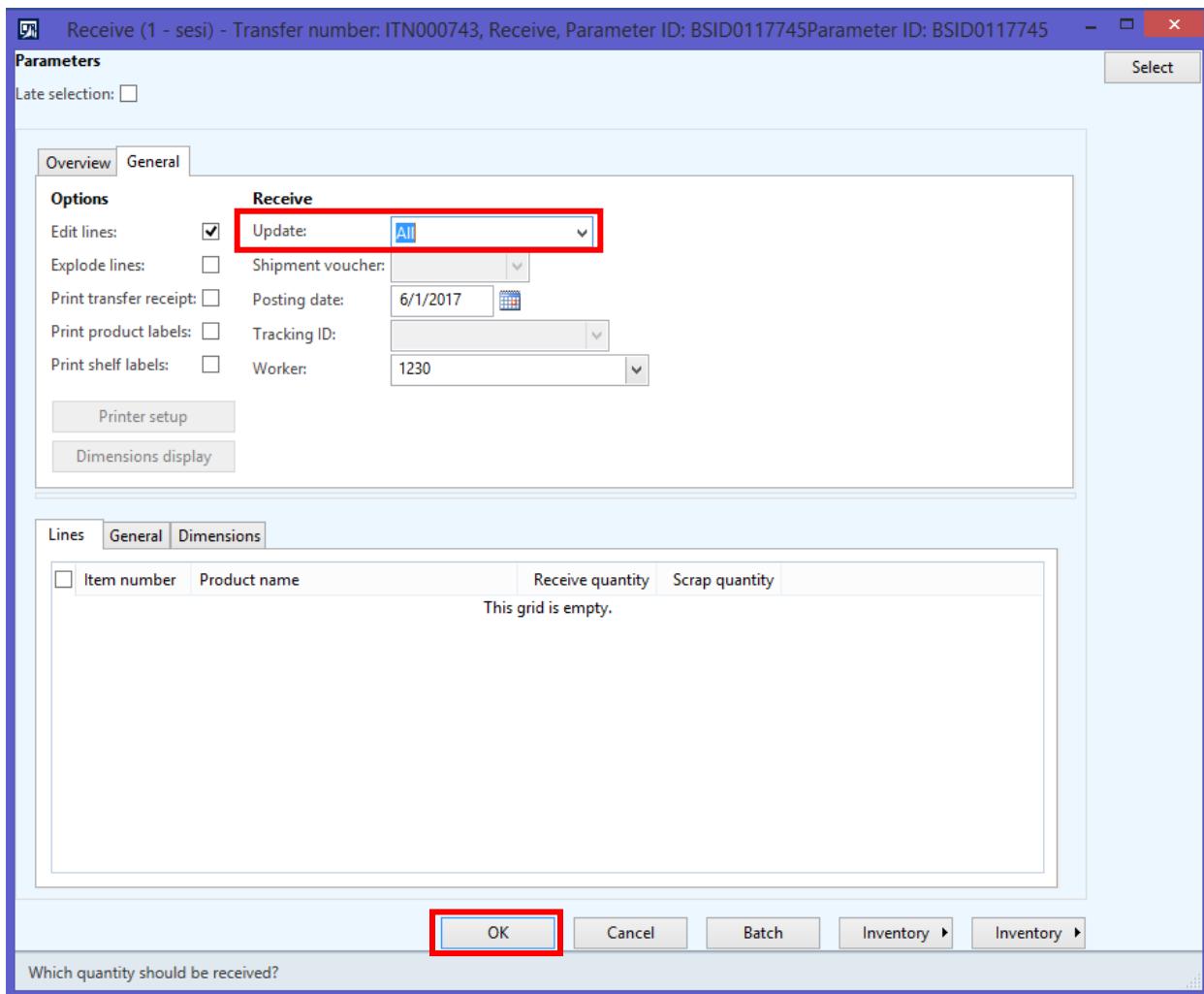
<input type="checkbox"/> Item number	Product name	Receive quantity	Scrap quantity
This grid is empty.			

OK Cancel Batch Inventory > Inventory >

Should it be possible to edit the lines before posting and updating?



Then change the “Update” drop down menu from “Receive now” to “All”



Then select OK at the bottom of the window to finish receiving the transfer order.



Counting Inventory

Every month an inventory count is performed at each district. This is done to keep an accurate inventory count and ensure no major discrepancies are present. For this example, we will be conducting an inventory count for Lac La Biche.

Before beginning an inventory count, there are certain prerequisites:

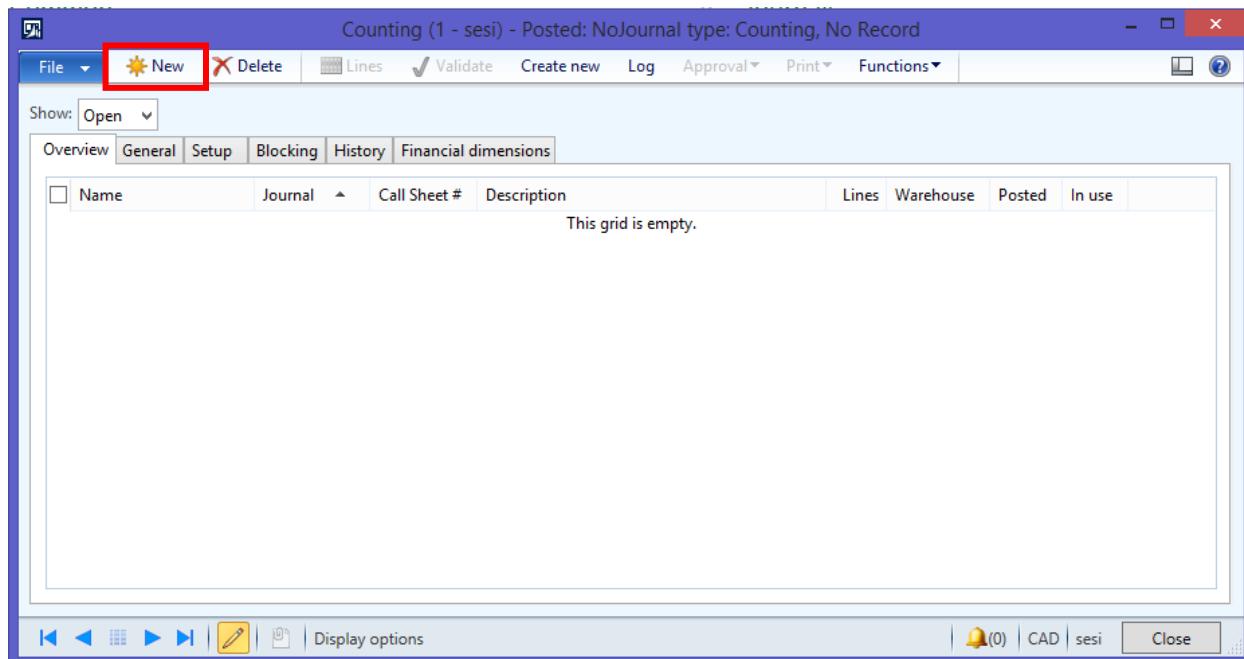
4. All Purchase Order receipts must be up to date
5. All issue out transaction are up-to date
6. All return transactions are up to date

Once those are complete, the inventory counting can begin.

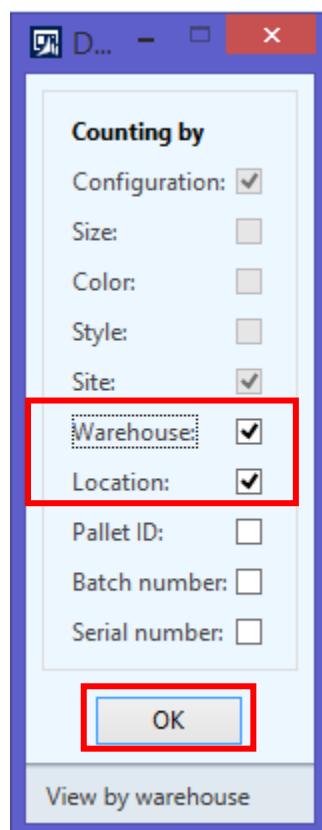
To start counting inventory in SBS, first open “Inventory Management” and click “Counting”

The screenshot shows the Microsoft Dynamics AX interface. The title bar reads "Microsoft Dynamics AX - Sanjel Group Ltd [SANJEL06: Session ID - 53] - [1 - sesi]". The left sidebar has a tree view with "Favorites", "Inventory management" (selected), "Common", "Journals", "Inquiries", "Reports", "Periodic", and "Setup". Under "Inventory management", "Area page" is also selected. The main area is titled "Area page" and contains sections for "Common", "Journals", "Inquiries", "Periodic", "Reports", and "Setup". In the "Journals" section, there is a tree view with "Item transactions", "Item counting" (selected), and "Counting" (highlighted with a red box). Other options in "Item counting" include "Movement", "Inventory adjustment", "Transfer", and "Tag counting".

In the new window, click new to create a new inventory count



In the pop up window, select “Warehouse” and “Location”, then click OK



On the newly formed inventory count, Select ICOUNT in the drop down menu under “Name”, select your district under the “Warehouse” drop down menu, and fill in your district, month, and year under “Description”.



Counting (1 - sesi) - Posted: NoJournal type: Counting, New Record

File New Delete Lines Validate Create new Log Approval Print Functions

Show: Open Overview General Setup Blocking History Financial dimensions

Name	Journal	Call Sheet #	Description	Lines	Warehouse	Posted	In use
ICOUNT	J009208		Inventory May 2017 Lac La Biche - Example		60620		

◀ ▶ | Description of the journal | Close

Next, click the “Financial Dimensions” tab and fill in the dimensions for your district.

Counting (1 - sesi) - Posted: NoJournal type: Counting, New Record

File New Delete Lines Validate Create new Log Approval Print Functions

Show: Open Overview General Setup Blocking History Financial dimensions

Financial dimensions

DEPARTMENT:	014	Operations-Variable
DISTRICT:	D606	Lac La Biche
DIVISION:	DV002	Pressure Pumping
MAINSERVICELINE:	13	Cementing
PROJECT:		
REGION:	KG001	Canada
SECONDARYSERVICELINE:		
UNIT:		

◀ ▶ | Select the default dimension value | Close

Next, click “Lines” at the top of the window to open a new window



Journal lines, inventory (1 - sesi) - Journal: J009208, New Record

File **New** Delete Validate Approval Functions Inventory **Create**

Overview General Financial dimension Inventory dimensions

Product name	Date	Item number	Item group	Warehouse	On-hand	Counted	Quantity	Worker	Log
	6/7/...	~~~~~							

◀ ▶ ⌂ ⌃ ⌄ ⌅ | Descriptive name of the product | **Close**

| **Bell(0)** CAD sesi |



Now we need the list of inventory on hand according to SBS. To do so, click “Create” at the top of the window and click “On Hand” to open a new window.

Microsoft Dynamics AX (1)

Create on-hand counting journal

General Batch

Setup

Journal:	JU009208
Counting date:	6/7/2017
Max. number of lines:	999
Physical transactions:	<input type="checkbox"/>
Not counted since:	<input type="text"/>
Counting group:	<input type="text"/>
Activate counting code:	<input type="checkbox"/>
Include items with nothing on hand:	<input checked="" type="checkbox"/>

On-hand inventory

Item number:	<input type="text"/>
Closed:	<input type="text"/>

Inventory dimensions

Warehouse:	60620
Location:	<input type="text"/>

Items

Auto-report as finished:	No
--------------------------	----

Relationship between items and item groups

Item group:	MATERIALS
-------------	-----------

Relationship between items and item model groups

Item number:	<input type="text"/>
--------------	----------------------

Counting by

Configuration:	<input checked="" type="checkbox"/>
Size:	<input type="checkbox"/>
Color:	<input type="checkbox"/>
Style:	<input type="checkbox"/>
Site:	<input checked="" type="checkbox"/>
Warehouse:	<input checked="" type="checkbox"/>
Location:	<input checked="" type="checkbox"/>
Pallet ID:	<input type="checkbox"/>
Batch number:	<input type="checkbox"/>
Serial number:	<input type="checkbox"/>
GTD number:	<input type="checkbox"/>
Owner:	<input type="checkbox"/>
Inventory profile:	<input type="checkbox"/>

Select

Date for which on-hand is to be counted

OK Cancel

In this window, make sure “Include items with nothing on hand” is not selected and your “Warehouse” and “Item group” blocks are filled in. If they are not present, follow the next step. If they are present, skip this next step

To fill in “Warehouse” and “Item group”, click “Select” near the top right of the window.

In the window that pops up, select your warehouse number in the drop down menu under the “Criteria” column beside “Warehouse”, and select “MATERIALS” in the drop down menu in the same column beside “Item Group”.



Then select “OK” to close the window

The screenshot shows the 'InventSumCount (1 - sesi)' query configuration window. The 'Tables' pane on the left lists several tables: On-hand inventory, Inventory dimensions, Items, and Relationship between items and item groups. The main area displays a grid of query details:

Table	Derived table	Field	Criteria
On-hand inventory	On-hand inventory	Item number	60620
On-hand inventory	On-hand inventory	Closed	
Inventory dimensions	Inventory dimensions	Warehouse	
Inventory dimensions	Inventory dimensions	Location	
Items	Items	Auto-report as finis...	No
Relationship between items and item groups	Relationship between items and item groups	Item group	MATERIALS
Relationship between items and item mode...	Relationship between items and item mode...	Item number	

Buttons at the bottom include 'Reset', 'OK' (highlighted with a red box), and 'Cancel'.



Next select "OK" in the "Create on-hand counting journal" window.

Microsoft Dynamics AX (1)

Create on-hand counting journal

General **Batch**

Setup

Journal:	IJ009208
Counting date:	6/7/2017
Max. number of lines:	999
Physical transactions:	<input type="checkbox"/>
Not counted since:	<input type="text"/> <input type="button" value="Calendar"/>
Counting group:	<input type="text"/> <input type="button" value="Select"/>
Activate counting code:	<input type="checkbox"/>
Include items with nothing on hand:	<input type="checkbox"/>

On-hand inventory

Item number:	<input type="text"/>
Closed:	<input type="checkbox"/>

Inventory dimensions

Warehouse:	60620
Location:	<input type="text"/>

Items

Auto-report as finished:	No
--------------------------	----

Relationship between items and item groups

Item group:	MATERIALS
-------------	-----------

Relationship between items and item model groups

Item number:	<input type="text"/>
--------------	----------------------

Counting by

Configuration:	<input checked="" type="checkbox"/>
Size:	<input type="checkbox"/>
Color:	<input type="checkbox"/>
Style:	<input type="checkbox"/>
Site:	<input checked="" type="checkbox"/>
Warehouse:	<input checked="" type="checkbox"/>
Location:	<input checked="" type="checkbox"/>
Pallet ID:	<input type="checkbox"/>
Batch number:	<input type="checkbox"/>
Serial number:	<input type="checkbox"/>
GTD number:	<input type="checkbox"/>
Owner:	<input type="checkbox"/>
Inventory profile:	<input type="checkbox"/>

Buttons: OK (highlighted with a red box) | Cancel

Selection and setup of job search.



A list of all the on hand inventory for your district will now be shown.

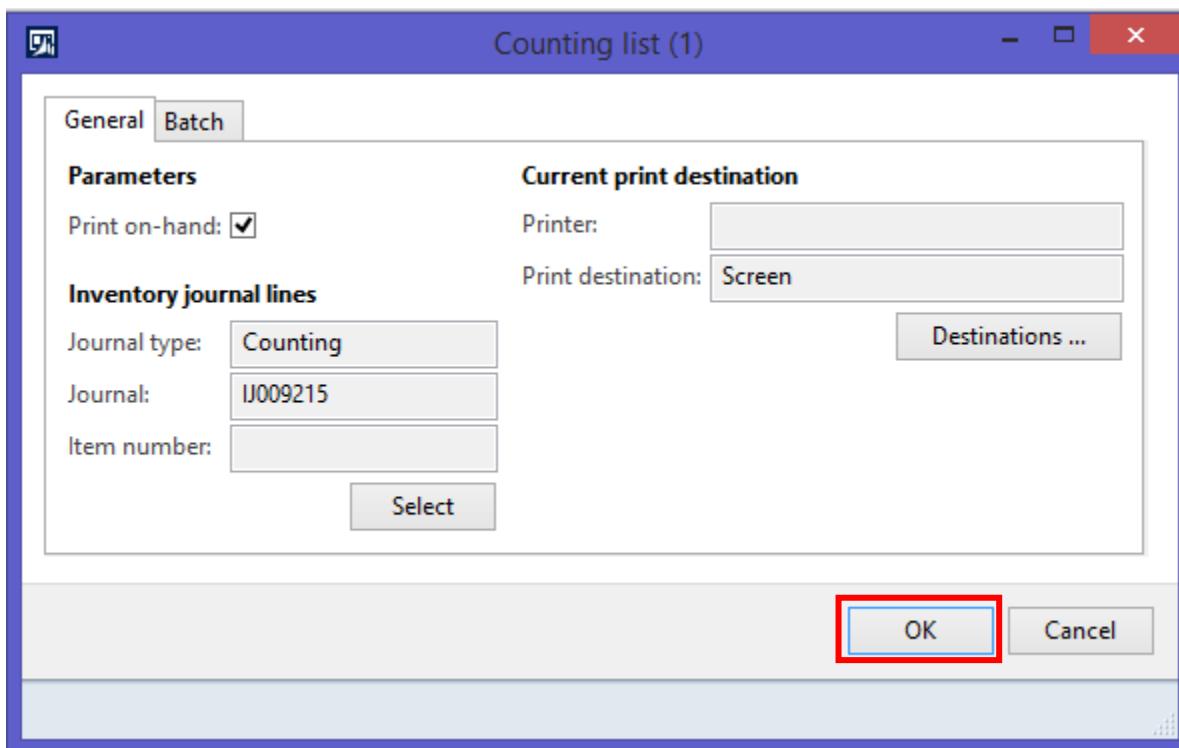
Product name	Date	Item number	Item group	Warehouse	On-hand	Counted	Quantity	Worker	Log
GSS-1 (FWC-1), Bentonite Gel	6/7/...	IIN023022	MATERIALS	60620	1,668.45				
Breaker, Breaker O	6/7/...	IIN023034	MATERIALS	60620	8.00				
Crosslinker, BX-1LB	6/7/...	IIN023043	MATERIALS	60620	20.00				
Lost Circulation, LCG-2 (CalCarb 325)	6/7/...	IIN023050	MATERIALS	60620	13,100.41				
Lost Circulation, LCG-5 (CalCarb SuperCalRock)	6/7/...	IIN023052	MATERIALS	60620	13,100.41				
Accelerators, CaCl2 (Calcium Chloride)	6/7/...	IIN023054	MATERIALS	60620	16,592.06				
Fluid Loss Additive, CFL-3	6/7/...	IIN023060	MATERIALS	60620	889.50				
Fluid Loss Additive, CFL-3L	6/7/...	IIN023061	MATERIALS	60620	600.00				
Fluid Loss Additive, CFL-4	6/7/...	IIN023062	MATERIALS	60620	844.83				
Fluid Loss Additive, CFL-7	6/7/...	IIN023064	MATERIALS	60620	181.72				
Dispersants, CFR	6/7/...	IIN023067	MATERIALS	60620	1,362.50				
Dispersants, CFR-2	6/7/...	IIN023068	MATERIALS	60620	3,262.50				
Dispersants, Citric Acid	6/7/...	IIN023071	MATERIALS	60620	1,000.00				
Cement, Class G	6/7/...	IIN023074	MATERIALS	60620	124.52				
Defoamers, DF-1	6/7/...	IIN023084	MATERIALS	60620	140.00				
Defoamers, CDF-3L, (DF-3)	6/7/...	IIN023085	MATERIALS	60620	520.00				
Lost Circulation, LCF-6, (Fiberblock)	6/7/...	IIN023088	MATERIALS	60620	54.40				
Free Water Control, FWC-2, Undensified Silica Fume	6/7/...	IIN023099	MATERIALS	60620	4,982.05				
Accelerators, SCA-1 (Gypsum W-60)	6/7/...	IIN023102	MATERIALS	60620	22,515.00				
Density Control, Hematite	6/7/...	IIN023105	MATERIALS	60620	45.36				
Retarders, HTR	6/7/...	IIN023109	MATERIALS	60620	271.98				
Retarders, MCR-5	6/7/...	IIN023110	MATERIALS	60620	980.00				

Next, close the window containing the list of inventory and click “Print” at the top of the journal overview window, then click “Counting List”

Name	Journal	Call S...	Description	Lines	Wareh...	Posted	In use
ICOUNT	IJ009215		inventory May 2017 Lac La Biche - Example	75	60620		



Select OK on the new window to open the counting list





This creates a list that can be printed to write down your inventory while counting. To print a hard copy of the list, click “File” then “Print” and print to your desired printer. Then, take this list and perform an inventory count for all items listed.

Counting list (1)									
File Options									
Counting list									
Sanjel Energy Services Inc.									
Line number	Item number	Product name	Description	Unit	On-hand	Counted	Now counted	Counted By	Entered By
1	IIN023022	GSS-1 (FWC-1), Bentonite Gel	GSS-1 (FWC-1), Bentonite Gel	kg	1668.45				
		Warehouse: 60620 Location: A Configuration:							
2	IIN023034	Breaker, Breaker O	Breaker, Breaker O, concentrate, Ammonium Persulfate	kg	8				
		Warehouse: 60620 Location: A Configuration:							
3	IIN023043	Crosslinker, BX-1LB	Crosslinker, BX-1LB	l	20				
		Warehouse: 60620 Location: A Configuration:							
4	IIN023050	Lost Circulation, LCG-2 (CalCarb 325)	Lost Circulation, LCG-2 (CalCarb 325)	kg	13100.41				
		Warehouse: 60620 Location: A Configuration:							
5	IIN023052	Lost Circulation, LCG-5 (CalCarb SuperCalRock)	Lost Circulation, LCG-5 (CalCarb SuperCalRock)	kg	13100.41				
		Warehouse: 60620 Location: A Configuration:							
6	IIN023054	Accelerators, CaCl2 (Calcium Chloride)		kg	16592.06				
		Warehouse: 60620 Location: A Configuration:							
7	IIN023060	Fluid Loss Additive, CFL-3	Fluid Loss Additive, CFL-3, PVA, ultra low	kg	889.5				
		Warehouse: 60620 Location: A Configuration:							
8	IIN023061	Fluid Loss Additive, CFL-3L	Fluid Loss Additive, CFL-3L, Polyvinyl alcohol, ultra low liquid additive	l	600				

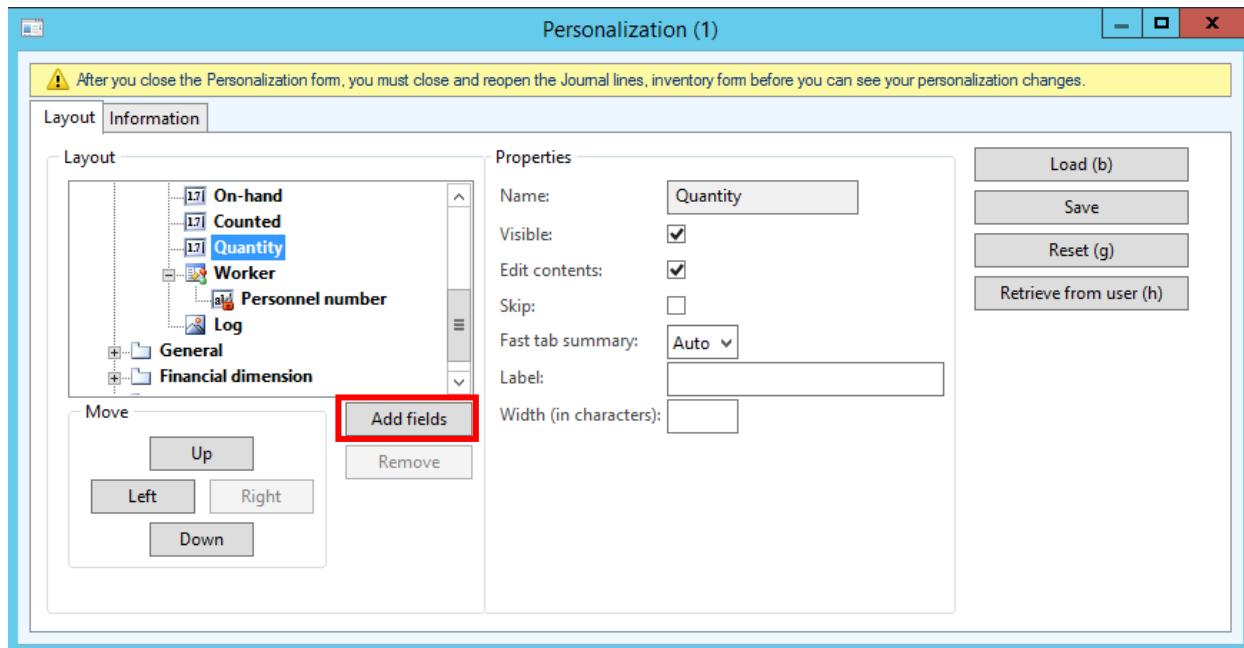


Once all the inventory has been counted, the numbers need to be entered into SBS. Open the “Lines” section of the inventory count again, and enter all the inventory numbers under the “Counted” column. It is important an additional 2 columns are present in the “Lines” page, these columns are the “Cost Price” and “Cost Amount” columns. (You need these columns otherwise you will get an error in a later step)

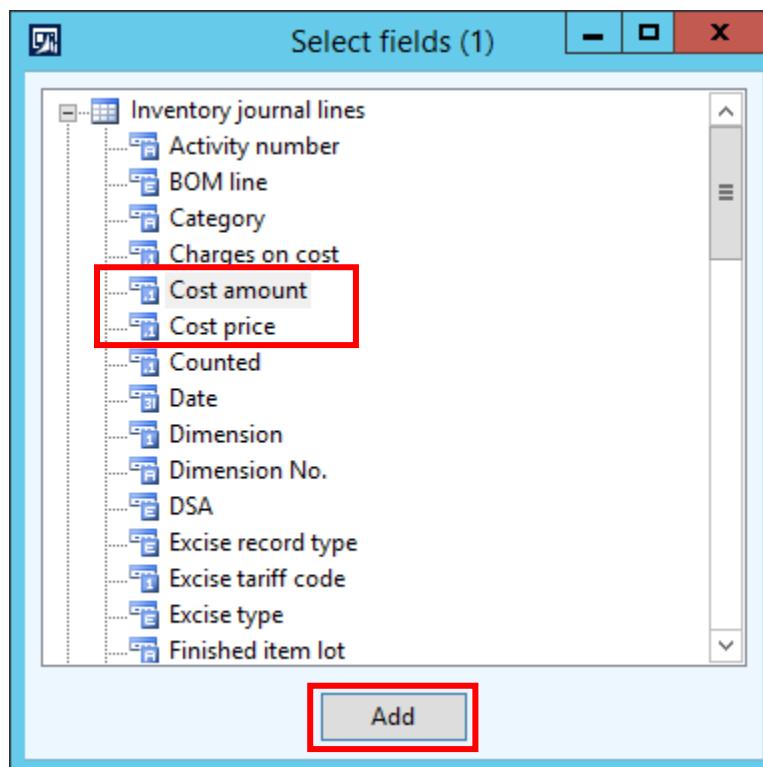
To get these columns, right click on the blue area and select “Personalize”

Product name	Date	Item number	Item group	Warehouse	On-hand	Counted	Quantity	Cost price	Cost amount	Weight
Corrosion Inhibitor, ACW-4	8/24/...	IIN023003	MATERIALS	61220	2,180.00	2,180.00		5.77		
Corrosion Inhibitor, Al-4	8/24/...	IIN023005	MATERIALS	61220	1,590.00	1,590.00		4.18		
Acidizing, Al-8	8/24/...	IIN023008	MATERIALS	61220	200.00	200.00		8.86		
Acids, Ammonium Bifluoride	8/24/...	IIN023009	MATERIALS	61220	1,254.12	1,254.12		3.63		
Acids, Ammonium Chloride, Fine	8/24/...	IIN023010	MATERIALS	61220	1,606.00	1,606.00		1.47		
Antisludge Agent, ASA-3W	8/24/...	IIN023014	MATERIALS	61220	3,750.00	3,750.00		4.29		
Acids, ASA-7	8/24/...	IIN023015	MATERIALS	61220	300.00	300.00		3.84		
Free Water Control, FWC-1(Bentonite Gel)	8/24/...	IIN023022	MATERIALS	61220	3,013.20	3,013.20		0.46		
Breaker, Breaker 1Z	8/24/...	IIN023029	MATERIALS	61220	48.06	48.06		16.29		
Breaker, Breaker F	8/24/...	IIN023033	MATERIALS	61220	36.40	36.40		12.80		
Density Modifiers, CDM-5, (Bubbles 5000, ...)	8/24/...	IIN023037	MATERIALS	61220	4,800.00	4,800.00		7.76		
Accelerators, CaCl2 (Calcium Chloride)	8/24/...	IIN023054	MATERIALS	61220	697.86	697.86		0.41		
Surfactants, CAS-1	8/24/...	IIN023055	MATERIALS	61220	3,530.00	3,530.00		4.58		
Density Modifiers, CDM-C, (Ceramic Sphe...	8/24/...	IIN023058	MATERIALS	61220	9,300.00	9,300.00		1.45		
Fluid Loss Additive, CFL-3	8/24/...	IIN023060	MATERIALS	61220	2,454.50	2,454.50		3.75		
Fluid Loss Additive, CFL-3L	8/24/...	IIN023061	MATERIALS	61220	1,040.00	-1,040.00		4.89	-5,081.13	
Fluid Loss Additive, CFL-4	8/24/...	IIN023062	MATERIALS	61220	145.76	145.76		19.76		
Fluid Loss Additive, CFL-6	8/24/...	IIN023063	MATERIALS	61220	1,128.00	1,128.00		9.05		
Fluid Loss Additive, CFL-7	8/24/...	IIN023064	MATERIALS	61220	317.50	317.50		24.57		
Dispersants, CFR	8/24/...	IIN023067	MATERIALS	61220	706.00	450.00	-256.00	2.36	-604.39	
Dispersants, CFR-2	8/24/...	IIN023068	MATERIALS	61220	390.00	390.00		3.13		
Dispersants, Citric Acid	8/24/...	IIN023071	MATERIALS	61220	425.00	425.00		2.39		
Cement, Class C, Type 3	8/24/...	IIN023073	MATERIALS	61220	52.60	52.60		223.00		
Cement, Class G	8/24/...	IIN023074	MATERIALS	61220	38.15	38.15		219.00		
Cement, Class R, Recycled	8/24/...	IIN023076	MATERIALS	61220	92.00	92.00		180.00		

In the new pop up window, click the “Add fields” button.

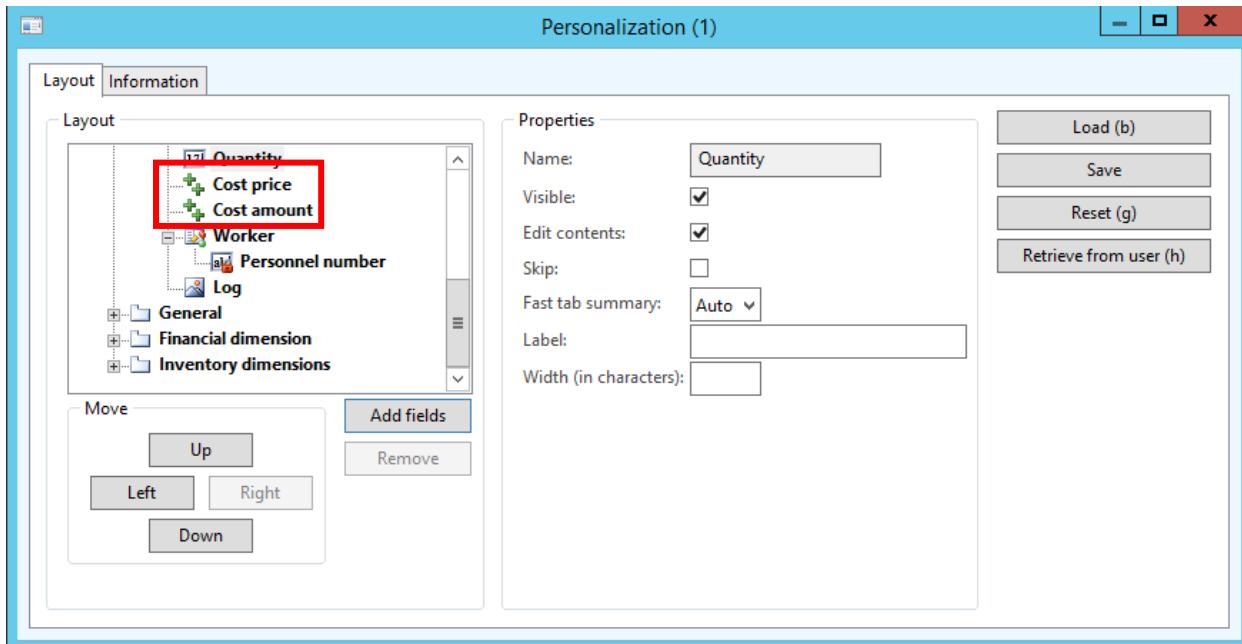


In the new pop up window, expand the “Inventory journal lines” section, then select Cost amount” and hit “Add” then select “Cost Price” then select “Add”. Then exit out of the window





Cost price and Cost amount are now added to the Personalization window. You may now exit the window



The next step is to add your counted inventory numbers in the “Counted” column. Some numbers may not be the same as what the “On-hand” column states, and the difference between the two can be seen in the “Quantity” column.

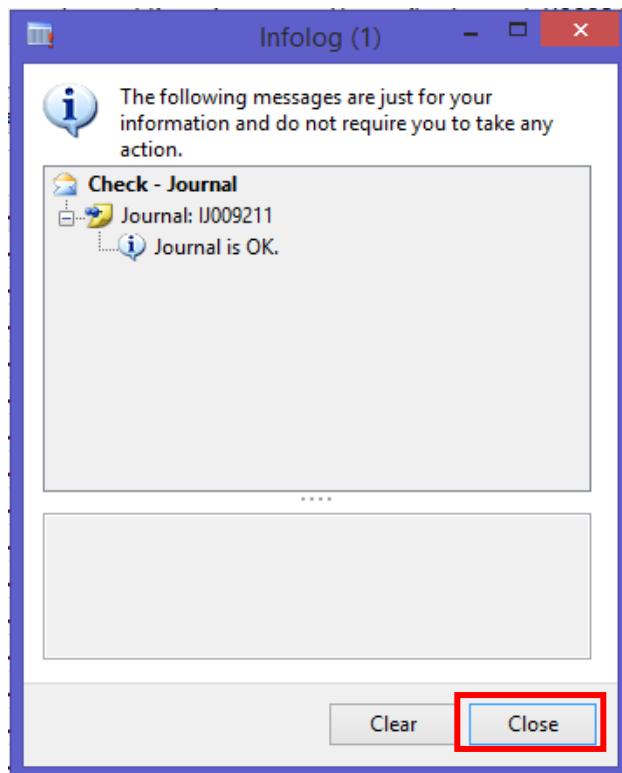
Product name	Date	Item number	Item group	Warehouse	On-hand	Counted	Quantity	Cost price	Cost amount	Worker	Log
Corrosion Inhibitor, ACW-4	8/24/...	IIN023003	MATERIALS	61220	2,180.00	2,180.00		5.77			
Corrosion Inhibitor, Al-4	8/24/...	IIN023005	MATERIALS	61220	1,590.00	1,590.00		4.18			
Acidizing, Al-8	8/24/...	IIN023008	MATERIALS	61220	200.00	200.00		8.86			
Acids, Ammonium Bifluoride	8/24/...	IIN023009	MATERIALS	61220	1,254.12	1,254.12		3.63			
Acids, Ammonium Chloride, Fine	8/24/...	IIN023010	MATERIALS	61220	1,606.00	1,606.00		1.47			
Antisludge Agent, ASA-3W	8/24/...	IIN023014	MATERIALS	61220	3,750.00	3,750.00		4.29			
Acids, ASA-7	8/24/...	IIN023015	MATERIALS	61220	300.00	300.00		3.84			
Free Water Control, FWC-1(Bentonite Gel)	8/24/...	IIN023022	MATERIALS	61220	3,013.20	3,013.20		0.46			
Breaker, Breaker 1Z	8/24/...	IIN023029	MATERIALS	61220	48.06	48.06		16.29			
Breaker, Breaker F	8/24/...	IIN023033	MATERIALS	61220	36.40	20.00	-16.40	12.80	-209.92		
Density Modifiers, CDM-5, (Bubbles 5000, ...	8/24/...	IIN023037	MATERIALS	61220	4,800.00	4,800.00		7.76			
Accelerators, CaCl2 (Calcium Chloride)	8/24/...	IIN023054	MATERIALS	61220	697.86	697.86		0.41			
Surfactants, CAS-1	8/24/...	IIN023055	MATERIALS	61220	3,530.00	3,530.00		4.58			
Density Modifiers, CDM-C, (Ceramic Sphe...	8/24/...	IIN023058	MATERIALS	61220	9,300.00	9,300.00		1.45			
Fluid Loss Additive, CFL-3	8/24/...	IIN023060	MATERIALS	61220	2,454.50	2,454.50		3.75			
Fluid Loss Additive, CFL-3L	8/24/...	IIN023061	MATERIALS	61220	1,040.00	1,000.00	-40.00	4.89	-195.43		
Fluid Loss Additive, CFL-4	8/24/...	IIN023062	MATERIALS	61220	145.76	145.76		19.76			
Fluid Loss Additive, CFL-6	8/24/...	IIN023063	MATERIALS	61220	1,128.00	1,128.00		9.05			
Fluid Loss Additive, CFL-7	8/24/...	IIN023064	MATERIALS	61220	317.50	317.50		24.57			



With all the inventory entered, click “Validate” at the top of the window, then click “OK” on the pop up window



If the inventory count has been entered correct, a confirmation window will appear. Click “Close” when finished





Next we need to use tools outside of SBS to generate a report that will be given to the District Service Line Manager (DSLM) and any other applicable managers. With the Lines window open, click “Ctrl”+”t” on your keyboard to export the list to Excel.

(Select Ctrl+t in this window)

Product name	Date	Item number	Item group	Warehouse	On-hand	Counted	Quantity	Cost price	Cost amount	Worker	Log
Corrosion Inhibitor, ACW-4	8/24/2017	IIN023003	MATERIALS	61220	2,180.00	2,180.00		5.77			
Corrosion Inhibitor, Al-4	8/24/2017	IIN023005	MATERIALS	61220	1,590.00	1,590.00		4.18			
Acidizing, Al-8	8/24/2017	IIN023008	MATERIALS	61220	200.00	200.00		8.86			
Acids, Ammonium Bifluoride	8/24/2017	IIN023009	MATERIALS	61220	1,254.12	1,254.12		3.63			
Acids, Ammonium Chloride, Fine	8/24/2017	IIN023010	MATERIALS	61220	1,606.00	1,606.00		1.47			
Antisludge Agent, ASA-3W	8/24/2017	IIN023014	MATERIALS	61220	3,750.00	3,750.00		4.29			
Acids, ASA-7	8/24/2017	IIN023015	MATERIALS	61220	300.00	300.00		3.84			
Free Water Control, FWC-1(Bentonite Gel)	8/24/2017	IIN023022	MATERIALS	61220	3,013.20	3,013.20		0.46			
Breaker, Breaker 1Z	8/24/2017	IIN023029	MATERIALS	61220	48.06	48.06		16.29			
Breaker, Breaker F	8/24/2017	IIN023033	MATERIALS	61220	36.40	20.00	-16.40	12.80		-209.92	
Density Modifiers, CDM-5, (Bubbles 5000, ...	8/24/2017	IIN023037	MATERIALS	61220	4,800.00	4,800.00		7.76			
Accelerators, CaCl2 (Calcium Chloride)	8/24/2017	IIN023054	MATERIALS	61220	697.86	697.86		0.41			
Surfactants, CAS-1	8/24/2017	IIN023055	MATERIALS	61220	3,530.00	3,530.00		4.58			
Density Modifiers, CDM-C, (Ceramic Sph...	8/24/2017	IIN023058	MATERIALS	61220	9,300.00	9,300.00		1.45			
Fluid Loss Additive, CFL-3	8/24/2017	IIN023060	MATERIALS	61220	2,454.50	2,454.50		3.75			
Fluid Loss Additive, CFL-3L	8/24/2017	IIN023061	MATERIALS	61220	1,040.00	1,000.00	-40.00	4.89		-195.43	
Fluid Loss Additive, CFL-4	8/24/2017	IIN023062	MATERIALS	61220	145.76	145.76		19.76			
Fluid Loss Additive, CFL-6	8/24/2017	IIN023063	MATERIALS	61220	1,128.00	1,128.00		9.05			
Fluid Loss Additive, CFL-7	8/24/2017	IIN023064	MATERIALS	61220	317.50	317.50		24.57			

The newly generated Excel file shows the same information as the SBS lines window. We will use this file to copy and paste data into the “Monthly Inventory Count Variance Report”. To do so, Click “Ctrl” + “a” to select the whole document (you will likely have to click “Ctrl” + “a” multiple times to select the whole document). With the document selected, copy the data by clicking “Ctrl” + “c”.

Product name	Date	Item number	Item group	Warehouse	On-hand	Counted	Quantity	Cost price	Cost amount	Workers	
Corrosion Inhibitor, ACW-4	8/24/2017	IIN023003	MATERIALS	61220	2,180.00	2,180.00		5.77			
Corrosion Inhibitor, Al-4	8/24/2017	IIN023005	MATERIALS	61220	1,590.00	1,590.00		4.18			
Acidizing, Al-8	8/24/2017	IIN023008	MATERIALS	61220	200.00	200.00		8.86			
Acids, Ammonium Bifluoride	8/24/2017	IIN023009	MATERIALS	61220	1,254.12	1,254.12		3.63			
Acids, Ammonium Chloride, Fine	8/24/2017	IIN023010	MATERIALS	61220	1,606.00	1,606.00		1.47			
Antisludge Agent, ASA-3W	8/24/2017	IIN023014	MATERIALS	61220	3,750.00	3,750.00		4.29			
Acids, ASA-7	8/24/2017	IIN023015	MATERIALS	61220	300.00	300.00		3.84			
Free Water Control, FWC-1(Bentonite Gel)	8/24/2017	IIN023022	MATERIALS	61220	3,013.20	3,013.20		0.46			
Breaker, Breaker 1Z	8/24/2017	IIN023029	MATERIALS	61220	48.06	48.06		16.29			
Breaker, Breaker F	8/24/2017	IIN023033	MATERIALS	61220	36.40	20.00	-16.40	12.80		-209.92	
Density Modifiers, CDM-5, (Bubbles 5000, glass spheres)	8/24/2017	IIN023037	MATERIALS	61220	4,800.00	4,800.00		7.76			
Accelerants, CaCl2 (Calcium Chloride)	8/24/2017	IIN023054	MATERIALS	61220	697.86	697.86		0.41			
Surfactants, CAS-1	8/24/2017	IIN023055	MATERIALS	61220	3,530.00	3,530.00		4.58			
Density Modifiers, CDM-C, (Ceramic Spheres)	8/24/2017	IIN023058	MATERIALS	61220	9,300.00	9,300.00		1.45			
Fluid Loss Additive, CFL-3	8/24/2017	IIN023060	MATERIALS	61220	2,454.50	2,454.50		3.75			
Fluid Loss Additive, CFL-3L	8/24/2017	IIN023061	MATERIALS	61220	1,040.00	1,000.00	-40.00	4.89		-195.43	
Fluid Loss Additive, CFL-4	8/24/2017	IIN023062	MATERIALS	61220	145.76	145.76		19.76			
Fluid Loss Additive, CFL-6	8/24/2017	IIN023063	MATERIALS	61220	1,128.00	1,128.00		9.05			
Fluid Loss Additive, CFL-7	8/24/2017	IIN023064	MATERIALS	61220	317.50	317.50		24.57			
Dispersants, CFR	8/24/2017	IIN023067	MATERIALS	61220	706.00	450.00	-256.00	2.36		-604.39	
Dispersants, CFR-2	8/24/2017	IIN023068	MATERIALS	61220	390.00	390.00		3.13			
Dispersants, Citric Acid	8/24/2017	IIN023071	MATERIALS	61220	425.00	425.00		2.39			
Cement, Class C, Type 3	8/24/2017	IIN023073	MATERIALS	61220	52.60	52.60		223.00			
Cement, Class G	8/24/2017	IIN023074	MATERIALS	61220	38.15	38.15		219.00			
Cement, Class R, Recycled	8/24/2017	IIN023076	MATERIALS	61220	92.00	92.00		180.00			
Demulsifiers, D-4	8/24/2017	IIN023080	MATERIALS	61220	4,520.00	4,520.00		5.35			
Defoamers, DF-1	8/24/2017	IIN023083	MATERIALS	61220	1,010.00	1,010.00		5.16			
Defoamers, DDF-3, (DF-3)	8/24/2017	IIN023084	MATERIALS	61220	1,699.50	1,699.50		6.17			
Bulk Additive, Flyash , Pozzolan	8/24/2017	IIN023091	MATERIALS	61220	286,125.20	286,125.20		0.10			
Acids, Formic Acid, 85%	8/24/2017	IIN023093	MATERIALS	61220	1,050.00	1,050.00		2.15			
Free Water Control, FWC-2, Undensified Silica Fume	8/24/2017	IIN023099	MATERIALS	61220	783.28	783.28		0.86			
Bond Enhancer, GCA-1	8/24/2017	IIN023100	MATERIALS	61220	105.10	105.10		10.00			
Bulk Additive, Graphite	8/24/2017	IIN023101	MATERIALS	61220	175.00	175.00		1.81			
Accelerators, SCA-1 (Gypsum W-60)	8/24/2017	IIN023102	MATERIALS	61220	5,204.60	5,204.60		0.39			
Acids, HCl, 35 %	8/24/2017	IIN023103	MATERIALS	61220	6,500.00	6,500.00		0.39			



Next, Open the Monthly Inventory Count Variance Report file and click “Enable Content”

The screenshot shows a Microsoft Excel spreadsheet titled "Monthly Inventory Count Variance Report - (Warehouse) - (Journal) - (MMM_vslsm [Read-Only])". The ribbon at the top includes tabs for File, Home, Insert, Page Layout, Formulas, Data, Review, View, Add-ins, DYNAMICS AX, BI360 REPORTING, ACROBAT, Design, and Tell me what you want to do... . The "Home" tab is selected. In the center of the screen is a table with columns: Product Name, Item number, On-hand, Counted, Quantity, Cost Amount, Variance (%), and Explanation. The "Variance (%)" column contains mostly 0.00% values. To the right of the table, there is a large red box containing four numbered steps:

- 1.) Click here to sort the data
- 2.) Complete the explanation column in the 10% Explanation Sheet.
- 3.) Complete the explanation column in the \$1000 Cost Explanation Sheet.
- 4.) Email to report to your DSLM.

To paste the data into the variance report, click “Ctrl” + “g” (If you get an error at this stage, refer to the work instruction “How to use the Monthly Inventory Count Variance Report”)

With the data inputted into the report, click the large button “1) Click here to sort the data”

This screenshot shows the same Excel spreadsheet after data has been entered. The "Total Journal Adjustment" cell in the top-right corner now contains "\$14,215.21". The rest of the table data is identical to the previous screenshot, with the "Variance (%)" column mostly showing 0.00%. The large red box with the four numbered steps is still present on the right side of the screen.



This button sorts inventory variance into two separate sections, one being >10% Variance, and >\$1000 Variance. Each line that shows up in either of these categories needs an explanation for the variation before submitting the report to the DSLM.

10% Variance Explanation Sheet

	A	B	C	D	E	F	G	H	I	J
1	Product Name	Item number	On-hand	Counted	Quantity	Cost Amount	Variance (%)	Explanation		
11	Breaker, Breaker	IIN023033	36.4	20	-16.4	-\$209.92	45.1%	Type your explanation here		
21	Dispersants, CFR	IIN023067	706	450	-256	-\$604.39	36.3%	Type your explanation here		
45	Cement, Intercent	IIN023116	72.47	32.47	-40	-\$7,480.00	55.2%	Type your explanation here		
49	Scale Inhibitor, LD	IIN023124	832	700	-132	-\$506.88	15.9%	Type your explanation here		
61	Retarders, QSR-2	IIN023178	2790	2000	-790	-\$4,215.20	28.3%	Type your explanation here		
499										
500										
501										
502										
503										

>\$1000 Variance Explanation Sheet

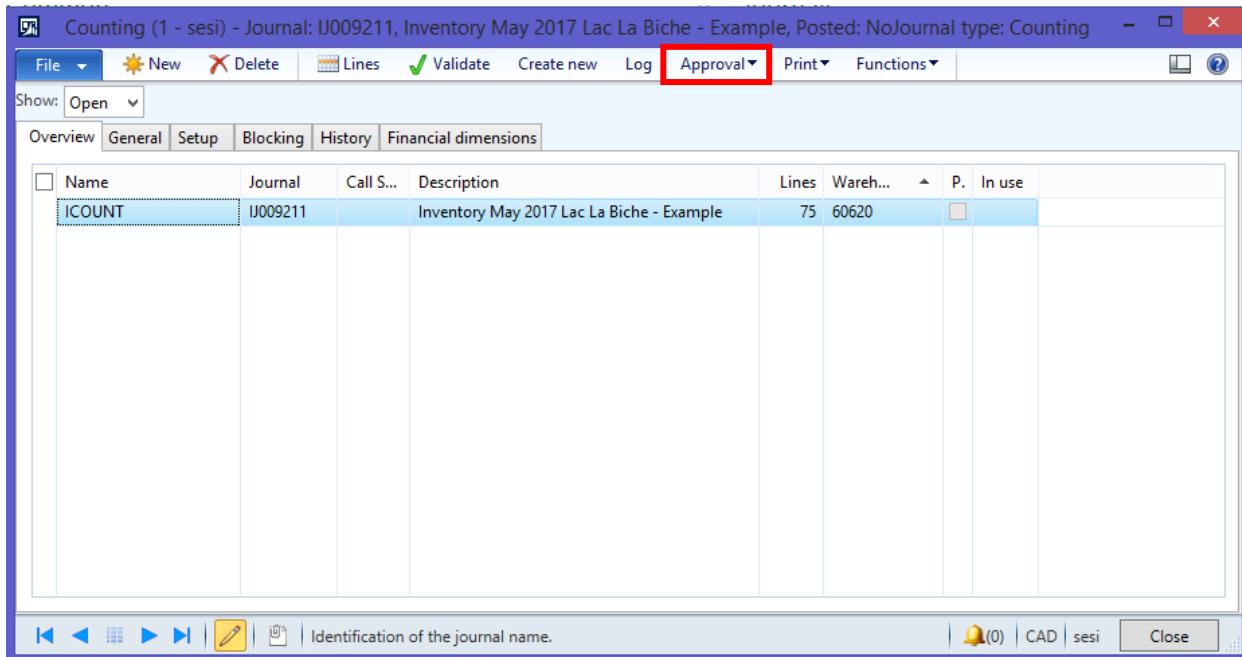
	A	B	C	D	E	F	G	H	I	J
1	Product Name	Item number	On-hand	Counted	Quantity	Cost Amount	Variance (%)	Explanation		
45	Cement, Intercent	IIN023116	72.47	32.47	-40	-\$7,480.00	55.2%	Type your explanation here		
61	Retarders, QSR-2	IIN023178	2790	2000	-790	-\$4,215.20	28.3%	Type your explanation here		
499										
500										
501										
502										
503										

With each line having an explanation, you can now email the variance report to the DSLM for approval. Your DSLM will determine if the explanations are acceptable, and will either approve the report or have you investigate further.



Any mistakes made while conducting movement journals issuing out/in materials for jobs will cause these numbers to have an error. If the variance between what was counted and what was expected is large, the bulk plant operator will have to search back through movement journals to find any potential errors.

Assuming the DSLM has signed off on the inventory variance sheet, the inventory journal on SBS can now be submitted for approval by the head office supply chain team. In the counting window, click on your inventory journal, then click “Approval” then “Report as ready”.



Then click OK to submit for approval. At this point, the bulk plant operator can close the window; the procurement team will take care of posting the inventory journal.

Ordering Chemical and Plugs

Most purchases a bulk plant operator makes will be sent as a “purchase requisition” to head office. A Purchase Requisition (PR) is a request to order materials. Sanjel has designated personnel to take care of most of the purchase orders for all the bulk plants in the company. While bulk plant operators take care of purchasing product that gets consumed quickly (for example, Class ‘G’ and Intercem), less frequent and expensive purchases are handled through the supply chain team.



	A	B	C	D	E	F	G	H
1				PURCHASE REQUISITION <i>Use this form to order chemicals</i> (district-warehouse-yymm-xxx)				
2				CEMENT CHEMS ONLY	Date:			
3					Ordered by:			
4					District			
5					Phone #			
6								
7	Delivery Address					<i>e-mail: purchasing@sanjel.com to submit order</i>		
8								
10	Quantity Order	Pallets or Totes	Product Name	Date Required	Buyer's Use Only			
11					Supplier	PO #	Trucking Services	
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
30	everything in this color will be populated by the buyer				Supplier	Address (Pick Up Point)		
32								
33								
34								
35								
36								

Figure 6-1. Blank Purchase Requisition (PR) Form
(used by the bulk plant operator)



The PR form is an Excel file with drop down menus containing a list of all chemicals the bulk plant can order. The white boxes are to be filled out by the bulk plant operator, and to be sent to the supply chain team for approval. An example of a filled out PR is shown below:

A	B	C	D	E	F	G	H
1	2	3	4	PURCHASE REQUISITION <i>Use this form to order chemicals</i> (district-warehouse-yyymm-xxx)	5	6	7
8	Delivery Address	CEMENT CHEMS ONLY	Date:	June 5th, 2017	8	9	10
11	Quantity	Pallets or Totes	Product Name	Date Required	Supplier	PO #	Buyer's Use Only Trucking Services
13	12		Plug, Top Rubber, 114.3 mm - 4-1/2" - IIN023436	June 7th, 2017			
14	12		Plug, Bottom Rubber, 114.3 mm - 4-1/2" - IIN023434	June 7th, 2017			
15	1	Pallet	Sil 1 - IIN023203	June 7th, 2017			
16	1	Pallet	Sil 4 - IIN023204	June 7th, 2017			
17	2	Pallet	LCC-1 - IIN023122	June 7th, 2017			
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
30	<i>everything in this color will be populated by the buyer</i>				Supplier	Address (Pick Up Point)	
32							
33							
34							
35							
36							

Figure 6-2. Sample Completed Purchase Requisition (PR) Form

When to Order?

One of the most important jobs as a bulk plant operator is knowing when to order more bulk/chemicals. Ordering too early will mean the excess chemicals will have to be stored somewhere, while ordering too late may drain your inventory and cause issues. Bulk plant operators must be able to forecast when to order products and chemicals.

Experience at your district will help you most for knowing how frequently products need to be ordered. Some products will be used up faster than others and will need to be ordered on a regular basis.

Shipping time is a major factor when placing orders. Certain products, like base blends, are used up fast but can be shipped relatively quickly to replenish stock. Other products like specialty chemicals that are not used as much may take a few days to ship.

Another way to forecast the need for products is to look at a schedule of rigs Sanjel will be servicing. If a few of the rigs commonly serviced are performing tasks other than drilling for an extended period (ex. hanging liners on a pad), you can predict less product will be used during that time. However, once those rigs come back online drilling, more product will be used during that period and products should be



ordered earlier. It is also important to look at what kind of work is forecasted. If a rig has just moved to a new pad and is going to be drilling and cementing a row of surface casings (which can be performed in roughly 12 hours a hole), ensure your stock on surface blend bulk and chemicals are adequate to meet the demands of the rig. Similarly, if the rig will be drilling and cementing a row of intermediate casings, have the materials needed for those blends well stocked, and expect to blend loads for those jobs regularly and in large quantities.

Ultimately, keeping track of your inventory is the best way to manage ordering. If a product that normally gets used fast is down to its last pallet, chances are you need to order product right away. Most of these orders are handled through the supply chain team, don't hesitate to ask them questions if you have concerns about when you should order product.



7 Bulk Plant Inspections and Maintenance

The bulk plant requires inspections on a regular basis and maintenance when required. Certain parts of the plant have scheduled maintenance, while other maintenance is done as needed.

Whenever maintenance is performed at the bulk plant, it must be recorded. A maintenance record is found at all bulk plants.

Bulk Plant Maintenance

Date (d/m/y)	Description of Work Preformed	Initials
June 30/09	Did monthly inspection fire extinguishers	LM
June 30	Change Rubber 3" ring on carlock connected to blower	LM
June 30	Changed oil in blower/greaser electric motor exhaust fan	LM
July 2/09	Blowout both dust collectors /shak socks	LM
July 3/09	Greased blower exhaust fan shak socks	LM
July 7/09	Greased exhaust fan /blower checked and	LM
July 8/09	Shak socks blowout both dust collectors	LM
July 8/09	Added 1/4 liter of oil to blower	LM

Figure 7-1. Sample Maintenance Record

Day to Day Duties

The bulk plant operator has many tasks to accomplish on a day to day basis, including some basic maintenance and checks. Apart from their regular duties of blending/loading cement and inventory management, the bulk plant operator has to inspect and maintain the plant. The following is a list of some of the day to day duties the bulk plant operator is responsible to perform:

- Cross shift with other bulk plant operator
- FLEX
- General housekeeping
- Check silo contents for accuracy with whiteboard and SBS
- Pressure testing
- Greasing
- Monitoring "Class R" cement (junk silo) and lining up the disposal
- Updating SDS and cross reference sheet when required
- Site walk around to check for any issues



Storage Silo

Silos need to be inspected and maintenance on components is performed when needed.

- Conduct pressure tests weekly to check discharge and vent line valves for leaks (can perform pressure tests while pressuring silos to move product)
- Verify product volumes inside silos weekly (Verify silos with content levels that can fit and be weighed in the weigh silo)
- Ensure PRV is working properly and venting air at 15 psi (and vacuum relief valves if equipped)
- Inspect canvas if it has suspected issues
- If the canvass needs replacing, product will seep through and collect below in an area at the bottom of the silo. Removing an access plug and checking for product leakage will determine if there is canvass damage.
- Inspect pressure gauges (check if it reads 0 psi when pressure is bled off, check functionality)



Figure 7-2. Storage Silo Inspection

Blower

The blower must be maintained like all other equipment and requires greasing and oil changes

- When starting your shift grease the unit and check the oil level
- Inspect 18 psi PRV on blower, make sure it functions properly



- Before working on the blower or any mechanical device, follow the proper lock out procedures.
- The blower follows the 500 hour maintenance schedule:

At 500 hours of service:

- Inspect air filter, change if needed
- Change lower lubrication oil

GOOD TO KNOW

If the blower is unable to function properly, you can use a blower off a bulk tractor as a substitute. All blowers should have an external hook up for this purpose.

Air and Vent Hoses

Air and vent lines that run to the silos heat up and cool down over their use with compressed air, which wears out the hoses over time. Hoses around the plant should be inspected weekly.

- Inspect hoses for cracking or any leaks, replace when needed
- Make sure fitting connections are in good condition and not leaking

Dust Collector

Like all other silos, the dust collector needs to be inspected weekly.

- Ensure PRV is functional at 15 psi
- Inspect air/vent lines and associated valves into/out of the dust collector
- Pressure test the silo weekly

Dust collectors require maintenance when dust is exiting the vent or when excess backpressure is held into the system (>5 psi).

- Inspect dust collector socks by either unbolting the top of the silo and lifting the socks out with the forklift or through the hatch on the front of the silo (depending on the model). Find the socks that need replacing and change them out for new ones.

Make sure proper PPE is worn when working with the dust collectors, a full face respirator will be needed when dust is present.

The following weekly checklist is used when inspecting the dust collectors (see Figure 7-3).

**DUST COLLECTOR UNIT SEMI-ANNUAL MAINTENANCE CHECKLIST****SEMI - ANNUALLY****DUST COLLECTOR UNIT**

Start Date: _____

Unit # _____

WEEKLY CHECK

WEEKLY CHECKS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Weekly Visual Checks (must be in good condition)																										
Camlocks have locking ears																										
Camlock fittings (clean/gaskets)																										
Skid																										
Support beams																										
Paint																										
Weekly Function Checks (must be working)																										
Pressure Test																										
Product Discharge Valve																										
Vent Valves																										
Top Air Valve																										
Pressure Gauge																										
Pressure Relief Valve																										
Semi – Annual Visual Checks (must be in good condition)																										
Ultrasonic Thickness Testing																										
Dust Socks																										
Semi – Annual Function Checks (must be working)																										
Side Hatches																										
Top Air Check Valve																										
Product Line Purge Valve (2")																										
Product Line Purge Check Valve (2")																										
Inspectors Initials																										

Figure 7-3. Weekly Inspection Sheet for Dust Collectors



Admix Bottle

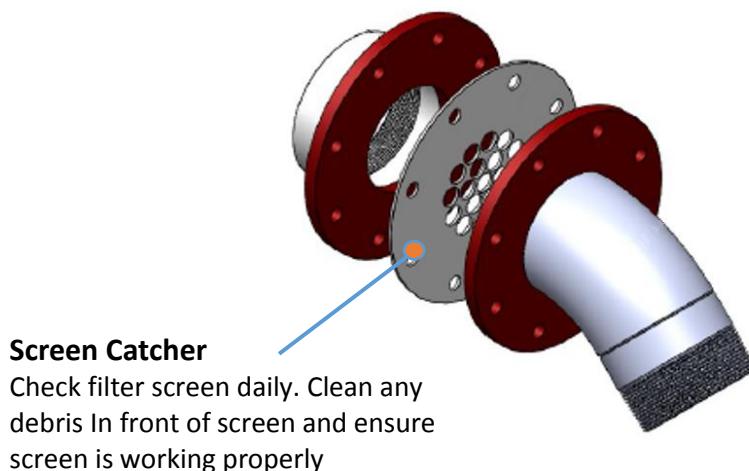
The Admix bottle, like all other silos, requires maintenance and inspections

- Pressure test silo weekly and replace valves as needed, inspect flanges when replacing valves
- Ensure PRV is functional at 15 psi (and vacuum relief valve if equipped)
- Ensure pressure gauge is reading accurately
- Ensure fume hood ventilation is working properly, clean filter when needed
- Grease ventilation fan monthly

Weigh Silo

The weigh silo requires maintenance and inspections to ensure it is accurately working.

- Clean and inspect screen catcher daily
- Pressure test silo weekly and replace valves as needed, inspect flanges when replacing valves
- Ensure PRV is functional at 15 psi
- Ensure pressure gauge is reading accurately
- Make sure scale reads zero when empty (check with rubber mallet)
- Inspect scale is clear of debris
- Calibrate scale every year
- Test weigh silo scale accuracy monthly. (Weigh out a set amount of product, for example 15t of Class 'G'), and blow onto a bulker. Have that bulker weighed at a scale to see if the 15 tonnes weighed in the silo is 15 tonnes on the truck. (greater than 10t should be used for the verification)



Screen Catcher

Check filter screen daily. Clean any debris in front of screen and ensure screen is working properly

Figure 7-4. Clean and Inspect the Screen Catcher



Product and Vent Hose Maintenance

The product and vent hoses for loading trucks need to be inspected daily to check for any damage present.

- Inspect hose for any excess wear or cracking, replace hose if any cracks or bulges form.
- Inspect camlock fittings and locking mechanisms, replace when damaged
- Ensure hose ends attached to the bulk plant are secure

GOOD TO KNOW

Cut and wrap the old product hose around the new one and loosely sew it with mechanics wire. This will help with wear from dragging the hose on the ground.

Forklift

The forklift requires a daily inspection before it can be operated. The following check list is to be filled out each shift (see Figure 7-5).



Forklift Daily Pre-Shift Inspection

FORKLIFT UNIT #:		MODEL: _____												
	MONDAY	TUESDAY		WEDNESDAY		THURSDAY		FRIDAY		SATURDAY		SUNDAY		
DATE:														
INSPECTORS NAME:														
HOURS AT SHIFT START:														
ITEM INSPECTED:	OK	REPAIR	OK	REPAIR	OK	REPAIR	OK	REPAIR	OK	REPAIR	OK	REPAIR	OK	REPAIR
Forks, Backrest, Carriage														
Mast Chain, Hydraulic Lines & Cylinders														
Leaks under Fork Lift														
Tires & Axles														
Overhead Guard/ROP														
Fuel Tank & Connections														
Hydraulic Oil Level														
Engine Oil Level														
Radiator Water Level (<i>Cold</i>)														
Fuel Level														
Seat & Seat Belts														
Horn and/or Backup Alarm														
Gauges & Instruments														
All Brakes														
Steering (<i>Check Operation</i>)														
Lights														
Hydraulic Controls & Lift														

1. This checklist must be completed daily and retained for at least one year
2. If the forklift is found to be unsafe, the condition must be reported immediately to the supervisor and removed from service until repaired
3. No forklift shall be operated with a leak in the fuel system

Figure 7-5. Forklift Pre-shift Inspection Shee



Warehouse and Facilities

The bulk plant operators up keep the warehouse and bulk plant facilities. Every day the warehouse and facilities should be cleaned in order to stay on top of cleanliness.

Ensure proper housekeeping of:

- Office Desk
- Printer top
- Bathroom
- Office Windows
- Office Walls
- Floors
- Workbench
- Bulk Plant Warehouse and Exterior

Class R Silo

The bulk plant contains a waste silo used to hold any Class R cement (e.g., if a bulker returns from a job with excess cement that can't be reused). This silo needs to be monitored and disposal needs to be arranged when the silo is starting to get full (or combination of Class R silo and storage silos). Once 40 tonnes of Class R cement has accumulated (1 B-train load), arrange disposal of the bulk.

Note: Every district has different companies to haul away their waste cement, ask your mentor which company they typically use.

Spring Maintenance and Cleaning

When operations slow down, more in depth maintenance can be performed at the plant, this list of maintenance and cleaning must be done if time permits:

- Replace dust collector socks (do so on a warm dry day as the humidity will glaze the material causing excess dust to come out of the snorkel when in use).
- Thickness test the Y-pipe on the weigh silo and replace when needed
- Move contents out of storage silos (time and storage dependent) and inspect silo canvasses, replace if needed. (look for holes and make sure canvass is not plugged up due to humidity and dry bulk clumping in the canvass)
- Remove admix bottle assembly from the pit and do a complete wash inside and out, including all duct work for ventilation. Hang admix bottle upside down on a locked out forklift for a day to dry.
- Remove all chemical from the bulk plant and place covered outside; wash the floors and all walls inside the plant (ensuring all water falls or is pushed into the admix bottle pit for vacuum truck disposal)
- Inspect admix bottle for any rust blisters and visual signs of attention needed



- Full wipe down of blower and walls with degreaser
- Pressure wash all silos and cement pads at the laydown (continue this all spring, summer, and fall)
- Order a grader to clean the ground around the bulk plant for disposal and bring new washed rock around the loading and unloading areas
- Replace back up pylons if appearance requests it
- Thickness test the iron in the bulk plant and report any thin areas



8 Troubleshooting

Common issues that occur at the bulk plant are shown below with ways to work around it.

1. Bulk transfer is slow
 - Ensure silo moving product has its vent line closed and air open
 - Ensure silo receiving product has its vent line open and air shut off
 - Make sure no other silos are receiving air, which would split the amount going into the silo moving product
 - Ensure purge valves are properly set (adjust to best setting)
2. No bulk transfer between pods
 - Ensure silo sending product has pressure, and silo receiving does not
 - Ensure product line valves are open from one silo to the next

If product is plugged off:

 - Shut in product valves on both silos
 - Vent air pressure from the silo that is plugged, leave vent line open
 - Pressurize the product line using purge valves attached to the line
 - Once pressurized, open the product valve to the silo you wanted to move product from. This should move product back into the silo freeing the plug and “fluff” the product, helping it move afterward. Fluff for a couple minutes
 - Close vent line and product line, allow pressure to build in the silo again by opening the silo air valve. Adjust purge valves on the product line, then open both product valves for the two silos. Product should now be transferring from one silo to the next
3. Admix bottle plugged off
 - Stop attempting to push the product as soon as it becomes plugged, it will plug off worse
 - Shut in the product valve out of the admix bottle
 - Purge the product lines from the storage silos to the weigh silo, make sure the lines are clear. This step clears the back half of the admix bottle product line (see Figure 8-1)
 - Keep the product valve for the admix bottle closed and open the admix bottle purge valve, attempting to clear the line (see Figure 8-2)
 - If the line clears: continue moving chemicals to the weigh silo, being careful of another plug
 - If the line is still plugged: Check along the product line for any more purge valves that you can use, attempt to clear the line that way. A last attempt can be made by opening the vent line for the admix bottle and trying to push the material back into the admix using the purges in the product lines. If all else fails you may have to take the line apart and clear it by hand. Make sure to bleed of pressure and shut down/lockout the blower before doing so.
4. Blower will not start/out of service
 - Check the breakers/fail safes to ensure the blow is not locked out
 - Drive a bulker over to the blower and hook up an air line to the discharge of the bulker blower to the 3" fitting on the blower unit. Use the bulker's blower for the plant while the blower is down

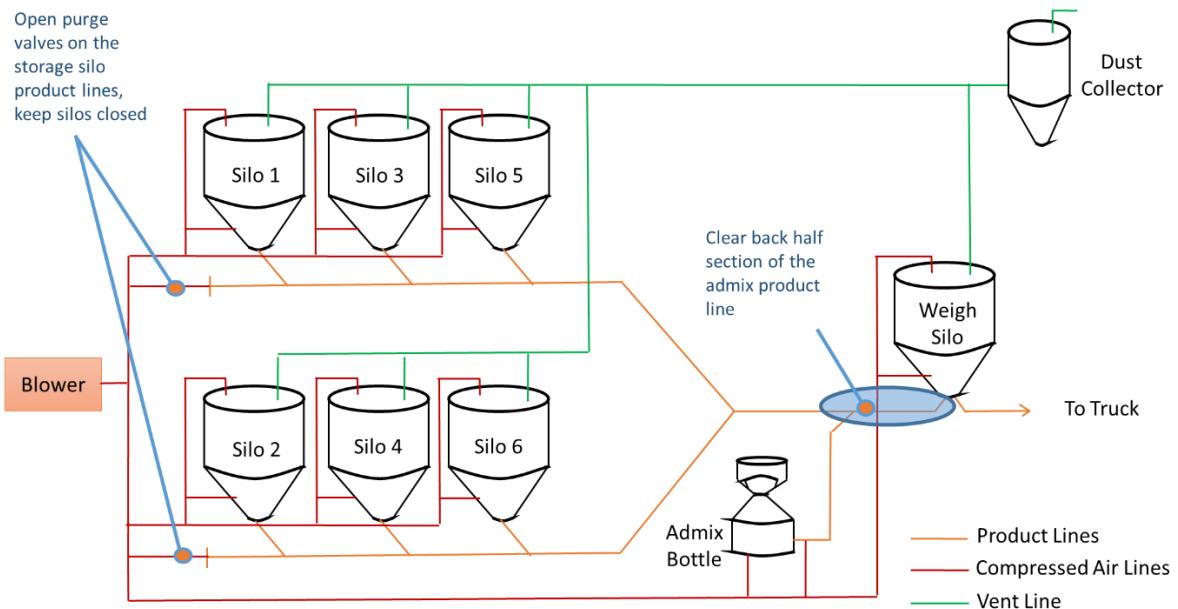


Figure 8-1. How to Clear the Back Half of the Admix Bottle Product Line

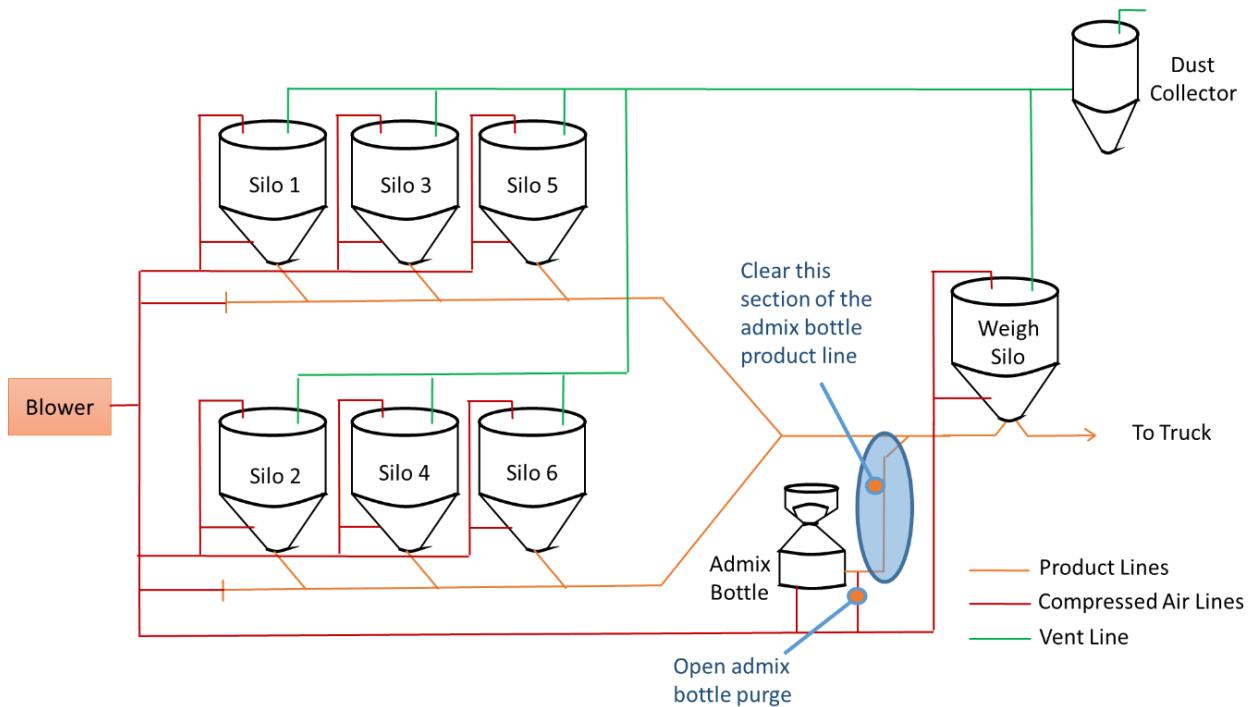


Figure 8-2. How to Clear the First Half of the Product Line



9 Acidizing

Acidizing Information

Acidizing is a process that is used to increase production of wells which have naturally low permeability or have been damaged in the drilling and/or completion operations. In both cases, the reactive characteristics of acid are used to dissolve rock or other materials that are reducing permeability.

In acidizing operations, chemicals are pumped down the well and into the formation where they dissolve rock thereby creating channels in the rock leading to the wellbore. This increases permeability and allows the well to increase its production fluids.

Some of Sanjel's districts are involved in Acidizing, and their bulk plants are used for storage and mixing of acid and chemicals. The bulk plant operators specific duties related to acidizing include:

- Keeping a running inventory of acids, additives, and chemicals
- Blending acids and additives prior to shipping
- Scheduling transportation
- Ordering third party transportation, if required
- Checking the operation of equipment visually through gauges and instruments
- Controlling and adjusting the operation of equipment
- Inspecting controls and equipment to identify wear and/or damage
- Completing the appropriate paperwork
- Load Tickets (Material Transfer Sheets)
- TDG forms
- Incoming Materials Sheet
- Bulk Plant Inventory List
- Interchanging generic names to Sanjel names for products

Many of these tasks are similar to managing the cementing side of the bulk plant. The major difference is the blending and titration of acids.

Acid PPE

Potential Health Hazards

Acidizing presents potential hazards associated with pressure, well services equipment, fire and sour gas. This section of the manual, however, will cover the specific hazards associated with chemicals used in acidizing operations. The table below illustrates the potential health effects of exposure to three of chemicals frequently used in acidizing well treatments at Sanjel.

**Table 9-1. Health Effects of Frequently Used Acidizing Chemicals**

Type of Exposure	Hydrochloric Acid	Acetic Acid	Formic Acid
Inhalation	Irritation of the nose and respiratory tract. In high concentrations, can cause death from irregular heart beat or from fluid buildup in the lungs (pulmonary edema).	Respiratory tract burns; bronchitis, pharyngitis and dental erosion.	Severe irritation of the nose, throat and upper respiratory tract and possible lung damage.
Ingestion	Damage to the esophagus and stomach. Gradual, lingering narrowing of the esophagus.	May cause severe and permanent damage to the digestive tract.	Pain, burns / corrosion of the mouth, throat, esophagus. Possible kidney damage.
Skin Contact	Severe pain, burning and scarring. Visible damage may not appear for 12 - 24 hours. Fingertip exposure may result in injury to the nail bed and bone loss.	Severe skin burns and harmful if absorbed through the skin.	Corrosive. Redness, pain, and severe burns.
Eye Contact	May cause prolonged or permanent visual defects, blindness, or complete destruction of the eyes.	Severe eye irritation and possible irreversible eye damage.	Vapours cause eye irritation. Contact may cause severe burns and permanent eye damage.

Basic Acidizing PPE

Sanjel employees working on acidizing jobs, but not working directly with chemicals, must wear the following PPE:

- Fire retardant coveralls
- Safety gloves
- Rubberized work boots
- Hard hat
- Safety glasses
- Hearing protection

Specialized Acidizing PPE

Sanjel employees working on acidizing jobs and who may, in the performance of their duties, directly contact corrosive chemicals must wear the following PPE:

- Rubber suit
- Rubber gloves
- Hard hat
- Full face respirator
- Hearing protection



Acid Blending Procedure

The bulk plant operator may be required to blend acid for an acidizing job. This includes performing the blend calculations and physical blending.

Acid blends are mixed using water and a high concentration of acid to produce a desired concentration (%) of a given acid. To mix a required concentration, pre calculated mix water and raw acid requirements are found in the *Sanjel Technical Data Handbook*. In the handbook, charts will provide mix water and acid volumes to blend 1 m³ of required acid.

Mix water has certain rules to follow when finding the volume required to dilute an acid to the required concentration, they are as follows:

- All liquid additives except Xylene and Diesel (or other hydrocarbons) will dilute concentrated acid and are therefore subtracted from the mix water total.
- Additive volumes are calculated based on the acid volume only, hydrocarbon additive volumes are not included.
- Water used to flush lines or to wash containers must also be subtracted from the mix water total.
- Solid additives do not take away from the mix water total

Once the blend is calculated and confirmed by dispatch, you may begin blending. The following generic procedure covers how to blend acids (*Note: Products listed in brackets are examples only*):

1. Add a minimum of 50% of the calculated WATER volume to the mixing tank as a medium for the chemicals to be mixed into.
2. Add the following products to the mixing tank in the order listed. Do not mix or combine different chemicals in pails or drums prior to adding the chemicals to the mixing tank. Remember best practice is to include a water spacer of 5 to 10 L between additives.
 - a) DF-1 (except in foamed acid blends)
 - b) S-101 (if required)
 - c) Corrosion inhibitor (AI-4, AI-5)
 - d) Anti-sludge agent (ASA-3)
 - e) Demulsifiers (D-2, D-4)
 - f) Any remaining liquid additives (ME-4, S-103, SI-14, MS-1, IFTR-1 etc) EXCLUDING StimSol-200
 - g) Iron Control Agents (ISA-1, ICA-7)
 - h) StimSol-200
 - i) Any remaining volume of water left over.
 - j) Circulate for a minimum of 10 minutes.
 - k) Add the concentrated acid.
 - l) Add LDP-A-0110 (ICA-8C) if included in the blend program.
 - m) Add MS-1 if included in the blend program.
 - n) Circulate for a minimum of 15 minutes and titrate the acid.
 - o) It is IMPERATIVE to add LDP-A-187 by using a “stinger” style pump and add directly to blended acid volume (if included in the blend program)
 - p) Add Xylene or Toluene (if required).
 - q) Circulate for 15 minutes.
 - r) Pull two 1 litre samples of the acid blend, label accurately, and hold for 3 weeks minimum.



Acid Certification

Each blend needs to be certified by doing the following:

- All blends need to be titrated
- Required iron tolerance to be tested
- Compatibility with provided oil sample
- Retain sample for a minimum of 3 weeks

Example Blend Calculations

Blend 5m³ of a 70/30 15% HCl/Xylene blend with the following additives

- AI-4 at 8.0L/m³
- ASA-3 at 6.0L/m³
- ICA-7 at 10.5 kg/m³
- D2 at 1.0L/m³
- DF-1 at 0.5L/m³
- Xylene at 300L/m³

What volume of raw acid, water, xylene and additives are required? (Assuming the raw HCl is 35%).

- 15% HCl requires 390L of concentrated acid per m³ (Technical Handbook)
- 610L of “water” per m³ ($1000\text{ L} - 390\text{ L} = 610\text{ L}$)
- 15.5 L of additives per m³ acid ($8.0 + 6.0 + 1.0 + 0.5$ Note: ICA-7 is a solid additive and not included)
- Need 30% Xylene (300L/m³)

Remember

- Additives are soluble and subtracted from water
- Xylene is not soluble in the acid/water/additive mixture; do not count as part of the acid volume.
- 5m³ total blend is required, of that 3.5m³ is HCl and 1.5m³ is Xylene

$$\text{Acid} = 5.0 \text{ m}^3 \times 70\% = 3.5 \text{ m}^3$$

$$\text{Xylene} = 5.0 \text{ m}^3 \times 30\% = 1.5 \text{ m}^3$$

- Require 2080.8 L of water ($610 \text{ L/m}^3 - 15.5 \text{ L/m}^3 = 594.5 \text{ L/m}^3 \times 3.5 \text{ m}^3 = 2080.8 \text{ L}$)
- Require 1365.0 L of concentrated acid ($390 \text{ L/m}^3 \times 3.5 \text{ m}^3$)
- Require 54.2 L of total additives ($15.5 \text{ L/m}^3 \times 3.5 \text{ m}^3$)



What if we instead needed 7.5m³ of this same blend?

For 7.5m³ - We need to blend:

- Require 2047.5 L concentrated acid ($390 \text{ L/m}^3 \times 7.5 \text{ m}^3 \times 70\% = 2047.5 \text{ L}$)
- Require 3121.1 L water ($594.5 \text{ l/m}^3 \times 5.25 \text{ m}^3$)
- Require 81.4 L additives ($15.5 \text{ L/m}^3 \times 5.25 \text{ m}^3$)
- Require 2250 L of xylene ($7.5 \text{ m}^3 \times 30\%$)

Acid Blending Directly into Acid Truck



Figure 9-1. Acid Truck

Blending acid can take place by pumping all required materials directly into the acid hauler. When doing so, the procedure stays mostly the same as before, and you may start with raw acid on the acid hauler. This procedure is outlined below:

1. Find the total additive package volume for the load based off the job call sheet/program
2. Calculate the water requirement for the acid blend
3. Subtract the additive package volume from the water requirement, to find the total amount of water needed.



4. Using a minimum 5 to 1 ratio of water to additives determine how much water will be needed to ship the additives to the acid hauler.

Note: this ratio is a best guess and can vary between bulk plants. If the Acid hauler can suck the additives through the plant the water requirements can be reduced.

5. This can then be subtracted off the remaining amount of water to determine how much water can be added to the raw acid before arriving at the Sanjel facility. (Note: some districts fill the acid hauler with raw acid elsewhere and dilute the acid with the remaining mix water that isn't used by transferring chemicals before arriving at the district)

Note: As an alternative, larger additive volumes can be more efficiently sucked directly from totes onto the acid hauler rather than measured out multiple times using the graduated cylinders.



Figure 9-2. Liquid Additive Measurement Station

6. Complete a load sheet that includes
 - Additives volumes required and the order they should be added (same order as in the previous procedure)
 - The maximum amount of water that can be used to ship additives and flush lines
7. Prepare for arrival of Acid Hauler
 - Upon arrival of acid hauler review his load sheet
8. Confirm Acid and water volumes loaded
Rig in the acid hauler to receive from the acid plant discharge
9. Zero the water flowmeter, and measure out the additives in the clear graduated cylinders.
 - Use a scale to measure out the iron control powders
 - Use the handler to add Iron control powders.



10. Note: Adding the powders to the liquid iron control aids in dissolving it.
11. Open the valves leading to the acid hauler, engage the acid haulers pump and start the flow of water from the plant.
 - Note: ensure clear communication with Acid hauler to confirm he is to engage his pump to pull from the acid plant
12. Open the valve at the bottom of each cylinder and suck down the cylinders, refill if necessary to make up the total additive volume needed.
13. Any additives not plumbed into the cylinders can be measured out and added through the handler, including solid chemicals.
14. Add the chemicals in the mixing order supplied in the program.
15. Flush plant after use to remove all chemical residue from piping and valves.
16. **Ensure not to exceed the total water volume.**
17. Total water volume = additive volume + water used to ship chemicals + water on acid hauler.
18. Roll acid hauler (1min per m³) and have them provide an acid sample.
19. Titrate the sample to determine strength.

Example calculation following the above procedure

20. 16m³ 15% HCl blend with 1000 L additive package
21. Use handbook to find water requirement:

35.2% raw acid requires 611 L of H₂O / m³ of diluted acid to make a 15% HCl strength.
 $16\text{m}^3 \times 611 \text{ L/m}^3 = 9776 \text{ L}$
22. 9776 L – 1000 L of additives = 8776 L mix water
23. 1000 L x 4 = 4000 L
24. 8776 L – 4000 L = 4776 L to be added to acid hauler prior to arriving at Sanjel. Acid strength would be approximately 26% HCl.
25. In this case **Do not exceed 4000 litres of water to ship chemical to acid hauler.**

NOTE: For Acid volumes under 2m³ additives must be placed in pails and pulled on individually from acid hauler, as the plant will add too much water if additives are moved via the graduated cylinders.



Acid Titration

Sanjel requires a sample of each acid that is blended be tested using an “acid-base titration”. An acid-base titration is the determination of the concentration of an acid or base by exactly neutralizing the acid or base with an acid or base of known concentration. For the titration, we are testing if the concentration of acid we blended is what was planned by using a base of known concentration. The procedure to titrate the acid sample is shown below:

1. Clean a prescription bottle and add approximately 40 ml of Distilled Water.
2. Using a clean 1 cc syringe, accurately measure out 1 ml of acid to be titrated and add to the above Distilled Water.
3. Add 4 drops of 1% Phenolphthalein Solution and mix thoroughly.
4. Titrate using 1N Sodium Hydroxide (NaOH) Solution. The following procedure should be used to accurately measure the Acid strength.
5. Using a clean 10 cc syringe, accurately measure out 10 ml of 1N NaOH.
6. Add the 1N NaOH drop-by-drop, thoroughly mixing, to the acid solution until it turns from a clear to a light pink colour.
7. Once the solution turns pink, allow it to stand for a couple of minutes.
8. Should the solution turn back to a clear colour, add more 1N NaOH drop-by-drop until the solution remains a pink colour (this should only take 1-2 drops).
9. Read the volume of 1N NaOH used off of the syringe.
10. Find the percentage of acid from the charts in the technical data handbook for the acid that you titrated, or use the following instead:

$$\text{Acid Strength (in %)} = \frac{(Volume\ of\ 1N\ NaOH\ added\ in\ mL) \times (\text{Constant})}{(\text{SG}\ of\ Acid)}$$

Where “Constant” is equal to the appropriate value listed below.

Table 9-2. Constants for Acid Strength Calculations

Acid Type	Value of Constant
Hydrochloric Acid	3.65
Formic Acid	1.10
Acetic Acid	6.05



10 Additional Information

GOOD TO KNOW

This section contains information about cementing as well as Sanjel's services and products. Knowing the basics of cementing and cementing chemicals will help you be a better bulk plant operator and a well-rounded team player.

What is Well Cementing?

The process of oilwell cementing consists of mixing cement slurry and placing it at critical points in the wellbore by pumping it through steel casing, drill pipe, or tubing.

Oilwell cement slurry consists of:

- Cement powder
- Chemical additives
- Mixing water

The Purpose of Oilwell Cement

Cement has been used in oilwell drilling operations since 1903. Cement is still used in every well drilled today, for the following reasons:

- To provide support for the casing
- To isolate fluids in one formation from fluids in others
- To consolidate the open hole or formations behind the pipes
- To prevent problems caused by blowouts, etc. during deep drilling
- To help protect the casing from corrosion
- To provide a permanent seal for well abandonment

Cement Classifications

The American Petroleum Industry (API) has eight different classifications of cement. These classifications were introduced in the early 1930's to accommodate the different cements manufactured for oilwell applications. In Canada, however, there is only one true API class of cement and that is Oilwell G (typical construction cement, normal Portland, is sometimes marketed as API Class A). Oilwell G can be used for virtually any application by adding chemicals to change its characteristics. The majority of oilwell cementing in Canada is with Oilwell G.

How Does Oilwell Cement Differ From Construction Cement?

Oilwell cementing requires a type of Portland cement especially designed for oilwell cementing applications. It differs from normal Portland cement in the following ways:

- More coarsely ground; reduces its reactivity for use at higher temperatures
- Stricter manufacturing specifications; maximum allowable impurities and setting characteristics
- Resistance to sulphate attack; chemically resistant to the sulphates present in most ground waters
- Improved storage properties



Introduction to Products, Chemicals, and Services

For bulk plant operators, knowledge of the products and services offered by Sanjel, and the various chemicals used to obtain superior products and better service provide a safe and effective work environment.

The products and chemicals used in well servicing cementing operations are developed to suit a specific application and are tailored to be the most effective for the situation.

Sanjel has a full range of cement additives, all of which are available as free-flowing powders. For remedial squeezes, the additives are generally pre-hydrated in the mix water prior to blending the slurry. Cement slurries can be tailored to provide optimum characteristics for any downhole conditions.

The description and use for the various additives along with any special handling or mixing procedures are outlined in the sections that follow. Unless instructed otherwise, follow proper PPE and WHMIS requirements.

Cementing Chemicals

Sanjel offers several general categories of chemicals as well as proprietary blends used in cementing. This section is merged with the next section and presented in chart form to define the categories of chemicals and describe how they are combined to produce a variety of unique cementing products. Some overlap occurs but for ease of reading, the product name is repeated along with the information pertinent to that particular section.

Cementing Products

Sanjel offers a number of regular products, as well as specialized products and services in the cementing industry. The various categories are listed with brief descriptions identifying the major characteristics of each category. Further details of the products within each category are given in the chart that follows.

Thixotropic or Expanding Thixotropic Slurry

Thixotropic slurry is fluid while being pumped (sheared) but quickly gains gel strength when static.

Advantages of a thixotropic cement:

- They generally have a higher viscosity (stickiness), which aids in mud removal in the wellbore.
- There is less likelihood of feeding far into a lost circulation zone because of the ability to build gel strength.
- They generally set faster (although with lower ultimate strength) which aids in the prevention of gas channeling or falling in the annulus.

Lightweight Cements

Sanjel has developed an entire line of cement blends for use when a lower than normal hydrostatic gradient is required. In situations where a formation in the open hole section will not support a column of cement, a lightweight blend can be used. Sanjel has developed the Litefill Series and the Superlite Series to meet this need.



Thermal Cements

Oilwell 'G' cement can be modified for use up to the maximum temperature that hydrocarbon formations experience; however, long term exposure to static temperatures above 110 °C causes strength retrogression and increased permeability.

- To prevent this breakdown, the industry practice is to add into the cement matrix 40% (by weight of cement) Silica Flour. Silica flour prevents the chemical reaction that causes the strength retrogression.
- For the most part, it does not affect the performance of the other additives or the properties of the original blend, other than a slight change in the water requirement.
- Sanjel has three thermal blends that have been "converted" from standard blends to be thermally stable (see the chart that follows).

Gas Migration / Gas Channeling Prevention

The migration of annular gas through a cement column in the annulus is common in many oil-producing parts of the world, and is especially prevalent in Western Canada.

The most extreme cases occur when gas migrates to surface via either the surface/production (or intermediate) annulus, or worse – through the cement or formation outside the surface casing.

The cause of this gas flow is commonly accepted to be a reduction of localized pressure during the liquid-to-solid transition of the cement. Sanjel has developed a number of products to combat gas channeling.

Product Descriptions

Table 10-1. Product Descriptions

Class	Name	Description
	Normal Portland Class "A"	Used in conductor/surface casing and plug cementing Benefits: Low cost, readily available, good early compressive strength.
	Class "G" Pozzolan/Gel Cements	Class "G" is used mainly in surface /production casing and remedial /plug cementing. It has a wide application range and has moderate sulphate resistance. Low heat of hydration and compatible with most additives.
	1:1 Pozzmix 2:1 Pozzmix	1:1 and 2:1 are used in production casing. Both have a wide application range, are lightweight, economical, and can be extended with gel.
	Bentonite/Pozzolan Cement blend	Bentonite/Pozzolan Cement blend is used as production casing fill or tail cement. It has a high water ratio and is readily available. It is economical and compatible with all additives.
	Expandomix Expandomix LWL	Expandomix is primarily a tail or lost circulation cement. The slurry quickly supports itself, which reduces gas migration and slurry fall back. The expansion mechanism after it has set ensures an excellent bond. Expandomix is used on wells with BHCT 50°C and lower. The high viscosity increases friction so should be pumped in plug flow.
	Thix Mix Thix Mix II Quik-Set I Quik-Set II Glacial Mix Kwik Kick RAS II	Thix Mix is also a tail blend but is more economical than Expandomix. It has good thixotropic properties, which inhibit gas inflow; however, it does not contain additives to promote expansion. It is also limited to wells with a BHCT of 50°C and lower. The viscosity limits flow rates to low plug flow values Thix Mix II is excellent for shallow gas projects. The low density reduces friction pressure, which makes it suitable for narrow annuli and also reduces hydrostatic pressure on weak formations. It has moderate thixotropic properties, which combat gas migration, and is usually run as full-string production cement.



Class	Name	Description
Lightweight	LW-12 LW-13 LW-14 LW-15 Superlight 12 Superlight 13 Superlight 14 Litefill 1400 LT Litefill 1450 LT Litefill 1500 LT Litefill 1550 LT Litefill 1400 MT Litefill 1450 MT Litefill 1500 MT Litefill 1550 MT Litefill 1400 HT Litefill 1450 HT Litefill 1500 HT Litefill 1550 HT	In situations where a formation in the open hole section will not support a column of cement, either because of low formation pressure or because of low fracture gradient, a lightweight blend can be used instead of an expensive and complicated stage tool or packer. The main difference between the LW and Superlite series is the method in which the blend density is lowered.
Thermal (Modified Oilwell "G")	Thermal 30 Thermal 35 Thermal 40 Thermal 40 EXP Thermal 40 EXP+ Thermal 40 RAS Thermal 40 Thix Thermal 40 Lite 25% Spheres	Thermal 40 was originally 0:1:0 'G' and is most commonly used as Thermal tail or plug cement. Thermal 40 EXP was originally Expandomix and is used as a thermal thixotropic. Thermal 40 RAS was originally Right Angle Set and is used as thermal short transition time cement.
	SPC-I SPC-II	(Increases cement compressibility) - When exposed to the high pH environment of a cement slurry, these additives begin to react chemically to produce a gas. This gas, when constricted to the slurry matrix, allows the slurry to expand to a certain extent to make up for volume losses to the formation and maintain pressure against the formation. One advantage is that they are easily incorporated into the dry blend. Secondly, the coated product, SPC-II, ensures that reaction does not occur until the slurry is on its way down hole. One disadvantage occurs when above cement column hydrostatic is low (as with fill cements close to surface) and the generated gas may actually contribute by creating its own channel. To counteract this, SPC-I and SPC-II should only be used in Tail cements and in fill cements not brought to surface. The gas bubbles formed (and therefore present in the set cement) have been shown to interfere with acoustic bond logging instruments.
	Expandomix Expandomix HT Expandomix LWL Expandolite Thix Mix Thix Mix II Thix Mix SG ThixLite ThixLite HT	Thixotropic and high gel set cements have a higher resistance to gas flow. Thixotropic slurries have the ability to gain gel strength quite rapidly after becoming static in the annulus. This shortens the transition time that for minor to moderate gas influx problems has proven adequate. Thixotropic slurries have the added benefit of being better hole cleaners because of their high viscosity. The Expandomix and Thix Mix series are standard fill and tail cements, no special additives are required. Not suitable for liner cements. Transition time is long enough that it alone will not prevent serious gas influx problems



Class	Name	Description
	FA-1 (Foaming Agent)	The use of FA-1 for some operators has proven effective by encapsulating any gas that does manage to invade the slurry. The FA-1 prevents the coalescence of the gas and therefore results in a discontinuous gas phase that does not allow the gas to flow. Advantage is that it has little or no effect on the slurry or set cement characteristics at low temperatures. At higher temperatures it acts as a moderate retarder. Two disadvantages: must be added to the slurry after mixing. It is usually injected into the down hole pump under low pressure which requires an additional piece of equipment, and cement returns containing FA-1 may be more difficult to handle due to the foaming tendencies
	Right Angle Set (RAS) Thermal RAS Quikset IIIF	Short transition time cements
	Service - Annular Pressure Maintenance	Increases in-situ pressures by adding overburden pressure. Inexpensive can be used with any cement blend. Disadvantages: Where cement column is long above gas bearing formation, the effect of applying pressure at the surface is reduced; also, winter operations where service equipment and lines are prone to freezing.

Cementing Additives

Cement additives are products, when added to cement, chemically manipulate it. These products include:

- Accelerators – shorten the thickening time of the cement slurry
- Retarders – lengthen the thickening time of the cement slurry
- Fluid loss agents
- Friction reducers or dispersants
- Free water control
- Density modifiers
- Loss circulation control
- Specialty material

The table below identifies the major categories of cement additives, the product names under each category, and a general description of each product.

**Table 10-2. Types of Cement Additives**

Name	Description
Gypsum (product named Gyp-cem)	<i>Gyp-Cem is a controlled-set gypsum accelerator (similar to "Plaster of Paris") that was designed especially for the oil industry. Gyp-Cem is generally blended with Portland cement in the range of 5 to 15% by weight of the cement. In certain application it can be in higher percentages. When longer times are required for setting, using a special retarder, QSR, can control the time. Although Gyp-Cem is considered to be non-toxic, normal safety precautions should be followed when using it. Refer to the MSDS for further information.</i>
SMS (sodium Meta-silicate)	<i>SMS is a moderate accelerator that increases viscosity and promotes thixotropic (gel-like) properties. It is also used as a free water control additive. SMS is very alkaline and the dust is irritating.</i>
LWA	<i>LWA stands for lightweight accelerator and is proprietary to Sanjel. It is used to decrease thickening time and increase early compressive strength in certain lightweight blends.</i>

Retarders

The purpose of a retarder is to lengthen the thickening time of cement slurry to allow more time for placement. Retarders are used most often in remedial work and liner cementing to ensure there is enough time to properly place the slurry in the well. LTR, HTR, QSR, and GCR-2 are the main retarders used by Sanjel in cementing operations. Fluid loss products are usually good retarders.

LTR	<i>LTR stands for Low Temperature Retarder and is an economical versatile retarder used across a broad temperature range Compatible with all fluid loss additives. The temperature range is between 30 °C and 100°C</i>
HTR	<i>An economical High Temperature Retarder.</i>
QSR	<i>A retarder for quick-set blends (Quick Set Retarder) Used with quick setting blends, such as RAS II or Glacial Mix.</i>
GCR-2	<i>A Gypsum Cement Retarder used in quick setting blends such as RAS II or Glacial Mix. Almost always prehydrated.</i>

Fluid Loss Agents (CFL series)

CFL-1	<i>CFL-1 is a medium temperature, multi-purpose organic polymer blend used in primary and remedial cementing. Always used with a dispersant (not salt compatible) Allows turbulent flow rates. Also a good cement retarder.</i>
CFL-2	<i>CFL-2 is a specialized application synthetic polymer blend used in deviated or horizontal well cementing. Aids in controlling free water and promotes excellent slurry stability. Salt compatible product Requires a dispersant to mix.</i>
CFL-3	<i>CFL-3 is an ultra low fluid loss polymer blend used to plug flow cement systems. It is non-retarding and CaCl2 compatible. Can be used without a dispersant or with CFR-2 Limited by temperature depending on the density of the blend and the other additives.</i>
CFL-3L	<i>Liquid version of CFL-3. Use 2.5 times the amount required of CFL-3 to get the desired results.</i>
CFL-4	<i>A salt compatible product used in all temperatures. Typically used with a dispersant unless only a low concentration is used. Gives cement a short transition time</i>



Name	Description
CFL-H	<i>CFL-H is a high temperature synthetic polymer blend used for high temperature primary and remedial cementing. It is bi-functional exhibiting superior fluid loss control and retardation as well as being NaCl compatible.</i>
WG-1	<i>Very strong retarder. Occasionally used when a low fluid loss is required in a lightweight blend</i>
Friction Reducers or Dispersants	
CFR	<i>A multi-purpose polymer blend used to reduce slurry viscosity and friction pressure in primary and remedial cementing. Increases effectiveness of fluid loss additives Minimal retardation.</i>
CFR-2	<i>Stable at high temperatures Strong dispersant compatible with CFL-3.</i>
LWD	<i>Light Weight Dispersant A specialized application polymer blend used for high temperature primary and remedial cementing. A bi-functional blend that retards and disperses.</i>
Free Water Control	
FWCA	<i>A proprietary Sanjel product that is compatible with all blends. It is used mainly in primary cementing, fill and tail slurries, and highly deviated wells. Controls free water development</i>
FWCA-H	<i>Used at higher temperatures as it does not create higher viscosity like FWCA does. Used for all temperature ranges in primary cementing, fill and tail slurries, and highly deviated wells. Controls free water development.</i>
SMS	<i>Also used as an accelerator Chemically increases viscosity, which slows water movement throughout slurry</i>
Density Modifiers	
Cement Extenders	
Pozzolan (Flyash)	<i>Formerly an industrial waste byproduct, flyash is a cement additive used to lower the cost of slurry</i>
Bentonite (gel)	<i>Bentonite is a clay material that reduces slurry density by absorbing large amounts of water. Compatible with most additives</i>
Light Weight Additives	
Superspheres	<i>High strength hollow ceramic spheres for all temperature ranges in primary and remedial cementing of weak formations. Superior compressive strengths Compatible with all cement blends and additives</i>
Silica Fume	<i>An amorphous silicon dioxide compatible with all blends and good for all temperature ranges for both primary and remedial cementing High water requirement aids in reducing density. A more economical low density additive than Superspheres</i>
SMS	<i>Also an accelerator</i>



Name	Description
Heavy Weight Additives	
Barite	<i>Readily available barium sulfate is used in primary/plug cementing of overpressurized zones.</i>
Hematite	<i>Hematite (iron oxide) is used in primary and plug cementing of overpressured zones. Has minimal effect on cement properties.</i>
Loss Circulation Control Materials	
Celloflake	<i>Matting material made up of flakes of cellophane or mica</i>
CaCO ₃	<i>Multi-particle sized material that acts primarily as a bridging agent</i>
LCC-1	<i>Multipurpose additive that will act as both a matting and bridging agent</i>
Polyflake	<i>Polyethylene flakes best used in porous zones</i>
Indicator Dye	<i>Used to mark specific well fluids.</i>
Specialty Materials	
Thermal Stabilizers	<i>Silica Flour</i>
Expansion additives (bond enhancers) SPC-I, SPC-II	<i>Increased cement compressibility while in fluid form. When exposed to the high pH environment of a cement slurry, these additives begin to react chemically to produce a gas. This gas, when constricted to the slurry matrix, allows the slurry to expand to a certain extent to make up for volume losses to the formation and maintain pressure against the formation. Easily incorporated into the dry blend. The coated product, SPC-II, ensures that reaction does not occur until the slurry is on its way down hole. SPC-I and SPC-II should only be used in tail cements and in fill cements not brought to surface because when above cement column hydrostatic is low (as with fill cements close to surface) the generated gas may actually contribute by creating its own channel. The gas bubbles formed (and therefore present in the set cement) have been shown to interfere with acoustic bond logging instruments.</i>

Compatibility

The bulk plant operator is responsible for the final mixing of dry product; therefore, it is important that the compatibility factors of the various chemicals and additives be thoroughly understood as it is the last check before going on site. Any mistake at this point will usually be extremely costly. For example, in a deep well, the costs of an error from the bulk plant may easily run to several million dollars.



Table 10-3. Additive Compatibility

Product Name	Works Best With / For	Standard Loadings	Incomp. With	Not Recommended For Use With	Secondary Effect(s) / Comments
Accelerators					
	CFR-2				
	CFL-3				
	SCA-7				
	SCA-6				
	MCR-7				
	SCA-7				Increases viscosity
	SCA-5				reduces free water
	HTR-1A				
	SCA-7				
	SCA-6				
	MCR-7				
	CFR-2				Interferes with gel hydration and stability
	CFL-4				Elevated loadings can retard cement
					May increase slurry consistency
	CFR-2			Bentonite Gel	Interferes with gel hydration and stability
	CFL-4			GSS-1	Elevated loadings can retard cement
					May increase slurry consistency
Retarders					
LTR	BHCT <85°C	0.1 - 1.2%		Elevated loadings of SCA-6	Dispersing effect that may influence free water and fluid loss
					Dispersing effect
					Can reduce slurry instability and increase free fluid



Product Name	Works Best With / For	Standard Loadings	Incomp. With	Not Recommended For Use With	Secondary Effect(s) / Comments
HTR-2	85 - 150°C	Max ~1.6%		BHCT > 150°C	Powerful dispersing effect causing free water and stability issues
	CFL-7				
	ASM-3				
	MCR-7 (as intensifier)				
	85 - 200°C				
	Use with HTR-3A				
	ASM-3 or ASM-4				
	120 - 200°C				
	(Use 2:1 parts 3:3A)				
	Requires ASM-6 for stability				
	SCA-6				Temperature dependent retardation
	CFL-4 (where Fluid Loss is required)				Dispersing effect
					Reduces fluid loss and free water control
QSR-II	RAS-II	0.1-0.6%	All other cement blends		

Fluid Loss

	CFR-2		Salt > 5%		
	CFR-5		CFR		
	CaCl2				
	CFR-2		Salt > 5%		
	CaCl2		CFR		
	CFR				Increases viscosity
	CFR-5				Reduced free water
	Salt Tolerant Fluid Loss				Expensive
	CaCl2		Salt > 5%		Self-dispersing
	LTR		CFR		Reduces free fluid



Product Name	Works Best With / For	Standard Loadings	Incomp. With	Not Recommended For Use With	Secondary Effect(s) / Comments
CFL-7	CFR	0.5 – 1.2%		BHCT < 60°C	Initially created as a gas migration controlling additives
	LTR, HTR-2				
	ASM-3				
	CFR, CFR-2				
	Salt Tolerant Fluid Loss				
Dispersants					
	CFL-7		ASM-6 CFL-3		Reduces ultimate strength
	CFL-4				Increases free water
					Delays gel strength development
	CFL-3				Increases free water
	High Temperatures				Delays gel strength development
					Tends to accelerate blend containing CaCl ₂
	CFL-3 (BHCT < 60°C)				Reduces ultimate strength
	CFL-4 (BHCT 60-90°C)				Increases free water
					Delays gel strength development
Density Modifiers and Extenders					
					Improves blend stability
					Increases viscosity
					Reduces compressive strength
	Oilwell 'G'				
	Pozmix Blends				
					Promotes early onset of strength development
					Increases slurry viscosity
					Improves stability



Product Name	Works Best With / For	Standard Loadings	Incomp. With	Not Recommended For Use With	Secondary Effect(s) / Comments
Free Water Control & Stabilizers					
					Increases slurry viscosity
					Promotes early gel strength development
					Extends slurry setting time
					Lowers ultimate compressive strength
					Delays the onset of strength development
					Increases slurry viscosity
ASM-6	High temperature slurries	0.1 – 0.3%		High viscosity blends	May delay compressive strength
					Generally ineffective above 80°C
					Increases viscosity
					Generally decreases fluid loss
					Promotes early onset of strength development
					Increases slurry viscosity
					Improves stability
SCA-6	FWC-2	< 2.0%		Loadings >0.25% are not recommended when TT is extended using LTR	Difficult to control TT in higher density tail systems at elevated BHCT
Density Modifiers and Extenders					
					90% survival rate at 2000 psi
					Density – 320 kg/m ³
					90% survival rate at 4500 psi
					Density – 280 kg/m ³
					90% survival rate at 5000 psi
					Density – 380 kg/m ³



Product Name	Works Best With / For	Standard Loadings	Incomp. With	Not Recommended For Use With	Secondary Effect(s) / Comments
CDM-6	Deep fill cementing systems with density <1325 kg/m ³			Max Bottom hole pressures > 5000 psi	Limited crush up to ~4500 psi
					Density – 540 kg/m ³
					Low cost relative to other products
	Densified cements				Slurry must be able to suspend heavy particulates
	~ 1950 – 2300 kg/m ³				Density–5200 kg/m ³
Miscellaneous					
	All blends				
	Lost circulation material				
	All blends				
	Lost circulation Material				
	All blends				
	Lost circulation material				
	All blends				
	Lost circulation material				
Silica Flour	Thermal cements	35-50%			Increases slurry consistency
	All Blends				
	Gas migration control				
	All blends				
	Surfactant for gas migration control				
EA-1	BHST over 60°C	2 - 4%			Increases viscosity
EA-3	Must be used with SCA-1	0.5 - 2%			Increases viscosity
	Foamed cements				
	Foaming surfactant				
	Foamed cements				
	Foaming surfactant				



Cementing Services Offered by Sanjel

Sanjel offers a full range of cementing services. Sanjel offers three main categories of cementing: primary, remedial, and specialized. Each of these three categories can be further divided. A brief and simplistic definition is given in parenthesis after each of the specialized services that Sanjel offers.

- Primary Cementing
- Pre-flushes and spacers (removing drilling fluids /mud before a primary cementing operation)
- Cement testing (analyzing cement)
- Stabilizing casing (cementing conductor, surface and production casing in place)
- Multi-stage cementing (mixing and pumping more than one batch of cement)
- Liner cementing (top of the casing does not extend to the surface)
- Plug cementing (preparing a well to be permanently closed)
- Foam cementing (commonly used to cement wells that penetrate weak rocks or formations with low formation-fracture gradients)
- Remedial Cementing (cementing job that needs to be “fixed”)
- Braidenhead Squeeze (used near the bottom of a well in a low-pressure formation)
- Retainer Squeeze (contains a valve that controls fluid flow; can be drilled out)
- Circulation Squeeze (similar to retainer squeeze)
- Specialized Cementing
- Slow-rate cementing
- Cementing through coil tubing (enables relatively complex intervention techniques to be applied safely)
- High-pressure pumping
- Injectivity testing (used to help determine the key treatment parameters and operating limits)
- Batch mixing (a mixing system used to prepare treatment fluids)
- High density cement (used in wells that are less sensitive to hydrostatic pressure)
- Pancake squeeze

These services are highly technical and require a great deal of skill to employ them. This last section has been included so that you will be familiar with the services offered by Sanjel and will know to which category each belongs.



11 References

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Common Hot Keys and Shortcuts

Navigation Options

Alt + F1	Show navigation pane
Alt + F6	Move to next window
Ctrl + W	Open a new workspace
F11	Focus Address Bar in edit mode
Alt + ←	Back button in address bar
Alt + →	Forward button in address bar
Alt + M	Show AX Command Bar
Alt + W	Show Windows Menu (press 'a' to close all windows)
Alt + V	Show View menu
Alt + H	Show Help menu

Actions in Grids

Ctrl + T	Export to Excel
Ctrl + C	Copy selected cells
Ctrl + Shift + ↑ or ↓	Move focus next/previous cell
Ctrl + Shift + ← or →	Select more multiple
Ctrl + Shift + Home or End	Select records from current to first/last record

Actions

Ctrl + N	Create new record
Ctrl + S	Save current record
Alt + F4	Delete record(s)
Ctrl + F4	Close active window (w/ save)
Esc or Ctrl + Q	Close active window (no save)
Alt + F4	Close active window from SDI form OR close application from main window (w/ save)
Ctrl + P	Print auto-report in current form
Ctrl + A	Select all rows in active data source
Alt + ↓	Show drop down list
Ctrl + Alt + F4	Go to Main Table Form
F10	Activate menu bar (file, edit, etc.)
Tab or ←→ Enter	Move to next field
↑ Shift + ←→ Enter OR ↓ Shift + ←→	Move to previous field
Ctrl + ↑ Shift + Home	Go to first entry field in form
Ctrl + ↓ Shift + End	Go to last entry field in form

Actions Cont...

↑ Shift + F10	Open context menu (aka right click)
Ctrl + Page Up	Go to previous field group
Ctrl + Page Down	Go to next field group
Page Up	Go to previous page of records
Page Down	Go to next page of records
Ctrl + Home	Move to the first record
Ctrl + End	Move to the last record
F5	Refresh all data sources to current form
Ctrl + F8	Restore only the active record
Ctrl + Shift	Focus on Filter by Grid input cell
Ctrl + G	Enable/disable Filter by Grid
Ctrl + ↑ Shift + F3	Clear all filters

Filtering Commands

Ctrl + F	Find by field
Ctrl + K	Filter by field
Alt + F3	Filter by selection
Ctrl + F3	Open Advanced Filter window
Ctrl + Shift	Focus on Filter by Grid input cell
Ctrl + G	Enable/disable Filter by Grid
Ctrl + Shift + F3	Clear all filters