Procedure For Handling Silica Fume

1.0 DEGRADABLE BAGS

Figure 1 – 20kg Bags of Densified CSF

Incoming Materials Inspection

Incoming CSF degradable bags are to be inspected on delivery to ensure:-

- Material supplied is from the correct supplier and the bags are clearly marked and labeled in accordance with the standard
- Bags are free of damage.
- Supply complies with the order (packing, documents, quantity)

Handling and Storage

CSF degradable bags are to be unloaded and stored in a suitable safe location. Ensure that the bags and pallets are always kept under cover and away from water and rain. When the shrink wrap has been broken to remove some bags, pull it back firmly and fasten under other bags to maintain a waterproof covering.

2.0 DISCHARGING BULK CONTAINERS

Using An Auger

On arrival and prior to ordering a tanker for unloading, the bulk container will have been opened on arrival and the header sheet, liner and supports checked.

1. The auger (20HP, 300mm diameter) should be positioned to allow good access for trucks.
2. The bulk container is placed onto a flat top tipping scull.
3. The container doors are opened and the tipping scull is reversed to the auger bin so that discharge chutes line up with the bin opening.
4. The discharge chutes are untied, cut to the desired length and fitted into the auger bin feed holes.
5. Before starting the auger, check that the bulk tanker is correctly positioned with the discharge sock in the tanker.
6. Auger is started, feeding CSF into the bulk tanker. The tilt scull is raised as required to maintain CSF flow. To assist the consistency of flow, leave the tilt scull motor running which supplies some vibration to the container.
7. The tipping scull is tilted to allow the CSF to flow freely into the auger bin.
8. It will take approximately 30-40 minutes to load a bulk tanker with 10-12 tonne of CSF. As a container holds 18-22 tonne, 2 bulk tankers unload a container.
9. Bulk tanker is now able to weigh out (via a weighbridge) and deliver to the concrete plant.
10. The transport company is responsible for the clean up and disposal of the liner bags.

Figure 2 – Auger Unloading a Bulk Container

Using an Elevated Ramp

Another way to load if an auger is not available is to use a elevated ramp. The ramp needs to be the same height as the bulk tanker and provide access from the rear of the tilt scull to the bulk tanker.

1. Open one of the container doors only to gain access to a discharge chute.
2. Untie the discharge chute and slide it over a 250mm PVC pipe and then securely tape to prevent leakages.
3. Position the PVC pipe into the bulk tanker opening and drape a cover over to reduce the dust.
4. Allow CSF to feed down the PVC pipe under gravity, tilting the scull to control the feed rate.
5. When no more CSF will feed out of this discharge chute, tie it off. Now open the other door and carry out set up as per part 1 and 2.
6. This method is slower than using an auger and is more likely to have problems with the product flowing and with spillages.
7. Load time will increase to 1 to 1.5 hours approximately.

3.0 UNLOADING CSF BULK BAGS

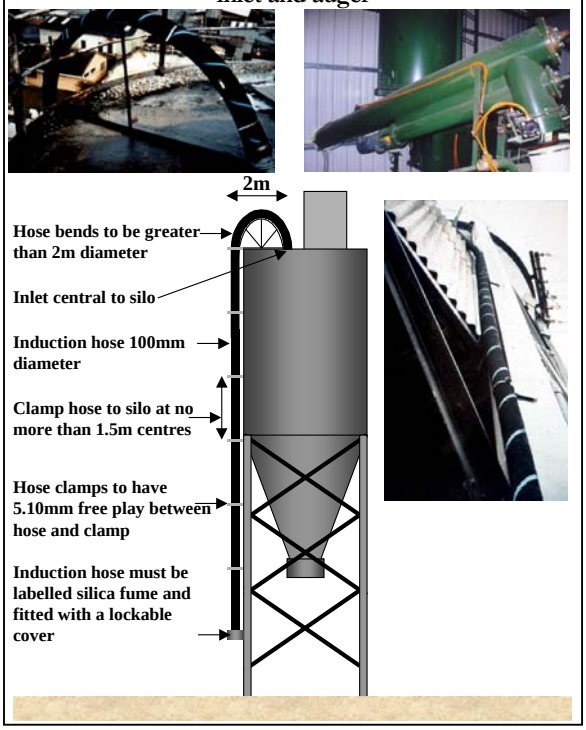
1. The loading cone is positioned onto the bulk tanker opening. Check that the loading cone is position securely in place. Using the lifting straps provided on the bulk bag, attach the crane.
2. Position the bulk bag centrally above the loading cone, which has a spike and cutting edge to pierce and open the base of the bulk bag.
3. Flow rate into the bulk tanker can be controlled by adjusting the height of the bulk bag in the loading cone.
4. A bulk bag of 1.75T will take approximately 5 minutes to empty, plus the time to lift and position. To load a bulk tanker with 11 tonnes, a duration of 1 to 1.5 hours could be expected.
5. A suitable protective cover should be draped over the bulk bag when loading to minimise the airborne dust.
6. The loaded bulk tanker when load transports the CSF to the plant for discharge into the silo.
7. Bulk bags meet high volume requirements in areas where there is no bulk container deliveries available. Loading can be transported to loading point, only leaving a lifting method to be organised.

4.0 STORAGE SILOS

A standard cement silo is suitable to covert to a CSF silo.
The following precautions must take place to prevent problems, e.g. contamination and blockages.

1. Silo clearly identified as "silica fume" on the induction pipe and on the plant controls console.
2. CSF is half the density of cement, therefore it takes up to twice the volume.
3. Must not use a shared silo filter.
4. Air slide kept to minimum length. Where augers are used, consider a high accuracy type.
5. Fit the silo with a rubber induction pipe. This will prevent build up in the line from static charge. Discharge hose should enter from the top of the silo. Induction hose must be labelled "silica fume" and be fitted with a lockable cam cap.
6. Bulker driver should retrieve the key from "Man in Charge" of the plant, identifying the product prior to discharge, preventing cement being charged into the wrong silo.

Figure 3 – Silo set up including photos of hose, hose inlet and auger



Silo Calibration

Calibration of the silo for GP cement should be multiplied by 0.45 to obtain the silica fume silo calibration in tonnes. For example, a 100 tonne GP cement silo will hold 45 tonne CSF (approximately).

5.0 BULK MATERIALS DELIVERY HOSE

Bulk materials handling hose is manufactured with anti-static rubber granting a complete discharge of static electricity.

- Temperature Range - 40-70°C
- Tube is black, smooth and compounded for long wear resistance in handling hard, sharp abrasive materials. It must be anti-static.
- Reinforcement with high strength synthetic cord. Covered with black, smooth (wrapped finish) abrasion resistant synthetic rubber that is anti-static.
- Lengths up to 125 metres (410ft) continuous length.

Dry Reinforced Cement Hose

Diameter – 102 cms
Outside Diameter – 119cms
Working Pressure – 5atm
Bursting Pressure (Theoretical) – 15atm
Weight – 3.29kg/m

6.0 FILTERS & SILO CONNECTION

Never ever use common filters for different cementitious materials. Use separate filters on each silo. Never join silos with "common pipes".

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