



EXPLOENERGY

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**MOBILE BULK
EMULSION PLANT**

ENERGETIC INNOVATION

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MOBILE BULK EMULSION PLANT

The EEA mobile bulk emulsion module contains all the equipment necessary to produce bulk emulsion formulations and chemical gassing solutions at standard rates up to 15 metric tonnes per hour. Higher production rates can be configured according to individual customer requirements.

The mobile plant can be configured to suit varying customer requirements including production rates, raw material inputs and product formulations.

The production line is engineered to operate at peak levels of efficiency and safety in accordance with international standards. 19 mobile bulk emulsion plants have been commissioned into service since 2012.

FIGURE 1: GENERAL LAYOUT WITH CRUSHING AND BOILER MODULES

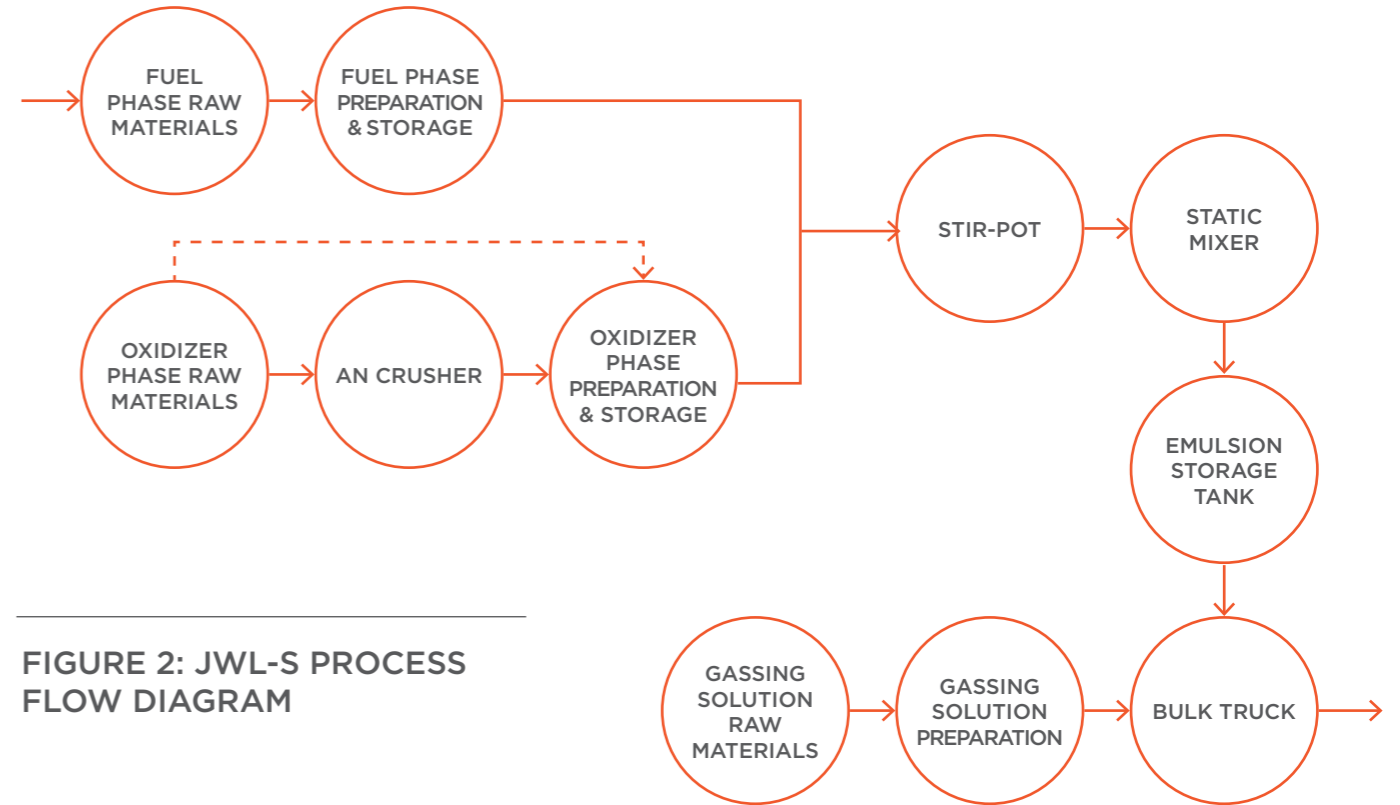


FIGURE 2: JWL-S PROCESS FLOW DIAGRAM

SYSTEM COMPONENTS

The standard raw material preparation section of the mobile bulk module includes the oxidizer phase preparation/storage tanks, fuel phase preparation/storage tanks, and a gassing solution preparation/storage tank. The emulsion module tanks are suitable for raw material preparation where intermittent operation or low daily production quantities are required. Continuous or high daily production requirements will necessitate the use of additional raw material preparation modules to prepare oxidizer solution and finished fuel phase.

EMULSIFICATION MODULE

The stir-pot and static mixer system provides safe, efficient, and accurate means of producing emulsion. As the industry standard, it has been proven and thoroughly developed to achieve accurate and consistent output. The emulsification system consists of the oxidizer phase metering pump, fuel phase metering pump, pre-mix tank, progressive cavity pump, and static mixer elements.

The oxidizer phase metering pump is a rotary lobe pump powered through a reduction gearbox by a variable frequency drive. This pump provides stable performance with minimal maintenance at outputs up to 15 m³/hr.

The fuel phase transport pump is a small displacement progressive cavity pump powered through a reduction gearbox by a variable frequency drive. This pump provides highly accurate delivery at

outputs up to 1.5 m³/hr. Flow meters installed to monitor oxidizer and fuel phase process flows utilize the Coriolis Effect to precisely measure mass flow, and can calculate fluid density. These meters require no maintenance to maintain their high precision.

The pre-mix tank blends the oxidizer and fuel phases into a coarse emulsion by using a high-speed agitator. The speed of this agitator is adjustable in the range of 150-600 RPM. Tank volume of 120 L maintains a sufficient buffer even during full speed production of 15 m³/hr.

Safety instrumentation on the emulsification system include temperature, pressure, flow, and level transmitter. The PLC controls interlocks, and are constantly monitored for conditions outside of normal and allowable operating parameters. A mechanical burst disk prior to the static mixer assembly provides an additional level of protection in the event of electronic malfunction. All process instrumentation operates on low voltage/current supplies to minimize risk.

EMULSION COOLING

Emulsion cooling is an option available for installation just after the stir pot/static mixer and prior to being pumped to overhead storage silos or directly to bulk trucks. Emulsion cooling is often desired due to concerns for operator safety, enhanced emulsion stability at lower temperatures, or to enhance performance and control of the chemical gassing process.

Standard emulsion cooling is achieved by means of a tubular heat exchanger. The nominal cooling capability of the heat exchanger is a temperature decrease of 40 degrees Celsius at an emulsion production rate of 15 m³/hr and presents a cooling load of 418 kW. The emulsion cooling system can be enhanced according to the user requirement.

CONTROL SYSTEM

The EMS (Equipment Management System) module may optionally be integrated into the JWL-RMA software. The EMS module handles the equipment maintenance, troubleshooting, and spare parts inventory. By gathering data specific to each equipment configuration and performing complex statistical analysis, maintenance intervals and procedures can be modified to save cost and minimize equipment down-time. The EMS module can be implemented as a standalone software package, separate from the JWL-RMA system.

SYSTEM SAFETY

The system is designed to safely produce bulk emulsion. The control system is equipped with emergency E-Stop functionality and common safety interlocks. Safety instrumentation on the emulsification system include temperature, pressure, flow, and level transmitter. The PLC controls interlocks, and are constantly monitored for conditions outside of normal and allowable operating parameters. A mechanical burst disk prior to the static mixer assembly provides an additional level of protection in the event of electronic malfunction. All process instrumentation operates on low voltage/current supplies to minimize risk.

SYSTEM UTILITIES

POWER SUPPLY

The standard JWL-S system is designed to operate on a 380V/3 /50Hz power supply. The system can be customized to operate on many different voltage/ frequency combinations to suit customer requirements. Rates of 15 mT/hr can be achieved using 56 kW. Energy consumption varies depending on the system configuration.

STEAM SUPPLY

Nominal steam consumption of the emulsion production module is 1 mT/hr at 0.4 MPa. The addition of an AN dissolver module and additional fuel phase preparation module requires a total plant steam capacity of 2 mT/hr at 0.4 MPa. Boiler modules may be supplied or the customers may select the option to purchase boilers from local suppliers.

FIGURE 3 JWL -S
EMULSIFICATION MODULE

