

The petroleum industry is required to inject lubricity additive into low sulfur diesel at a rate of 2.1 gallons per 1000 BBL's per ASTM D74 specification. In many applications, the diesel is not metered at the point of additization and thus meter inputs are not available.

The microLoad.net is capable of injection of lubricity additive with or without main product pulses. The additive will be injected based on the programmed recipe injection rate. Multiple recipes can be programmed if different injection rates are required. The pulses from the additive injector meter will be connected to the microLoad.net's metered injector input. The injector solenoid valve and pump will be connected to one of the microLoad.net's digital outputs.

The microLoad.net accommodates three possible scenarios as outlined below:

Scenario 1 - Meter on Main Product Line:

The microLoad.net receives pulses from the product meter and paces the additive accordingly. Batch can be preset and started in advance. No additive will be delivered until enough product has been received to trigger an injection.

This method does not require the batch size or flow rate to be known in advance. The additive will be paced on the actual product flow rather than a predicted rate.

If it is desired to additize the batch as soon as possible, the additive stop volume can be programmed. The additive stop volume defines the remaining batch volume when injections are stopped. The microLoad.net will automatically recalculate the injection rate to get the desired additive injected within a smaller amount of time. If the additive stop volume is to be used then the microLoad.net must know the actual batch size.

Scenario 2 – Flow Switch on Main Product Line (No Meter):

As there is no meter on the main product, the microLoad.net will simulate pulses. These pulses will be generated to match the selected high flow rate. Thus, the additive will be paced according to the predicted flow rate rather than actual flow.

The microLoad.net will prompt for the batch high flow rate, if high flow rate (207) and second high flow rate (208) are set to 0 in the program mode.

The batch can be preset and started in advance. The flow switch will act as a continuous, auto start permissive. The microLoad.net will not simulate product pulses unless the flow switch is active.

Scenario 3 – No Flow Switch or Meter on Main Product Line:

This would operate like scenario two, except that the microLoad.net will start simulating pulses when the "start" key is pressed. Thus, an operator must be present. Similarly, the batch preset size must be accurate as the additization will be done over the entire preset amount, even if flow of the main product stops.

Programming requirements for this feature are as follows:

Recipe Directory

- 011 Additive Injector 1 Amount/Cycle** – additive volume delivered per cycle (can be entered in cc's or gallons) if the metered injector k factor is programmed appropriately, pulses/cc or pulses/gal)
- 012 Additive Injector 1 Rate** – main product volume per injection cycle (can be in BBL, gal, etc)

Additive Directory

- 801 Additive Injector 1 Type** – should be set to metered injector
- 813 Additive Totals Units** – text entry to describe additive volume units (ex. gal)
- 814 Injection to Totals Conversion** – conversion from additive injection units to desired additive volume units (e.g. number of cc's per gal or gal per bbl)
- 821 Add Injector Stop Option** – should be set to recalculate this application (injection rate will be increased to account for the additive stop volume)
- 822 Add Injector Stop Amount** – volume remaining of main product to be delivered before injections are stopped
- 831 Metered Injector K Factor** – pulses per unit volume for metered injector (valid range 0.000 – 9999.999)

Diagnostics Directory

Enable the flow simulator if main product pulses are not available.

Notes:

1. The maximum allowed entry for Additive Injector 1 Rate (011) is 9999 to allow an entry of 1000 BBL's.
2. The maximum allowed entry for Additive Injector Stop Amount (822) is 99999.
3. The additive will be injected proportionally over the batch preset amount minus the additive stop volume
4. If the metered injector K factor is entered in pulses/gallon, then the Additive Injector Amount/Cycle (011) can be entered in gallons (ex. 2.1). The conversion factor (814) can be set to 1. The additive volume will then be displayed in gallons up to 3 decimal places.

If a flow detect switch is available from the main product line, this may be connected as a permissive input to the microLoad.net. The loss of flow would then stop the injection of additive. The permissive should be programmed for "continuous and auto start" operation. This would allow the operator to setup the batch, but injection would not start until main product flow has been detected (automatically start). This could be useful when the operator is not actually present at the scheduled time for delivery and also if delivery is stopped before the batch is completed.

The microLoad.net has a configurable delivery display option. A configurable display may be created using microMate and then downloaded to the microLoad.net to use in place of the default delivery display. This configurable display could include data such as the actual measured additive volume and the measured or simulated main product volume.

Operator Requirements:

```
microLoad.net Ready
Lubricity Additive

Flow Simulation
Press SET key

8/13/98 10:58:51
```

Operator presses SET key. The microLoad.net displays recipe prompt if multiple recipes are programmed. If only one recipe is programmed, the recipe prompt is not displayed. Next the microLoad.net displays the preset prompt.

```
LS Diesel

Enter Preset Amount
_____ BBL

Press START when ready
```

The operator enters the product batch size (inbound receipt quantity) at the preset prompt (valid range 1 – 999999) and then presses the START key. The microLoad.net next displays a prompt for the expected flow rate of the inbound receipt if no main product meter is available.

```
Enter Batch Flow Rate

XXXXXX BPH

Press START when
ready
```

The operator enters the expected flow rate of the inbound receipt (valid range 1 – 99999) and presses the START key. If a flow detect switch is configured to a permissive input, the microLoad.net would display the following screen if the flow is not detected. The "Waiting for Flow" message is a programmable permissive message.

```
Permissive Not Met
Waiting for Flow
```

Once flow is detected, the additive pump would automatically be turned on and the additive would start being injected into the main product at the programmed recipe injection rate.

Default Delivery Display

```
2235 IV
      BBL
7765 IV
      BBL

Batch #1 - LS Diesel
2000 BPH - P 10000
```

The default delivery display can be replaced with a user configurable display that could display data such as the additive volume, the main product batch size etc.

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

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