



# THOMPSON DUKE INDUSTRIAL

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503-847-5088 • thompsonduke.com

## ACF1 DATA ACQUISITION AND HISTORIAN SYSTEM

Event Time	Message	Activation Time	Message
09/12/2019 11:49:00	ACF#6 TRAY START COMMAND		
09/12/2019 11:48:52	ACF#6 RESET		
09/12/2019 11:48:48	ACF#6 TRAY DONE		
09/12/2019 11:46:59	ACF#6 TRAY START COMMAND		
09/12/2019 11:46:53	ACF#6 RESET		

109	110	111	112	113	114	115	116	117
100	101	102	103	104	105	106	107	108
91	92	93	94	95	96	97	98	99
82	83	84	85	86	87	88	89	90
73	74	75	76	77	78	79	80	81
64	65	66	67	68	69	70	71	72
55	56	57	58	59	60	61	62	63
46	47	48	49	50	51	52	53	54
37	38	39	40	41	42	43	44	45
28	29	30	31	32	33	34	35	36
19	20	21	22	23	24	25	26	27
10	11	12	13	14	15	16	17	18
1	2	3	4	5	6	7	8	9

**STATUS**  
MODE: ENABLED AUTO  
HEATER: OFF 24.4 C SP: 42.9 C  
DRAW TIME SEC: 0.10  
CURRENT POS: 95  
END POS: 117  
DWELL TIME SEC: 0.10  
DISPENSE TIMEOUT SEC: 30.0  
DISPENSE VOLUME mL: 0.50  
BATCH: BAT COUNTRY6  
SERIAL: 1234

**CURRENT TRAY**  
COMPLETED FILLS: 93  
SKIPPED FILLS: 0  
VOL DISP mL: 46.5

**RUNNING DAILY SUMMARY**  
START TIME: 09/12/2019 11:04  
END TIME: 09/12/2019 11:49  
DURATION HOURS: 0.8  
TOTAL FILLS: 2372  
COMPLETED FILLS: 2372  
SKIPPED FILLS: 0  
VOLUME mL: 1186.0  
RATE FILLS/HR: 3162.7

### SYSTEM OVERVIEW

- The Thompson Duke Industrial event based Data Acquisition system permanently stores a record for all ACF1 Automatic Filling Machine system process parameters and control variables each time any cartridge or POD is filled.
- Scalability for seven ACF1 filling machines connected to the DA System with all process data simultaneously collected from each connected ACF1 machine.
- Standard Summary Reports included
- Includes a workstation computer interface display for the Operations Supervisor to monitor the process parameters for seven ACF1 filling machines, including continuous live updates of production reports for all seven filling machines.
- Data is stored in a standard SQL database format that can be easily integrated into any third party, facility-wide Manufacturing Execution Systems (MES) and Enterprise Resource Planning System (ERP). The MES and ERP systems track all the data and Key Performance Indicators in the processing facility for compliance with seed-to-sale regulatory requirements.
- With a secure network connection to the facility's business network, the ACF1 data reports can be accessed from the C-Suite offices and Administration personnel at any time, as well as on the Operations Supervisor interface display.
- Remote network connectivity is available from the Thompson Duke Industrial support team.



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## SYSTEM DESCRIPTION

The Thompson Duke Industrial ACF1-DA System is the first and only Data Acquisition and Reporting System solution developed for vaporizer device filling operations. The ACF1-DA System operates as a dynamic and event-based monitoring solution for single or multiple ACF1 Filling Machines. The system allows real time monitoring of all aspects of the ACF1 machine operation and collects production and process data, storing it all in a standard SQL database.

The ACF1-DA System includes all necessary Thompson Duke Industrial software, Server Workstation hardware, and network hardware for connecting up to seven ACF1 machines via a standard Ethernet network. Production reporting is included to easily retrieve summary data such as total quantity of cartridge fills and oil volume processed on a daily and batch basis. Alarm and Event history is also stored for each connected ACF1 machine.

## REAL TIME DATA MONITORING

**STATUS**

MODE: **ENABLED AUTO**  
HEATER: **OFF 24.4 C SP: 42.9 C**  
DRAW TIME SEC: **0.10**  
CURRENT POS: **95**  
END POS: **117**  
DWELL TIME SEC: **0.10**  
DISPENSE TIMEOUT SEC: **30.0**  
DISPENSE VOLUME mL: **0.50**  
BATCH: **BAT COUNTRY6**  
SERIAL: **1234**

**CURRENT TRAY**

COMPLETED FILLS: **93**  
SKIPPED FILLS: **0**  
VOL DISP mL: **46.5**

**RUNNING DAILY SUMMARY**

START TIME: **09/12/2019 11:04**  
END TIME: **09/12/2019 11:49**  
DURATION HOURS: **0.8**  
TOTAL FILLS: **2372**  
COMPLETED FILLS: **2372**  
SKIPPED FILLS: **0**  
VOLUME mL: **1186.0**  
RATE FILLS/HR: **3162.7**

The Workstation based software system monitors the following parameters for each ACF1 machine that is connected to the system.

- Tray configuration and filling status for each cartridge
- ACF1 machine mode status
- ACF1 machine serial number
- Oil batch identifier code
- Heater status
- Reservoir temperature process variable
- Reservoir temperature setpoint
- Draw time setpoint
- Dwell time setpoint
- Dispense time out setpoint
- Dispense volume
- Current tray successful fills
- Current tray skipped fills
- Current filling position
- End filling position
- Total volume dispensed
- Running daily total for successful fills and skipped fills
- Time of first and last cartridge fills
- Running calculation of filling rate
- ACF1 machine event log
- ACF1 machine alarm log



## DATA ACQUISITION AND REPORTING FEATURES

The ACF1-DA system logs information for every cartridge fill and all process parameters to a SQL database in real time. This information is used for basic production and process reporting available to the user via the interface display, and basic report features are included with the system. The following information is collected for each cartridge fill event:

- Date and time
- Batch identifier code
- Tray position
- Fill status
- Reservoir temperature process variable
- Reservoir temperature setpoint
- Draw time set point
- Dwell time set point
- Dispense time set point
- Dispense volume
- Heat lamp status
- ACF1 serial number

## AGGREGATED REAL TIME SUMMARY DATA

**ACF #1 DATE REPORT**

**DATE RANGE:**

SET TO TODAY'S DATE FROM: 9/6/2019  
TO: 9/6/2019

**SUMMARY:**

**TOTAL FILLS: 440**  
**COMPLETED FILLS: 440**  
**SKIPPED FILLS: 0**  
**VOLUME mL: 88.0**  
**START TIME: 09/06/2019 09:47**  
**END TIME: 09/06/2019 10:22**  
**DURATION MIN: 35**  
**RES TEMPERATURE: 72.0**

Buttons: SET TO TODAY'S DATE, RUN DATE REPORT, RUN END OF DAY REPORT, CLOSE WINDOW

The ACF1-DA system provides real time summary data aggregated for all ACF1 machines that are connected and includes:

- Oil batch identifier code
- Total cartridges processed
- Quantity of successful fills
- Quantity of skipped fills
- Total volume dispensed



## INDIVIDUAL ACF1 MACHINE SUMMARY REPORTING

The ACF1-DA system includes reports for each individual ACF1 machine. All reports are available to view directly on the interface screen or can be queried using other applications such as EXCEL, ACCESS or PDF formats.

- Production and process summary by operator selectable date:
  - Time of first cartridge fill
  - Time of last fill of the day
  - Operation duration
  - Total cartridges processed
  - Successful fills
  - Skipped fills
  - Total volume dispensed
  - Average reservoir temperature.
- Production and process summary by batch identification:
  - Batch start time
  - Batch end time
  - Batch duration
  - Total cartridges processed
  - Successful fills
  - Skipped fills
  - Total volume dispensed
  - Average reservoir temperature.
- Production and process summary automatically generated at the end of each day, stored in an Excel compatible csv file:
  - Time of first cartridge fill
  - Time of last fill of the day
  - Operation duration
  - Total cartridges processed
  - Successful fills
  - Skipped fills
  - Average fill rate
  - Total volume dispensed
  - Average reservoir temperature.

## SYSTEM SUMMARY REPORTING

The ACF1-DA system includes summary reports that show aggregated data for all connected ACF1 machines:

- Production and process summary by operator selectable date. This report includes total cartridges processed, successful fills, skipped fills, total volume dispensed.
- Production and process summary by operator selectable batch identification. This report includes total cartridges processed, successful fills, skipped fills, total volume dispensed and fill rate for the batch.

## THIRD PARTY SYSTEMS INTEGRATION READY

The ACF1-DA data is available for direct integration with existing or future third party, facility-wide data acquisition and reporting systems that track overall performance of all processes and machinery efficiency:

- Manufacturing Execution Systems (MES)
- Enterprise Resource Planning System (ERP)
- Key Performance Indicators (KPIs)
- Overall Equipment Effectiveness (OEE)