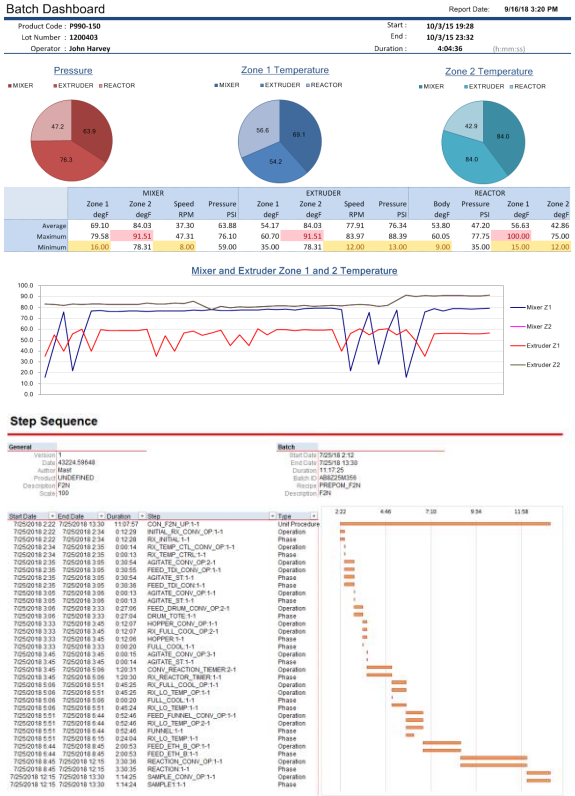
SyTech

ISA-88, IEC-61512 Batch Report

XLReporter Batch Reports

- ✓ Standard Batch Reports
  - Report from the result of database queries.



- ✓ Advanced Batch Reports
  - Report from the result of database queries and a calculation engine that understands the framework of ISA-88.

Standard Batch Reports

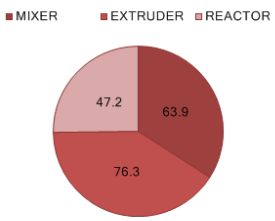
Batch Dashboard

Report Date: **9/16/18 3:20 PM**

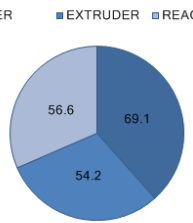
Product Code : **P990-150**
Lot Number : **1200403**
Operator : **John Harvey**

Start : **10/3/15 19:28**
End : **10/3/15 23:32**
Duration : **4:04:36** (h:mm:ss)

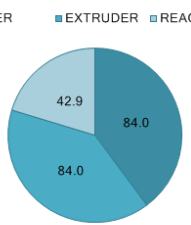
Pressure



Zone 1 Temperature

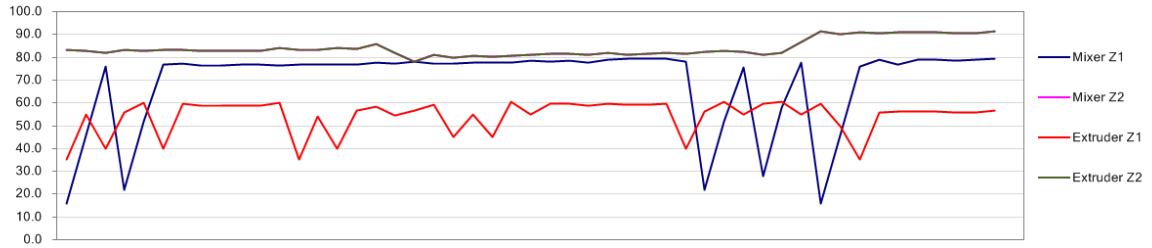


Zone 2 Temperature



	MIXER				EXTRUDER				REACTOR			
	Zone 1 degF	Zone 2 degF	Speed RPM	Pressure PSI	Zone 1 degF	Zone 2 degF	Speed RPM	Pressure PSI	Body degF	Pressure PSI	Zone 1 degF	Zone 2 degF
Average	69.10	84.03	37.30	63.88	54.17	84.03	77.91	76.34	53.80	47.20	56.63	42.86
Maximum	79.58	91.51	47.31	76.10	60.70	91.51	83.97	88.39	60.05	77.75	100.00	75.00
Minimum	16.00	78.31	8.00	59.00	35.00	78.31	12.00	13.00	9.00	35.00	15.00	12.00

Mixer and Extruder Zone 1 and 2 Temperature



Standard Batch Reports

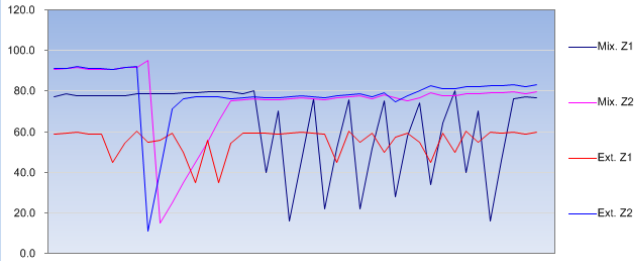
Batch Report

Report Date: **Tuesday, September 04, 2018**

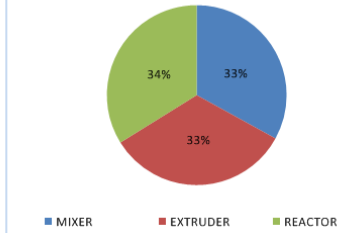
Product Code : **P50-30318**
Lot Number : **1200351**
Operator : **John Harvey**

Start : **10/2/15 19:44**
End : **10/2/15 23:12**
Duration : **3:27:58** (h:mm:ss)

Zone Temperatures



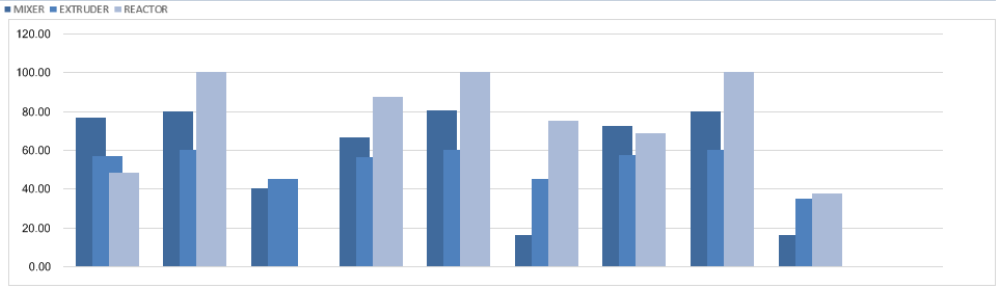
Pressure Balance



	MIXER				EXTRUDER				REACTOR			
	Zone 1 degF	Zone 2 degF	Speed RPM	Pressure PSI	Zone 1 degF	Zone 2 degF	Speed RPM	Pressure PSI	Body degF	Pressure PSI	Zone 1 degF	Zone 2 degF
Average	64.3	75.0	48.4	76.3	55.6	78.6	76.7	77.4	54.3	78.2	75.0	57.5
Maximum	80.2	95.3	53.4	89.4	60.4	92.0	82.5	88.1	60.2	111.0	100.0	75.0
Minimum	16.0	15.0	43.9	62.2	35.0	11.0	70.0	13.0	9.0	43.0	50.0	40.0
Date												
10/2/2015 19:44	77.1	90.6	52.2	62.2	58.8	91.0	75.3	85.0	55.9	43.0	50.0	40.0
10/2/2015 19:49	78.4	91.0	51.1	62.7	59.1	91.3	74.2	83.9	56.2	44.2	100.0	75.0
10/2/2015 19:54	77.8	91.7	50.1	63.2	59.8	92.0	73.2	82.9	56.9	45.6	50.0	40.0
10/2/2015 19:59	77.5	90.8	49.8	63.8	58.8	91.1	72.9	82.6	55.9	46.9	100.0	75.0
10/2/2015 20:04	77.7	90.6	49.8	64.4	58.6	91.0	72.9	82.6	55.7	48.4	50.0	40.0
10/2/2015 20:09	77.8	90.5	46.9	65.0	45.0	90.8	70.0	87.7	55.5	49.9	100.0	75.0
10/2/2015 20:14	77.9	91.5	46.7	65.6	54.4	91.9	75.9	37.0	56.5	51.5	50.0	40.0
10/2/2015 20:19	78.7	91.6	49.9	66.3	60.4	92.0	79.1	77.0	56.6	53.2	100.0	75.0
10/2/2015 20:24	78.7	95.3	49.7	66.9	55.0	11.0	78.8	85.6	60.2	54.9	50.0	40.0
10/2/2015 20:29	78.5	15.0	47.8	67.6	55.8	41.0	77.0	83.8	25.0	56.6	100.0	75.0
10/2/2015 20:34	78.6	25.0	47.5	68.4	59.4	71.0	76.6	83.4	45.0	58.4	50.0	40.0
10/2/2015 20:39	79.3	35.0	51.2	69.1	50.0	76.3	80.4	87.1	55.5	60.3	100.0	75.0
10/2/2015 20:44	79.4	45.0	51.3	69.9	35.0	77.3	80.4	87.2	9.0	62.1	50.0	40.0
10/2/2015 20:49	79.5	55.0	49.5	70.6	55.9	77.1	78.7	85.5	29.0	64.0	100.0	75.0
10/2/2015 20:54	79.7	65.0	49.3	71.4	35.0	77.0	78.5	85.3	49.0	66.0	50.0	40.0
10/2/2015 20:59	79.4	75.0	50.7	72.2	54.4	76.0	79.9	86.6	56.8	67.9	100.0	75.0
10/2/2015 21:04	78.8	75.8	50.1	73.0	59.2	76.8	79.3	86.1	57.5	69.9	50.0	40.0
10/2/2015 21:09	80.1	76.1	48.7	73.8	59.5	77.2	77.9	84.7	57.8	71.9	100.0	75.0

Standard Batch Reports

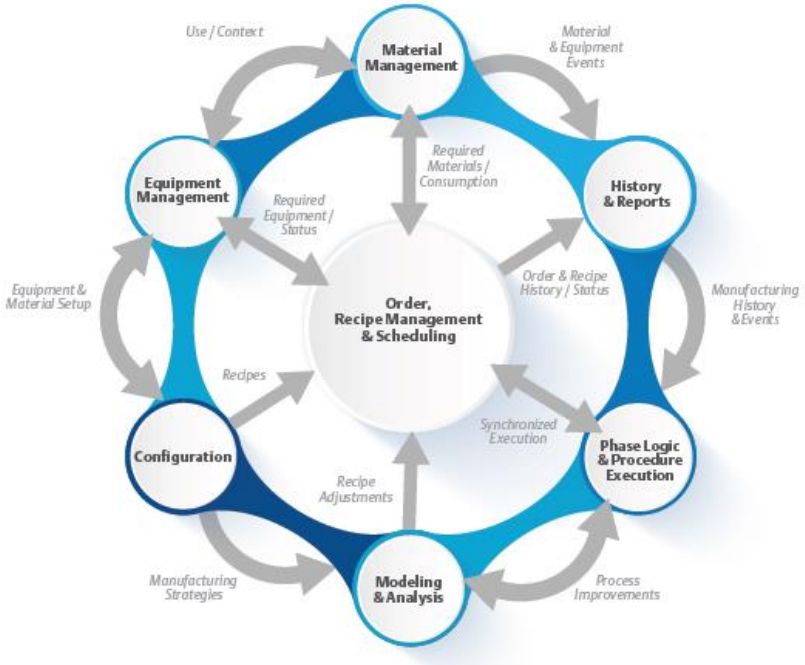
Batch Comparison



Product Code :			P990-150			P02369-80			P02369-80	
Lot Number :			1200404			1200362			1200363	
Operator :			Giles Smith			Giles Smith			John Harvey	
Start :			10/1/15 1:32			10/1/15 7:08			10/1/15 16:07	
End :			10/1/15 4:07			10/1/15 13:01			10/1/15 21:15	
Duration :			2:35:00			5:53:06			5:07:47	
			Average	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum
MIXER	Zone 1	degF	76.50	80.08	40.00	66.56	80.31	16.00	72.42	80.06	16.00
	Zone 2	degF	80.88	85.25	76.63	79.01	83.35	74.48	78.55	91.30	7.00
	Speed	RPM	52.70	60.62	46.18	61.43	70.86	50.52	61.56	66.48	55.87
	Pressure	PSI	74.22	85.26	63.48	68.69	88.05	59.00	82.28	91.00	64.19
EXTRUDER	Zone 1	degF	56.85	60.18	45.00	56.48	59.93	45.00	57.09	59.86	35.00
	Zone 2	degF	82.85	88.69	77.40	81.27	86.67	75.43	84.22	92.47	11.00
	Speed	RPM	75.48	77.74	70.96	78.05	86.19	19.00	78.36	86.59	33.00
	Pellets	RPM	77.33	88.40	13.00	77.61	87.85	13.00	79.37	88.07	21.00
REACTOR	Body	degF	55.97	58.59	25.00	55.01	60.71	9.00	52.62	60.35	9.00
	Pressure	PSI	73.06	100.65	46.20	59.23	107.63	35.01	93.20	115.00	47.97
	Zone 1	degF	48.39	100.00	0.00	87.32	100.00	75.00	68.75	100.00	37.50
	Zone 2	degF	36.29	75.00	0.00	67.39	75.00	60.00	58.75	80.00	37.50

DeltaV Batch Software

- ✓ Basic Batch
  - Coordinates batch processing
    - Schedules recipes and resources
    - Creates detailed batch history
    - Records history as a single file/batch
    - No batch historian
- ✓ Advanced Batch
  - Batch historian
- ✓ Professional Batch
  - Campaign manager
  - Batch analytics



https://www.emerson.com/documents

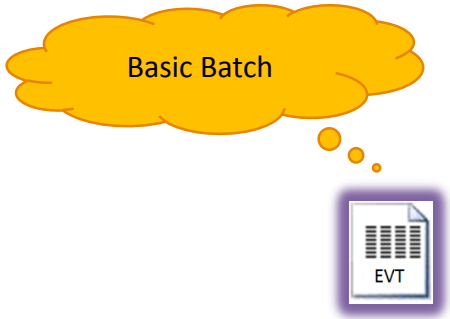
DeltaV Basic Batch History Log

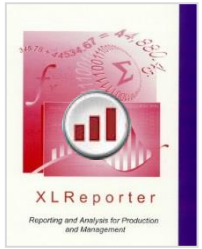
```
EU      Area    ProcCell        Unit    Phase   PhaseDesc       UserID  Un
        Event File Name D:\\DeltaV\\DVData\\batch\\journals\\@BS_20150830_
Version Recipe Header   1
Version Date    Recipe Header   11:45:32 June 23, 2015
Author  Recipe Header   Administrator
Product Code    Recipe Header   UNDEFINED
Description     Recipe Header   TOTAL
Class or Instance       Recipe Header   Class
Recipe Type     Recipe Header   BP
Area Model File Name    Recipe Header   D:\\DeltaV\\DVData\\DOWNLOAD\\AREA
File Name       Recipe Header   D:\\DeltaV\\DVData\\DOWNLOAD\\_G2268_RX200
Scale   Recipe Header   100.0   %
1298ACID_SP     Recipe Data     132.000000      kg
ACETIC_SP       Recipe Data     30.900000       kg
AGIT_SPEED      Recipe Data     85.000000       %
BORIC_SP        Recipe Data     111.199997      kg
C402_FEED_SP    Recipe Data     1820.000000     kg
H6000_FEED2_SP  Recipe Data     559.000000      kg
H6000_PROD_SP   Recipe Data     0.000000        kg
HYDR6000_FEED1_SP       Recipe Data     2071.600098     kg
LIME_SP Recipe Data     126.099998      kg
METH_SP Recipe Data     92.400002       kg
MIX_TIME        Recipe Data     2.000000        hr
ML_SPEED        Recipe Data     50.000000       %
N2_AUX2_BLK     Recipe Data     10.000000       mbar-g
N2_AUX2_PG      Recipe Data     15.000000       mbar-g
N2_PROD_BLK     Recipe Data     10.000000       mbar-g
N2_PROD_PG      Recipe Data     15.000000       mbar-g
NAUG_SP Recipe Data     58.500000       kg
PEN_HI_LIMIT    Recipe Data     310.000000
PEN_LO_LIMIT    Recipe Data     290.000000
PEN_TARGET      Recipe Data     300.000000
SN500_FEED1_SP  Recipe Data     434.200012      kg
SN500_FEED2_SP  Recipe Data     319.799988      kg
STEARIC_SP      Recipe Data     148.899994      kg
TEMP_AUX1_SP    Recipe Data     54.000000       \B0\C
TEMP_AUX2_SP    Recipe Data     70.000000       \B0\C
TEMP_PROD_SP    Recipe Data     149.000000      \B0\C
TEMP_RMP1_TIME  Recipe Data     1.000000        hr
TEMP_RMP2_TIME  Recipe Data     6.000000        hr
WT1_AUX2_SP     Recipe Data     0.000000        kg
WT2_AUX2_SP     Recipe Data     81.400002       kg
WT_AUX1_SP      Recipe Data     100.599998      kg
WT_FEED_SP      Recipe Data     478.899994      kg
AUX_FD_UN1_RX200:1      Equipment Selection     RX200
AUX_FD_UN2_RX200:1      Equipment Selection     RX200
C402_FD_UN_RX200:1      Equipment Selection     RX200
H6000_FD_UN1_RX200:1    Equipment Selection     RX200
H6000_FD_UN2_RX200:1    Equipment Selection     RX200
INIT_CONF_UN_RX200:1    Equipment Selection     RX200
MAN_LOAD_UN1_RX200:1    Equipment Selection     RX200
MAN_LOAD_UN4_RX200:1    Equipment Selection     RX200
```

- ✓ Produced For Each Batch
  - Consistent from batch to batch
  - Unique name for each batch
    - Not recognizable by User
    - @BS_20180720_142216137
- ✓ Difficult To Navigate
  - Especially for non process engineers
- ✓ No Easy Extraction Tools
  - Batch run time
  - Phase run time
  - Parameters and reports

Automating Basic Batch Reports

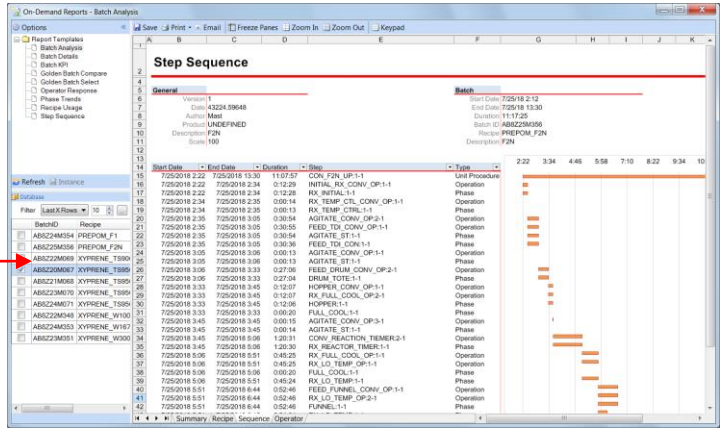
- ✓ On Each Completed Batch
  - Update batch header database
    - Used for batch on-demand batch selection
  - Produce a batch report





Update Headers for On-Demand Reports

Automatic Report



Phase Trends - Gain and Loss

Batch Details			
	Start Date	7/21/2018 16:25	7/23/2018 15:33
	End Date	7/23/2018 1:06	7/25/2018 2:27
	Batch Period	32:41:05	34:54:05
	Batch ID	AB8Z21M068	AB8Z23M070
	Recipe	XYPRENE_TS950A	XYPRENE_TS950A
	Description	TS950A	TS950A
Phase Times			
	RX_INITIAL:1-1	0:15:53	0:11:13
	RX_TEMP_CTRL:1-1	0:00:14	0:00:12
	AGITATE_ST:1-1	0:00:13	0:00:13
	DRUM_TOTE:1-1	5:07:37	3:45:48
	FEED_TDI_LF:1-1	0:25:50	0:37:42
	FEED_TDI_REC_LF:1-1	0:35:49	0:41:43
	FEED_ETHRINSE_LF:1-1	0:00:36	0:00:13
	HOPPER:1-1	0:04:38	0:10:54
	BLEND:1-1	0:10:24	0:10:24
	FEED_ETH_A:1-1	3:26:38	4:23:54
	FULL_COOL:1-1	0:00:24	0:00:18
	RX_REACTOR_TIMER:1-1	0:00:25	0:04:27
	REACTION:1-1	2:00:23	2:00:32
	SAMPLE1:1-1	2:23:32	2:55:41
	REC_SAMPLE1:1-1	17:41:40	19:34:20
	SPARE:1-1	0:00:11	0:00:11
	LFSETUP_TSS_D_T:1-1	17:41:29	19:34:09

Golden Batch Compare

- ✓ Compare selected batch to the “Golden” batch

Golden Batch Compare

Batch Details				Deviation (mins)
	Start Date		7/21/2018 16:25	
	End Date		7/23/2018 1:06	
	Batch Period	15:12:40	32:41:05	-391.58
	Batch ID	Golden Batch	AB8Z21M068	
	Recipe		XYPRENE_TS950A	
	Description		TS950A	

Phase Times			Deviation (mins)
XYPRENE_TS950A\\TS950A_UP:1-1\\INITIAL_RX_LF_OP:1-1	0:00:17	0:15:53	15.60 ▼
XYPRENE_TS950A\\TS950A_UP:1-1\\RX_TEMP_CTL_LF_OP:1-1	0:00:10	0:00:14	0.07 ▼
XYPRENE_TS950A\\TS950A_UP:1-1\\AGITATE_LF_OP:1-1	1:12:46	0:23:09	-49.62 ▲
XYPRENE_TS950A\\TS950A_UP:1-1\\FEED_DRUM_LF:1-1	1:08:42	0:23:18	-45.40 ▲
XYPRENE_TS950A\\TS950A_UP:1-1\\FEED_TDI_LF_OP:1-1	0:28:46	0:25:50	-2.93 ▲
XYPRENE_TS950A\\TS950A_UP:1-1\\FEED_TDI_REC_LF_OP:1-1	0:39:50	0:35:49	-4.02 ▲
XYPRENE_TS950A\\TS950A_UP:1-1\\FEED_ETHRINSE_LF_OP:1-1	0:17:03	0:00:36	-16.45 ▲
XYPRENE_TS950A\\TS950A_UP:1-1\\HOPPER_LF_OP:1-1	0:00:09	0:04:38	4.48 ▼
XYPRENE_TS950A\\TS950A_UP:1-1\\AGITATE_LF_OP:2-1	0:00:13	0:00:13	
XYPRENE_TS950A\\TS950A_UP:1-1\\BLEND_LF_OP:1-1	0:10:27	0:10:24	-0.05
XYPRENE_TS950A\\TS950A_UP:1-1\\FEED_ETH_A_LF_OP:1-1	3:13:31	3:26:38	13.12 ▼
XYPRENE_TS950A\\TS950A_UP:1-1\\RX_FULL_COOL_LF:1-1	0:00:18	0:00:24	0.10 ▼
XYPRENE_TS950A\\TS950A_UP:1-1\\FEED_DRUM_LF:2-1	3:47:44	5:07:37	79.88 ▼
XYPRENE_TS950A\\TS950A_UP:1-1\\NOR_REACTION_LF_OP:1-1	0:00:19	0:00:25	0.10 ▼
XYPRENE_TS950A\\TS950A_UP:1-1\\REACTION_LF_OP:1-1	2:00:35	2:00:23	-0.20
XYPRENE_TS950A\\TS950A_UP:1-1\\SAMPLE_LF_OP:1-1	26:02:20	2:23:32	-1418.80 ▲
XYPRENE_TS950A\\RECIVER_UP:1-1\\REC_SAMPLE_OP:1-1		17:41:40	1061.67
XYPRENE_TS950A\\VTA_TFR_SEL:1-1\\MODE_OP:1-1		17:41:29	1061.48

- ✓ Benefit
  - Maintain consistency

Equipment Utilization

- ✓ Dashboard to analyze step sequences

Step Sequence

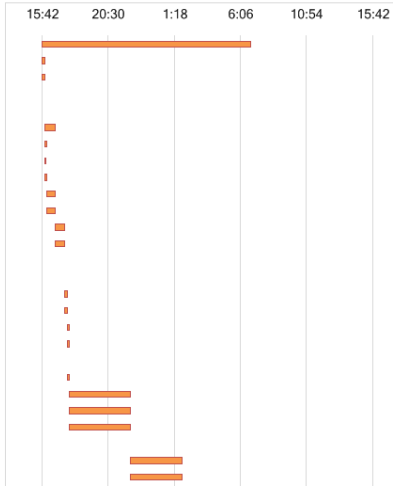
General

Version	1
Version Date	15:19:11 October 08, 2016
Author	Mast
Product Code	UNDEFINED
Description	TS950A
Scale	100

Batch

Start Date	7/23/2018 15:33
End Date	7/25/2018 2:27
Duration	34:54:05
Batch ID	AB8Z23M070
Recipe	XYPRENE_TS950A
Description	TS950A

Start Date	End Date	Duration	Step	Type
7/23/2018 15:42	7/24/2018 6:53	15:10:24	TS950A_UP:1-1	Unit Procedure
7/23/2018 15:42	7/23/2018 15:54	0:11:13	INITIAL_RX_LF_OP:1-1	Operation
7/23/2018 15:42	7/23/2018 15:54	0:11:13	RX_INITIAL:1-1	Phase
7/23/2018 15:54	7/23/2018 15:54	0:00:13	RX_TEMP_CTL_LF_OP:1-1	Operation
7/23/2018 15:54	7/23/2018 15:54	0:00:12	RX_TEMP_CTRL:1-1	Phase
7/23/2018 15:54	7/23/2018 16:39	0:45:13	AGITATE_LF_OP:1-1	Operation
7/23/2018 15:54	7/23/2018 16:01	0:07:30	FEED_DRUM_LF:1-1	Operation
7/23/2018 15:54	7/23/2018 16:00	0:05:55	AGITATE_ST:1-1	Phase
7/23/2018 15:54	7/23/2018 16:01	0:07:29	DRUM_TOTE:1-1	Phase
7/23/2018 16:01	7/23/2018 16:39	0:37:44	FEED_TDI_LF_OP:1-1	Operation
7/23/2018 16:01	7/23/2018 16:39	0:37:42	FEED_TDI_LF:1-1	Phase
7/23/2018 16:39	7/23/2018 17:21	0:41:44	FEED_TDI_REC_LF_OP:1-1	Operation
7/23/2018 16:39	7/23/2018 17:21	0:41:43	FEED_TDI_REC_LF:1-1	Phase
7/23/2018 17:21	7/23/2018 17:21	0:00:14	FEED_ETHRINSE_LF_OP:1-1	Operation
7/23/2018 17:21	7/23/2018 17:21	0:00:13	FEED_ETHRINSE_LF:1-1	Phase
7/23/2018 17:21	7/23/2018 17:32	0:10:54	HOPPER_LF_OP:1-1	Operation
7/23/2018 17:21	7/23/2018 17:32	0:10:54	HOPPER:1-1	Phase
7/23/2018 17:32	7/23/2018 17:42	0:10:26	AGITATE_LF_OP:2-1	Operation
7/23/2018 17:32	7/23/2018 17:42	0:10:26	BLEND_LF_OP:1-1	Operation
7/23/2018 17:32	7/23/2018 17:32	0:00:13	AGITATE_ST:1-1	Phase
7/23/2018 17:32	7/23/2018 17:42	0:10:24	BLEND:1-1	Phase
7/23/2018 17:42	7/23/2018 22:06	4:23:54	FEED_ETH_A_LF_OP:1-1	Operation
7/23/2018 17:42	7/23/2018 22:06	4:23:54	RX_FULL_COOL_LF:1-1	Operation
7/23/2018 17:42	7/23/2018 22:06	4:23:54	FEED_ETH_A:1-1	Phase
7/23/2018 17:42	7/23/2018 17:43	0:00:18	FULL_COOL:1-1	Phase
7/23/2018 22:06	7/24/2018 1:52	3:45:49	FEED_DRUM_LF:2-1	Operation
7/23/2018 22:06	7/24/2018 1:52	3:45:48	DRUM_TOTE:1-1	Phase



- ✓ Benefit
  - Quickly identify time periods of concern

Batch Trends

- ✓ Compare phase times over a selection of batches

Phase Trends - Gain and Loss

Batch Details			
	Start Date	7/21/2018 16:25	7/23/2018 15:33
	End Date	7/23/2018 1:06	7/25/2018 2:27
	Batch Period	32:41:05	34:54:05
	Batch ID	AB8Z21M068	AB8Z23M070
	Recipe	XYPRENE_TS950A	XYPRENE_TS950A
	Description	TS950A	TS950A
Phase Times			
	RX_INITIAL:1-1	0:15:53	0:11:13
	RX_TEMP_CTRL:1-1	0:00:14	0:00:12
	AGITATE_ST:1-1	0:00:13	0:00:13
	DRUM_TOTE:1-1	5:07:37	3:45:48
	FEED_TDI_LF:1-1	0:25:50	0:37:42
	FEED_TDI_REC_LF:1-1	0:35:49	0:41:43
	FEED_ETHRINSE_LF:1-1	0:00:36	0:00:13
	HOPPER:1-1	0:04:38	0:10:54
	BLEND:1-1	0:10:24	0:10:24
	FEED_ETH_A:1-1	3:26:38	4:23:54
	FULL_COOL:1-1	0:00:24	0:00:18
	RX_REACTOR_TIMER:1-1	0:00:25	0:04:27
	REACTION:1-1	2:00:23	2:00:32
	SAMPLE1:1-1	2:23:32	2:55:41
	REC_SAMPLE1:1-1	17:41:40	19:34:20
	SPARE:1-1	0:00:11	0:00:11
	LFSETUP_TSS_D_T:1-1	17:41:29	19:34:09

- ✓ Benefit
  - Reveal trends that would otherwise be overlooked

Recipe Usage

- ✓ Compare usages over a selection of batches

Recipe Usage

Batch Details

	Batch ID	AB8Z20M067			AB8Z21M068			AB8Z23M070	
	Recipe	XYPRENE_TS950A			XYPRENE_TS950A			XYPRENE_TS950A	
	Description	TS950A			TS950A			TS950A	
	Batch Period	39:12:40			32:41:05			34:54:05	
Recipe		Setpoint	Actual	Delta	Setpoint	Actual	Delta	Setpoint	Actual	Delta
	TDI_CHG	2382.2	2381.0	-1.23	2382.2	2382.0	-0.22	2382.2	2382.0	-0.19
	SLO_FEED	300.0			300.0			300.0		
	TDI_REC_CHG	2208.6	2208.9	0.29	2230.0	2228.7	-1.32	2252.1		
	TDI_ETH_CHG	0.0			0.0			0.0		
	ETHA_CHG	7212.3	7214.1	1.81	7355.1	7356.8	1.66	7232.7	7230.1	-2.59

- ✓ Benefit
  - Track material waste

Operator Response

- ✓ Operator response time for prompts occurring during the batch

Operator Response

Batch Details

Start Date	7/24/2018 2:37
End Date	7/24/2018 14:56
Batch Period	12:18:25
Batch ID	AB8Z24M354
Recipe	PREPOM_F1
Description	F1

Operator	Message	Response	Prompt Time	Response Time	Duration
Chaplin	Inspect reactor to ensure drained and free of contamination,Continu	<no response>	7/24/18 2:52	7/24/18 2:52	0:00:13
Chaplin	Acknowledge to check 410tank ready or not?	<no response>	7/24/18 3:01	7/24/18 3:01	0:00:39
	Proceed with funnel charge?		7/24/18 3:25		
Chaplin	Acknowledge to check 410tank ready or not?	<no response>	7/24/18 3:43	7/24/18 3:45	0:02:30
	Proceed with hopper charge? If yes, change the local switch to on!		7/24/18 5:26		
Chaplin	Acknowledge to check 410tank ready or not?	<no response>	7/24/18 6:00	7/24/18 6:28	0:27:55
Chaplin	Proceed with opening drumming automated valve?	<no response>	7/24/18 7:21	7/24/18 9:43	2:22:04
Chaplin	Do the drum add complete?	<no response>	7/24/18 9:43	7/24/18 10:37	0:53:33
Chaplin	prepare absolute vacuum by ramp control	<no response>	7/24/18 10:37	7/24/18 10:37	0:00:09

- ✓ Benefit
  - Ensure operator actions are not creating delays in the batch process

Why XLReporter?

- ✓ Out of Box Software
  - No scripting or programming
- ✓ Designed for Automation
  - Small footprint
- ✓ Utilize Existing Skills
  - Design workbook templates
- ✓ Report Reliably 24x7
  - Workbook, PDF and web reports
  - Email
- ✓ Scalable