Production Analytics Dashboard – Technical Documentation (CSV Data Source)

1. Overview

The **Production Analytics Dashboard** is a Microsoft Power BI solution built on a single CSV file as its exclusive data source. It delivers descriptive analytics of historical production performance, enabling KPI tracking, environmental monitoring, and defect/downtime analysis.

2. Core Features

Feature	Description
KPI Tracking	Measures yield, defect rate, and downtime from CSV data.
Environmental Monitoring	Analyzes average cleanroom temperature and humidity.
Defect & Downtime Analysis	Breaks down quality and downtime by material type and machine.
Interactive Exploration	Filters, slicers, and drill-downs for historical period analysis.

3. Data Source Details

- **Format:** CSV (Comma-Separated Values)
- **Encoding:** UTF-8 without BOM
- **Refresh:** Manual (replace/update CSV and refresh in Power BI)
- **Storage:** Local drive or network folder accessible to Power BI

4. Dataset Structure (dataset_production)

Key Fields

- Avg Humidity Today
- Avg Temp Today
- cleanroom_no
- date
- defect_rate

- Downtime Last 7 Days
- environment *(with hierarchy: environment → machine_id)*
- humidity
- Latest Date
- machine_downtime
- machine_id
- machine_no
- material_type
- production_yield
- Target Yield Latest Day
- Yield % of Target Latest Day
- Yield Today
- Yield Variance Latest Day
- temperature

5. Flat File Specification

Column	Data Type	Example	Notes
Timestamp/Date	Date / DateTime	2025-08-28	Primary time reference
MachineID	Text	MCH-001	Unique machine identifier
MaterialType	Text	Silicon	Material processed
UnitsProduced	Integer	1500	Total per time unit
UnitsDefective	Integer	45	Defects counted
DowntimeMinutes	Integer	30	In minutes
Temperature	Decimal(5,2)	25.20	°C
Humidity	Decimal(5,2)	32.43	% RH

6. Measures & Calculations

Measure	Formula (Conceptual)	Purpose
Yield % of Target Latest Day	(Yield Today ÷ Target Yield Latest Day) × 100	Compare actual to target yield
Yield Variance Latest Day	Yield Today − Target Yield Latest Day	Show surplus or deficit

Defect Rate	(UnitsDefective ÷ UnitsProduced) × 100	Quality performance
Downtime Last 7 Days	SUM(DowntimeMinutes, last 7 days)	Reliability tracking
Avg Temp Today	AVERAGE(temperature) for current date	Monitor temperature
Avg Humidity Today	AVERAGE(humidity) for current date	Monitor humidity

7. Usage Notes

- Replace or update the CSV source to refresh the dashboard.
- Ensure column names and formats remain consistent.
- No streaming, predictive analytics, or API connections are used.
- Data integrity depends entirely on the quality of the CSV.

8. Limitations

- **Manual refresh only** – no scheduled or live updates.
- **Single source** – no joins with other datasets.
- **Historical analysis** – no predictive forecasting features.