SwainSmith

DATA ENRICHMENT & TRANSFORMATION

Asset Profile Blueprint

This blueprint illustrates the end-to-end transformation of a raw, unstructured legacy system asset record into an enterprise-governed asset profile that can be uniformly applied across an organization. Through a systematic 9-step data pipeline, **AssetIQ** cleanses and structures EAM equipment data into an authoritative baseline for maintenance excellence.

BEFORE: RAW LEGACY CMMS RECORD

```
glds pmp co/mod # 3196-MTX 1.5X3-8
s/s cntrfgl pmp w/20hp
```

Unsearchable free-text. Duplicated entries. Missing engineering attributes. Unlinked failure codes.

AFTER: ENRICHED ASSETIQ PROFILE

- Verified Noun-Modifier Classification
- ISO 14224 4-Tier Equipment Taxonomy
- 10 Standardized Engineering Specifications
- Closed-Loop Reliability & Failure Codes
- Governed MRO Bill of Materials (BOM)

Step 1: Manufacturer, Model & Classification Normalization

Normalizes unstructured, free-text legacy entries into verified manufacturer names, clean model designations, and core noun-modifier classifications. This eliminates duplicate asset masters, enforces enterprise-wide naming governance, and establishes a clean baseline for downstream system alignment.

- **Normalized Manufacturer: GOULDS**
- **Normalized Model: 3196**
- **Noun: PUMP**
- **Modifier: CENTRIFUGAL**

Step 2: Taxonomy Assignment

Positions the asset within a rigorous multi-tier ISO 14224 engineering hierarchy spanning industry discipline down to specific operating mechanisms. This structured segmentation enables accurate cross-facility comparisons, automated spend and performance rollups, and seamless searchability across the EAM ecosystem.

TIER 1 **SEGMENT:** **MECHANICAL**

└▶ TIER 2 **CATEGORY:** **ROTATING**

└▶ TIER 3 **CLASS:** **PUMP**

└▶ TIER 4 **SUB-CLASS:** **CENTRIFUGAL**

Hierarchy Tier	Field Standard	Governing Value	Taxonomy Level
Tier 1	SEGMENT	`MECHANICAL`	Industry Domain Discipline
Tier 2	CATEGORY	`ROTATING`	Functional Equipment System
Tier 3	CLASS	`PUMP`	Primary Maintainable Equipment Class
Tier 4	SUB-CLASS	`CENTRIFUGAL`	Specific Operating Mechanism

Step 3: Technical Specifications Matrix

Captures vital engineering and operating parameters using standardized values, governed units of measure (UOM), and technical definitions. This ensures maintenance and engineering teams can access verified design parameters for procurement, replacement sizing, and operating boundary analysis without referencing field manuals.

Attribute Name	Cleansed Value	UOM	Attribute Governance & Engineering Definition
CASING MATERIAL	316 STAINLESS STEEL	N/A	Metallurgy of casing, CF-8M. Critical for chemical compatibility.
DESIGN FLOW RATE	180	GPM	Nominal best efficiency point volumetric flow rate at maximum trim.
DISCHARGE CONNECTION SIZE	1.5	IN	Nominal diameter of discharge outlet flange, ASME B73.1 Class 150 RF.
IMPELLER MATERIAL	316 STAINLESS STEEL	N/A	Metallurgy of rotating impeller, CF-8M. Wear and chemical resistance.
MAXIMUM OPERATING TEMPERATURE	260	DEGC	Certified process temperature limit to prevent thermal and seal failure, 500 DEG F.
MOTOR POWER RATING	20	HP	Nominal driver rating required to operate pump at baseline.
RATED ROTATIONAL SPEED	3500	RPM	Operational speed of shaft under standard 2-pole nominal synchronous load.
SHAFT SEAL TYPE	SINGLE MECHANICAL SEAL	N/A	Chamber sealing mechanism preventing fluid leakage along shaft.
SUCTION CONNECTION SIZE	3	IN	Nominal diameter of suction inlet flange, ASME B73.1 Class 150 RF.
TOTAL DYNAMIC HEAD	220	FT	Total equivalent differential head at 180 GPM design flow rate, best efficiency point.

Step 4: Standard Noun-Modifier-Attribute Descriptions

Generates rule-based industry-standard short (character-constrained) and unabbreviated long descriptions dynamically built from verified technical attributes. This delivers instant visual clarity on work orders, handheld mobile displays, and reporting dashboards while ending reliance on subjective, inconsistent free text.

> **Short Description:**
> PUMP, CENTRIFUGAL: SZ 1.5X3-8, FRAME MTX, MATL 316SS, SUC 3 IN, DISCH 1.5 IN, 180 GPM, 220 FT TDH
>
> **Long Description:**
> PUMP, CENTRIFUGAL: CASING SIZE 1.5X3-8, BEARING FRAME MTX, CASING MATERIAL 316 STAINLESS STEEL, IMPELLER MATERIAL 316 STAINLESS STEEL, SUCTION CONNECTION SIZE 3 INCH 150 POUND FLANGE, DISCHARGE CONNECTION SIZE 1.5 INCH 150 POUND FLANGE, DESIGN FLOW RATE 180 GALLONS PER MINUTE, TOTAL DYNAMIC HEAD 220 FEET, MOTOR POWER RATING 20 HORSEPOWER, RATED ROTATIONAL SPEED 3500 REVOLUTIONS PER MINUTE, SHAFT SEAL TYPE SINGLE MECHANICAL SEAL, MAXIMUM OPERATING TEMPERATURE 260 DEGREES CELSIUS, MAXIMUM WORKING PRESSURE 375 POUNDS PER SQUARE INCH GAUGE, DESIGN STANDARD ASME B73.1

Step 5: Baseline Asset Criticality

Establishes an initial class-level criticality rating. Coupled with process and location dependencies, this provides an objective benchmark for setting work order execution priorities, optimizing preventive maintenance intervals, and rationalizing storeroom inventory holding strategies.

Noun	Modifier	Code	Criticality Tier Name	Technical Justification
PUMP	CENTRIFUGAL	**3**	Medium / Operational Utility	Typically used for high-flow utility transfer, such as pre-treatment water or non-sterile process fluids, supporting operational utility systems.

Step 6: Reliability Engineering Codes (REC)

Provides a closed-loop taxonomy of standardized Symptoms, Problems, Failures, Actions, and Causes tailored to the specific operating mechanism. Standardizing these codes eliminates technician guesswork on work order closeouts, delivering clean failure history that directly powers Root Cause Failure Analysis (RCFA) and Bad Actor programs.

> **Failure Class:** `PUMP_CENTRIFUGAL`

Tier	Tier Code	REC Code	Description
SYMPTOM	S	`S01`	PUMP CASING HOT
SYMPTOM	S	`S02`	SHAFT VIBRATION HIGH
SYMPTOM	S	`S03`	SEAL FLUID LEAKING
SYMPTOM	S	`S04`	PUMP FLOW LOW
SYMPTOM	S	`S05`	MOTOR CURRENT HIGH
PROBLEM	P	`P01`	IMPELLER VANE WORN
PROBLEM	P	`P02`	MECHANICAL SEAL DEGRADED
PROBLEM	P	`P03`	SHAFT BEARING WORN

STEP 6: REC CODES (CONTINUED)

Tier	Tier Code	REC Code	Description
PROBLEM	P	P04	WEAR RING WORN
PROBLEM	P	P05	SHAFT MISALIGNED
FAILURE	F	F01	MECHANICAL SEAL FAILED
FAILURE	F	F02	SHAFT BEARING SEIZED
FAILURE	F	F03	IMPELLER SHEARED
FAILURE	F	F04	PUMP SHAFT BROKEN
FAILURE	F	F05	PUMP CASING RUPTURED
ACTION	A	A01	REPLACE MECHANICAL SEAL
ACTION	A	A02	REPLACE SHAFT BEARINGS
ACTION	A	A03	ALIGN PUMP SHAFT
ACTION	A	A04	REPLACE WORN IMPELLER
ACTION	A	A05	TIGHTEN CASING BOLTS
CAUSE	C	C01	FLUID CAVITATION
CAUSE	C	C02	DRY RUNNING
CAUSE	C	C03	SHAFT MISALIGNMENT
CAUSE	C	C04	BEARING LUBRICATION LOSS
CAUSE	C	C05	CORROSIVE FLUID

Step 7: Base PM Inspections

Establishes a standardized asset care strategy derived directly from recognized industry standards (ISO, API, ASME, HI). This delivers concise, plain-language walkdown inspections that enforce consistent equipment stewardship and catch early degradation before defects escalate into functional failures.

> **Asset Class:** PUMP, CENTRIFUGAL
> **Application:** Standardized basic PM route designed for general operators and plant technicians during daily and weekly walkdowns.

#	Inspection Task Description	Frequency	Governing Standard
01	Check oil level in sight glass. Confirm oil is full, clear, and not cloudy, milky, or foaming.	DAILY	OEM IOM / ISO 14224
02	Look at seal area around the shaft. Check for dripping liquid, leaks, or white powdery crust.	DAILY	API 682 / ISO 21049
03	Check inlet and outlet pressure gauges. Confirm readings are within normal running marks.	DAILY	HI 9.6.3 / ISO 14224
04	Listen for strange noises like rattling, grinding, cavitation popping, or squealing.	DAILY	ISO 14224 / TPM Best Practice
05	Check temperature on bearing housings with IR gun. Confirm bearings are not running hot.	WEEKLY	ISO 10816-3 / OEM IOM
06	Look at seal flush pipes and bottle. Confirm oil level is OK and connections are not leaking.	WEEKLY	API 682 / ISO 21049
07	Look at pump body and pipe joints for any fluid leaks, cracks, or corrosion.	WEEKLY	ASME B73.1 / OSHA 1910.119
08	Look at pump baseplate and tray. Confirm drain hole is open and no oil or water is puddling.	WEEKLY	TPM / SMRP Best Practice
09	Look at coupling guard. Confirm guard bolts are tight and no black rubber dust is under guard.	WEEKLY	OSHA 1910.219 / ANSI B15.1
10	Check vibration on bearing housings with vibration pen. Confirm reading is in green safe zone.	WEEKLY	ISO 10816-3 / ISO 20816-3

Step 8: MRO Common BOM Architecture

Defines the essential maintainable part classes and primary mechanical functions directly associated with the asset class before local storeroom cataloging occurs. This foundational architecture prevents parts sprawl, streamlines work order kitting, and establishes a standardized framework for completing plant-level bills of materials.

Associating an Asset Class directly to Part Classes is the critical first step to establishing BOM governance. The Individual SKU slot in the hierarchy demonstrates the operational path to completing the BOM once plant-specific storeroom catalog numbers are linked.

ASSET CLASSIFICATION: PUMP, CENTRIFUGAL

SEAL, MECHANICAL (EA)
↳ *Individual SKU Placeholder*

BEARING, BALL (EA)
↳ *Individual SKU Placeholder*

BEARING, ANGULAR CONTACT (EA)
↳ *Individual SKU Placeholder*

GASKET, O-RING (EA)
↳ *Individual SKU Placeholder*

COUPLING, FLEXIBLE (EA)
↳ *Individual SKU Placeholder*

IMPELLER, PUMP (EA)
↳ *Individual SKU Placeholder*

SLEEVE, SHAFT (EA)
↳ *Individual SKU Placeholder*

GASKET, CASING (EA)
↳ *Individual SKU Placeholder*

Step 9: Validation & Audit Trail

Documents data completeness scoring, engineering cut-sheet references, and direct hyperlinks to official OEM technical and IOM documentation. This provides a fully verifiable engineering pedigree, ensuring total data governance compliance and simplifying future technical onboarding or audits.

- **CONFIDENCE SCORE:** 95% HIGH DATA COMPLETENESS
- **ENGINEERING JUSTIFICATION:** VERIFIED AGAINST GOULDS 3196 TECHNICAL BROCHURE AND ASME B73.1 CUT-SHEET
- **OEM PRODUCT OVERVIEW:** ITT Goulds Pumps - Model 3196 -FRAME Process Centrifugal Pump
- **OFFICIAL OEM IOM MANUAL:** ITT Goulds 3196 Installation, Operation, and Maintenance Manual (PDF)