

From Engineering Exchange to Knowledge Graphs and AI

DEXPI as the semantic backbone of industrial
data

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Time Travel in the Process Industry

Let us travel through time...

How engineering standards became the foundation for Knowledge Graphs and Artificial Intelligence

From Engineering Data Exchange to Knowledge Graphs and Artificial Intelligence

DEXPI as the semantic backbone of industrial data

The Engineering Problem (ca. 2010)

Process industry challenges:

- Engineering data locked in proprietary tools
- Manual data re-entry between systems
- Loss of meaning during data exchange
- Limited interoperability across lifecycle phases

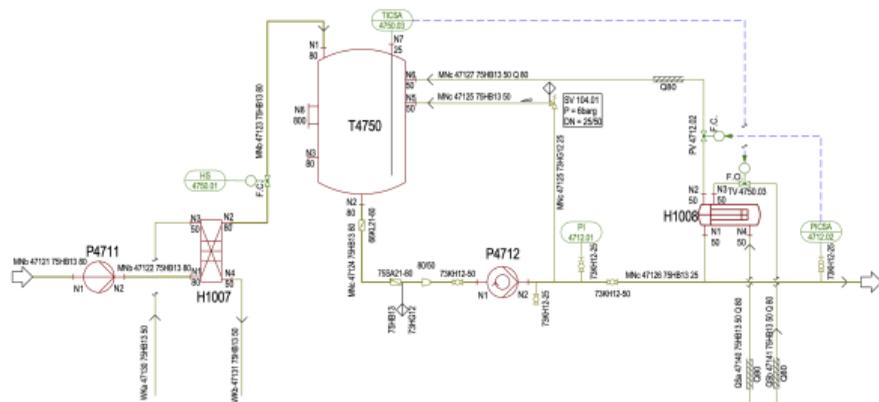


Industry needed structured, machine-readable engineering data.

The Birth of DEXPI

DEXPI was created to enable:

- Vendor-neutral data exchange
- Structured P&ID information
- Preservation of engineering intent
- Consistent interpretation across tools



DEXPI is not a drawing format — it is an information model.

DEXPI Was Semantic From the Beginning

Core design principles:

- Object-oriented information model
- Explicit relationships between assets
- Typed engineering objects
- Reference Data Library (RDL)

DEXPI describes knowledge, not graphics.

Compatibility with Ontologies

DEXPI aligns naturally with:

- POSC Caesar / ISO 15926 concepts
- Reference data libraries
- Persistent identifiers
- Ontology-based modeling

Engineering data already contained semantic meaning.

Ready for the Semantic Web

DEXPI structures represent graph models similar to:

- Objects → Nodes
- Relationships → Edges
- Properties → Attributes

DEXPI data can become RDF triples almost directly.

Enter Artificial Intelligence

AI enables:

- Natural language interaction
- Automated insights
- Knowledge discovery

But AI alone has limitations:

- Hallucinations
- Missing engineering context
- Inconsistent terminology



AI without structure guesses.

Why Knowledge Graphs Matter

Knowledge graphs provide:

- Context and relationships
- Traceability across lifecycle
- Semantic consistency
- Machine reasoning capability



Knowledge Graphs turn data into understanding.

We already built the foundation.

DEXPI already provides:

- Plant topology
- Equipment semantics
- Standard identifiers
- Lifecycle context

DEXPI → Knowledge Graph → AI

DEXPI structures industrial knowledge
Knowledge Graphs connect it
AI makes it accessible

Standards become AI infrastructure.

Industrial Use Cases

- AI-assisted engineering queries
- Impact and dependency analysis
- Lifecycle data integration
- Knowledge preservation
- Digital twin intelligence



The Next Time Jump

Past: Data Exchange
Present: Knowledge Graphs
Future: Cognitive Plants

**We did not build DEXPI for AI —
but AI now needs DEXPI.**

DEXPI as the Backbone of Industrial Intelligence



Standards → Knowledge → Intelligence