

Advanced Work Packaging Data Requirements

Companion Document to Special Report 19-01



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Advanced Work Packaging
Community of Practice • North America

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Introduction

This document has been created as a companion piece to the AWP Data Requirements Report. The purpose of this document is to help users navigate the report, direct users to useful information within the report and provide guidance as to how to get the maximum benefit when implementing AWP Data requirements.

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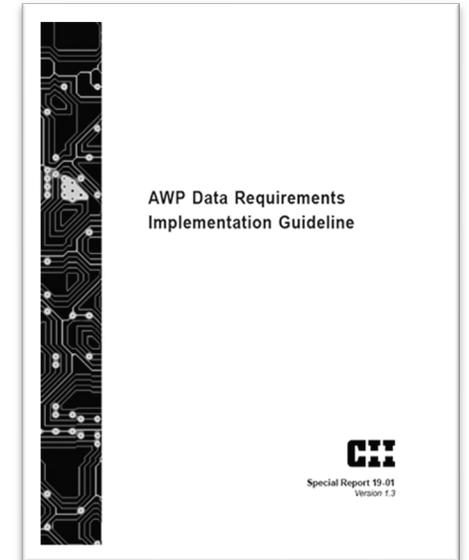
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Download the *AWP Data Requirements Implementation Guideline* report from the CII Knowledge Base.

- Adobe Acrobat PDF
- Microsoft Excel tool

AWP Data Requirements

What are AWP Data Requirements?

Advanced Work Packaging (AWP) Data Requirements outline the minimum requirements for data object attributes including format, structure, and description. By specifying the minimum data requirements communication is clarified, the quality of data is improved, and data integrity and integration can be realized.

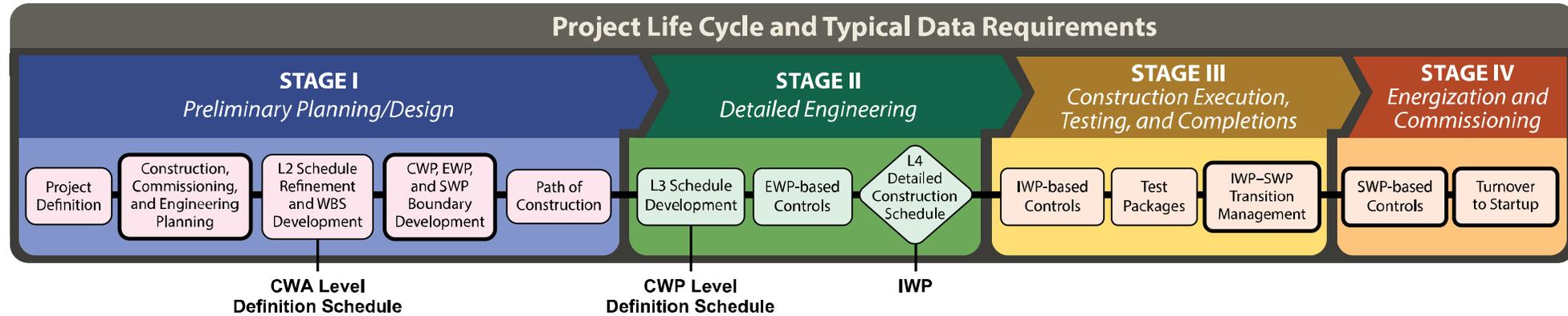
What aren't AWP Data Requirements?

- Establish an international standard
- Define acceptable values or required units
- Create a reference data library
- Develop data requirements for full digital project execution
- Overlap scope with other existing data initiatives

Why should you care?

CII has created a comprehensive list of requirements that relates specifically to AWP projects. By using the data requirements, companies can create contracts and agreements that specify key data attribute requirements from project inception to completion. Having a clear understanding of data requirements amongst all parties early on can help expedite the alignment of technology and software for planning, monitoring, and reporting purposes throughout the lifecycle of a project. The increased quality of data and data integrity can also help organizations navigate through their own digital transformation and move towards data-based decision making in the future.

Project Life Cycle and Typical Data Requirements



DR010 AWP Master Index	
DR010-01 Project Information	
DR010-02 CWAs	
DR010-03 CWPs	
DR010-04 EWPs	
DR010-05 IWPs	
DR010-06 SWPs	
DR020 Project Schedule	<ul style="list-style-type: none"> DR050 Equipment Design DR070 Piping Design DR080 3D Modeling DR090 Civil DR100 Electrical & Instrumentation Design DR120 Document Control DR140 Estimating and Cost DR150 Procurement DR170 Structural Detailing DR180 Steel Fabrication DR190 Pipe Detailing DR200 Pipe Fabrication DR230 Contractor Scope Items DR260 Constraints DR270 Site Materials DR290 Site Progress DR310 Completions

Top-level Data Requirements

3.1. DR010 – AWP Master Index (6)

- 3.1.1. DR010-01: Project Information
- 3.1.2. DR010-02: CWAs
- 3.1.3. DR010-03: CWPs
- 3.1.4. DR010-04: EWPs
- 3.1.5. DR010-05: IWPs
- 3.1.6. DR010-06: SWPs

3.2. DR020 – Project Schedule (1)

- 3.2.1. DR020-01: Schedule Activities

3.3. DR050 – Equipment Design (1)

- 3.3.1. DR050-01: Equipment List

3.4. DR070 – Piping Design (4)

- 3.4.1. DR070-01: Line List
- 3.4.2. DR070-02: Isometric List
- 3.4.3. DR070-03: Tie-in List
- 3.4.4. DR070-04: Pipe Support List

3.5. DR080 – 3D Modeling (2)

- 3.5.1. DR080-01: Pipe Components
- 3.5.2. DR080-02: Generic Components

3.6. DR090 – Civil-Structural Design (4)

- 3.6.1. DR090-01: Structures List
- 3.6.2. DR090-02: Rebar
- 3.6.3. DR090-03: Anchor Bolts
- 3.6.4. DR090-04: Foundations

3.7. DR100 – Electrical & Instrumentation Design (7)

- 3.7.1. DR100-01: Cable Schedule
- 3.7.2. DR100-02: Electrical Equipment
- 3.7.3. DR100-03: Instrument Index
- 3.7.4. DR100-04: Conduit
- 3.7.5. DR100-05: Cable Tray
- 3.7.6. DR100-06: Lighting & Devices
- 3.7.7. DR100-07: Electrical Heat Tracing

3.8. DR120 – Document Control (2)

- 3.8.1. DR120-01: Document Register
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3.9. DR140 – Estimating and Cost (2)

- 3.9.1. DR140-01: EWP Estimate
- 3.9.2. DR140-02: CWP Estimate

3.10. DR150 – Procurement (5)

- 3.10.1. DR150-01: Material Requisition Tracking
- 3.10.2. DR150-02: Purchase Order Line Items
- 3.10.3. DR150-03: Supplier Purchase Order Shipments
- 3.10.4. DR150-04: Supplier Load Detail
- 3.10.5. DR150-05: Supplier Container Detail

3.11. DR170 – Structural Detailing (5)

- 3.11.1. DR170-01: Steel Detailing Deliverables
- 3.11.2. DR170-02: Steel Detail Drawings
- 3.11.3. DR170-03: Steel Piecemarks
- 3.11.4. DR170-04: Steel 3D Model Relationship
- 3.11.5. DR170-05: Steel Connection Details

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- 3.12.1. DR180-01: Steel Fabrication CWP Tracking
- 3.12.2. DR180-02: Steel Fabrication Details Tracking

3.13. DR190 – Pipe Detailing (3)

- 3.13.1. DR190-01: Pipe Isometric Detailing
- 3.13.2. DR190-02: Pipe Isometric Transmittals
- 3.13.3. DR190-03: Pipe Spools

3.14. DR200 – Pipe Fabrication (2)

- 3.14.1. DR200-01: Pipe CWP Fabrication Delivery Requirements
- 3.14.2. DR200-02: Pipe Spool Fabrication Tracking

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How Data Requirements Are Interpreted

The figure below shows how the 60 data requirements follow a consistent format across all 19 categories. The structure is the same, but the details vary from data requirement to data requirement. The particular data requirement shown in this figure is relatively brief.

Each data requirement falls under a category.

The data requirement's description begins with its code and name.

3.1. DR010 – AWP Master Index

3.1.1. DR010-01: Project Information

Description: List of unique projects within the scope of the data sets

Source(s): Owner PM organization

Timing: Beginning of Stage 1 (Preliminary Planning & Design)

Frequency: Updated as needed (e.g., new projects or data sets changed)

Purpose

To define the master list of projects associated with the data set(s).

Data Requirement Definition: Project Information

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
	Required	Project Name	Name of the project
	Optional	Project Description	Description of the project
	Optional	Project Location	Location of the project installation

Discussion

- Each record might be a single entry for a large project, or multiple entries to capture a portfolio of projects.
- Defining the project allows companies to segregate data sets across projects. These *Project IDs* are a required attribute on every data requirement going forward. *Project ID* is considered the primary key (PK) to pull needed information from authoring tools and project executions systems.
- The intention of the "Optional" fields is to allow internal project categorization and the ability to sort or filter. Companies may expand the optional fields to capture other helpful project attributes (e.g., facility type, segment, process type, etc.).
- The data will often natively reside in the owner or EPC's ERP software (e.g., SAP, Oracle, etc.).

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>Project Name</i>	Project Pineapple	Demethanizer Debottleneck
<i>Project Description</i>	LNG Export 3 rd Train Expansion	Installation of additional reboiler
<i>Project Location</i>	Nacala, Mozambique	Baytown, TX, USA

Each data requirement gives its description, source(s), timing, and frequency.

Then the requirement's purpose is identified.

Next, the data requirement's data fields are defined, identifying the key, assigning tiers, and giving each field's name and definition.

A discussion section identifies relevant information for the data requirement under consideration.

Sample entries provide two projects' values for the fields that make up this data requirement.

Considerations for Including Data Requirements in Contracts

Introduction

Consider the following guidelines to when incorporating data requirements into contracts. The authors encourage parties using this information to use their own legal counsel. The authors are providing this information to support the efforts of the Construction Industry Institute (CII) Data Requirements joint working group and do not attest to the efficacy of the recommendations.

Consistency

To increase the consistency of the use of data requirements we recommend your organization develop a data requirements strategy and policy. Based on this strategy the format and details related to data requirements should be applied consistently. Use the Data Requirements report as a reference source. The contract should identify our request:

- The source of the data
- Data flow requirements (How the data will be used)
- Acceptable data formats
- Frequency of data updates
- Whether the data is required or optional

A basic contract template should be created for your organization, and we recommend that each project should attempt to follow 80% of the template and limit modifications to 20% to address project specific requirements.

Considerations for Including Data Requirements in Contracts

(continued)

Easy to Understand

We recommend a collaborative approach be used for contract development be used with the goal of creating a clear plain language contract. As updates to organizational data requirements and standards occur, they should also be used to update the contracts. We also recommend a formal lesson learned approach be followed to continuously improve the contract language.

Optional versus Required Information

Within each data requirement there are recommendations in the Data Requirement Report as to whether the information should be required or optional. These are guidelines and the company developing the contract should review each data requirement and based on the companies' requirements and identify whether they are required or optional. These assessments will change based on the maturity of the organizations' AWP program.

Data Transmission

In order to satisfy the required data format and update frequency there are two primary options. The transmitter of the data can convert the data generated by their systems into the format required by the recipient which we will call option one. Alternatively, the transmitter can provide data key or translation tables so the recipient can convert the data into a usable format which we will call option two.

Both options have advantages and disadvantages in option one the transmitter will require more resources and charge the recipient for the data conversion. In option two the recipient will require additional resources and will have more control over the data. The level of information technology sophistication of the transmitter and recipient, risk tolerance, and AWP maturity need to be considered when determining the appropriate option.

Considerations for Including Data Requirements in Contracts

(continued)

AWP Data Requirements of Both Parties

To align AWP data requirements of all parties entering a contract, it is important to have a clear understanding of your organization's data requirements to maintain consistency at the project and enterprise levels. Prior to including any provisions in the contract, it is also important that, as previously mentioned, optional vs. required data, data formats, and specific software are clearly identified by the Promisee prior to flowing those data requirements down to the promisor. It is recommended that when including AWP data requirements in contracts, that the intent and timing of the data is clearly stated such that both parties can collectively agree on the final handover of AWP data such that there are limited disruptions with the functionality of project-specific software for either party.

Interactive planning meeting

Prior to sending the contract on data requirements we strongly recommend an interactive planning session be scheduled to ensure both parties understand and can satisfy the requirements.

Benefits and Costs of Implementing AWP Data Requirements

Benefits

- Improves alignment among stakeholders
- Identifies and potentially mitigates risk
- Increases the transparency surrounding AWP data sharing through standardization
- Enables better proactive planning for stakeholders
- Supports the ability to apply artificial intelligence and machine learning to organizational data
- Provides information that can be used to implement data-based decision making

Benefits and Costs of Implementing AWP Data Requirements

(continued)

Costs

Staffing Costs

- Creating AWP data management position
- Creating AWP Data requirement policies, procedures and specifications
- Training staff on AWP data requirements
- Auditing data transmittals for compliance to contract requirements

Contract Costs

There may be an initial increase in contract fees related to data, but this should reduce as the contractors become familiar with the new requirements.

Special Considerations

As AWP data requirements become part of the bid process, they could become a disqualifying factor. If a company does not meet minimum safety requirements, it will not be considered.

Cautions about Prescribing Tools

EPCs, engineering firms, construction contractors, and vendors develop their business processes supported by software they use. They become familiar with their tools and those costs are built into their delivery model. It may be attractive for owners to require those parties to use a specific tool but caution should be used for the following reasons:

- 1. Inefficiencies:** Changing the tool could decrease the efficiency of the affected organization as they support the additional tools along with the tools they normally use.
- 2. Transmitting:** Transmitting data causes communication challenges in handling different data formats each group produces, needing more manual prescribing and transforming data within each system.
- 3. Training:** If the toolsets are different, each group will need to be trained in how to use the toolset, which increases training costs.
- 4. Automation breakdowns:** Toolset difference can cause breakdowns in automation efficiency that the Operator, contractor, and vendor already has set up within their organization to be efficient
- 5. Cost of new tools:** The new devices have a price to implement within an operator, contractor, and vendor.

If one company prescribes software to another company, that software might not be new to the company. For example, some EPCs use two different tools, depending on the project. In some cases, prescribing specific software can be cheaper to purchase and support, dependent upon existing solutions. On some projects it is beneficial to have multiple companies working on the same platform for communication, so some of the five reasons might not always be valid. The caveat at the end exists yet limiting.

The concept is valid that one company tells another that they must change their system and in effect their process can and has created many difficulties, yet there are advantages to having multiple stakeholders working in the same environment.

While these issues can be overcome, they must be considered prior to prescribing a tool. If the tool is being prescribed as a part of a larger strategy, the affected organizations can support the new tool, and the cost benefit analysis supports the new tool then prescribing the tool may be considered.