
AVEVA Everything 3D

A Unified Engineering and Design Approach

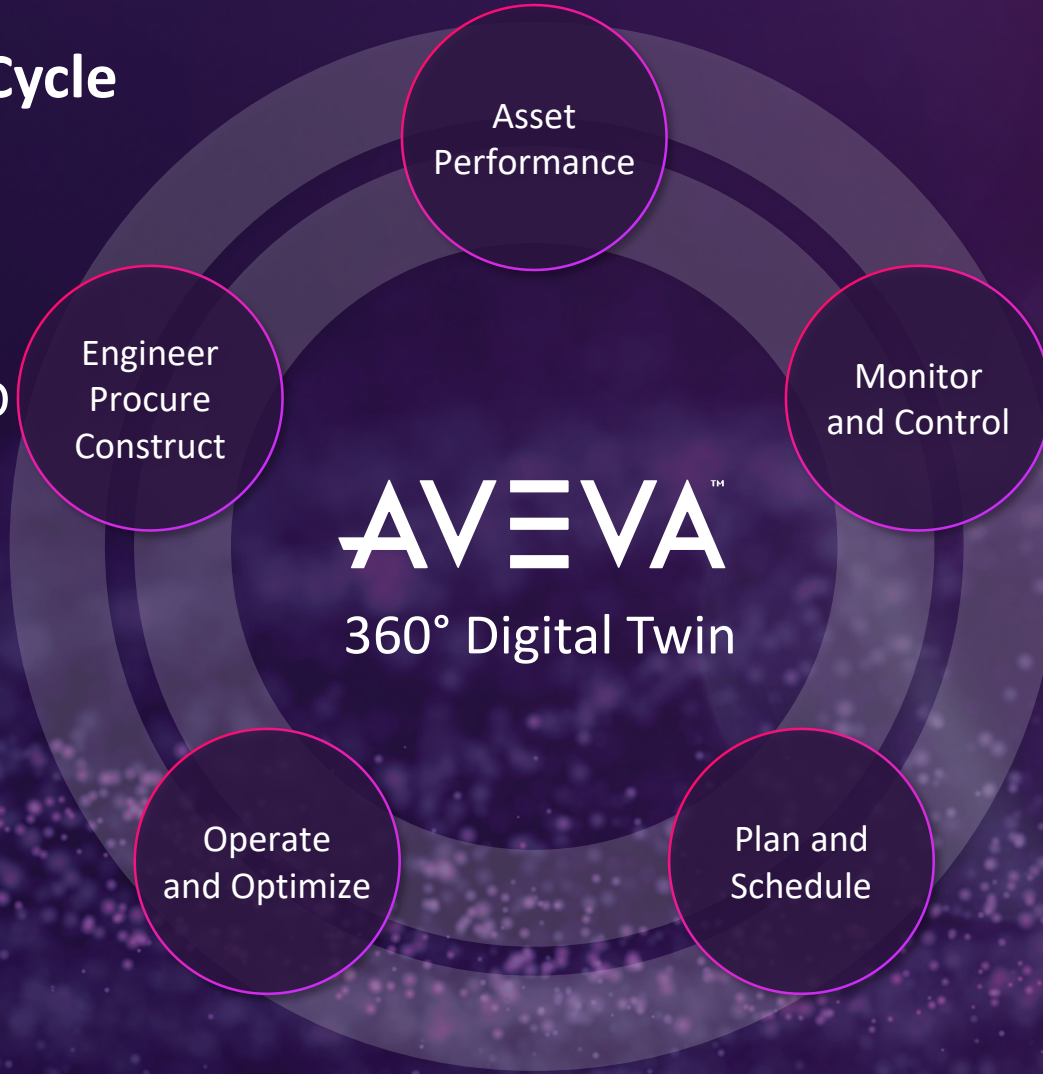
Jen Sargianis—Technical Consultant

September 2020

Asset Life Cycle

Improve Return On Capital

AVEVA E3D



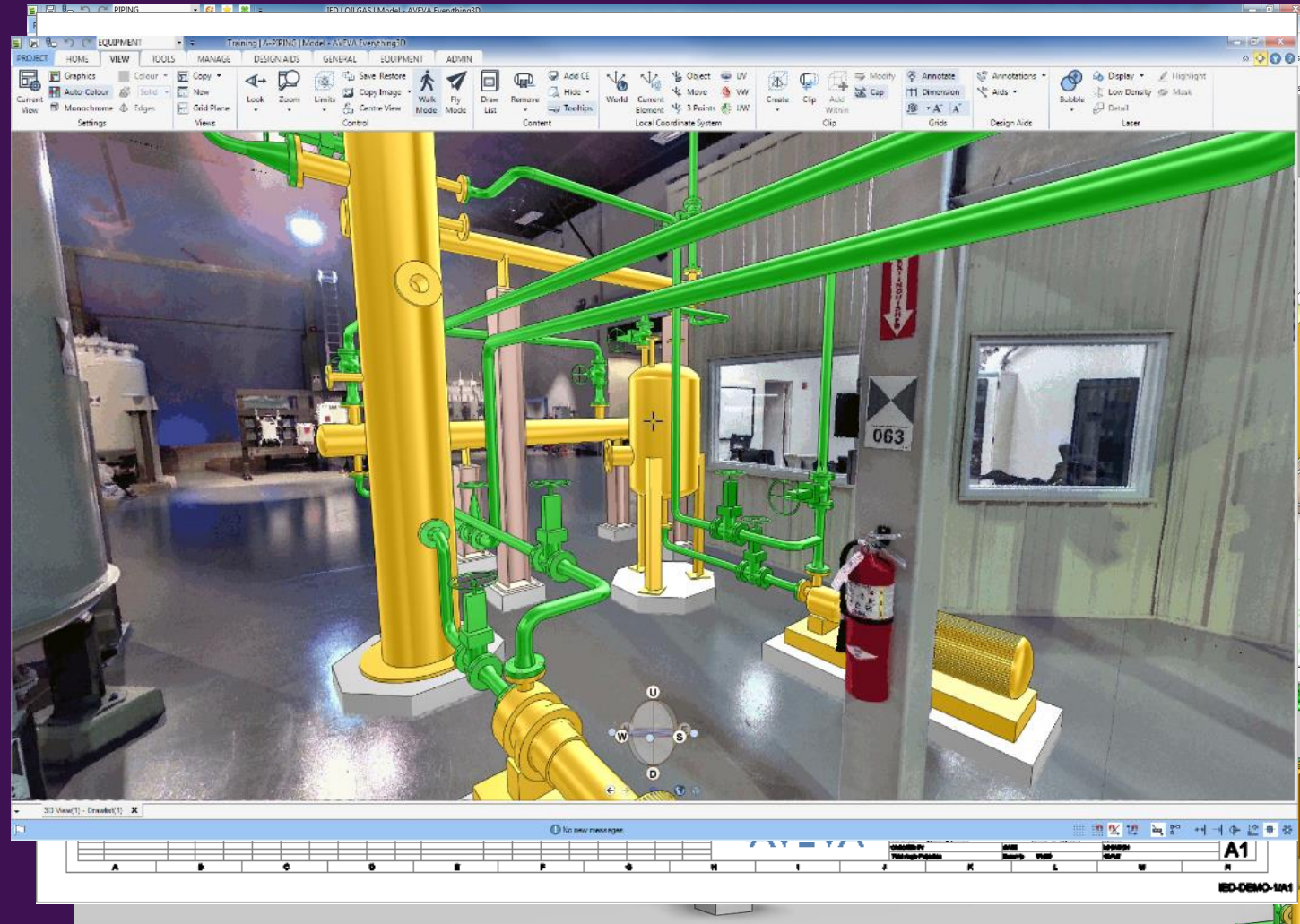
Operations Life Cycle

Improve Profitability



What is AVEVA Everything 3D?

- Object & Data Based Design
- Multi-user and Multi-discipline Concurrent Design
- Built on a power graphics engine and intuitive user interface
- Ensures consistent, reliable, clash-free design
- Rapid and correct deliverable creation
- Fully integrated Laser Data Capabilities

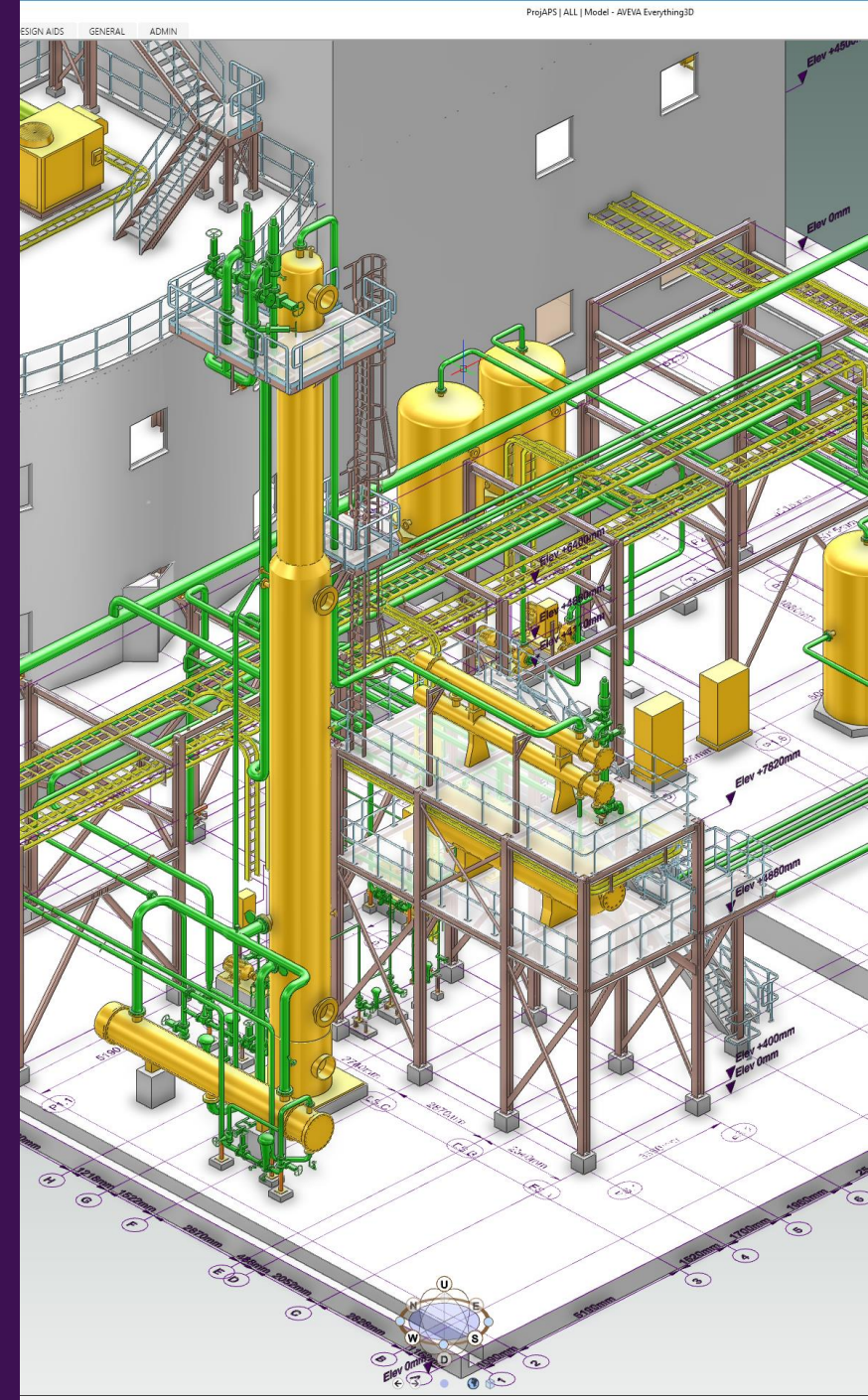


What is included in AVEVA E3D?

What is in AVEVA Everything 3D?

Multi-Discipline Design

- Piping Catalogues & Specifications
- Structural Layout
 - Catalogues and Specifications
 - LOD 300-350
- Equipment
 - Process, Mechanical and Electrical
- HVAC, Mining & Terrain, Multi-Discipline Supports
- Cableway, Cable Tray, Cable Design
 - Direct Integration with AVEVA Instrumentation & Electrical for automatic cable routing
 - Pass back Cable Design Lengths for complete Cable Schedule



What is in AVEVA Everything 3D?

Deliverable Creation

- Automatic Reporting:
 - Lists
 - Status Reports
 - Progress Reports
- 2D Drawings
 - Plant Layout
 - Piping Isometrics
 - Equipment Layout
 - Automatic Drawing Production
 - Automatic Support Drawing Production



AVEVA E3D

Catalogues & Specifications and Templates

HVAC Catalogs

- 3 User Defined Fitting Specs
- 1 Penetration Spec
- 1 "SPIRO Duct" Spec
- 19 Duct Insulation Specs
- 21 HVAC Detailing Specs
- 758 Components
- 2 Shapes
- 32 Fittings

Piping Catalogs

- 6 Layout Specs
- 12 Design Specs
- 25 Insulation & Tracing
- 3 Bolting Specs
- 2 PSI Specs
- 3 Pipe Fabrication Specs
- 4 Surface Treatment Specs
- 2 Miscellaneous Specs
- 45,947 Components

Steelwork Catalogs

- 11 National Standard Specs
- 76 Components
- 14,7050 Shapes
- 843 Fittings

Equipment Catalogs

- 19 Specs
- 38 Components

Electrical Catalogs

- 285 Specs
- 23,973 Components

Mining Catalogs

- 12 Specs
- 56 Components

Supports Catalogs

- 24 Specs
- 331,407 Components
- 172 Shapes
- 74 Fittings

Drawings

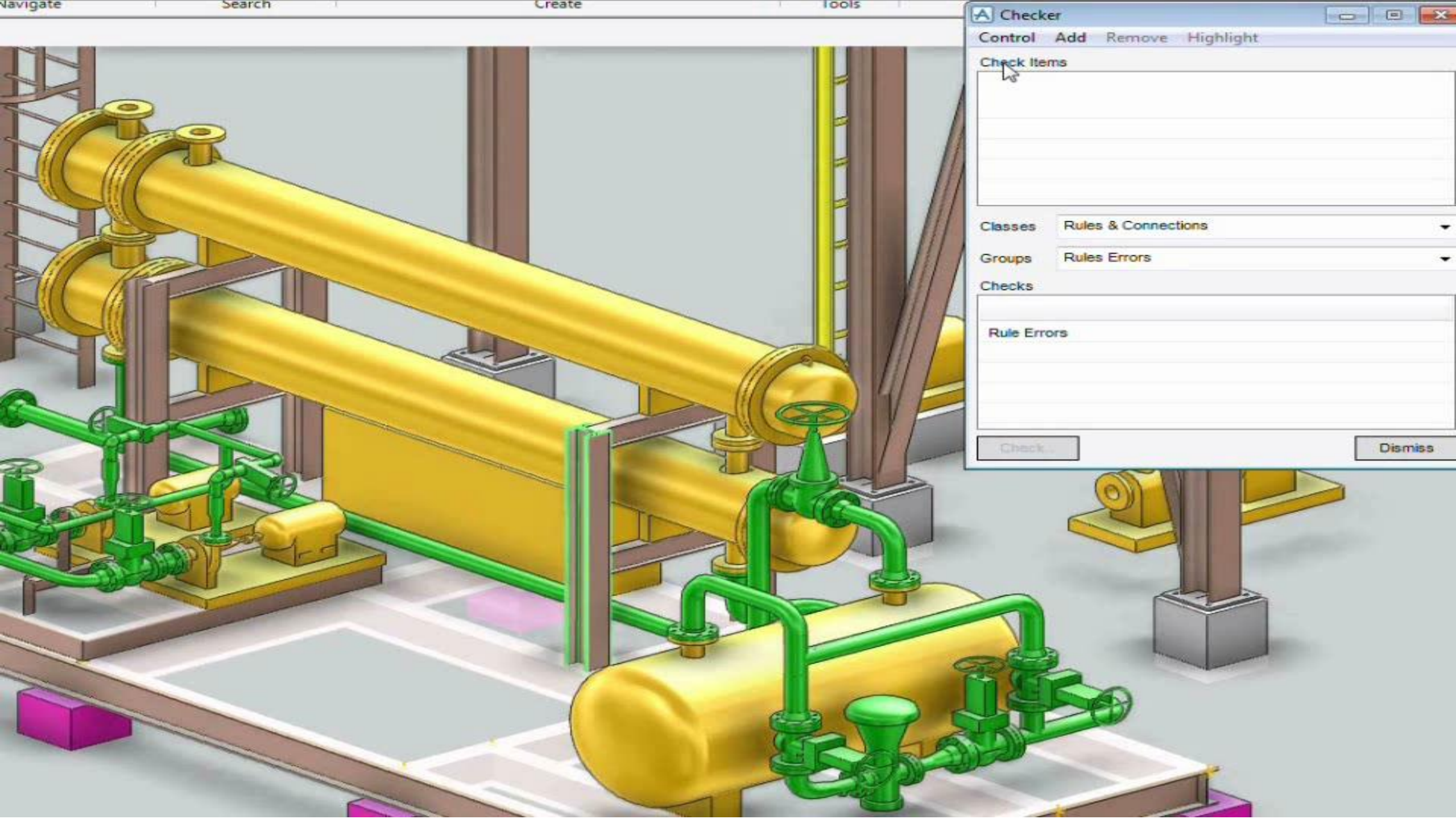
- 15 Report Templates
- 5 Isometric Drawing Configurations
- 45 Drawing Templates (Imperial & Metric sizes, drawing standards-fonts & line styles)
- 29 Backing Sheets
- 170 Label Templates
- 280 Symbol Templates

Data Dictionary

- 5,092 User Defined Attributes
- 300 User Defined Element Types

Modeling

- 25 Mechanical Equipment Templates
- 68 Mining Equipment Templates
- 600 Support Frameworks
- 1,517 Support Hangers



AVEVA E3D

Equipment Standards

AVEVA Standard Parameterized Equipment:

- AVEVA Pumps, Tanks, Columns, Exchangers

The image displays two overlapping software dialog boxes from the AVEVA E3D interface. The 'Create Equipment' dialog is in the foreground, and the 'Modify Properties' dialog is in the background.

Create Equipment Dialog:

- Name: [Empty]
- User Defined Type: All types
- Selection Table: /AVEVA_STD_EQUIP
- Specification: AVEVA Standard Equipment
- Sort Specification: Database Or...
- Type: PUMP Centrifugal (selected)
- Other options in the list: AIR Cooler, PUMP Diaphragm, PUMP In-Line, PUMP Centreline, PUMP Turbine, HEAT Exchangers, STORAGE Vessels.

Modify Properties Dialog:

Horizontal Inlet / Vertical Outlet

A = Baseplate Length	5'-10.7/8
B = Baseplate Width	2'-1.19/32
C = Baseplate Height	3.5/32
D = Height Baseplate to CI	11.13/16
E = Discharge Nozzle Height	1'-3.3/4
F = Suction Nozzle Height	11.13/16
G = Distance Discharge Nozzle	7.7/8
H = Origin to Baseplate End	1'-1.25/32
J = Distance to Coupling	3'-1.13/32
K = Coupling Height	3.15/16
	2'-7.1/2

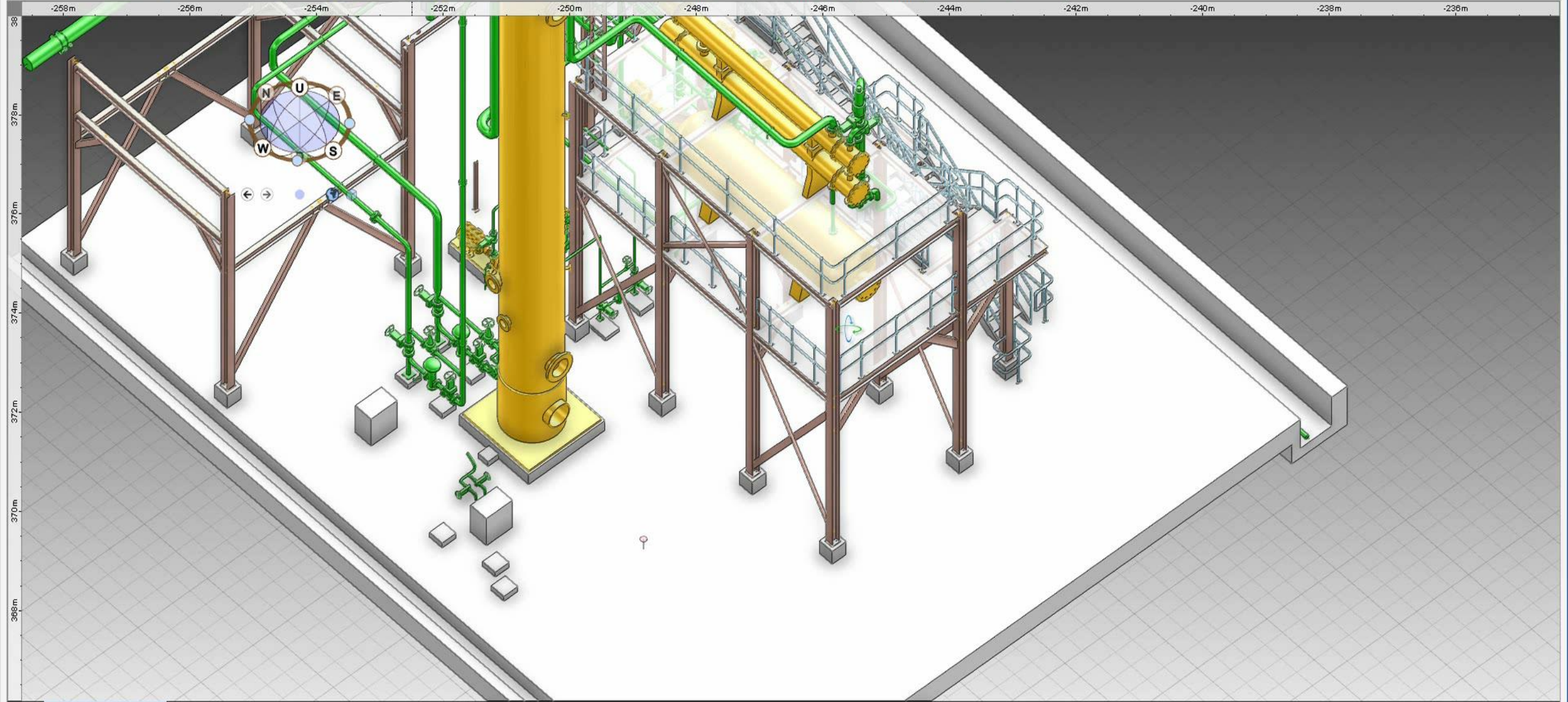
The background of the 'Modify Properties' dialog shows a 3D model of a centrifugal pump with various dimensions labeled (A through K) and a technical drawing of the pump assembly.

Project: ProjAPS | ALL | Model - AVEVA Everything3D

Menu: PROJECT | HOME | VIEW | TOOLS | MANAGE | DESIGN AIDS | GENERAL | EQUIPMENT | ADMIN

Equipment Tools: Equipment, Nozzle, Electrical, Standard, Modify, Delete, Integrator Mode, Open Diagram, Design Point, Penetration Profile, Defaults, Penetrate, Report, Associate

Defaults: 0, 10



AVEVA E3D

Support Standards

AVEVA Supports

- Lisega
- Pipe Supports Limited
- Carpenter & Patterson
- Anvil (*Grinnell*)
- Automatic Drawing Production for supports and hangers

The screenshot displays the AVEVA E3D software interface. On the left, a tree view shows a project structure with folders for various hanger types. The central window shows a 3D model of a yellow hanger with a 'Parameter Definitions' table. To the right, a 3D rendering shows a green pipe supported by a hanger. Below these, a technical drawing includes a 'Location Plan', 'ISOMETRIC' view, and two orthographic views: 'View Looking North' and 'View Looking West'. A table at the bottom right lists material specifications and drawing details.

No	Value	Description
1	38.1	Rod Diameter
2	88.9	Eye O/D (D)
3	41.275	Eye Hole Dia (F)
4	12.7	Fork Depth (T)
5	44.45	Fork Width (W)
6	152.4	Fork Length (A)
7	38.1	Fork Gap (gro)
8	41.275	Nut Height (N)

Name	Gtype	PA1	PA2	PA3	PA4	PA5	PA6	PA7	PA8
H-GHVORRCC	HELE	9.52	36.5125	12.7	7.9375	26.9875	93.6625	12.7	15.875
H-GHVORRDD	HELE	12.7	36.5125	15.875	7.9375	26.9875	93.6625	12.7	15.875
H-GHVORREE	HELE	15.87	36.5125	19.05	7.9375	26.9875	93.6625	15.875	15.875
H-GHVORRFF	HELE	19.05	50.8	22.225	9.525	31.75	127	19.05	22.225
H-GHVORRGG	HELE	22.23	50.8	25.4	9.525	31.75	127	22.225	22.225

REV	DESCRIPTION	BY	DATE	CHK	APP	NOTES

ITEM	QUANTITY	UNIT	WEIGHT
F1	1	kg	40.62kg

AVEVA E3D HVAC

Specs & Catalogs

Multi Specs and Catalogs:

- AVEVA HVAC Spec
- AVEVA HVAC Insulation
- AVEVA HVAC Penetration
- Catalogues include Branches, Rectangular, Circular, Flat Oval, Transformations, Branch Connectors, Joints, Stiffeners, Inline Equipment

HVAC Sketches:

- HVAC Sketches can be generated automatically in the DRAW module

Pos	Item	Description	Duct Sizes	Joints
1	0	Circular Radiused Bend	450dia	Joints F,J25, F,J25
2	0	Angle 90 Inside Rad 225 Extensions 25, 25	450dia	Joints F,J25, F,J25
3	0	Circular Side Branch Tee Piece	450dia to 400dia and 400dia	Joints F,J25, F,J25, F,J25

Item	Description	End Points
3	BP(1) 90	cd from end 450
1	BP(1) 180	

POG	Turn	Assembly data	End Points			
			X	Y	Z	
			C3	-304779.59mm	325124.75mm	107100mm
			C2	-305229.59mm	325467.25mm	107100mm
			C1	-302104.59mm	325467.25mm	107575mm

DRWN BY tom.stiparo
DATE 15 Jun 2018
CHKD BY
DATE
JOB No
LOCN.
SCALE A4

TITLE HVAC Sketch - Spool B01_LEVEL02_AC-RETURN/HS/005
DRWG. No B01_LEVEL02_AC-RETURN/HS/005 SHEET 1 of 1

HVAC Flat Oval Ductwork

AVEVA E3D

Cable Tray, Conduits & Cabling Standards

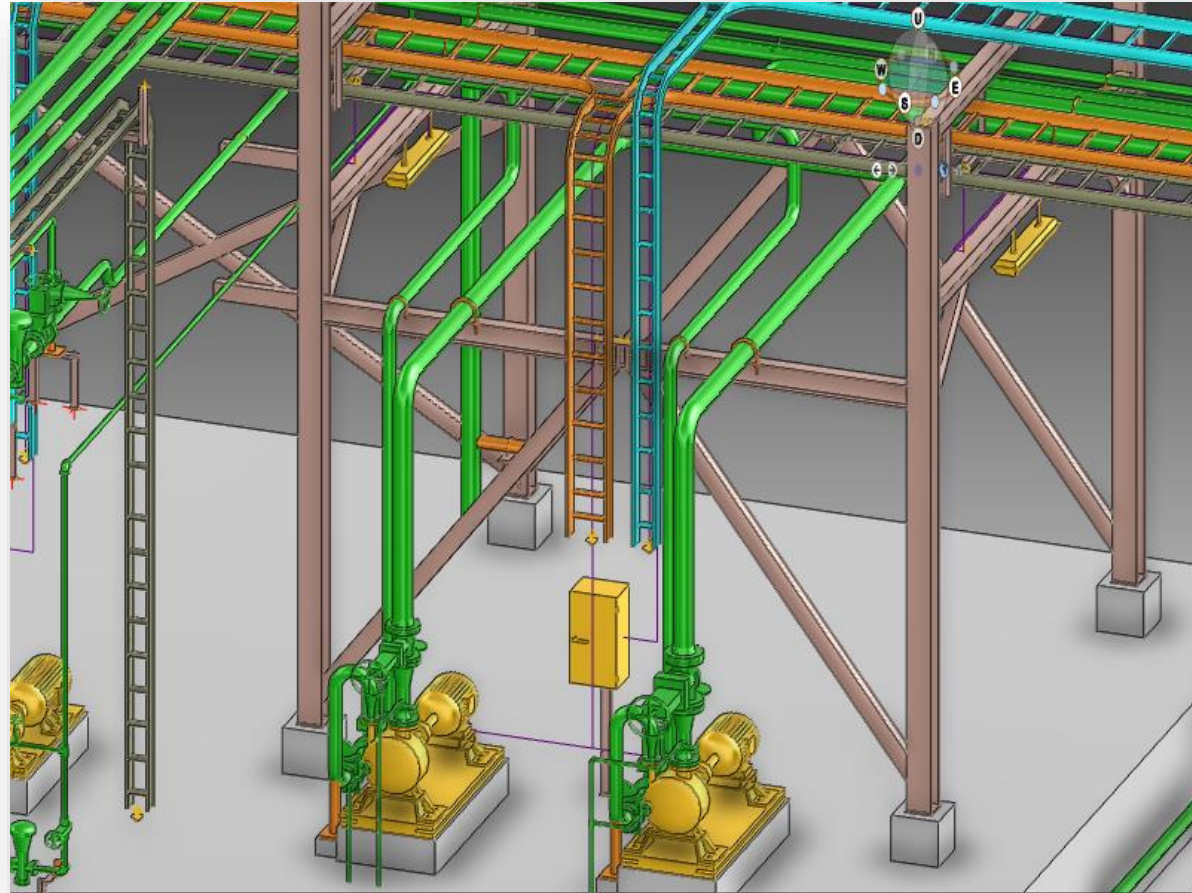
Cable Tray Specs and Catalogs

Cable Tray Specs

- Cablofil
- Vantrunk
- Legrand
- Oglaend
- Salamandre
- Comm Cables
- Signal Cables
- Power Cables
- Control Cables
- Wire Cables
- Catalogs include:

Conduit Specs

- Allied ARC
- Allied GRC



- Straights, Bends, Elbows, Reducers, Tees, Crosses

AVEVA E3D

Steelwork Standards

AVEVA Structural specs include

- American Profiles
- Australian & New Zealand STD Profiles
- British Profiles
- Canadian Profiles
- Chilean Profiles
- Chinese Profiles
- European Profiles
- Indian Profiles
- Japanese Profiles
- Russian Profiles
- South African Profiles
- Swedish Profiles

Model View: AISC-W-Profiles > W36x650 - W36X650

CE /AISC_W Track Axes P-Points P-Lines Representation Choose

Model References:

Description	Value
Category	/AISC_W
Component	/W36x650
Plane Set	/AISC-PTSS-W-PRFL
Geometry	/AISC-GMSS-W-PRFL
Data Set	/AISC-DTSE-W-PRFL

Parameter Definitions:

No	Value	Description
1	1028	Overall Depth
2	446	Overall Width
3	50	Web Thickness
4	89.9	Flange Thickness
5	967.4	Weight per Unit length
6	32.1	Root Radius
7	123000	Cross Sectional Area
8	784	Depth Between Fillets
9	920	Nominal Depth

Desc:

Name	Gtype	PA1	PA2	PA3	PA4	PA5	PA6	PA7	PA8	PA9	PA10	PA11	PA12
w40x331	BEAM	1036	309	31	54	492.4	32	62900	864	1000	0	0	191
w40x327	BEAM	1036	308	30	54.1	486.2	31.9	61900	864	1000	0	0	191
w40x278	BEAM	1020	304	25.9	46	413.9	32	52800	864	1000	0	0	191
w40x264	BEAM	1016	303	24.4	43.9	392.5	32.1	50000	864	1000	0	0	191
w40x235	BEAM	1008	302	21.1	40	349.6	32	44500	864	1000	0	0	191
w40x211	BEAM	1000	300	19.1	35.9	314	32.1	40000	864	1000	0	0	191
w40x183	BEAM	990	300	16.5	31	272.2	32	34700	864	1000	0	0	191
w40x167	BEAM	980	300	16.5	26	248.7	32	31700	864	1000	0	0	191
w40x149	BEAM	970	300	16	21.1	221.2	31.9	28300	864	1000	0	0	191
w36x798	BEAM	1066	457	60.5	109	1182.5	32	151000	784	920	0	0	191
w36x650	BEAM	1028	446	50	89.9	967.4	32.1	123000	784	920	0	0	191
w36x527	BEAM	996	437	40.9	73.9	783.9	32.1	99800	784	920	0	0	191

Total Items = 267

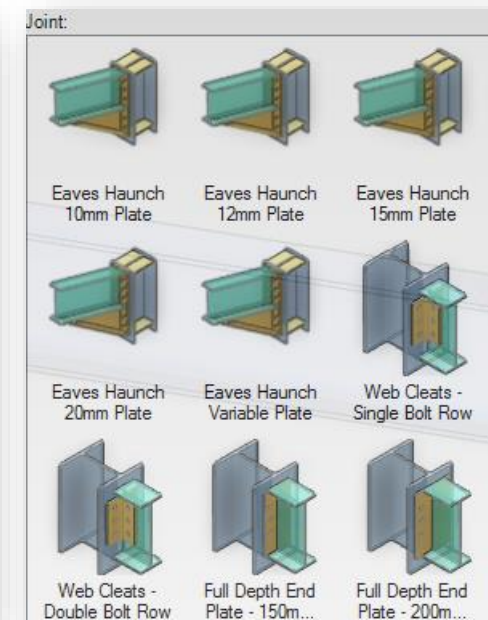
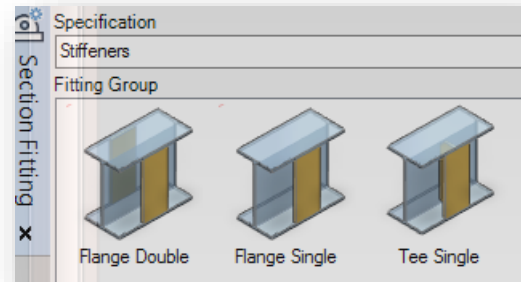
Category Attributes

AVEVA E3D

Steelwork Catalog Component

AVEVA Structural specs also include

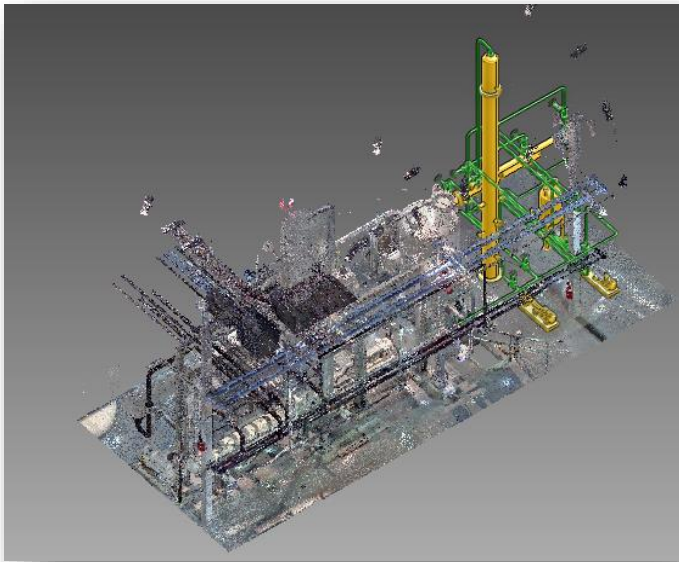
- Joints
- Architectural Fittings
- Non-Standard (Plate Girders)
- Plate (Grating)
- Walls (Brick, Concrete)



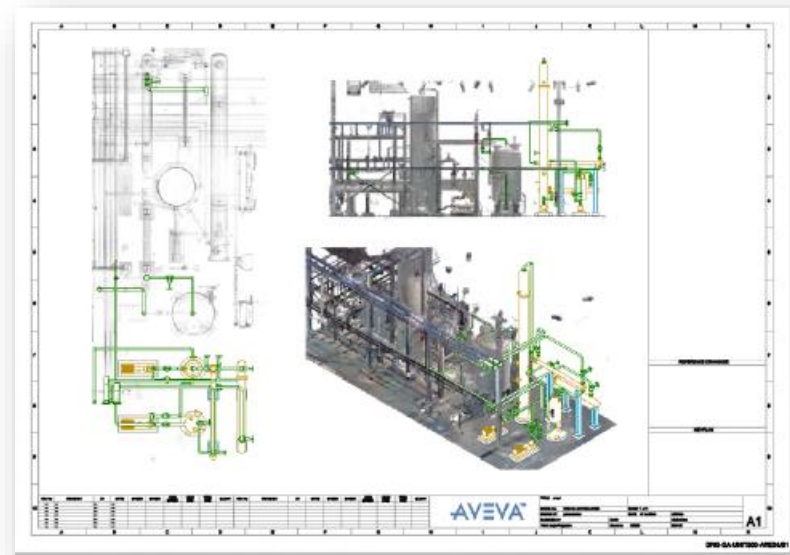
AVEVA E3D

Draw Deliverables

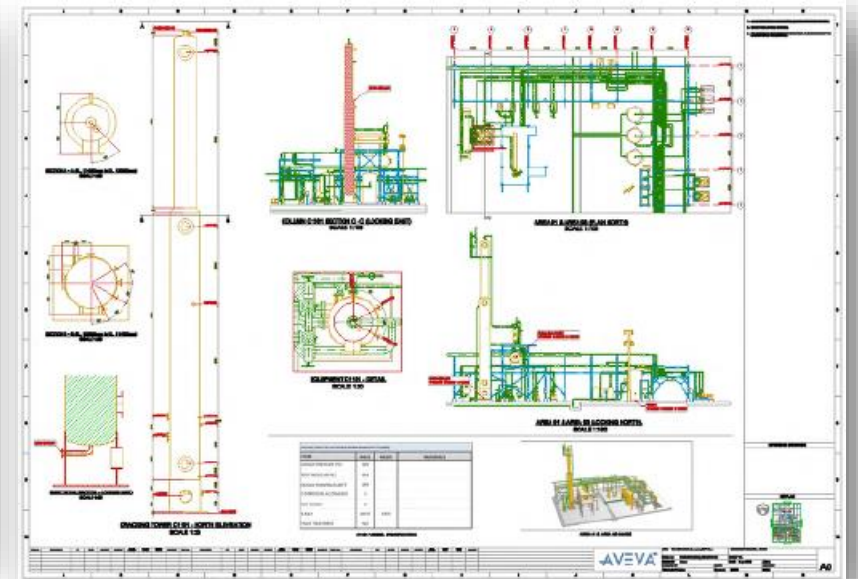
- Discipline arrangement drawings are generated from the intelligent design items.
 - Laser Data can be added and annotated on the arrangement drawings.
- drawings.



Laser Data and 3D Model shown in the Model Module.



Laser Data and the 2D Design shown on an arrangement drawing



Draw - AVEVA Everything3D (Project - IPE)

PROJECT HOME DRAW ANNOTATE UPDATE MANAGE TOOLS AUTO AREA ADMIN SUPPORTS

Close New Layers Project Design Detail Line Cloud Circle Centre-radius Chained Across Diameter Across PCD Delete Paste Copy Cut Undo Pan Realtime Tools Zoom In Active Properties Property Grid Tabbed View Rep. & Hatch Rules Plot Styles Display Current Owner Update

Active Properties

Current Owner: AWS_02

Current Layer: 0

Current Line Type: By Layer

Current Colour: By Layer

Properties

SHEE

Backing sheet: DRA/PIU/BACKS/MET/

Locked?: No

Name: AWS_02

Owner: AVEVA_World_Summit

Plot file path: unset

Pseudo attributes: (-)

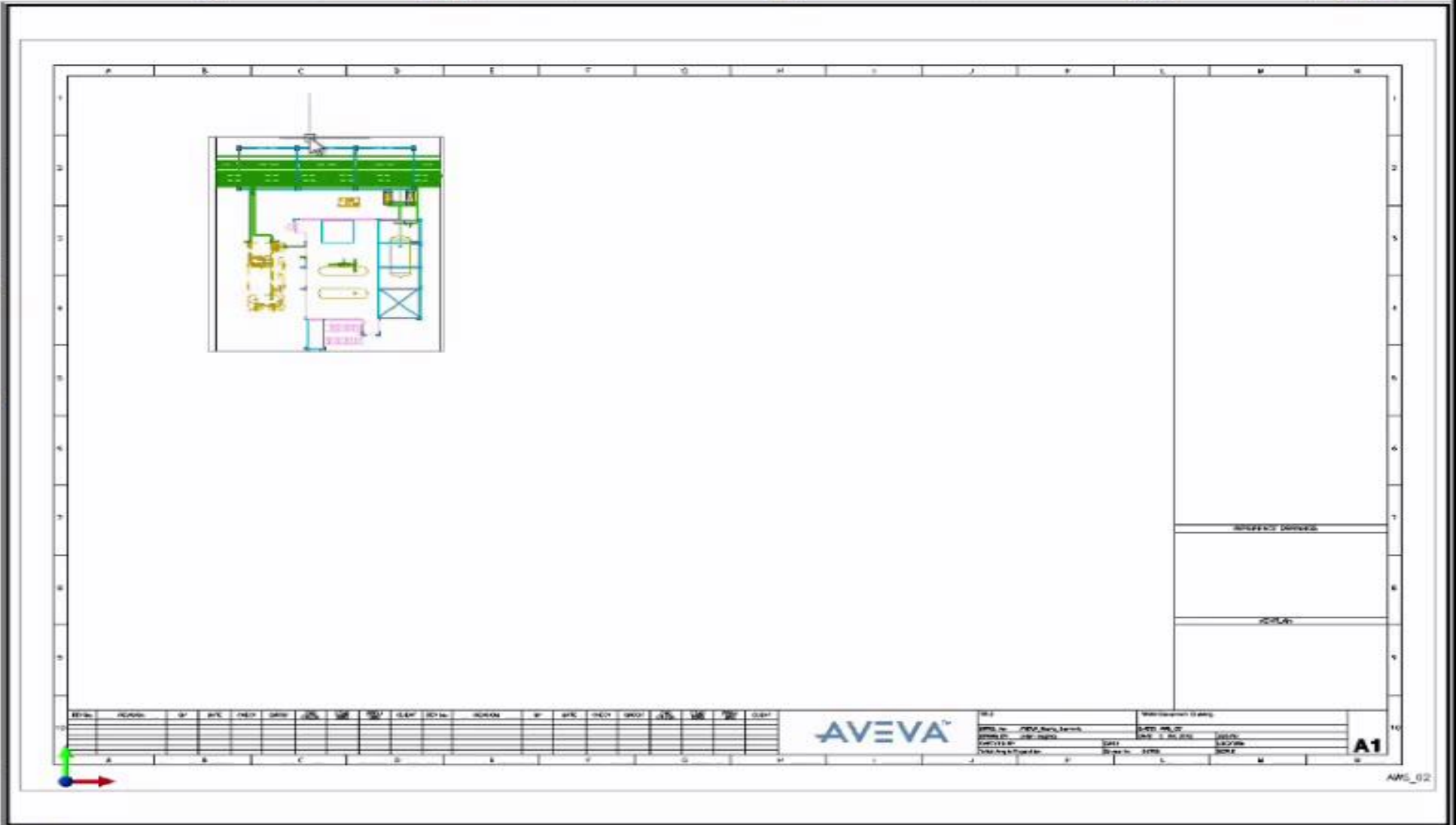
Size: 841mm 594mm (A1)

Title: White Equipment Drawing

User-defined attribute: (-)

Zoom centre: X 421mm Y 297mm

Zoom scale: 1.34



Name
Name of the picture owner.

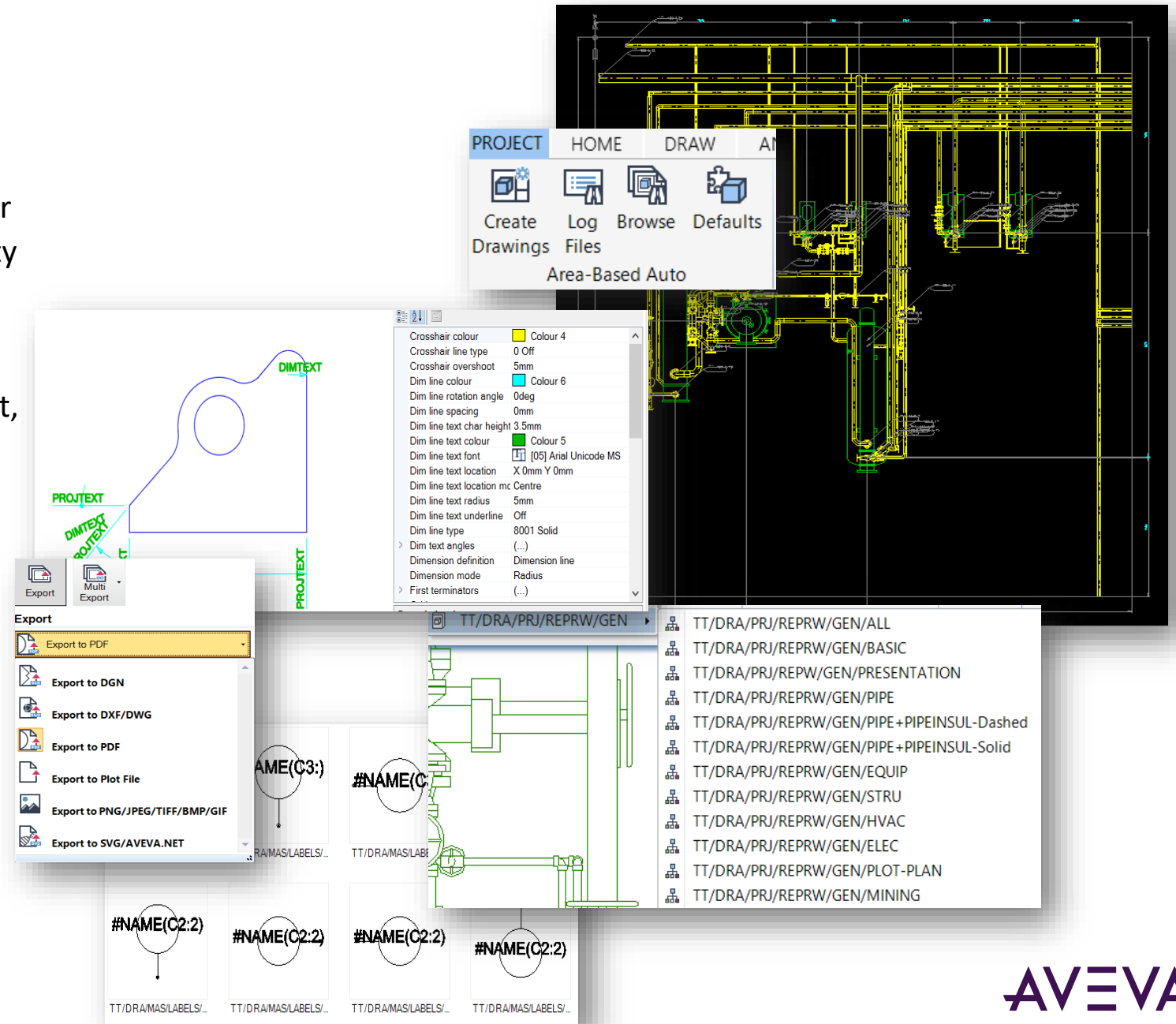
Design Explorer Properties

AWS_02

AVEVA E3D

Draw Deliverables

- Area based automatic drawing production for Discipline arrangement drawings functionality is available for companies to configure per their drawing generation requirements.
- Intelligent Label Libraries for Pipe, Equipment, Loops, Columns, Geodetic and Datum Elevations, etc.
- Representation Styles for discipline specific arrangement drawings.
- Visual Styles for Dimensions Labels, etc.
- Drawing Export Formats



AVEVA E3D

Reports & Templates

Reporting Templates & Options

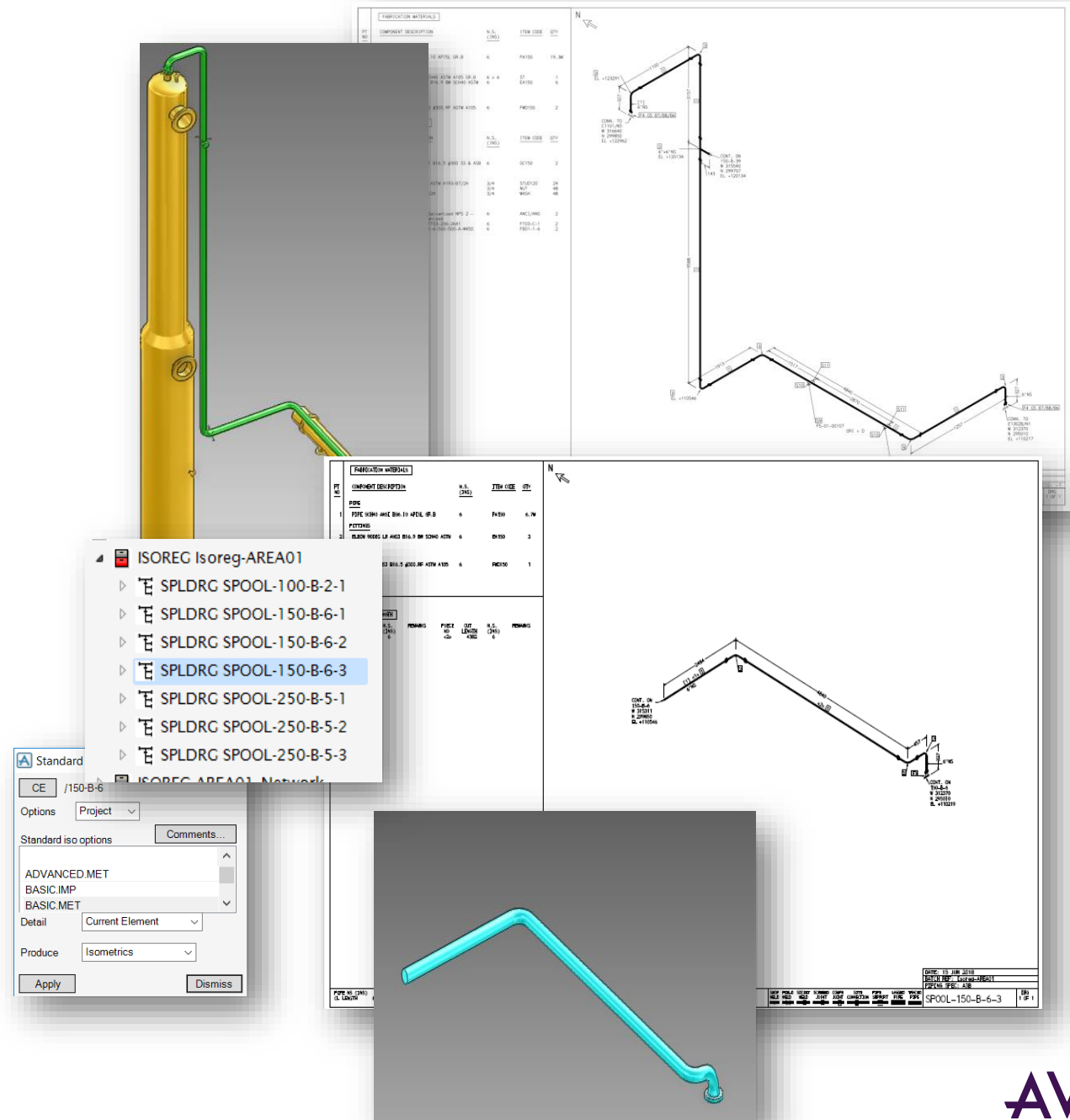
- 28 Report Templates, execute and export to multiple formats.
- Simple Reports
- Search Grids Exported to Excel
- Create Company Corporate or Project Report Templates with Report Designer
- Create a Programmable Macro Language (PML) macro to generate a report

The screenshot displays the AVEVA E3D reporting interface. At the top, the ReportHeader shows 'Valve List' with metadata: Generated By: tom.stirparo, Date: Thursday, June, Project: APS, and a Company Logo. Below this is the PageHeader and GroupHeader1, both containing 'Valve List'. The main content area shows a table with columns 'Arrive Bore (mm)' and 'Quantity'. A 'Run Report' dialog is open, showing a list of report definitions and a 'Run Report' button. A 'Report Designer' window is also visible, showing a table with columns 'Pipe Name', 'Branch Name', 'Type', 'Specification', and 'Total of this type and Specification in this Branch'. The table lists various equipment types like ELBO, FLAN, GASK, REDU, TUBI, VALV, and VALV with their respective specifications and counts. A 'Simple Report' dialog is open, showing the file path 'C:\Users\Public\Documents\MATRIX\EquipList.txt' and the types 'EQUI'. A red arrow points from the 'Run Report' button to the 'Excel' export option in the 'Export' menu. The Excel spreadsheet shows a table with columns 'Pipe Name', 'Branch Name', 'Pipe Spec', 'Insulation Spec', 'Head Pos', 'Head Ref', 'Head Conn', 'Head Dir', and 'Tail Pos'. The spreadsheet data includes rows for various equipment types and their specifications.

AVEVA E3D

Isometrics & Spool Drawings

- Standard and System Isometrics can be automatically generated from company or project specific Isodraft Option Files.
- Options files format the look and content of the isometrics including borders, bill of material, dimensioning, etc.
- Pipe spools can be defined in the SPOOL Module and SPOOL Drawings can then be generated.



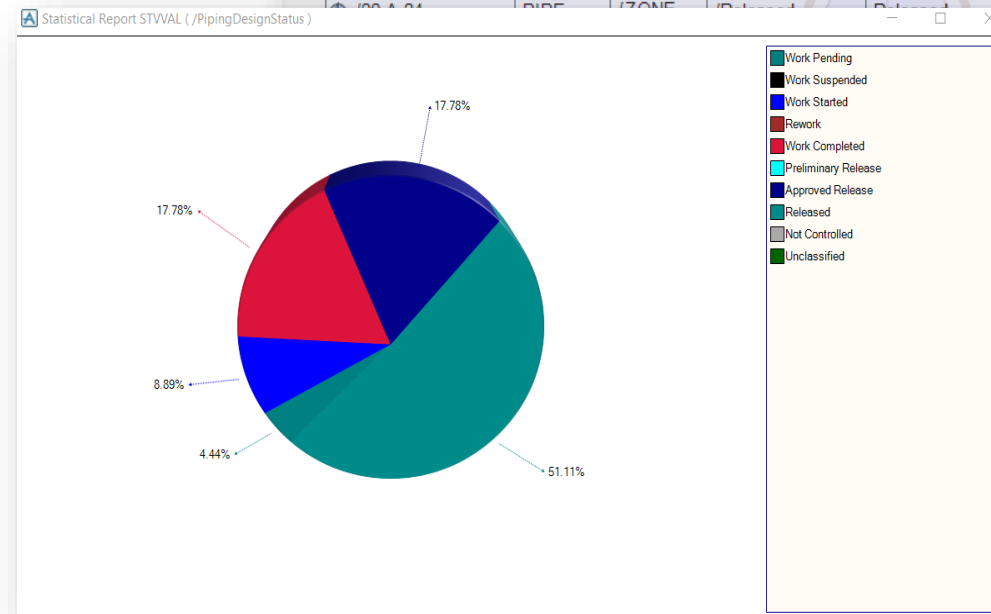
AVEVA E3D

Reports, Status Control

Status Reporting Options

- The Status grid can be exported to Excel to create a report and many types of charts can be produced showing the current status of the design elements.

Name	Type	Owner	Piping Design...	Piping Design Status Desc	Piping Design Status Number
/100-B-17	PIPE	/ZONE-...	/Approved	Approved Release	80
/100-A-18	PIPE	/ZONE-...	/Approved	Approved Release	80
/150-A-19	PIPE	/ZONE-...	/Approved	Approved Release	80
/100-A-20	PIPE	/ZONE-...	/Approved	Approved Release	80
/20-B-21	PIPE	/ZONE-...	/Approved	Approved Release	80
/20-A-22	PIPE	/ZONE-...	/Approved	Approved Release	80
/20-B-23	PIPE	/ZONE-...	/Released	Released	100
/100-A-24	PIPE	/ZONE-...	/Released	Released	100
/100-A-25	PIPE	/ZONE-...	/Released	Released	100
/100-A-26	PIPE	/ZONE-...	/Released	Released	100



AVEVA E3D

Import & Export options

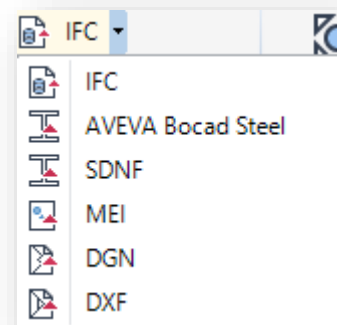
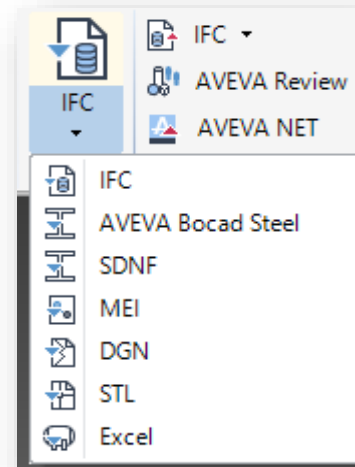
Import:

- IFC, AVEVA Bocad Steel, SDNF, MEI, DGN, STL, Excel

Export:

- IFC, AVEVA Bocad Steel, SDNF, MEI, DGN, DXF

Note: STEP AP203 .STP files can be imported and exported via MEI
(*Mechanical Equipment Interface*)

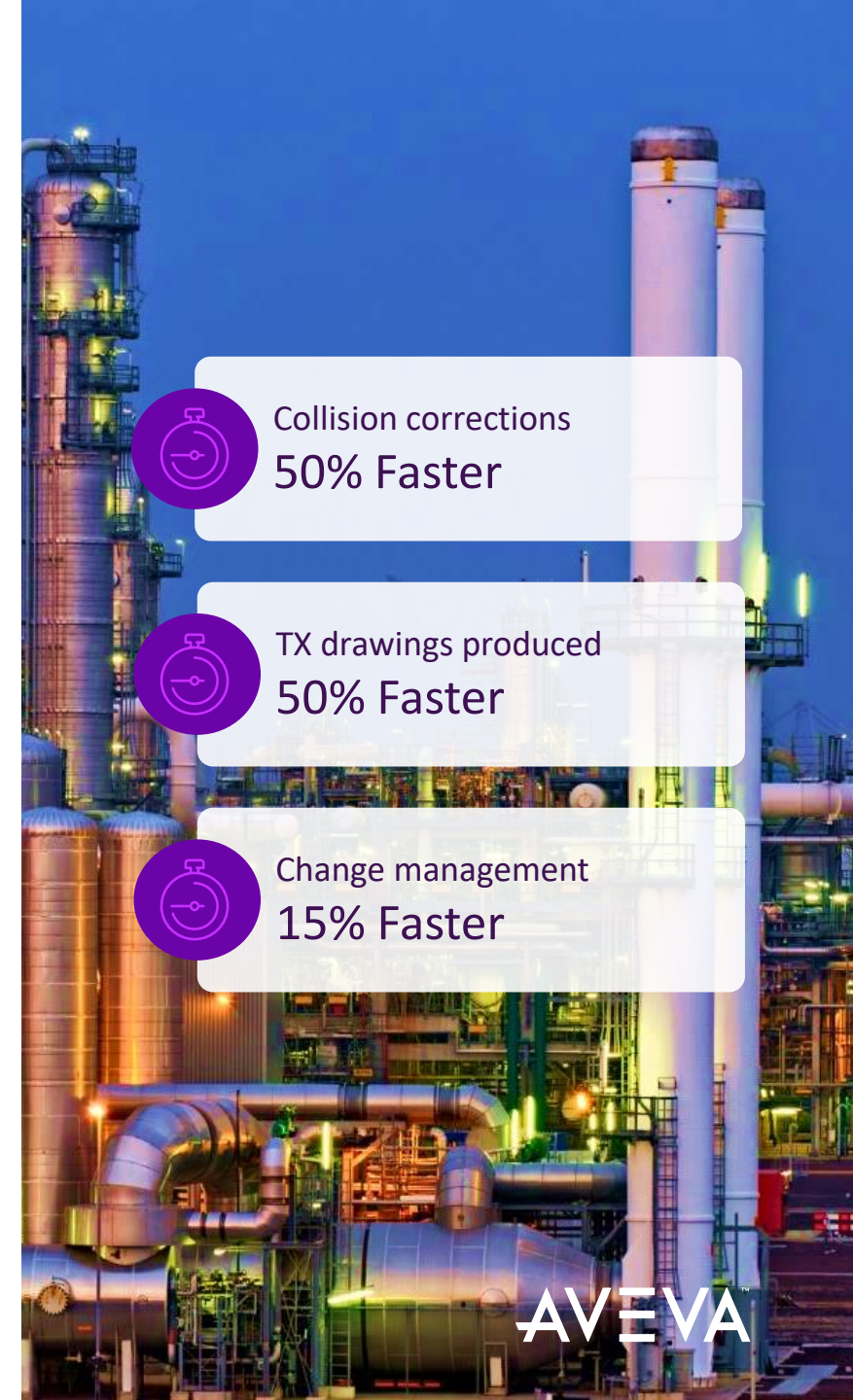


NIIK

Efficient Engineering and Design

- Challenges
 - Information transfer between departments
 - Opaque processes at the design supervision stage
- Solution
 - Improve plant safety for all
 - Instil greater confidence in the operator
 - Unite the company in their approach to implementing change
 - Streamline the procurement process
 - Deployment of **AVEVA Everything 3D (AVEVA E3D), AVEVA Bocad, AVEVA Engineering, AVEVA Diagrams, AVEVA Instrumentation, AVEVA Electrical**
- Results
 - Collision corrections are 50% faster
 - TX drawings are produced 30% faster
 - Changes as a whole are managed 15% faster
 - Working relationships were greatly improved
 - Updates are communicated automatically instead of tracked manually
 - Progress is easily monitored and controlled at all stages of design and construction

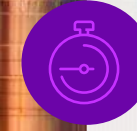
[View case study](#)



Collision corrections
50% Faster



TX drawings produced
50% Faster



Change management
15% Faster

EPC Contractor in Australia

- Used for the Varanus Island Compression Project for Apache Energy
 - Complex greenfield project with brownfield tie-ins
- Chose AVEVA E3D Specifically for it's tight integration with Laser Scan Data
- 3D Data Capture integration allows for familiarization of hazardous or difficult access sites
- Originally a 14-week schedule with 8,500 estimated man-hours delivered in 13 weeks

“ AVEVA E3D has enabled Atkins to increase design flexibility and increase accuracy. I'm honestly really impressed by it. ”

Jim Wright, Design Team Lead, Atkins



Delivered project
ahead of schedule

“ BubbleView™ enables you to rapidly check the 3D design model against the scan to detect clashes. It's very neat. It's very quick. Instead of waiting weeks for the information we need, we can get it in two days. ”

Jim Wright, Design Team Lead, Atkins

Follow Up Availability:

October 12th, 13th or 14th