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Introduction of the new 3D engine outline view and shipyard connection concept

X82DF-1.0, X82-2.0, X-DF upgrades, X-S, and future portfolio engines

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1 Introduction

WinGD presents a new concept for optimised shipyard relevant drawings and data sets in 3D CAD data format. This new concept builds on WinGD's already existing information in 2D data format. The 3D engine outline view and shipyard connection concept introduce enhancements for the shipyard relevant data sets, which contain improvements on drawings and models of several design groups.

The new concept includes three major enhancements:

1. Provision of 3D CAD data together with the already existing 2D data
2. Introduction of new Design Groups (DGs) such as DG 0812-01 and DG 0812-02, which allows more flexibility and on-time data dispatch depending on the project stage
3. General optimisation and harmonisation of the drawing content compared to the existing design

These optimised drawings and data sets will be available for the X82DF-1.0, X82-2.0, all X-DF upgrades, X-S, and future portfolio engines. For the remaining engine types, the existing drawings will remain unchanged.

This new concept has begun to be launched and the first fully completed data sets for selected engine configurations are expected to be available by the end of 2022. In addition to the existing 2D data, the 3D CAD data will be available on WinGD's webpage.

2 Affected design groups

The following table provides a summary of the new and existing design groups:

Table 2-1: Affected design groups of the shipyard relevant drawings

Design Group	Title
0812-01	Engine Outline View - Concept (new)
0812-02	Engine Outline View (new)
0816-01	Dismantling Dimensions – Concept (new)
0816-02	Dismantling Dimensions (new)
7602-01	Platform Outline View – Concept (new)
7602-02	Platform Outline View (new)
8020	Pipe Connection Plan (existing)
9715	Engine Stays (existing)

3 Design groups and drawing changes

In addition to the 3D CAD data, the following major drawing adaptations will be implemented for the new drawings and data sets:

1. Separation of platform relevant information from DG 0812-01/02 to DG 7602-01/02
2. All drawings for dismantling dimensions have been transferred from DG 0812 to DG 0816
3. Separation of dismantling relevant information from DG 0812-01/02 to DG 0816-01/02

Examples of several drawings from different engine types are provided in this document.

A new document, Engine Outline Specification – Dimensions and Tolerances, will be part of this new concept as outlined in this TIN.

DG 0812-01: Engine Outline View – Concept (new)

The new design group, DG 0812-01 applies in an early stage of engine development to verify if the selected engine fits into the hull of the vessel. This design group can be used for first concept studies of a vessel or engine room design. The model and drawing provide a first draft of the engine design, which includes dimensions and weights that are not final, and are accompanied with specific tolerances.

The drawing content of this design group includes:

1. The engine outline showing the main engine structure. Platforms can be found in DG 7602-01.
2. The 3D CAD outline model

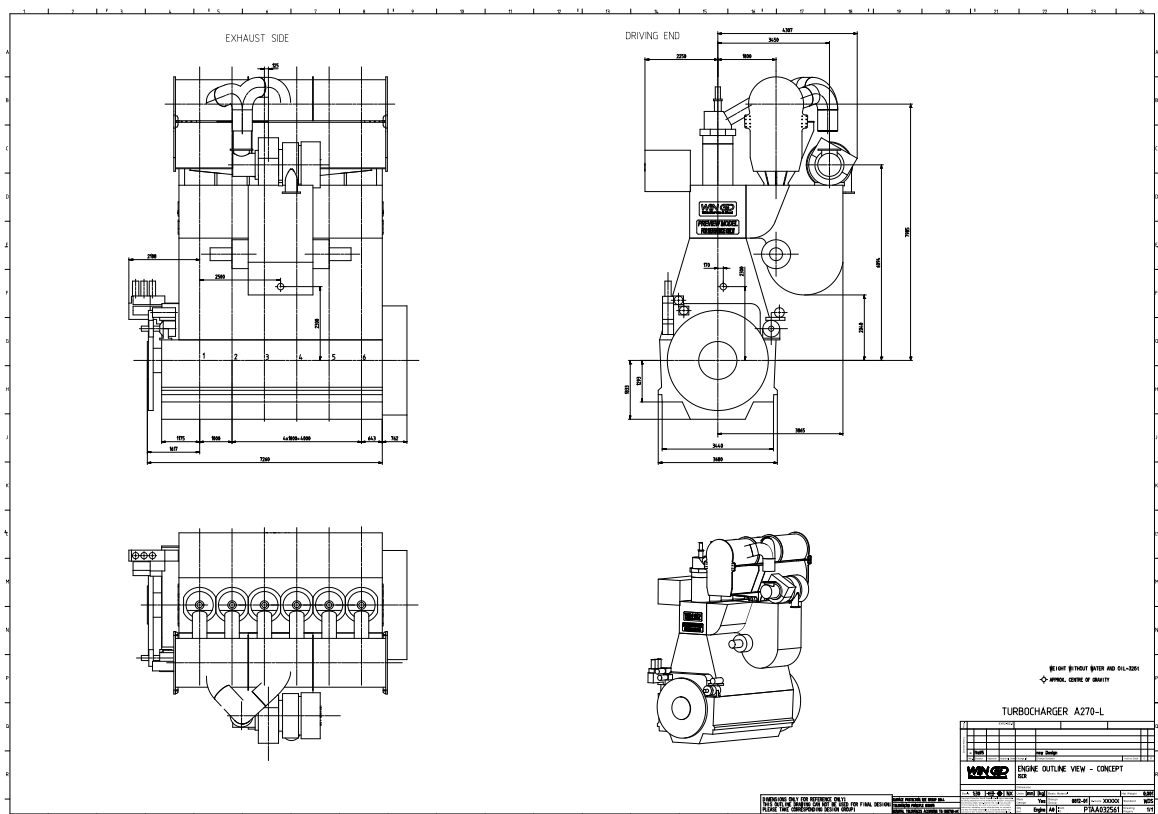


Figure 3-1: Example drawing of a new Engine Outline View – Concept (DG 0812-01) for a 6X62-S2.0 engine (A270-L, iSCR)

DG 0812-02: Engine Outline View (new)

The new design group, DG 0812-02 applies in the final stage of engine development. The engine design has been defined or approved. The dimensions and weights are final and include reduced tolerances.

The drawing content of this design group includes:

1. The engine outline showing the main engine structure. Platforms can be found in DG 7602-02.
2. The 3D CAD outline model
3. One drawing and model representing a single engine configuration (multiple executions and options will not be specified)

Information for scavenge air cooler and turbocharger dismantling, crane area, space for the engine room hatch, spare parts, and tool space have been transferred to DG 0816.

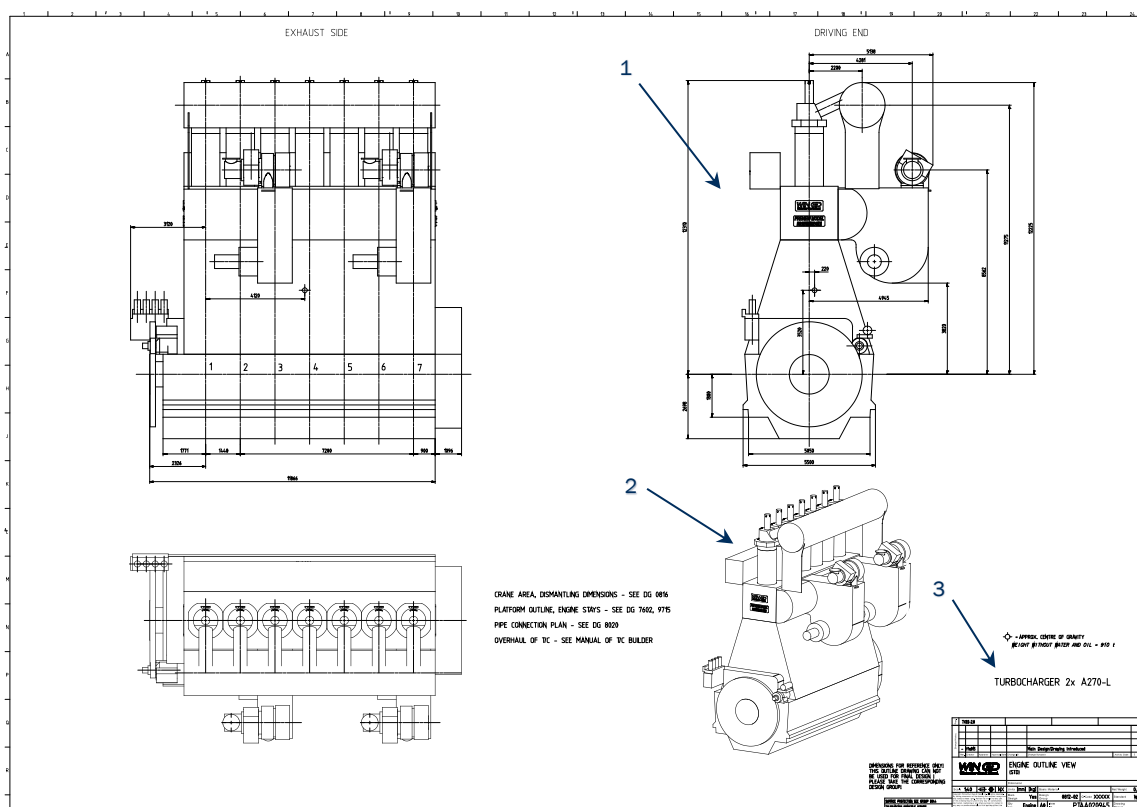


Figure 3-2: Example drawing of a new Engine Outline View (DG 0812-02) for a 7X82-2.0 (2xA270-L)

DG 0816-01: Dismantling Dimensions – Concept (new)

The new design group, DG 0816-01 applies in an early stage of engine development to verify whether the engine room height is sufficient. The most important dismantling dimensions such as those for the working piston or cylinder liner are provided.

The drawing content of this design group includes:

1. The dismantling height (F1), which is defined by the main component that requires the most vertical dismantling space (e.g. working piston or cylinder liner)
2. Dismantling components are available in 3D CAD format (see Figure 3-3)

Information such as crane capacity, crane area, space for the engine room hatch, etc. are not included in this design group.

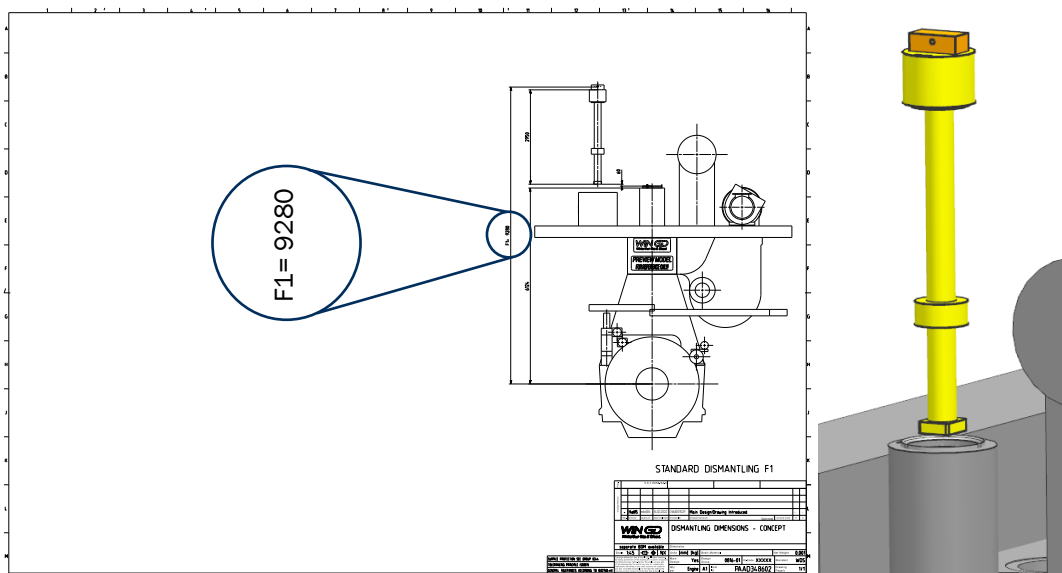


Figure 3-3: Example drawing of new Dismantling Dimensions – Concept (DG 0816-01) for X52-S2.0 engines. The 3D CAD model of the drawing (shown in yellow and orange) provides the space requirement of the working piston.

DG 0816-02: Dismantling Dimensions (new)

The new design group, DG 0816-02 represents the drawing and model of the dismantling dimensions in the final stage of engine development. The engine design has been defined or approved.

The drawing content of this design group includes:

1. The dismantling dimensions of all main components
2. Detailed information for crane capacity, crane area, space for the engine room hatch, spare parts, and tool spaces
3. Information for scavenge air cooler dismantling has been enhanced
4. Dismantling components are available in a simplified 3D CAD model (see Figure 3-5)

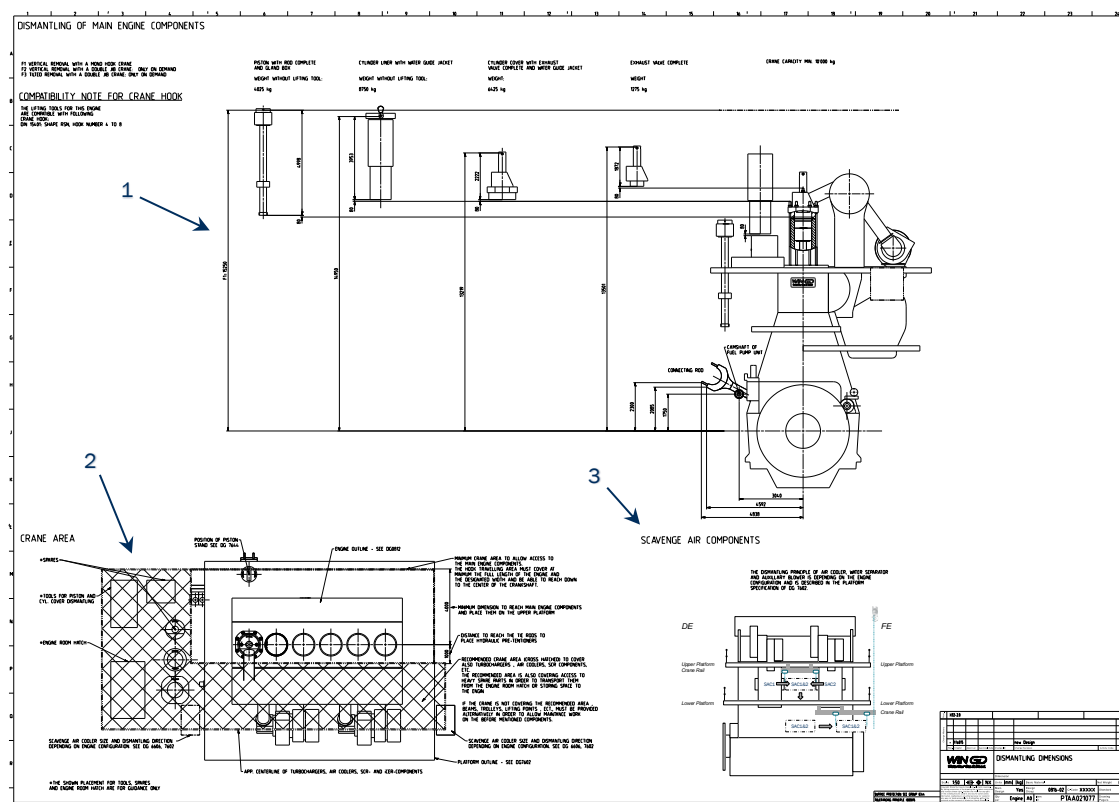


Figure 3-4: Example drawing of new Dismantling Dimensions (DG 0816-02) for X82-2.0 engines

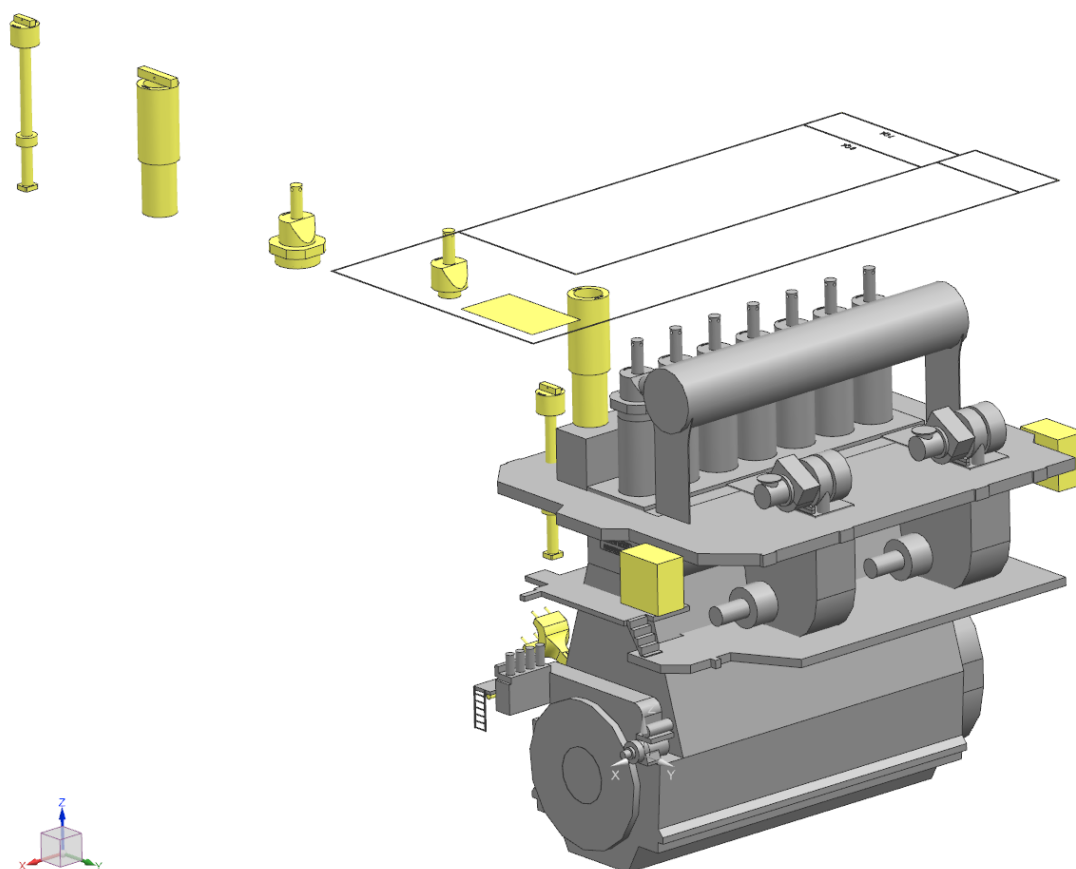


Figure 3-5: The 3D CAD model of the Dismantling Dimensions (DG 0816-02) for X82-2.0 engines, showing dismantling components in yellow and the crane area inside the rectangular frame

DG 7602-01: Platform Outline View - Concept (new)

The new design group, DG 7602-01 applies in an early stage of engine development to verify if the platform fits into the hull of the vessel. The model and drawing provide a first draft of the platform design. In this design group, major changes may occur throughout development.

The drawing content of this design group includes:

1. The platform which is shown in a simple rectangular shape and does not contain the final contour or cut outs
2. Data is available in 3D CAD format (see Figure 3-7)

Information such as top bracing system (engine stays) and passage height are not yet available in this design group.

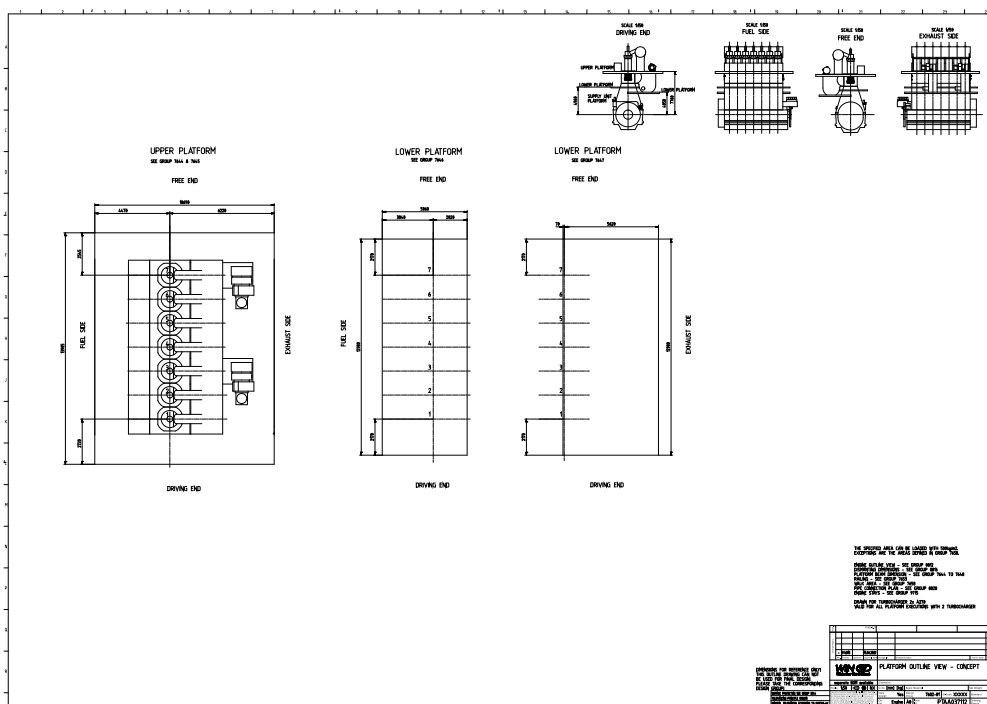


Figure 3-6: Example drawing of a new Platform outline view – Concept (DG 7602-01) for a 7X82-2.0 engine

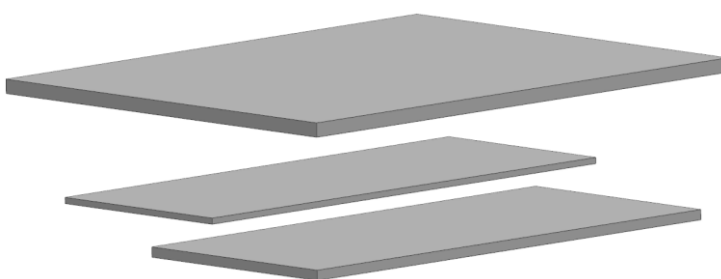


Figure 3-7: The 3D CAD model of the Platform Outline View – Concept (DG 7602-01) for a 7X82-2.0 engine

DG 7602-02: Platform Outline View (new)

The new design group, DG 7602-02 represents the data content in an advanced or final stage of engine development. The design of the platform outline is defined. In this design group, minor changes may occur throughout development.

The drawing content of this design group includes:

1. The platform dimensions and platform contour which are final design and available in 3D CAD format (see Figure 3-9)
2. Information about the railing
3. Positions of the top bracing system (engine stays)
4. An additional drawing with the top bracing positions in the parts list

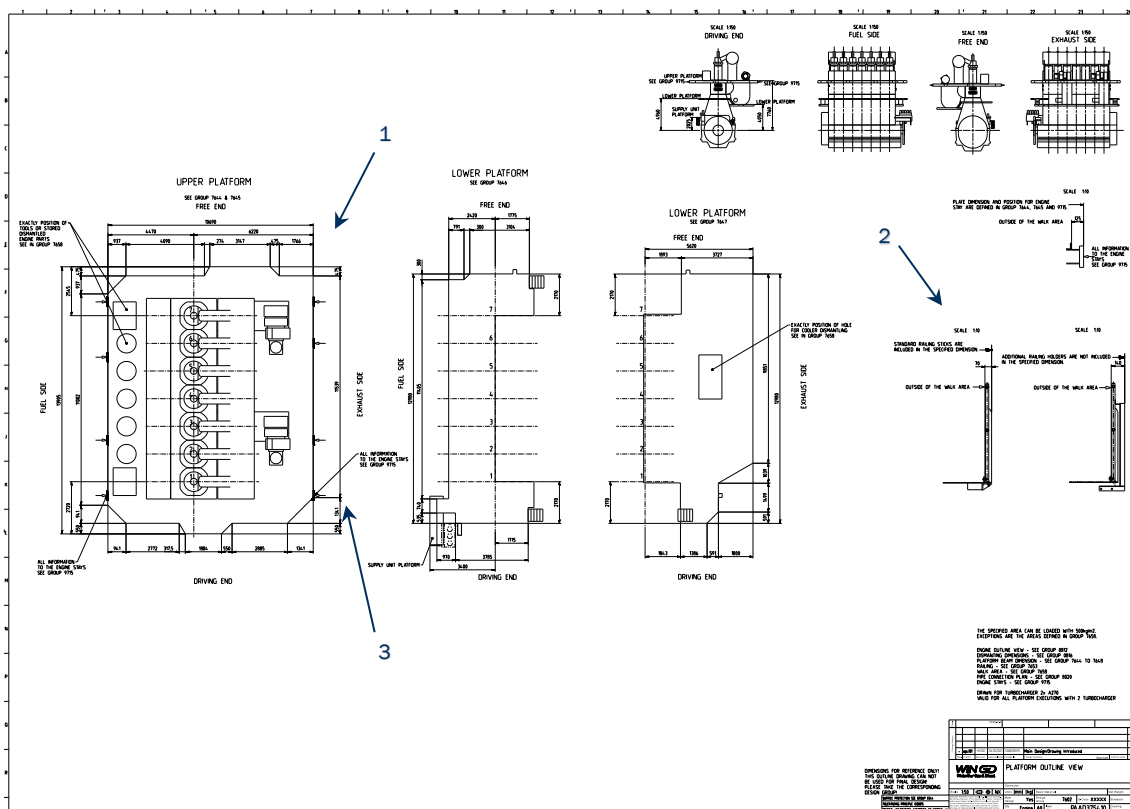


Figure 3-8: Example drawing of a new Platform Outline View (DG 7602-02) for a 7X82-2.0 engine

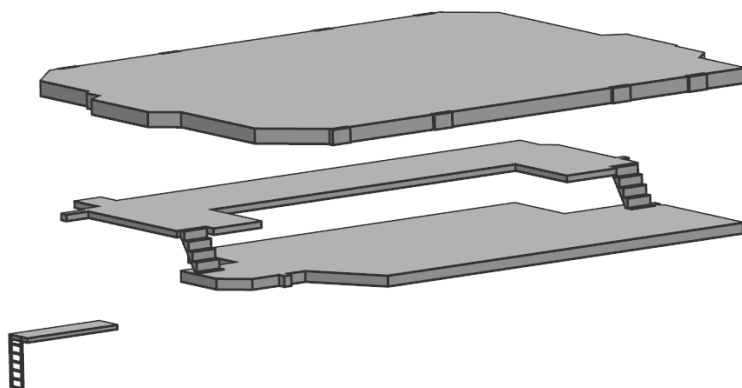


Figure 3-9: The 3D CAD model of the Platform Outline View (DG 7602-02) for a 7X82-2.0 engine

DG 8020: Pipe Connection Plan (existing)

The existing design group, DG 8020 has been expanded to include 3D CAD pipe connection parts. The background ambient assembly will be displayed in simplified format. The 2D drawing content of this design group will remain in its current format.

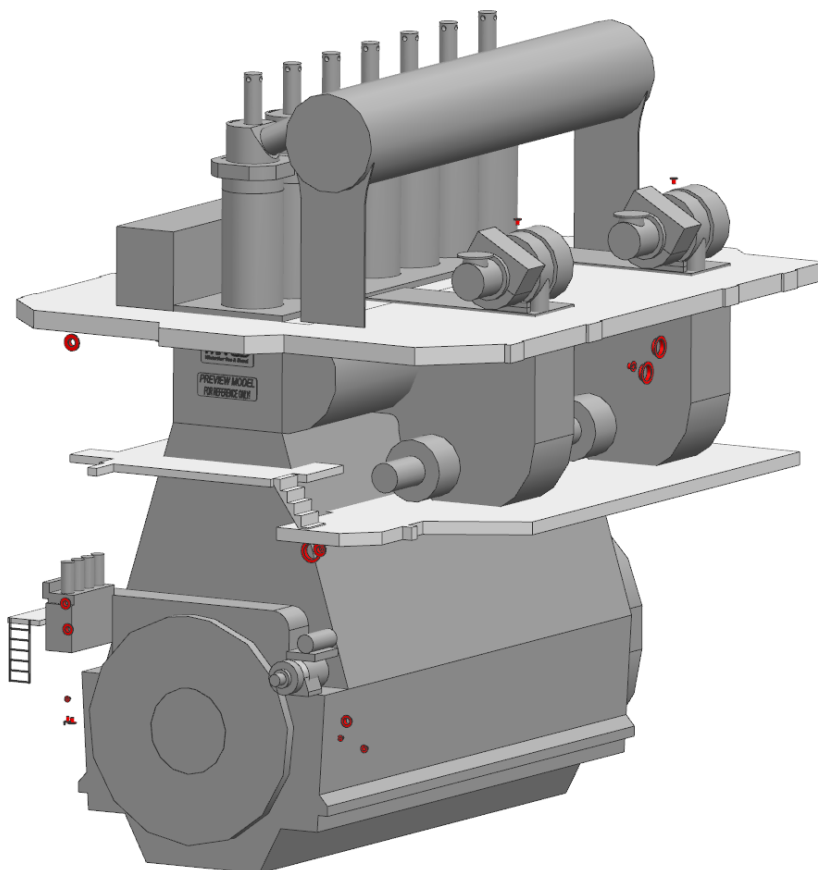


Figure 3-10: The new 3D CAD model of the Pipe Connection Plan (DG 8020) for a 7X82-2.0 engine, showing the pipe connection flanges in red

4 Combination of the 3D designs

The individual design groups can be combined into a 3D CAD assembly (see Figure 4-1):

1. The Engine Outline View (DG 0812-02) shown in grey
2. The Dismantling Dimensions (DG 0816-02) showing dismantling components in yellow and the crane area inside the rectangular frame
3. The Platform Outline View (DG 7602-02) shown in purple
4. The Pipe Connection Plan (DG 8020) shown in red

All components of the above listed design groups are relative to the same origin point, which lies in the centre of the crank shaft of cylinder 1.

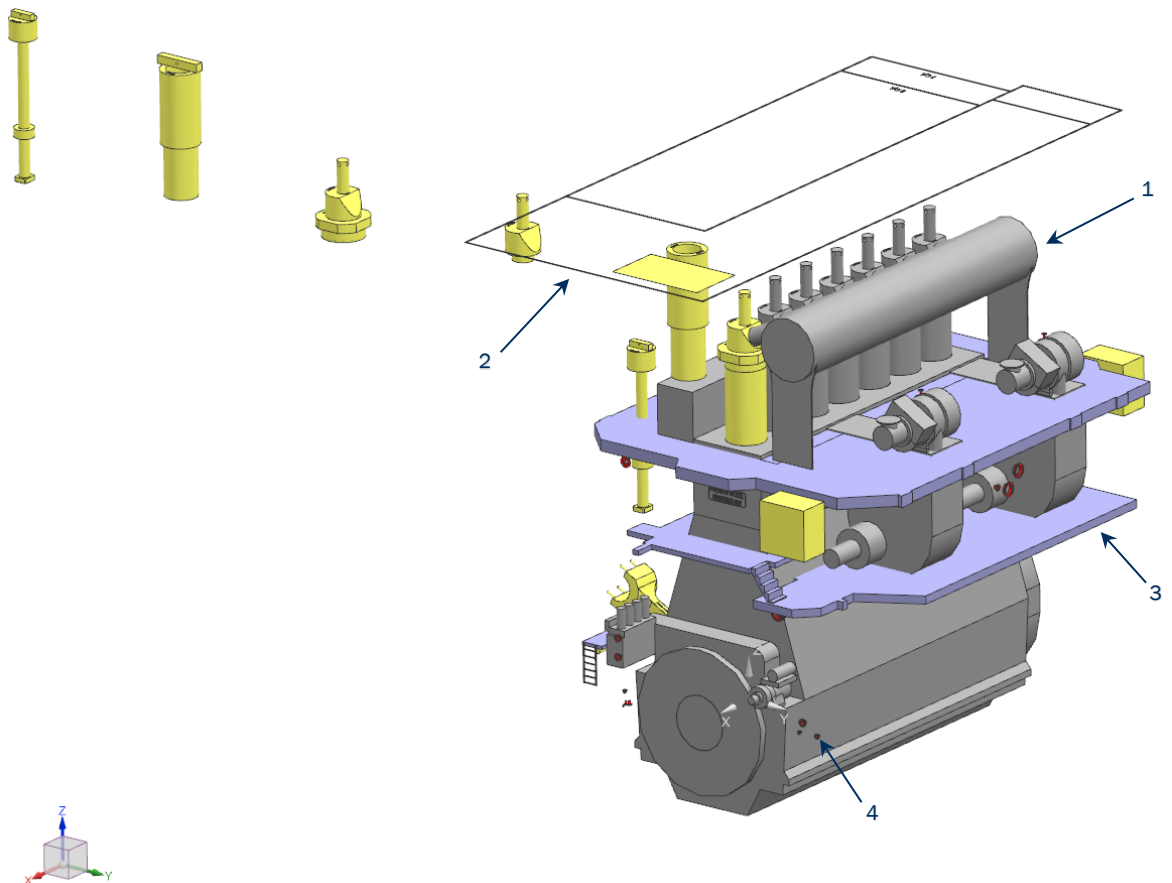


Figure 4-1: A combined 3D CAD model with multiple design groups (DG 0812-02, DG 0816-02, DG 7602-02, and DG 8020) for a 7X82-2.0 engine

5 Drawing availability

During the various stages of engine development, different design groups are available and will come with increasing accuracy over time:

- The concept design groups, DG 0812-01, DG 0816-01, and DG 7602-01 are designs in the early stage of engine development
- The final design groups, DG 0812-02, DG 0816-02, and DG 7602-02 are designs in the end stage of engine development
- For a combined assembly, concept design and final design groups can be mixed. However, final design groups contain more accurate data and therefore, overrule concept design groups. The final design groups will replace the concept design groups as soon as these are available.
- The optimised drawings and data sets will be available for the X82DF-1.0, X82-2.0, all X-DF upgrades, X-S, and future portfolio engines. For the remaining engine types, the existing drawings will remain unchanged.
- The new concept has begun to be launched and the first fully completed data sets for selected engine configurations are expected to be available by the end of 2022
- In addition to the existing 2D data, the 3D CAD data will be available on WinGD's webpage