SIMONA® SmartTank 3.0
Calculation program for rectangular and cylindrical tanks
In tank and apparatus construction, two aspects are of essential importance: the right material that is tailored to your requirements and the right partner with the expertise needed to provide you with pertinent advice – from the selection of materials to pre-engineering in the field. SIMONA offers you the best of both worlds – premium product quality and excellent service.

In close collaboration with our development partner, LU Engineering Software GmbH, we have consolidated decades of experience in the area of tank analysis so that you can benefit from intelligent software. The software is designed to meet the needs of our customers and is intuitive to use. From program structure to the design of the user interface, in SIMONA® SmartTank the focus is always on user benefit.

Version 3.0 of our SIMONA® SmartTank structural analysis software offers you an exciting array of possibilities for analysing thermoplastic rectangular and cylindrical tanks. In this second major enhancement of the proven software you can again look forward to innovative new program components and features that will enable you to maximise both cost-effectiveness and safety in the design of your tanks.

The program offers you:

- Maximum cost-effectiveness in the design of tanks
- State-of-the-art, future-oriented programming
- Realistic FEM formulation of circumferentially reinforced tanks and all the structural steel members, thus revolutionising the analysis of those components and providing considerable cost-saving potential
- Network-capable application and administration of the software
- Centralised administration of all projects in a project manager
- Simple, convenient user guidance
- Plausibility check and validation of all inputs
- High-quality, verifiable and graphically sophisticated outputs as well as complete printout
- Optimised service and support via hotline with minimal response times

SIMONA® SmartTank – Tank analysis software that sets new standards
Program highlights at a glance

- New geographical zone tool for simplified input of wind, snow and earthquake loads thanks to locating by means of postcode or geographical map
- Load determination in accordance with SIA 261 and ASCE 7-10
- Integration of the material PE-EL (electrically conductive polyethylene)
- Tank analysis for shell design
- Interactive sizing of wall thicknesses, shot limits and nozzles with error avoidance
- Creep curves that can be displayed to the design engineer live as a special feature, depending on the operating conditions selected
- Integrated miner tool for alternating temperature calculation
- Assistant for analysing tank columns
- Call up either the current DIBt media list or alternatively our SIMCHEM database
- Analysis of rectangular tanks in accordance with the latest DVS draft (integrated FEM basis)
- FEM analysis for flat roofs of cylindrical and rectangular tanks
- SIMONA® twin-wall sheets module for analysing flat roofs of cylindrical and rectangular tanks
- User-defined profile arrangement for circum-frentially reinforced tanks
- Profile maker for creating and administering custom reinforcement profiles
- Materials manager to customise material definition for reinforcements

You can also obtain detailed information on the software at [www.simona.de/en/smarttank](http://www.simona.de/en/smarttank) or directly from the SIMONA Technical Service Centre.

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Standard features of SIMONA® SmartTank

Our tank analysis program SIMONA® SmartTank was presented for the first time in 2016 to coincide with the plastics trade fair in Düsseldorf. With innovative analysis modules, an extremely user-friendly environment and top-quality structural analysis documentation, SIMONA® SmartTank remains unique within the market. Here are some of the highlights that still constitute an integral part of the program:

1. Miner-Tool
   The miner tool integrated into SIMONA® SmartTank makes it possible to enter different temperatures and their length of exposure when specifying a mean operating temperature over the service life of the tank.

2. Column analysis
   Within the program a copy of an existing tank can be generated and customised with a few mouse clicks in order to process series of tanks within a very short space of time.

3. Call up either the current DIBt media list or alternatively the SIMCHEM database
   In addition to the SIMCHEM database, as of version SIMONA® SmartTank 2.0 the material-dependent DIBt media lists are also made available for the selection of alternatives.

4. FEM analysis for flat roofs of cylindrical and rectangular tanks
   Especially if the flat roof is to be rated as walk-on, the analytical methods applied within DVS 2205 call for relatively conservative analytical assumptions that generate considerable wall thicknesses and also take roof reinforcement for granted. The FEM analysis newly integrated into SIMONA® SmartTank 2.0 relieves the user of this necessity and reduces the wall thickness of the tank roof substantially.

5. SIMONA® twin-wall sheets module for analysing flat roofs of cylindrical and rectangular tanks
   SIMONA® twin-wall sheets are characterised by significant flexural strength. With the structural design concept developed by LU Engineering Software GmbH it becomes possible to use this product in conventional tank construction. In connection with the FEM sizing module integrated into SIMONA® SmartTank if a maintenance agreement has been concluded, the number of stiffeners or the cross sections thereof can be reduced or an arrangement of stiffeners can even be omitted completely. This brings about a considerable reduction in the weight of the roof.

6. Analysis of rectangular tanks according to the latest DVS standards
   Analysis of rectangular tanks is performed in accordance with DVS 2205-05. The draft of the newly written 2205-05 information sheet appeared at the beginning of 2020. The new information sheet guides the user through the analysis process in much greater detail and corrects any calculation models that were too conservative. One key item that was changed is the option of still being allowed access to FEM analyses in compliance with this information sheet.

   This opens up the following possibilities, for example:
   - Consideration of linking the tank to stiffening profiles: if the analytical relationships are used for sizing according to DVS 2205-05, the reinforcement profiles must be designed with the conditions set out below.
     Reliable profile deformation of the reinforcement profiles for circumferentially reinforced tanks and cross-ribbed tanks:
     - \( wp,1 \leq 0.01*b_1 \) Span height of the first span
     - \( wp,i \leq 0.01*b_i \) Span height below in the \( i \)-th span
     During a sizing process with the aid of FEM this requirement does not apply because the relationship of rigidities and their impact on design variables are identified directly and the quantities of steel are thus reduced substantially.
   - Detection of the real stress distributions within a tank: Knowledge of the real stress characteristics within the tank enables optimal exploitation of the existing material reserves.
   - Independent floor and wall thicknesses: the analytical calculation requirements of DVS 2205-05 assume full fixity between floor and wall, and hence at least identical wall thicknesses for both components. Within FEM different wall thicknesses can be used for sizing the tank and both components can be sized with adequate stability.
   - Tank roof sizing with the aid of FEM
8. Profile maker

The profile maker was newly integrated into the rectangular module of SIMONA® SmartTank 2.0. When the profile maker has been activated, a dialog box opens which shows all the profiles that can be defined by the user. After selection of a profile type all the necessary cross-section data is requested, the necessary cross-section values are calculated by the SIMONA® SmartTank program and they are then made available for sizing. Consequently, exotic profile series or self-created welding profiles can also be easily made available by users with little background knowledge of structural analysis.

7. User-defined profile arrangement for circumferentially reinforced tanks

Apart from the optimised profile layer made available by SIMONA® SmartTank in order to ensure a specified wall thickness for circumferentially reinforced tanks, it is also possible to specify a profile layer by graphical interaction and have SIMONA® SmartTank calculate the relevant wall thickness. In addition to the option of moving profiles by drag & drop, profiles can also be added or deleted.

9. Materials manager

Using the also newly implemented materials manager, absolutely any material can be defined by the user and applied when sizing the stiffening profiles. Application is amazingly simple. After activation of the materials manager the user is shown all the materials existing in the program and he or she is given the option of adding a new material by pressing the „+“ button. Then, within the menu that opens up, a unique material name has to be issued and the material values requested have to be entered. When the material has been saved, it is available for all future sizing processes.
Discover SIMONA® SmartTank 3.0

Our expertise continues to develop further – and SIMONA® SmartTank continues to grow. The program is being continuously optimised so it always reflects the state of the art. The third release of the SIMONA® SmartTank software offers you an extended catalogue of modules that will make your daily work in tank construction even more convenient by streamlining the tank analysis process.

1. Geographical zone tool
The geographical zone tool determines wind, snow and earthquake loads within a region selected by the user. In a simple drop-down menu the user can systematically select one of currently nine European countries (Germany, Austria, Switzerland, Luxembourg, Belgium, Netherlands, Denmark, Poland and Hungary) and the required parameters are automatically read out of the database, which contains over 80,000 stored data records. As a result, it is no longer necessary to make manual entries. At the same time the geographical zone tool visualises the location on a graphically interactive map to enable the user to check output.

The new geographical zone tool, which is a unique feature in the market, offers the following benefits:
- Convenient detection of all basic load data
- Visual checking of input location
- Automatic consideration of the respective national annex/national standard
- Ultra-fast specification of all wind, snow and earthquake loads

Map view for locating with regard to wind, snow and earthquake loads.
Locating can be performed either by using a drop-down list or in map mode. In the latter case the respective zones are clearly visualised so attention is drawn to borderline areas (characteristic of the respective load zone). The geographical zone tool is linked to the Eurocodes and Swiss standard SIA 261.
2. Load determination in accordance with SIA 261 and ASCE 7-10

SIMONA® SmartTank 3.0 enables load determination in accordance with SIA 261 and ASCE 7-10 for the load cases of snow, wind and earthquake. This module can also be used manually, irrespective of whether the geographical zone tool is being applied.

3. Integration of the material PE-EL (electrically conductive polyethylene)

The material PE-EL – an electrically conductive polyethylene – has been newly integrated into SIMONA® SmartTank 3.0 with its long-term data. Thus, it is now also possible to design tanks made of this material.

4. Uplift safety

According to DVS 2205, it is necessary to produce evidence of adequate uplift safety inside a drip pan in the event of damage. SIMONA® SmartTank generates the relevant evidence and documents it in a verifiable manner within the structural analysis. In this context, the program supports both procedures that are possible according to DVS 2205-2:

1. Proof of a suitable retaining structure
2. Proof of enlargement of the inside diameter of the drip pan (takes place automatically in the program)
5. Tanks of shell design – tensile strength monitoring

If sheet-based tanks exceed the permissible strain limitations for the material used owing to their media load, according to DVS 2205-2 Supplement 6 a wide shell can be specified. For this purpose, SIMONA® SmartTank generates all the necessary proofs and documents them in a verifiable form.

### Prices and services

<table>
<thead>
<tr>
<th>Service/Feature</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>SmartTank full version incl. all packages</td>
<td>€ 9,200,00</td>
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<tr>
<td>TWS module</td>
<td>Included in the service agreement</td>
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<td>Project manager</td>
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<td>Languages German/English/French</td>
<td>Included as standard</td>
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<td>Network dongle</td>
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</tr>
<tr>
<td>Service agreement per full version</td>
<td>€ 1,380,00 p.a.</td>
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</table>
Benefits of a service agreement at a glance:

- Innovation
- Safety
- Value retention
- Profitability
- Cost control
- Reduction of software outages

Our software is subject to ongoing further development and improvement. At least once a year a new main version of the software is published on DVD and as a download on our server. Customers with maintenance agreements are notified automatically and are sent the download link on request.

These main versions contain the following:

- All software corrections (bug fixes) since the last software version
- New functions, extensions and improvements of the software and the available versions
- Standard-dependent software updates (e.g. in the event of changes made to a national standard)
- Changes made to DVS rules

Here are the details of the services provided under a service agreement:

- Maintenance of the current version and the preceding version
- With every new main version and every new service pack a detailed list of all the bugs fixed is offered in the protected download area. That list is only available to customers with a maintenance and support agreement.
- Automatic delivery of updates (bug fixes, minor program changes) of all the programs in the software family for which the service agreement has been concluded (up to a maximum of three times a year, download via Dlubal extranet).
- Telephone support and guaranteed call-back if you are unable to talk to any of our service technicians immediately
- Preferential treatment in hotline support
- If necessary, online support via Internet video conference
- Price reductions for future upgrades (major chargeable further developments) of the main programs
- Price reductions for consultancy and project management services rendered by our team of engineers IFKI in the event of complex problems that are beyond the scope of our software modules.

The following special features are exclusively available to customers with a service agreement:

- Twin-wall sheet sizing
- Profile maker
- Materials manager
- Geographical zone tool
- Load assumptions in accordance with SIA 261 and ASCE 7-10

Please note: as opposed to updates, upgrades are program versions that have been revised very significantly or completely reprogrammed. It is not possible to skip upgrades. This means it is not possible to upgrade directly from version 1.xx of a program to version 3.xx if a version 2.xx exists. All the intermediate versions are obligatory and have to be acquired. With a service agreement you are entitled to reduced-rate upgrade terms.
Welcome to SIMONA –
Put your trust in expertise and service

SIMONA is one of the leading manufacturers and development partners for thermoplastic products. We provide optimal solutions for your applications: in the chemical process industry, water and energy supply, and for environmental engineering, mobility, construction and advertising equipment. Anywhere in the world.

Our customers benefit from our first-class advisory service. Our employees are specialists in their field and have years of experience in the manufacture and processing of plastic components. Whether it involves tank and apparatus construction, interior linings or pipeline construction, our experts will be pleased to assist you with product selection and also help to answer questions about the use of our products. It’s advice you can rely on.

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