

# CAD review by *The Home Handyman Magazine* – July 2016

PROGRAMME	OPERATING SYSTEMS SUPPORTED	USER INTERFACE AND FEATURES	LEVEL OF EXPERTISE REQUIRED	DIRECT OR PARAMETRIC	2D OR 3D	FILE FORMATS SUPPORTED	PRICE	RESTRICTIONS	PROS	CONS	RATING
<b>PTC Creo Elements Direct Modeling Express 6.0</b>	Windows® 7 32-bit & 64-bit, Windows® 8 32-bit & 64-bit	Odd user interface and workflow will take some getting used to for users of parametric 3D modelling software. Very powerful and fully featured.	Advanced	Direct	3D & 2D	Imports Autodesk® DWG, DXF, STEP and IGES 3D. Export in VRML and STL only.	Express version is free	Files created in the Express version cannot be used in the full professional version. Cannot save files in common file formats like .step. Professional version costs \$2 200.00 USD.	Can handle assemblies with up to 60 unique parts. Can create parts, assemblies and drawing with a bill of material.	Active Internet connection required to run software every 72 hours. No constraints so dynamics of assemblies cannot be tested. No support for threads, sheet metal part developments. No support for saving in common formats. Windows operating system only.	8/10
<b>SketchUp Make version 16.1.1449</b>	Windows® 10, Windows® 8+ and Windows® 7+ Mac OS X 10.11+ (El Capitan), 10.10+ (Yosemite) and 10.9+ (Mavericks) Can run on Linux using Wine.	Simple interface is good for those who are new to 3D modelling. Very limited tool set. Originally intended for modelling buildings. Not easy to work with precision so this may not be the best programme for machine parts.	Novice	Direct	3D only	Saves in .skp format. Exports in .dae and .kmz only.	Basic version is free	Not for commercial use. Cannot generate drawings from 3D models or save in common formats. Professional version costs \$695.00 USD.	Simple interface. Can create assemblies and apply textures to faces of models. Supports Mac OS. Large online community of users.	Too basic for advanced users. No constraints so dynamics of assemblies cannot be tested. No support for threads or sheet metal part developments. No support for saving as DWG, DXF, STEP and IGES 3D.	5/10
<b>DesignSpark Mechanical 2.0</b>	Microsoft® Windows 7 - 32-bit and 64-bit Microsoft® Windows 8 - 32-bit and 64-bit Microsoft® Windows 10 - 64-bit	Modern ribbon type interface. Because DesignSpark supports SketchUp format it makes the ideal next step for users of SketchUp who are looking for more advanced 3D modelling tools but still want to use their existing data. Can be used to convert SketchUp files to other formats.	Intermediate to advanced	Direct	3D only	Saves in .rstdoc format. Imports .obj, .skp, .stl. Exports in Autodesk® 2D DXF, .obj, .skp, .stl, .xaml and 3D pdf.	Free	The basic version cannot generate 2D drawings from 3D models or save in the popular 3D formats. Add-ons are available to extend the programme's capabilities. DS Mechanical Exchange – for STEP & IGES support costs \$795 USD. DS Mechanical Drawing – to create drawings from 3D models costs \$795 US.	Access to 40 000+ 3D models from the RS Components Catalogue. Can generate bill of materials from assemblies. Parts can be ordered directly from the software.	No constraints so dynamics of assemblies cannot be tested. No support for saving as DWG, STEP and IGES 3D. Windows operating system only.	9/10
<b>eMachineShop Basic Version 1.916.1.44</b>	Windows® 32-bit & 64-bit	Odd user interface and workflow. Excellent for drawing and testing sheet metal patterns. Can be used for modelling simple machine parts too.	Advanced	Parametric	3D only	Saves in .ems format. Imports Autodesk® DXF, STEP and IGES 3D. Exports in DXF, STEP and IGES 3D, .stl and .xml.	Free	No restrictions.	Saves in all the common formats. Parts can be ordered directly from the software in USA. The software can generate a quote so that you can see how various design changes will affect the price of the component you are designing. Automatic design assistant is great for making designs more practical to manufacture.	Cannot generate drawings from 3D models. Does not support assemblies or bills of materials. Only the flat patterns can be exported not the folded sheet metal part. Support for metric and NPT threads but not BSP thread.	7/10

PROGRAMME	OPERATING SYSTEMS SUPPORTED	USER INTERFACE AND FEATURES	LEVEL OF EXPERTISE REQUIRED	DIRECT OR PARAMETRIC	2D OR 3D	FILE FORMATS SUPPORTED	PRICE	RESTRICTIONS	PROS	CONS	RATING
<b>123D Design 2.1.11</b>	Windows® 7 and up 32-bit & 64-bit OS X 10.6.6 or later OS 7.0 or later Compatible with iPad	Simple interface is good for those who are new to 3D modelling. Has a fairly comprehensive tool set. Not easy to work with precision so this may not be the best programme for machine parts. Great for converting file formats.	Novice to Intermediate	Direct	3D only	Saves in .123dx format. Imports Autodesk®DWG, DXF, STEP, .sat, .obj and .stl. Exports in Autodesk®DWG, DXF, STEP, .sat, .x3d and VRML.	Basic version is free	Private use. Premium (commercial) version costs \$9.99/month.	Saves in all the common formats. Access to a library of free projects and 3D models. Compatible with iPad.	Cannot generate drawings from 3D models. No constraints so dynamics of assemblies cannot be tested. No support for threads, sheet metal part developments.	8/10
<b>KOMPAS-3D V15 Home</b>	MS Windows® XP SP3 Windows® 7 32-bit & 64-bit	No ribbon but it does have a feature tree on the left like Autodesk Inventor and other high end packages. Tool bars work a little differently to other programmes but the tutorial explains this well.	Advanced	Parametric	3D & 2D	Exports in DWG, DXF and STEP	\$89.00	Private use. Commercial version costs \$3,699.00 or \$319.00 for three months rental.	Supports the popular CAD formats. Fully parametric 3D modelling with feature tree.	No support for assemblies, sectional views, sheet metal and bill of materials. Limited support in the English language (videos are mainly in Russian).	9/10
<b>Cubify Design 2014</b>	Windows XP with Service Pack 3, Windows Vista, Windows 7 and Windows 8	Extremely capable 3D drafting programme with support for parametric assembly constraints. Sadly, there is no support for sheet metal part design and only basic 2D drawing tools. The programme comes bundled with Keyshot for photo real rendering.	Advanced	Parametric	3D & 2D	Imports IGES, STEP and SAT. Exports 3D models in STL and 2D drawings in dwg format.	\$199.00	Sectional views and bill of materials are greyed out with this version. The full version is called Geomagic Design and costs over R30 000.00.	Fully parametric 3D modelling with feature tree. Can be used to test the dynamics of assemblies. Imports the most popular CAD formats. Affordable price tag.	Exports 3D models in STL format only. This is a major limitation. Windows operating system only.	8/10
<b>Autodesk Fusion 360</b>	Microsoft® Windows® 7 SP1 or Microsoft® Windows® 8.1, Windows® 10. Apple Mac® OS® X Mavericks (10.9.5), OS® X Yosemite (10.10.5), OS® X El Capitan (10.11).	A high end cloud-based parametric CAD/CAM programme. Can be used to test fit and motion, perform simulations, create assemblies, make photorealistic renderings and animations. Modelling can be done in offline and only synced to the Cloud when bandwidth is cheaper. Allows for collaboration with other users anywhere in the world.	Advanced	Parametric	3D & 2D	Imports and exports DWG, DXF, STEP, IGES 3D, STL and OBJ. Imports native files from Autodesk Inventor, CATIA V5, Pro/ENGINEER, SolidWorks, SketchUp and Rhino.	Free.	Free for hobbyists or small start-ups. A start-up is defined as company generating less than \$100 000 (or equivalent in other currency) per year working on a project or product that is not yet commercially available. Rental is \$25 per month on an annual subscription for non-startups.	The most powerful parametric 3D modelling programme we tested. Excellent tutorial videos and support. Can import almost any well known 3D CAD format. Saves in all the common formats.	Works best with a reliable Internet connection but can be used offline. Because it is Cloud based some users may have concerns about hackers stealing intellectual property or privacy concerns.	10/10
<b>Onshape</b>	Any operating system that can support a web browser including Windows, Mac, Linux, Chromebook, Mobile iOS and Android.	A high end cloud-based parametric CAD programme. This is an online only programme. There is no way to work offline. This may be a problem in areas with unreliable Internet connections.	Advanced	Parametric	3D & 2D	Imports and exports DWG, DXF, STEP, IGES 3D, STL, SolidWorks, CATIA v5 and Rhino. Imports native files from Autodesk Inventor, CATIA V6, Pro/ENGINEER, and SolidWorks and Rhino.	Free	Free for hobbyists but Cloud storage is limited to 5GB (100MB private). You are also limited to 10 private documents. If you need more than 10 you have to make them open for use by the general public. The professional version costs \$100 per user per month and does not have these limitations.	Very powerful high end 3D cad software. Can be used by virtually any device that can connect to the Internet.	Cannot be used offline. The program needs a fast and reliable internet connection so it may not be suitable for South African conditions. Because it is Cloud-based some users may have concerns about hackers stealing intellectual property or privacy concerns.	7/10

PROGRAMME	OPERATING SYSTEMS SUPPORTED	USER INTERFACE AND FEATURES	LEVEL OF EXPERTISE REQUIRED	DIRECT OR PARAMETRIC	2D OR 3D	FILE FORMATS SUPPORTED	PRICE	RESTRICTIONS	PROS	CONS	RATING
<b>FreeCAD 0.15</b>	Windows, Linux/Unix and Mac OSX	No ribbon but it does have a feature tree on the left like Autodesk Inventor and other high end packages.	Advanced	Parametric	3D & 2D	Reads and writes STEP, IGES, OBJ, STL, DXF, SVG, STL, DAE, IFC or OFF, NASTRAN & VRML.	Free	No restrictions. Open source.	Supports the popular CAD formats. Fully parametric 3D modelling with feature tree. Can create 2D views of your 3D models on a drawing sheet. Large on-line community of users.	Unfortunately the programme tends to be unstable which makes it frustrating to use. There is no support for sheet metal parts at present. An assembly module is currently being developed.	4/10
<b>DraftSite 2015</b>	Windows, Mac & Linux. The latest version does not run on Windows XP and Vista. DraftSight is unsupported on Mac or Linux 32bit machines.	Similar to AutoCAD LT classic. The tool set is good enough for general drafting.	Intermediate and advanced	Direct	Mainly 2D with some 3D support	.dwg & .dxf	Free	The specialised tools are only available in the professional version at a cost of R1 583.00.	Runs on Mac and Linux. Good for general purpose drafting. Large on line user community and excellent support.	All specialised tools are behind a pay wall. Can be a bit unstable.	8/10
<b>Solid Edge 2D Drafting ST8</b>	Windows 7 and 8	A free, reliable and fully featured 2D drawing programme. The interface is modern with a ribbon. The tool set is best suited for machine part detailing but it could be used for anything.	Novice to advanced	Direct with parametric support.	2D only	.dgn, .dwg & .dxf	Free	2D drafting only.	Very easy to use. Supports parametric drafting. Perfect for circuits and 2D detailing of mechanical parts. Can save in MicroStation Format.	No support for 3D drafting. No Mac or Linux version.	10/10
<b>NanoCAD 5.0</b>	Windows XP, Windows Vista, Windows 7 and 8	Almost exactly like AutoCAD LT classic. The programme recognises the AutoCAD keyboard shortcuts and the user interface is very easy to customise. This programme is good for general 2D drafting.	Advanced and professional	Direct	Mainly 2D with some 3D support	.dwg & .dxf	Free	Limited 3D functionality. The pro version costs \$290 and supports 3D modelling with parametric constraints.	Can be used for commercial purposes. Easy to customise the user interface. Lightning fast.	Need to renew the subscription once a year. No Mac or Linux version.	9/10
<b>MEDUSA4 PERSONAL V5</b>	Windows and Linux	Odd user interface and workflow. Powerful but very different to other CAD programmes.	Extremely advanced	Direct	Mainly 2D with some 3D support	.dwg & .dxf	Free	Free for private use only. Drawings can be released for commercial use on a fee per drawing basis.	Support for designing sheet metal parts and 3D drafting.	Steep learning curve. No Mac version.	6/10
<b>DoubleCAD XT 5</b>	Windows® XP, Vista or Windows 7	The user interface is similar to classic AutoCAD light but with some updates. This programme is good for general 2D drafting.	Advanced and professional	Direct	Mainly 2D with some 3D support	.skp, .dwg & .dxf	Free	No restrictions.	Can be used to generate detail drawings of SketchUp 3D models. Has tools for drawing house plans.	No Mac or Linux version. .Dwg exports sometimes have formatting issues.	8/10
<b>AllyCAD HOME Version</b>	Windows® XP, Vista or Windows 7	The interface is reminiscent of AutoCAD but quite different in many respects. AllyCAD has a strong following among civil engineers, town planners and architects in South Africa.	Advanced and professional	Direct	Mainly 2D with some 3D support	.dwg & .dxf	R 980,00	The entry level version is limited to a maximum of 300kb. There is no email or telephonic support for the home version but you can access the online support forum. The professional version costs R28 700.00.	Affordable pricing. Powerful 'toolkits' for architectural, structural, mechanical and survey drafting.	Not free. No Mac or Linux version.	8/10