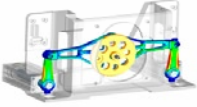

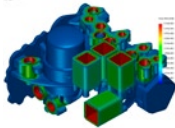
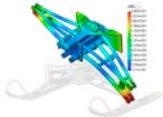
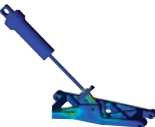

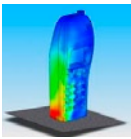
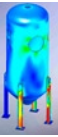


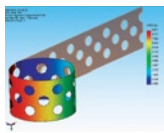
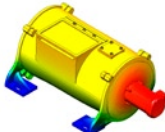
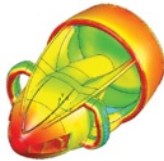
# DESIGN VALIDATION - QUICK REFERENCE GUIDE

COSMOS provides simple, accurate design analysis that leads to better products by giving designers a safety net for catching errors.

- Design validation helps:
- Improve the quality of your product
  - Cut the cost of your product
  - Improve the performance of your product

	Analysis Type	Feature Benefits	Keywords
SOLIDWORKS OFFICE PREMIUM	<b>Stress analysis (linear)</b> 	<ul style="list-style-type: none"> <li>• Will the part break under normal operating <b>loads</b>?</li> <li>• Is the model <b>over-designed</b>?</li> <li>• Can the design be modified to increase the <b>safety factor</b>?</li> </ul>	Yielding Factor of safety Prototyping
	<b>Motion simulation</b> 	<ul style="list-style-type: none"> <li>• Does the design contain <b>moving</b> parts and assemblies?</li> <li>• What is the correct size <b>motor</b> or <b>actuator</b> for the design?</li> <li>• Need to study <b>linkage</b> movement, cam-drives, gear-drives or latch-<b>mechanisms</b>?</li> </ul>	Motors and actuators Mechanisms Cams and Gears
	<b>Heat transfer (thermal)</b> 	<ul style="list-style-type: none"> <li>• How do <b>temperature</b> changes effect the model?</li> <li>• How does the model operate in an environment with temperature fluctuation?</li> <li>• How long it takes for the model to <b>cool down</b> or <b>overheat</b>?</li> <li>• Does temperature change cause the model to expand?</li> </ul>	Thermal conduction Thermal stresses Time dependent cooling/heating
COSMOSWORKS PROFESSIONAL	<b>Vibration</b> 	<ul style="list-style-type: none"> <li>• Is the model exposed to excessive <b>shaking</b> or <b>rattling</b> or <b>vibration</b>?</li> <li>• How do you know if your model does not <b>buckle</b> for the applied load?</li> </ul>	Natural frequency Resonance
	<b>Fatigue</b> 	<ul style="list-style-type: none"> <li>• Can the <b>lifespan</b> of the product be estimated accurately?</li> <li>• Will modifying the current design help extend the <b>product life</b>?</li> <li>• Do you have <b>warranty</b> issues?</li> <li>• Will redesigning the model help minimize <b>damage</b> caused by fluctuating forces or temperature?</li> </ul>	Cyclic loading Product life Damage prediction
	<b>Optimization</b> 	<ul style="list-style-type: none"> <li>• How do you know you have the best design?</li> <li>• Is material cost important?</li> <li>• Can the <b>shape</b> of the model be changed while maintaining the design intent?</li> <li>• Can the design be made <b>lighter, smaller, cheaper</b> without compromising strength or performance?</li> </ul>	Weight reduction High material cost
	<b>Drop test</b> 	<ul style="list-style-type: none"> <li>• Is the product <b>portable</b> or handheld?</li> <li>• What will happen if the product is mishandled during transportation or <b>dropped</b>?</li> <li>• How does the product behave when dropped on hardwood floor, carpet, or concrete?</li> </ul>	Handheld products Drop testing
	<b>Pressure vessel</b> 	<ul style="list-style-type: none"> <li>• Does your pressure vessel design meet <b>ASME standards</b>?</li> <li>• Have you optimized the thickness of your pressure vessel designs?</li> </ul>	Stress linearization Load case combination



	Analysis Type	Feature Benefits	Keywords
COSMOSWORKS ADV. PROFESSIONAL	<b>Nonlinear analysis</b> 	<ul style="list-style-type: none"> <li>Are the parts made of <b>plastic, rubber, foam, or Nitinol</b>?</li> <li>How will the seals or o-rings in the design perform?</li> <li>Does the model experience <b>excessive bending</b> during normal operating condition?</li> <li>Does the assembly include snapping, <b>friction</b> effects, or any form of <b>contacts</b>?</li> <li>Is impact loading a concern to your products?</li> </ul>	Plastic components Rubber, foam Seals and o-rings
	<b>Advanced Dynamics</b> 	<ul style="list-style-type: none"> <li>Is your design operating under a load that changes with <b>time</b>?</li> <li>Does your part operate near machinery?</li> <li>Do you test your products on a <b>shaker</b> table?</li> <li>Do you supply products for the military or aerospace industry?</li> </ul>	Shaker table test <b>Random vibration</b> Shock loading
COSMOSFLOWWORKS	<b>Fluid flow</b> 	<ul style="list-style-type: none"> <li>Does <b>liquids</b> and <b>gas</b> flow through your design?</li> <li>Are you interested in pressure drop across <b>valves</b> and <b>regulators</b>?</li> <li>Is cooling an issue in your designs?</li> <li>Do you do wind tunnel testing?</li> <li>Do you deal with fluids like plastic melts, <b>blood, toothpaste, honey</b> etc?</li> <li>Are you designing components that is involved in drug delivery?</li> <li>Is your product getting overheated by <b>radiation</b>?</li> </ul>	CFD analysis Fans Heat transfer Pump

## Design Validation Products

# COSMOSWorks

## Adv. Professional

### Professional

Designer

Static



Vibration




Thermal



Drop Test



Nonlinear



Motion\*



Fatigue



Optimization



Advanced Dynamics



COSMOSFloWorks  
Flow Simulation



COSMOSEMS  
Electromagnetic



\*Motion is included in Designer as part of the SW Office Premium bundle or as part of CW Professional.