

 ON - DEMAND FEA · ELASTOMERIC SEAL DESIGN

Seal design is still trial-and-error.

Every new oil or bearing seal means cutting steel, molding, measuring, and starting over. **For most teams the simulation that would end the guesswork is out of reach.**

01

Long lead times

Iterative physical trials run into days or weeks per design.

02

High cost of entry

Legacy FEA licenses plus a workstation run into tens of thousands of dollars.

03

Steep learning curve

Traditional tools expect a highly trained FEA specialist to drive them.

WHAT SEALSIM IS

One workbench. Upload a STEP file. Get answers.

SealSIM is **on-demand finite element analysis** for elastomeric seals — delivered as a browser workbench, priced per simulation.



No FEA training

Pick a module, upload geometry — done.



Pay per simulation

Zero upfront software cost.



Manufacturable output

CAD-ready DXF: one line or arc per curve. Text and Word reports in SI and Imperial units. Stress plots and animations.



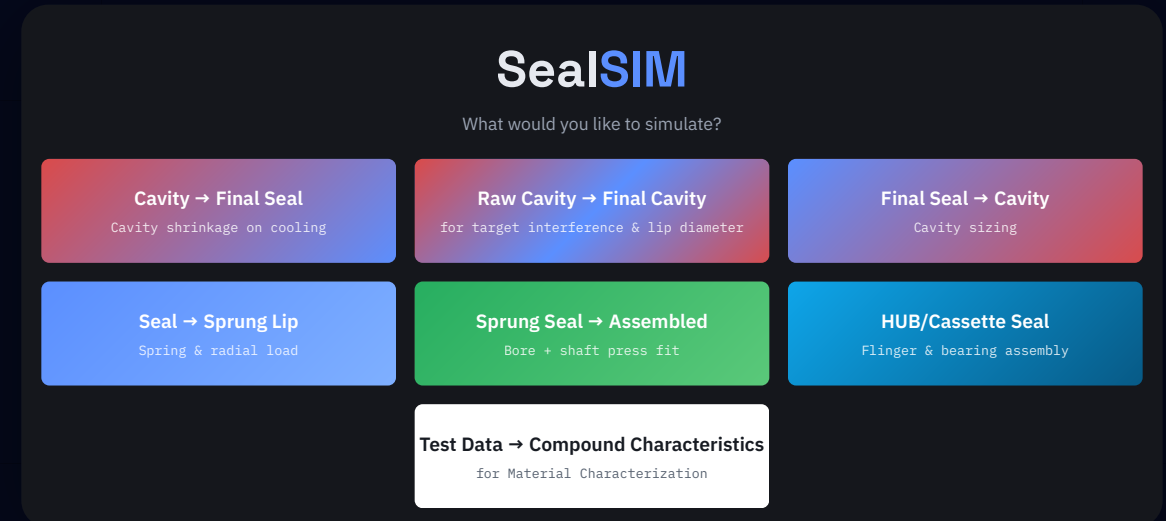
Runs on a laptop

Cloud-solved. No workstation, no licenses.



Accuracy in microns

Lip geometry predicted to within microns.



Seven one-click modules — M1-M5 and M7 for seals, M0 for the material model.

M1 • MODULE

Cavity → Final Seal

Predict the molded seal before you cut steel. From a mold cavity, SealSIM derives the as-molded seal after cooling shrinkage.



YOU GET

Lip diameters

Interference angles

R-value

Main, dust & axial lips

CAD-ready DXF

M2 • MODULE

Target Optimization

Dial a cavity in to your spec — automatically. Fix an existing cavity and let SealSIM tune the parameters to hit your target.



YOU GET

Cavity dimensions on-target

No manual sweeps

Main, dust & axial lips

Exact cavity DXF

RULE-BUILT CAVITY • HEEL AND FLEX SECTION DESIGN CHECK IN THE REPORT

M1

M2

M3

M4

M5

M7

M3 • MODULE

Final Seal → Cavity

Reverse-engineer your tooling. Start from the seal you want and derive the mold cavity that produces it.



YOU GET

Cavity geometry

Fewer tooling re-cuts

Main, dust & axial lips

CAD-ready DXF

M1

M2

M3

M4

M5

M7

M4 • MODULE

Seal → Sprung Lip

See the lip under spring load. From a molded seal, derive the sprung-lip behavior and the garter spring that drives it.



YOU GET

Sprung-lip geometry

Radial load on shaft

Garter-spring characteristics

GARTER SPRING • F5, F10, TENSION AND STRESSES FOR EACH WIRE SIZE

M1

M2

M3

M4

M5

M7

M5 • MODULE

Full Assembly

The whole assembly — and the number that sells a seal. Bore press-in and shaft insertion in one run, with the radial load the lip exerts on the shaft.



YOU GET

Unsprung radial load

Sprung radial load

Press-fit forces

Contact angles & pressure

Stress plots

TWO METHODS • ASSEMBLY SIMULATION OR SEATED STATE

M1

M2

M3

M4

M5

M7

M7 • MODULE

HUB / Cassette Seal

Unitize the cassette and fit it before you build it. Press the flinger into the hub seal, then the cassette into the bearing or hub. See every lip load and the stress where the lips bend.

INPUT

Seal + case + flinger

Radial, Aux and axial lips — sprung or not. Bearing rings.

**SealSIM**
assemble

OUTPUT

Cassette in the bearing

Unitized and fitted, with lip loads and stresses

YOU GET

Unitization force

Lip loads & contact points

Bend-radius stress

Stress plots

Seal & assembly DXF

TWO STAGES • FLINGER ASSEMBLY, THEN BEARING ASSEMBLY • TWO METHODS

M1

M2

M3

M4

M5

M7

 TWO ANALYSIS METHODS

Full travel or seated state. You choose.

Assembly Simulation

The full assembly motion, step by step.

- Bore press-in and shaft insertion peak forces
- Lip fold and lip damage check
- Deformed-shape animation
- End values and worst case over the stroke

Seated State

Faster compared to Assembly Simulation.

- Parts start at the seated position
- Final radial loads, contact pressure and stresses
- Press-in force given as an estimate
- Best for quick design loops

 CHECKS BEFORE YOU RUN

Catch input errors before the solve.

SealSIM checks your geometry and inputs first. **Stops and warnings tell you what to fix.**

01

Profile and labels

One closed profile per file. Labels checked against seal design rules.

02

Interference from your parts

Bore and shaft interference measured from the uploaded geometry.

03

Spring against groove

Garter-spring free diameter checked against the spring groove.

04

Press-fit entry

Chamfers and entry radii checked for a clean press-in.

05

Lips against the flinger

Seal checked against the flinger at your offset (M7).

06

Messages first

Every stop and warning comes before the run starts. No lost solve time.

 STRESS PLOTS

See where the rubber works hardest.

Every assembly run ends with **stress plots of the seal on its deformed shape** — and the peak values in the report.



Assembly stress plot

Von Mises stress on the assembled, deformed parts (JPG).



Seal stress plot

The seal alone, on its own scale, with a numbered marker at each lip contact.



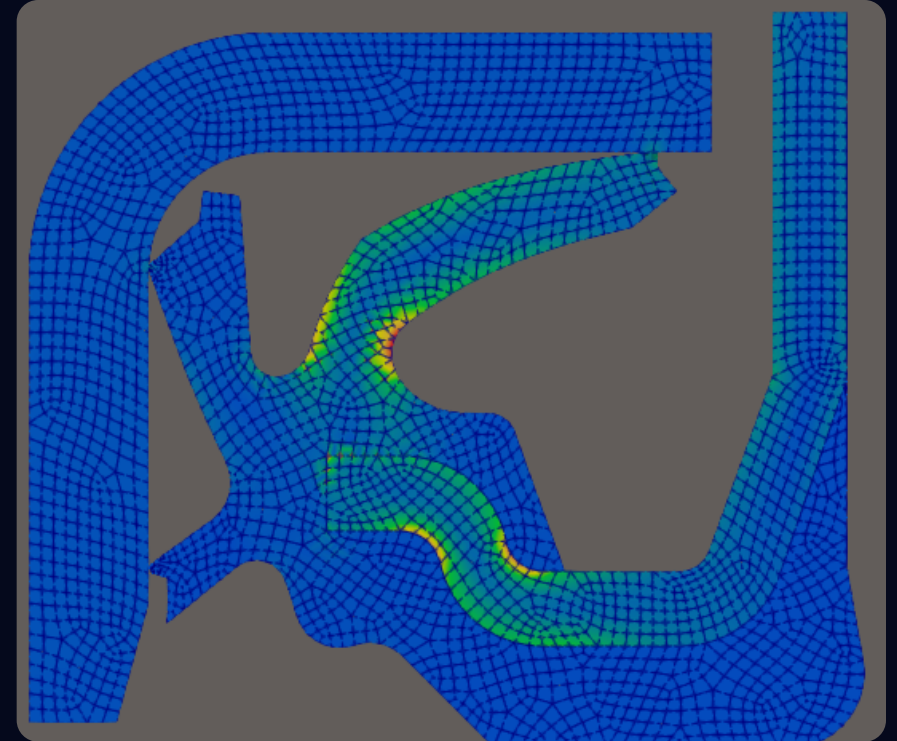
Named points (M5 and M7)

Lip contacts, axial-lip bend radii and the Aux-lip fold: max principal and von Mises.



End and worst case

Values at the end of the stroke and the maximum over the stroke.



X-type cassette seal – stress after flinger assembly.

A horizontal bar with a rainbow gradient, transitioning from red on the left to blue on the right.

THE WHOLE WORKFLOW

Stop iterating. Start optimizing.

From mold cavity to the cassette in the bearing — **six seal modules and one material module**, on any laptop, priced per simulation.

M1

Cavity → Final
Seal

M2

Target
Optimization

M3

Final Seal →
Cavity

M4

Seal → Sprung
Lip

M5

Full Assembly

M7

HUB / Cassette
Seal

M0

Material
Calibration

Start your first simulation at sealsimtech.com

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