

Designation

RSC-S1 “Shellform”

Stationary lunar press that forms the **course-spider-optimized** cartridge shell and lid. It does not dig soil, stack the wall, or fill the radiation mass. It only makes the two hard parts whose geometry RSC-CS is allowed to clamp and pour into.

Vendor excavator, hopper, conveyor, and demold arm are out of scope except as interfaces. The article you own is the **frame + dual-die set + thermal/vacuum set cycle**.

Why this machine exists

RSC-CS will not climb a compacted-dirt brick or a fabric bag. It needs:

- a square chamfered mouth for the chute/skirt
- a recessed lid with a **hookable rim beam**
- corner pin hole and fiducial faces
- walls that take clamp pinch into the box, not through the lid span

Shellform is the tool that freezes that interface in ISRU material. If you change the rim, you change the feet. The press and the spider are one drawing package.

What is commercial vs what is yours

Element	Source
Dig, haul, coarse screen	Commercial / existing ISRU excavator
Feed hopper, conveyor, 6-axis demold arm	Commercial, dust-derated
Press frame, platens, actuators	Yours (or a vendor frame with your control and platens)
Tub die + lid-rim die + fiducial/pin inserts	Yours only
Mix recipe, pressure/temp/time, release draft	Yours only

A terrestrial block press is not Shellform. It does not cut the rim beam or the mouth chamfer RSC-CS requires.

Outputs (two SKUs, one cycle family)

1. **Tub** — open-top square shell, ~2–4 cm walls, chamfered ID, draft for core pull.
2. **Lid** — recessed field, raised hookable rim, seal face, corner pin hole, fiducial recesses.

Both from the same sized-regolith + binder / cold-sinter feedstock. Not the fill dirt that later goes in the wall.

Green parts leave the press onto a cure tray. They are not climbable until cured and, in the wall, until filled and capped.

Die set (the actual product)

Tub die

Female box + male core. Gap = wall thickness. Core carries the mouth chamfer. Slight draft. Vents so vacuum-dry mix does not trap voids at the corners RSC-CS will pinch.

Lid die

Female that forms the **rim lip** (outer hook catch) and the recessed shoe pocket (inner foot). Inserts stamp:

- pin hole
- checker / high-contrast fiducial pockets (filled later or left as as-molded contrast)

Dies are imported steel (or equivalent). They are the high-value landed mass. Shell material is local.

Change rule: die inserts are serialized to RSC-CS foot revision. No mixed rim generations on one wall.

Process

1. Beneficiate a **shell stream** (fines + optional fiber). Keep it separate from the fill stream.
2. Charge the closed die.
3. Press at modest load with platen heat and/or vacuum set — not a 1500 °C melt cell, not wet concrete.
4. Hold until the skin can be demolded without tearing the rim.
5. Core pull / lid eject onto conveyor.
6. Offboard cure in vacuum until the rim meets clamp rating.
7. Inspect rim continuity, mouth square, pin hole, fiducials. Fail = crush for recycle, never send to the wall.

Target cycle is tens of minutes per part plus cure, not seconds. Throughput is set by how fast RSC-CS can place empty tubs, not by Earth brick-plant rates.

Notional specifications

Item	Target
Role	Form tub + rim-lid only
Planform	Frozen to RSC / RSC-CS (order 0.6–0.8 m)
Wall / lid rim	~2–4 cm skin; lid is a rim beam
Landed mass (press + dies)	keep dies + platens as the mass you actually protect

Item	Target
Power	kW-class during press/heat, not megawatt furnace
Environment	vacuum, abrasive dust, thermal cycle
Quality gate	rim hook profile + mouth chamfer + fiducials in spec

Interfaces

Upstream: screened shell-mix hopper (commercial).

Downstream: cure rack → RSC-CS or a setter places **empty cured tubs** on the course.

Robot contract: mouth ID matches RSC-CS chute/skirt; lid rim matches RSC-CS clamp;

CAPPED vision marks are molded in, not painted as an afterthought if paint is an Earth extra.

Failure modes Shellform is responsible for

- Weak rim that RSC-CS punches or peels
- Mouth out of square so the skirt does not seat
- Core lock / torn chamfer on demold
- Missing pin hole or unreadable fiducial
- Sending green parts to the climbable wall

Dust on the die face is a dimensional error, not a housekeeping issue. The rim profile is the robot's foothold.

What you would sell or license

Not “a press on the Moon.”

Rimform tooling + recipe + interface control drawings tied to RSC-CS feet and chute. The excavator in the picture is scenery.

One-line spec: *RSC-S1 Shellform is the dual-die lunar press that forms the thin ISRU tub and hookable rim-lid whose geometry is the only legal foothold and pour mouth for the Course Spider.*