

# SWIRLED ENTHALPY EQUILIBRATION DEVICE

An innovative process for the production of high integrity die casting parts

## How it works

Semi-solid forming has proven to be an effective solution for the production of high integrity parts. The SEED - Swirled Enthalpy Equilibration Device - operates by using a liquid based method (rheocasting) for producing a prime quality aluminium slurry that can be processed through high pressure die casting.

The principle is based on achieving a rapid and controlled thermal equilibrium between a metallic crucible and the bulk of molten aluminium. The process delivers a high solid fraction feedstock which is free of entrapped oxides. This feedstock allows for the casting of heat-treatable weldable parts showing high mechanical properties, high ductility, and ultra-low porosity for leak-tight applications.

The SEED technology has proven to be highly efficient on a wide variety of aluminium foundry alloys and has even been demonstrated on wrought compositions (6xxx). Shot weights and dimensions can be readily adjusted (demonstrated up to 54 kg), and the process can be retrofitted to both horizontal and vertical die/squeeze casting machines.

## Key features

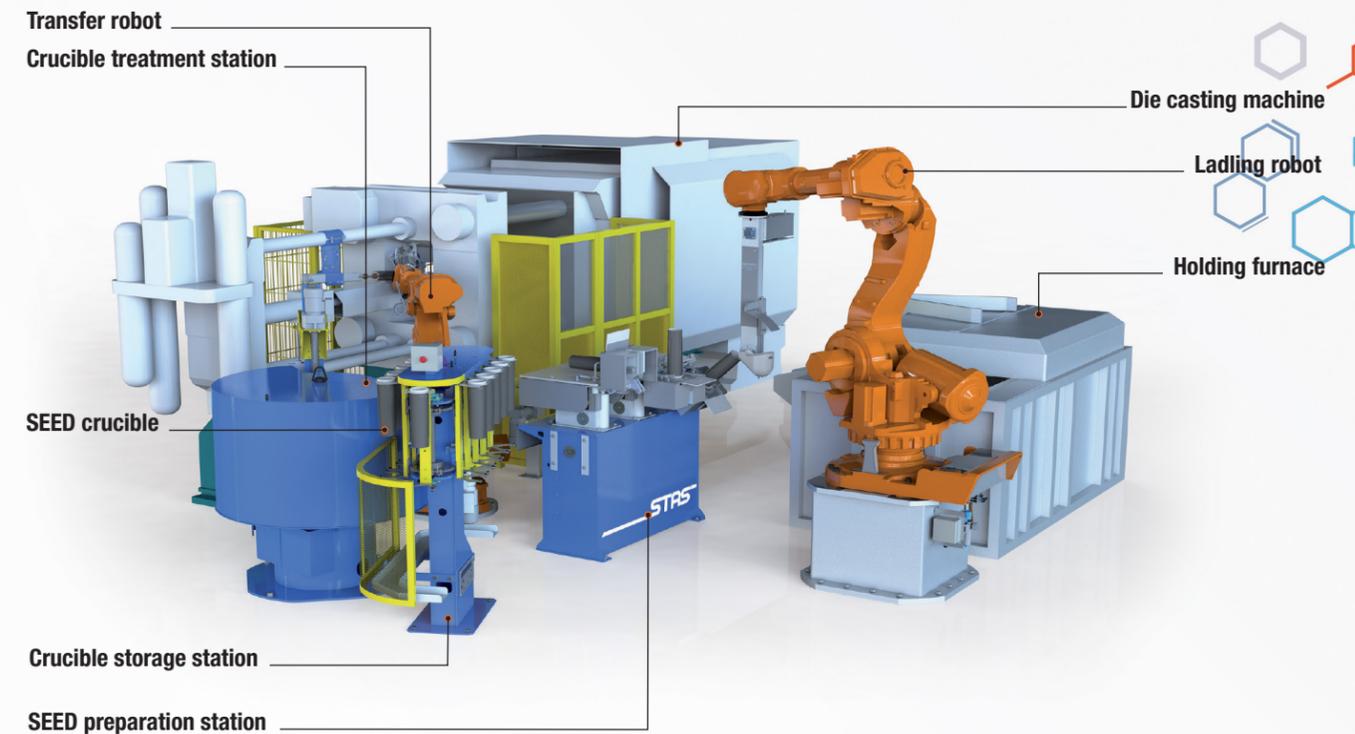
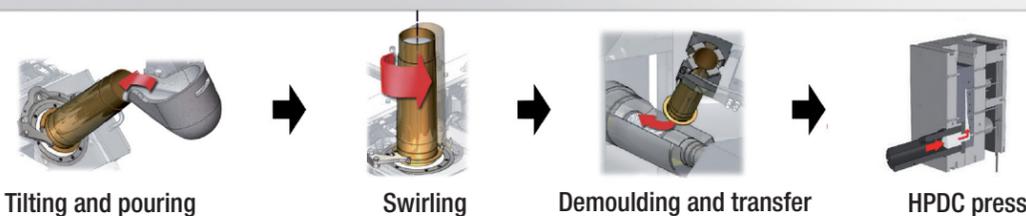
### Casting Quality Improvement

- > Production of high integrity parts suitable for structural applications.
- > T5 and T6 heat-treatable (blister free) and weldable parts.
- > Near net shape, thick and thin walled castings that require less machining.
- > Geometrical flexibility.
- > Enhanced mechanical properties.

### Productivity Improvement

- > Faster cycle rate.
- > Reduced total heat load on tooling, resulting in longer die life.
- > Returns can be fully reused.
- > Fully automated machine that can be used with both horizontal and vertical die/squeeze casting machines.

## SEED process



## Typical specifications

	Material		Mechanical properties		
	Alloy	Temp.	Yield strength (Mpa)	Tensile strength (Mpa)	Elongation
SEED rheocasting*	357	T6	298	354	11%
Thixocasting	357	T6	240	310	13%
Squeeze casting	357	T6	241-262	324-338	8-10 %
VRC/PRC	356	T6	239	314	11%
Gravity permanent mold	357	T6	248-262	331-345	5-7 %
Sand casting	357	T6	230	300	5%
Vacuum HPDC	226	T6	269	373	4%
HPDC high pressure die casting	390	As Cast	241	279	1%

\* T6 Temper can be optimised to increase or reduce strength (affecting elongation). Please refer to technical documents on our Website. Mechanical properties presented in the table are typical values from different publications.

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