
Heat checking resistance of the AMDAP™ LTX
3D-printed mold evaluated by a die casting machine

Evaluation conditions

- ◆ Metal powders : AMDAP™ LTX, Maraging steel

Hardness of 3D-printed molds : 51HRC

- ◆ Die casting conditions

Cast Al-alloy	ADC12	Injection velocity	1.6m/s
Weight of a cast	600g	Casting pressure	65MPa
Temperature of molten Al-alloy	685°C	Lubricant spray time in a cycle	3s



Fig.1 Die casting machine for this test

- ◆ Evaluation method

- Number of cycles: total 10,000 cycles
- Compared the appearance of the test molds after penetrant testing

Test mold

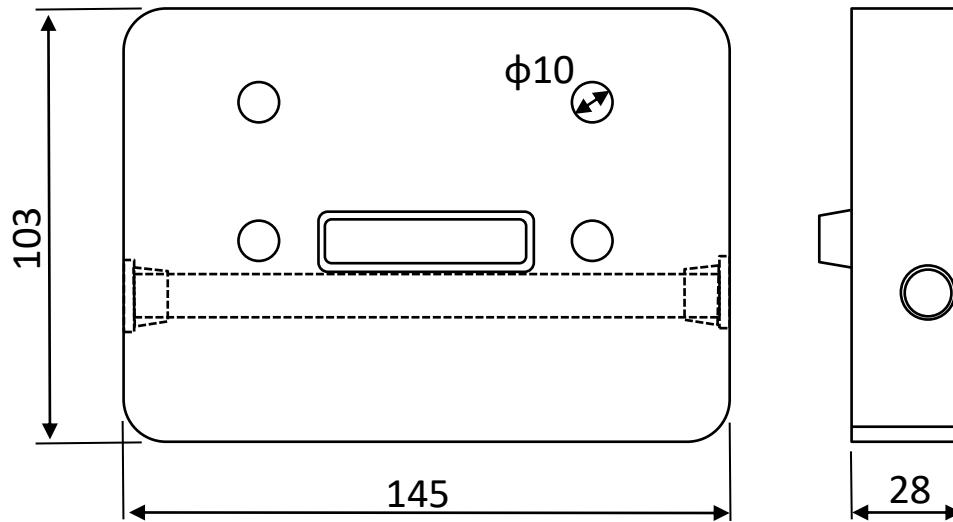


Fig2. Shape of test mold

The corner shape was 5R to prevent cracking.

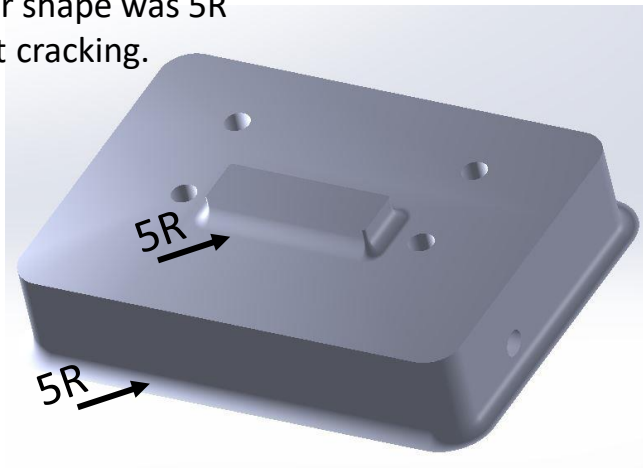


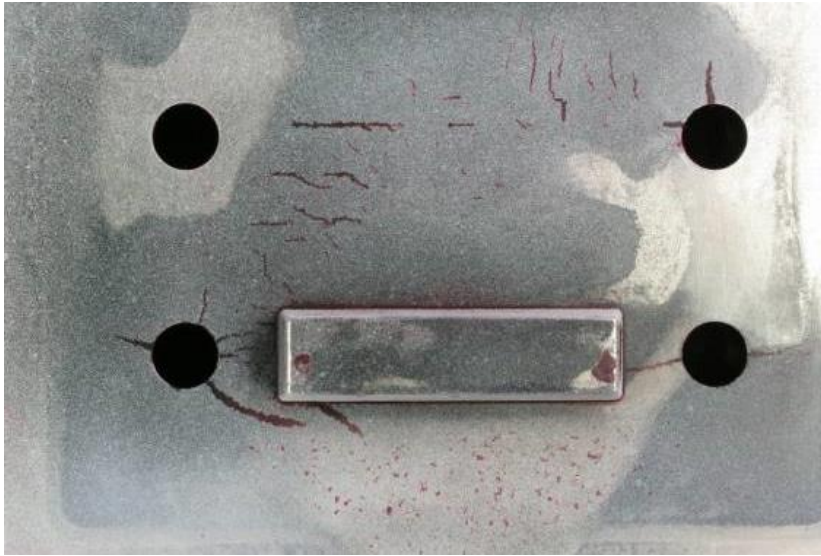
Fig. 3 CAD model of test mold



Fig. 4 Appearance of the 3D-printed test mold

Results

Maraging steel(51HRC)



AMDAP™ LTX(51HRC)

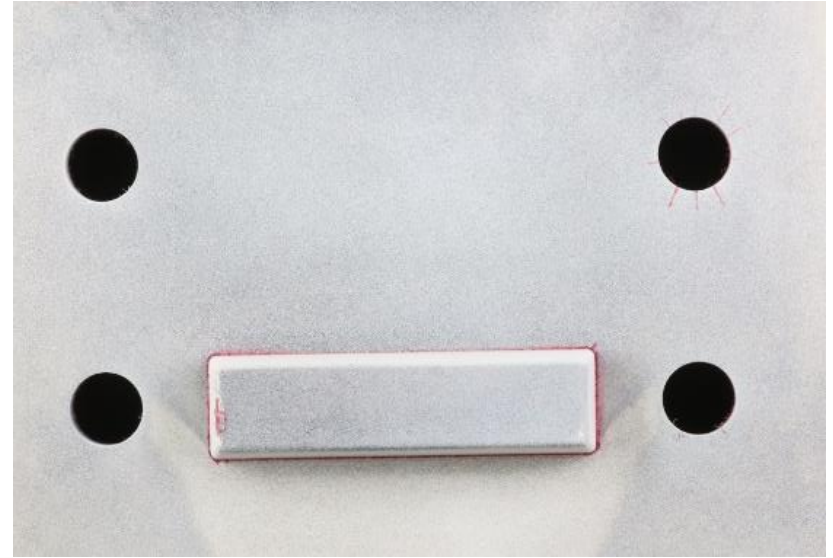


Fig. 5 Comparison of the appearance of the test molds after penetrant testing (at 10,000 cycles)

The AMDAP™ LTX 3D-printed mold shows less number of heat checking cracks than that of maraging steel at the same hardness condition.

The reason for this result is that the higher thermal conductivity of AMDAP™ reduced thermal stress.

- ◆ Features of high thermal conductivity of AMDAP™ LTX
 - Contributes to prevent seizure due to enhance the internal cooling efficiency.
 - Reduce the risk of cracking from a cooling line due to decreasing internal stress.