

Al-Si alařımlarında Bifilmli ve Sıcak Yırılma

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29 September -1 October / 29 Eylül - 1 Ekim 2016
TÜYAP Fair, Convention & Congress Center, İstanbul

8. Uluslararası Döküm Kongresi / 8th International Foundry Congress by TUDOKSAD Academy
In conjunction with Ankiros / Annofer / Turkcast fairs



İstanbul Üniversitesi

Metalurji ve Malzeme Mühendisliğı



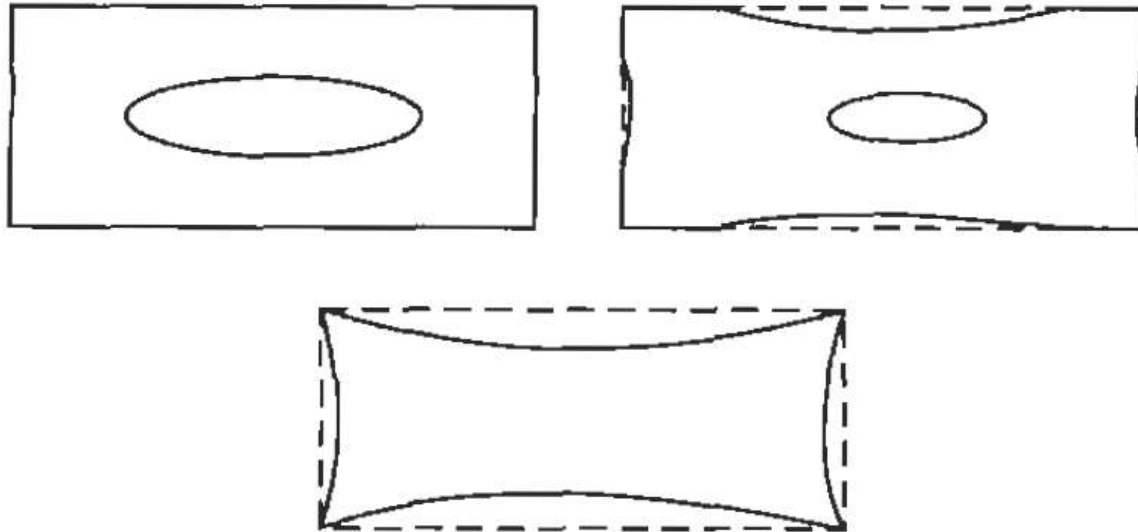
Motivasyon

Sıcak yırtılma:

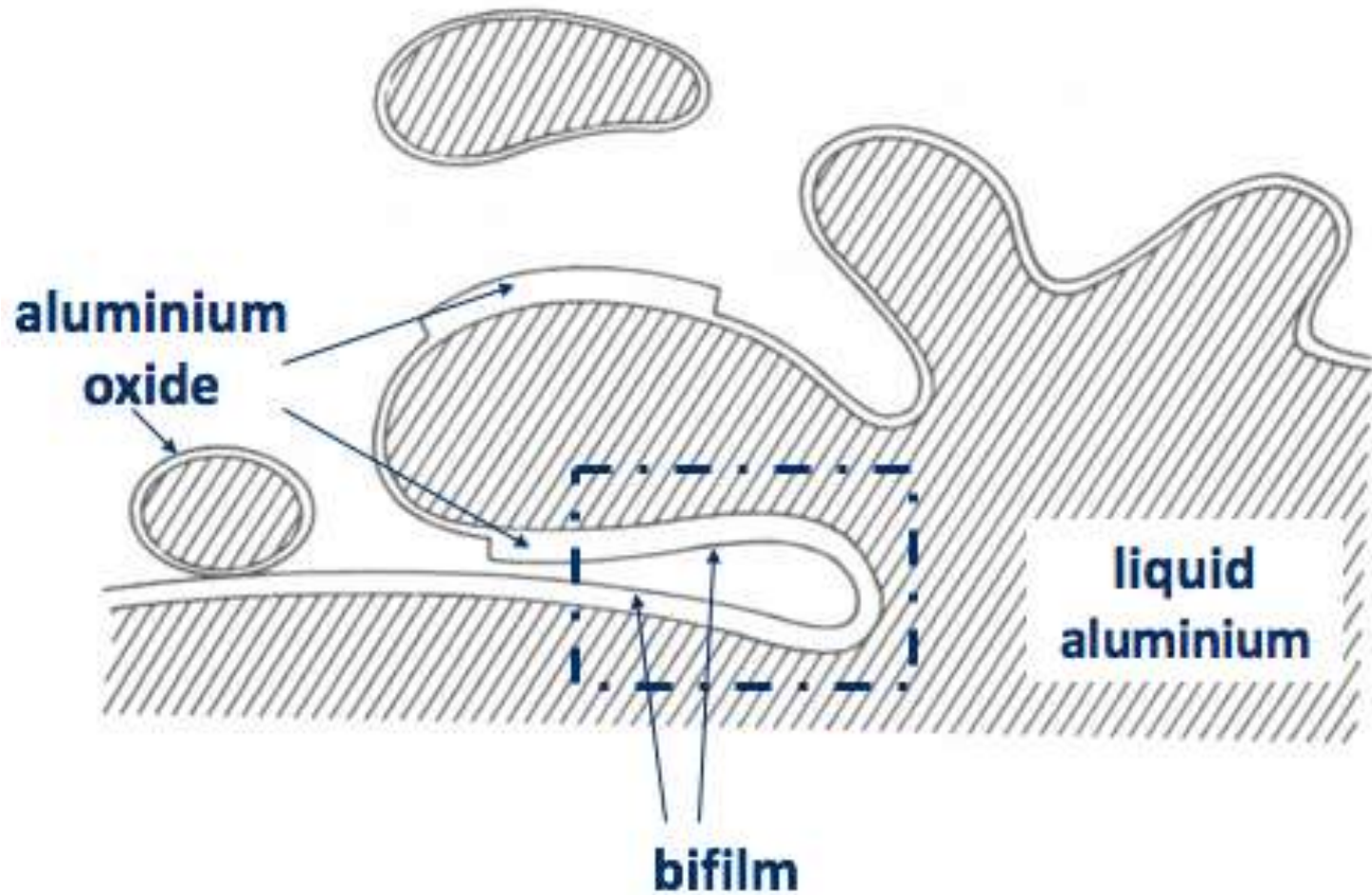
- Tamamen gelişigüzel ve rastgele olarak oluşur
- Her zaman hep aynı şartlarda oluşacak diye bir kaide yoktur
- Sadece belirli başlı alaşımlara özgün bir hatadır!

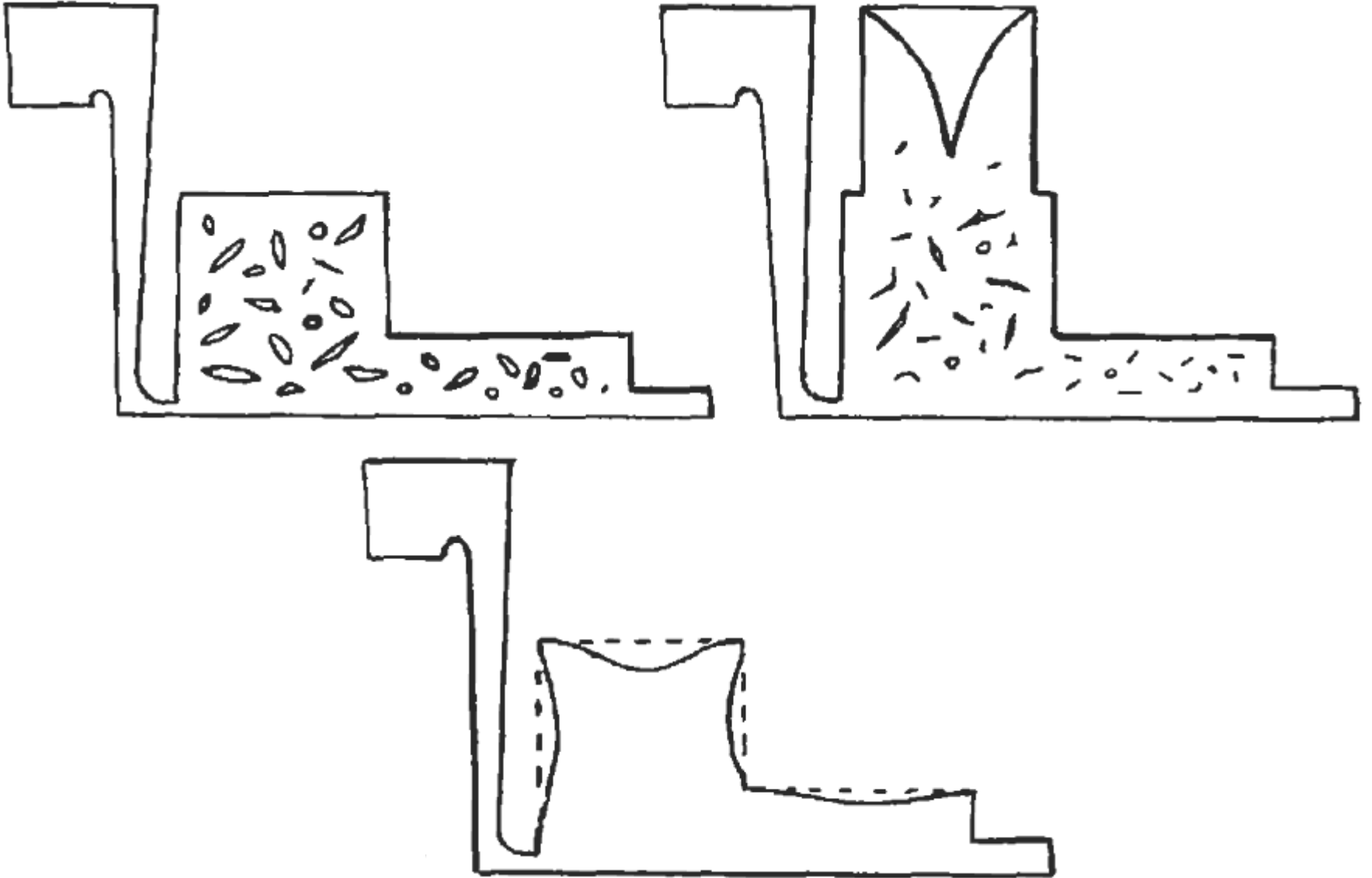
Sıcak yırtılma

- Yarı-katı (mushy) bölgede oluşan gerilim
- Çekintinin kısıtlanması
- Besleyici eksikliği

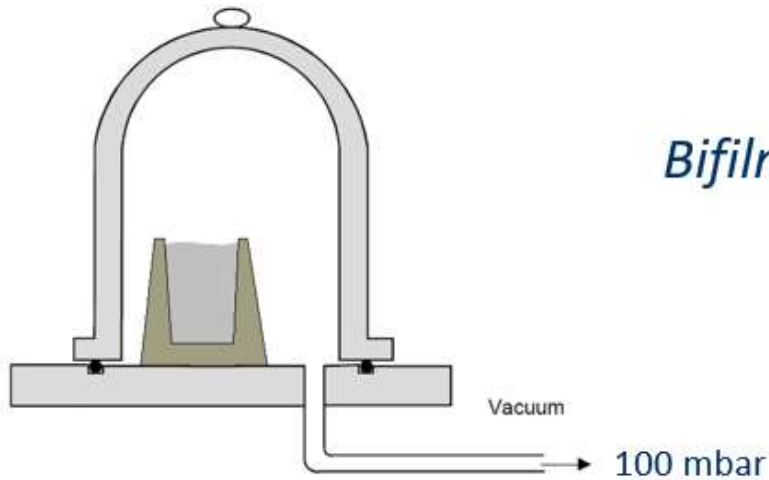


bifilms





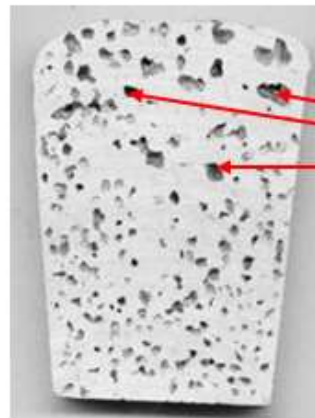
Döküm Kalitesi: Bifilm index



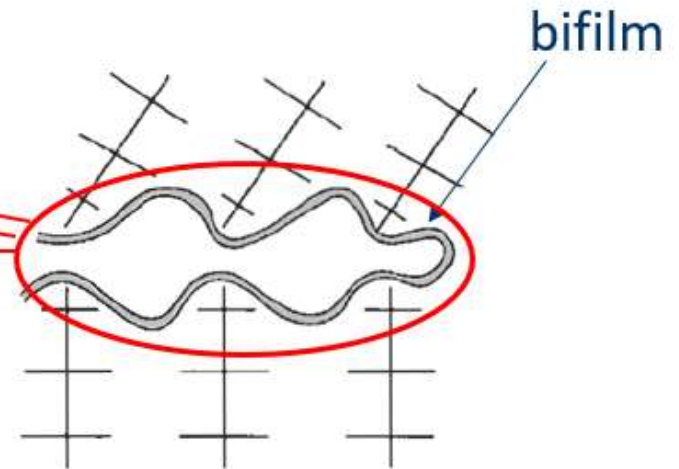
$$\text{Bifilm Index} = \frac{\sum (\text{max pore length})}{\text{total oxide length}}$$



air

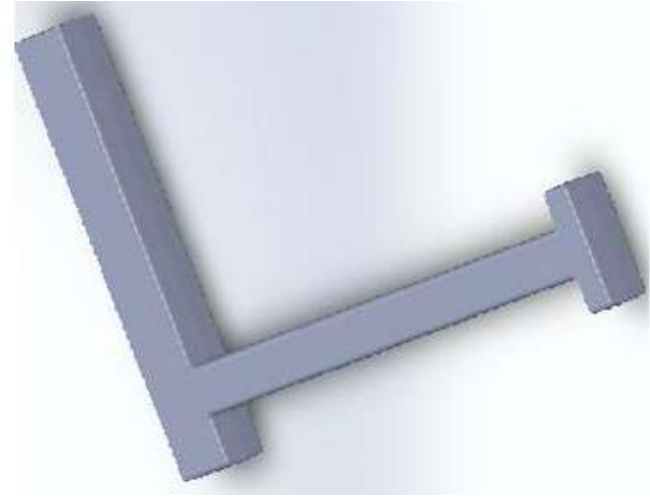
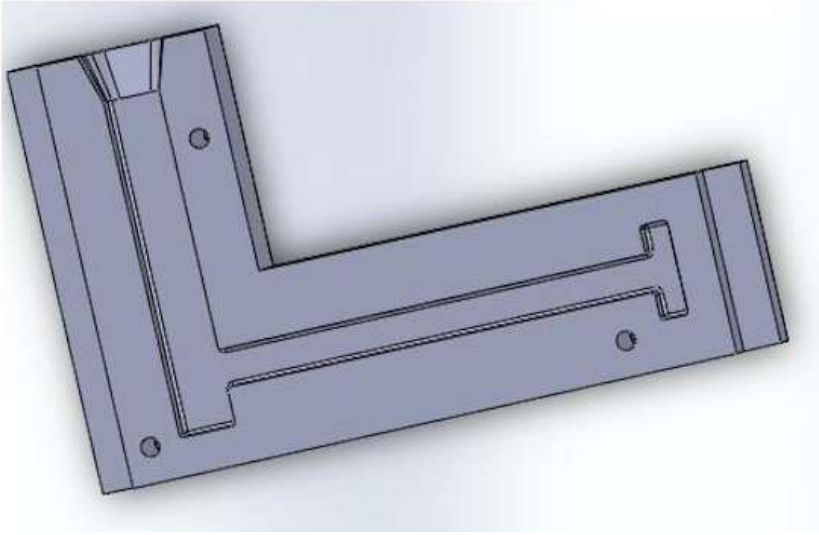


vacuum

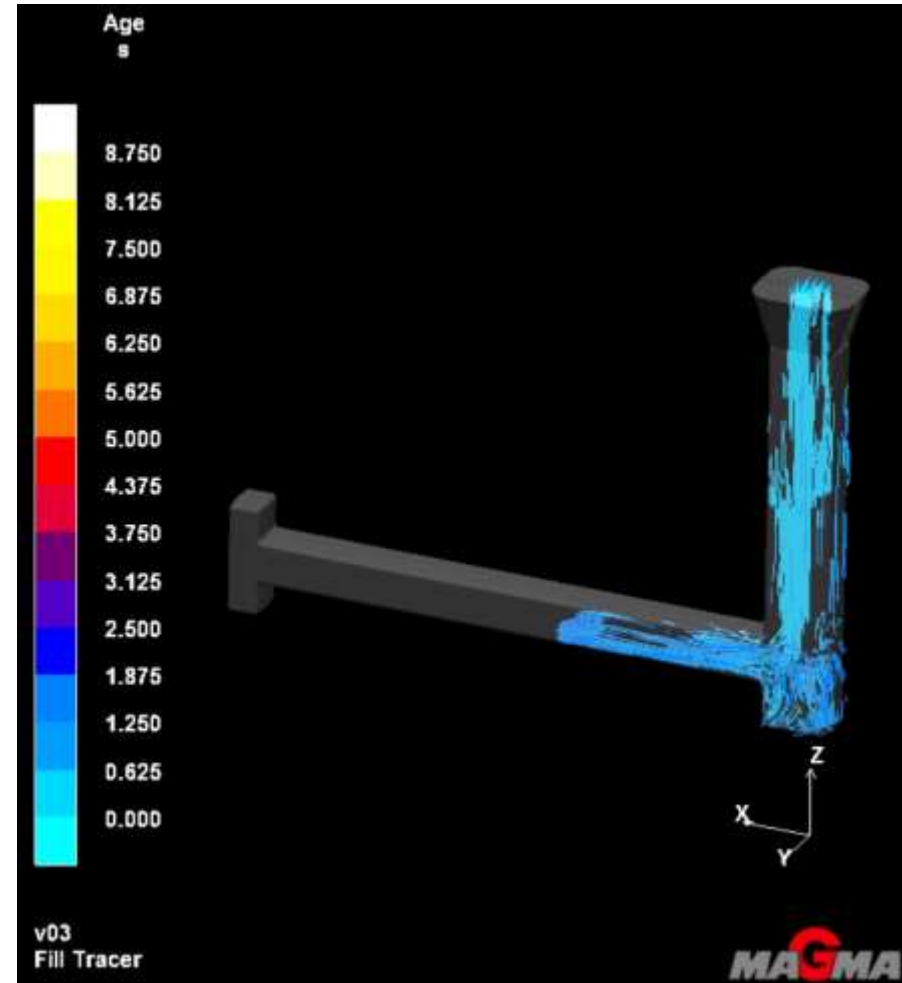
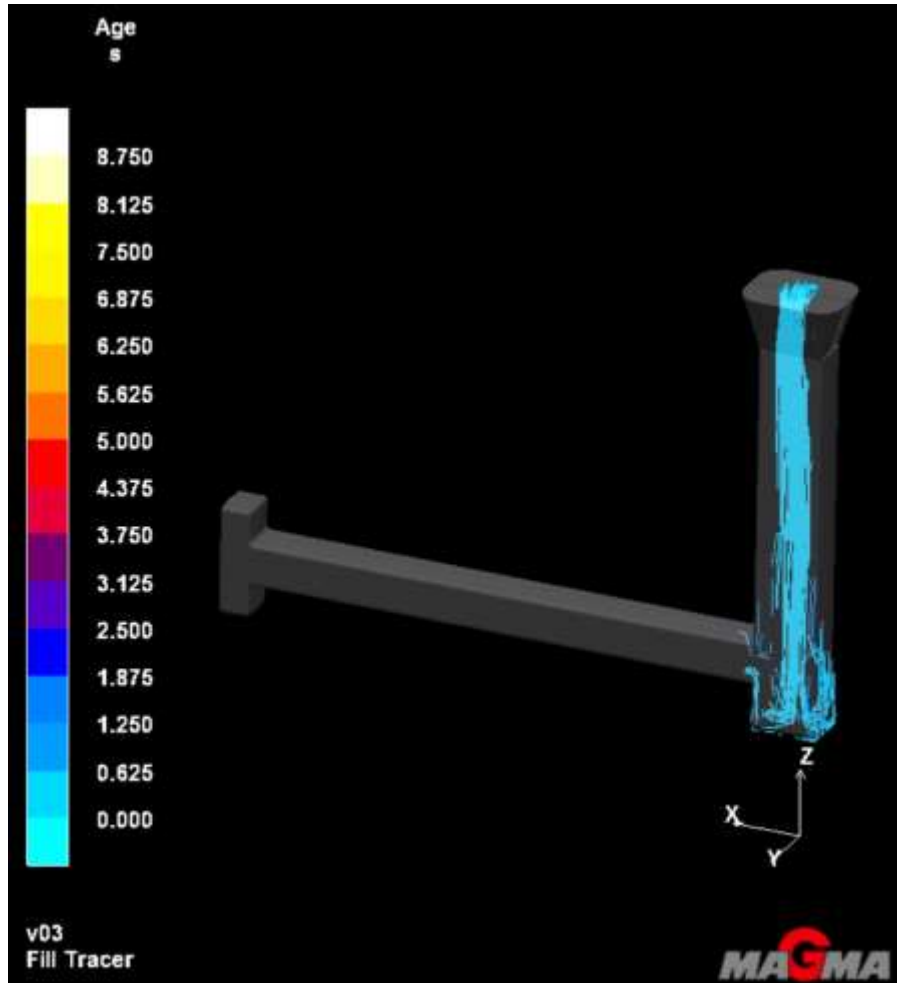


Deneysel çalışma

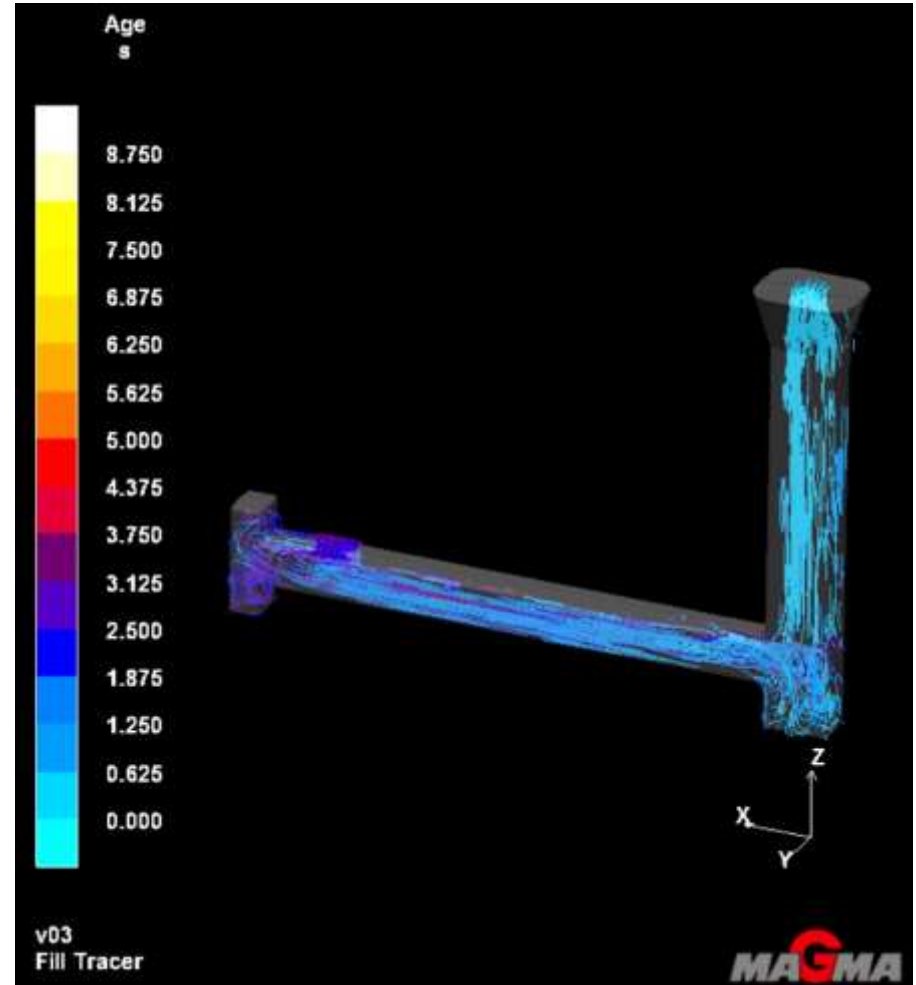
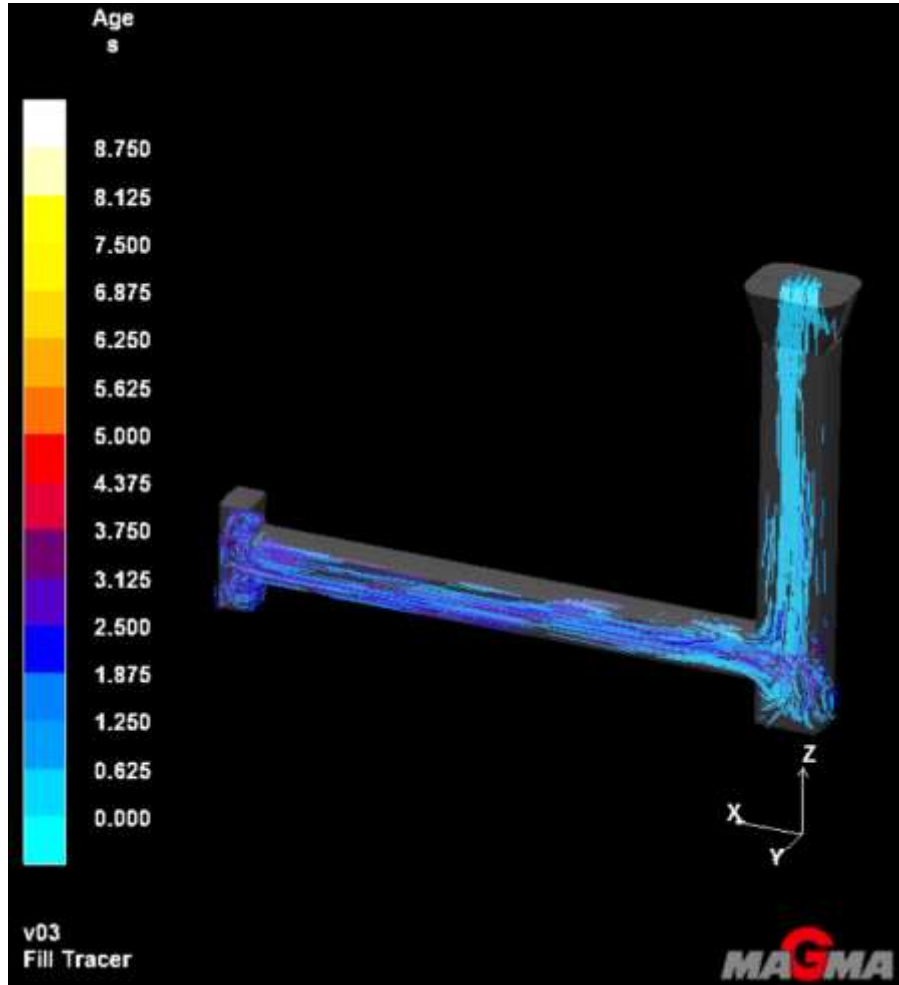
	Si	Fe	Cu	Mn	Mg	Ti	Al
A357	6,6	0,20	0,02	0,03	0,30	0,08	rem
A380	8,1	1,1	2,6	0,5	0,02	0,09	rem
A413	11,3	0,13	0,02	0,01	0,1	0,09	rem



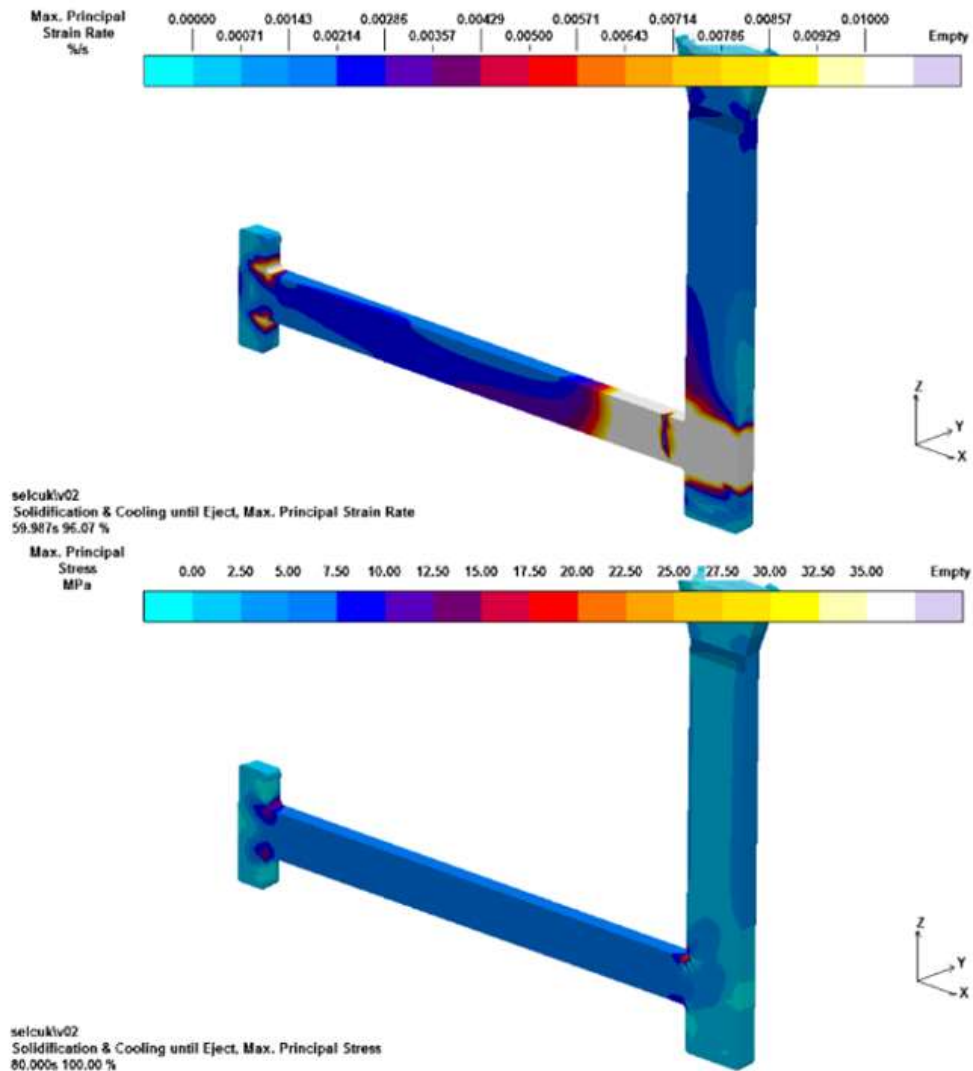
Kalıp dolumu



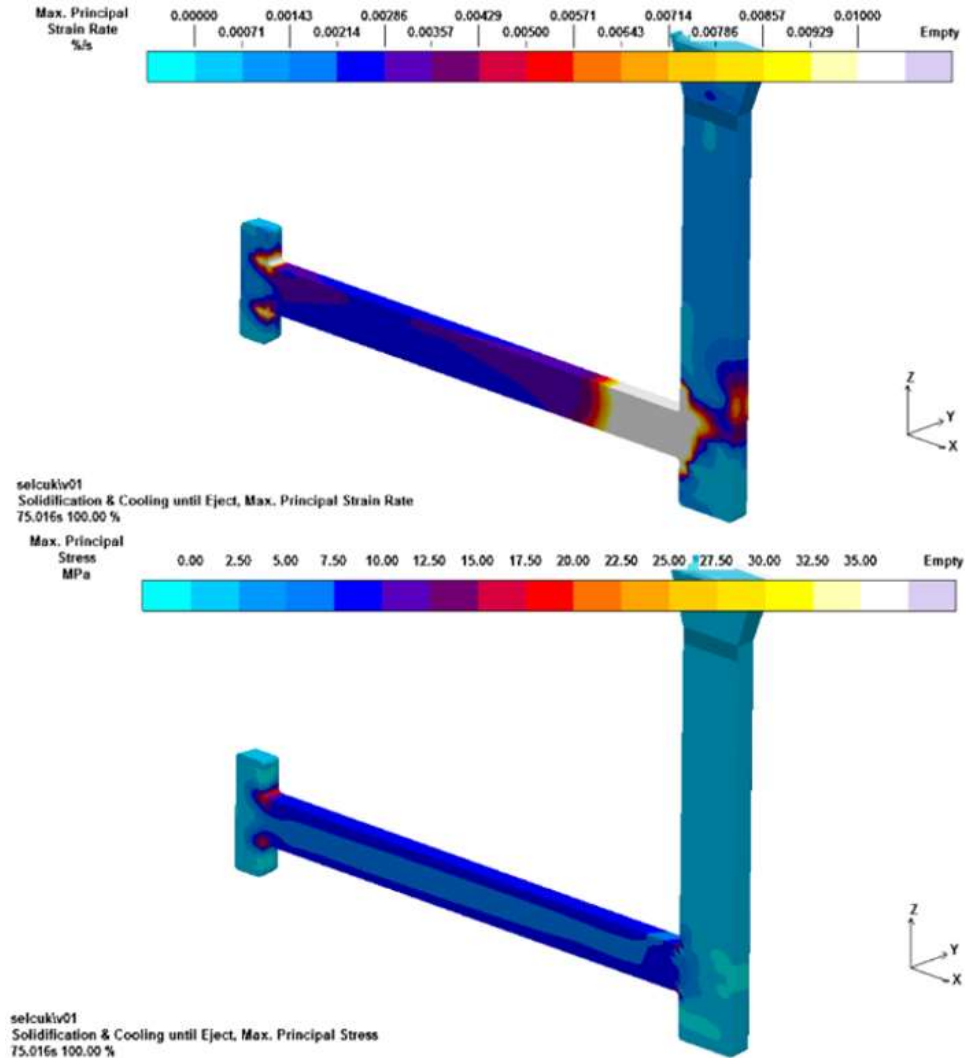
Kalıp dolumu



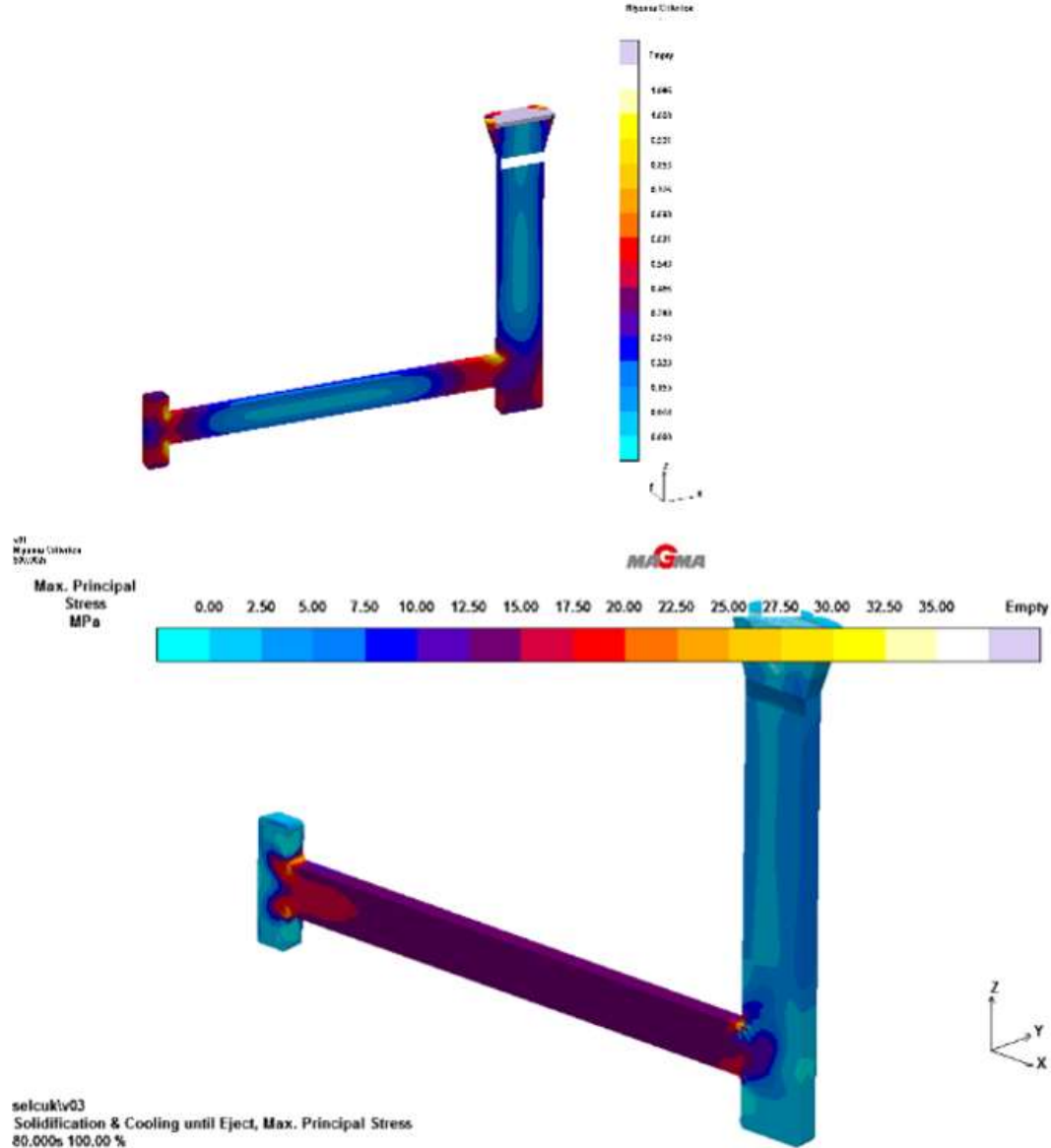
A357



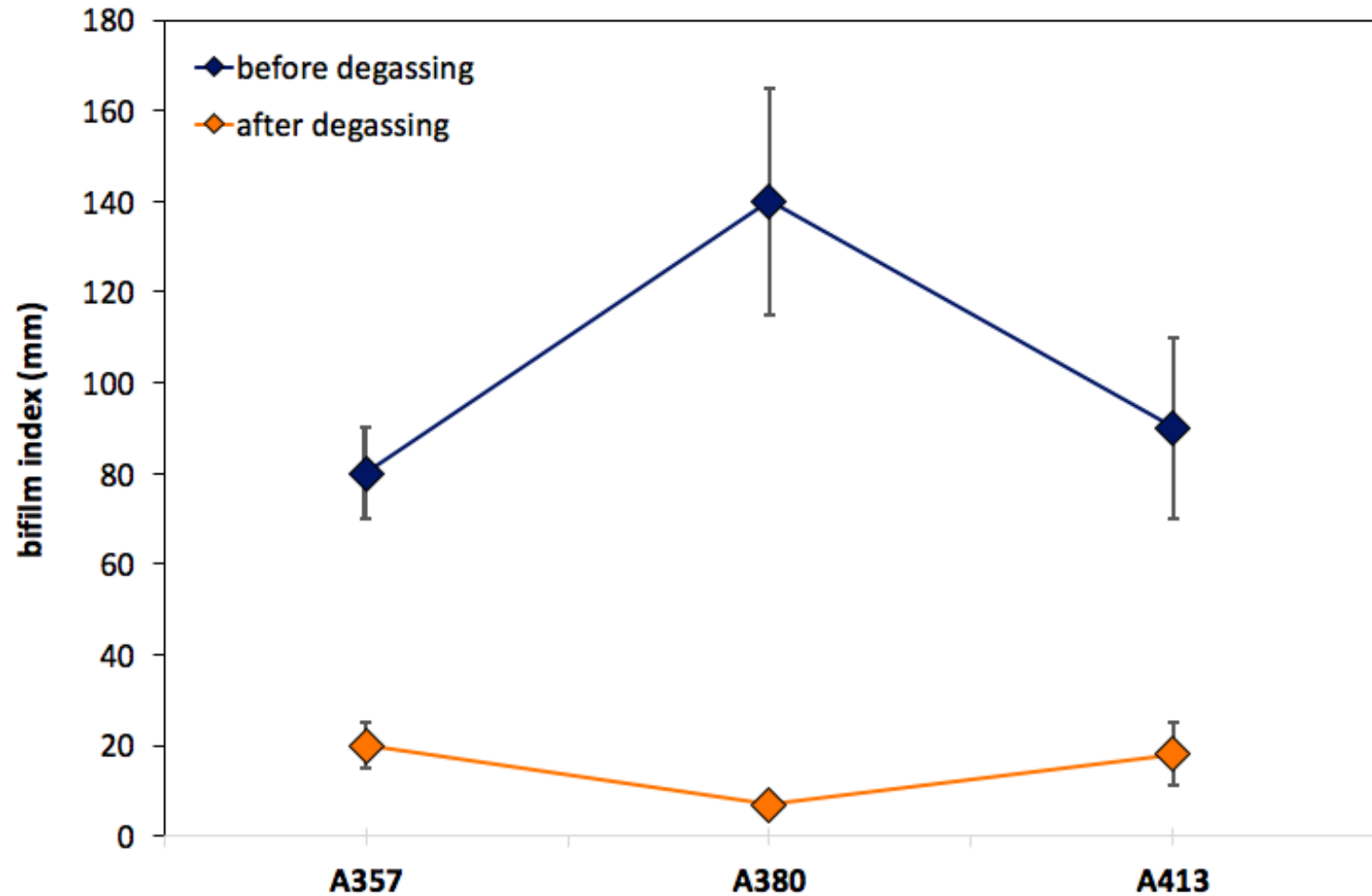
A380



A413

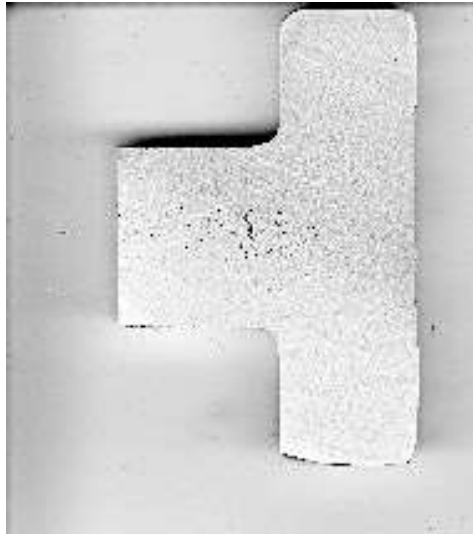


Sıvı metal kalitesi



kötü kalite

gaz giderme öncesi

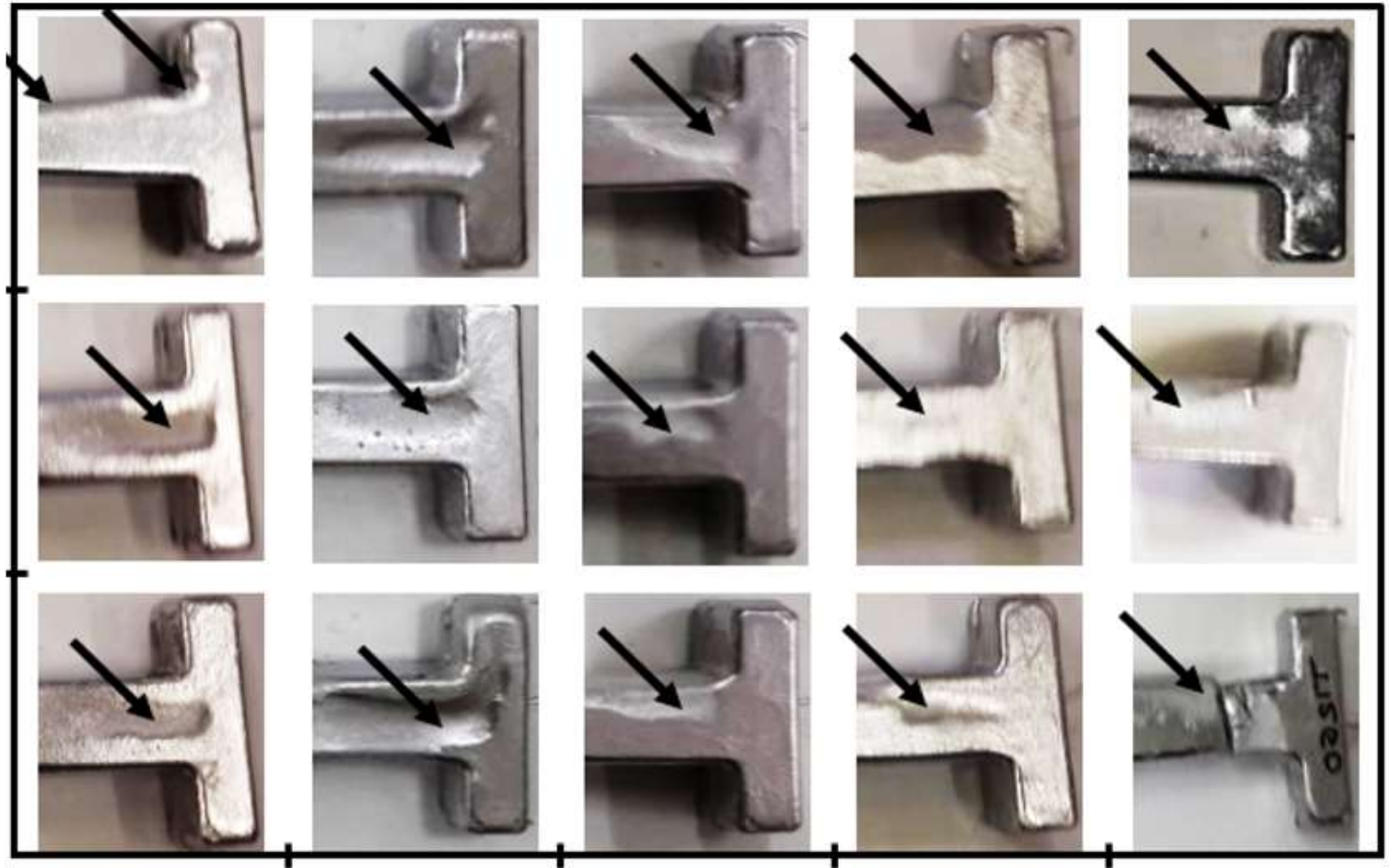


iyi kalite

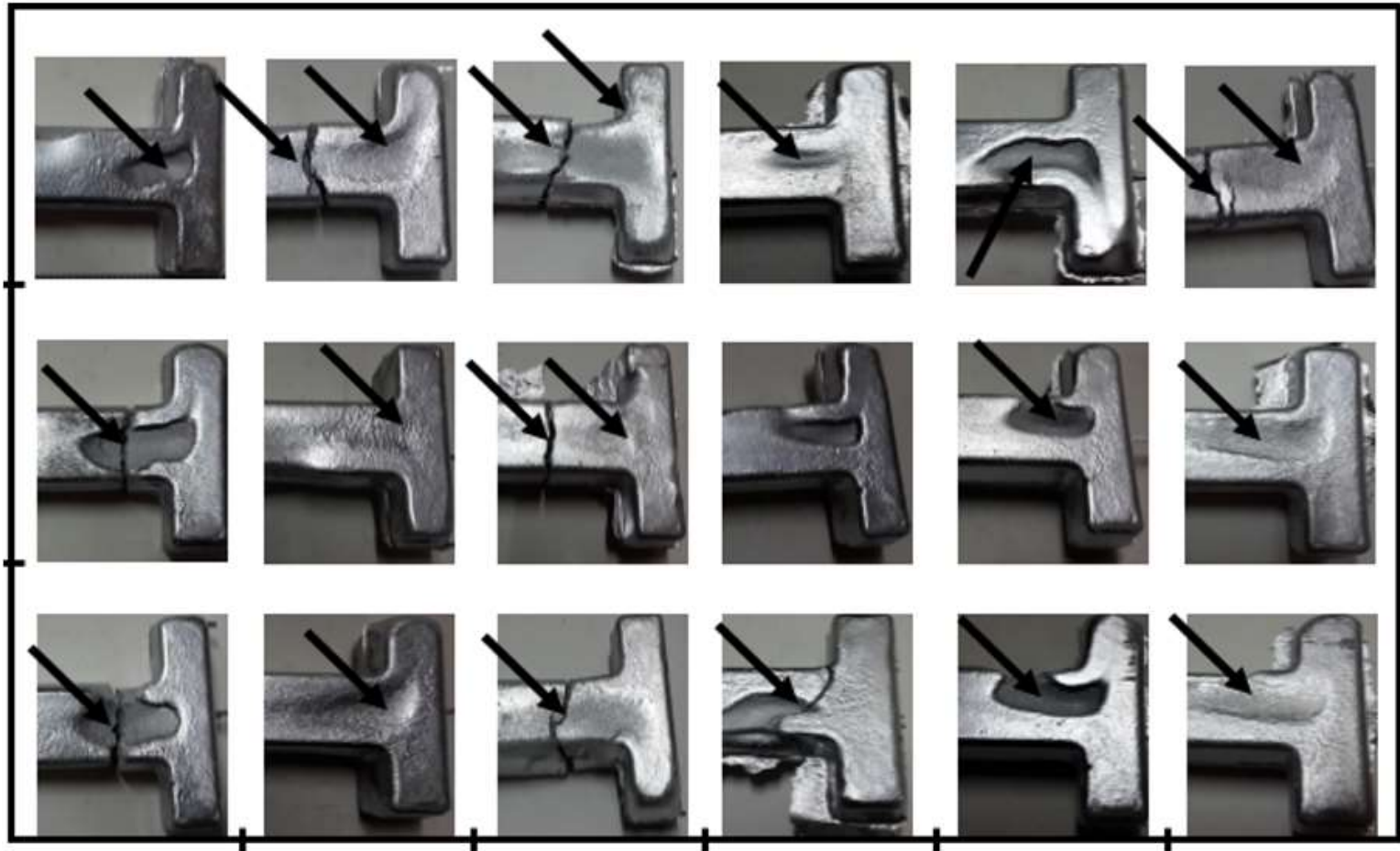
gaz giderme sonrası

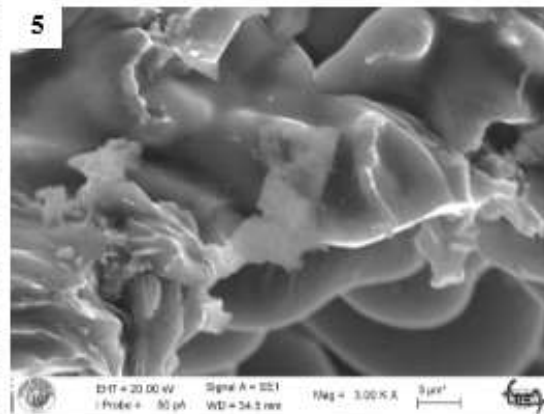
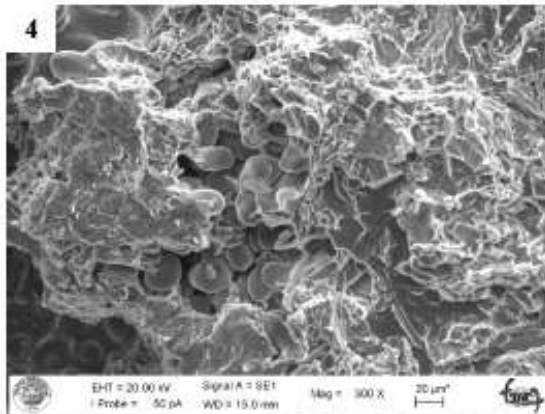
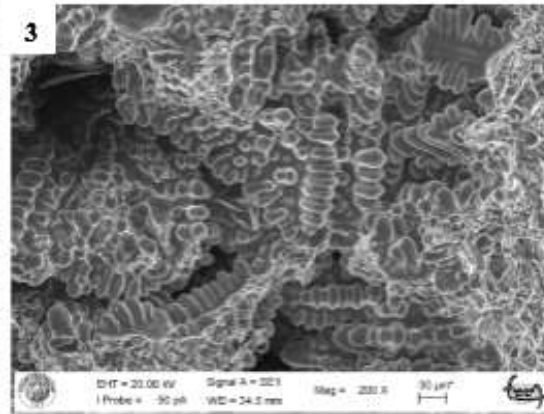
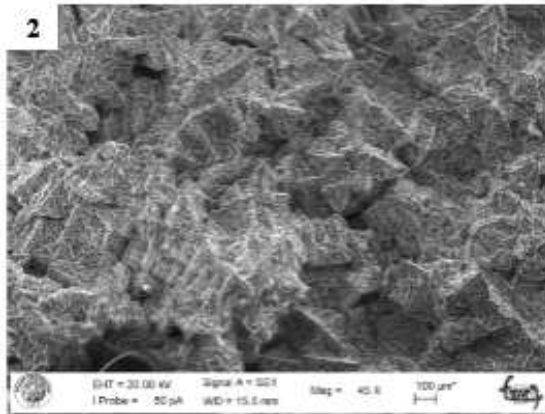
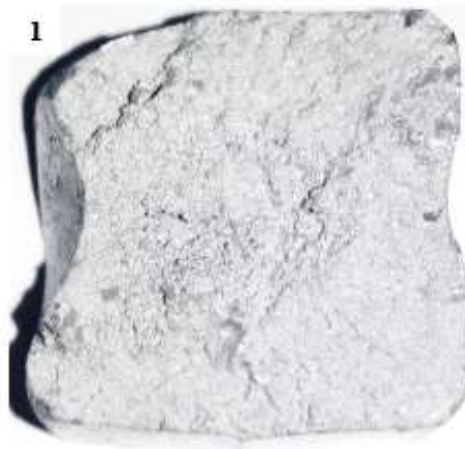


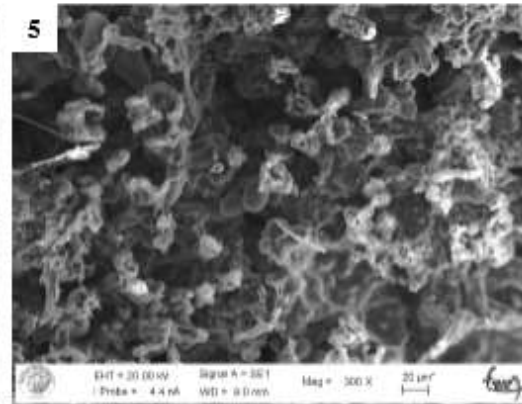
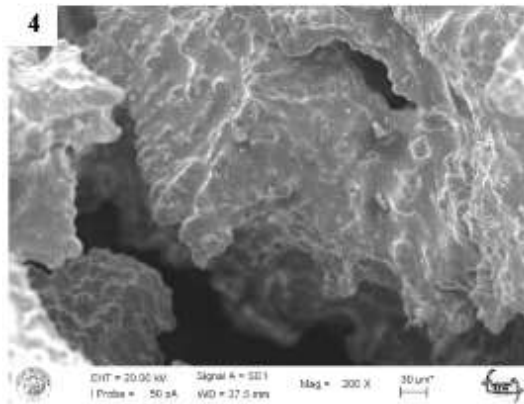
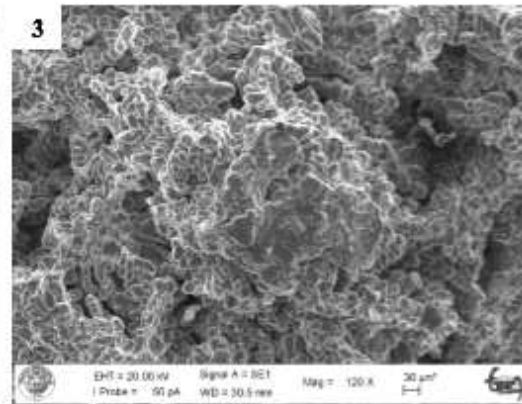
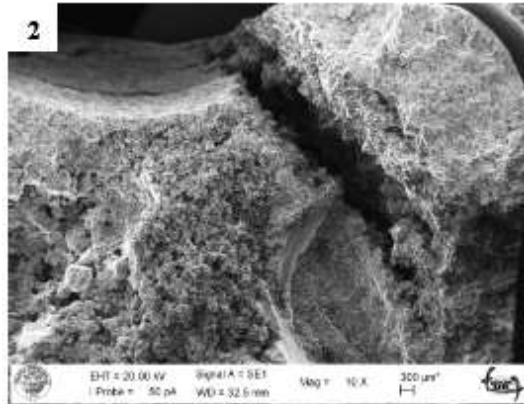
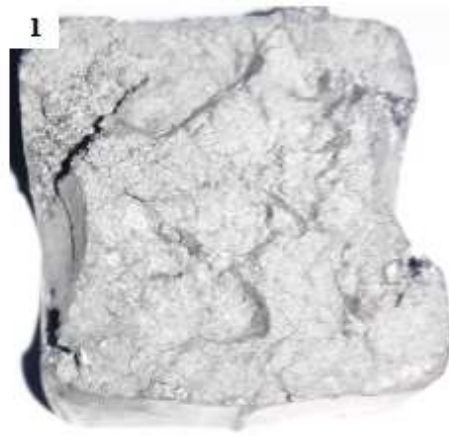
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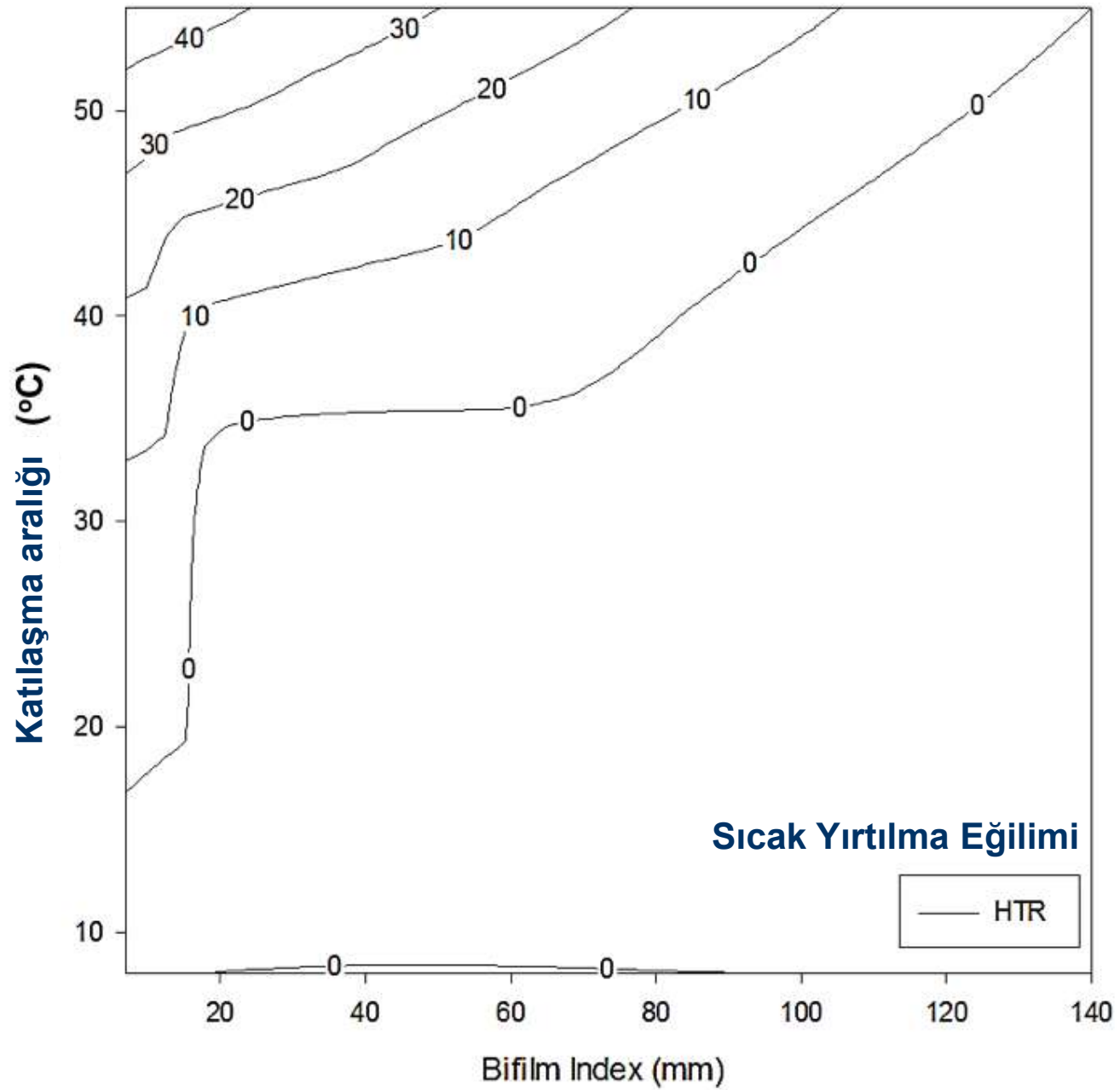


A380









sonuçlar

- Sıvı kalitesi kötü olduğu durumlarda (yüksek bifilm indeks) oluşan poroziteler çekintiyi engelliyor ve sıcak yırtılmaya izin vermiyor
- Bu durum alaşım bileşiminden veya katılaşma aralığından bağımsız olarak oluşuyor
- Sıcak yırtılma, bifilmelerden arındırılmış temiz sıvılarda, uygun olmayan kalıp tasarımlarında oluşuyor

Teşekkürler

