



# サンドブラスト加工条件の最適化による 薄板セラミックスの加工クラック抑制

## *Avoiding Processing Cracks in Thin Ceramic Plates by Optimization of Sand Blasting Conditions*

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Devices made by processing a thin lead zirconate titanate ceramic plate are used in the ink droplet firing units of ink-jet printers. The desired device shape is obtained by sand blasting the thin ceramic plate, but the formation of cracks in the thin ceramic plate during the sand blasting process has been a problem. The sand blasting process conditions were determined by using these problematic cracks as a characteristic value. The present study, however, reconsidered the processing conditions by performing a parameter design focused on the relation between the input of processing energy and the processed output volume. Specifically, an  $L_{18}$  orthogonal array experiment was carried out, using the number of scans made by the processing nozzle as input and the processing depth as output. Optimization of the processing conditions by means of this parameter design resulted in a 4 db improvement. When production was carried out under the optimized conditions, dimensional variability was reduced to approximately one third of its former value, and the rate of occurrence of the quality problem of processing cracks was reduced to approximately one eighth.

**Key words** : quality engineering, Taguchi methods, S/N ratio, parameter design, zero-point proportional formula, sandblast, ceramics, crack

### 1. はじめに

当社では、高速・高画質インクジェットプリンタのインク滴吐出駆動部に、チタン酸ジルコン酸鉛の薄板セラミックス（以下PZT薄板と呼ぶ）を用いる研究を行っている。

PZT薄板を分割し、インク滴吐出駆動部のアクチュエータを作製する。それぞれのアクチュエータに曲線を含む複雑な形状を付与するため、そのような加工に適したサンドブラスト加工を行っている。PZT薄板は薄くてもろいため、サンドブラスト加工中に、**図1**のようなひび（以下加工クラックと呼ぶ）が入り、歩留まりを低下させる問題があった。

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