

Contributed Article

PV-Tech PRO 6, Chinese Edition
Edition SNEC 2013 (5-2013)
«**How to Survive – Reduction of Costs per Piece**»
Author: Peter Weier, Head of Business Unit Silicon
Arnold Gruppe, Weilburg/Germany
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English Version

How To Survive - Reduction Of Costs Per Piece

The worldwide consolidation of silicon PV-industry still persists. Companies producing wafers at low piece costs are the only who will be able to survive in the market in future. Since material costs for silicon still constitute the largest cost pool within wafer production, the answer just leads to a further increase of yield at concurrently lowest process costs. The key to achieve this target, are fully automatic production plants. This is the only possibility to ensure reproducibility of production processes under compliance with tight process parameters. Moreover a plant must facilitate a continuous recording and evaluation of data. Hereby, reliable quality and output can be sustainably raised.

From the global point of view Arnold Group from Weilburg in Germany belongs to the pioneers among a few manufacturers of production machinery for brittle materials such as silicon and glass. Thanks to the experience over decades, the specialist is in the position to offer high-tech machinery with necessary process- and automation technology for the wide range of processing silicon blocks - with the core competencies grinding, cutting and glueing of mono- and multicrystalline silicon ingots and -bricks - from one source.

Besides the production (crystallization), a material protecting and sensitive handling of bricks in an automatic production line are the crucial factors for quality and output of wafers. The integrated measurement of material quality ensures, that exclusively approved and high-quality silicon is forwarded the following process steps.

An example for the success of using intelligent production principles means the automotive industry. Nowadays convincing by sophisticated quality, solid processes as well as monitoring and optimization of process parameters. Analogously the photovoltaic branche will not succeed without comparative standards. Especially at strongly linked production processes, each individual machine must provide perfect process reliability, sophisticated

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sensortechnology and intelligent control technique with adequate interfaces periphery.

Arnold Group offers both solutions such as automated standalone-machines, and complete fully-automated production lines. The Arnold-Remote-Process-Analyzing-Tool (Arpat) - the core of process automation of each individual grinding- and cutting machine by Arnold - tends to definition of quality, realization of deviations and their reasons, developing improvements, permanent removal of failures, and thus ensuring a maximum output. Thanks to the integrated process analyzing tool (closed loop process development) based to the principles of Six Sigma (*1) – a method, which is used worldwide for the quality- and process management – data of each individual machine are permanently collected, stored and analyzed during the process. Resulting knowledge helps to improve the process continuously and make it more economic.

From the perspective of Arnold, the goal „to reduce waste almost to zero“ cannot be achieved unless a high process automation with a permanent evaluation of process data will be guaranteed. An indispensable condition to compete on the tough photovoltaic market in future.

Arnold Gruppe

Herbert Arnold GmbH & Co. KG
Peter Weier, Business Unit Silicon
Weilstrasse 6
35781 Weilburg/Germany

Phone: +49 (0)6471 939426

Fax: +49 (0)6471 2065

peter.weier@arnold-gruppe.de

www.arnold-gruppe.de

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Background:

*1 = http://en.wikipedia.org/wiki/Six_Sigma

Caption:

Closed loop process development

Source:

Arnold Gruppe, Weilburg/Germany

Company Contact:

Arnold Gruppe
Herbert Arnold GmbH & Co. KG
Peter Weier
Head of Business Unit Silicon
Processing and Automation
Weilstraße 6
35781 Weilburg
Germany
Phone +49 (0)6471 939426
Fax +49 (0)6471 2065
peter.weier@arnold-gruppe.de
www.arnold-gruppe.de
www.facebook.com/ArnoldGruppe

Press Contact:

Benson GmbH
Agentur für angewandte
Kommunikation
Gisela Benson
CEO
Brucker Straße 4
82266 Inning am Ammersee
Germany
Phone +49 (0)8143 44 44 73
Fax +49 (0)8143 44 47 61
info@agentur-benson.de
www.agentur-benson.de