

DVD-R/CD-R 3503



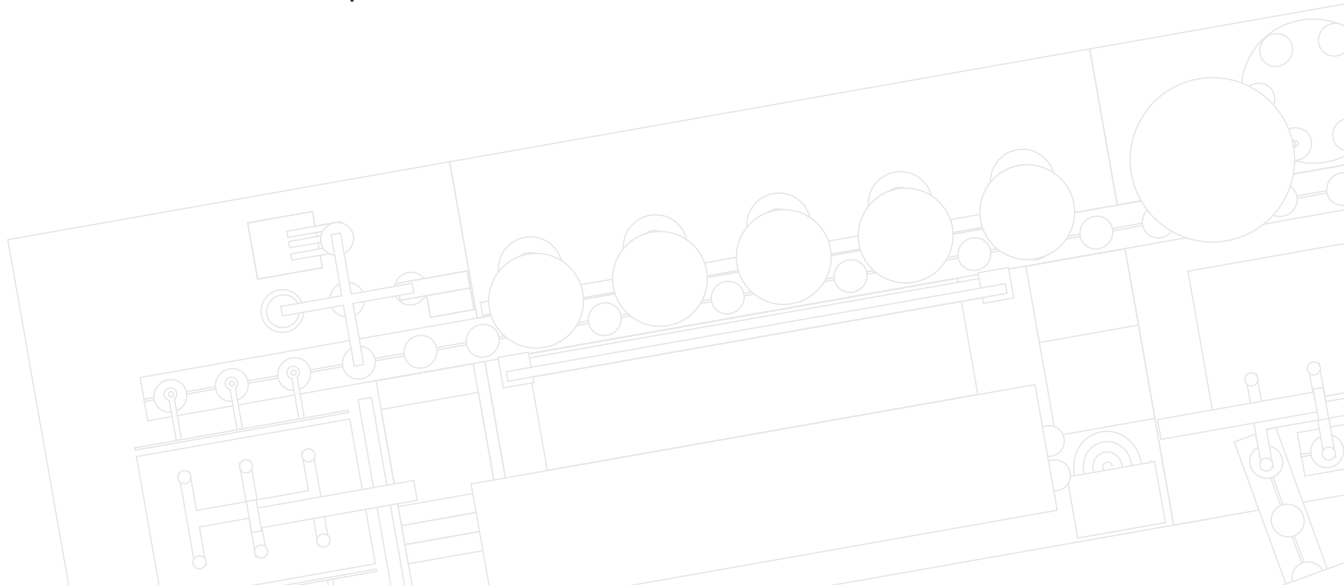
DVD-R/CD-R 3503

Highlights DVD-R 3503

- Very compact high performance production tool for DVD-R and CD-R production
- Small footprint of only 25 m²
- Low cost of ownership
- Cycle time handling ≤ 4.0 sec (in CD-R mode ≤ 2.5 sec)
- Uptime $\geq 95\%$
- Yield $\geq 85\%$ (in CD-R mode $\geq 90\%$)
- Easy format change from DVD-R to CD-R and vice versa

Highlights CD-R 3503

- The world's most compact high performance production tool for CD-R production
- Overall footprint of only 29 m² – smallest footprint per disc ever built
- Low cost of ownership
- Cycle time ≤ 1.8 sec
- Uptime $\geq 95\%$
- Yield $\geq 90\%$
- Easy upgrade to DVD-R inline production

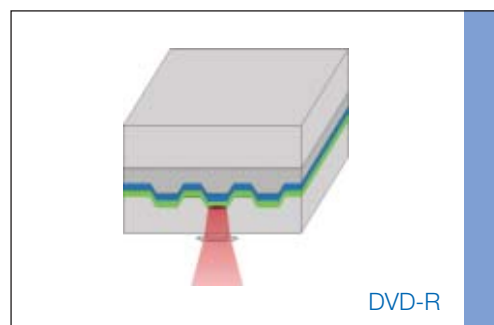
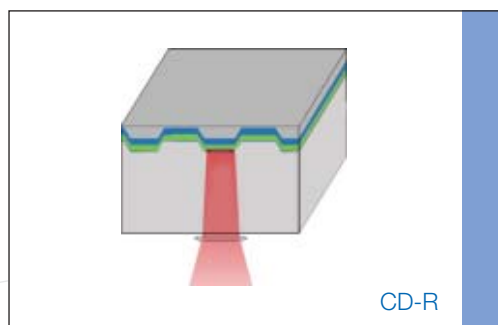


Introduction

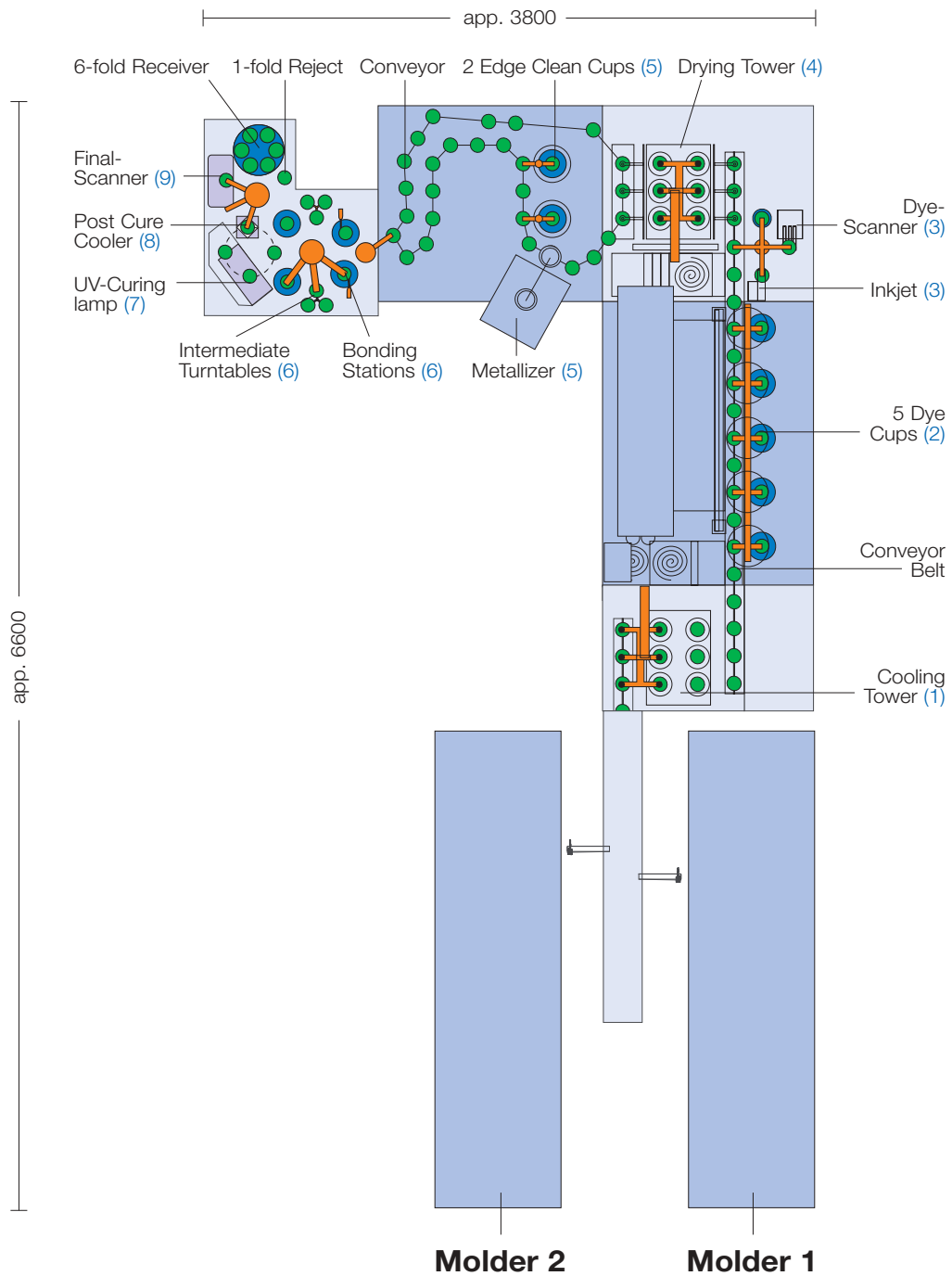
DVD-R/CD-R 3503

The CD-R 3503 is designed to produce CD-R under never previously achieved low cost per disc values. The CD-R 3503 is meeting all requirements for a mass production CD-R tool. It is part of the CD-R / DVD-R 3503 series. The DVD-R 3503 is an inline DVD-R system which is dedicated to mass production of DVD-R discs. The DVD-R 3503 combines all necessary features to produce DVD-R and CD-R. Therefore, the DVD-R 3503 is the perfect matching tool for the transition time of the recordable disc market today as it runs DVD-R and CD-R on the identical 3503 platform.

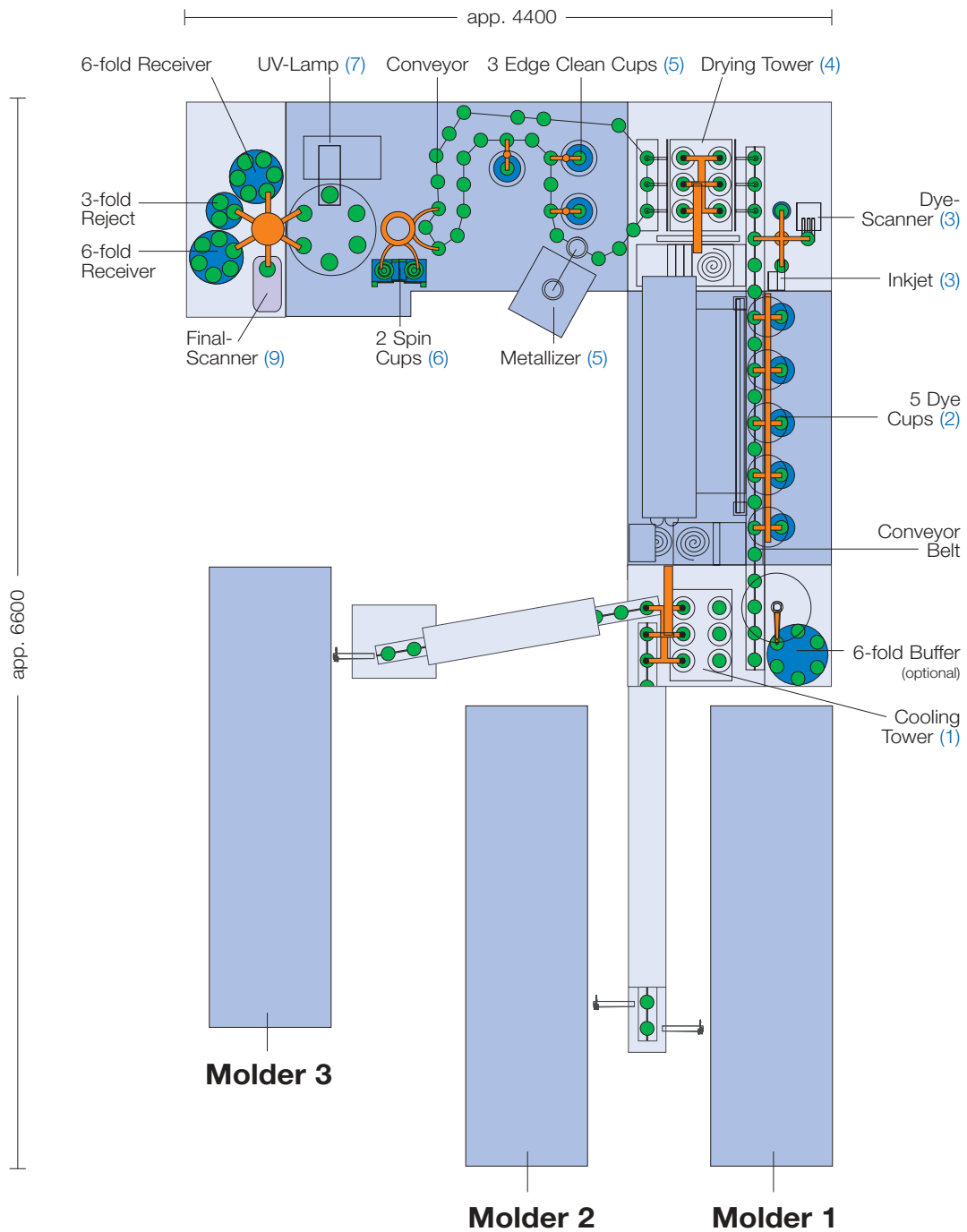
The major difference between CD-R and DVD-R 3503 systems is the downstream unit. Since the CD-R 3503 is optimized for maximum throughput the CD-R 3503 has a dedicated downstream unit to meet this application. In the DVD-R 3503 version the Bonding Unit of the STEAG HamaTech DVD 2200 system is acting as the downstream. All other units are designed to transport and process CD-R and DVD-R substrates.



Layout DVD-R 3503



Layout CD-R 3503



System Description

Layout advantages

(DVD-R 3503 and CD-R 3503)

The 3503 series of CD-R and DVD-R production tools have a significantly reduced floor space requirement. The tools have only a 25 m², or 29 m² respectively footprint which reduced the amount of clean room space to 2/3 compared to other systems. Looking on the ratio floor space per disc capacity the 3503 system is the top performer in the market.

The reduced footprint has made the tool smaller and the volume that has to be fed with conditioned air (e.g. the dye dispense unit) is much less. The system therefore can save energy on the the climate unit side. This cuts down the costs for the tool climate unit.

These system features do reduce the running cost of ownership for the mass manufacturer significantly.

Cooling

(DVD-R 3503 and CD-R 3503 - #1)

The substrates are stored in a carrier in horizontal position. In the carrier the substrates are only held in the centerhole so the substrate can relax without mechanical stress. The carrier is rotating during the transportation through the cooler unit. The cooler provides 426 positions. This and the rotation enables the optimum uniform cooling of the substrates even at highest throughput levels.

The new approach of this horizontal design combined with the disc carriers enables us to minimize the space requirement.



System Description

Dye Coating

(DVD-R 3503 and CD-R 3503 - #2)

The central conveyor belt transfers the discs to the five independent dye coating process units. Every dye coating process station is equipped with a AC-servo motor driven spin cup for high precision coating process to ensure high quality and uniformity of the dye coating. The dye dispense arm is controlled by a precise stepper motor. Each process station is connected to an exhaust air flow system. The constant and controllable air flow results in constant evaporation conditions on all 5 dye coating units. The dye dispense program as well as the dye spinning program is independently controllable at each process cup. Additionally, separate dispense and spinning programs can be set up to the different sources of the discs. All this leads to a very constant optical density of the applied dye layer from all sources of the discs.

The dye is dispensed through 5 independent tank pressure systems with software controlled automatic pressure regulation to compensate for all parameters in the tank system. With this feature, the amount of dye dispensed is extremely precise and has a great repeatability. This allows the user to actively minimize the amount of dye dispense whilst running at the



highest quality requirements at the same time – this reduces the running cost of production. The stability of the system allows the manufacturer to work at the edge of the process window and keep the cost low when producing highest quality discs.

Apart from this, a tank pressure system does have another advantage to a pumping system: a tank pressure system is mainly maintenance free.

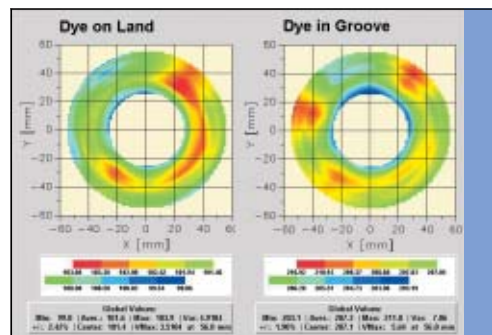
The 5 independent dye coating units are separated by windows to give the user the possibility to maintain or optimize each cup individually during running full production on the other cups.

System Description

Dye Inspection and Printing

(DVD-R 3503 and CD-R 3503 - #3)

The scanner provides high resolution quality inspection and defect analysis of dye coated discs. Special inline statistical control allows the user to monitor the disc quality at a glance. Due to its precise inline measurement of optical dye-density by special spectrometer features, the system comes with the tools needed to take full advantage of the features of the high precision dye coating unit. Automatic calibration of the quality inspection unit is implemented, and provides low disc to disc variability.



Serial printing of the products can be applied on the printing station including all special disc information wanted.

Drying

(DVD-R 3503 and CD-R 3503 - #4)

The Drying Tower provides horizontal positioning of discs during drying process in a disc carrier. The basic design is the same as the Cooling Tower. The dryer has a temperature profiling so there is no shock heating of the discs. Temperatures up to 100°C are possible. The unit itself is thermally isolated to minimise the amount of heat loss – and heat impact to the surrounding area.



This lowers the costs of the clean room conditioning.

System Description

Metallizer and Edge Cleaning

(DVD-R 3503 and CD-R 3503 - #5)

After the reflective layer is applied in the metallizer the discs are edge cleaned. This design has some significant advantages.

Due to the applied metal layer the outline of the outer dye edge is given. This results in an easy adjustment of the edge cleaning process. The yield is significantly higher and reaches almost 100% for this process step due to this application.

UV-Coating

(CD-R 3503; #6)

The UV-Coating system is equipped with two UV process units working in parallel. The spin coater is AC-Servo controlled and provides high UV lacquer film quality with high accuracy. The lacquer system is improved to meet the higher requirements today when more different UV lacquers are used in the field.



Gap Dispense Bonding Stations and UV Spinning

(DVD-R 3503 - #6)

Two gap dispense bonding stations working in parallel to provide best bonding quality at low cycle time. Servo controlled disc bowing and needle positioning guarantee best dispense and bonding repeatability.

The intermediate turntables allow time for capillary forces to evenly distribute the adhesive to achieve uniform spacer-layer thickness. In the UV Spinning Unit the final

spacer-layer thickness is controlled by high-speed disc spinning with AC-Servo motor control.



System Description

UV-Curing

(DVD-R 3503 and CD-R 3503 - #7)

The UV Lamp uses a selective spectral filtering and focussing that minimizes the heat radiation to the rotating disc.

The UV Lamp is water cooled. The amount of air exhaust necessary is reduced significantly.



Post-Cure Cooling

(DVD-R 3503 - #8)

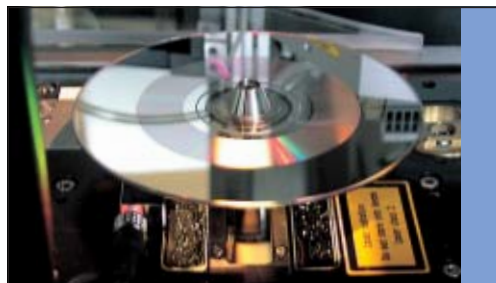
The specially designed post cure cooler is to ensure disc temperatures below 30°C prior to final inspection. That enables the inline scanner to fully decide about the radial and tangential disc shape right away.



Final Inspection

(DVD-R 3503 and CD-R 3503 - #9)

The high resolution scanner provides a high informative feedback about the production conditions. Again multiple source statistical features and defect analyzing features come along with auto-calibration of the system.



Customer Support/Training

Customer satisfaction is the ultimate goal that every STEAG HamaTech employee pursues. STEAG HamaTech has understood that customer satisfaction does not only come from highly performing equipment. Therefore, STEAG HamaTech offers qualified training to make sure that customers get superior results from their equipment. Specialized field service engineers will put the

machine to work and support the customers start-up phase with their background knowledge. Additional training courses including special process training are available (See example below).

A worldwide service and distribution network ensures spare parts availability where ever you are. Our technical support is available 24 hours a day, 7 days a week.

Course Outline DVD-R Process:

- **Day 1 – Basics**
 - Overview about DVD-R technology and production technology
 - Structure & dimensions of the DVD-R
 - Specifications
 - Presentation of DVD-R dye processing
 - Bonding technology
- **Day 2 – Line Operation and Troubleshooting**
 - Dye dispense and pressurized tank system
 - Masks and parameters
 - Line Operation: Getting started and setting up
 - Injection molding machine
 - Test equipment
 - Metallizer
- **Day 3 – Quality Assurance Procedures**
 - Quality criteria of the DVD-R
 - Process window for dye application
 - Inline measurement technique
 - ETA-inline scanners: practical exercise, parameters
- **Day 4 – Laboratory**
 - Safety instructions, introduction to the equipment
 - Dye preparation
 - Analytical sequences: spectroscopy, gas-chromatography
- **Day 5 – DVD-R Production at the Line**
 - Production with practical exercises (Coater, Macros Process Parameter Setup)
- **Day 6-8 – DVD-R Production at the Line**
 - Production with practical exercises (Dye Coating, Edge Clean, Bonding)
 - Production with line operators, supported by STEAG HamaTech engineers
- **Day 9 – Final Acceptance Test procedure**
- **Day 10 – Final discussion & open points**



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