

# THEN DYEHOUSE NETWORK



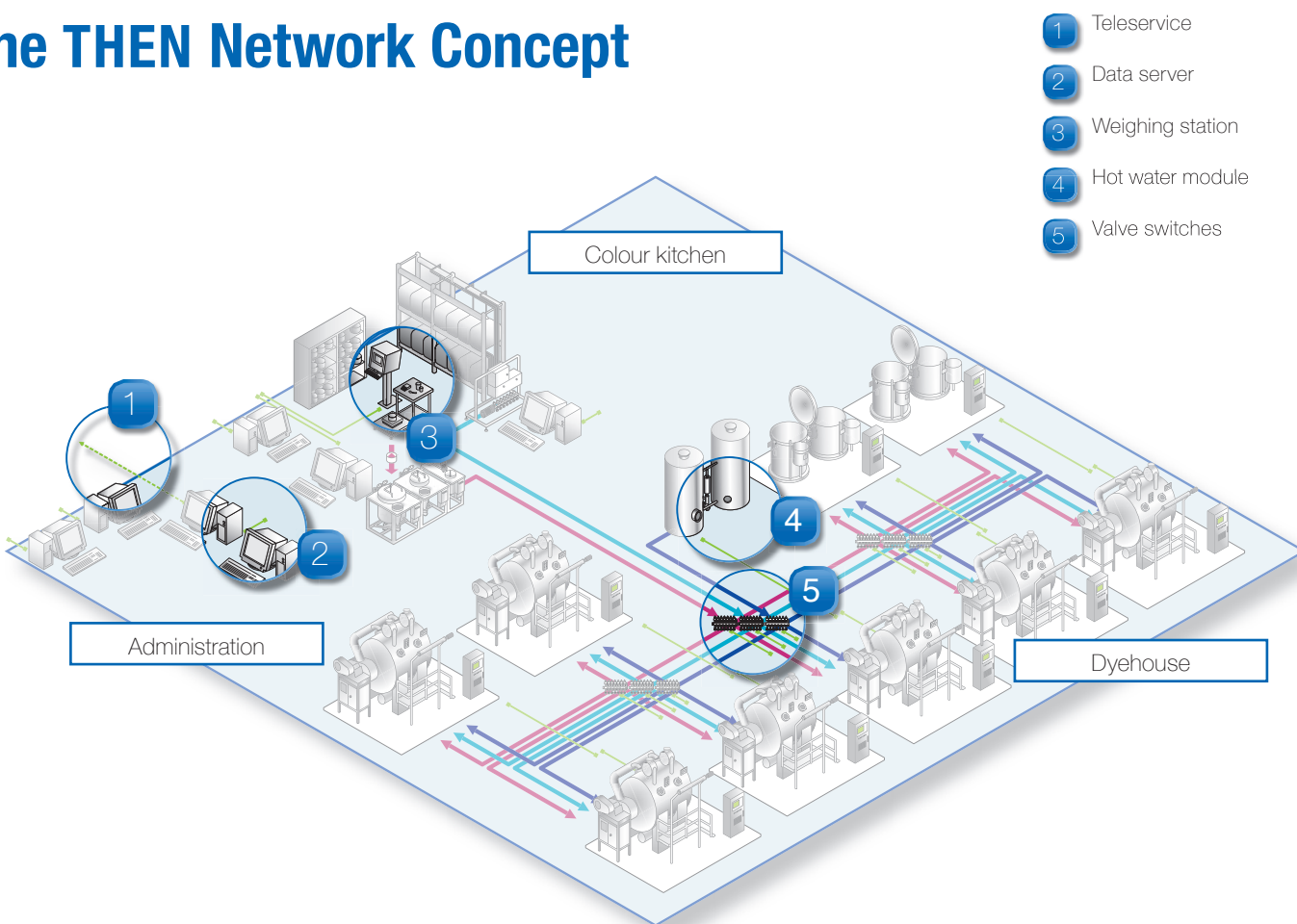
Integrated Management and Controlling System



**fong's** Member Companies of CHTC Fong's Group



# The THEN Network Concept



## THEN DYEHOUSE SYSTEM (TDS)

The integrated management system

## THEN DYNET

The complete control system

## THEN COLOUR KITCHEN MANAGER (CKM)

The modular colour kitchen system

### For reliable dyeing quality

Unless dyeing systems are integrated into an optimum network, dyehouses can waste valuable resources.

Therefore, THEN offers a wide range of harmonised system components for the creation of efficient dyehouse networks.

In order to achieve reliable dyeing quality and improved reproducibility, the network supplies the dyeing systems with dyes, chemicals and auxiliaries, quickly, as required and in exact doses.

### Co-ordination of process phases

The employment of networks allows the co-ordination of process phases and the optimum use of capacity.

In addition, order management is linked with the machine controls in order to form a complete dyehouse network.

### Open and flexible

The THEN network concept is open and flexible. Partial solutions for gradual network creation are possible, e.g. an independent chemical dosing system.

### Standard interfaces

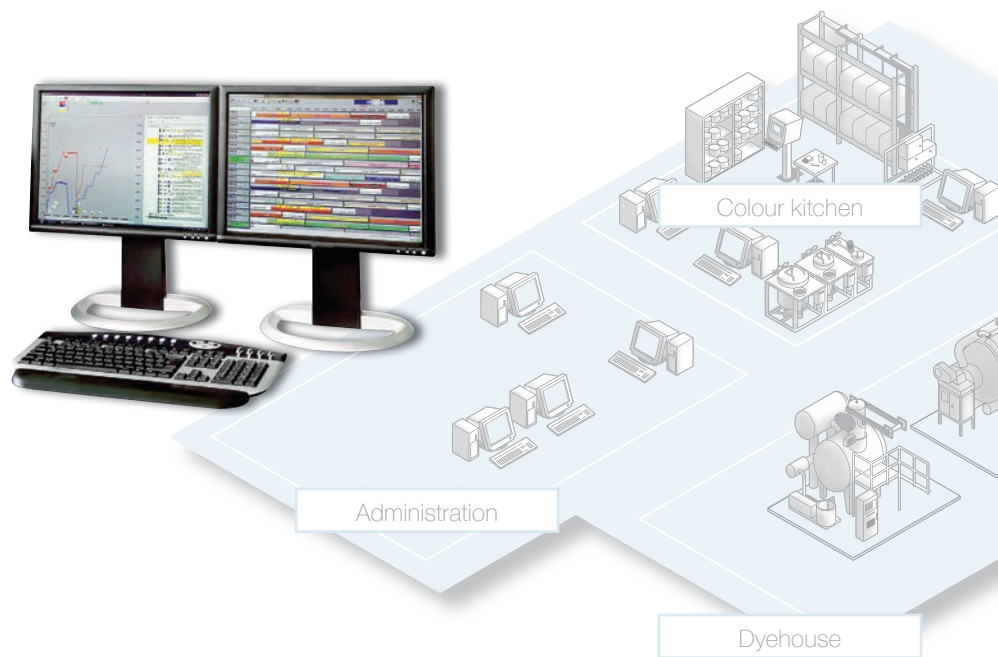
All THEN control and colour kitchen components operate using standard interfaces. This allows the integration of plant units from other manufacturers into THEN networks.

## The 3 Modules

### THEN DYEHOUSE SYSTEM (TDS)

#### The integrated management system

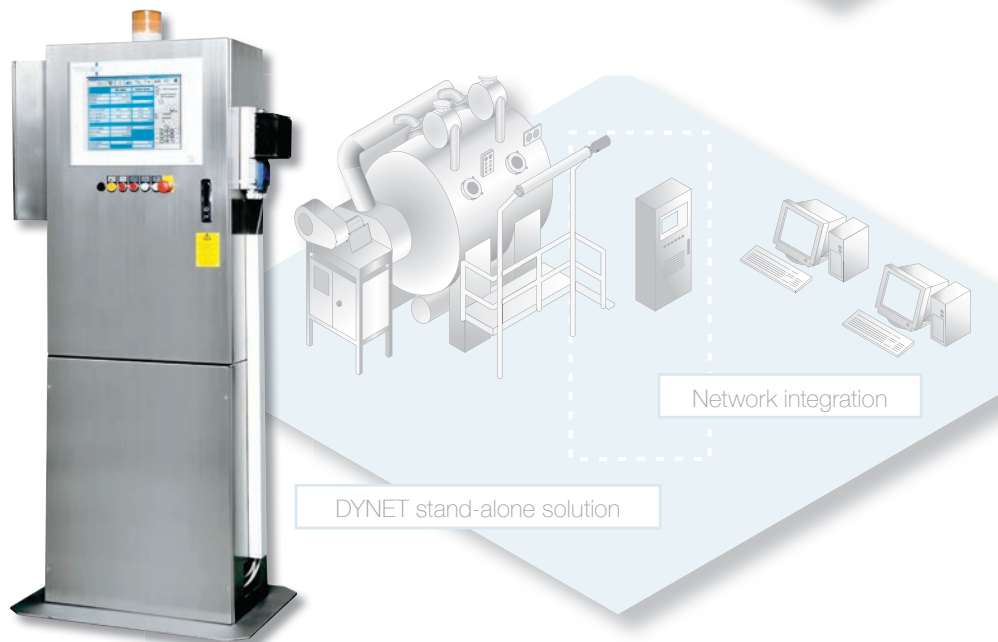
TDS undertakes the management and organisation of the dyehouse and integrates both THEN and other products, as well as PC control systems and hosts into a unified dyehouse system.



### THEN DYNET PLUS

#### The complete control system

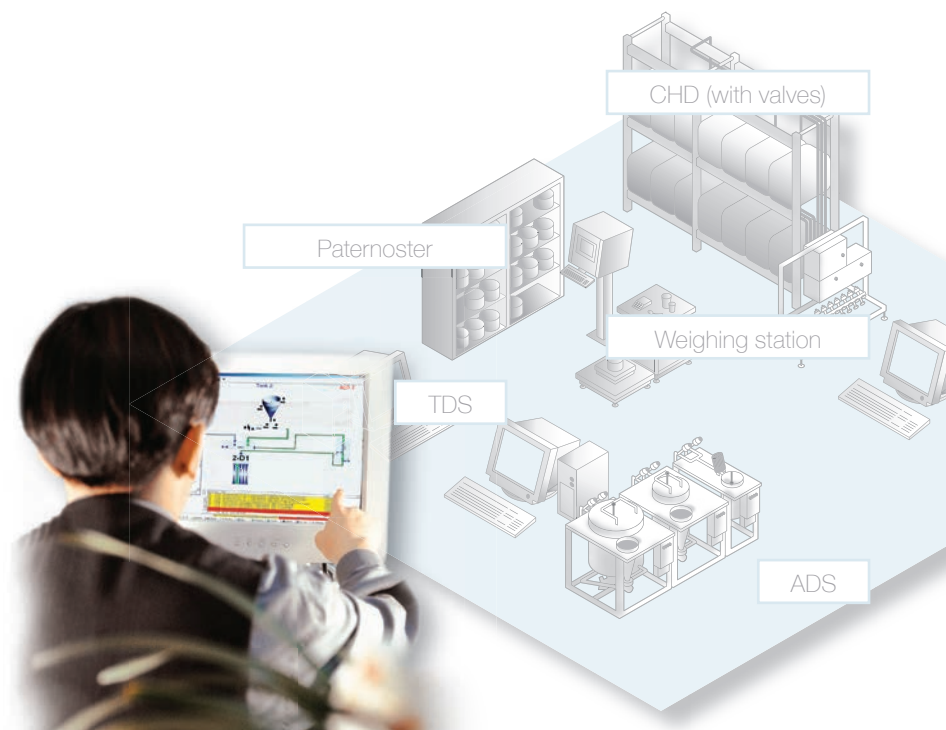
The THEN DYNET PLUS control system consists of a WINDOWS embedded PC with 15" Touchscreen and an industrial BoxPC with LINUX Operating System. Web-based programming tools allow handheld devices like tablet or smartphones for operating and maintenance.



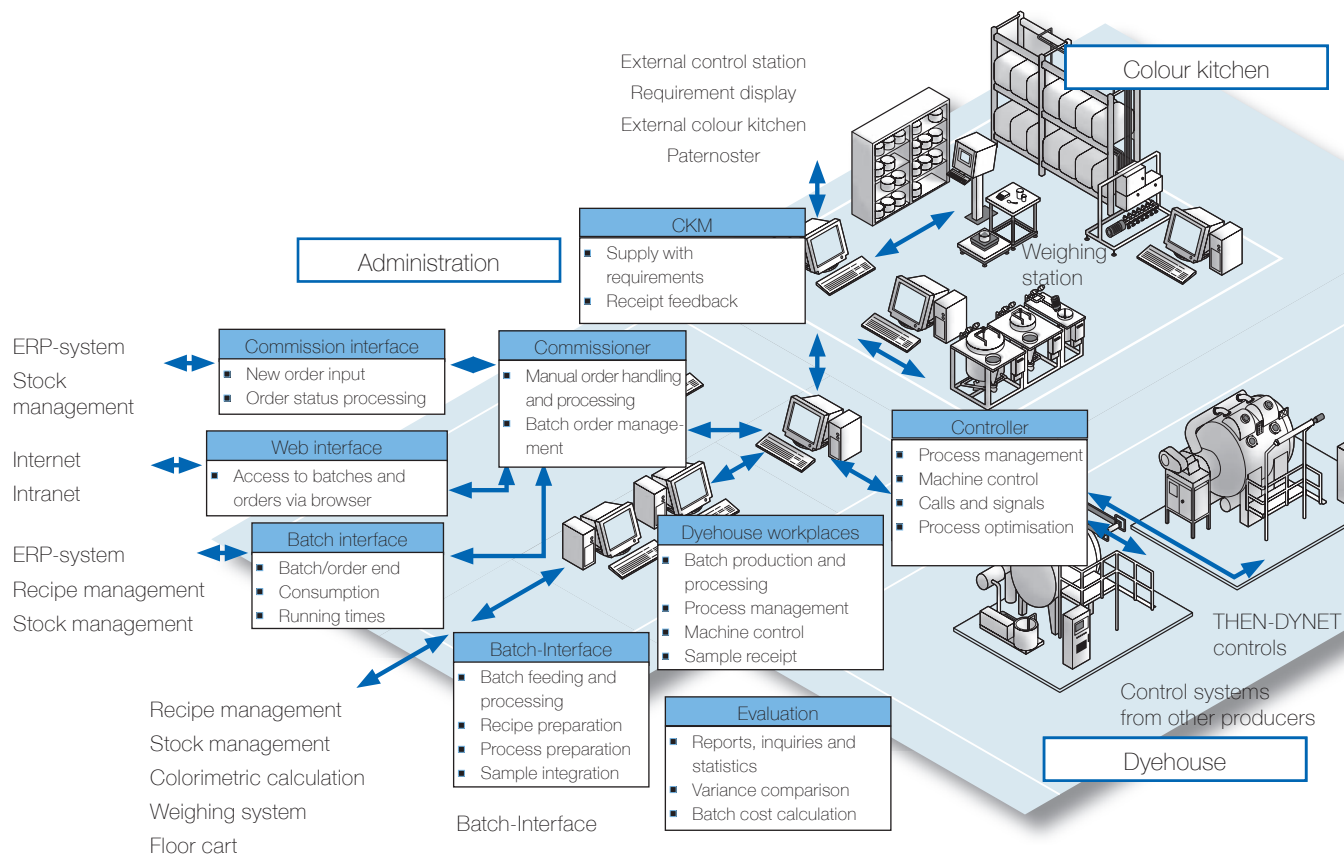
### THEN COLOUR KITCHEN MANAGER (CKM)

#### The modular colour kitchen system

The THEN CKM colour kitchen management system is of modular design. The SCALE weighing system with bar code scanner and the ADS automatic dissolving station are modules for powdered dyes and auxiliaries. The liquid product module is formed by automatic CHD chemical dosing.



# THEN Dyehouse System (TDS)



## The integrated management system

TDS undertakes the management and organisation of the dyehouse and integrates both THEN and other products, as well as PC control systems and hosts into a unified dyehouse system. This includes order management, recipe formulation systems and programs for the optimisation of dyeing processes. The complete software is fully object-oriented programmed using the latest development tools.

As appropriate, production recipes are transmitted to the weighing station, the ADS dissolving station or the CHD chemical dispensing unit. The dyeing machines log and feed back set and actual values, all types of statistics and defect reports to the control systems. Where necessary, this data is also visualised.

## Optimised data flow

The linkage of individual, dyehouse components guarantees an optimised data flow, as well as a clearly structured and flexible production sequence. The input of production data takes place centrally. TDS transfers the process programs in accordance with the order management sequence to the controls of the dyeing machinery via the standardised operating surface.

# Creating Value Added

The TDS contains functions, which are only available from THEN. Accordingly, dyeing processes are shortened by means of the optimum use of dyeing machinery capacity. This includes batch overlapping, involving the preparation of the bath for the subsequent batch, while the final treatment phase of the batch in the machine



is still undergoing completion. The time gains can be as high as 30 minutes per process.

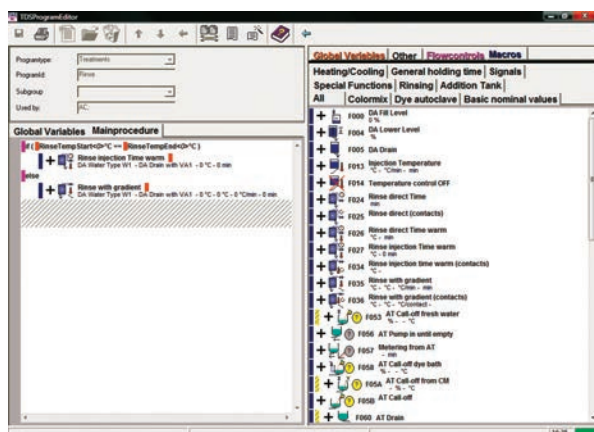
## The outstanding advantages

- THEN's long-term experience in the organisation of discontinuous dyehouses offers numerous advantages:
- Order management, logging of part orders
- Order management release according to configurable working phases
- Pre-sorting of orders in „machine pools“ using order data
- Configurable order/display data
- Filtering (optional), according either to machine pools or order sub-groups
- User-defined, machine-related batch visualisation (job lists)
- Call-up optimisation with information concerning the maximum optimisation time
- Automatic batch starts
- Batch entry, (detailed) order management, release
- Batch-related logging/display of all production data
- Running batches: remote control, receipt signals
- Receipts for batch-related jobs
- Configurable batch printout
- Combination of several orders to form a batch
- Batch-related reports (see picture below)
- Machine-related reports; operator interventions, defects, call-up requirements
- Visualisation of the requested data
- Export of the requested data in ASCII files for external evaluation programmes.

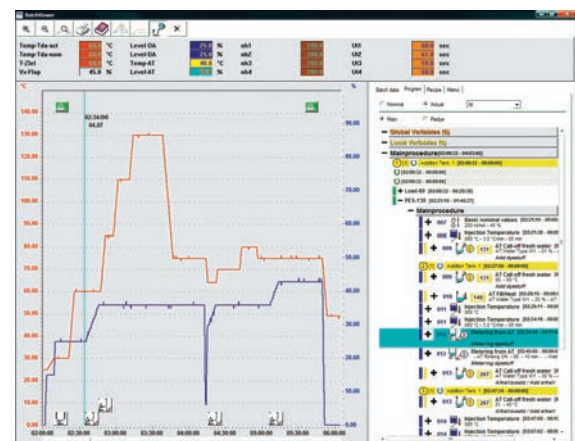
Reserve machine capacity is systematically employed in order to avoid standstills. In addition, high-priority call-ups are given preferential treatment. The system carries out optimisation according to the time remaining until the dyeing machine actually requires the demanded product. An optimum working sequence is prescribed via the operating controls on the PC.

An additional advantage is supplied in the form of complete batch documentation with machine- or batch-related evaluation of the data shown.

System reports can also be called up centrally and grouped as information, warnings and faults. Dynamic programming increases the use and reuse of the dyeing programmes.

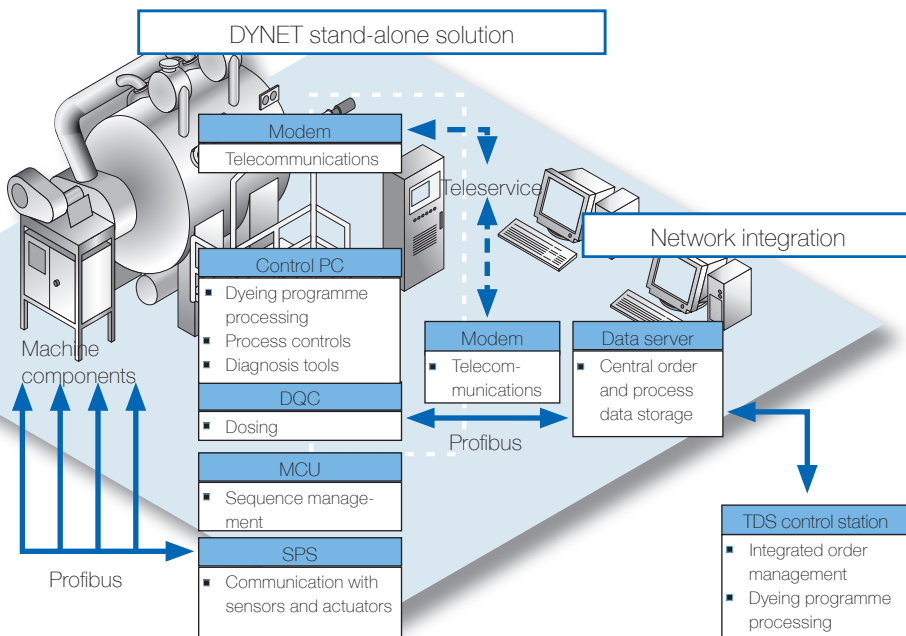


TDS Program editor



Visualisation of the displayed batch data

## THEN Dynet



	Set values	Actual values
Temperature Tj	80 °C	80 °C
Gradient	3.0 °C/min	
Hold time	15 min	12 min
Level / quantity DT	20 %	220 l
Level / quantity AT		0 l
Level / quantity AT2	30 %	27 l
Mixing time		0 min
Injection quantity	90 %	110 l/min
Blower power	30 %	
Winch	330 min	
T-around time	183 s	122 s
T-around no.		0

The graphic user interface of the control-PC is operated via a touch-screen. It can be adapted to your requirements.

## The complete control system

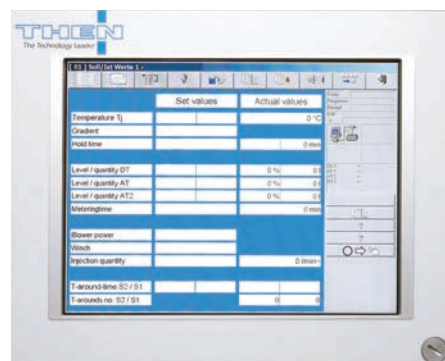
The intelligent THEN DYNET PLUS control System consists of a Windows PC with touchscreen and an industrial BoxPC. The control system has intuitive operator guidance and animated, self-explanatory operating icons. The most important functions are:

- Multi-tasking and batch overlapping
- 3 in 1 function (dosing, rinsing, cooling)
- Contact Dyeing System (CDS) for the self-regulation of dyeing processes
- THEN-VOLMEDOS for automatic dosing (linear, progressive, digressive)
- Salt dissolving function, salt dosing
- Service and diagnosis tools
- Teleservice capability via Internet
- Process visualisation.

During network operation, the control system can access the control station data and, conversely, the complete control system can also be operated from the control station. Batch processing is shown in real time. Apart from the set and actual values of the machine, defects and manual interventions by the operator are also registered. The resulting curves can be freely configured.

The dyeing program and all the necessary parameters are fed into the BoxPC, which controls the program sequence.

Dyeing programs are processed using the same macro-editor as that employed by the TDS control station. The editor accesses the control station directly via the network.



The DYNET control unit is consisting of a Windows® industrial PC with 15" touch-screen.



Standard industrial BoxPC with Interface to the machines Hardware via IO-Bus-system.

# THEN Dyehouse Networks

## Technical specifications

### General

- Standardised operating surface based on Windows 7 or Windows 10
- Dynamic programming (if ... then ...)
- Integration of batch values from order management
- Program export/import
- Program management in sub-groups
- Management of collections, global/local variables, customer catalogues, processes and treatments
- Set time calculation
- Simple recipe management
- Configurable printout

### Software

- Microsoft "Visual Studio", "Visual C++"
- Object-oriented development
- Client-server architecture with DCOM (Distributed Component Object Model) technology. Central server components: TDS data server (data server for dyeing files)
- Database independence through ODBC access
- Fully normalised database
- Scalable displays
- Use of source code management
- Server and all clients use the same data structure

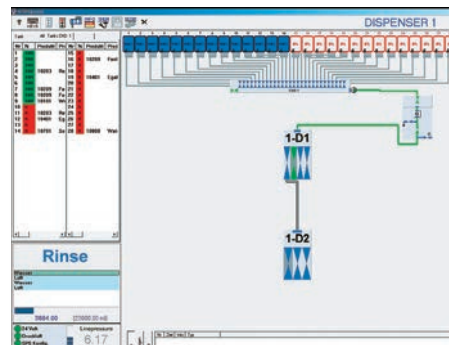
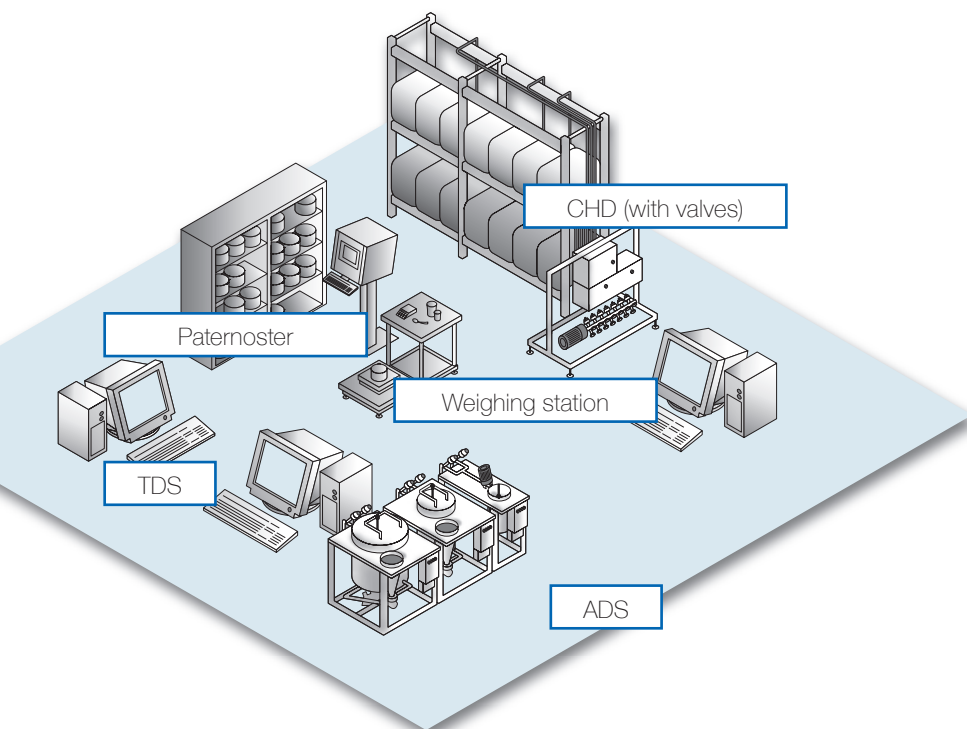
### External interfaces

- Remote control
- External order-related systems (PPS/ERP systems)
- External batch-related systems
- Recipe management: "ColorMaster", "ITM Process1.3", "ITM Process 2.0", "Data Color Process", Customized Solution
- Weighing system (dye cake)
- Floor scales (packer)
- Process parametering via external optimisation programs
- Downstream labelling systems

### Additional modules

- Batch generation (m:n)
- User-dependent surface configuration (TDS Dyeman)
- Freely configurable batch data fields and status flags

## THEN CKM



The CKM color kitchen manager controls the distribution of all products to the dyeing apparatuses.

## The modular colour kitchen system

The THEN COLOUR KITCHEN MANAGER (CKM) colour kitchen management system is of modular design. In the basis version, the CHD chemical and auxiliary dosing unit offers a compact, process controlled measurement and distribution system. Chemicals and liquid dyes are measured with Coriolis flowmeter and transported to the equipment via a line system.

CKM surveillance ensures precisely dosed supply of the machines, which prevents off-shade dyeing and inadequate reproducibility. Moreover, the closed line system reduces environmental impact to a minimum.

The SCALE weighing system with bar code scanner and the ADS automatic dissolving station are modules for powdered dyes and auxiliaries. The next development phase involves dyes supply via a parallel line system, the dyes entering the distribution system via the SCALE recipe-controlled weighing station and the ADS automatic dissolving station.

### Functions

- Automatic dissolving and transporting of dyes, powder chemicals and auxiliaries
- Weighing and acquisition of dyes and chemicals
- Central request management with transparent and well-arranged indication of the request status

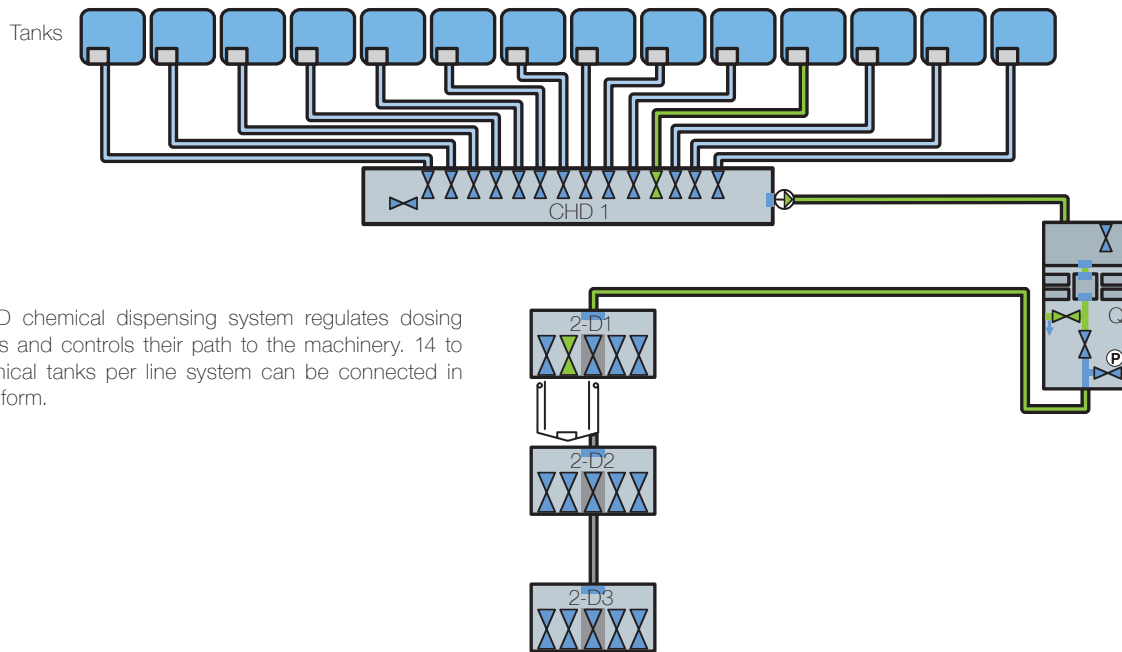
- Optimization of the requests according to priorities and request times
- Recording of the actual product values (via chemical dispensing unit and scale)
- Connection of external request and supply systems as well as paternoster systems
- Supply of non-automated machines (eg. stenter frames) via call panel TDSCallPanel)

The pipes of the tanks end up into a common main pipe to the dyehouse. There the transfer to the correct machine takes place via the CKM-controlled valve switches.





## THEN CHD: Automatic Chemical Dispensing



The CHD chemical dispensing system regulates dosing quantities and controls their path to the machinery. 14 to 56 chemical tanks per line system can be connected in modular form.

### Process controlled measurement and distribution system

The THEN CHD chemical dispensing system allows the dosing of chemicals and auxiliaries in amounts from 50 ml to several hundred litres from the chemical room to the individual machine units. The basis version of the CHD comprises a compact, process controlled measurement and distribution unit. Autonomy with regard to the space available is provided by compact design and the use of pumps. Installation is simple and cost efficient.

reduced markedly due to the use of compressed air as a transport medium, while absolute reproducibility and maximum dosing precision result in a cut in the quantities of chemicals employed and the minimisation of subsequent topping up. In addition, CHD safeguards the operating personnel against contact with chemicals. Each CHD unit is mounted on a stainless steel frame and comprises:



Volumetric measurement takes place by means of flow meters during transport via a line system to the machine units.

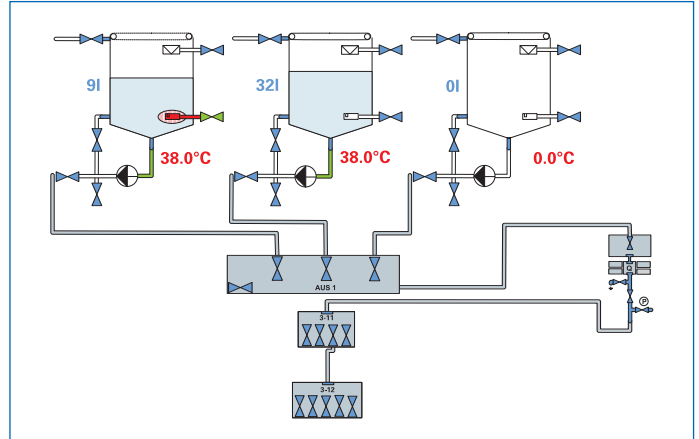
Water consumption is

- Basic collector module for the linkage of the chemical tank to the line system
- Transport pump
- PLC controller with Profinet
- Rinsing water connection

The system can be employed on a stand-alone basis, or be integrated into an existing IT system by means of interfaces to all standard recipe formulation and control systems. The decentralised control system, device control via a bus system and variable, individual line layout make an extension of the distribution system through the connection of additional machines extremely simple.

The space-saving and compact machine can be installed in any room.

# THEN ADS: Automatic Dissolving Station



Schematic diagram of the system parameters (connected nozzles, level, etc.) of the ADS automatic dissolving station.

## Modules for greater efficiency

The ADS automatic dissolving station can consist of up to four solvent tanks of various sizes for the supply of up to 20 dyeing machines and serves the fast and reliable dissolving of powdery products and dyes.

Dissolving parameters such as temperature, dissolving time, solubility, etc. are preset and monitored by the control unit without manual intervention. The operating personnel is guided by means of a clear monitor display, which shows all ADS call-ups, a system diagram and information concerning the machine, requisition number, components and quantities. The working sequence is arranged according to priorities.

Dissolving parameters such as temperature, dissolving time, water volume and type are given and automatically calculated. The parallel preparation of up to four requisitions is possible.

The solvent tanks are electrolytically polished on the inside and fitted with a mixing and transport pump, constant level measurement, temperature control and a cleaning device. As a result of the transport of the additions with one pump, the position of the ADS can be freely selected. Absorption and dissolving occur automatically and in an operator-friendly manner.

## SCALE weighing station

Scales of differing size can be connected to the system. Linkage of the SCALE weighing station to the TDS control system allows a weighing order sequence in line with the individual priority of the machine requests. Correct product solution takes place using a wireless barcode scanner. The respective weighing tolerance can be defined for each product. The superordinated control system stores the weighing protocol for further processing.

Clearly arranged operator guidance at weighing.



# THEN Colour Kitchen Manager (CKM)

## Technical specifications

### General

- Data transparency through OPC server and PC
- Extended diagnosis through the use of soft PLC (WinLC)
- Clear presentation of system parameters (system diagram)
- PLC control with Profinet
- Links to external requisition and supply systems, as well as to paternoster systems
- Supply of non-automated equipment (e.g. stenter frames) via a call panel (TDS call panel)
- Central call administration with transparent and comprehensible display of the call-off status
- Optimisation of calls according to priorities and requirement times
- Logging of actual product values (via chemical dispensing and scales)

### CHD

- Short call-off times and high flow speeds
- 14-56 chemical tanks per line system can be connected on modular basis
- Special, product-related flow characteristics are accounted for

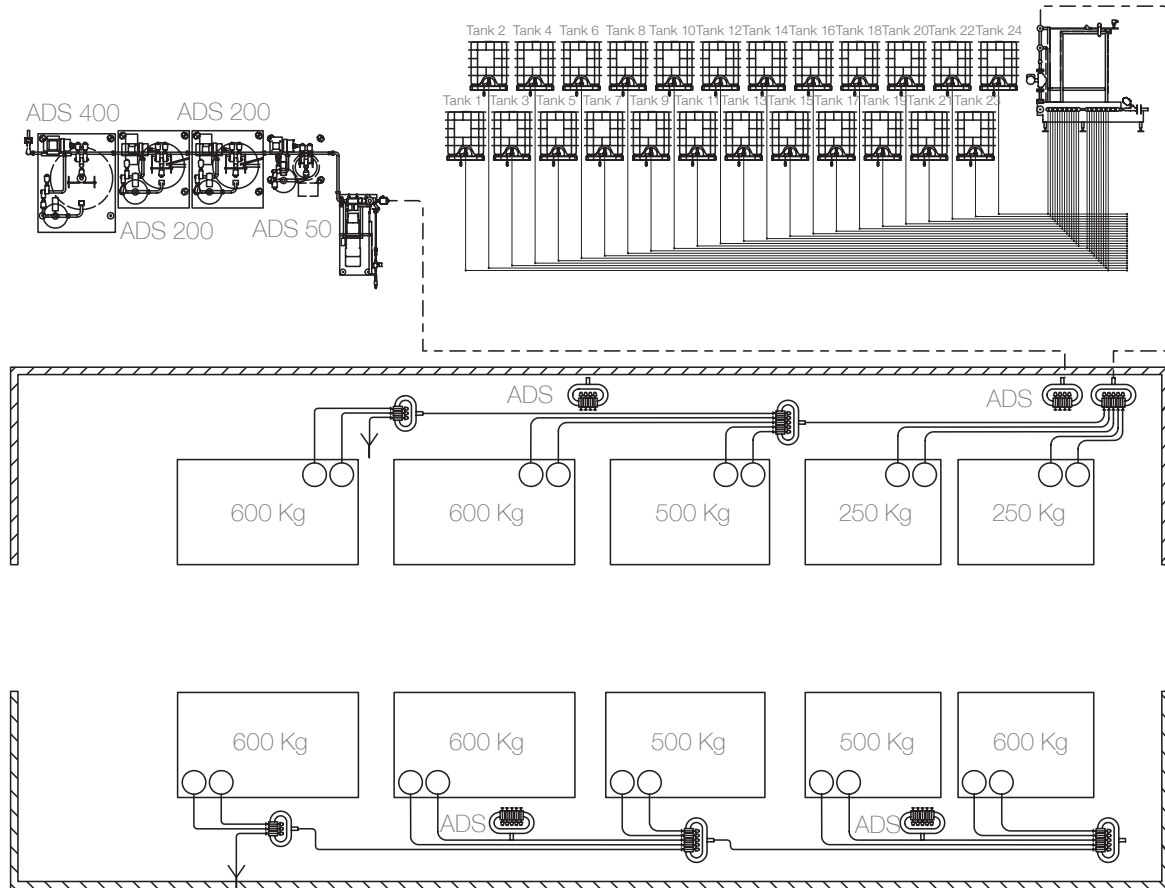
### ADS

- Supply of up to 20 dyeing machines per ADS dissolving tank
- Up to four ADS can be connected on a modular basis
- Special, product-related flow characteristics are accounted for

### SCALE

- Parallel weighing system
- Link to the TDS dyehouse system
- Integration of a bar code scanner and printer
- Logging of actual product values (via chemical dispensing and scales)

# KNOWLEDGE BY EXPERIENCE



Our engineering team provides support during the realisation of customer's production needs. The team plans the ideal solution on the basis of his requirements, the space available and the existing installations. Experienced engineers prepare the most economical and efficient layout for the production plant and draw up a comprehensive, phased installation plan. The calculation of the precise need for electricity, water, steam and compressed air are just as much part of this plan as active environmental management, e.g. for heat recovery and wastewater. In a further step, dyeing engineers assist with the start-up of the applied technology. In teamwork with the factory's specialists, the optimum process is developed with regard to safety, "right first time", ecological management and the shortest possible duration.

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