

# **Technical Description**

DT Laboratory Calender

## **1. GENERAL**

## **2. DESCRIPTION OF THE MAIN UNITS**

### 2.1 Calender Unit

#### 2.1.1 Backing roll

##### 2.1.1.1 Supercalendering

##### 2.1.1.2 Softcalendering

#### 2.1.2 Hot roll

### 2.2 Functional Parts

#### 2.2.1 Heating Element

##### 2.2.1.1 Backing roll

##### 2.2.1.2 Pressing roll

#### 2.2.2 Pressurizing System

##### 2.2.2.1 Backing roll

##### 2.2.2.2 Pressing roll

### 2.3 PLC

### 2.4 Graphic Display

## **3. DIMENSIONING DATA**

### 3.1 General dimensioning data

#### 3.1.1 Dimensions of the calender

## **4. DRIVES**

### 4.1 List of motors and steering

## **5. CONTROLS**

### 5.1 Inverters

### 5.2 Operator terminal

## **6. SCOPE OF DELIVERY**

### 6.1 To be arranged by the Buyer

### 6.2 Documentation

## 1. GENERAL

The DT Laboratory Calender is a small, versatile and efficient laboratory calender especially developed for pigment coated, surface sized or Supercalendering of paper and board. The three calendering possibilities (supercalender with one hot nip, softcalender with one hot nip or two steel rolls with one hot nip) represent the three most industrially used calendering processes. One of the unique features of the DT Laboratory Calender is the possibility to calender sheets as well as a web. The DT Laboratory Calender is made for a sheet width up to 300 mm. The maximum width of the web is 300 mm. The maximum roll diameter is designed approximately for 500 mm. The main building material of the DT Laboratory Calender is painted steel. The Laboratory calender requires only a little space and can be used in a regular laboratory environment.

## 2. DESCRIPTION OF THE MAIN UNITS

### 2.1 Calender Unit

The basic calender unit is built as an open structure for an easy change of backing roll. The backing roll is on top and the hot roll vertically underneath. The hydraulic unit is situated in the calender stand under the actual calender frame. The control cabinet is placed on the side of the calender, which makes the whole calender unit as one single machine. The calender unit is movable by using forklift or a standard palette mover. The unit is after placing put on adjustable rubber bottom machine feet. A feeding plate is attached on the frame for usage with sheet calendering to maximize your safety.

In the normal delivery is two rolls according to the customers' specifications, for example one hot roll (lower roll) and one steel/soft/super roll (upper roll).

#### 2.1.1 Backing roll

- Diameter 250 mm (224/180 x 400)
- Material Steel
- Cover thickness 26 mm
- Shaft Steel D60-75
  - Flanged type of bearing
  - Driving unit attached to the shaft

#### 2.1.1.1 Super roll

- Cover hardness 91 62 ShD
- Cover Supertex Series (The type of cover can be discussed according to customer specifications)  
Paper filled shaft construction

#### 2.1.1.2 Soft roll

- Cover hardness 91 62 ShD
- Cover XCC Summit Series (The type of cover can be discussed according to customer specifications)

#### 2.1.2. Hot roll

- Diameter 200 mm (200/160 x 375)
- Material Steel roll, hardened and hard chromed and grinded to 0.05 Ra  
(The type of cover can be discussed according to customer specifications)
- Shaft Steel D 60-80
- Roughness Ra = 0,1 µm
- Hardness 60 Rockwell

## 2.2 Functional Parts

### 2.2.1 Heating Element

- Electrical resistance
- 3 ‘ 1.5 kW
- ceramic cover
- temperature sensor K-type

#### 2.2.1.1 Backing roll

- inverter steering and electrical motor

#### 2.2.1.2 Pressing roll

- usually heated

### 2.2.2 Pressurizing System

#### 2.2.2.1 Backing roll

- fixed on frame

#### 2.2.2.2 Pressing roll

- movable in vertical direction
- paper feed 90 degrees between rolls

## 2.3 PLC

Mitsubishi FX1N-24-MT

Mitsubishi FX2N-24-4AD

## 2.4 Graphic Display

Beijer Electronics MAC E300

## 3. DIMENSIONING DATA

### 3.1 GENERAL DIMENSIONING DATA

#### 3.1.1 Dimensions of the calender

- Machine frame 500 kg (approx.)
- Length of the calender unit 700 mm (approx.)
- Minimum working space 1000 mm (approx.)
- Width 1300 mm
- Height 1300 mm

- Hydraulic pressure 0 – 175 bar
- Heating element 3 \* 1,5 kW
- Unwind/rewind excluding paper roll 100 kg (approx.)
- Web width max. 300 mm
- Length of the unwind/rewind stand buck 1000 mm (approx.)
- Max. speed sheet 30 m/min
- Max. speed web Depending on heating

**4. DRIVES**

**4.1 LIST OF MOTORS AND STEERING**

Item	Location	Q'ty	kW	rpm n1	Drive	Steering	Velocity m/min (Note)
UW-P	Unwind	1			Friction Plates	Pneumatic Valve with analogue display	
CB-M	Backing roll	1	1.1	1370	Gear	AC Inverter	30
CH-	Heated roll	1			Friction from backing roll		
HY-M	Hydraulic Unit	1	0.75	1500	Direct		

**5. CONTROLS**

Tension control is carried out with potentiometers situated in the main console for the rewind and at the unwind/rewind frame for the brake with pneumatic valve.

**5.1 INVERTERS**

Item	Unit	Q'ty	kW	Inverter type / option
UU	Unwind			
CU	Backing Roll	1	1.5	Mitsubishi FR-A500
CU	Pressing Roll			
HU	Hydraulic Pump			

**5.2 OPERATOR TERMINAL**

MAC E-300 operator panel is connected to Mitsubishi FX1N-1-MT for temperature and pressure regulation. In the MAC E-300 operator panel the temperature and pressure values are fed using the panel keyboard. The panel includes also a display for the temperature and pressure. There are function keys and leads for programming the temperature and pressure values. The panel LCD resolution is 128\*64 pixels.

## **6. SCOPE OF DELIVERY**

### **6.1 TO BE ARRANGED BY THE BUYER**

- Air conditioning of the room
- Air for instrumentation
  - Pure dry oil free air. Min pressure 6 bar.
  - Minimum pipe diameter to machine 6 mm.
- Architectural works, grouting, openings, lead-troughs
- Electricity 3~ 400 V with neutral and grounding (unless otherwise agreed)
- Special safety arrangements
- Safety shields if special arrangements

### **6.2 DOCUMENTATION**

Following documentation will be supplied:

- Owners manual, one paper copy in English
- Electrical drawings, one set of paper copies (A4)
- One paper copy of main parts of the calender and optional unwind/rewind
- Spare part list, one paper copy in English
- Documentation and necessary drawings in PDF form in CD-ROM