

Mondi Štětí a.s.

STANDARD

Part 20.01.06

HYDRAULICS CENTRAL OIL LUBRICATION

PNEUMATICS

STANDARD

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HYDRAULICS CENTRAL OIL LUBRICATION

PNEUMATICS

EXECUTION, CONDITIONS, QUALITY, REGULATIONS, STANDARDS, SUPPLIES, PROVISIONS

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TABLE OF CONTENTS

	Page
1 GENERAL INTRODUCTION	3
2 RESPONSIBILITIES FOR SUPPLIERS	3
3 DOCUMENTATION REQUIREMENTS	3
3.1 Required documents	3
3.2 Delivery standard and deadlines for documents	4
4 REQUIREMENTS FOR HYDRAULICS AND CENTRAL OIL LUBRICATION (COL).....	5
4.1 Hydraulic units.....	5
General:.....	5
Electrical:	5
Pumps with motors:	5
Filtration:.....	6
Heating and Cooling:	6
Materials and Piping:	6
4.2 Hydraulic cabinets and valve groups	6
General:.....	6
Electrical:	7
Materials and Piping:	7
4.3 Suppliers of components	7
5 REQUIREMENTS FOR PNEUMATICS	9
5.1 Pneumatic cabinets and valve groups	9
Electrical:	9
Materials and Piping:	9
5.2 Suppliers of components	10
6 MATERIAL SPECIFICATIONS	11
7 RELATED STANDARDS AND NORMS	14

1 GENERAL INTRODUCTION

This is our mandatory Hydraulic & Pneumatic mill standard, which is designated in the text below in the abbreviated form "Standard". This standard has been created in order to increase operation efficiency and maintenance of the equipment. The types of the used devices must be minimized that the transferability of spare parts to other areas of the machine is given.

2 RESPONSIBILITIES FOR SUPPLIERS

The supplier is obliged to observe this standard in deliveries, assemblies and repairs of hydraulic and pneumatic equipment including clamping and auxiliary materials with regard to the target area of its utilisation. The demands for the equipment for these different areas of the machine are described in the table "Material Specifications" mentioned in this standard.

In the standards "Hydraulic and Pneumatic" and "Electrical + C&I", different manufacturers or instruments are sometimes specified for one type of instrument. In this case, the specification corresponding to the STANDARD 07 - "Hydraulic, COL and Pneumatic" applies. The different specifications are due to the need to consider special hydraulic and pneumatic requirements.

3 DOCUMENTATION REQUIREMENTS

3.1 Required documents

The suppliers are obliged to submit the following documentation with each delivery:

- a) Hydraulic & pneumatic circuit diagrams including:
 - required adjustment data (e.g.: pressure set point)
 - designation of all devices in accordance of the mill identification system
 - designation of locations in accordance of the mill identification system
 - naming of all pipe-connection points to field and machine piping
 - sequence charts
- b) Assembly drawings for hydraulic units
- c) Function descriptions and special features of complex control circuits (e.g.: Nip-Control)
- d) Spare part list (Excel) with internet hyperlink to the manufacturer of standard devices.

For special customized or nonstandard elements the data sheets must be included.

- e) Inspection and maintenance schedule
- f) Safety instructions for operation and maintenance (e.g.: operation of safety shut off valves)
- g) Requirements on mill air for the delivered equipment according ISO 8573-1
- h) Quantity and quality requirements for oil filling of the hydraulic units (Procurement list)
- i) Quantity and type of filter elements which are needed for initial flushing (Procurement list)
- j) Specification and manufacturer's declaration of pressure vessels including safety-valves
- k) Cooling water consumption list with the amount of heat which must be lead off

3.2 Delivery standard and deadlines for documents

- Documentation delivered as electronic documents embedded in an entire HTML based directory.
 - Circuit diagrams have to be delivered additionally as files in AutoCAD - DWG format.
 - Amount of paper copies of the circuit diagrams and operation manuals according general project directives.
- Deadline for the entire “**Final Documentation**” according general project directives and timeline.
- Deadline for “**Documentation in Advance**” according general project directives and timeline:
- Assembly drawings for hydraulic units (main dimensions for foundation, pipe connection points)
 - Spare part list – Final list for the purchase, to ensure the availability of spare parts for start-up
 - Requirements on mill air for the delivered equipment
 - Quantity and quality requirements for oil filling of the hydraulic units (Procurement list)
 - Quantity and type of filter elements which are needed for initial flushing (Procurement list)
 - Specification and manufacturer's declaration of pressure vessels including safety-valves
 - Cooling water consumption list with the amount of heat which must be lead off

4 REQUIREMENTS FOR HYDRAULICS AND CENTRAL OIL LUBRICATION (COL)

4.1 Hydraulic units

General:

Hydraulic units consist of:

- the oil tank with all required operation and **stand-by pumps** to generate compressed oil as well as the electrical motors, heaters (if required) and electrical monitoring equipment.
- valve groups for hydraulic functions, if technical applicable, located on a mounting-plate, which is set-up on the oil tank by a frame. See chapter 4.2 for detailed information.

The unit is completely piped, wired in accordance with the electrical standard and function-checked.

The line outlets are executed at transfer points with fittings or flanges. The counter-flanges and fittings for the field piping must be included in the delivery.

Instrument boxes, valve groups, all instruments and pipe outlets are marked.

Electrical:

- Hydraulic valves are to be equipped with **24V DC** solenoids.
- The electrical connections at the solenoid valves are made with instrument plug sockets to DIN EN 175301-803. The active status is indicated by LED.
- Cables (except motor cables) are wired on terminals in junction box(es) installed on the unit (see electrical standard for detail information).
- Motor specifications (manufacturer, voltage, additional features) - see electrical standard

Pumps with motors:

- Hydraulic pumps must be laid out for **redundancy operation** with automatic pulsation-free changing to the stand-by pump in the case of a pressure drop **if technical applicable** (e.g. shifting units for COL).
- Location of Pump-Motor units:
 - Pumps with electric motors ≤ 30 kW placed on the oil tank - if possible
 - Pumps with electric motors > 30 kW placed next to the oil tank

Filtration:

- Suction filters (if applicable)
- Pressure filters (Duplex filter, manual switch over)
- Return filters (Single filter, Duplex filter is possible)
- Bypass filters in cooling circuit (Single filter, Duplex filter only, if need for application)
- filter element mesh wide according the required cleanness of application
- N+1 filtration concept is allowed for special applications (shoe press HY-unit)

All filter housings are equipped with:

- electric/optical clogging indication
- internal bypass (to avoid collapsing of filter element)

Additional connections (2 pieces) on the tank for an external filtration/dewatering unit

- Dimension for tanks up to 1000 L ≤ 1 " minimum
- Dimension for tanks greater to 1000 L > 2 " minimum

Heating and Cooling:

The stations are to be equipped with electric-heating if required for the application (e.g.: COL).

Steam heating is not possible and will be not accepted!

Air cooling is standard for the cooling circuits. Water cooling is only to be supplied if technical required.

Cooling water temperature max. 25 °C (further information of water quality see STANDARD 25)

Materials and Piping:

The different demands for the equipment, according the machine sections, are described in the table "Material Specifications" mentioned in this standard

4.2 Hydraulic cabinets and valve groups**General:**

Hydraulic boxes and valve groups are either set up on the oil tank or located in the field or at the machine, according to the demands of the application.

The units are completely piped, wired in accordance with the electrical standard, and function-checked.

The line outlets are executed at transfer points with fittings or flanges. The counter-flanges and fittings for the field piping must be included in the delivery.

Instrument boxes, valve groups, all instruments and pipe outlets are marked.

Individual hydraulic devices in the field may also be mounted without protective boxes if required.

(e.g.: check-valves, throttle-valves, ...)

Electrical:

- Hydraulic valves are to be equipped with **24V DC** solenoids.
- The electrical connections at the solenoid valves are made with instrument plug sockets to DIN EN 175301-803. The active status is indicated by LED.
- Cables are wired on terminals in a junction box installed in the cabinet (see electrical standard for detail information).
- Large cabinets are to be furnished with lighting.

Materials and Piping:

The different demands for the equipment, according the machine sections, are described in the table "Material Specifications" mentioned in this standard.

4.3 Suppliers of components

Type of component	Make (preferred)	Make (alternative)	Remarks
Regulated pumps: - Axial piston pumps - Fan cell pumps	Bosch Rexroth	Parker, Vickers/Eaton	including double and multiple pumps
Constant flow pumps: - Gear pumps - Screw spindle pumps	Kral, Allweiler, Settima, Kracht		used for COL and HY-units for shoe press
Shut-off valves	Bosch Rexroth	Hydac, Parker	
Flow control valves	Bosch Rexroth	Parker	
Pressure-reducing valves	Bosch Rexroth	Parker	
Pressure-limiting valves	Bosch Rexroth	Parker	
Servo and proportional valves	Bosch Rexroth	Moog, Parker	
Multiple-way valves	Bosch Rexroth	Parker, COAX	

Version: 01

Oil filters	Hydac	Paker, Pall	
Oil cooler oil / air	Parker		Standard
Oil cooler oil / water	Parker (Olaer) welded Alfa-Laval (screwed)	GEM	Special applications (e.g.: for shoe press) Material: AISI316
Pressure meters	Wika	Parker	
Pressure transmitters	Hydac	Bosch Rexroth	
Pressure accumulator	Bosch Rexroth	Hydac	
Level switches	Bosch Rexroth	Parker	
Temperature switch	Bosch Rexroth	Parker	
Flow control cooling water	Danfoss		
Oil heater	Loval	Backer	
Cylinders	Rexroth	Bosch Parker	
Flow control bearings	AS-Drive (System FlexoFlow)	SKF	for COL
Measuring connections	Parker	ISO 15171-2	coupling thread M16x2
Water warning unit (COL)	Bühler	Hydac	

5 REQUIREMENTS FOR PNEUMATICS

5.1 Pneumatic cabinets and valve groups

Pneumatic boxes, with all required valve groups, pressure regulators, filters and electrical equipment are located in the field or at the machine, according to the demands of the application.

Only big air filters, maintenance units and shut-off valves should be installed outside of the housing.

The units are completely piped, wired in accordance with the electrical standard, and function-checked.

The line outlets are executed at transfer points with fittings or flanges. The counter-flanges and fittings for the field piping must be included in the delivery.

Instrument boxes, valve groups, all instruments and pipe outlets are marked.

Individual pneumatic devices in the field may also be mounted without protective boxes if required

(e.g.: manual-operated valves on the framing, throttle-valves, ...).

Electrical:

- Hydraulic valves are to be equipped with **24V DC** solenoids.
- The electrical connections at the solenoid valves are made with instrument plug sockets to DIN EN 175301-803. The active status is indicated by LED.
- Cables are wired on terminals in a junction box installed in the cabinet (see electrical standard for detail information).
- Large cabinets are to be furnished with lighting.

Materials and Piping:

The different demands for the equipment, according the machine sections, are described in the table "Material Specifications" mentioned in this standard.

5.2 Suppliers of components

Type of component	Make (preferred)	Make (alternative)	Remarks
Solenoid valves	Aventics	Festo, Norgren	
Manual multiple- way valves	Aventics	Festo, Norgren	
Pressure control valves	Aventics	Festo, Norgren	
Proportional pressure valves	Aventics	Festo, Norgren	
Boosters	Fairchild		
Converters I/P	Samson	Emerson	
Pressure meters	Wika	Parker, Aventics	
Pressure switches	Aventics	Festo, Norgren	
Air filters	Aventics	Festo, Norgren Hörbiger	
Maintenance units	Aventics	Festo, Norgren	

6 MATERIAL SPECIFICATIONS

Specifications of materials according to the machine sections in the following tables:

Remark: The mentioned material is the **minimum standard**; the use of better material is allowed.

Environment	Preperation, Refiner	Press part	Wire part	Pre-drying drying	Clupak, Coater, SizePress	Calender	Reeler POPE, Chopper, Rewinder
Water content %	100	100	100	60-40	100	0	0
Temperature °C	20-30	70	120	150	120	200	20-30
Chemistry		5% NaOH	5% NaOH	0	0	0	0
Vibration	Yes	Yes	Yes	Yes	Yes	Yes	Yes

HYDRAULIC UNITS							
Oil tanks	AISI 304	AISI 304	AISI 304	AISI 304 Al (for small back-pump units)	AISI 304	AISI 304	AISI 304
Mounting panels for valve groups on HY-units	AISI 304 or Al	AISI 304 or Al	AISI 304 or Al	AISI 304 or Al	AISI 304 or Al	AISI 304 or Al	AISI 304 or Al
Electrical junction boxes on HY-units	AISI 304	AISI 304 or chemical-resisting plastic	AISI 304 or chemical-resisting plastic	AISI 304 or chemical-resisting plastic	AISI 304	AISI 304 or chemical-resisting plastic	AISI 304 or chemical-resisting plastic
Frame of the entire HY-unit	AISI 304	AISI 304	AISI 304	Steel varnished	AISI 304	Steel varnished	Steel varnished
Grid of the frame on the HY-unit (if applicable)	Galvanized	Galvanized	Galvanized	Galvanized	Galvanized	Galvanized	Galvanized
Pipe connection <=42 mm Parker Ermeto or Walterscheid Walform	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti
Pipe connection >=42 mm DIN flange or SAE flange	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti
Hose material	as per requirement	as per requirement	as per requirement	as per requirement	as per requirement	as per requirement	as per requirement
Hose fittings (Hose ends secured)	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti
Piping material	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti

Version: 01

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Environment	Preperation, Refiner	Press part	Wire part	Pre-drying drying	Clupak, Coater, SizePress	Calender	Reeler POPE, Chopper, Rewinder
HYDRAULIC & PNEUMATIC BOXES / PANELS							
Boxes/Panels on machine framing or inside hood	AISI 304	AISI 316	AISI 316	Steel varnished (RAL 7035)	AISI 304	Steel varnished (RAL 7035)	Steel varnished (RAL 7035)
Boxes/Panels outside machine framing or on HY-units	AISI 304	Preferably chemical-resisting plastic if technical possible or AISI 304	Preferably chemical-resisting plastic if technical possible or AISI 304	Preferably chemical-resisting plastic if technical possible or Steel varnished (RAL 7035)	AISI 304	Preferably chemical-resisting plastic if technical possible or Steel varnished (RAL 7035)	Preferably chemical-resisting plastic if technical possible or Steel varnished (RAL 7035)
Pipe connection <=42 mm Parker Ermeto (alternative Swagelok) or Walterscheid Walforn	AISI 316Ti	AISI 316Ti	AISI 316Ti	Steel with CF-zinc-chrome coated	AISI 316Ti	Steel with CF-zinc-chrome coated	Steel with CF-zinc-chrome coated
Pipe connection >=42 mm DIN flange or SAE flange	AISI 316Ti	AISI 316Ti	AISI 316Ti	Steel varnished	AISI 316Ti	Steel varnished	Steel varnished
Hose material for hydraulic	as per requirement	as per requirement	as per requirement	as per requirement	as per requirement	as per requirement	as per requirement
Hose fittings (Hose ends secured)	AISI 316Ti	AISI 316Ti	AISI 316Ti	Steel with CF-zinc-chrome coated	AISI 316Ti	Steel with CF-zinc-chrome coated	Steel with CF-zinc-chrome coated
Piping material <=42 mm	AISI 316Ti	AISI 316Ti	AISI 316Ti	Steel with CF-zinc-chrome coated	AISI 316Ti	Steel with CF-zinc-chrome coated	Steel with CF-zinc-chrome coated
Piping material >=42 mm	AISI 316Ti	AISI 316Ti	AISI 316Ti	Steel varnished	AISI 316Ti	Steel varnished	Steel varnished
Plastic tube for pneumatic box installed in field outside machine	PP	PP	PP	PP	PP	PP	PA
Plastic tube for pneumatic box installed on the machine	PP	PTFE	PTFE	PTFE	PTFE	PTFE	PA
Plastic tube connections system	Push-In nickel-plated brass	Push-In nickel-plated brass	Push-In nickel-plated brass	Push-In nickel-plated brass	Push-In nickel-plated brass	Push-In nickel-plated brass	Push-In plastic

Version: 01

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Environment	Preperation, Refiner	Press part	Wire part	Pre-drying drying	Clupak, Coater, SizePress	Calender	Reeler POPE, Chopper, Rewinder
PIPING FOR MACHINE AND FIELD							
Pipe connection <=42 mm Cutting ring bolted connection Parker Ermeto (alternative Swagelok)	AISI 316Ti	AISI 316Ti	AISI 316Ti	Steel with CF-zinc-chrome coated	AISI 316Ti	Steel with CF-zinc-chrome coated	Steel with CF-zinc-chrome coated
Pipe connection >=42 mm Welded or if requirement DIN flange or SAE flange	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti
Hose material	as per requirement	as per requirement	as per requirement	as per requirement	as per requirement	as per requirement	as per requirement
Hose fittings (Hose ends secured)	AISI 316Ti	AISI 316Ti	AISI 316Ti	Steel with CF-zinc-chrome coated	AISI 316Ti	Steel with CF-zinc-chrome coated	Steel with CF-zinc-chrome coated
Piping material <=42 mm	AISI 316Ti	AISI 316Ti	AISI 316Ti	Steel with CF-zinc-chrome coated	AISI 316Ti	Steel with CF-zinc-chrome coated	Steel with CF-zinc-chrome coated
Piping material >=42 mm	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti	AISI 316Ti
Gaskets	Viton	Viton	Viton	Viton	Viton	Viton	NBR
Clamps	RAP (80°C)	RAP (80°C)	Al	RAN (120°C)	RAN (120°C)	Al	RAP (80°C)
installation material (screws, butterfly nuts, runners, supports, C-rail)	AISI 316Ti Screws secured against loosening	AISI 316Ti Screws secured against loosening	AISI 316Ti Screws secured against loosening	CF-zinc-chrome coated Screws secured against loosening	AISI 316Ti Screws secured against loosening	CF-zinc-chrome coated Screws secured against loosening	CF-zinc-chrome coated Screws secured against loosening
ACTUATORS / FIELD DEVICES							
drives, cylinders motors	Stainless steel finish, heat-resistant plastics	Stainless steel finish, heat and chemical-resistant plastics	Stainless steel finish, heat and chemical-resistant plastics		Stainless steel finish, heat-resistant plastics	Standard finish, heat-resistant Standard design plastics	Standard design
Units for air treatment	Chemical-resisting plastics	Chemical-resisting plastics	Chemical-resisting plastics	Heat-resistant plastics	Heat-resistant plastics	Heat-resistant plastics	Standard design
Measuring (Manometers) and control elements	Stainless steel, chemical-resisting plastics	Stainless steel, chemical-resisting plastics	Stainless steel, chemical-resisting plastics	Metal, heat-resisting plastics	Stainless steel, heat-resisting plastics	Metal, heat-resisting plastics	Metal, heat-resisting plastics

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7 RELATED STANDARDS AND NORMS

a. Modification of pressurised air/hose and screw coupling

- pressure vessels
97/23/EG
87/404/EWG
EN 286-1
- manometers
DIN EN 837-1
- safety quick-acting couplings
ISO 4414

b. Valves/valve terminals

- electro-magnetic and pneumatic valves
ISO 15407-1
ISO 5599-1
- connecting boards for valves
DVI / DVE 3845
ISO 15407-1
ISO 5599-1
- valve terminals
ISO 15407-1
ISO 5599-2

c. Pneumatic drives

- cylinders
ISO 6432
DIN ISO 6432
ISO 15552
NFE 49003.1
UNI 10290
- Forked terminals
DIN ISO 8140
DIN ISO 8139

d. Pipes and Pipe connectors

- seamless precision tubes
DIN EN 10305-4
DIN EN 10216-5 TC1
DIN EN 10305-1
DIN EN ISO 1127 D4/T3
- pipes
DIN EN 10220
DIN EN ISO 1127

e. Documentation

- hydraulic & pneumatic diagrams
ISO 1219-1
ISO 1219-2