Lubricants

for the

Paper Industry

Raw Materials and their Preparation

Fibre, Additives and Water

Wood is the principal source (approx 95%)

Other sources are

Waste Paper,Sugar Cane Processing Waste, Bamboo, Straw

4 different methods of Pulping Processes

Groundwood (Mechanical) Pulp
Chemical Pulp
Chemi-mechanical Pulp
Waste Paper Pulp

Groundwood (Mechanical) Pulp

In the classic groundwood process debarked logs are pressed against a rotating grinding stone while hot water is sprayed on. The rough surface of the stone breaks down the wood into fibres. After grinding the ground wood pulp is screened, refined and thickened. When required ground wood pulp may also be bleached before going to the paper machine.

Saw mill waste or wood chips are the raw material for the refiner process. During the last few years this process has been further developed to the thermo-mechanical pulp (TMP) process. In the TMP process the lignin between the fibres is softened by pre-steaming at about 130°C. Refiner discs rotating against each other separate the fibres from the chips. Water is also added during the process.

Chemical Pulp

Chemical Pulp is a higher quality fibre which is produced by dissolving and removing the lignin which binds the fibres together and also resins present in the wood. Both of these are not good for the paper quality.

To make chemical pulp the wood is first cut into small chips, then cooked with chemicals and water. The main purpose of this process is to remove the lignin and gently break down the wood into individual fibres. After this the fibre stock is screened, cleaned and thickened. Depending on the application bleaching is sometimes required.

Waste Paper Pulp

Many grades of waste paper are collected and they are used for a variety of paper grades. The waste paper treatment systems common in the paper industry generally operate according to the following principle:

The waste paper is dissolved in water and broken down into a fibre slurry. This is done in a “Pulper”, the functioning like a very large kitchen mixer. Unwanted contaminants like wire, metals, string a. s. o. are removed and the waste slurry is screened to remove even finer contaminants.

In addition to this type of waste paper treatment facilities many paper mills have a so called “De-inking” system which can remove most of the printing inks found in the waste paper.

Application Examples Woodyard

Cranes		Bearings	HIGH LUB FA 67-400
		Open Gear Drives	BERULIT GA
		Chains	HIGH LUB SW 2 V
		Gears	BERUGEAR GS BM
Log Stackers		Gears	BERUGEAR GS BM
Feeders, Kickers	Le Tourneau	Hydraulic System	HYDROSTAR 46 D
Roto-Bakers	Nicholson	Bearings & Guides	HIGH LUB FA 40 MO
Barker Drum		Open Gear Drives	BERULIT GA
Slusher Unit		Chains	HIGH LUB SW 2 V
Chippers		Bearings	HIGH LUB FA 67-400
		Open Gear Drives	BERULIT GA
Drum Filter		Bearings	HIGH LUB FA 67-400
Chip Screens	Dillon	Screen Bearings	HIGH LUB FA 67-400
Vibrating Screens		Bearings	HIGH LUB FA 40 MO
Pressure Screens		Bearings	HIGH LUB FA 67-200
Conveyor System		Bushings	HIGH LUB FA 40 MO

Application Examples Pulp Mill

Digester Room		Blow Valve Srew & Nut	CERITOL PT 2
		Acid Pump Bearings	BERUPLEX KS 22
Pulp Stock Washers	IMPCO	Worm Gears	BERUGEAR GS BM
Pressure Washers	Rauma Repola	Bevel / Spur Gears	BERUGEAR GS BM
Vertical Pulper	Voith	Gears	ECOGEAR M
Hydorpulper	Black Clawson	Drive Shaft Bearings	HIGH LUB FA 67-200
Pulp Screens	Bird	Main Shaft Bearings	HIGH LUB FA 40 MO
Pulp Mixer		Main Shaft Bearings	HIGH LUB FA 67-400
Pulp Storage Tank Agitator		Open Gear Drives	BERULIT GA
		Shaft Support Bearings	HIGH LUB FA 67-400
Primary Disc Refiners	Sprout Waldron	Disc Shaft Bearings	STAROIL SMO 220
Disc Refiners		Spherical Roller Bearings	STAROIL G 68
Disc Refiners	Bolten Emerson	Tapered Roller Bearings	HIGH LUB FA 67-200
Cone Type Refiners	Jones	Refiner Bearings	BERUSYNTHE GP
TMP System	Beloit	Rotary Steam Valve	BERUTOX FH 28 KN
Mixer Bleach Plant		Falk Gear Reducer	BERUGEAR GS BM
Eucalypt Concentrator	Radiclone	Drive Gear Box	BERUGEAR GS BM
Stock Chest Agitators		Gear Reducer Drive	BERUGEAR GS BM

Application Examples Recovery Section

Lime Kiln		Open Gear Drives	BERULIT GA
		Support Roller Bearings	BERUSYNTH EP
		Main Gear Box	BERUGEAR GS BM

The Paper Machine

Despite the great variety of designs, in principle all machines are composed of basically the same elements

Headbox

Wire Section

Press Section

Dryer Section

Reel

The design and the speed depends on the product being made.

Paper is made at speeds up to 2.000 meters per minute.

Headbox and Wire Section

The job of the headbox is to very uniformly distribute the very dilute fibre suspension over the entire width of the machine.

In a Fourdrinier type of machine this fibre suspension comes out through a slit onto the flat, continuously running wire. The fibres orient themselves on the wire, adjacent to or on top of the other fibres. Simultaneously , the water drains through the wire or is sucked away by vacuum.

At the end of the wire section the paper web still contains approximately 80% of water.

Press Section and Dryer Section

The still relatively weak paper web is further dewatered by mechanical pressure in the press section. The web is led on very absorbent continuous felt through rolls made of steel, granite or hard rubber. After this the paper web goes into the dryer section.

The dryer section consists of up to 100 steam heated drying cylinders.

In the dryer section additional equipment may be added to achieve special effects.

Some paper machines have a calender following the dryer section. The calender consists of a number of rolls oriented vertically in line. By running the practically dry paper web between these rolls comes under high pressure and the web is compacted and smoothened.

Application Examples Paper Machine

Headbox / Wire Section (Wet End)	Black Clawson	Bearings	HIGH LUB SW 2
		Vacuum Box Bearings	BERUPLEX KS 22
		Forming Roll Bearings	STAROIL G 150
		Suction Roll Bearings	STAROIL G 150
	Beloit	Press & Couch Roll Bearings	BERUTOX M 21 EPK
	Beloit Walmsley	Wire Roll Bearings	BERUPLEX KS 22
Press Centre (Dry End)		Roll Bearings	STAROIL G 150
	Beloit Walmsley	Roll Bearings	HIGH LUB FA 67-200
		Gear Reducer Drive	BERUSYNTH EP 220
Dryer Section (Dry End)	Beloit	Bearings	BERUTOX FH 28 KN
		Open Gear Drive	BERULIT GA
		Dryer Cylinder Bearings	BERUSYNTH GP 220
	Sandy Hill	Open Gear Drives	BERULIT 443
	Beloit	Rewinder Chuck Bearing	HIGH LUB FA 67 / II
		High Speed Blower Bearings	HIGH LUB FA 67 / II
		Rotary Calendar Joints	BERUTOX VPT 54
Calender Stack		Roll Bearings	BERUSYNTH GP 220
Double Arbor Edger	Klamath Ward	Feed Roll Bearings	BERUPLEX KS 22
Sherman Edger		Feed Roll Bearings	BERUPLEX KS 22
Gear Drives	Flender	Drive Gear Box	BERUSYNTH GP
Couplings		Tooth Couplings	BERULIT GA 2500
Air Blowers		Bearings	BERUPLEX CS 2 EP

Application Examples Other Areas

Compressors			Compressor Bearings	BERUSYNTH FG H
Electric Motor			Bearings	BERUPLEX CS 2 EP
Power House	Soot Blowers	Diamond	Bearings	BERUTOX FH 28 KN
	Steam Boiler		Stoker Grate Bearings	BERUPLEX KS 22
	Coal Mills		Open Gear Drive	BERULIT GA
			Pinion Bearings	HIGH LUB FA 67-400

Application Examples Converting

Tissue Machine	Circulation System		Bearings	BERUSYNTH GP 320
Corrugator	Single Facer	Martin	Flute & Pressure Roll Bearings	BERUSYNTH GP
	Conveyor System		Gear Reducer Drive	ECOGEAR M
			Chains	BERUSYNTH CU 50
	Corrugated Rolls		Bearings	BERUTOX VPT 54
	Hydraulic System			STAROIL HVI
Cardboard Tray Machine	Conveyor System		Oven Chains	BERUSYNTH CU 250
	Mold Equipment		Truning Shaft Bearings	BERUTOX FH 28 EPK
Offset Printing Machine	Oil Circulation System	MAN		STAROIL D68 EPS
	Pressure Vacuum Pump		Bearings	BERUTOX M 21 EPK