PART A TECHNICAL SPECIFICATION OF DELIVERIES AND SERVICES

1. BASIC DATA

Feed material	Limestone (very sticky)
Feed size	0 – max 1000x1000x1000 mm ROM
Feed moisture Limestone	Max 17,2%
Bulk density	approx. 1,3 t/m³
Altitude	280 m a.s.l
Working Temperature	-20 °C to +37 °C
Standards	DIN, VDE, IEC, ISO

2. PERFORMANCE DATA

Throughput capacity	1100 t/h
Product size	95% < 80 mm, 98% < 100 mm measured on square mesh according to DIN 66165 and ISO 3310

3. TECHNICAL SPECIFICATION

ITEM 01 PRIMARY RollSizer DRS 1000 x 2000 Center Sizer

Technical data:

Type	DRS 1000 x 2000 Center Sizer
Roll width	2000 mm
Distance of rolls	1000 mm
Crushing tools	**Exchangeable pics**
Feed opening	Approx. 2100 x 2000 mm
Number of crushing rolls	2
Peripheral tip speed of the rolls	approx 2.1 m/s low speed
Type of drive	2 x 250 kW / 50 Hz dual drive. Two mechanical drives incl. fluid coupling and parallel shaft speed reducer gears
Protection of drive	Fluid coupling Reversible rolls
Required motors	Squirrel cage motors **(by others)** 2 x 250 kW, 1500 rpm, design B3, protection IP 54

THE THYSSENKRUPP PRIMARY ROLLSIZER MAINLY CONSISTS OF:

Crusher Housing

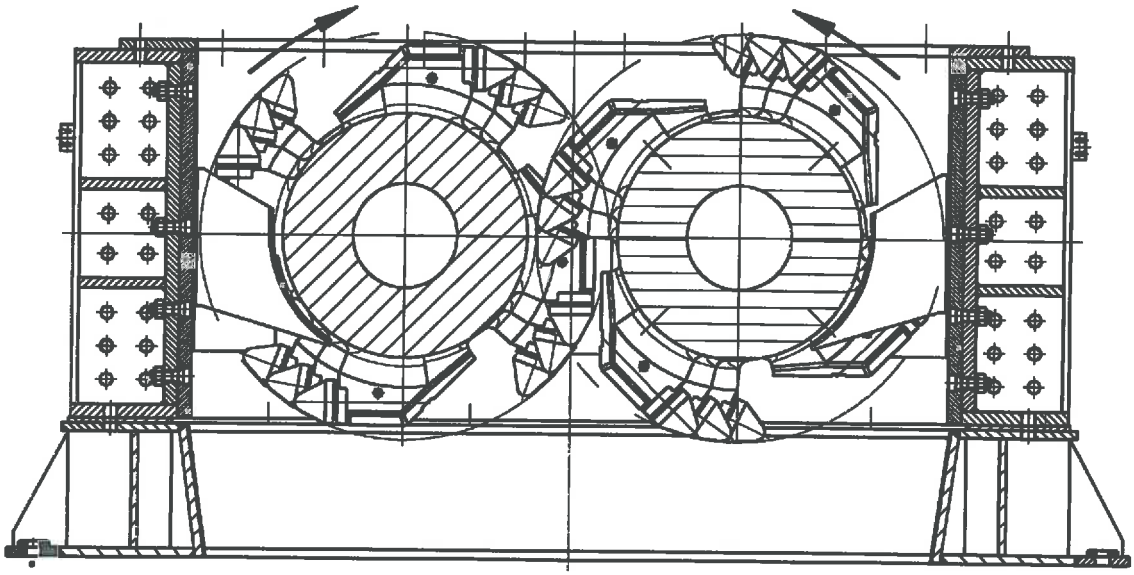
Mainly consisting of:

- the side walls and the front walls in bolted and welded design
- the bearing housings for the shaft bearings
- the standard wear protection for the crushing chamber

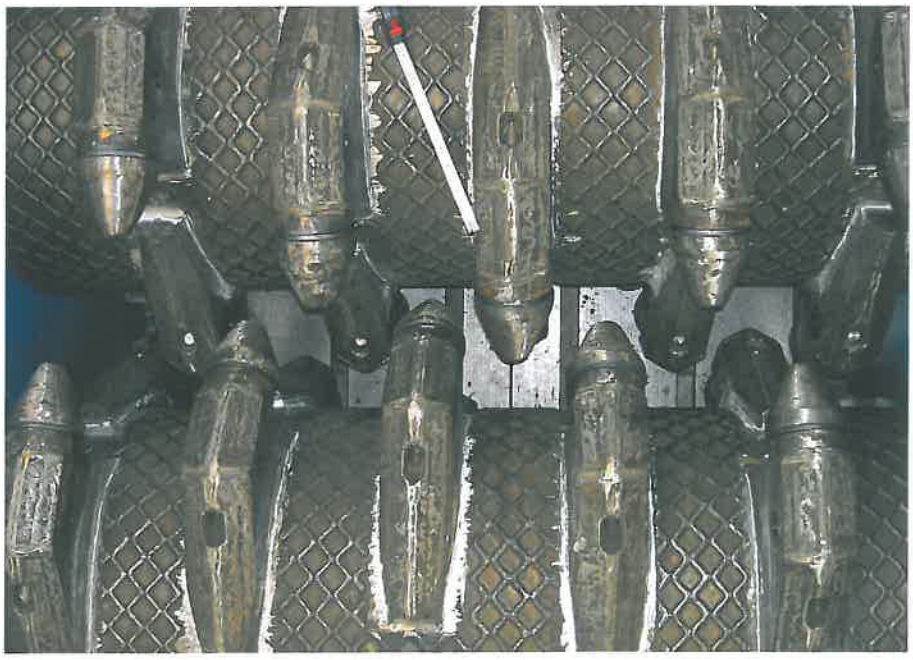
Crushing rolls

Mainly consisting of:

- two rolls, supported in the side walls by the means of antifriction bearings (SKF/FAG)
- the replaceable crushing tools including special tool for exchanging of crushing picks
- the sealing arrangement of the antifriction bearings



Replaceable pics

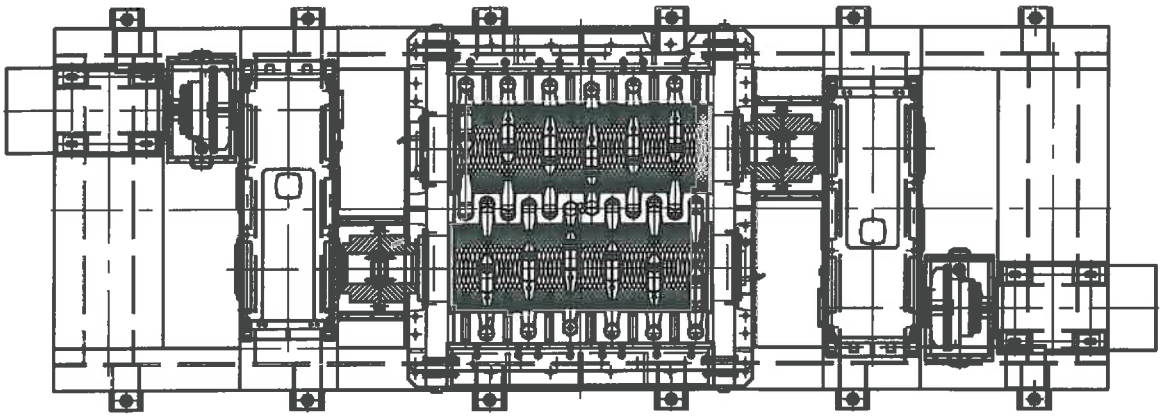


Typical picture

Mechanical Double Drive

One drive unit for each roll mainly consisting of:

- the curved tooth coupling
- the spur gear reducer with oil lubrication
- the fluid coupling incl. elastic coupling
- the squirrel cage drive motor 250 KW **(by client)**
- Protection of the drive train:
  - Speed monitor to indicate stoppage of the rolls
  - Hydraulic fluid coupling with overheat protection
  - PT 100 to control the temperature of the bearings
- the drive trains will be arranged on both sides of the crusher housing.



Base Frame (To be manufactured by CBMI according to TKF drawings)

mainly consisting of:

- a welded, bolted and machined frame, designed to support the crusher housing and the two drive strains.
- Information about slide rails will be provided by TKF

Chutes (not included)

- Crusher inlet hood
- Crusher discharge chute

of strongly ribbed welded steel plate design with the necessary bracings and mounting structure.

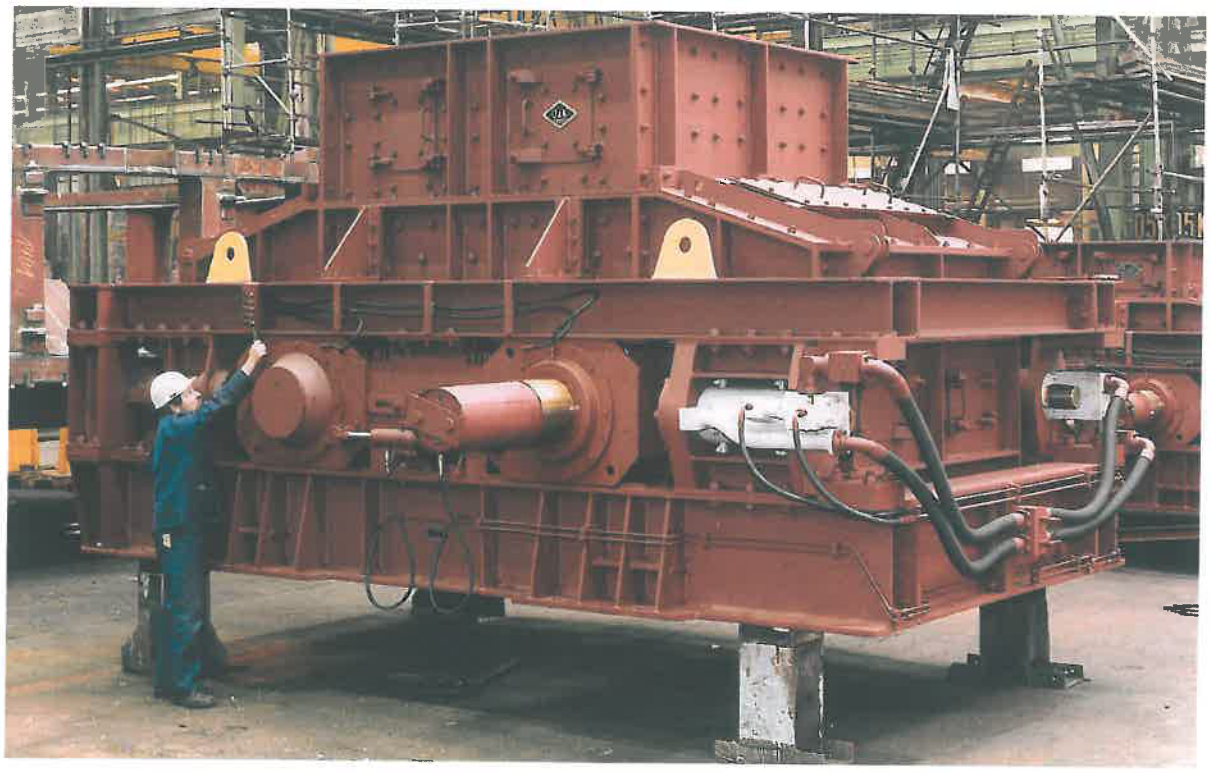
ITEM 02 Secondary Double roll crusher WS 14 x 20

Technical data:

Type	WS 14 x 20
Roll circle diameter	approx. 1400 mm
Roll width	approx. 2000 mm
Roller shell material	High alloyed steel
Feed opening	approx. 1500 x 1950 mm
Number of crushing rolls	2
Peripheral speed of the rolls	approx. 6.5 m/s
Gap between rollers	80 mm, adjustable
Roller tension and protection system	Dual hydraulic cylinders
Type of drive:	Fixed speed drive with different velocity of each roller
Floating roll, fixed speed	1 x 315 kW / 50 Hz dual drive V-belt drive and speed reducer gears as well as flexible coupling
Fixed roll, fixed speed	1 x 315 kW / 50 Hz dual drive V-belt drive and speed reducer gear as well as flexible coupling
Required motors and starters (if required)	**(by others)** 2 x 315 kW, 1500 rpm, design B3, protection IP 55

THE THYSSENKRUPP DOUBLE ROLL CRUSHER CONSISTS OF:

- the crusher housing with liner plates
- the hydraulic gap adjusting system
- the hydraulic support system of the movable roller
- the two toothed rollers
- the fly-wheels
- the V-belt drives



Typical picture

- **Crusher housing including maintenance doors**
  The crushing housing consists of a rigid main frame made of steel profiles and sections in a bolted and welded design. The main frame supports the bearing housings including the grease lubricated antifriction bearings.
  The housing is protected by liner plates fixed at the side walls.
  Limit switches for maintenance doors are included.

- **High alloyed crusher segments**
  The segments are made of high alloyed steel. The teeth are additionally protected by wear resistance overlays.

- **Roller gap adjustment**
  The roller gap is adjustable by two integral hydraulic cylinders. This allows optimizing the final product size according to the requirements.

- **Hydraulic pre-tension of the rollers**
  One of the two rollers is designed as movable roll and pre-tensioned by two lateral hydraulic cylinders. In case of feeding unbreakable tramp iron to the roll crusher the floating roll will automatically be moved backwards to increase the roller gap. After reducing the overload, the floating roll will be moved back by the two hydraulic cylinders in the former position.

  - hydraulic power pack including housing
  - hydraulic cylinders

- **Two V-belt drives**

  mainly consisting of:

  - the base frames with slide rails **(by CBMI according to TKF drawings)**
  - the gear reducers
  - the flexible couplings
  - the hydraulic tensioning devices
  - the pulleys and the V-belts incl. protection hood
    (the protection hood to be manufactured by CBMI according to TKF drawings)
  - the 2 x AC-motors **(by others)**
  - protections of the drive train: - Speed monitor for the rolls
    - PT 100 temperature control of bearings

- **Crusher inlet hood and discharge chute (not included)**

4. TECHNICAL SPECIFICATION SERVICES

ITEM 3 Engineering

Mech. engineering

- dimension drawings
- foundation plan with load
- operation manual including lubrication list
- spare parts lists for two years of operation
- fabrication drawing for local manufacturing
- Documentation in English + Ukraine language

Electr. engineering

- electro basic engineering
- motor list,
- list of sensors and instrumentation
- function diagram in raw structure
- Documentation in English + Ukraine language

5. EXCLUSIONS

Foundations, buildings, lightning protection, illumination and all other kind of civil engineering, civil work and infrastructure.

Erection, auxiliary means like for example, but not limited to lifting cranes, welding-rods and gases, compressed-air etc.

All kinds of oils, lubricants and other auxiliary and operational means, both for initial filling and continuous operation.

Spare and wear parts

Erection / commissioning, supervision of manufacturing of local supply, supervision of erection and commissioning.

Support structures, walkways, ladders, platforms and stairs, if not explicitly mentioned.

Electrical equipment as but not limited to motors, cables, transformers, PLC, etc.

Taxes, import duties and similar contributions and fees which may possibly be raised on our shipments from authorities outside of Germany.

All other components and services which are not quoted by us.

6. LIST OF WEIGHTS

Item	No.	**Equipment**	**TKF supply (approx kg)**	**Local supply (approx kg)***
01	1	Primary RollSizer DRS1000x2000	44.050	-
		Center Sizer		
		Supporting Frame	Drwg	12.300
		2 x AC Motor 250 kW	-	By others
02	1	Double Roll Crusher WS 14-20 cpl.	63.130	-
		with drive i.e. bearings, spur gear, pulley		
		Drive Base Frame with Slide Rails	Drwg	5.100
		Drive Motors 2 x 315 kW	-	By others
		Drive Guards	Drwg.	1.700
03	1	Commissioning Spares For each Double RollerSizer: 1 set of resistant thermometer 1 set of seals for curved tooth coupling 1 set of seals for turbo coupling For each Double Roll Crusher: 1set of sealing for hydraulic cylinder.	included	-
	1	Engineering	included	-
		Total weight approx.	**107.180**	**19.100**

* equipment mentioned by weight means local fabrication by Customer according to ThyssenKrupp fabrication drawings