



Thickeners & Clarifiers



Metso Thickeners and Clarifiers are designed for continuous 24 hour per day operation in chemical, industrial mineral and ore processing industries. Units are supplied in two basic configurations: bridge or centre pier mounted in diameters from 5 to 75 m.

Drive Head

A new range of drives has been designed utilising computer optimising techniques to ensure the highest possible torque/load characteristics whilst giving maximum performance and reliability even in the most adverse conditions.

Drive Head Design

Metso's drivehead consists of a rigid housing, enclosing a worm, wheel and a large diameter slewing ring bearing.

The worm shaft is driven by a multistage, epicyclic gear box complete with a squirrel cage induction motor.



Lift Mechanism

For bridge mounted drive heads rake lift is through a torque tower which is bolted to the main wheel and drives the rake shaft through a keyway. The rake shaft is raised and lowered by a motor driven screw jack.

For centre pier mounted drive heads, the drive head is supported by a pier and drives the rakes through a torque cage. The drive head and rake torque cage are raised and lowered by motor driven screw jacks.

Controls

Operating torques are continually monitored.

A motor torque sensing device which accurately measures the motor power, provides preset overload outputs, rake lift, warning, and shutdown.

The lift mechanism is fully automatic and is activated by the torque sensing system.

All controls are located in a weatherproof enclosure mounted on the bridge. Rake torque is locally displayed and automatic - local operation can be selected for drive and lift motors.

The complete range of Metso drive heads is available as both lift and non-lift designs. Rake height indication and remote indication of rake height and rake torque are available.

Bridges

Metso thickeners are supplied with variety of bridge structures.

- Up to dia 15 m - Beam Type
- Up to dia 40 m - Truss Type
- Above dia 40 m - Centre Pier.

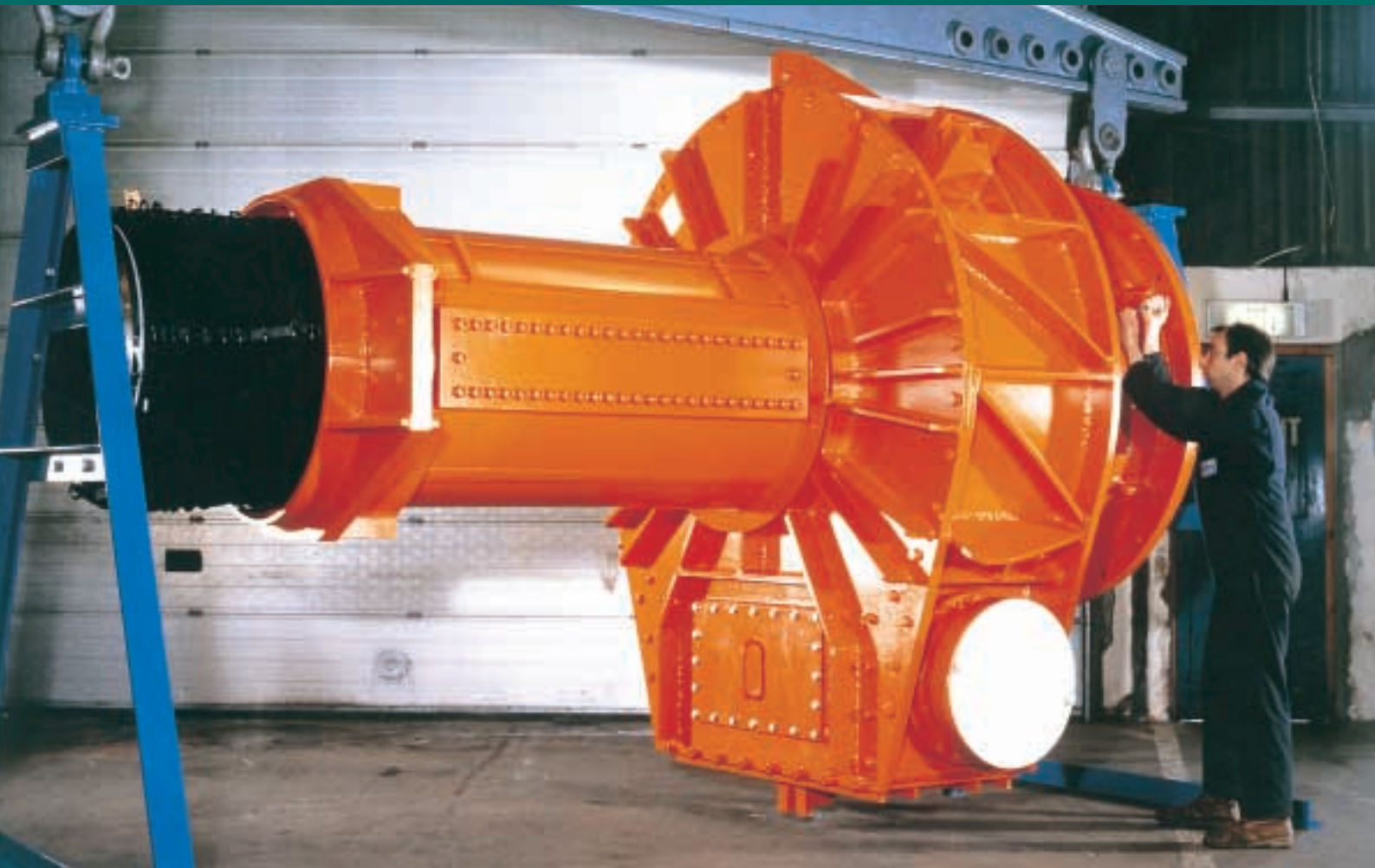
All bridges are provided with grid plate walkways with safety handrails. An enclosure around the drive mechanism is available where weather conditions dictate.

Rakes

The rakes effectively convey settled solids to the centre discharge cone or trench. Rakes are constructed in tubular or structural steel, with rake blades bolted or welded underneath.

At the tank centre, cone or trench scrapers attached to the raking assembly keep the discharge area free of blockages.

Special rake options include spikes for breaking up the bed, pickets above the rake arms to assist in water/solids separation, and skimmers to remove scum or froth from the slurry surface.



Thickener drive head during assembly.

Launders, Feedwells, Weirs and Tanks

Feed launders and feedwells are suspended beneath the bridge.

Plain or notched overflow weirs can be supplied for tank perimeters.

For tanks 20m or less, steel construction can normally be used, with larger ones built in concrete. Tanks can be lined for acidic conditions. Tank covers are available for units where required.

Applications

Metso thickeners and clarifiers have been installed for a wide variety of duties, typical examples include:

- Coal fines and tailings
- Magnetite fines
- Kaoline storage & thickening
- Copper concentrates and tailings
- Gold/Silver concentrates and tailings

- Phosphate slimes
- Lead/Zinc concentrates and tailings
- Iron ore tailings
- FGD plant slurries

Features and Benefits

Thickening and clarification are massflow processes that need stable and continuous operating conditions.

Metso provides:

- Bridge or Centre Pier mounted Drive Heads
- Slewing Ring designed High Torque Drive Heads
- Fully automatic Rake Lift
- Remote or Local operation
- Up to 75 m diameter
- Steel or Concrete tanks



Standard product range

Drive Mechanisms

- Type BL or BN for installation on Bridge type structures
- Minimum - Size 10 Mechanism with 32,000 Nm cut-off torque
- Maximum - Size 40 Mechanism with 1,100,000 Nm cut-off torque
- Type CL or CN for installation on Pier type structures
- Minimum CN Type - Size 20 with 190,000 Nm cut-off torque
- Minimum CL Type - Size 24 with 310,000 Nm cut-off torque
- Maximum - Size 40 Mechanism with 1,100,000 Nm cut-off torque

Superstructures

- Full diameter bridge type up to 40 metres diameter
- All Bridges to be truss type design
- Centre Pier type with half diameter access superstructure for all tanks larger than 40m diameter
- Up to 12m superstructure to be beam type
- from 12m to 25m superstructure to be castellated beam type
- over 25m superstructure will be truss type

Rakes

- up to 15m tank diameter, Rakes to be beam type with tierods
- over 15m tank diameter, Rakes to be truss type

Options

The complete range of Metso driveheads are available as both lift and non-lift designs. Rake height indication and remote indication of rake height and rake torque are available.

Drive mechanism and controls

Proven design extended to all drive head sizes

- Substantial slewing ring main bearing used for all sizes of drive heads. This bearing accommodates all tipping moments from rake system without affecting wormwheel alignment, thus further extending worm and wormwheel life.
- Designs available for both bridge and centre pier mounting.

Increased torque capacity.

Main wormwheel machined from centrifugally cast phosphor bronze for maximum wear life and torque capacity.

Reliable and adjustable torque sensing

Torque sensing by electronic main drive slip sensor with fixed high torque alarm and motor cut off values but with adjustable rake raise torque value.

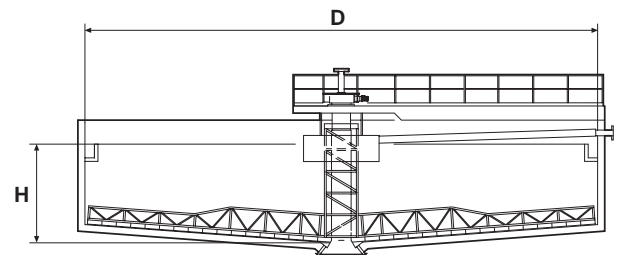
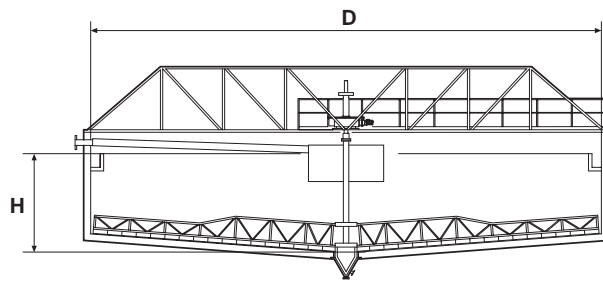
Improved design for easier maintenance

In-drive system consists of in-line, high efficiency epicyclic gearbox and main motor. Torque tower and telescopic pier redesigned, giving easier inspection of torque keys.

Standard mechanism range

The standard range of sizes and designs for the Metso Drive mechanism is shown in the table below. The CL and CN range do not exist below the Size 20 mechanism as it is not envisaged that the centre pier design will be used with these smaller drive mechanisms.

DRIVE HEAD	DESIGN OPTIONS	10 YEAR LIFE TORQUE, Nm	CUT-OUT TORQUE, Nm	PEAK TORQUE Nm
10	BL, BN Only	10,000	32,000	75,000
12	BL, BN Only	17,000	45,000	116,000
14	BL, BN Only	26,000	72,000	175,000
17	BL, BN Only	45,000	120,000	270,000
20	BL, BN, CN Only	65,000	190,000	400,000
24	BL, BN, CL, CN	112,000	310,000	650,000
28	BL, BN, CL, CN	164,000	450,000	920,000
32	BL, BN, CL, CN	225,000	610,000	1,170,000
36	BL, BN, CL, CN	301,000	800,000	1,530,000
40	BL, BN, CL, CN	397,000	1,100,000	2,000,000



Diameter		Area	
(m)	(ft)	(m ²)	(ft ²)
10	33	78	839
12	39	113	1 216
14	46	154	1 658
16	52	201	2 164
18	59	254	2 734
20	66	314	3 380
22	72	380	4 090
24	79	452	4 865
26	85	531	5 716
28	92	616	6 631
30	98	706	7 599
32	105	804	8 654
34	111	908	9 773
36	118	1 018	10 958
38	125	1 134	12 206
40	131	1 257	13 530
42	138	1 385	14 913
44	144	1 521	16 367

Diameter		Area	
(m)	(ft)	(m ²)	(ft ²)
40	131	1 257	13 530
42	138	1 385	14 913
44	144	1 521	16 367
46	151	1 662	17 889
48	157	1 810	19 479
50	164	1 963	21 130
52	170	2 124	22 860
54	177	2 290	24 653
56	184	2 463	26 512
58	190	2 642	28 440
60	197	2 827	30 430

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