Conveyor Systems Components — Technical Handbook

Structural, mechanical, and drive components for scraper (AFC/chain) conveyors and belt conveyors in mining, bulk handling, and heavy industrial applications. All components produced to OEM drawings with full dimensional and materials certification.

PART A — AFC and Scraper Conveyor Components

Armored face conveyors (AFC) and scraper conveyors operate under continuous chain pull in abrasive, wet underground conditions. Dimensional accuracy of structural components directly determines chain fatigue life and system reliability.

A1. Pan Sides and Spill Plates

The pan side is the lateral structural element of each AFC middle pan and transition pan section. Together with the bottom plate and middle plate it forms the closed coal transport channel. It simultaneously serves as the chain running surface, the shearer haulage track interface, and the hydraulic support push-pull load transfer point — three distinct structural functions in one component.

Critical Dimensional Requirements

Dimension	Function	Consequence of Error
Pan rail height	Chain vertical running clearance	Chain hang-up or excessive vertical load at joint
Pan-to-pan step at joint	Smooth chain transition between sections	Impact loading at fixed position → fatigue crack initiation
End connector geometry	Section-to-section articulation	Binding or excessive play → accelerated pin/bore wear
Rack bar interface	Shearer haulage engagement	Haulage tracking error, uneven load distribution

Pan width range	750 mm to 1,200 mm — European longwall standards
Material	Alloy steel casting, grade to OEM specification
Heat treatment	Q+T or normalised to specified condition
Inspection	Rail height and step verified per batch to drawing tolerance
Compliance	Produced to OEM proprietary drawing under NDA

A2. Connecting Housings

Connecting housings join adjacent pan sections at articulating joints, permitting controlled movement in horizontal and vertical planes while maintaining chain running geometry through the joint. Pin bore positional accuracy is the critical

dimension — bore position error misaligns the articulation axis, concentrating chain load at the joint and accelerating pin and bore wear.

Material	Alloy steel casting or forging per drawing specification
Critical dim.	Pin bore positions verified by CMM — positional tolerance to drawing
Heat treatment	Q+T to specified hardness, charted per batch
Hardness	Verified and recorded per batch

A3. Scraper Blades and Chain Components

Component	Material	Process	Key Requirement
Scraper blade	Alloy steel	Cast or fabricated + hardface option	Wear face hardness matched to floor abrasivity
Chain side links	23MnNiMoCr54 or equivalent	Closed-die forged, Q+T	Fatigue life at link geometry transitions
Connecting links	Alloy steel forged	Q+T to specification	Proof load and fatigue verification
Pan side bolts	High-tensile alloy steel	Precision machined	Clamping force retention under vibration

PART B — Belt Conveyor Components

B1. Drive and Tail Pulleys

Drive pulleys transmit belt tension from the drive unit to the belt; tail pulleys return the belt and maintain tension at the non-drive end. Shell diameter, face width, lagging specification, and shaft dimensions are application-specific and are produced to the project drawing.

Parameter	Typical Range	Notes
Shell diameter	400–1,800 mm	To project specification
Face width	500–2,400 mm	To match belt width + overhang
Lagging	Plain / grooved / ceramic	Grade selected for drive / take-up / snub duty
Shaft material	42CrMo4, Q+T	Open-die forged for large diameters
Dynamic balance	G6.3 standard / G2.5 on request	For high belt speeds

Shell construction	Rolled plate welded, stress relieved after fabrication
End discs	Flame-cut or cast, machined bore to shaft fit tolerance

Shaft fit	Interference fit to drawing tolerance, CMM verified
Certification	Dimensional report + weld inspection per delivery

B2. Rollers and Idlers

Tube material	ERW or seamless steel tube per application load
Bearing selection	Deep groove ball bearing, grease-lubricated, sealed
Sealing	Labyrinth + contact seal standard; enhanced for wet/dusty environments
Shell treatment	Shot blasted, primed; polyurethane coating on request
Dynamic balance	Required for high-speed conveyor rollers — specify belt speed
Custom dims.	Any diameter and face length to project drawing

B3. Drive Units — Cylindrical-Planetary Gearboxes

Mining belt conveyor drive units combine cylindrical gear stages (high-speed input) with a planetary output stage (high-torque, compact). This architecture is standard for long-distance, high-capacity conveyors where output torques and physical installation constraints favour planetary output over parallel-shaft designs.

Power Range	Typical Application	Drive Control
250–630 kW	Gate road / panel conveyors, shorter surface conveyors	DOL or soft-start
630–1,000 kW	Main haulage underground, medium overland conveyors	CST or VFD recommended
1,000–1,800 kW	High-capacity trunk conveyors, long overland systems	CST or VFD — multi-drive load sharing required

Supply basis	To client drawing or specification — no standard catalogue
Reduction ratio	Confirmed at design stage to match belt speed and motor speed
Planet carrier	Alloy steel casting, CMM-verified bore positions
Housing	Alloy steel casting, pressure-tested oil tightness
Certification	Material certs, dimensional report, test run data on request

B4. Frames, Structural Supports and Transfer Chute Components

Frame construction	Structural steel fabrication, stress relieved, primed

Chute sidewalls	Alloy steel casting or fabricated with wear liner pockets
Wear liner material	AR steel plate (400–600 HBW), Cr-carbide overlay, or ceramic tile
Custom geometry	To project drawing — transfer chute profiles to suit material flow
Inspection	Dimensional report per delivery; weld inspection as specified

Quality Assurance Summary

Quality system	ISO 9001 certified
Material certs.	EN 10204 3.1 / 3.2 as specified
Heat treatment	Time-temperature charts per batch
Hardness records	Actual measurement values recorded — not pass/fail
NDT	UT, MPI, PT per drawing specification or applicable standard
Dimensional	CMM for precision components; conventional for standard parts
First article	FAI report against all drawing requirements before volume production
Response	1–2 working days for technical enquiries
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