

DAL



**PRODUCTS
AND SERVICES**

ABOUT DAL ENGINEERING GROUP

DAL Engineering Group is one of the world's leading engineering companies that provides machinery, equipment and customized solutions for turnkey industrial projects for;

- Cement and Lime Industries
- Grinding Plants for Raw Material, Cement and Coal
- Refractory, Ore and Mineral Industries
- Energy and Power Plants
- Heat Recovery and Environmental Technologies
- Electric and Automation of Processes





LEADING ENGINEERING COMPANY

We are capable of; designing, producing, integrating equipments, accomplishing turn-key projects. We develop, engineer and build greenfield projects and revamp, upgrade brownfield facilities.



THE MOST INNOVATIVE

We enhance and sustain value creation by innovation. We have a strong R&D center that always welcomes sharp minds with fresh ideas. We have made remarkable contributions to the technological advancement in areas we are active.



MULTIDISCIPLINARY APPROACH

We employ technology for the good of human and nature. This technology comes from a set of diverse areas such as energy efficiency, digitalisation and process optimisation.

DAL ENGINEERING COMPANIES



DAL ENGINEERING GROUP

SHAPING THE FUTURE OF HEAVY MACHINERY

DAL is an innovative leader in cement, zinc recovery and energy industries. We provide machines, equipment and customized systems. DAL Machinery & Design creates a unique customer experience in order to implement the most effective and profitable investment.

DAL has been providing machinery for industrial plants since 1985. We mainly focus on cement, lime, coal and energy technologies and other heavy industries. DAL also supplies integrated services together with DAL Engineering Group (DEG) companies.

MISSION

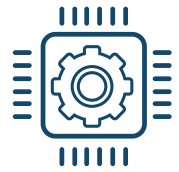
To be a helping hand for our customers whenever they need us. To put their needs ahead of everything and the desire to solve their problems as a technology provider company in most economic and environmental-friendly way.

VISION

To become the sole address for our customers with our dynamic employees throughout the world. To offer efficient solutions for their problems and genius ideas for their needs. In the areas of design and engineering and turnkey solutions for the sectors of cement, lime, gypsum and coal.



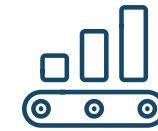
OUR SERVICES



ENGINEERING



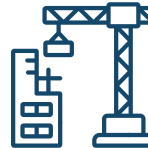
REVAMPING



MANUFACTURING



SPARE PARTS



**CONSTRUCTION
SERVICES**



SITE SERVICES

PROCESS AUDITS

PROCESS AND ON-SITE EQUIPMENT MEASUREMENTS:

- Kiln and grinding systems

CFD AND FEA SIMULATIONS:

- Clinker combustion and grinding processes

BOTTLENECK IDENTIFICATION AND SOLUTION OPTIMIZATION:

- Bottleneck Optimization

CONSULTATION:

- Geometrical optimization for process efficiency and recommendations for ongoing operations

OPTIMIZATION

- Production operations in kiln and mills



DESIGN SOFTWARES



Open▽FOAM

Ansys
MECHANICAL

Ansys
FLUENT

Ansys
CFX

N AUTODESK
NASTRAN IN-CAD

I AUTODESK
INVENTOR®

3S
SOLIDWORKS

FILTER-TO-FILTER PYRO PROCESS DESIGN

OPTIMIZED HEAT CONSUMPTION

Optimized combustions process audits

LOW INVESTMENT COST

Customized design of Preheater & Precalciner

LOW NO_x OPERATION

NO_x Reburning

AF UTILIZATION

Up to 99% AF utilization in Kiln & Calciner

HIGH EFFICIENCY COOLER

Standard cooler loss 95-98 kcal/kg clinker

CL BY-PASS SYSTEM

Extraction of Chlorine for smooth Operation



DAL Filter-to-Filter Pyro Process Design covers the following production units:

PYRO PROCESS UNIT

Kiln ID Fan, Gas Conditioning Tower, Preheater, Calciner, Rotary Kiln and Clinker Cooler

CL BY-PASS UNIT

Quenching Air Chamber, Quenching Air Fans, By-Pass De-dusting Unit, Dust Transport System

CLINKER COOLER DE-DUSTING UNIT

Heat Exchanger + Bag Filter, Clinker Cooler Exhaust Fan

ALTERNATIVE FUEL HANDLING UNIT

AF Storage, Transport Line, AF Dosing and Feeding

MAIN PROCESS FILTER

Bag Filter, Bag Filter Fan, Chimney

KILN EXPERT & TREND SYSTEM

DAL Advanced Process Control & Trends

EQUIPMENT LIST

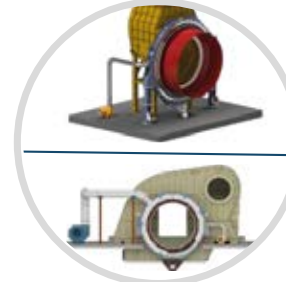
ROTARY KILN PRODUCTS



ROTARY KILN



**HYDRAULIC
THRUST ROLLER**



**INLET & OUTLET
SEALING**



KILN SHELL



**KILN
TYRE & ROLLERS**

MILLING AND GRINDING PRODUCTS



CEMENT MILL



DYNAMIC SEPARATOR



MILL SHELL



**MODULAR
GRINDING PLANT**



**BOLTED
STEEL SILO**

CRUSHERS



**CLINKER ROLLER
CRUSHER**



**DOUBLE SHAFT
CRUSHER**

FEEDERS



SURFACE FEEDER



APRON FEEDER

SPARE PARTS



**GRINDING ROLLERS
OF VERTICAL MILLS**



MILL TRUNNIONS

AND MANY MORE

BALL MILLS

Double pinion direct gearbox with girthgear.

Central drive reducer with shaft coupling.

Direct drive torque arm reducer without coupling.

MAXIMUM GRINDING EFFICIENCY

LOW ENERGY CONSUMPTION

COMPACT PLANT LAYOUT AND MILL DRIVE DESIGN

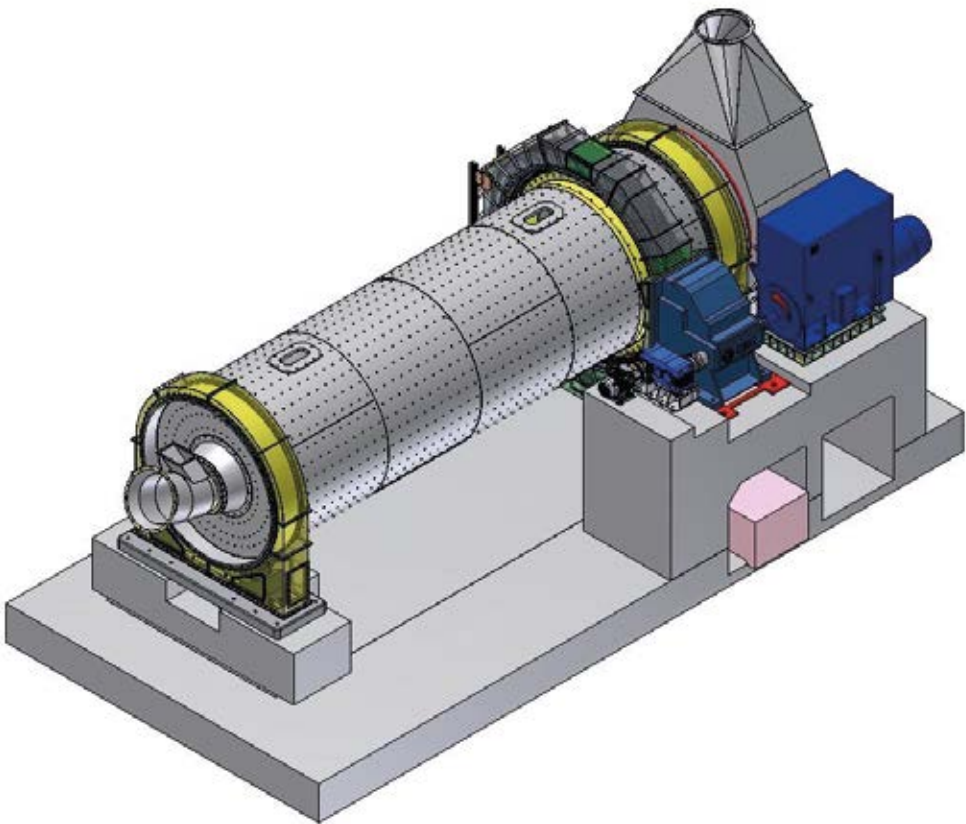
APPROVED LINING TYPES



UNIVERSAL DRIVE BALL MILLS SERIES

Diameter x Length (m)	min.Capacity (tph) *1)
Ø 3,0 x 10	30
Ø 3,2 x 11	40
Ø 3,2 x 13,5	50
Ø 3,8 x 13	75
Ø 4,0 x 13,5	90
Ø 4,2 x 14,5	110
Ø 4,4 x 14,5	125
Ø 4,6 x 15	145
Ø 5,0 x 15	180

*1) OPC CEM I 32,5N, 3200 Blaine, 95% Clinker, 5% Gypsum



MODULAR GRINDING PLANTS



CAPACITY UP TO 30 TPH
LOW INVESTMENT COST
SHORT DELIVERY TIME DOWN TO 8 MONTHS
EASY AND FAST ERECTION
LOWER CIVIL AND ERECTION COST
PRE-ASSEMBLED, READY TO INSTALL EQUIPMENT

DYNAMIC SEPARATORS

DAL serves dynamic separator for grinding and separation processes. Unique advantages and prevailing with other types of separators as follows;

Reliable mechanical properties.

Distribution plates ensure the uniform material distribution and increase separation efficiency.

Optimized and compact design.

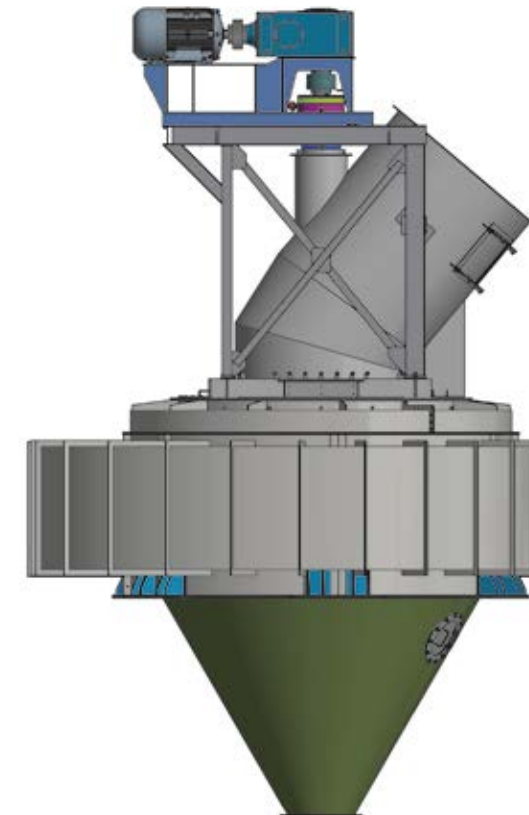
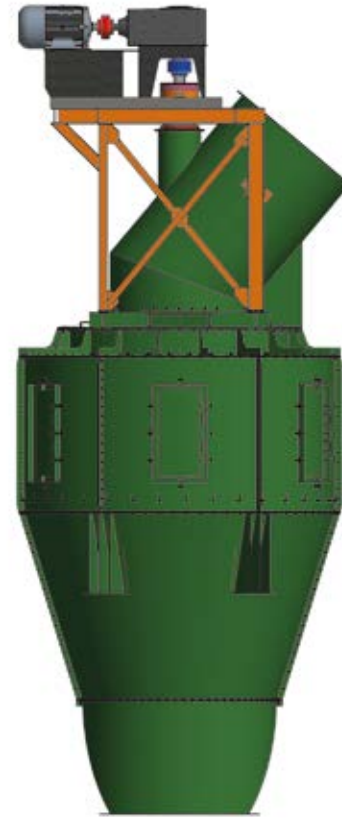
High efficiency separation.

Easy to maintain construction, modular system.

Customized designed rotor blades, low wear and tear.

Speed control enables to select product range.

Easy operation with fully automatic control system.



LOW PRESSURE DROP

EFFECTIVELY USED ROTOR SEPARATION AREA

IDEAL TROMP CURVE WITH BYPASS RATE LESS THAN 10%

ECONOMIC AND EASY MAINTENANCE

COST EFFECTIVE INSTALLATION

ROTARY KILN

DAL rotary kilns use graphite seals at the inlet & outlet of the kiln, which guarantees 0 false air intake into the system.

Our optimized kiln design ensures operational reliability and increases the lifetime of the kiln.

The kiln tyre & support rings can be manufactured with casting and forged manufacturing methodology.

DAL girth gears can be manufactured in a segmented design.

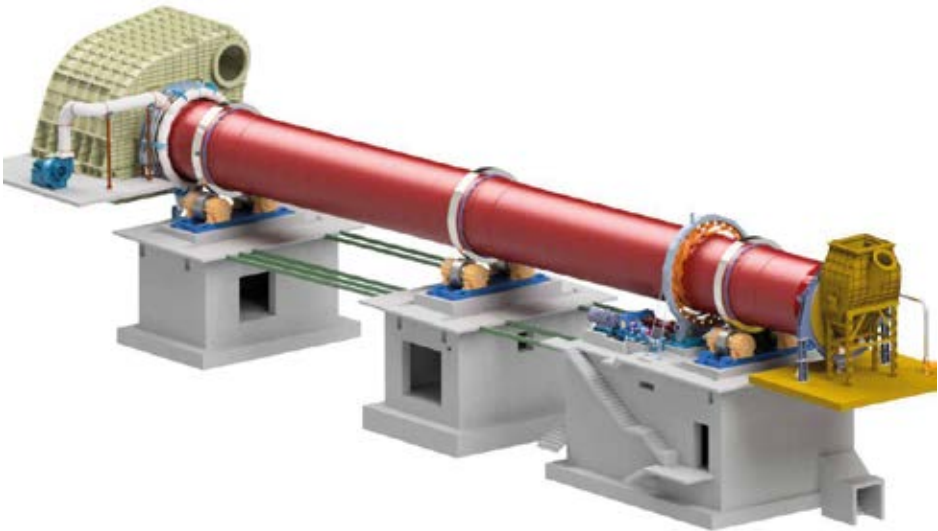
- HIGH RELIABILITY
- LOW CAPITAL EXPENSE
- LOW SPECIFIC OPERATING COST



Nominal Capacity (tpd)	Diameter x length (m)	Installed power
2000	3.6 x 52	250
2500	3.8 x 54	315
3000	4.0 x 58	400
3500	4.2 x 60	560
4000	4.4 x 62	630
4500	4.6 x 66	700
5000	4.8 x 68	800
6000	5.0 x 72	2 x 450
7000	5.2 x 74	2 x 500
8000	5.4 x 78	2 x 560

- Rotary Kiln Design for Any Size
- Kiln Shell and Heavy Kiln Shell
- Graphite Type Kiln Inlet and Outlet Seals
- Kiln Tyres and Rollers
- Kiln Camera Systems
- Supervision Services

- Segmented Girth Gears
- Drive Systems
- Hydraulic Thrust Roller
- Rotary Kiln Main Burner
- Kiln Maintenance Service
- Rotary Kiln Ovality Measurements



ROTARY COOLER

The DAL Rotary Cooler is a key component in several industries production, designed to efficiently reduce the temperature of hot materials after they exit the rotary kiln. This cooling process helps prevent overheating and ensures that materials are at the right temperature for further processing or storage. The rotary cooler operates with a rotating drum that uses air or gas to cool the material uniformly.



EFFECTIVE TEMPERATURE CONTROL

ENERGY-EFFICIENT DESIGN

DURABLE CONSTRUCTION

CUSTOMIZABLE CONFIGURATION

ROTARY DRYER

The DAL Rotary Dryer is an essential solution for reducing moisture in cement raw materials, ensuring smooth grinding and consistent product quality. Designed with a rotating, inclined drum, it uses high-temperature gases to dry materials such as raw mixes, coal, and other inputs, preventing build up in grinding equipment and improving efficiency.

Available in direct and indirect heating models, the dryer Accommodates diverse material needs. Direct heating enables rapid drying with direct gas contact, while indirect heating offers precise temperature control for sensitive materials. Both designs ensure efficient drying and effective dust management.

Customizable for various temperatures, flow design, and drum sizes, the DAL Rotary Dryer provides reliable performance tailored to your production needs, supporting efficient cement processing and superior output quality.



EFFICIENT MOISTURE REDUCTION
CUSTOMIZABLE HEATING OPTIONS
ADAPTABLE DESIGN
ENHANCED DRYING EFFICIENCY

HYDRAULIC THRUST ROLLER

The automatic hydraulic thrust roller controls the kiln's axial motion. The hydraulic thrust device is designed to compensate the full axial load of the kiln, so skewing of the support rollers is not needed. The result is smooth operation with improved lifetime for rolling components.



IMPROVES LIFETIME FOR ROLLING COMPONENTS

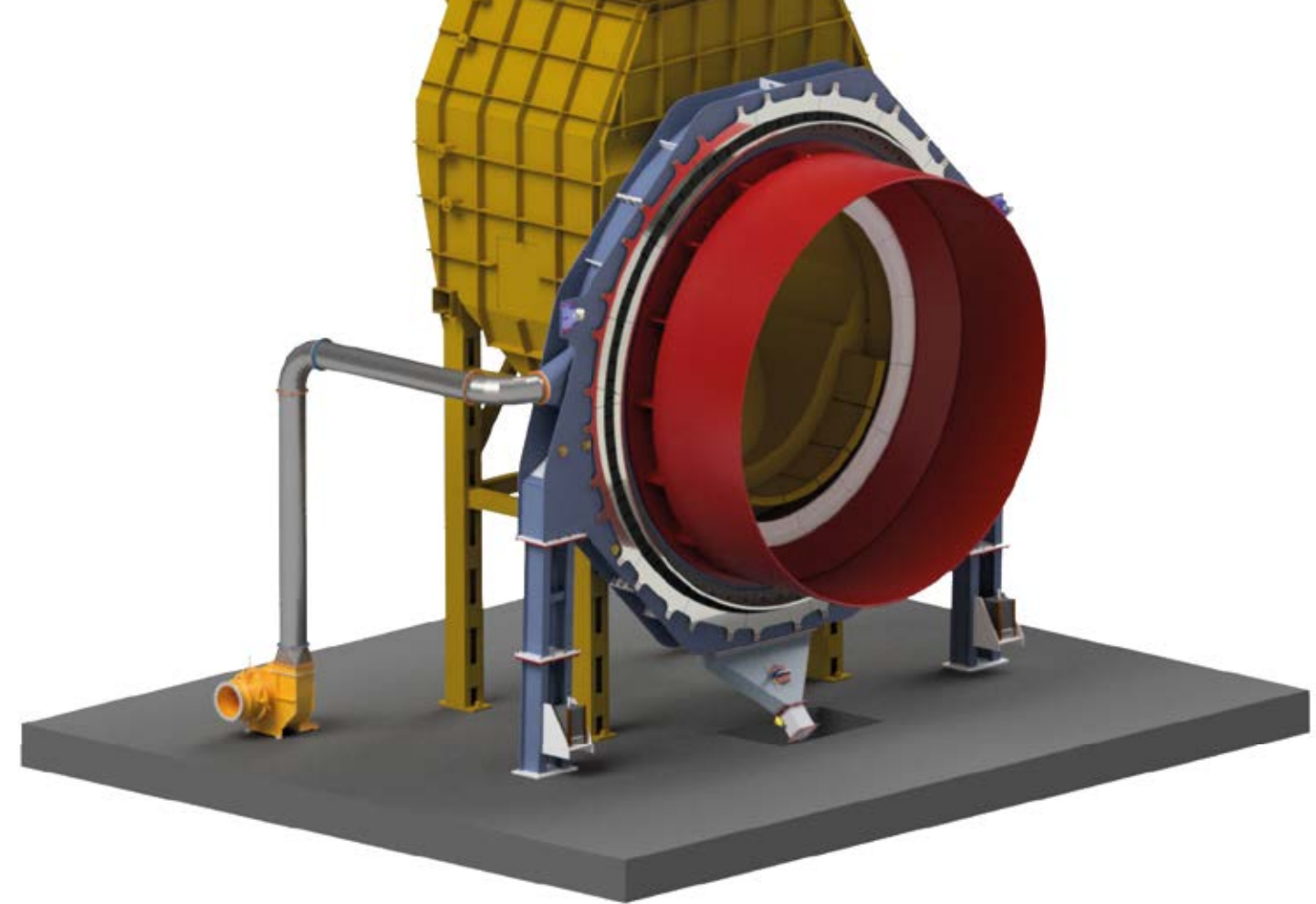
MINIMIZES THE RISK OF BREAKDOWNS

REDUCES MAINTENANCE COSTS

FUNCTIONAL AND PROVEN DESIGN

GRAPHITE TYPE KILN INLET SEAL

The inlet and outlet zones with seals are very critical parts of a kiln. If false air enters the kiln system, fuel consumption increases, production output decreases and operating expenses go up. Graphite seals require no greasing and are practically maintenance-free under normal operating conditions.



**PROVIDE EFFECTIVE LEAK TIGHTNESS AROUND THE KILN DISCHARGE HOOD TO PREVENT
COLD AIR ENTRANCE RELEASE OF HOT GASES AND PARTICLES**

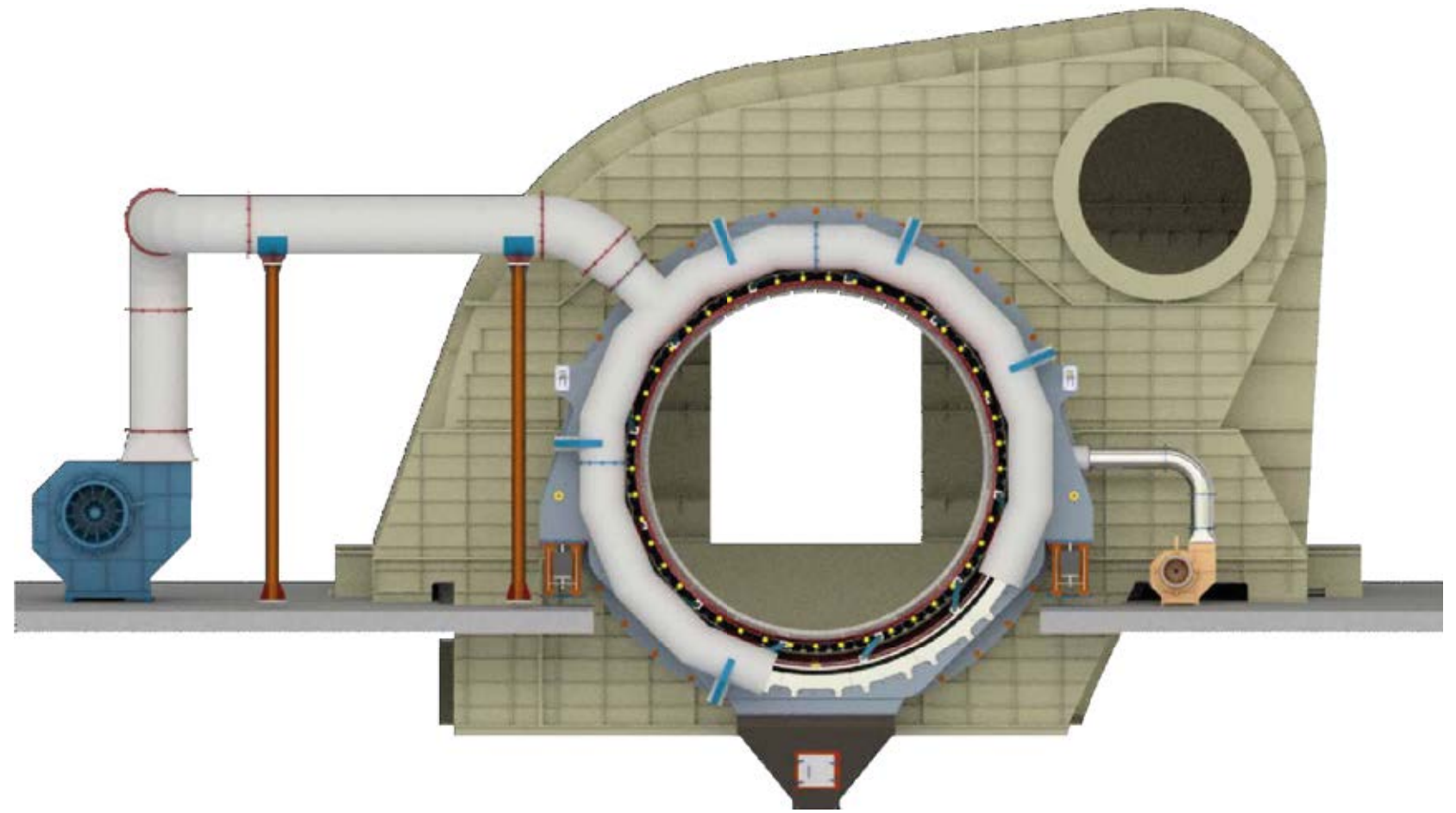
IMPROVE PRESSURE STABILITY IN THE KILN

**ALLOW INSTALLATION ON EXISTING KILNS WITHOUT
MODIFYING THE KILN SHELL OR KILN INLET**

GRAPHITE TYPE KILN OUTLET SEAL

Our graphite seals reduce false air intake and allow enough flexibility to follow the kiln's movements.

Rows of graphite blocks are held in place by a wire rope system. This ensures an efficient seal against the outer air casing.



**PROVIDE EFFECTIVE LEAK TIGHTNESS AROUND THE KILN DISCHARGE HOOD TO PREVENT
COLD AIR ENTRANCE RELEASE OF HOT GASES AND PARTICLES**

LEAK TIGHTNESS EFFICIENCY AND PREVENTION OF FALSE AIR LEAKAGE

ADAPTATION ON EXISTING KILNS AND EASY INSTALLATION

NO MAINTENANCE

CLINKER ROLLER CRUSHER

Our portfolio includes also clinker crusher. We offer our clients top-quality turnkey solutions for aggregate crushing systems.

We undertake custom-designing, engineering, installation, erection and commissioning of our range of aggregate crushing systems.

Our turnkey solutions are carried out by our experts who ensure minimum downtime and accuracy on the project.



TAILOR-MADE DESIGN FOR BOTH DIMENSIONAL AND PROCESS
HIGH AVAILABILITY AND RELIABILITY OF MINIMIZING OPERATIONAL COSTS

LONG WEAR LIFE

EASY MAINTENANCE AND OPERATION

LOW POWER CONSUMPTION

IMPACT CRUSHER

DAL impact crushers are successfully used to crush non-abrasive materials with high crushing ratio.



HIGH AVAILABILITY AND RELIABILITY TO MINIMIZE OPERATIONAL COSTS

**HYDRAULIC OPENING OF THE CRUSHER CASING FOR ADJUSTMENT AND
EASY CHANGE OF CRUSHING ELEMENTS**

FAST EXCHANGE OF BARS

HIGHLY WEAR RESISTANT MATERIALS OF MAIN CRUSHING COMPONENTS

**EASY ADJUSTMENT OF THE CRUSHING GAP THROUGH
HAND-OPERATED HYDRAULIC EQUIPMENT ADJUSTMENT OF THE CRUSHING GAP**

DOUBLE ROTOR HAMMER CRUSHER

Largely dimensioned antifriction bearings.

One or two heavy flywheels to balance crusher peak loads. Crushing hammers made of high-grade manganese steel. Cheek plates made of high-strength special steel. Easy adjustment of the crushing gap through hand-operated hydraulic adjustment.

Automatic lubrication system can be applied upon request.



LONG WEAR LIFE TIME

WOBBLER APPLICATION TO INCREASE THE CRUSHER CAPACITY

LOW ENERGY CONSUMPTION

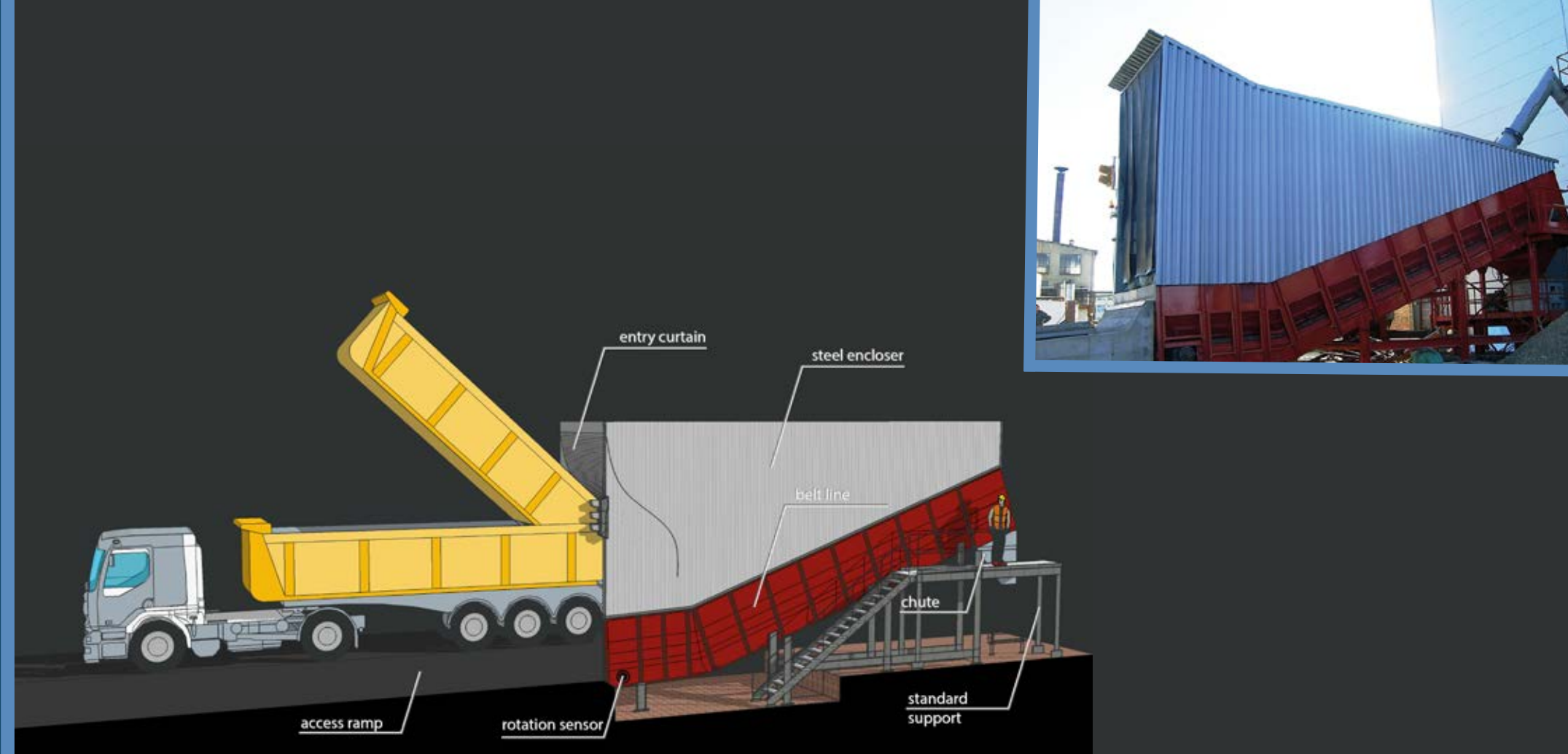
LOW MAINTENANCE COSTS

EASY MAINTENANCE WITH AUXILIARY ATTACHMENTS

SURFACE FEEDER

DAL feeder is firstly compound by a truck entry unit and dump station designed to receive material deposited by all type of trucks.

Our capabilities allow us to offer our clients turnkey and customized surface feeders at different capacities between 50 tph to 1000 tph with economic solution ready to operate in harsh conditions such as high humidity.



EQUIPPED WITH BELT CLEANER (SCRAPER) IN THE DISCHARGE CHUTE

THE CHUTE ELIMINATES THE RISK OF BLOCKAGE WHEN HANDLING STICKY MATERIALS

LONG WEAR LIFE

FLEXIBILITY OF RELOCATION

OPTIMAL INSPECTION AND MAINTENANCE PLATFORM

FLEXIBLE CONSTRUCTION IN MODULES MINIMIZES THE TIME SPENT ON ERECTION AND ENGINEERING

APRON FEEDER

Apron feeders are used to extract or feed large, lumpy, abrasive and heavy ores under severe impact conditions including wet, sticky or frozen operations. A robust, heavy duty design provides minimal downtime and many years of service life.



**THE MAINTENANCE FREE SLIDE RAIL IS MADE OF SPECIAL STEEL
WHICH ALLOWS THE APRON FEEDER TO BE OPERATED
WITHOUT AN ADDITIONAL LUBRICATION SYSTEM**

ECO-FRIENDLY DESIGN AVOIDS GREASE OVERFLOW

HIGH OPERATIONAL SAFETY

STEEL SILOS

DAL steel bolted silos have customized sizes and layout for specific requirements, easy transportation and fast installation. Our system is the most effective solution for dry and granular bulk goods that are to be further processed into various types and grades.



MODULAR DESIGN
EASY TO INSTALL
LONG LIFE SEALING DESIGN

SPARE PARTS

DAL is able to process each part of production, which has significant processing capacity independent of size and weight.

DAL can supply different kind of grey, ductile iron and cast iron, as well as all kinds of steel forging, aluminium and sheet parts.



**FORGED, CASTED, WELDED AND MANUFACTURED FOR CAPABILITY OF
DELIVERY PRODUCING PARTS FROM 1 KG UP TO 50 TONS**

QUICK DELIVERY AND WORLDWIDE TRANSPORT

**QUALITY ASSURANCE & QUALITY CONTROL ADVANCED
MANUFACTURING AND ACQUISITION PLAN**

SUPERVISION FOR ASSEMBLY AND COMMISSIONING

DAL 1 WORKSHOP

Indoor Area
6.000 m²

Crane Capacities
3 x 15 tons

Height Under the Crane
10 m

Management Building
400 m²



DAL 1

DAL 2 WORKSHOP

Indoor Area
10.000 m²
(each building 5.000 m²)

Crane Capacities
4 x 64 tons
2 x 16 tons

Height Under the Crane
10,5 m

Management Building
3 stages
500 m²



DAL 2

ISO CERTIFICATES

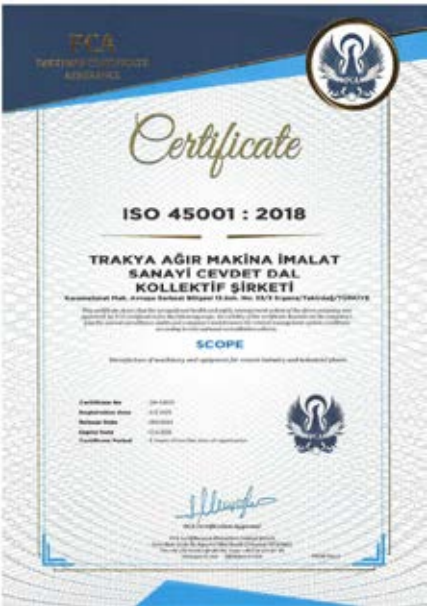
ISO 14001:2015



ISO 9001:2015



ISO 45001:2016



EN-1090-1:2009



EN ISO 3434-2



KEY PRODUCTION AND QUALITY STANDARDS



1. GENERAL QUALITY MANAGEMENT

- ISO 9001 - GENERAL QUALITY MANAGEMENT REQUIREMENTS
- EN 1090-2, EXECUTION CLASS 2 (EXC2) - EXECUTION OF STEEL AND ALUMINUM STRUCTURES
- EN ISO 3834-2 - QUALITY REQUIREMENTS FOR FUSION WELDING OF METALLIC MATERIALS (COMPREHENSIVE)

2. RAW MATERIAL ACCEPTANCE & INCOMING CONTROLS

- EN 10204 - RAW MATERIAL ACCEPTANCE & INSPECTION DOCUMENTATION
- EN 1559 - FOUNDING - TECHNICAL CONDITIONS OF DELIVERY
- EN 10293 - STEEL CASTINGS FOR GENERAL ENGINEERING PURPOSES
- EN 10213 - STEEL CASTINGS FOR PRESSURE PURPOSES
- EN 10222 - STEEL FORGINGS FOR PRESSURE PURPOSES
- EN 10250 - OPEN DIE STEEL FORGINGS FOR GENERAL ENGINEERING PURPOSES

3. MACHINING

- EN 2768 - GENERAL TOLERANCES (LINEAR & ANGULAR)
- ISO 1302 - INDICATION OF SURFACE TEXTURE IN TECHNICAL PRODUCT DOCUMENTATION
- ISO 1101 - GEOMETRICAL PRODUCT SPECIFICATIONS (GPS) - GEOMETRICAL TOLERANCING REQUIREMENTS
- ISO 6789 - HAND TORQUE TOOLS - DESIGN, TESTING, AND CALIBRATION

4. WELDING & HEAT TREATMENT

- EN ISO 15609 - WELDING PROCEDURE SPECIFICATION REQUIREMENTS
- EN ISO 15614 - WELDING PROCEDURE QUALIFICATION
- EN ISO 5817 - WELDING QUALITY LEVELS
- EN ISO 17663 - HEAT TREATMENT FOR WELDING & ALLIED PROCESSES (STRESS RELIEF)
- EN 1011 - GUIDANCE FOR WELDING AND CUTTING OF METALS (PLASMA CUTTING & BENDING)

5. SURFACE PROTECTION

EN ISO 12944 - CORROSION PROTECTION & PAINTING REQUIREMENTS

- ISO 8501-1 - VISUAL ASSESSMENT OF SURFACE CLEANLINESS BEFORE COATING
- ISO 8502 - TESTS FOR SURFACE CLEANLINESS
- ISO 8503 - SURFACE ROUGHNESS CHARACTERISTICS AFTER BLASTING

6. NON-DESTRUCTIVE TESTING (NDT)

- EN ISO 9712 - QUALIFICATION & CERTIFICATION OF NDT PERSONNEL
- EN ISO 17638 - MAGNETIC PARTICLE TESTING (MT)
- EN ISO 17640 - ULTRASONIC TESTING (UT)
- EN ISO 17636-1/-2 - RADIOGRAPHIC TESTING (RT)
- EN ISO 17637 - VISUAL TESTING (VT)
- EN ISO 3452-1 - PENETRANT TESTING (PT)

7. BOLTING & TORQUE CONTROL

- ISO 898-1 - MECHANICAL PROPERTIES OF FASTENERS MADE OF CARBON STEEL AND ALLOY STEEL
- ISO 16047 - TORQUE/CLAMP FORCE TESTING FOR FASTENERS
- EN 1090-2 - EXECUTION OF STEEL STRUCTURES - TORQUE TIGHTENING REQUIREMENTS
- ISO 6789 - HAND TORQUE TOOLS - DESIGN, TESTING, AND CALIBRATION

SOME OF OUR CUSTOMERS

MORE THAN 70 COUNTRIES



FROM JAPAN TO COLOMBIA

HEIDELBERGCEMENT



HEADQUARTER

Şirinevler Mah. Adnan Kahveci Bulvarı No:206 Haydar Akın İş Mrk-1 34510
Bahçelievler, İstanbul - Turkey

DAL EUROPE

Hermannstal 5 30926
Seelze, Hannover - Germany

DAL 1

Yılmaz Alparslan Cad. No:31 Türkgüçüköyü
Çorlu, Tekirdağ - Turkey

DAL 2

Karamehmet Mah. Avrupa Serbest Bölgesi Adnan Arısoy Bulvarı No:1/A
Ergene, Tekirdağ - Turkey

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