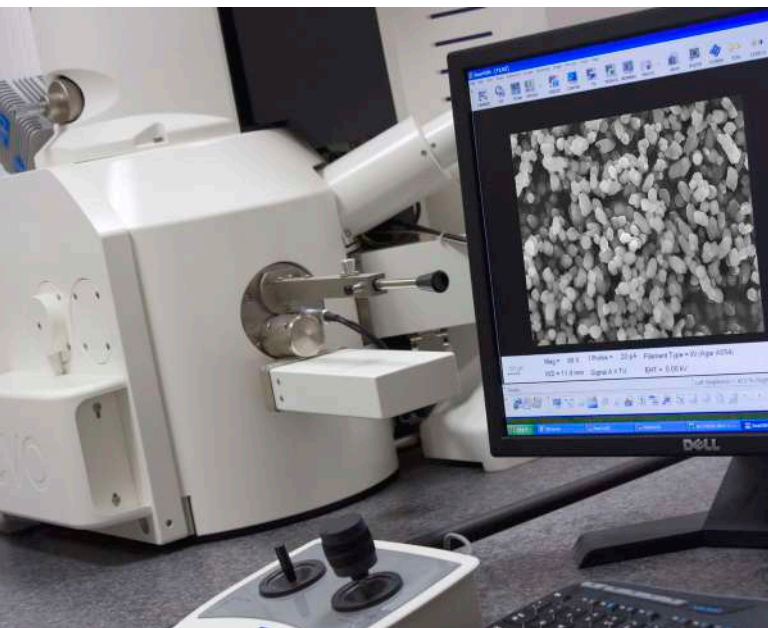



adaçal® INDUSTRIAL
MINERALS Co.







For our future...



The Bera Group has become the leader in Anatolian investments with its extended share holders structure and a unique operational system of sharing the loss and profit. It brings small savings together and transforms them into investment and production.

The Bera Group is active in a variety of sectors like paper and cardboard, machinery, oil, construction and building materials, marble, textiles, tourism and food.

Adacal Industrial Minerals and Hisar Mining, marble&mining group companies of Bera, are the pioner firms of Turkey that perform the firsts in industrial mineral market. While Adacal Industrial Minerals is producing Precipitated Calcium Carbonate(PCC) products under the "adaCAL"brand, Hisar Mining is producing Ground Calcium Carbonate(GCC) under the Hisarcal" brand and supply to industry.

Bera determines its future strategy, target and vision in accord with such global trends as state of the art technology and competitiveness in the information age. Concepts and functions like quality, competitiveness, efficiency and exports are crucial to Bera.

Powerful resources, a robust financial structure, well-programmed and sacrifice demanding work procedures, a high production capacity, and quality production are the dynamics that determine Bera's developmental vision.



Adacal Industrial Minerals

Adacal Ind. Min. was established as a lime factory in 2000 at 110.000 sqm. area. Adacal has become a well known trade mark in its sector with the raw material quality, advanced technology and precise production.

Adacal is major supplier of the two distinct areas, construction and industry sectors. The importance of the lime is increasing day by day and becoming a significant raw material of the production. Our company has always been preferred supplier for Turkey's elite institutions in their sectors which have no tolerance at the quality such as gold, silver, aluminum, boron, soda, power plants, iron & steel plants, water treatment plants, chemistry and glass-fiber industry for many years.

In order to guarantee the product quality, Adacal adapted "selective mining" approach and also incorporated into the mine operations in 2009.

Adacal has completed the first and the only industrial scaled PCC (Precipitated Calcium Carbonate) production plant in Turkey at the end of 2011 and started to supply PCC with "adaCAL" trademark. adaCAL can be produced in nano size and at desired morphology. With these superior specifications adaCAL meets the required technical specifications and used as functional filler in many different industries like paper, plastic, paint, chemistry, pharmacy and food to increase the quality and reduce the costs.

In 2019, with the commissioning of our second kiln with a production capacity of 400 tons/day, Adacal lime production capacity was updated to 650 tons/day.

Adacal is a full integrated plant when considered its own raw material processing plant, modern kiln and ability of producing CO₂ necessary for PCC by own facilities. The use of CO₂ by 44% in the production process attributes our PCC an environmentally-friendly product.

As a necessity of the new investments, a modern laboratory is established in the company. This laboratory, including Scanning Electron Microscope (SEM) and a pilot PCC plant, plays an important role in research & development (R&D) studies.

adaCAL® (Precipitated Calcium Carbonate)



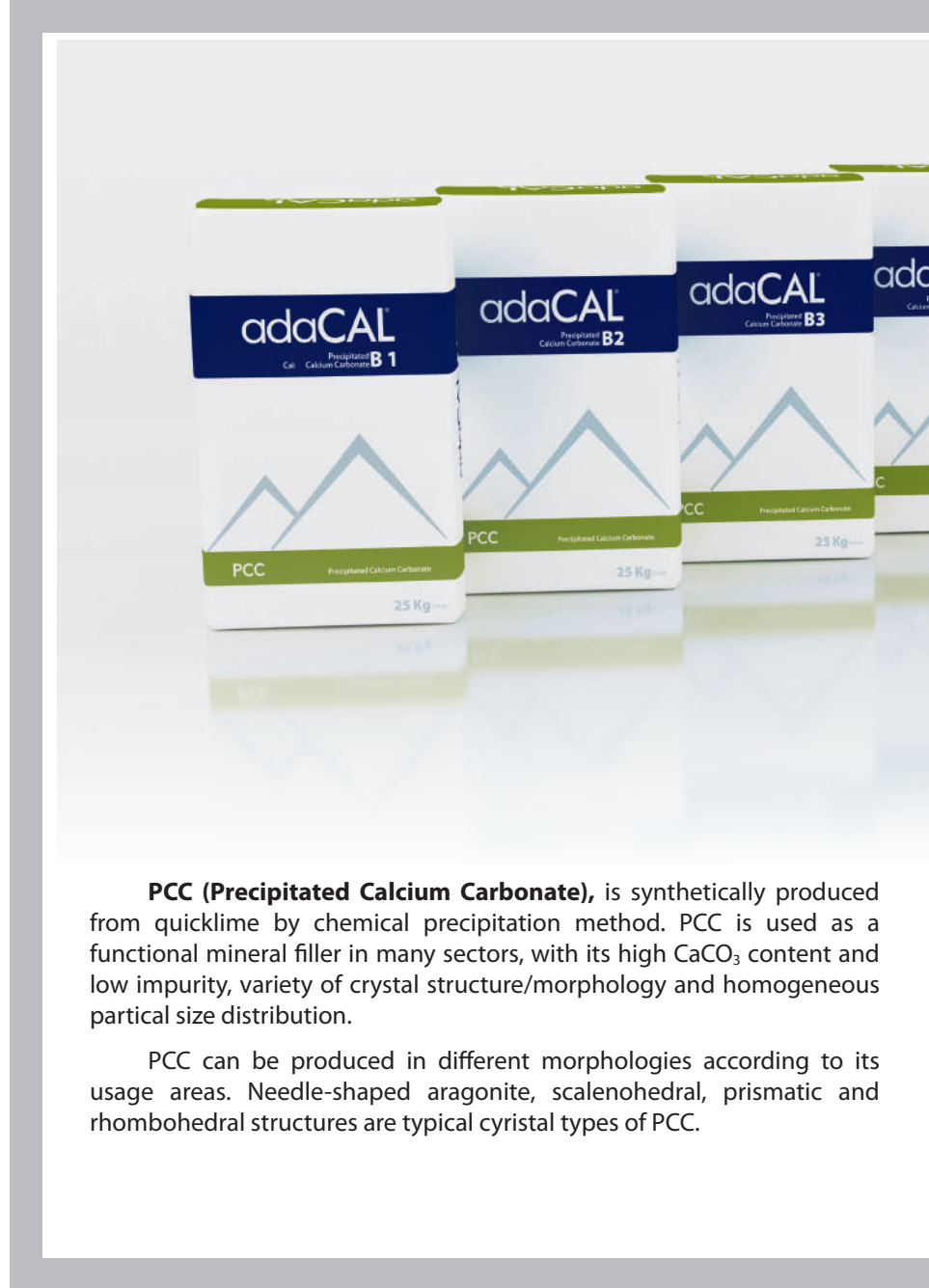
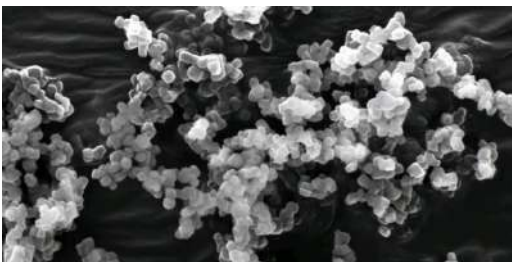
adaCAL B1: Scalenohedral crystal structure. Average(d50) particle size is 2,5 micron. Used as extenders in paint, plastic, paper, food, rubber and cosmetics. High surface area and oil absorption.

adaCAL B2: Scalenohedral crystal structure. Average(d50) particle size is 2,5 micron. Used as extenders in paint, plastic, paper, food, rubber and cosmetics.

adaCAL B3: Scalenohedral crystal structure. Average(d50) particle size is 2,5 micron. Used as extenders in sectors like plastic, rubber, paint, pharmacy, food, paper and chemistry.

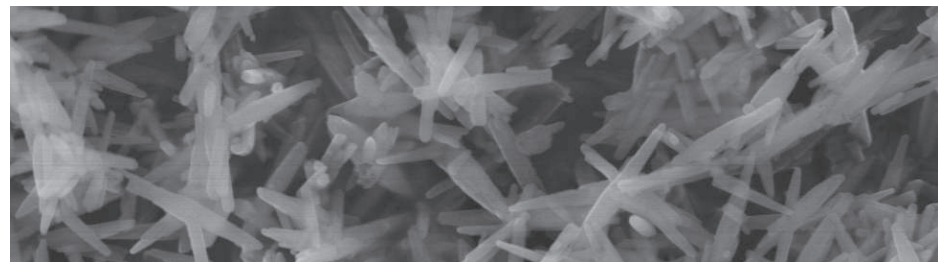
adaCAL P1: Prismatic crystal structure. Average(d50) particle size is 0,80 micron. Used as extenders in sectors like plastic, rubber, paint, pharmacy, food, paper and chemistry.

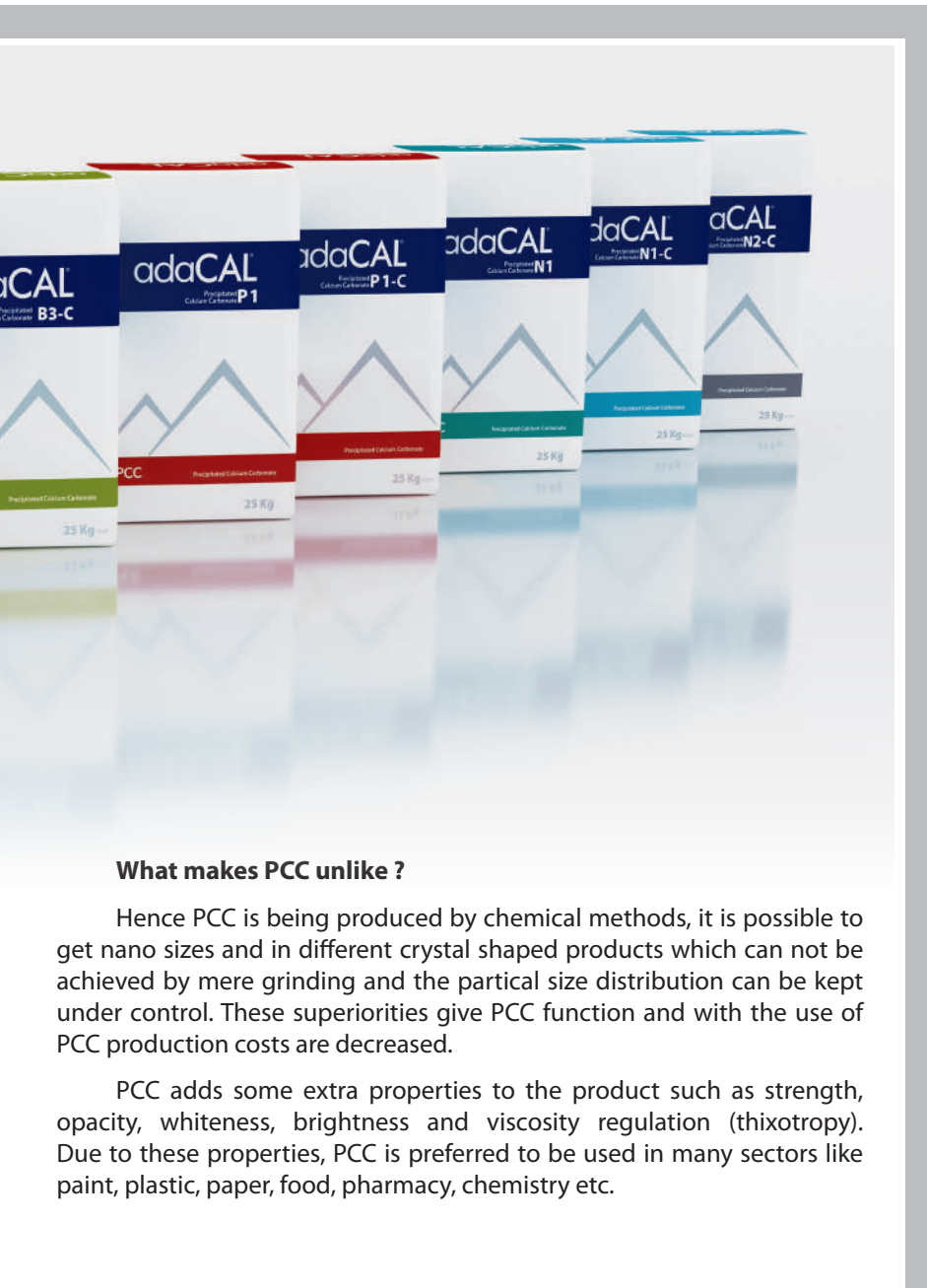
adaCAL N1: Rhombohedral crystal structure. Average(d50) particle size is 60 nano. Used as extenders in paint, rubber and pharmacy.



PCC (Precipitated Calcium Carbonate), is synthetically produced from quicklime by chemical precipitation method. PCC is used as a functional mineral filler in many sectors, with its high CaCO_3 content and low impurity, variety of crystal structure/morphology and homogeneous particle size distribution.

PCC can be produced in different morphologies according to its usage areas. Needle-shaped aragonite, scalenohedral, prismatic and rhombohedral structures are typical crystal types of PCC.





What makes PCC unlike ?

Hence PCC is being produced by chemical methods, it is possible to get nano sizes and in different crystal shaped products which can not be achieved by mere grinding and the partial size distribution can be kept under control. These superiorities give PCC function and with the use of PCC production costs are decreased.

PCC adds some extra properties to the product such as strength, opacity, whiteness, brightness and viscosity regulation (thixotropy). Due to these properties, PCC is preferred to be used in many sectors like paint, plastic, paper, food, pharmacy, chemistry etc.



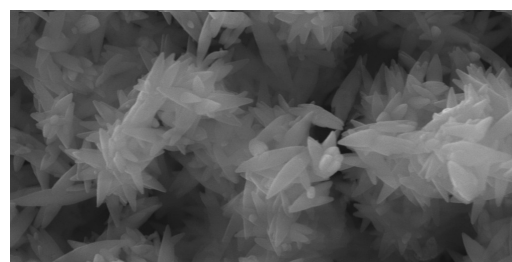
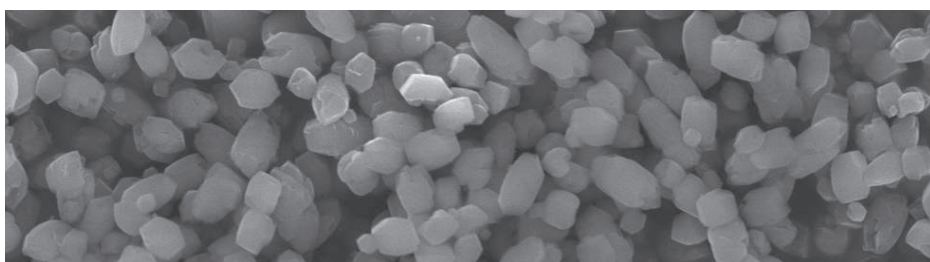
adaCAL B3-C: Scalenohedral cyrstal structure. Average(d50) particle size is 2,5 micron. Stearic-acid coated. Used as extenders in paint, plastic, rubber and cosmetics.

adaCAL P1-C: Prismatic cyrstal structure. Average(d50) particle size is 0,80 micron. Stearic-acid coated. Used as extenders in plastic, rubber, sealant and adhesives.

adaCAL N1-C: Rhombohedral cyrstal structure. Average(d50) particle size is 60 nano. Stearic-acid coated. Used as extenders in plastic, rubber, sealant, adhesives and chemistry.

adaCAL N2-C: Rhombohedral cyrstal structure. Average(d50) particle size is 60 nano. Stearic-acid coated. Used as extenders in plastic, rubber, sealant, adhesives and chemistry.

adaCAL N3-C: Rhombohedral cyrstal structure. Average(d50) particle size is 60 nano. Stearic-acid coated. Used as extenders in plastic, rubber, sealant, adhesives and chemistry.



adaCAL[®] in Paint



adaCAL is used as a functional mineral filler in paint formulas in order to reduce the production cost and improve the optical features.

Compared to other fillers in paint, , adaCAL has narrow and homogeneous partical size distribution and improves the optical properties of paint with the help of its controlled crysyal structure and shape.

Specifically in architectural paints, by replacing adaCAL PCC instead of TiO₂, the most expensive input in paint formulas, the unit consumption of TiO₂ can be reduced up to 40% and production costs are reduced by 6%-18%.





with adaCAL use in paint;

- Hiding power is improved.
- The desired whiteness is provided.
- Surface smoothness is increased.
- The desired brightness/opacity is provided.
- Scrub resistance is increased.
- Density is decreased.



adaCAL[®] in Plastic



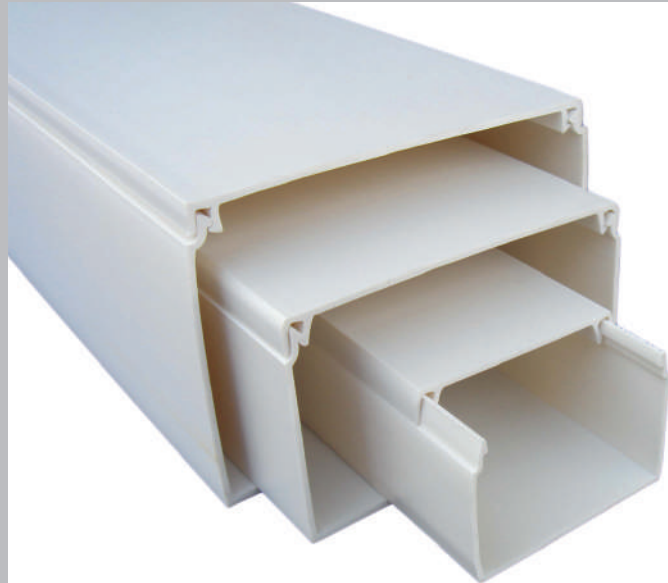
adaCAL is used as a functional mineral filler, primarily in rigid plastic/PVC profile, plastic pipe and flexible plastic/PVC cable production.

With the adaCAL PCC use in PVC extrusion;

- Impact strength of the PVC profile products are improved.
- Brightness is increased 2-3 times.
- Better surface finish is supplied.
- Corner butt weld strength is improved.
- Extrusion torques in production process are balanced.
- Regular material flow is supplied during extrusion.

In pipe production;

- Impact strength test values are increased.
- Interior surface smoothness is improved.
- Supply a better voice/noise insulation.
- Minimize the geometrical deformation and/or heat distortion due to temperature changes.





With the adaCAL use in cable production;

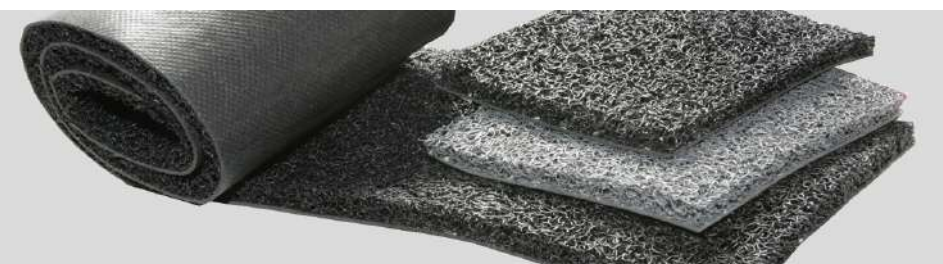
- Add the cable toughness and elasticity.
- The electric resistance of PVC cable cover is increased.
- Unify the interface of PVC cable and conductive material.
- Tensile strength is improved.

With the adaCAL PCC use in flexible PVC production (fittings, seal, doormat, tread etc.);

- Flexibility is increased.
- Tensile strength is improved.
- Better surface finish is supplied.

With adaCAL PCC use in PP,PE nylon bag and packing;

- Supply the permeability of the film at desired products.
- Tensile strength is improved.
- Transparency of the film is not affected negatively.



adaCAL[®] in Paper



adaCAL is used in paper production as functional filler and coating mineral. It positively changes, both chemical and physical/optical properties of the paper.

with adaCAL use in paper as filler;

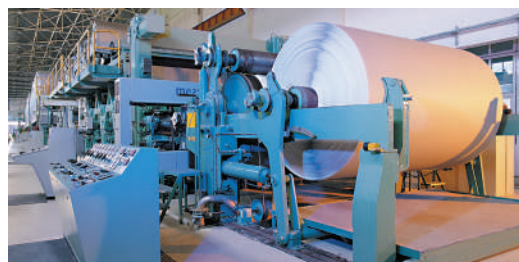
- Adds paper opacity/birghtness and whiteness.
- Increases the bulk density of paper.
- Improves the smoothness of the paper surface.
- Reduces dusting.
- Enhances bonding interaction with fibers.
- By stabilizing the retention/drainage system, allows better paper machine runnability.
- By significantly increasing sheet filler content, reduces the production cost.





with adaCAL use in paper as coating pigment;

- Adds paper brightness and whiteness.
- Performs optimum rheological properties and provides ideal thixotropy.
- Improves opacity.
- By balancing ink absorption, improves the print quality.



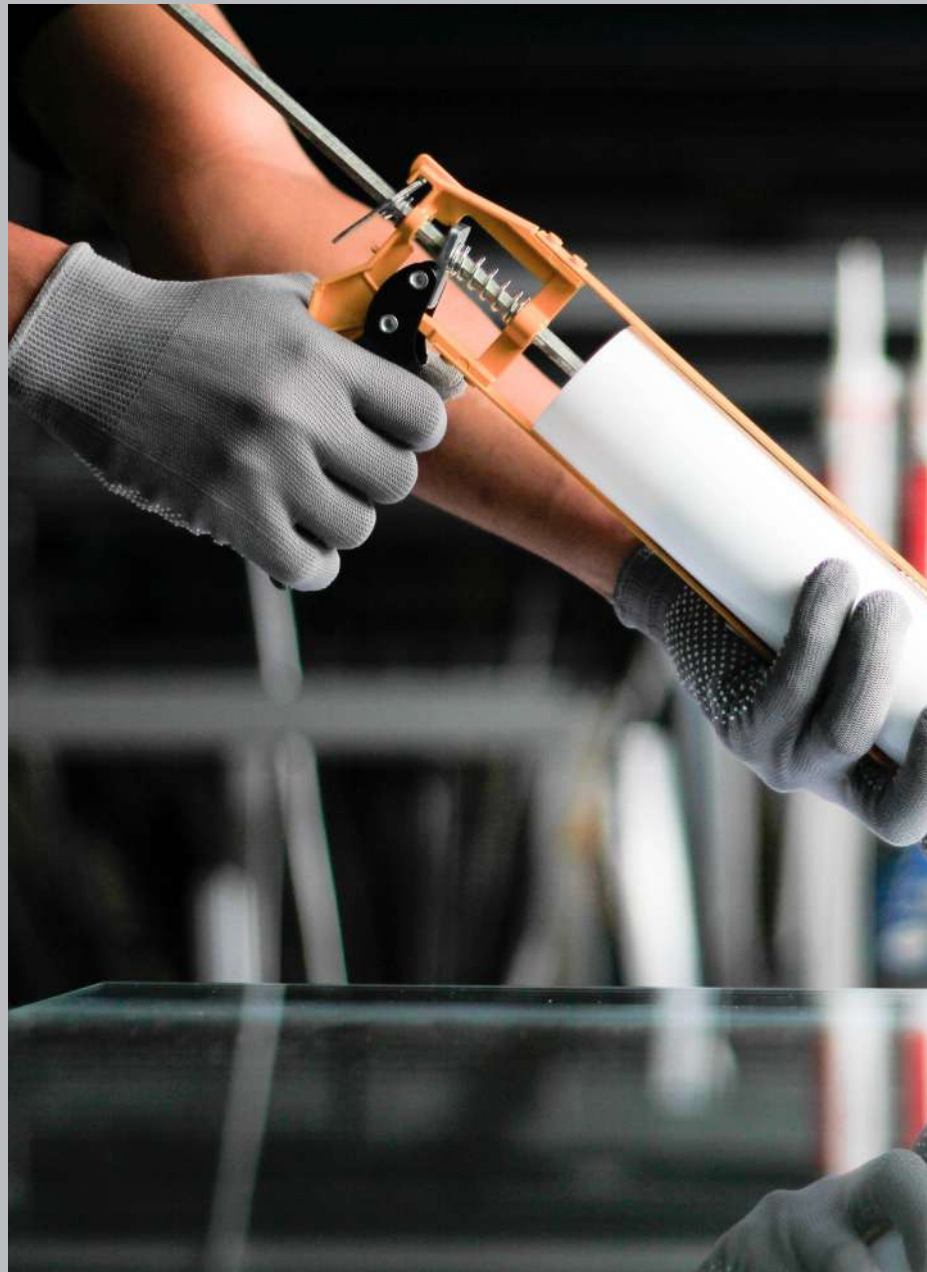
■ adaCAL® in Chemistry



(NPCC) adaCAL N1, N1-C are used in adhesives and sealants.

in process;

- Functions as a rheological additive and provides rheological control.
- Imparts thixotropic viscosity.
- By increasing the mechanical forces, improves the adherence of adhesive/sealant on applied surface.





The other functioning areas of (NPCC) adaCAL N1 and adaCAL N1-C,

- **In pharmacy:** As major and minor drug substance.
- **In food industry:** As a calcium source.
- **In toothpaste:** As a calcium source and the moderate to mild abrasive.
- **In cosmetics:** Used as pH regulator and can find place in sector with low abrasion features and chemical stability.



adaçal® Calcium Lime in Industry



Lime production is made by circular, paralel flow, regenerative double shaft lime kiln and the process is controlled with scada. As a result of high quality raw material and technological equipments, high efficiency calcining is realized. Low impruties and reactivity, super whiteness and high CaO activity are major characteristics of our lime.

Our firm, always aims the best in production and accepts the customer satisfaction as a basic principle, performs the requirements of ISO 9001:2008 quality management system at each stage of the production.





Our lime products are categorised in two main product groups as hydrated lime and quicklime. We supply our products in the market, upon customer requests, as micronized/grinded and separated, packaged in kraft paper bags, PP bags and Big-bags or as bulk with silobas/trailer.

HYDRATED LIME	QUICKLIME
CL 90S	CL 90Q (Micronized Lime)
CL 80S	CL 80Q (Lime)
	ADA01 Micronised CaO-Moisture Scavenger
Agricultural Lime	Surface Disinfectant



■ Mining Operations



Our company has been conducting mining activities with experienced staff and the latest technology heavy work machines. By applying selective mining criterias, ensures the continuity of raw material quality.

Adacal Limestone;

- 11669 TSE certificated.
- Aggregate has TS706 EN12620 certificate.
- Hard, Strong and Tough.
- Have resistance to pressure and abrasion.
- Not including any contaminants that may weaken the concrete such as dust and soil.
- Not including flat and long particles.





Aggregate for concrete and asphalt are produced in our plants. Upon customer demands, different sized products for road, sub-base, infrastructure, precast, drainage can be produced.

According to the ICP method, (ACME accredited analytical laboratory, Canada) in the results of the chemical analysis, CaO content of aggregate should be min. 55,16% and LOI(loss of ignition) is %43.30. The rocks with 55% and over CaO content are considered as pure limestone.



■ Laboratory & Analysis Facilities



Lime Laboratory

The following quality control stages are being carried out by our fully equipped lime laboratory;

- All the chemical analysis of limestone mined from our own quarries is daily performed.
- The produced lime is stored in silos according to partial sizes after screening. Chemical analysis of each product stored in silos are done and bulk density, reactivity are determined.
- For hydrated lime, chemical and moisture analysis are done.
- The product is packed after quality control and arbitration specimen/sampling process. Certificate of Analysis is prepared for every shipment/sent product.



Scanning Electron Microscope (SEM):
Used to identify the morphology of PCC.

Laser Particle Size Analyzer :
Used for partial sizing. Particle size distribution and the average particle size of PCC are determined.

Contact Angle Meters :
Used to measure the wettability of a solid surface by a liquid.

XRF;
Used for chemical analysis of materials.

Reometre;
PCC'nin süspansiyon içerisindeki Reolojik davranışlarını inceler.

Wet Scrub Tester;
Used for testing the wet abrasion resistance of paint formulas.



PCC Laboratory

adaCAL laboratory entered a different phase with PCC production, is equipped to perform all necessary analyzes for production quality-control and R&D studies.

Gas Pycnometer (Density Measurement Instrument) ;

Used for determining the density of raw materials and final PCC products .

Spectrophotometer:

Used for color measurement (whiteness, yellowness, etc.) of PCC and raw material.

Anton Paar Reometer;

Used to examines the rheological behavior of PCC in suspension.

Brookfield Rheometer:

Used to measure viscosity and determine the rheology of the suspension/PCC.

Titration:

Mettler Toledo Excellent T5 is used for titration of gravimetric analyses.

Zeta Potential Measurement Instrument:

Used to measure the surface electric charge of PCC.

Automatic Surface Area and Pore Size Analyzer:

Used to calculate the specific surface area(BET) of PCC.

Glossmeters:

Used for testing the gloss of paint formulas.

Laboratory Dissolver;

Used for trial productions in product development studies.

Ultrasonic Baths:

Used to clean laboratory equipments.

■ Research and Development (R&D)

Adacal has ongoing projects with Tübitak and Santez ARGE (R&D) support programmes. These studies provide us to increase the number of qualified staff, technological equipments and knowledge.

PCC, with superior specifications, is used as functional filler in many different industries like paper, plastic, paint, chemistry, pharmacy and food with increasing amounts every year. Production process in different industries may expect different functions from adaCAL PCC products.

In Adacal, study groups specific to each sector has been conducted in order to understand and to explain the function of PCC along with its mechanism in the production of different industries. We can sequence these groups as Paint Study Group, Plastic Study Group, Paper Study Group and Chemistry Study Group. In each study group, experimental studies are carried out by our experienced staff in cooperation with universities.

We are ready to open our fully equipped laboratories to use of our customers upon request and pleased to give technical support with our experienced staff.



Scanning Electron Microscope (SEM)

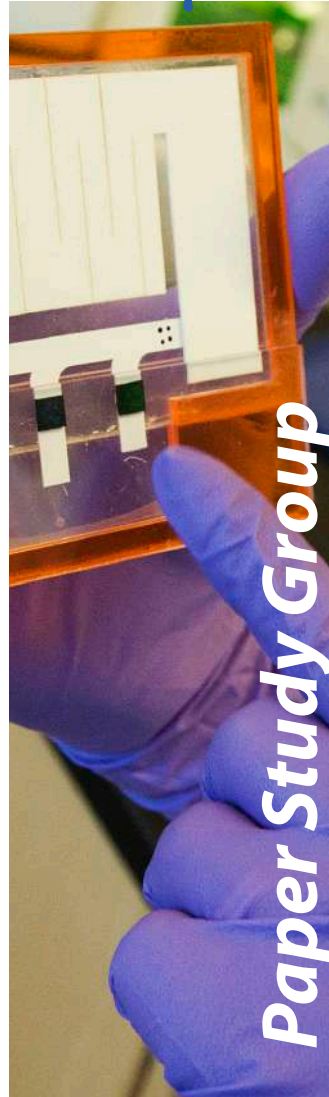


Laser Particle Size Analyzer



Brookfield Rheometer

We work, We produce...





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