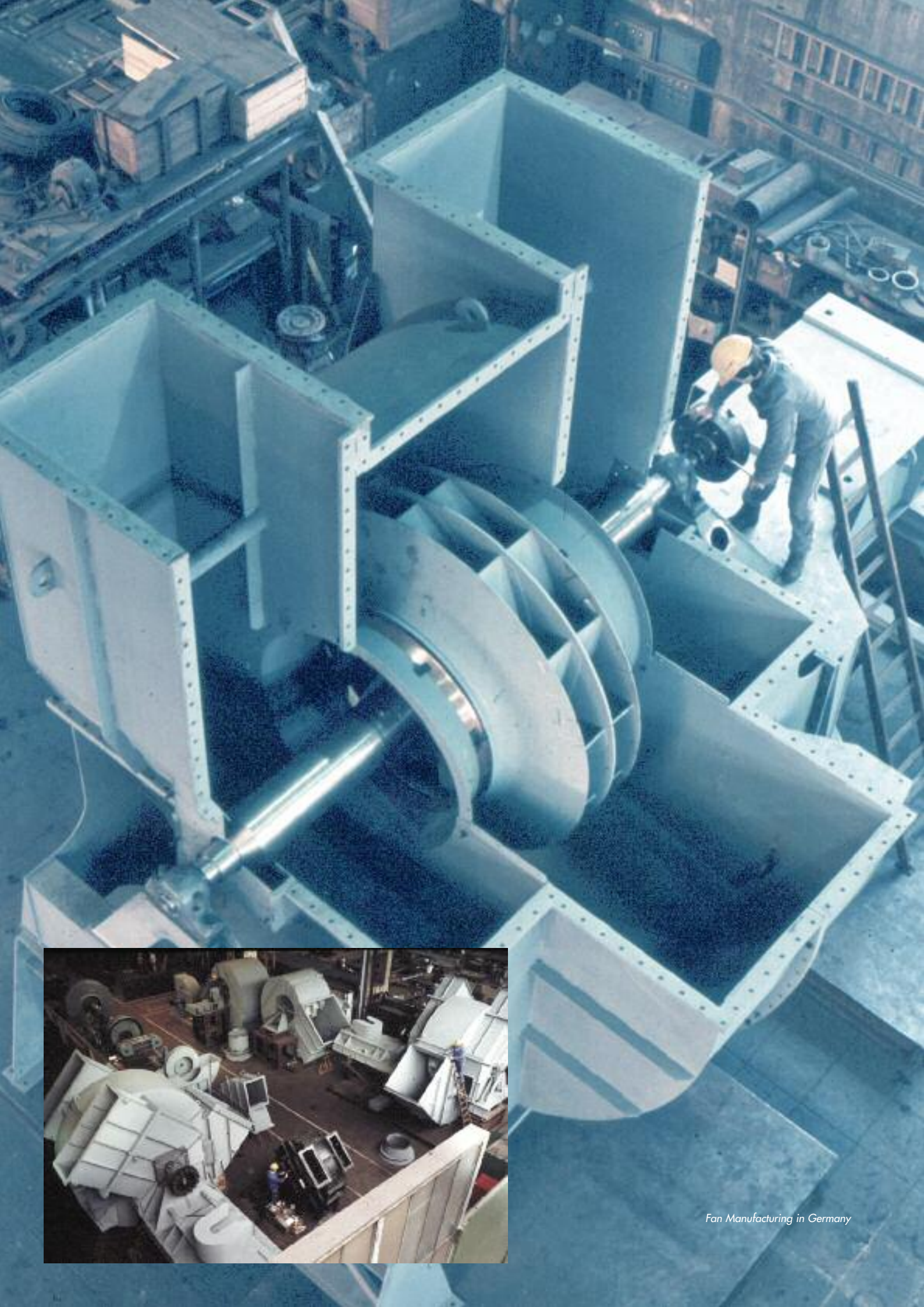


Centrifugal Fans

▲ for Cement Plants



TLT-Turbo GmbH



Fan Manufacturing in Germany

Centrifugal Fans for Cement Plants



Engineering and progress in air technology

The requirements imposed on Industrial Fans have noticeably increased over the years.

The variety of problems that need to be tackled when handling gases in a cement plant requires a comprehensive range of fans to optimize the selection for each particular application.

Decades of intensive research and operating experience gained during this time are the basis for our range of fans that provides the best economical choice for any application.

Guiding factors for the development of this range have been:

- **Low Investment Cost**
- **Low Operating Cost**
- **High Reliability**
- **Long Life**
- **High Noise Attenuation**

More than 130 years Fans from Bad Hersfeld

Tradition and development.

In 1874, when Benno Schilde and August Büttner started their own enterprises independently from each other, neither of them anticipated that more than 130 years later there would be in Bad Hersfeld one of the most modern manufacturing places.

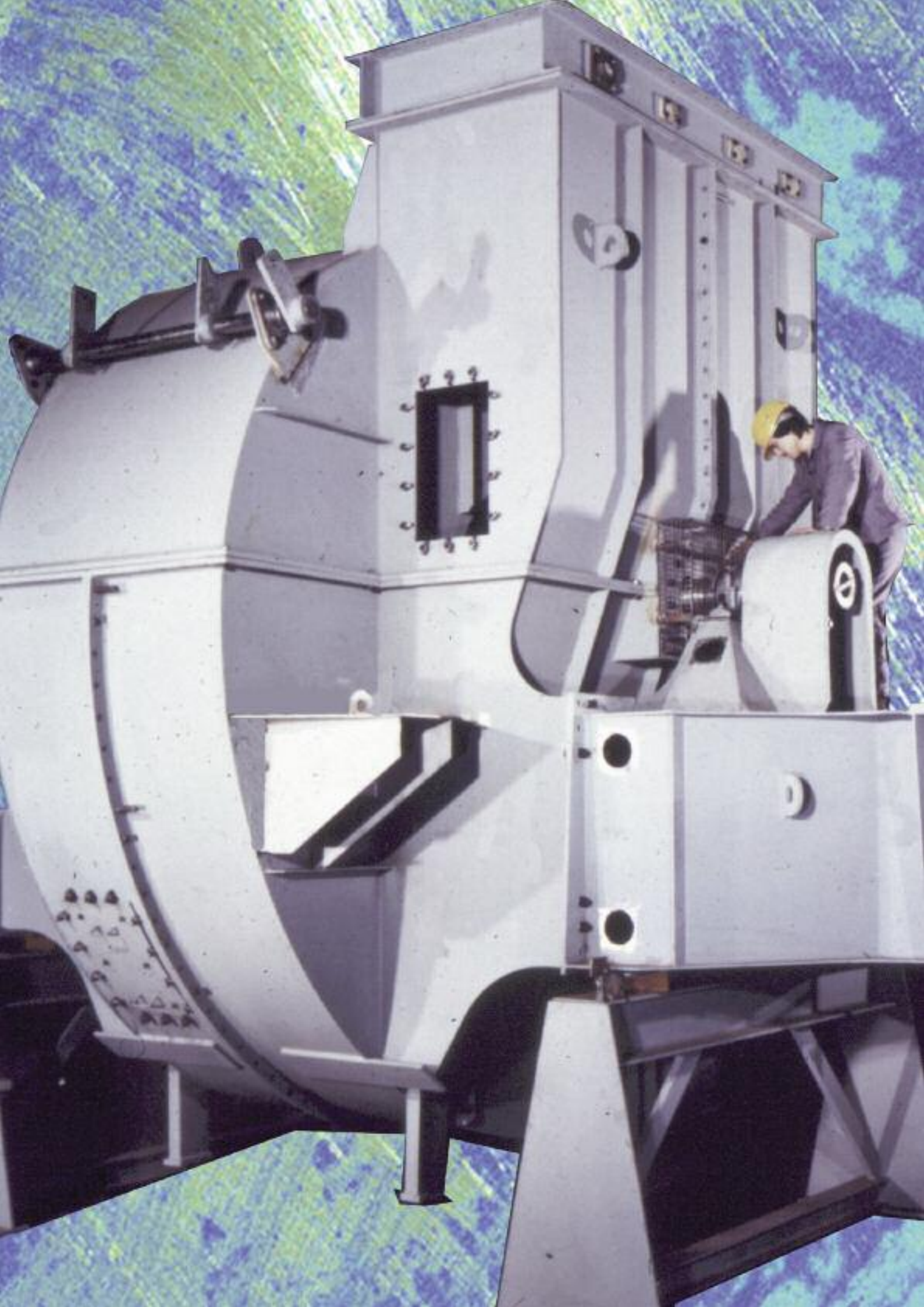
They started with "Exhausters", first mainly made out of Cast Iron. Later steel plates were used, reducing weight and costs. Our engineers moved on and developed fans of highest quality and most reliable technology.

Based on this tradition, a most successful company developed with highly innovative products.

For nearly all industrial applications our fans are used in various designs.

Today, TLT-Turbo GmbH offers a complete programme for the different industries.





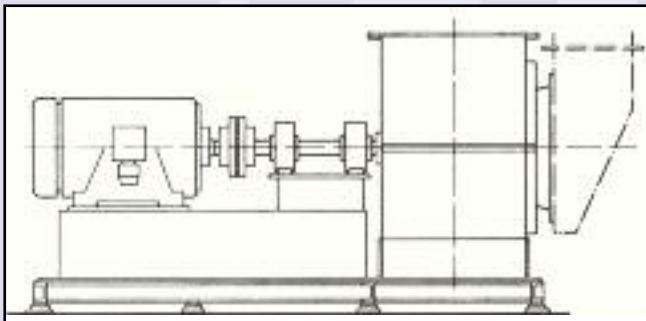
Quality assurance: W

Tested safety

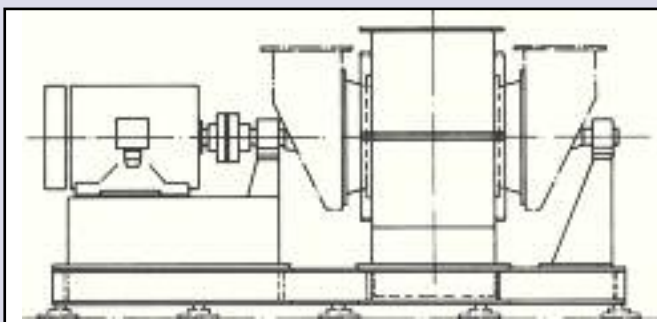
Our quality assurance system guarantees perfect products on a constantly high level – in material, workmanship, technology and function as well as in user and operating safety.

Quality of a product is determined in its development phase already. For this reason, our quality assurance starts no later than at this stage.

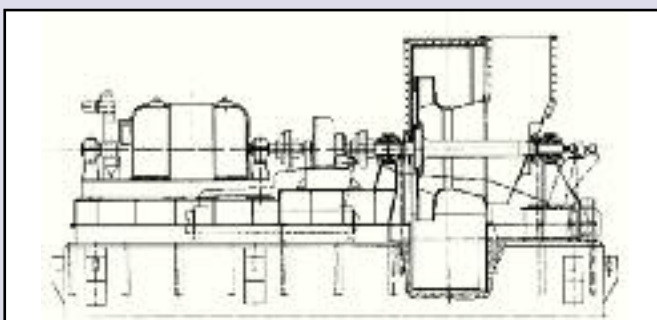
The fan range of TLT includes:



Single or multi stage centrifugal fans with maximum efficiency at pressures up to 50.000 Pa. Standard and heavy duty designs are available.



Double width double inlet centrifugal fans for large flow volume. Standard and heavy duty designs are available.



Centrifugal fan, rotor supported on both sides, fan supported by an integral steel frame.

e set standards

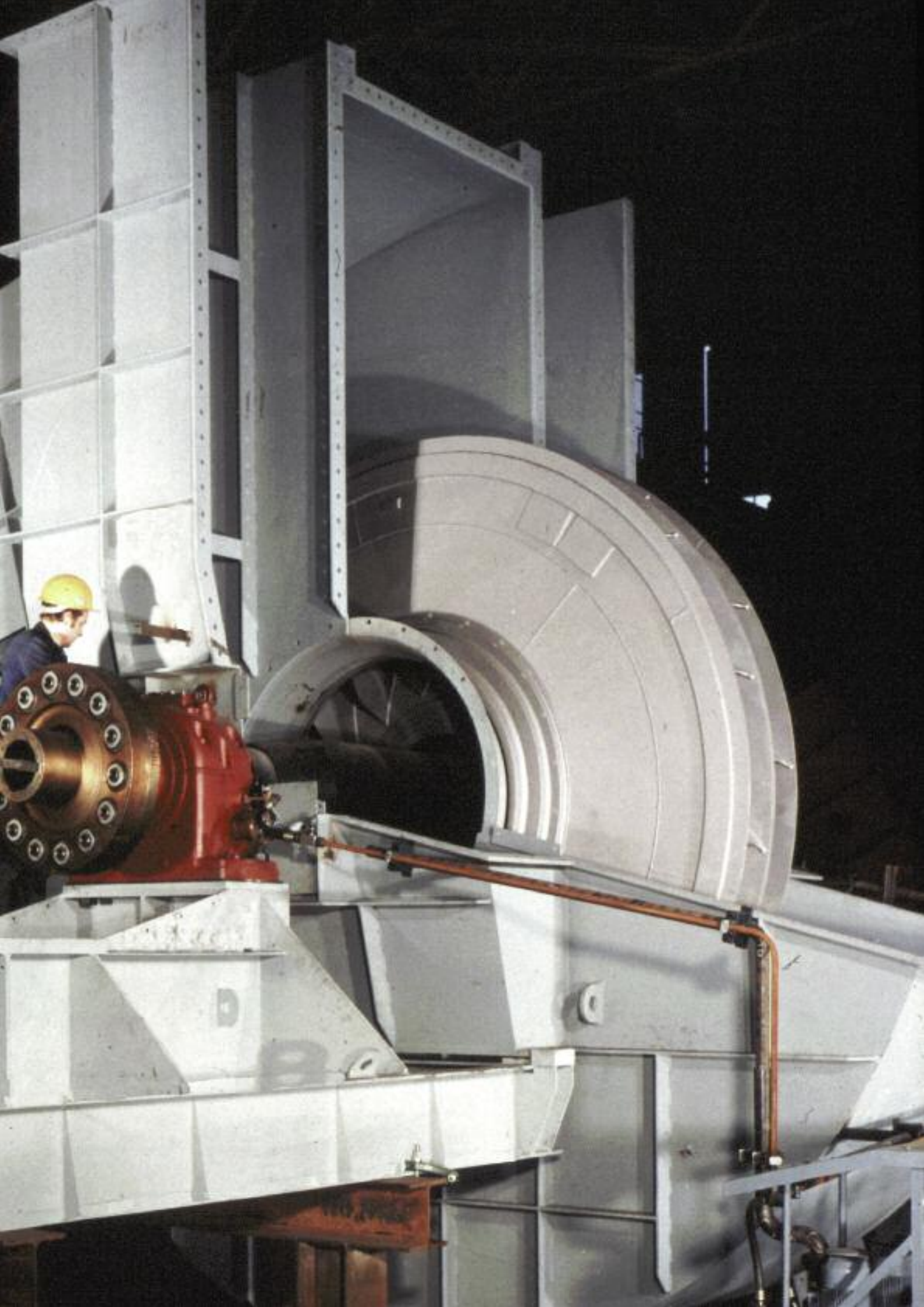
Our staff consider quality as a decisive element in their daily work. It belongs to their most important tasks to continuously check our quality assurance system and to update it, if and when necessary. Thus, its effectiveness is ensured permanently.

Our quality management in compliance with DIN ISO EN 9001 ensures that all materials we process, manufactured components, assemblies, individual products and complete system meet the high requirements.

We obviously adhere to national and international standards and laws as well as to all contractual regulations.



*Wilfried Rasokat,
ISO Management*

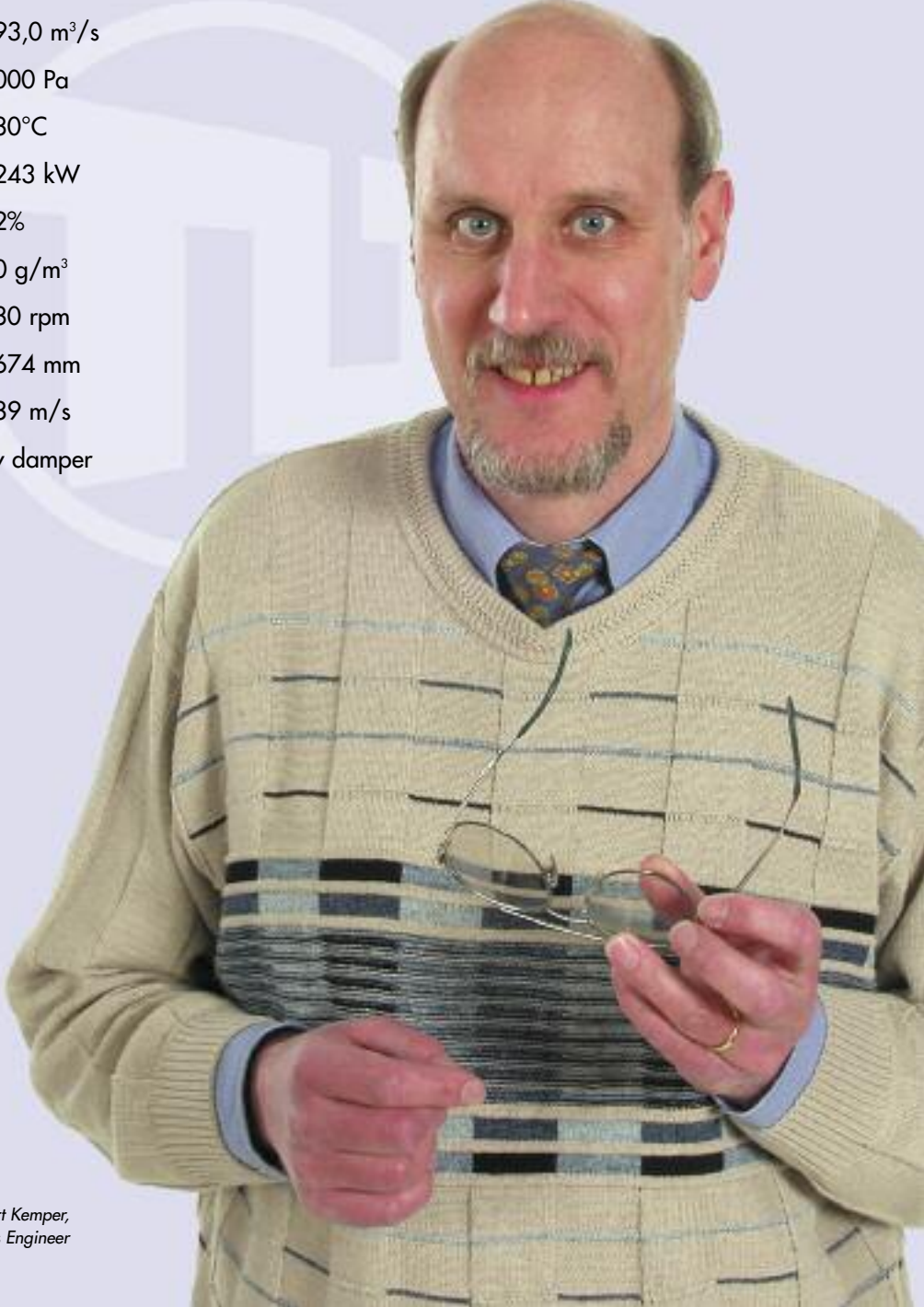


Kiln I.D. Fan for Cement Plants

Kiln I.D. fan for a cement plant

Technical Data:

Volume flow:	193,0 m ³ /s
Total pressure increase:	9000 Pa
Temperature:	380°C
Shaft power:	2243 kW
Efficiency:	82%
Dust:	30 g/m ³
Speed:	980 rpm
Impeller diameter:	3674 mm
Tip speed:	189 m/s
Control:	by damper

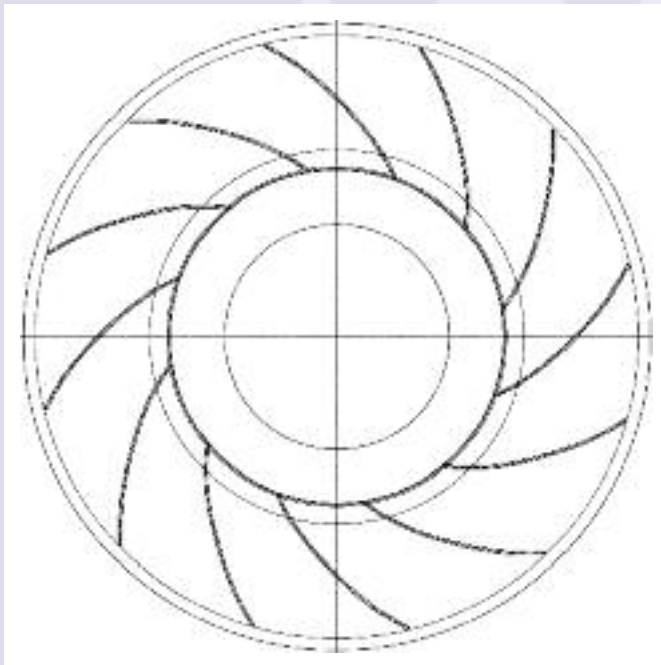
A man with a goatee and glasses, wearing a light-colored sweater over a blue shirt and tie, is smiling and holding his glasses. He is standing in front of a large, faint, stylized logo that resembles a 'P' or a similar symbol.

Norbert Kemper,
Sales Engineer

Impeller with different



Typical fan arrangement of Fans in Cement Plants.

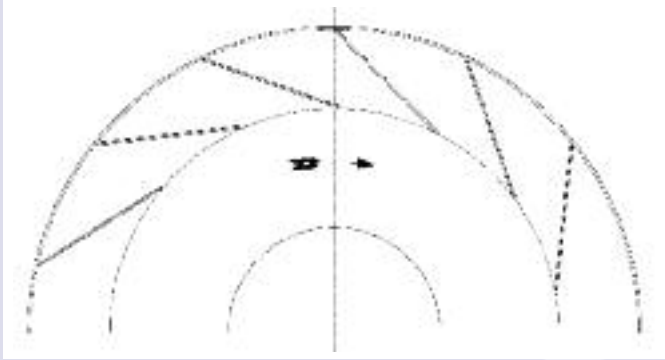


Typical forms of blades:

impeller backward curved, high pressure increase at high efficiency.

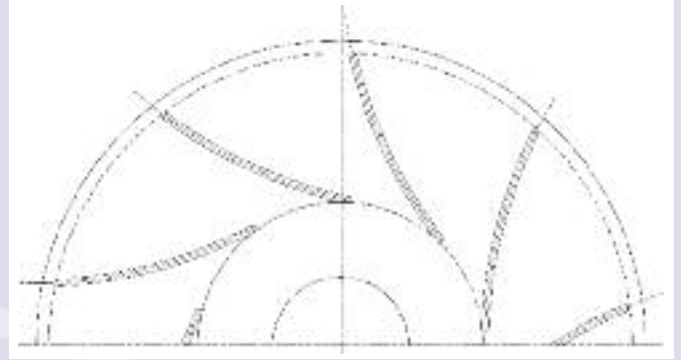
inlet angle: 35°
outlet angle: from $40-45^\circ$

nt blade forms



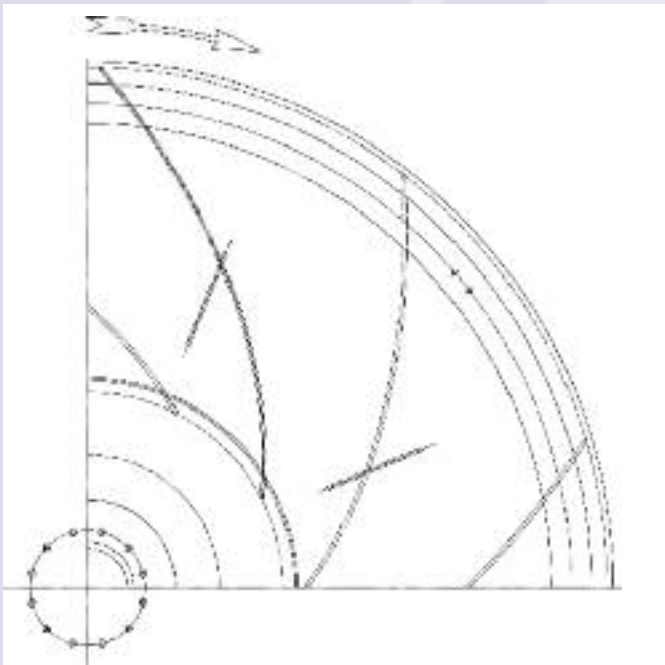
straight blades

inlet angle: 60°
outlet angle: 78°
application: adhesive dust



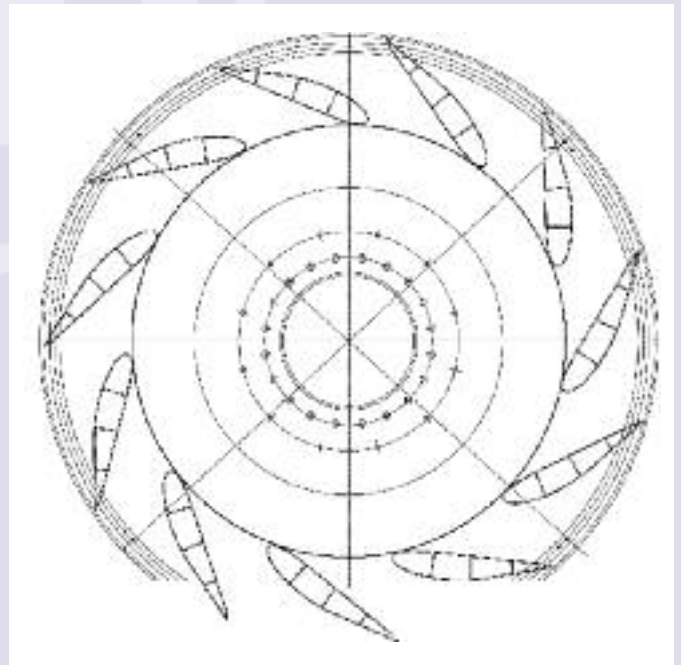
forward curved blades

inlet angle: 40°
outlet angle: 90°
application: wet dust



Curved backward inclined blade profile for dust application which optimizes efficiency and minimizes build up. Most of the dust passes through the impeller without getting trapped and without creating major build up.

inlet angle: 45°
outlet angle: 45°
application: For Kiln I.D. Fans and Raw Mill Fans



Impeller with airfoiled blades for Baghouse Fans

Volume flow up to 400 m^3/s
Pressure increase up to 5000 Pa
Shaft power up to 1500 kW

Wear protection (welded)

Especially for the Raw Mill Fans blades are used with a hard surfacing made by machine welding.



An impeller experiences two different modes of wear. At the entry to the impeller, the dust particles will impinge the blades and backplate at 90° to their surface. This wear is known as erosion. As the dust laden air progresses through the blade "channel", the dust slides over the blade and backplate surfaces. This is known as abrasion. The wear protection has to address both methods of wear. After extensive trials with different methods and materials, TLT-Turbo has concluded that compound plates offer the best protection for fan impellers against wear.

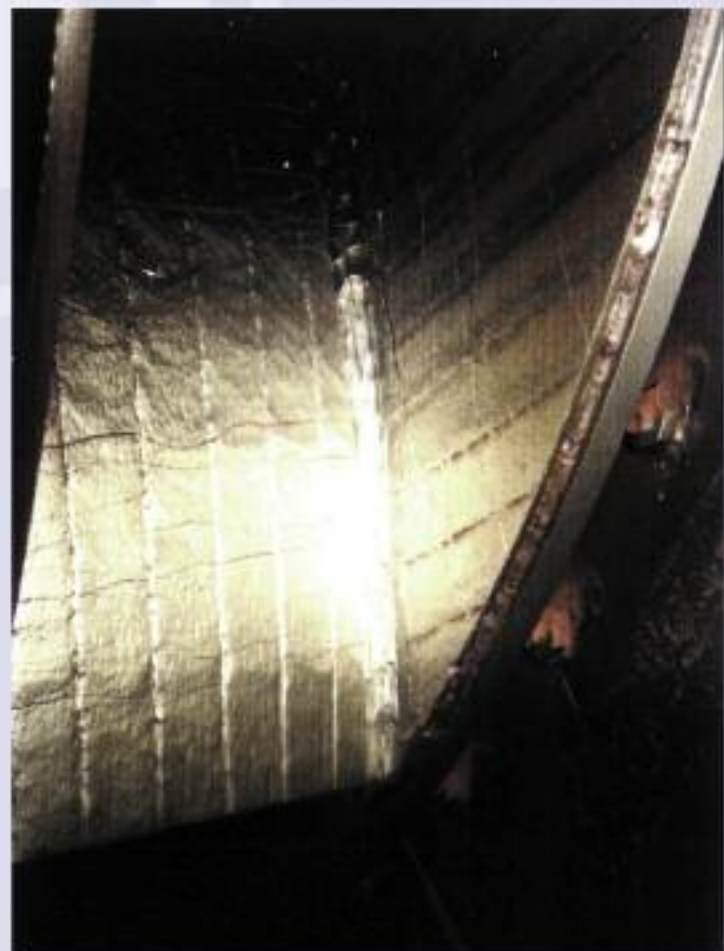
In a compound plate, a "hard-surface" is welded on to

a base plate. TLT-Turbo uses an automatic welding process with an electrode to deposit the "hard surface" on the base plate. This deposition method results in little mixing of the base plate material and the "hard surface" material resulting in the "hard surface" having a high hardness (~ 62 – 63 HRC).

Other advantages of the automatic deposition method are that the "hard surface" has a smoother surface and is more homogenous than the hand laid "hard surface". This results in less turbulence on the blades which, in turn, minimizes abrasion.



Hard surfacing of the blades...



... and the center disk

Wear- out (Exchanged

If required some impellers are delivered with an exchangeable hard surfacing.



able)



References worldwide



We have delivered about 750 fans for the Cement Industry all over the world.

some examples:

Type of Fan	Location	Volume Flow (m ³ /s)	Temperature (°C)	Total pressure (Pa)	Fan speed (rpm)	Shaft power (kW)	Impeller diameter (mm)
Kiln I.D. Fan	United Arab Emirates	180.0	290	13650	990	3210	3700
Kiln I.D. Fan	Great Britain	250.0	350	10651	990	3033	3206
Kiln I.D. Fan	Iran	267.0	340	8505	990	2821	3630
Raw Mill Fan	Turkey	344.4	91	11839	990	4641	3360
Raw Mill Fan	Iran	263.9	90	9658	990	3145	3132
Raw Mill Fan	Turkey	243.1	95	10777	990	3055	3310
Compound Fan	Germany	227.8	90	9876	990	2468	2956
Compound Fan	Mexico	350.0	240	3369	768	1342	2936
Clean Gas Fan	Turkey	231.8	95	2658	740	2360	2324
Mill Fan	Thailand	145.8	90	9878	980	1574	3300
Cement Mill Fan	Mexico	77.8	110	7295	1180	659	2442

World-wide service ...

Service safety

Even the best quality product is only as good as the service backing it up. It is an adequate customer service that makes a corporate profile absolutely complete. We offer our customers the safety of excellent product quality within the framework of a comprehensive and individual service package.

Efficiency as from hour 1

You have to be able to use your fans and plants in an ideal way right from the beginning – technically as well as economically. With this aim in mind, our service team assists you both in word and deed, from installation and commissioning up to staff training and maintenance.

Installation and commissioning

Our specialists mount your fans, commission up the plant and train your staff members in correct handling in everyday use.

Plant optimisation

We can further improve the economic performance of your plant by targeted modifications and future-orientated upgrades. Wear, for example, can be minimised and the service life is increased.



24-hour service

If any faults occur, the services of our specialist staff are initiated within twenty-four hours. These staff members ensure fast diagnosis and implementation of solutions. Any spare and wearing parts required are manufactured, delivered and installed as fast as possible.

World-wide service team

Whether in power plants; in the chemicals, cement or mining industry; in tunnel ventilation or in wind tunnels: Our qualified service team has considerable experience in international missions and is available to you all over the world, if necessary.

*Michael Reppermund,
Service Manager*



The responsibility for technical support of centrifugal and axial fans embodying the BSH, Babcock, Schilde, Turbon and Büttner systems rests with TLT's service department at Bad Hersfeld and Oberhausen.

Even the best fan can only be as good as the service supporting it, and no service portfolio can be complete without adequate technical support. Our customers benefit from an extensive and individual service package designed to preserve the outstanding quality of our products.

We realize that maximum performance and availability are the first and foremost objective of fan users and equipment operators.

Our service staff addresses this requirement by providing effective assistance in word and deed - from the installation and commissioning phase through to operator training and maintenance. So why not let our experts install your fans, handle the commissioning process, and instruct your staff in the system's day-to-day operation.

Contacts:

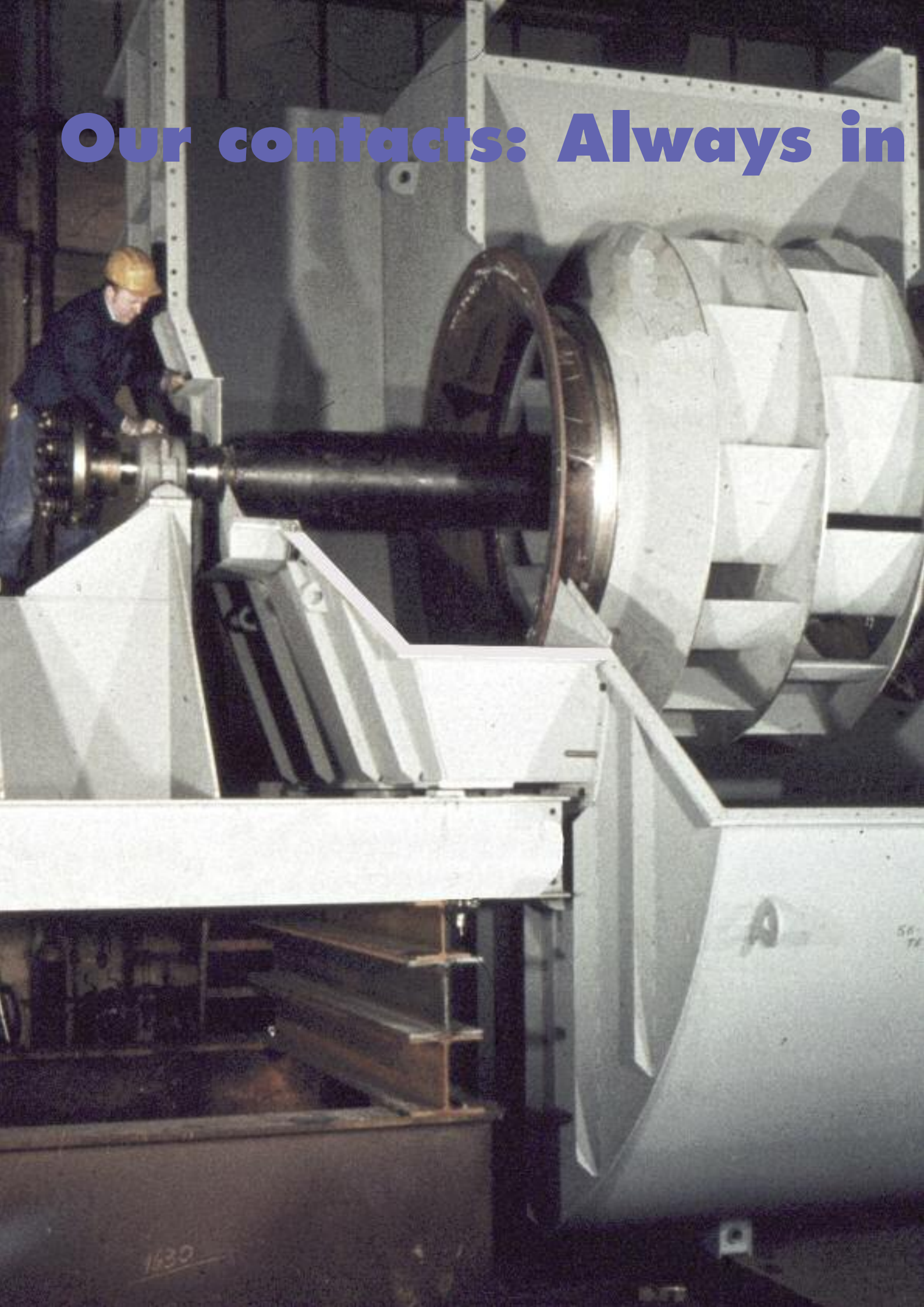
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