



Technology that **makes its mark**

► Our technology. Your success.

Pumps • Valves • Service





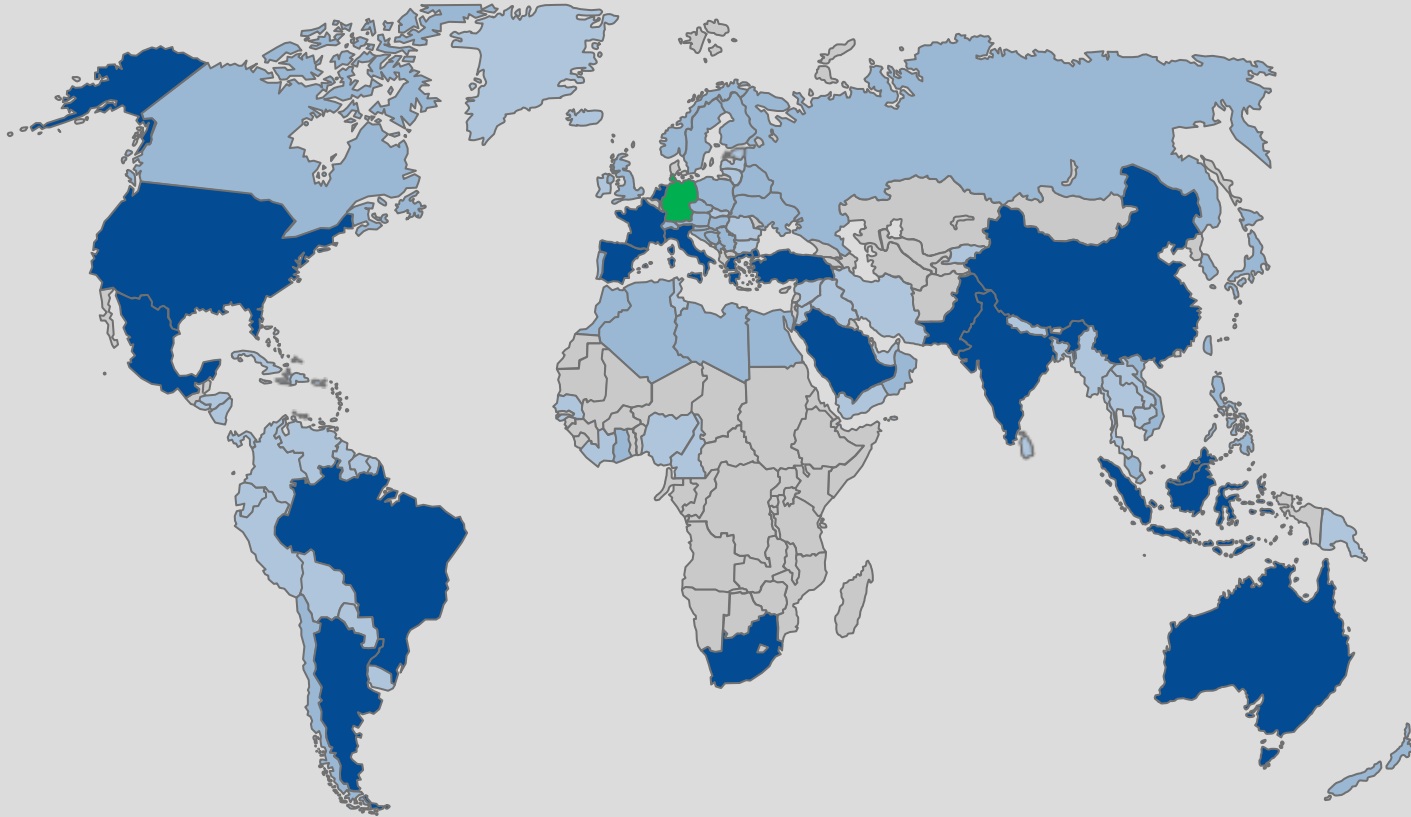
KSB Pumps for Flue Gas Desulphurization

Absorber Recirculation Pumps

EEC Seminar, 22nd April 2016, New Delhi

Elmar Lindner, KSB AG Germany, Director Sales Process Pumps



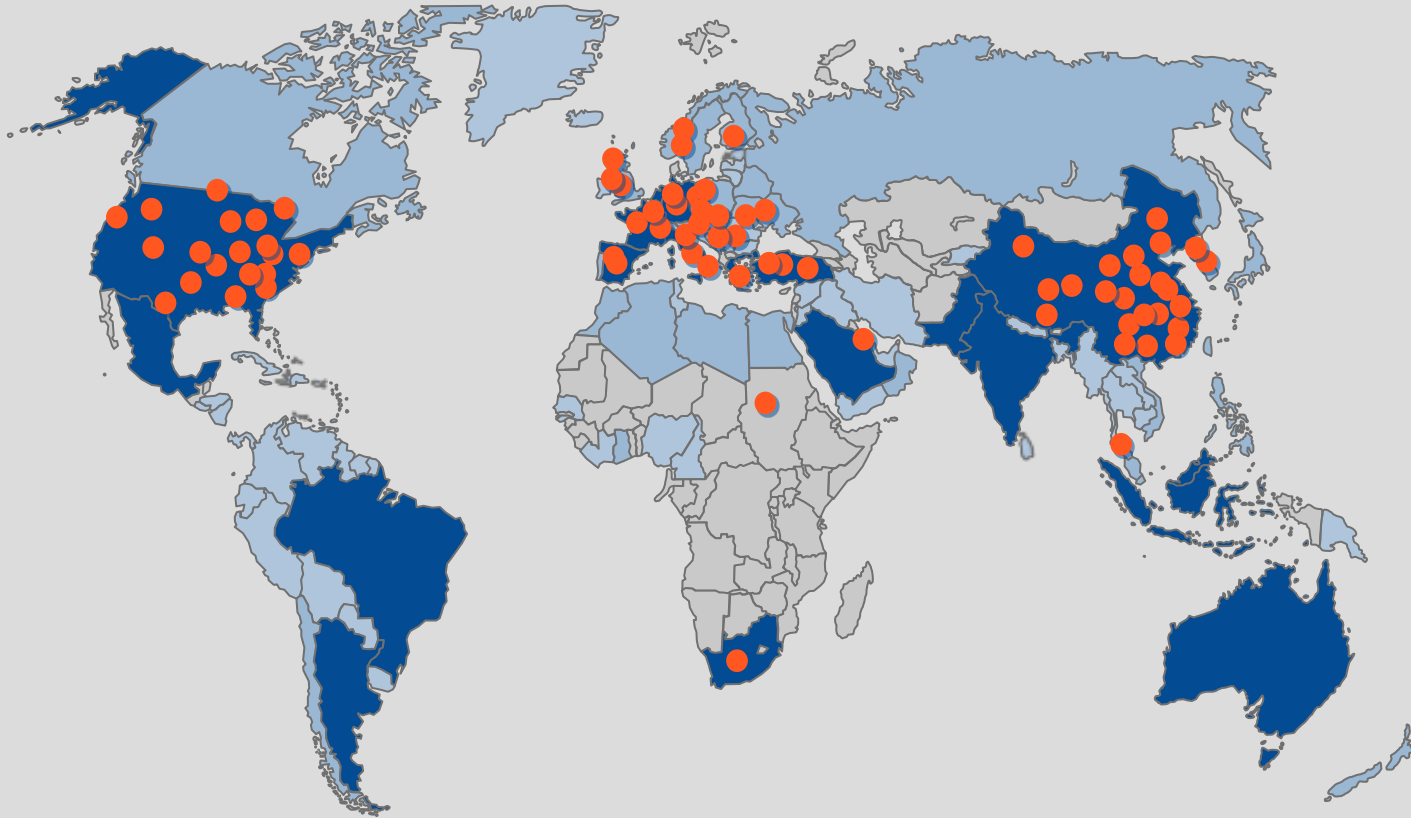


→ **KSB is a real global player**

KSB Pumps for FGD

1. Introduction of KSB

- KSB is a leading manufacturer of pumps, valves and related systems
- Established in the year 1871 in Frankenthal, GERMANY
- Sales revenue of EUR 2.4 billion/year
- More than 30 manufacturing facilities & 150 service centres worldwide
- Own factory in India since more than 50 years



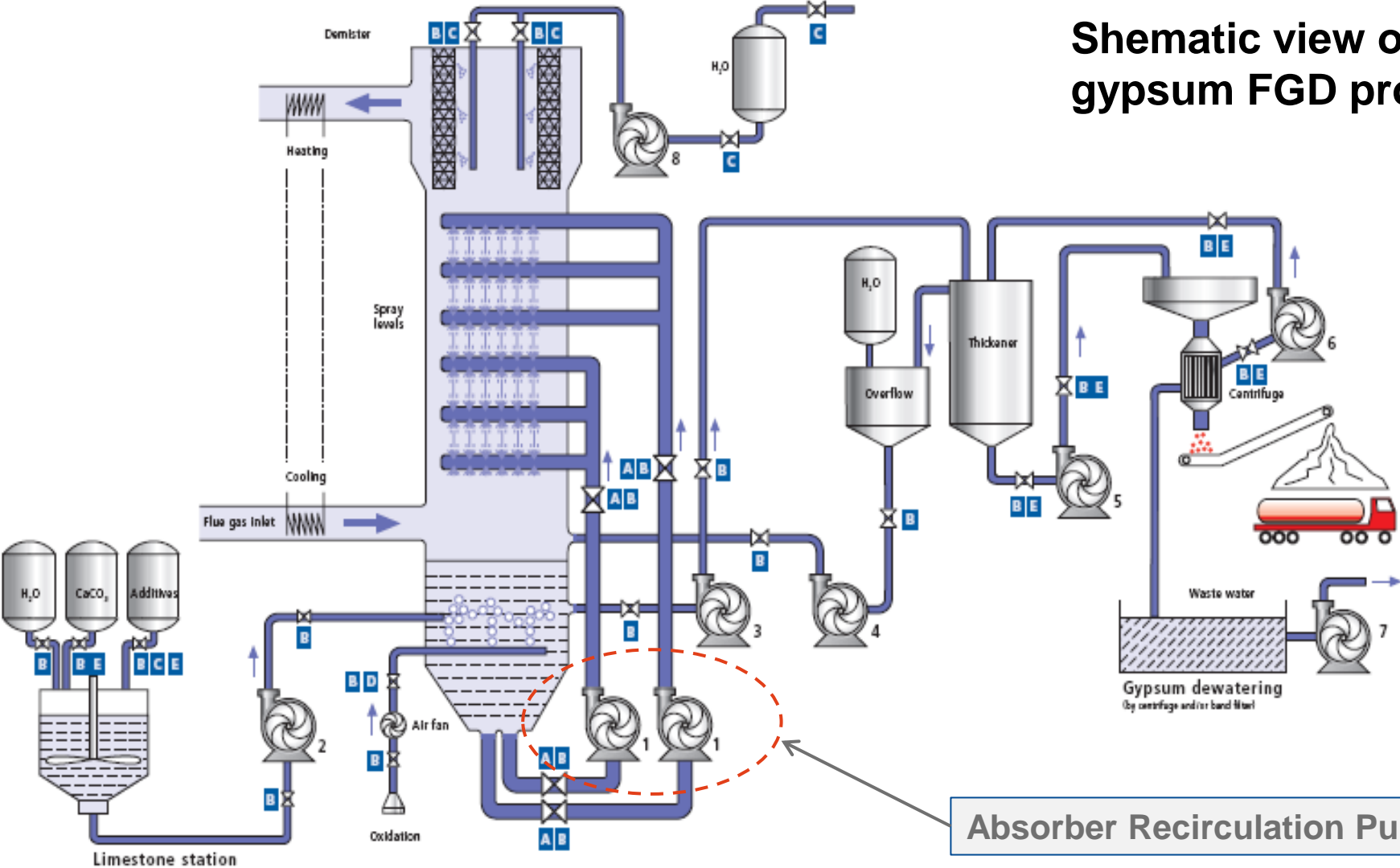
KSB Pumps for FGD

2. KSB know-how

- Supplier for FGD applications since 1977
- KSB has delivered equipment for >225 FGD plants worldwide
 - nearly 1500 absorber recirculation pumps
 - > 3000 process pumps for auxiliary circuits
 - >> 1000 valves

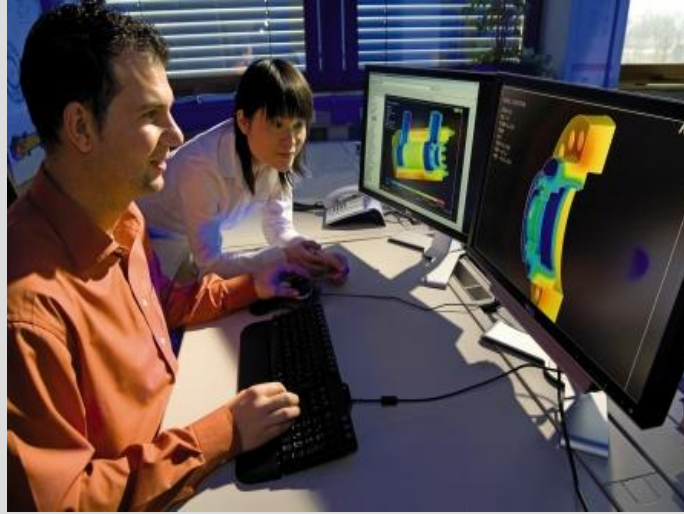
→ KSB provides you 40 years of experience & know-how in FGD business

Schematic view of a limestone gypsum FGD process



Absorber Recirculation Pumps





KSB Pumps for FGD

2. KSB know-how

- R&D for special FGD materials in own laboratory
- Flow simulation & FEM analysis
- Cavitation, Wear tests
- Specialised foundry for FGD materials

➔ Hydraulic system and materials FGD-optimised



KSB Pumps for FGD

2. KSB know-how

- **High efficiency** of the hydraulic system plays an important role for KSB pumps, therefore
 - we use high quality materials
 - we use optimised hydraulics
 - we adjust the required TDH by trimming the impeller
- Test bed for hydraulic tests up to 18,500 m³/h to ensure our **KSB quality**

→ High efficiencies
up to 93%*

Example:

KSB Pump Type:	KWPK 900-900-1133
Capacity:	15,500 m ³ /h
TDH:	25 m
Efficiency:	91%
Power demand:	~ 1,000kW

Compared to a similar pump with 88% efficiency only:

Energy costs:	0.05 USD/kWh
Operating hours:	7,000 h/year
Calculated period:	8 years
Saving of energy costs:	> 100,000 USD (per pump)

KSB Pumps for FGD

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KSB Pumps for FGD

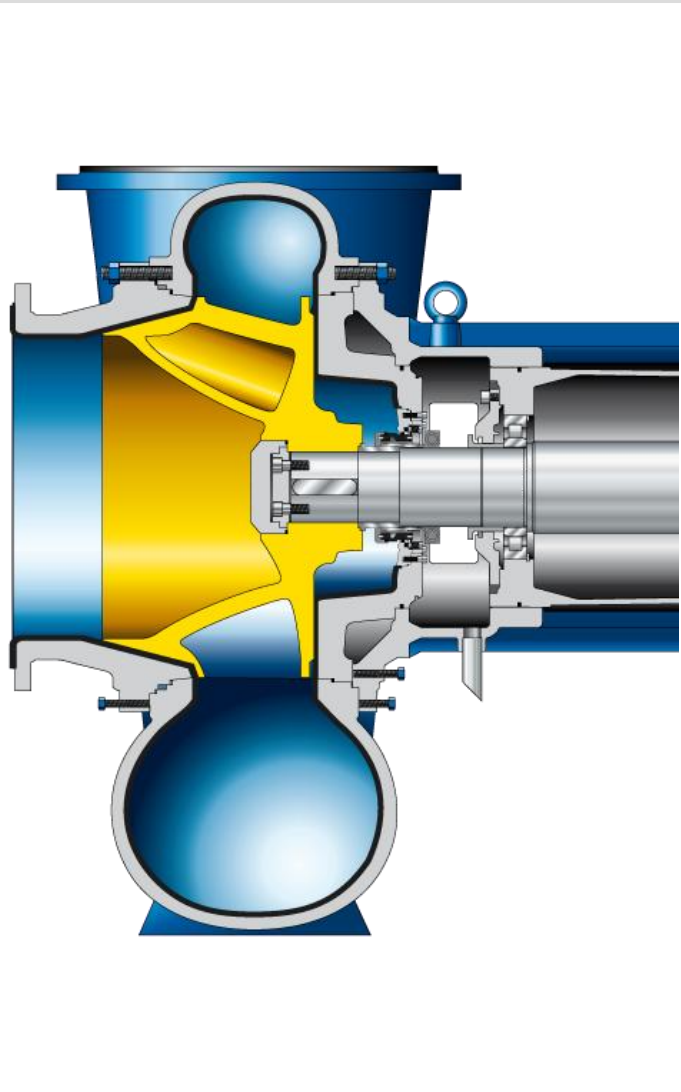
2. KSB know-how

KWPK 900-900-1133

DN	in mm	900
Q	in m ³ /h	15,500
H	in m	25
η	in %	91

(applies to clean water to ISO 9906 Cl.1)

- Picture shows a complete aggregate, consisting of:
Pump, Coupling, GearBox, Coupling, Electr.Motor



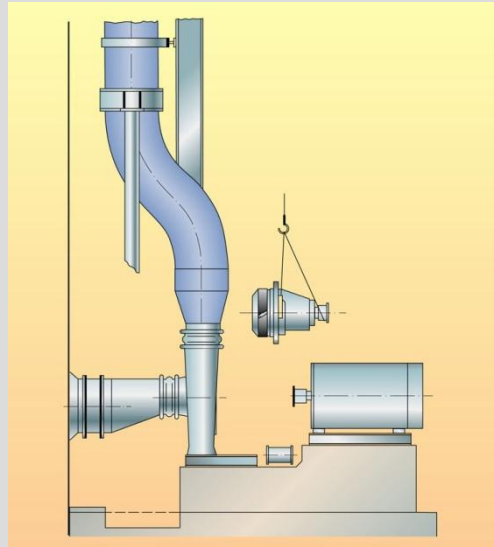
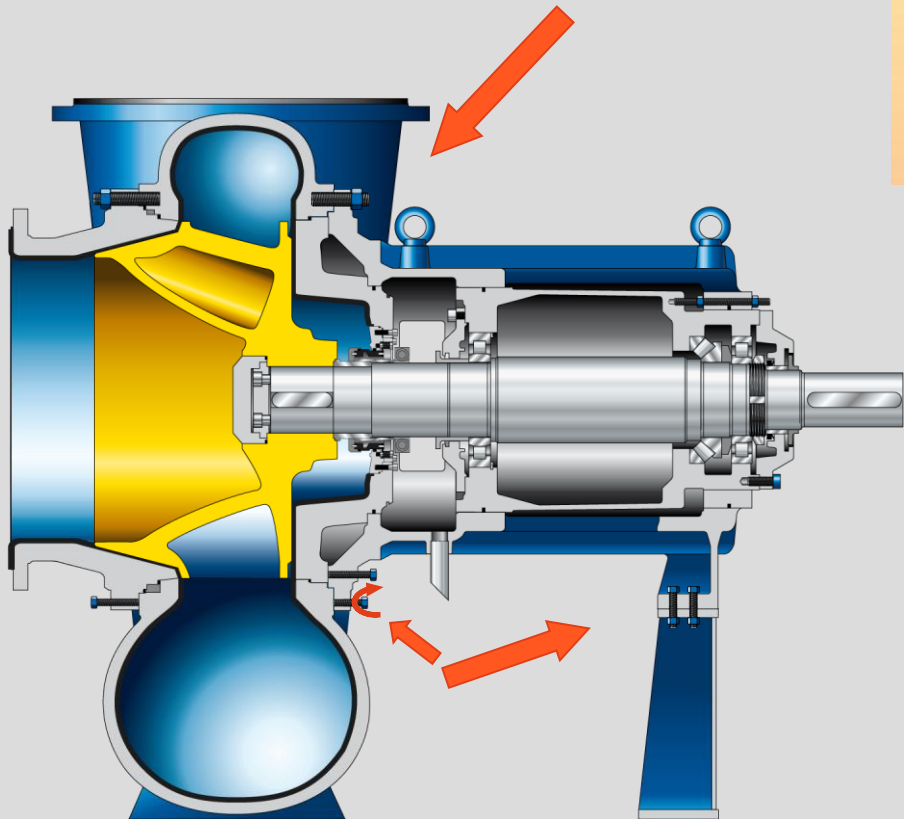
KSB Pumps for FGD

3. Design

- **Casing Material:**
Nodular Cast Iron + Ceramic liner (**CPS**®)
 - CPS ensures extremely wear & corrosion resistance!
 - One-piece volute casing up to 10bar (no splitted design)
- **Impeller Material:**
Noridur DAS (Duplex) or CPS (Ceramic)
→ KSB makes the optimum selection for YOU
- **Adjustable Bearing Bracket** for long service life and constantly high efficiency
- **Compact design**; perfect for retrofits

→ **Extremely long service life**

*CPS: Ceramic Poly SiC®

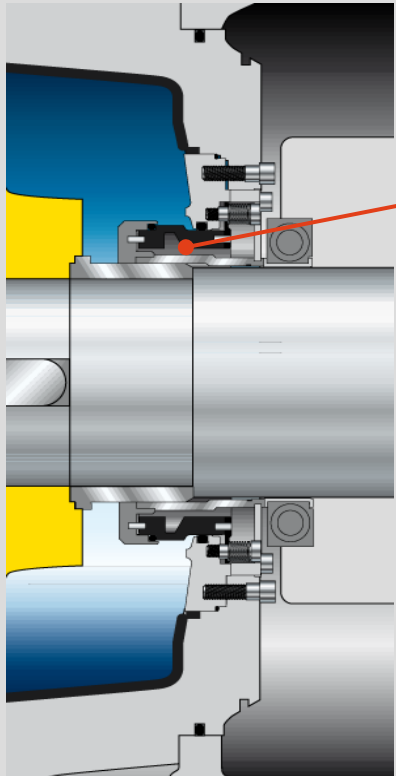
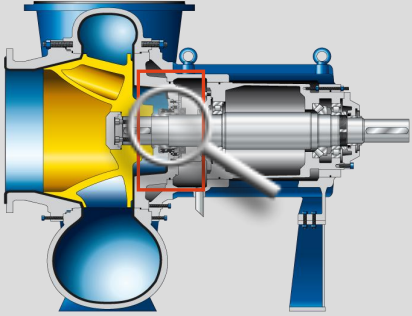


KSB Pumps for FGD

3. Design

- Due to “back-pull-out” design, in case of maintenance it’s not necessary to disassemble:
 - Casing
 - Motor
 - Gear box (if any)

→ Easy and fast maintenance



shaft seal

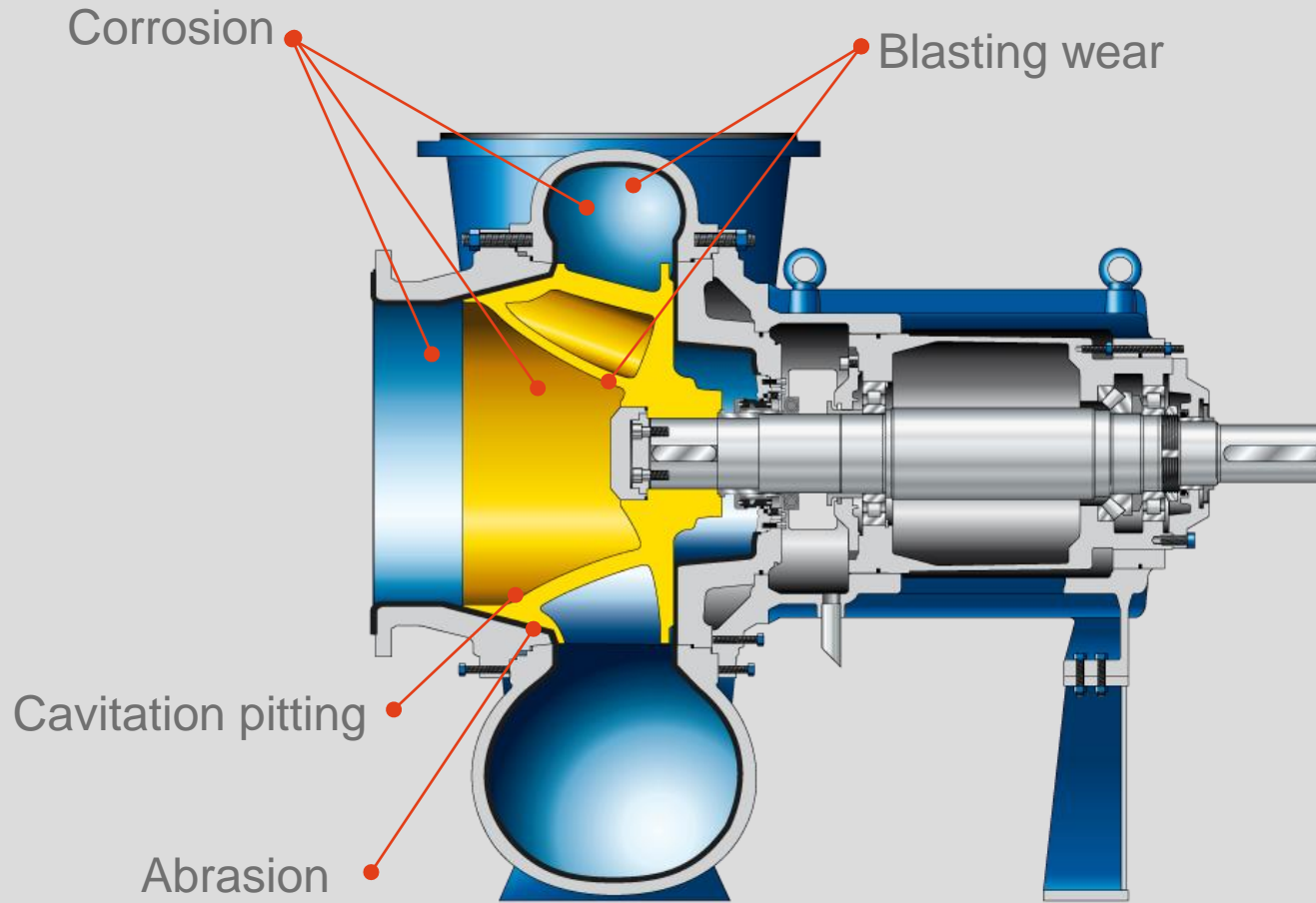
KSB Pumps for FGD

3. Design - Mechanical seal – KSB type 4K

- KSB seal optimised for FGD
- Balanced & robust design
- Stationary design
 - no clogging of springs
 - no wear on shaft sleeve
- Atmospheric side flushing as option



➔ Reliable design / Easy Service



KSB Pumps for FGD

4. Materials

FGD means **heavy duty** for the pump components, which are subject to different types of wear:

- Corrosion:
- Blasting wear:
- Cavitation pitting: Impeller
- Abrasion: suction-side sealing clearance

➔ KSB provides you a wide range of sophisticated materials



KSB Pumps for FGD

5. Reference projects

Reference project in South Africa!

KSB supplies absorbent recirculation pumps for one of the largest coal-fired power station in the world.

Kusile:

6 x 800 MW units

24 PcsKWPK 900 - 900 -1138

Impeller material: CPS

Flow rate: $Q = 12,800 \text{ m}^3/\text{h}$

Head: $H = 18.1 - 24.1 \text{ m}$

Efficiency: **$\eta = 91.3 \%$**

(applies to clean water to ISO 9906 Cl.1)

FGD plants are of importance for people,
animals and plants alike.
We are committed to environmental protection.
What can we do for you?
Our specialists and laboratories are at your
disposal.

**KSB products represent premium
solutions at excellent cost/benefit
ratios!**

Follow us at www.ksb.com



| IEEC Seminar, Delhi | Elmar Lindner |
22nd April 2016 |





Thank you very much for your attention!

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