

**ZIMMERMANN & JANSEN**



## **Innovative Unheading and Isolation Valves for Coker Unit Application**

**Latest Unheading Technology**

**Coking.com  
Safety Seminar**

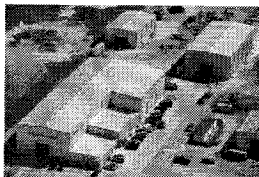
**ZIMMERMANN & JANSEN**



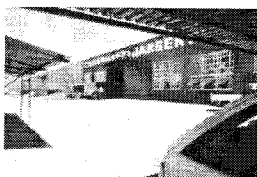
### **Company Profile**



**Z&J Technologies GmbH**  
Bahnstrasse 52  
D-52355 Dueren  
Germany  
Tel.: (+49) 2421 691-0 ext. 204  
Fax: (+49) 2421 691-200  
E-mail: postoffice@zjtechnologies.de



**Zimmermann & Jansen Inc.**  
620 N. Houston Avenue  
Humble, Texas 77347-3365  
USA  
Tel.: (+1) 281 44 68 000  
Fax: (+1) 281 44 68 126  
E-mail: zj.central@zjinc.com



**Zimmermann & Jansen, S.A. Ltd.**  
11, Michelin Street, P.O. Box 1335  
Vanderbijlpark 1900, South Africa  
Tel.: (+27) 16 986 - 0159  
Fax: (+27) 16 986 - 0510  
E-mail: zandj@zandj.co.za

**Z&J High Temperature Equipment  
(Shanghai) Co., Ltd.**  
No. 1928, Humin Road,  
Zhuanquiao Town, Minhang District,  
Shanghai, PR China  
Tel.: (+86) 21 649 7780 ext. 8018  
Fax: (+86) 21 6490 7822  
E-mail: D.Ye@zjtechnologies.cn

**Asvotec Termoindustrial Ltda.**  
Manufacturing Plant  
Rod. Cónego Cyriaco Scaranello Pires, km 1  
13190-000- Monte Mor  
(nearby Campinas)-Sp/Brazil  
Tel: (+55) 19 3879 - 8777  
Fax: (+55) 19 3879 - 2179 / 3879-8714  
E-Mail: vendas@asvotec.com.br

# ZIMMERMANN & JANSEN



RACO

## Leader in Valve Technology

for Chemical / Petrochemical, Glass and Steel Industries

- speciality engineering and manufacturing
- critical/severe service conditions
- large diameter designs
- high temperature service conditions



## Company Profile

- 125 years of experience in specific valve applications
- in house design & engineering facilities
- fully integrated and certified fabrication facilities
- certified quality management system
- extensive testing facilities
- field and shop service capabilities

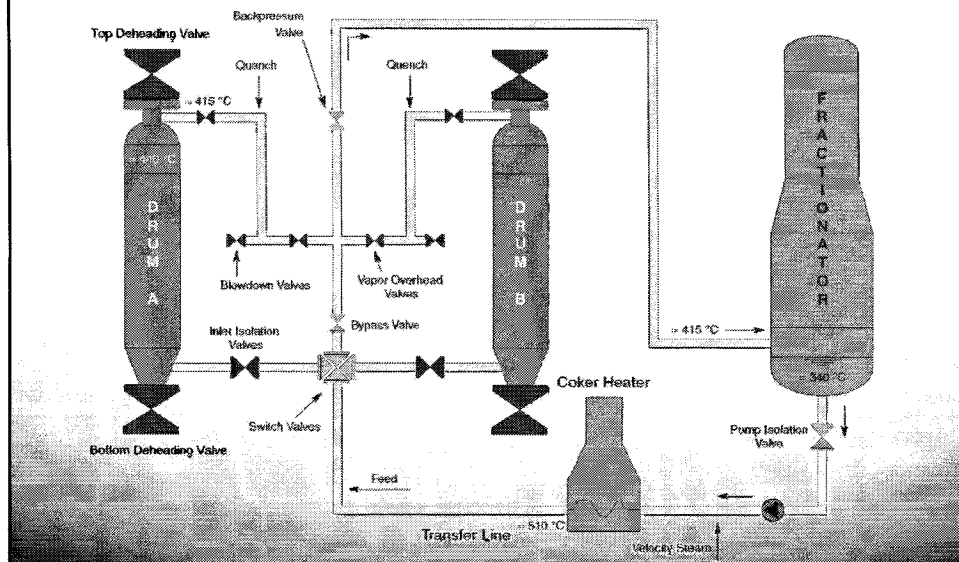


# ZIMMERMANN & JANSEN



RACO

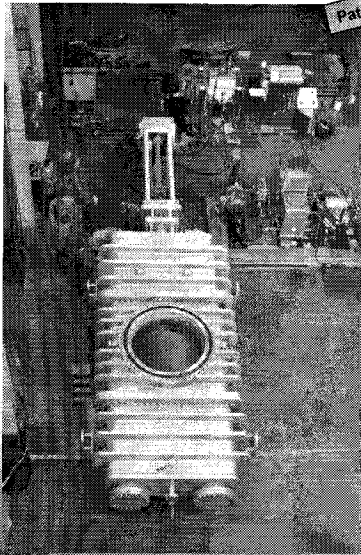
## Coker Application



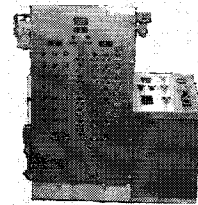
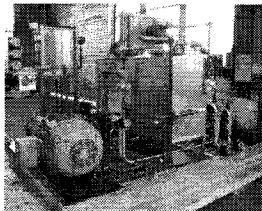
**ZIMMERMANN & JANSEN**



**RACO**



### **Z&J Double Disc Automatic Bottom Unheading Valve System**



**ZIMMERMANN & JANSEN**

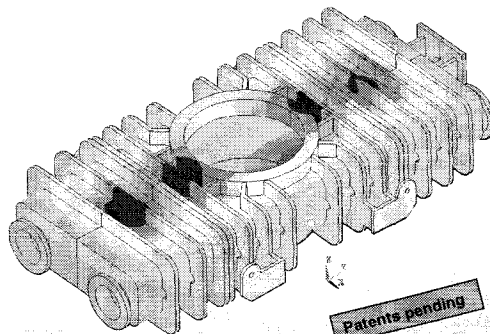


**RACO**

## **Design Philosophy**

Z&J utilizes the latest and most advanced design and engineering methods available on the market today.

- **FEA / FEM**
  - stress
  - deflection
  - temperature
- **flow analysis**
- **fatigue analysis**
- **various types of conventional calculations**

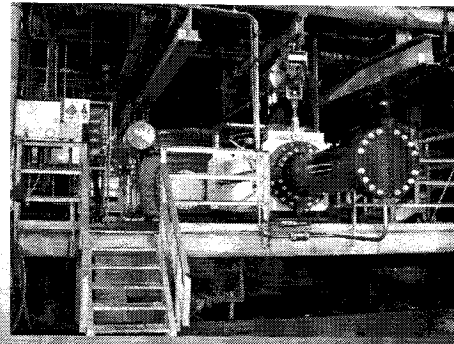
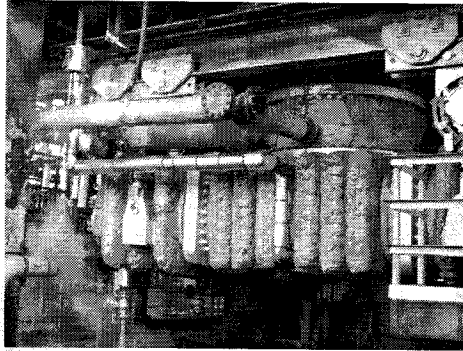


# ZIMMERMANN & JANSEN



RACO

## Bottom Unheading Valve Installation



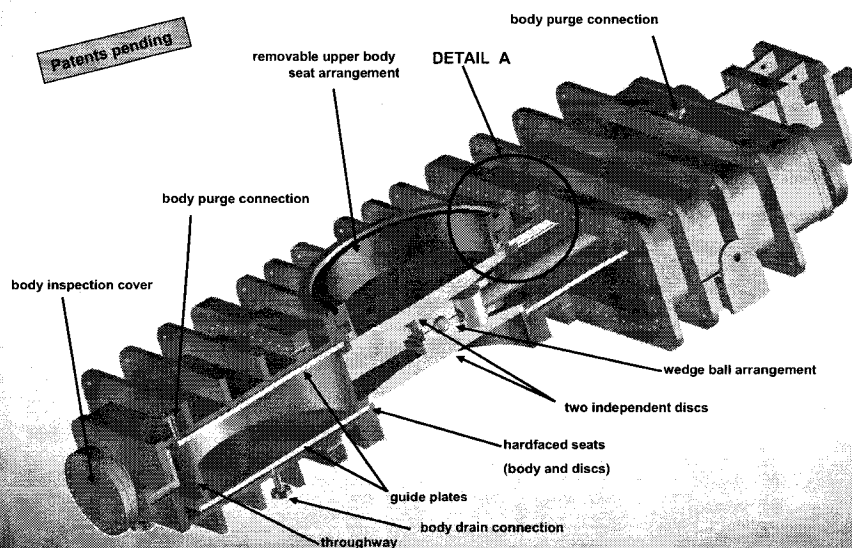
Patents pending

# ZIMMERMANN & JANSEN



RACO

Patents pending



# ZIMMERMANN & JANSEN



RACO

## Removable Upper Body Seat Arrangement

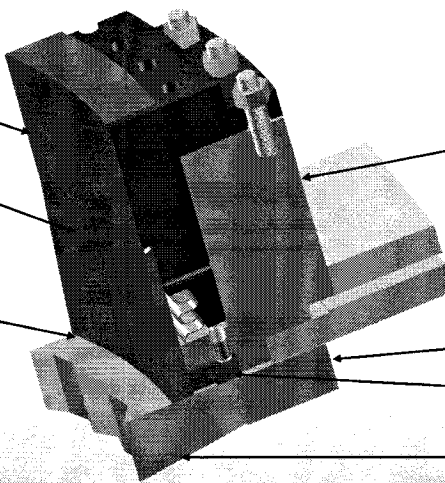
### DETAIL A

removable upper  
seat assembly

surface overlaid

scraper edge

Patents pending



upper body stub

upper guide plate

disc cage

upper body seat

upper disc

# ZIMMERMANN & JANSEN



RACO

Patents pending

support beam

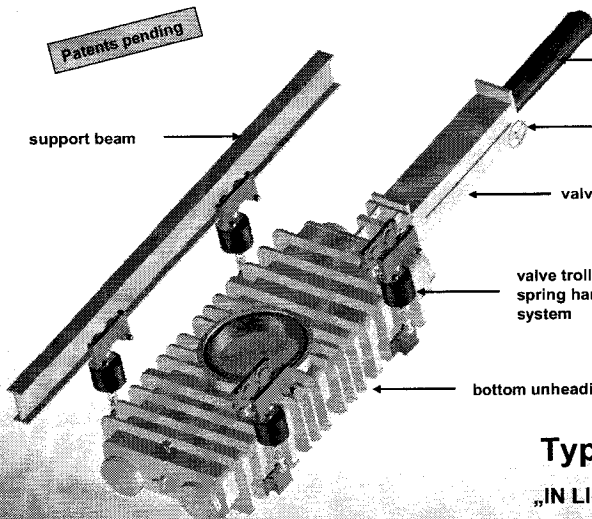
hydraulic actuator

emergency drive

valve positioner

valve trolley and  
spring hanger  
system

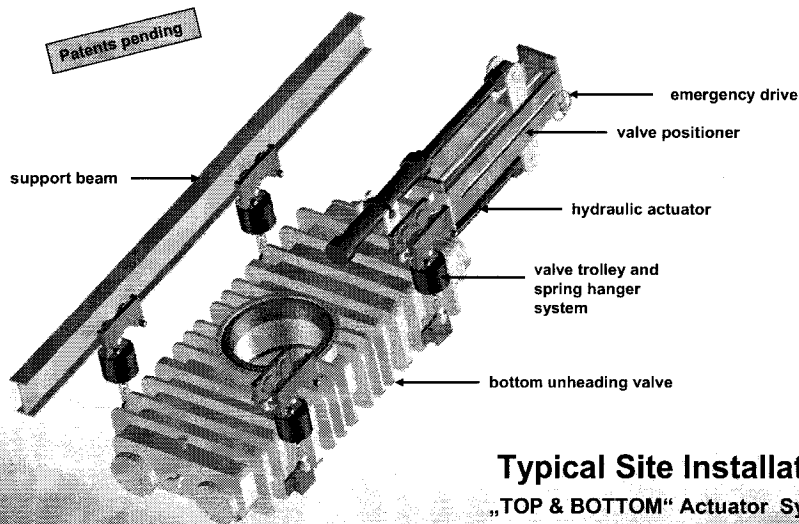
bottom unheading valve



## Typical Site Installation

„IN LINE“ Actuator System

# ZIMMERMANN & JANSEN



## Typical Site Installation

„TOP & BOTTOM“ Actuator System

„SIDE by SIDE“ Actuator System

# ZIMMERMANN & JANSEN



## Z&J Double Disc Bottom Unheading Valve

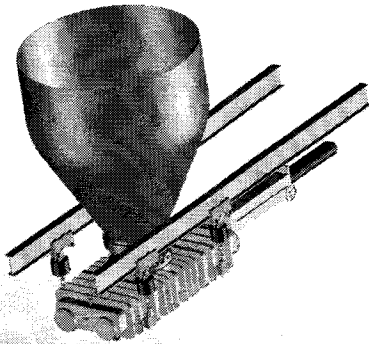
- Valve capable for modulating service.
- Real double block and purge performance within one valve body due to two independent discs.
- Independent valve discs for top and bottom sealing (double disc design).
- Active mechanical seating force due to central wedge-ball arrangement.
- Elimination of thermal warping due to circular shaped discs.
- Fixed and rigid scraper with additional spring loaded seat arrangement.
- Corrosion and wear resistant hardfacing overlay on the seat; No adjustment and replacement required.
- No deposits of solid particles in valve body due to valve gate carrier guided between guide plates.
- The sealing surfaces are completely covered in each gate end position. Depositing within the valve and on the seats is avoided.
- Easy maintenance accessibility of top seat arrangement and top disc.
- Permanently attached emergency actuator device.
- Availability of dual cylinder assembly to shorten overall length .
- No cooling box required for stem cooling.
- Gaskets and stuffing box packing fulfilling all low emission specifications.
- Extremely low steam consumption with no steam escaping to the atmosphere during coke drum filling.

ZIMMERMANN & JANSEN

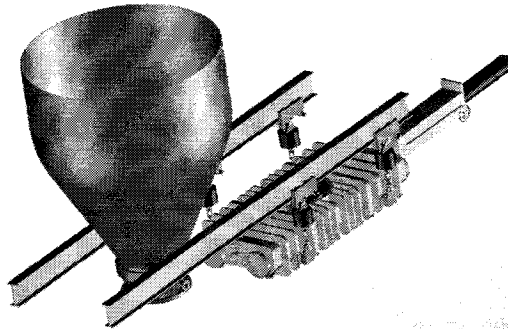


RACO

Valve in operating position



Valve in maintenance position



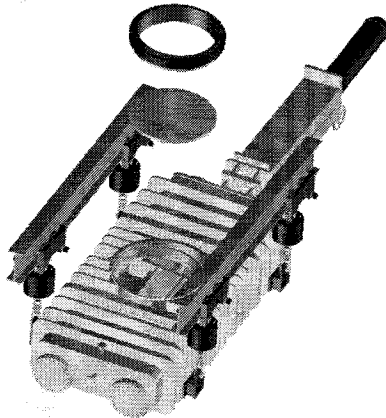
Patents pending

ZIMMERMANN & JANSEN



RACO

Valve in Maintenance Position



Upper Body Seat Arrangement

Upper Disc

Patents pending

### 60" Z&J Coker Bottom Valve Operational Summary

- Service in Torrance refinery: Jan. 27, 2006 to the present
- Completed > 130 complete coking cycles as of Nov. 1, 2006 (full pressurization; temperature; coking; decoking)
  - Coker operation intermittent due to other refinery process unit outages not related to coker or Z&J valve
  - Many additional valve openings & closings resulting from coke throttling, operator training, and valve testing
- Valve is process fluid/resid-leak free; relatively high pressure operation– 65 psig at oil in; ~ 100 psig at coke drum bottom by end of cycle
- Smooth opening/closing/throttling and reversing action (conservative design)
  - Full speed open time ~ 120 seconds
- Successfully throttles coke + water mixtures (key design criterion)
- Does not utilize steam in valve body during valve opening
  - No problem with excessive fines build-up in valve body

**ExxonMobil**  
Research and Engineering

### 60" Z&J Coker Bottom Valve Operational Summary, cont'd

- No indication of valve degradation
  - E.g., no trend in rising actuator force, steam consumption, etc.
- No problems when valve body was inadvertently/erroneously not steam-pressurized on two occasions
  - No external resid leakage
  - Small amount of resid inside valve was easily removed through the condensate drain
- Back-up actuator (air motor) acceptable
- Operators like valve
- To date, valve meets specified design criteria
- Additional coker bottom valves will be worked through capital project system

**ExxonMobil**  
Research and Engineering

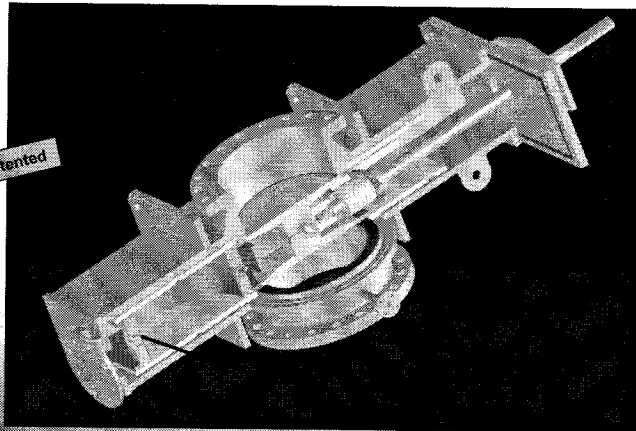


**ZIMMERMANN & JANSEN**



**RACO**

**Coke Drum Valves for Top Unheading,  
Inlet Isolation, Overhead, and Blowdown**



**ZIMMERMANN & JANSEN**



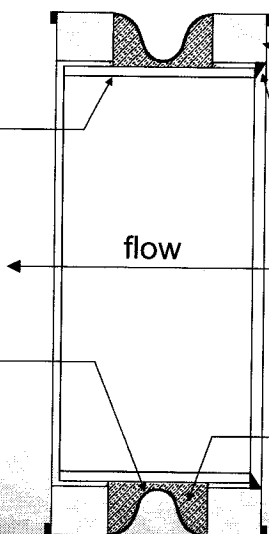
**RACO**

## Expansion Bellows

**Inner Sleeve Pipe**  
- guiding  
- bellow protection

Patented

**Expansion Bellow**  
- single wave  
- stainless steel



**Seat Rings**  
- floating  
- overlay - hardfacing

**Seal Weld**  
- located on one side only  
- valve is unidirectional flow

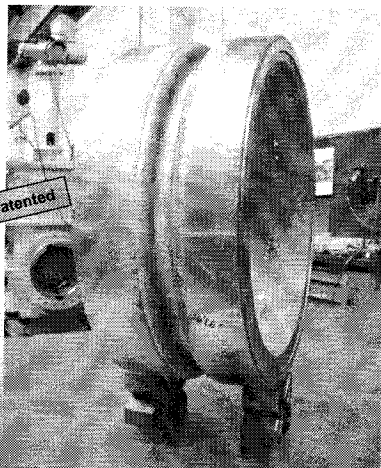
**Bellow Void Area**  
- packed w/Kaowool blanket

**ZIMMERMANN & JANSEN**



**RACÖ**

## **Expansion Bellows**

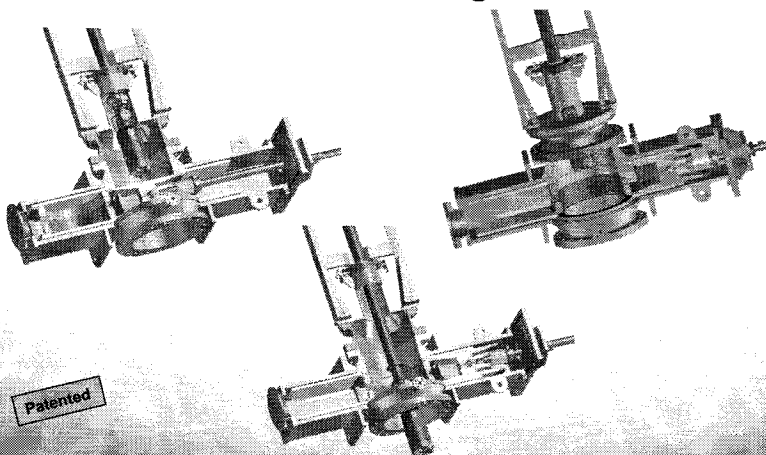


**ZIMMERMANN & JANSEN**



**RACÖ**

## **Top Unheading Valve Installation With RuhRPumpen Cutting Tool**



ZIMMERMANN & JANSEN



RACO

## Top Unheading Valve Installation

