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**DESTEC**  
REGENERATOR & REACTOR VESSEL HEAD REMOVAL  
DRY CUTTING, MACHINED FROM THE OUTSIDE



**CUTTING  
OPERATION  
TAKES ONLY  
24HRS**



**SIZE RANGES FROM 2 METRE DIAMETER THROUGH TO 20 METRES AND BEYOND**

**AVAILABLE WORLDWIDE...**

REGENERATOR & REACTOR VESSEL HEAD REMOVAL / REPLACEMENT FROM THE INDUSTRY LEADER



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**Making The Right Connection**

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# DESTEC REGENERATOR / REACTOR VESSEL HEAD REMOVAL (DISTILLATION COLUMNS & OVERHEAD LINES)

## FCCU (Fluid Catalytic Cracking Unit)

A Fluid Catalytic Cracking Unit has been an integral part of oil refineries since 1942, when it was introduced in the U.S.A. An FCCU accepts chains of hydrocarbons and breaks them into smaller ones in a chemical process called cracking. This allows refineries to utilize their crude oil resources more efficiently, making more products such as Petrol for which there is a high demand.

A continuous FCCU has a primary reactor, a distillation column for separating out the cracked hydrocarbons, and regeneration unit for cleaning the catalysts and preparing them for reuse.

## The Task

**Regenerator & Vessel Head turnarounds are the most critical of operations in the refinery life cycle and numerous factors need to be carefully considered during project planning, such as:**

- Site safety
- Scope of work
- Cutting methods to be employed and machine tools required
- Established capabilities of contracting team
- Mobility of contracting team
- Quality assurance provided by contractor
- Estimated turnaround time
- Predicted weather conditions
- Possible disruption to other processes
- Logistics
- Costs

Bringing all these factors satisfactorily together for a smooth, speedy and 'event-free' turnaround, particularly in remote or inhospitable areas of the world, can be a major concern for refinery operators.

## The Solution

**Dry Cutting Operations by Oil & Gas solutions provider, Destec Engineering, offer a range of advantages for the turnaround of even the largest FCCU Regenerator & Reactor Vessel Head:**

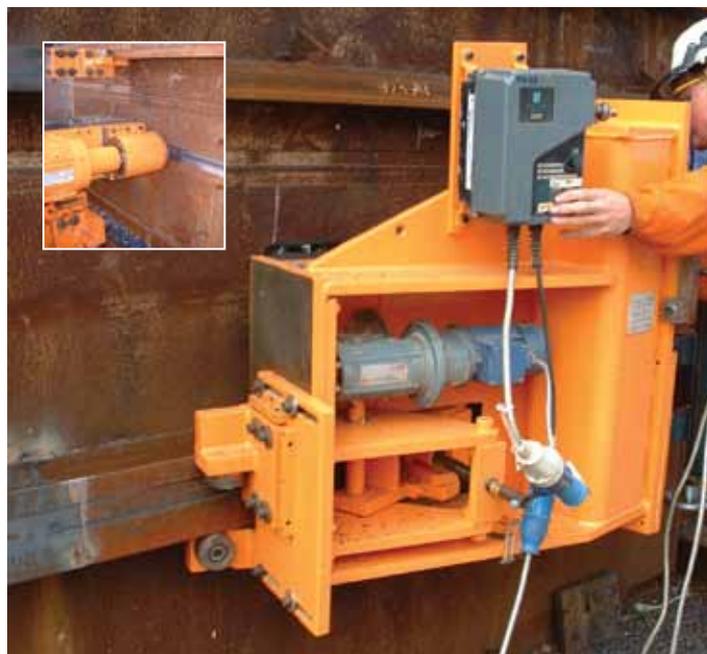
- Fast, efficient dry cutting process
- Cutting can start even before plant is shut down
- The actual cutting operation takes 24 – 36 hours
- Weld preps can be machined on one or both sides of the cut line (depending on whether the same head is to be reused)
- Cutting of Overhead lines also available by Destec
- In House designed machines attached externally to the vessel via purpose made tracks. Steel is cut using milling heads followed by diamond cutting of the refractory.
- Clean – little or no post operative cleaning (unlike waterjet cutting that can take up to 10 days to 'mop-up')
- Non-polluting and environmentally friendly
- Over 10 years' experience in Regenerator Head & Vessel removal. Largest project to date: 17m diameter with 125mm refractory wall thickness
- Highly skilled team
- Portable equipment – team has ability to work worldwide
- Total project planning and execution

## The Company

Formed in 1969, Destec Engineering Ltd is a specialist engineering company for the Oil & Gas Industry. Based in Washingborough, Lincolnshire, UK, Destec operates on a global scale; designing and manufacturing a highly-acclaimed range of Oil & Gas industry approved products and offering a comprehensive range of on-site services.

The product range includes G Range Clamp Connectors, ROV operable GSB Single Bolt Clamp Connectors, Type Approved Compact Flanges, Seal Rings and Boiler Inspection Caps.

Complementing its Regenerator & Vessel Head turnaround operations, Destec on-site services cover Machining, Special Purpose Machine Tools, On-line Leak Sealing, Bolt Tensioning, Polymer Coatings & Repair and Ultrasonic Testing.



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# DESTEC PROCEDURE



**1. Bottom rail showing secure welds**



**2. Bottom rail with top rail mounting brackets in position**



**3. Rail positions and brackets**



**4. Rail positions showing non-removable obstructions**



**5. Top and bottom rails ready for dressing**



**6. 'C' plate brackets tacked over cut line area**



**7. 'C' plate brackets fully welded and setting machine on the rail**



**8. Initial cut**



**9. Finished prep showing refractory wall**



**10. Cutting the refractory**



**11. Grinding frame**



**12. Re-gen head with 'C' plates and wedges positioned**



**13. Re-gen head with 'C' plates and wedges fitted**



**14. Prep completed. 'C' plates and alignment plates fitted**



**15. Re-gen head lift**

(Refractory lining of ceramic capable of resisting & maintaining high temperatures).

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# REGENERATOR / REACTOR VESSEL HEAD REMOVAL USER LIST

Client Site	Plant Shutdown Date	Vessel Data	Shell Cutting Method	Internal Refractory Lining	Refractory Cutting Method	General Information
<b>MOBIL</b> Coryton Refinery England, UK	February 1996	<b>Diameter: 9.4 m.</b> Wall Thickness: 26mm. Material: C.S.	Type PM6 Milling M/c.	100mm thick	Electric cutters with diamond & abrasive disc.	Head re-used. Angle prep. machined to top and bottom.
<b>BP</b> Grangemouth Refinery Scotland, UK	September 1996	<b>Diameter: 8.4 m.</b> Wall Thickness: 16mm. Material: C.S.	Purpose built V8 electric grinder Cutter. Abrasive disc.	125mm thick	Electric cutters with abrasive disc.	Head replaced with new one. Straight cut only.
<b>TOTAL</b> Lindsey Oil Refinery England, UK (Mitsui Babcock)	October 1996	<b>Diameter: 8.3 m.</b> Wall Thickness: 20mm. Material: C.S.	Type PM7 Milling M/c.	125mm thick	Electric cutters with diamond & abrasive disc.	Head re-used. Angle prep. machined to top and bottom.
<b>Netherlands Refinery Co. (NEREFCO / BP)</b> Rotterdam, Holland	March 1998	<b>Diameter: 9.4 m.</b> Wall Thickness: 22mm. Material: C.S.	Type PM7 Milling M/c.	100mm thick	Air power cutter with diamond & abrasive disc.	Head replaced with new one. Angle prep (10°) machined to bottom side only.
<b>Yambu Refinery</b> Arabian C.B.I. Saudi Arabia (ARAMCO)	April 1998	<b>Diameter: 13.6 m.</b> Wall Thickness: 26mm. Material: C.S.	Type PM8 Milling M/c.	100mm thick	Electric cutters with diamond & abrasive disc.	Head re-used. Angle prep. machined to top and bottom.
<b>TEXACO</b> Milford Haven Refinery Wales, UK (Ledwood)	September 1999	<b>Diameter: 13.3 m.</b> Wall Thickness: 28mm. Material: C.S.	Type PM8 Milling M/c.	102mm thick (Gunite)	Electric cutters with diamond & abrasive disc.	Head replaced with new one. Straight cut only.
<b>ESSO</b> Refinery Rotterdam, Holland (Stork)	October 1999	<b>Diameter: 11.5 m.</b> Wall Thickness: 19mm. Material: C.S.	Type PM8 Milling M/c.	127mm thick (3BF with S.S. needles)	Electric and air cutters with diamond and abrasive discs.	Head replaced with new one. Straight cut only.
<b>CONOCO</b> Humber Refinery England, UK (Mitsui Babcock)	April 2001	<b>Diameter: 8.1 m.</b> Wall Thickness: 20mm. Material: C.S.	Type PM8 Milling M/c.	100mm thick	Electric cutters with diamond & abrasive disc.	Head replaced with new one. Angle prep (15°) machined to bottom side only.
<b>SHELL</b> Pernis Rotterdam, Holland	April 2002	<b>Diameter: 12.75 m.</b> Wall Thickness: 25mm. Material: C.S.	Type PM8 Milling M/c.	150mm thick	Electric and air cutters with diamond and abrasive discs.	Head re-used. Preps machined 15° bottom 45° top
<b>Netherlands Refinery Co. (NEREFCO / BP)</b> Rotterdam, Holland	October 2002	<b>Diameter: 9.4 m.</b> Wall Thickness: 22mm. Material: C.S.	Type PM8 Milling M/c.	100mm thick	Electric cutters with diamond & abrasive disc.	Head re-used. Preps machined 15° bottom 45° top
<b>BP</b> Coryton Refinery England, UK	February 2005	<b>Diameter: 9.4 m.</b> Wall Thickness: 26mm. Material: C.S.	Type PM8 Milling M/c.	100mm thick	Air powered cutters with diamond & abrasive discs.	Head re-used. Angle prep machined top & bottom. Original rails re-used as basis for new type tracks.
<b>TOTAL</b> Lindsey Oil Refinery England, UK (Mitsui Babcock)	September 2005	<b>Diameter: 8.3 m.</b> Wall Thickness: 20mm. Material: C.S.	Type PM8 Milling M/c.	100mm thick	Electric powered cutters with diamond & abrasive discs.	Head replaced with new one. Angle prep (15°). Machined to bottom side only.
<b>ESSO</b> Fawley Refinery England, UK	October 2006	<b>Diameter: 17 m.</b> Wall Thickness: 22mm. Material: C.S.	Type PM8 Milling M/c.	125mm thick	Electric & Air powered cutters with diamond & abrasive discs.	Head replaced with new one. Angle prep (10°). Machined to bottom side only.
<b>STATOIL</b> Mongstad Refinery Norway (Ledwood)	September 2008	<b>Diameter: 11.65 m.</b> Wall Thickness 25mm Material: C.S.	Type PM8 Milling M/c.	100mm thick	Electric & Air powered cutters with diamond & abrasive discs.	Head replaced with new one. Angle prep (10°) Machined to bottom side only.
<b>ESSO</b> Italiana Augusta Refinery Sicily	March 2009	<b>Diameter: 6.93 m.</b> Wall Thickness: 11mm. Material: C.S.	Type PM8 Milling M/c.	102mm thick	Electric & Air powered cutters with diamond & abrasive discs.	Head re-used. Angle prep machined top & bottom. Original rails re-used as basis for new type tracks.
<b>PETROPLUS</b> Coryton Refinery England, UK (Vessels & columns only)	October 2009	<b>Diameter: 1 m - 4 m.</b> Wall Thickness: 20mm - 43mm. Material: C.S.	Type PM8 & Ring Milling M/c.	25mm Hexmesh 100mm Resco	Electric powered cutters with diamond & abrasive discs.	Variety of straight cut only and single angle weld preps machined as required.
<b>EXXON MOBIL</b> Rotterdam, Holland (ERMO GmbH)	January 2010	<b>Diameter: 11.5 m.</b> Wall Thickness: 22mm. Material: C.S.	Type PM8 Milling M/c.	127mm thick	Electric & Air powered cutters with diamond & abrasive discs.	Reactor vessel head reused. Preps machined 15° bottom 45° top.

NOTE: In most cases the overhead lines were also cut by **Destec Engineering Ltd**  
Material: C.S - Carbon Steel  
PM6/7/8 - Portable Milling Machines



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