




Energy in a liquid by accelerating it using a rotating impeller. The larger the diameter of the impeller or the higher the rotational speed of the impeller, the greater the energy imparted to the fluid.

www.jalcoat.com



Gold Applied Coatings for Pump Protection and Efficiency Enhancement

Presented by : Mr. R. Campbell
 International Technical Services Director
 Belzona Polymers Ltd
 Claro Road
 Mansfield, UK

www.belzona.com




Solutions for Centrifugal Pumps

- Rebuilding Compounds for restoring hydraulic profiles.
- Machineable compounds to restore clearances in close tolerance areas.
- Coatings to prevent corrosion and Resist the effects of erosion and chemical attack.
- Low surface tension / hydrophobic coating to increase efficiency by reducing hydraulic and friction losses.

Diagnosis

- Restore Clearances
- Protect from Erosion Corrosion
- Increase Efficiency



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Performance Deterioration

- Corrosion / Erosion
- Chemical attack
- Wear / Entrainment
- Bi-metallic corrosion
- Cavitation



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Belzona 1111 Super Metal
Used to repair pump shaft

Belzona 1117 Supermetal
Used to repair pump gland

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Belzona 1313 rebuilding Composite used to return the leading edges of Pump Diffuser Vanes

Belzona 1311 rebuilding Composite used to repair Pump Impeller

Pump Lifetime Cost

Capital Cost	1%
Maintenance Cost	4%
Energy Cost	95%

• Pumps use 25-50% energy in certain industrial plant operations.

• Typically the energy cost of a pump represents the biggest fraction of life time cost, much more than the capital cost.

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Multi-Stage Water Injection Pump
prepared by Grit Blasting

Re-blasted Splitting Flange
to prevent erosion creep

Belzona 1321 Application
1st Coat at 300microns

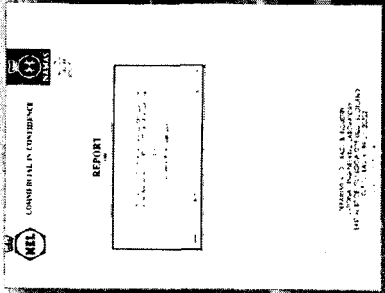
Completed application after
2nd Coat at 500 microns applied

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Due to the low surface roughness, the
 surge centrifugal pump with
 a wetting impeller and a specific
 speed of 1.06. Both impeller and
 casing were coated with Belzona
 1341 efficiency coating.

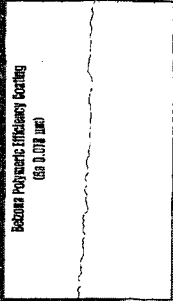
Performance tests indicated the
 overall peak efficiency increased
 from 89.4% to 93% when a power



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Surface roughness, which results in skin friction or form
 drag, reduces the efficiency of centrifugal pumps.



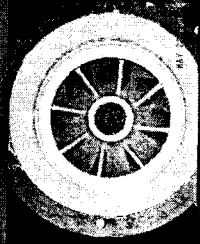
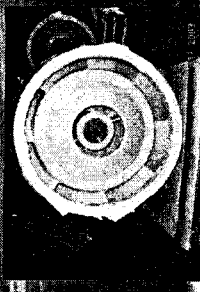
The hydrophobic low surface energy Belzona 1341 is
 considerably smoother than polished stainless steel.
 This leads to reduced frictional losses, increased flow
 rate and increased hydraulic efficiency.

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Brand New Flowserve Vertical
 Turbine Pumps

Rated 2000 horsepower,
 and 900 rpm.



The casings are 34 inch in diameter.

www.babcock.com

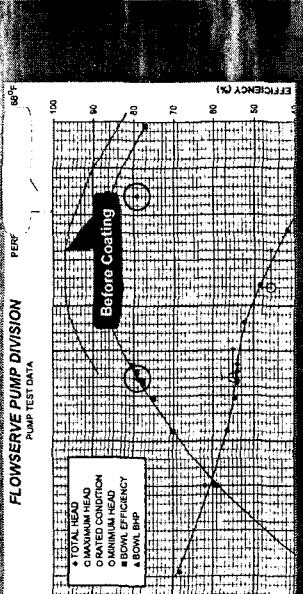


Impellers of Centrifugal Pump Efficiency Enhancement

All internal surfaces of
 bows on six pumps were
 coated with Belzona 1341
 efficiency enhancement
 coating.



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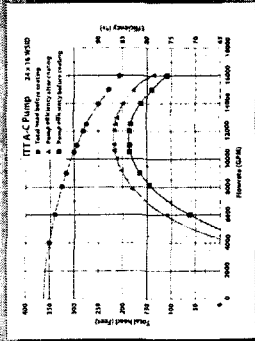
2 % efficiency gain at normal operating condition
 7 % efficiency gain at max. operating condition
 Flowserve certified the consistent effectiveness
 of Belzona on all 16 pumps.

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Belzona 1341 Efficiency enhancement coating was applied to the pump volutes only.

Three brand new ITT A-C pumps after preliminary in-house testing were found to be 1.5% below target design efficiency.

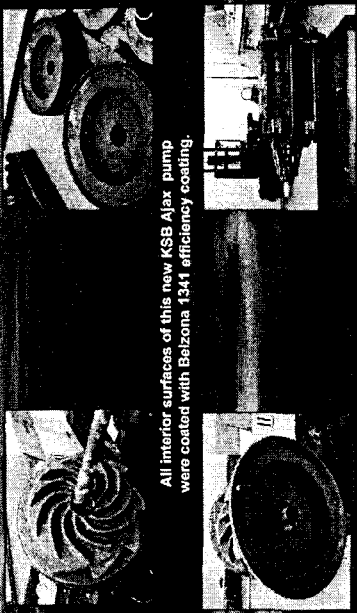
ITT A-C testing indicated an increase of 3-3.3% at best efficiency point and 3.1% at duty efficiency in each pump.



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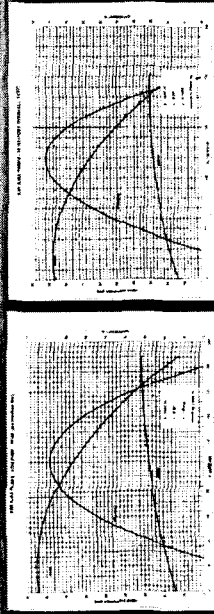


Solutions for Centrifugal Pumps - Efficiency Enhancement




All interior surfaces of this new KSB Ajax pump were coated with Belzona 1341 efficiency coating.

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The peak efficiency rose from
 Duty point efficiency rose from
 The maximum head improved and the input power was reduced.


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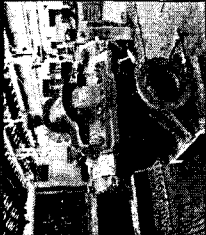
Corrosion Protection for pumps damaged by Erosion -

- User friendly, fast turn-around in-house & field application.
- Improved pump efficiency and hydraulic performance combined with reduced energy consumption.
- Short-term of return on investment from the savings on electricity due to increased efficiency.
- Maintains a high level of performance with Erosion - Corrosion protection extending equipment life-cycles.
- Suitable for potable water contact - NSF and WRG approved.

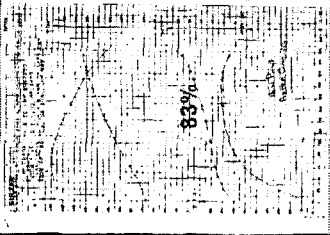
www.belzona.com




New Sizer split case pump
Treated with Belzona 1341 efficiency enhancement coating



Efficiency increased from 78.5% to 83%



www.belzona.com



BELZONA®

**Conserving the Environment
and the Worlds Energy Resources.**

www.belzona.com