MITSUBISHI HEAVY INDUSTRIES COMPRESSOR CORPORATION



Application of diffusion treatment against solid particle erosion

REASON FOR SUGGESTION:

In case of long-term continuous operation, 1st stage nozzle may experience solid particle erosion due to scales from inlet steam piping.

On the other hand, diffusion treatment technology applied to get high resistance effect against solid particle erosion.

DETAILS OF SUGGESTION:

Diffusion treatment is done by chemical vapor such as nitrogen and boron. These materials bond with base material inside the metal structure. This method is called diffusion treatment.

This feature is as follows:

- Although the diffusion layer is as thin as 0.07mm, bonding power is very strong because of single layer structure.
- 2) The influence on the steam path can be kept little because outer dimension change is negligible small.
- 3) The steam path of the nozzle can be uniformly covered by diffusion layer.
- 4) Surface hardness is 5 times hard as base material and it has excellent resistance against erosion.

Two kinds of nozzle materials are used according to the system requirement temperature. Diffusion treatment can be applied to either material.

Applied	Material	Base material	Diffusion layer	Surface hardness after
temperature		hardness Hv	thickness	Diffusion treatment Hv
<450°C	SUS410J1 (13CrMo)	202-252	0.07mm	050 1965
≧450°C	A422-1	284-320	0.07mm	950-1865
	(13CrMoWV)			

MCO Head Office Customer Service Division 4-6-22, Kan-on-shin-machi, Nishi-ku, Hiroshima, 733-8553 Japan Phone: 81-82-291-2082 FAX: 81-82-294-1663
 Mitsubishi Heavy Industries Compressor

 International Corporation

 14888 Kirby Dr. Pearland, Texas 77047, USA

 Phone:
 1–832–710–4700

 FAX:
 1–832–710–4600

Mitsubishi Heavy Industries Europe, Ltd.

 Building 11, Chiswick Park, 566 Chiswick High

 Road, London, W4 5YA, United Kingdom

 Phone:
 44–20–3480–7500

 FAX:
 44–20–3480–7501

 MHI Compressor do Brasil Ltda. (MCO-B)

 Avenida Doutor Morato 190, Sala 01, Vila

 Rezende, Piracicaba, Sao Paulo, SP, Brasil

 CEP: 13405-260

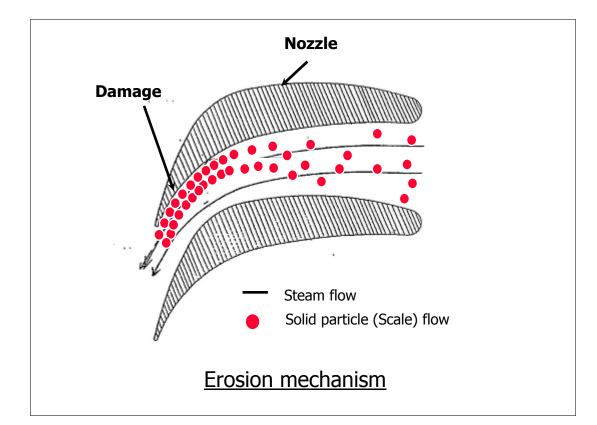
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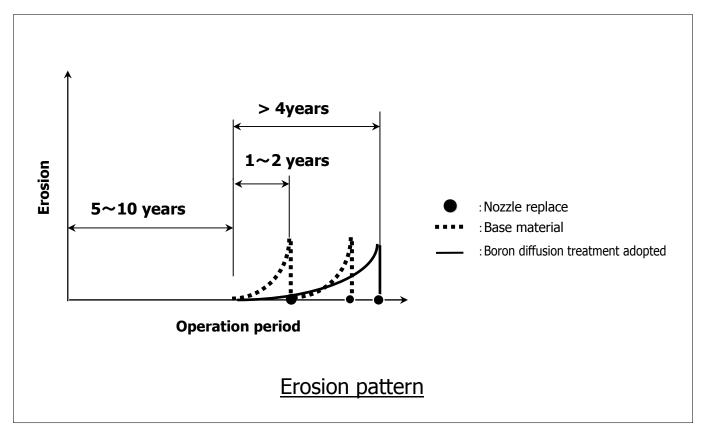
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P.O. Box 3782, Al-Khobar 31952, Kingdom of Saudi Arabia Phone: 966-13-896-5354





Effect of boron diffusion treatment



MCO Head Office Customer Service Division 4-6-22, Kan-on-shin-machi, Nishi-ku, Hiroshima, 73-8553 Japan Phone: 81-82-291-2082 FAX: 81-82-291-1663

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 FAX:
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 Building 11, Chiswick Park, 566 Chiswick High

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 44-20-3480-7500

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 44-20-3480-7501

 MHI Compressor do Brasil Ltda. (MCO-B)

 Avenida Doutor Morato 190, Sala 01, Vila

 Rezende, Piracicaba, Sao Paulo, SP, Brasil

 CEP: 13405-260

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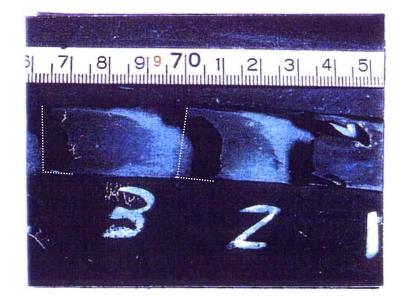
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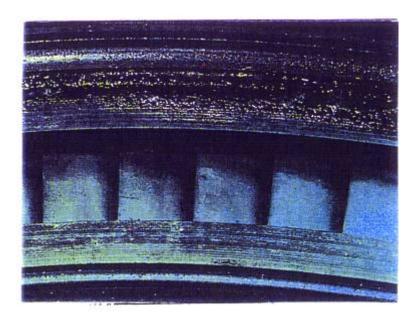
P.O. Box 3782, Al-Khobar 31952, Kingdom of Saudi Arabia Phone: 966-13-896-5354



Boron diffusion treatment example



Before treatment



After 20 month operation with diffusion treatment

MCO Head Office Customer Service Division 4-6-22, Kan-on-shin-machi, Nishi-ku, Hiroshima, 73-8553 Japan Phone: 81-82-291-2082 FAX: 81-82-294-1663

Mitsubishi Heavy Industries Compressor International Corporation 14888 Kirby Dr. Pearland, Texas 77047, USA Phone: 1–832–710–4700 FAX: 1–832–710–4600 Mitsubishi Heavy Industries Europe, Ltd. Building 11, Chiswick Park, 566 Chiswick High Road, London, W4 5YA, United Kingdom Phone: 44–20–3480–7501 FAX: 44–20–3480–7501
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