

SOREX WELDING CO.,LTD.

The influence of Diffusible Hydrogen for welding



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「The influence of Diffusible Hydrogen for welding」

Hydrogen diffusing to metal becomes air Impurities, which endanger almost all metal, result in cracks and flaws.

Control the volume of diffusible hydrogen when welding is a must-consider point.



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「1.What is diffusible hydrogen 」

●In welding, the compound including hydrogen in high temperature resolve as single atom hydrogen in the molten weld pool.

When the pool solidifies, some hydrogen remain in the welding passes.

●The hydrogen exist, as the form H , H^+ , H^- , in the welding pass, reform interstitial solid solution with weld metal.

As the radius of hydrogen is small, part of them diffuse in the weld metal, so called diffusible hydrogen ◦

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「1.What is diffusible hydrogen 」

●In different metal, structure, circumstance, the velocity of diffusion is different.

It also happens in room temperature.

The hydrogen gathering in weld leg and weld toe will cause colding crack.

Therefore, the number of diffusible hydrogen must be controlled when welding carbon steel and alloy.

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「2、The source of hydrogen and danger hydrogen:」

The source of hydrogen

Moisture in flux caused by humidity

Moisture in shielding gas

Crystallization water and greasy in the rust on workpiece.

Hydrogen from the process of smelting steel.

Organic compound from flux.

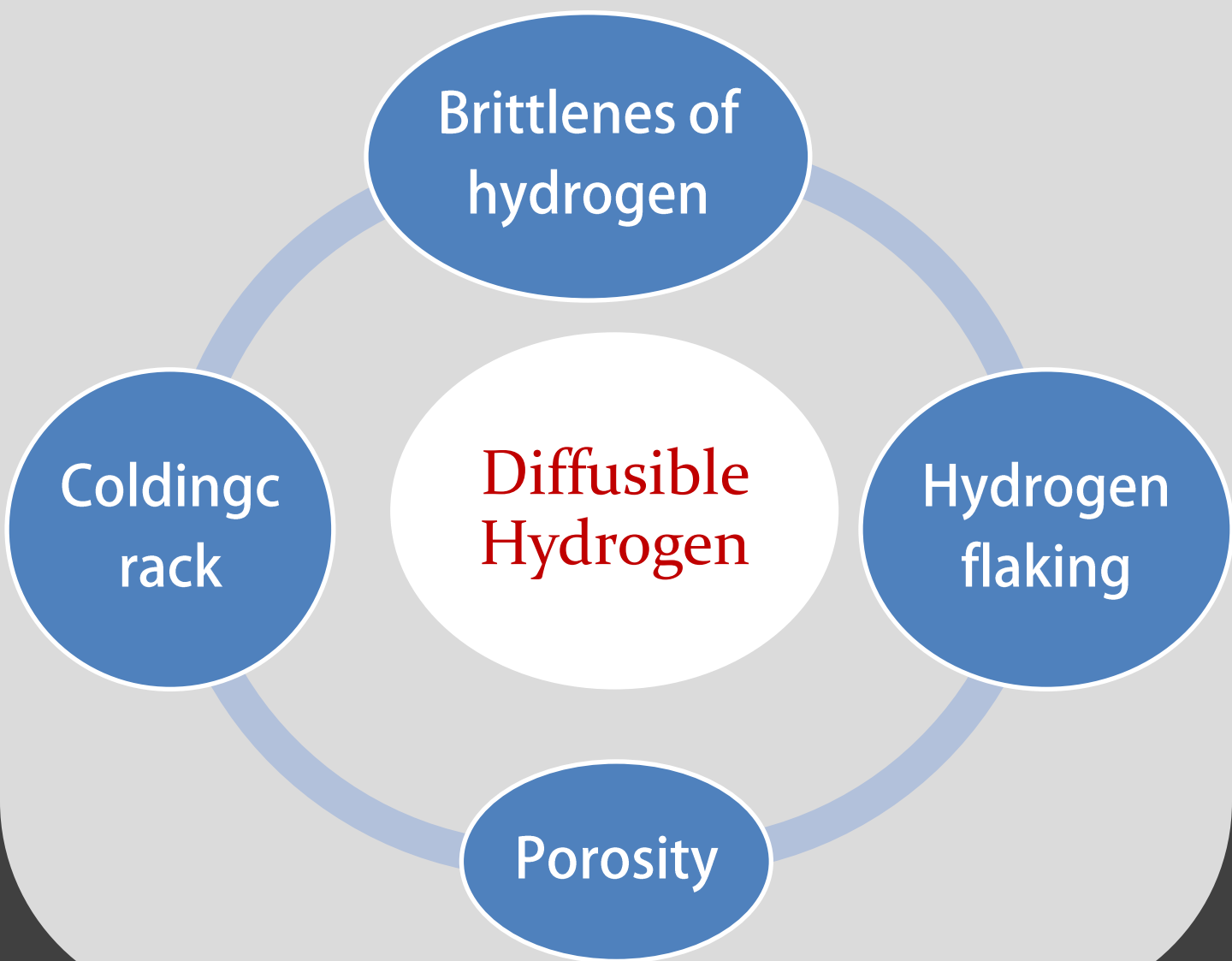
Crystallization water from alloy

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「2、The source of hydrogen and
danger hydrogen:」

The harm of hydrogen



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「3、Test methods and limit for diffusible hydrogen」

Methods

Test number	Test name
GB / T 3965	Test method of diffusible hydrogen in welding pass.
AWS A4.3	Test method of diffusible hydrogen for Martensitic, Bainite, and Ferrite steel.
ISO 3690	Test method of diffusible hydrogen in welding pass of arc welding.

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「3、Test methods and limit for diffusible hydrogen」

Diffusible hydrogen limits for reference

	Level	Limit(ml/100g)
AWS welding consumable	H4	≤ 4
	H8	≤ 8
	H16	≤ 16
GB welding consumable	H5	≤ 5
	H10	≤ 10
	H15	≤ 15
NB/T47018 welding consumable	H5	≤ 5
	H6	≤ 6
	H7	≤ 7
	H8	≤ 8

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「4、How to control the content of diffusible hydrogen」

1、During welding process

- ◎Electrodes and fluxes need to be dry before use.
- ◎The groove need to be clear without oil and rust.
- ◎Preheat.
- ◎Dehydrogenation.

2、Consumables

- ◎Take consumables with low hydrogen.

3、Restoration of consumables

- ◎Electrodes and fluxes: If not used after 4 hours from the heat insulation box, reheat is suggested and will have better function.
- ◎Flux cored wire: Don't leave the wires on welding machine, and need to seal them with bags for better function.

◎According to customers' requirement, low or extreme low hydrogen consumables are available by Sorex .

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