PIPETECTOR Scientific Report

Anti-Corrosion Application, Nissan Motor Co., Ltd. (Kyushu Factory)

(Cooling water)

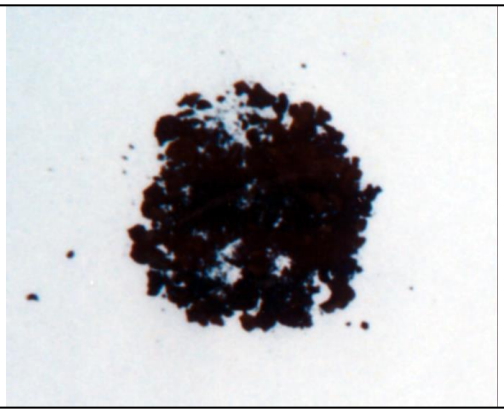
NMR Corporation

To stop corrosion and prevent clogs in cooling pipe of welding robot

◆Installation results

Before the installation
Inside of the cooling water pipe was seriously blockaded caused by corrosion. Therefore, the clogged cooling water pipe for the welding robot stopped the whole production line often.

9 months after the installation
The corrosion was reduced to magnetite and clogs of the cooling water pipe disappeared. So, the whole production line did not have to be stopped.



Before the installation
(Magnetite 4.0%)

9 months after the installation
(Magnetite 43.6%)

(1)Color

The rust before the installation of PIPETECTOR was red color.
The rust taken 9 months after the installation of PIPETECTOR became and formed magnetite film covering the inner pipe.

(2)Analysis of Mass Magnetite

According to the analysis done by Tokyo University of Science, before the installation of PIPETECTOR, the ratio of magnetite as 4% while corrosion was 96%, but 9 months after the installation, magnetite became 43.6%. It proves that corrosion was reduced to magnetite which became film and protected the pipe.

◆Installation Summary

Method of Water Supply	**Circulation water method**
Installation Day	**August in 1998**
Installation Place **Number of Installed** **PIPETECTOR**	**On cooling and circulation water pipe** **(SGP 30mm in diameter)** **PIPETECTOR PT- 30DS×4 units**

◆Economical Profit by the Installation of PIPETECTOR

The following economical profit was found after the installation of PIPETECTOR, the corrosion which clogged the cooling water pipe was reduced to magnetite, and decreased the clog.

① **Increase of production because of the increased cooling effect and no stop of operation by clogging the pipe.**

② **Decrease of cost because of the unnecessary of stopping operation and decreased maintenance fee.**

③ **Decrease of running cost because of the unnecessary of the use of Anti-corrosive chemical.**

May 27, 1999

Mass Analysis Test Result

To: NMR Corporation

Tokyo University of Science

The following is the Mass Analysis Test Result based on materials given out on May 24 in 1999.

Name of Material	Cooling water pipe for welding robot (Sample material was taken out on May 19 in 1999)		
Installation Place	The factory in Fukuoka Prefecture Cooling water pipe for car welding robot		
Date of Analysis	May 26 in 1999	Client Name	Kyushu Factory of Nissan Motor Co.,Ltd.

Test Results of Mass Analysis of Magnetite formed Within the Water Pipe

Item Measured Value (weight percentage among total rust)

Before the Installation of PIPETECTOR

Magnetite: 4.0 (%)

After the Installation of PIPETECTOR

Magnetite: 43.6(%)

平成 11 年 5 月 27 日

質量分析試験検査成績書

日本システム企画株式会社　殿

平成 11 年 5 月 24 日試験依頼により提出された試験品について行った質量分析試験検査結果は下記の通りです。

記

試験品の名称	溶接ロボットの溶接ガン･トランス冷却水供給配管 （平成 11 年 5 月 19 日 採取試験品）		
検査配管設置場所	福岡県　　工場 車体溶接ロボット冷却水配管		
検査日	平成 11 年 5 月 26 日	検査依頼者	工場

配管内黒錆質量分析試験検査の成績

項　　目	測定値（重量 %）
ウォーターマックス　設置前 マグネタイト（黒錆）：	4.0
ウォーターマックス　設置後 マグネタイト（黒錆）：	43.6

以上