

# REFERENCE CASE CHEMICAL PLANT



## Extensive Safety Assessment of Petrochemical Plants in Taiwan

Due to several fire incidents at their petrochemical plants in Taiwan, Formosa Plastics Group (FPG) required independent safety assessment and inspection services by an experienced expert. That's why they turned to TÜV Rheinland.

Basic Facts	
Client	Formosa Plastics Group
Timeframe	December 2011 – September 2012
Project location	Mailiao, Taiwan
Main services	<ul style="list-style-type: none"><li>▪ Audit on 14 elements of process safety management system (PSM) including process hazards analysis (PHA) and mechanical integrity (MI) inspection</li><li>▪ In-service inspection, including on-stream and off-stream inspection, covering pressure vessels, storage tanks, piping system, relief and vent system devices, emergency shutdown system (including SIS), controls, rotary machinery and electrical equipment (including ATEX)</li></ul>
Involved regulations/standards	<ul style="list-style-type: none"><li>▪ USA OSHA regulation 29 CFR 1910.119 "Process Safety Management (PSM)"</li><li>▪ Process hazards analysis (PHA) and mechanical integrity (MI) inspection</li><li>▪ API 510 / 570 / 576 / 653 / 571 / 580 / 581</li><li>▪ IEC 61511 and IEC 60079 series</li></ul>

### Initial situation and requirements

The Formosa Plastics Group is one of Taiwan's largest industrial conglomerates and consists of the Formosa Plastics Corporation, the Nan Ya Plastics Corporation, the Formosa Chemical & Fibre Corporation, the Formosa Petrochemical Corporation and other subsidiaries. The group is engaged in businesses such as oil refining, petrochemicals, plastic raw material, fiber and textile, electronic materials and transportation. Since 2010, several fire incidents occurred in Formosa Plastics Group (FPG) refineries leading the governmental authority to order a shutdown of more than 50 plants within a year in the Formosa No. 6 Naphtha Cracking Project Mailiao industrial park, Taiwan. In order to reopen the plants, FPG was required to conduct safety inspections supervised by an international third-party organization.

## Solutions, results

Thanks to our extensive experience in plant safety services and our profound knowledge of international standards, TÜV Rheinland was the preferred choice for Formosa Plastics Group.

The framework for the plant safety assessment of the 13 concerned petrochemical and power plants was provided by the USA OSHA regulation 29 CFR 1910.119 "Process Safety Management (PSM)", as this safety specification had already been established in the plants. The assessment was divided into three phases: the preliminary audit of the PSM system, on-site verification of mechanical integrity implementation and final compliance validation. During the assessment, our tasks covered all 14 elements of PSM including process hazards analysis (PHA) and mechanical integrity (MI) inspection during operation and shutdown based on risk-based inspection (RBI) according to API (American Petroleum Institute) in-service inspection standards. Furthermore, we reviewed all inspection plans and verified the improvements and corrections to the system management of PSM and the implementation of equipment inspection. Because pressure vessels and the piping system caused the previous fires, our API 510 / 570 / 653 / 580 / 571 authorized experts conducted the necessary document reviews and inspection. In addition, field experts examined the required documentation and inspections plan of controls, rotary machinery and electrical equipment.

Thanks to the collective experience and knowledge of the TÜV Rheinland team, the required work was completed on schedule and the future operation of the 13 FPG plants was approved.

### Did you know?

More than 50 professionals from local and international partners as well as experts from the global TÜV Rheinland Group helped to provide extensive safety assessment services.

### Benefits for the client

TÜV Rheinland supported the Formosa Plastics Group by providing:

- **Systematical identification of the compliance and improvement of the plant Process Safety Management (PSM) system.**
- **Reduction of potential safety risks and gradual improvement of the effectiveness of the equipment maintenance and safety management.**
- **A safety guarantee and verification of a standard system to establish the professional image and credibility of petrochemical enterprises while ensuring the safety of staff, property and local residents.**
- **Normal production safety operations to strengthen the market and boost demand for petrochemical products to positively affect the economy.**

### Your contact:

TÜV Rheinland Group  
Industrial Services  
is@tuv.com  
www.tuv.com

### About TÜV Rheinland:

Founded 140 years ago, TÜV Rheinland is a global leader in independent inspection services, ensuring quality and safety for people, the environment, and technology in nearly all aspects of life.

We inspect technical equipment, products and services, oversee projects and help to shape processes for companies around the world. Since 2006 we have been a member of the United Nations Global Compact to promote sustainability and combat corruption.

Due to our extensive knowledge in the field of plant safety, we can help you to optimize your processes and establish a viable safety management system that reliably supports you in preventing incidents and ensuring the safety of your plant, employees and the surrounding environment.

We offer you a variety of services, including the development of concepts for incident prevention, preparation and review of safety reports, disaster prevention and damage investigations.