



炼油石化工业工艺安全及机械完整性评估服务

Process Safety and
Mechanical Integrity Assessment Services
for the Refining and Petrochemical Industry

控制风险, 迈向安全及可持续发展

Control risk, forward safety and sustainable development



德国莱茵TÜV是全球权威认证机构, 在炼油石化工业领域提供完整生命周期的供应链检验与安全认证服务。并以工艺安全管理系统为架构, 深入工艺危害分析、量化风险评估、机械完整性、安全仪表系统安全完整性、损坏诊断及失效分析、防爆安全等技术评估, 以确保全厂设备系统可靠度及安全性。

TÜV Rheinland is a global authoritative Notified Body that provides complete life cycle supply chain inspection and safety verification services for the refining and petrochemical industry. Under the process safety management system structure, we conduct process hazard analysis, in-depth quantitative risk assessment, mechanical integrity checks, safety integrity checks of safety instrumented system, damage diagnosis and failure analysis and explosion-proof safety assessment. With our services, the reliability and safety of all your plant equipment and systems can be ensured.

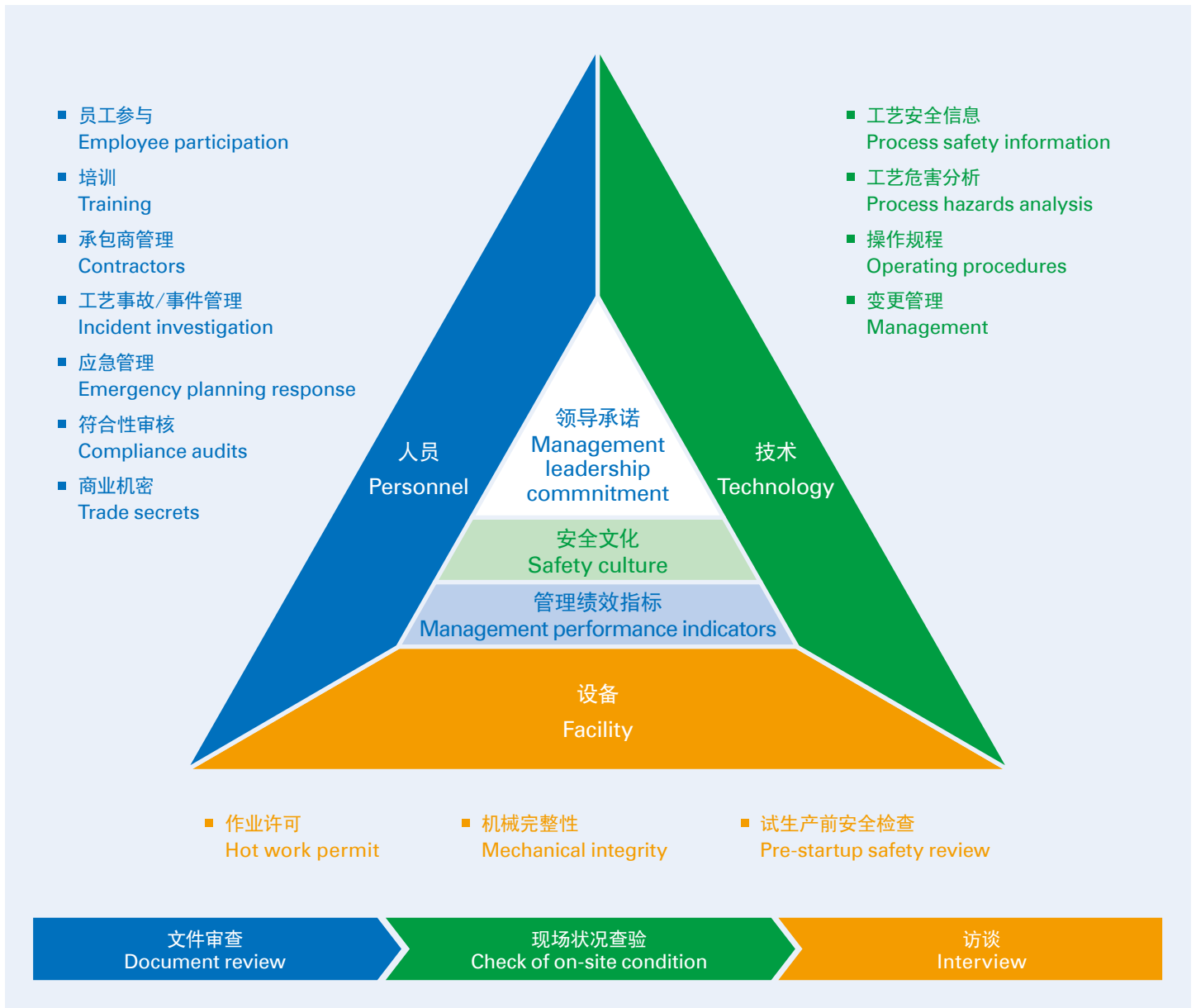
全方位安全完整性解决方案

Total solution of safety integrity



工艺安全管理系统评估

Assessment of process safety management system



德国莱茵TÜV丰富的工艺安全管理验证经验
具备优质的务实特色:

- 14个单元的完整技术咨询
- 3个阶段的专业辅导流程
- 3种方法的符合性核查
- 超过200项的实务审核要点
- 灵活的驻厂落实度验证
- 精准地鉴别出符合程度及改善潜力
- 持续的风险改善计划及安全追踪机制
- 量化的管理绩效指标

TÜV Rheinland has extensive experience in the high-quality, pragmatic validation of process safety management with the following features:

- Comprehensive consultation on 14 elements of PSM
- Three phase professional consultation process
- Three categories of approach to verification audit
- More than 200 practical audit items
- Flexible on-site verification for degree of implementation
- Precise identification of compliance gaps and improvement potential
- Continuous risk improvement plan and safety tracing mechanism
- Quantitative indicators of management performance

工艺风险及机械完整性评估

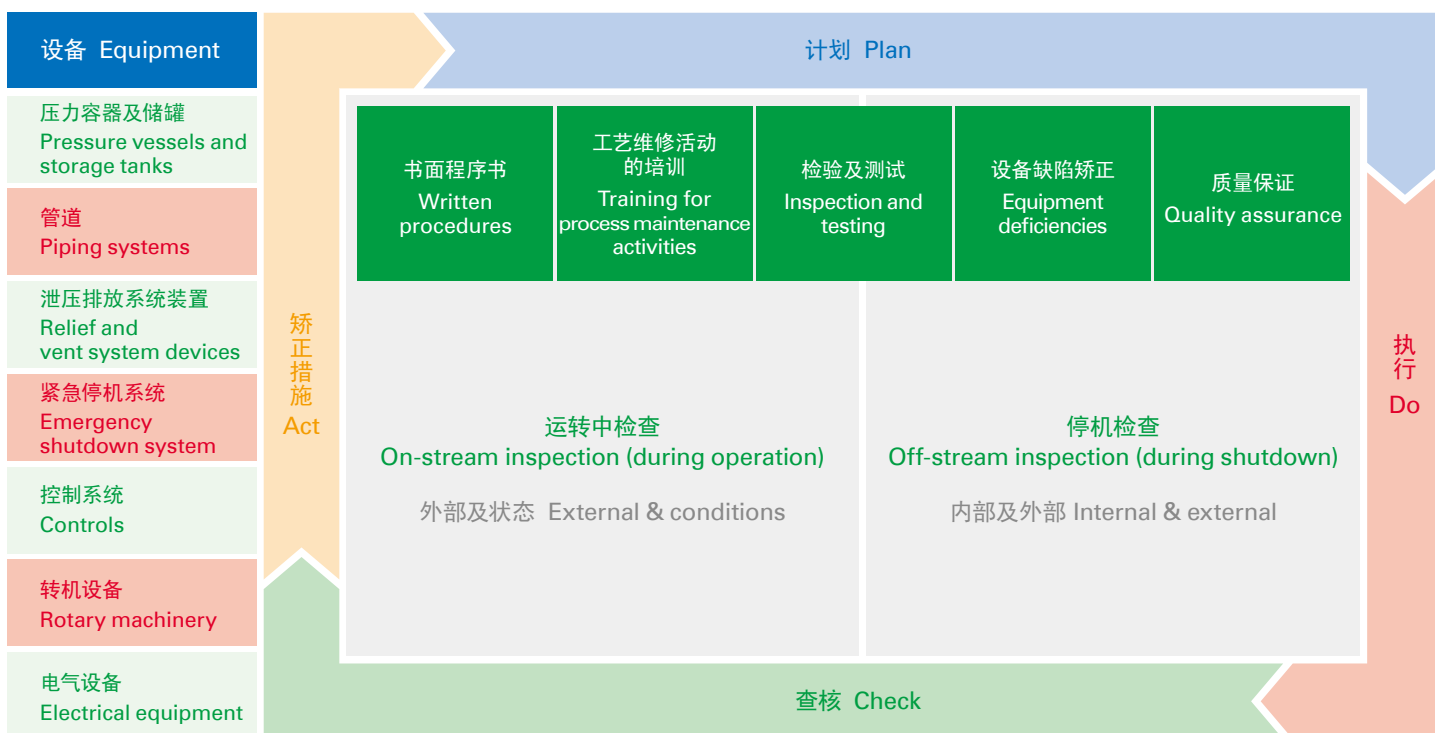
Assessment of process risk and mechanical integrity

凭借延续数百年的工厂安全检验经验，德国莱茵TÜV团队持续为石化厂安全把关，主要技术策略专注于：

- 以风险管理为基础，运用量化风险分析(QRA)、危害与可操作性分析(HazOp)、故障树分析(FTA)、失误模式与影响分析(FMEA)、保护层分析(LOPA)等方法
- 以防漏、防爆及失效防制安全策略为起点，扩大为七大关键系统进行机械完整性评估
- 压力设备、储罐及管道系统以损害机制原理进行腐蚀环路分析，并支持工厂RBI软件工具选用咨询
- 运用API运转中检查标准(API 510/570/653/581等) 鉴别设备风险等级，并制定合理有效的检验计划、检测方法、检测报告及修理改善策略
- 分析损坏机制及腐蚀趋势，确保诊断机制有效循环
- 兼顾运转中检查及停机检查，预知掌握非计划性停机的潜在因素
- 以可靠性为中心的维修(RCM)技术，监测转机设备及电气设备的失效趋势管理及系统可靠度

With more than a century of experience in plant safety inspection, the TÜV Rheinland team safeguards in-service petrochemical plants. Our strategic focuses are as follows:

- With risk-based management, we adopt the approaches of quantitative risk assessment, hazard and operability study, failure mode and effect analysis, fault tree analysis, layers of protection analysis, etc.
- Starting with a safety strategy of ensuring that your plant is leak-proof, explosion-proof and subject to failure prevention and control, we extend that to seven key systems for assessing mechanical integrity
- Based on damage mechanisms, we conduct corrosion loop analysis for pressure equipment, storage tanks and piping systems. Furthermore, we provide assistance and consultation on RBI software tool selection
- We adopt API in-service inspection codes (API 510/570/653/581, etc.) to identify equipment risk classes. We also formulate reasonable and effective inspection plans, inspection methods, inspection reports and repair strategies
- We analyse damage mechanisms and corrosion trends to ensure an effective diagnosis mechanism cycle
- Taking into account both on-stream and off-stream inspections, we allow you to predict and control the potential factors of unplanned system shutdowns
- Based on reliability-centered maintenance (RCM), you will be able to monitor failure trends and system reliability for rotary machinery and electrical equipment



建构可靠的安全自动控制系统防线

Build a reliable defense with safety instrument and control systems

在自动控制安全系统及组件的功能安全认证市场上，德国莱茵TÜV引领全球技术，并依据 IEC 61508 及 IEC 61511 标准要求，协助炼油石化厂建构安全仪表系统(SIS)安全生命周期管理系统，从危害风险评估、保护层配置、制定技术规范、设计与制造、安装调试、操作维护、变更管理到除役停用、验证、功能安全管理、评估与审核等11个阶段，导入具体的失效预防及控制做法，使安全仪表系统维系达到要求的安全完整性等级(SIL)。德国莱茵TÜV迄今已培训并向全球精英技术人员颁发了超过六千张FS Engineer (TÜV Rheinland)工程师证书，协助工厂掌握营运风险及控制故障的专业能力。

In the functional safety certification of automation safety systems and components, TÜV Rheinland is a global leader. Also in accordance with the requirements of the IEC 61508 and IEC 61511 standards, we assist petrochemical plants to build SISs through a safety lifecycle management system that covers 11 stages, including hazard risk assessment, the allocation of safety functions to protection layers, design and engineering, installation, commissioning and validation, operation and maintenance, modification, decommissioning, verification, management, assessment and auditing. We introduce specific failure prevention and control practices to achieve the required safety integrity level (SIL) of SIS. TÜV Rheinland has trained and issued more than 6,000 FS Engineer (TÜV Rheinland) globally. We help plants to master operational risk and the professional ability to control failure.



德国莱茵TÜV, 值得您信赖的合作伙伴

TÜV Rheinland, your reliable partner

- 系统化鉴别出工厂工艺安全管理系统的符合性
- 降低潜在风险并提升机械完整性的有效性、落实度与完善度
- 达到国际水准与全球石化厂安全管理技术接轨
- 打造安全保证及公信标准制度，建立石化企业专业形象与信誉
- 维持正常安全生产作业，稳定石化工业市场供应需求并促进经济发展
- Systematically identify the degree of compliance and level of improvement in the plant's PSM system
- Mitigate potential risk and raise the effectiveness, fulfillment and completeness of mechanical integrity
- Meet international standards of petrochemical plant safety management
- Build safety guarantee and credibility. Establish professional corporate image and prestige
- Support the operation of safety process and stabilise the market supply of petrochemical products



TÜVRheinland[®]
Precisely Right.

德国莱茵TÜV大中华区
TÜV Rheinland Greater China
服务热线 Hotline
4008831300/8009993668
+852 21921022 (中国香港Hongkong)

service-gc@tuv.com
www.tuv.com