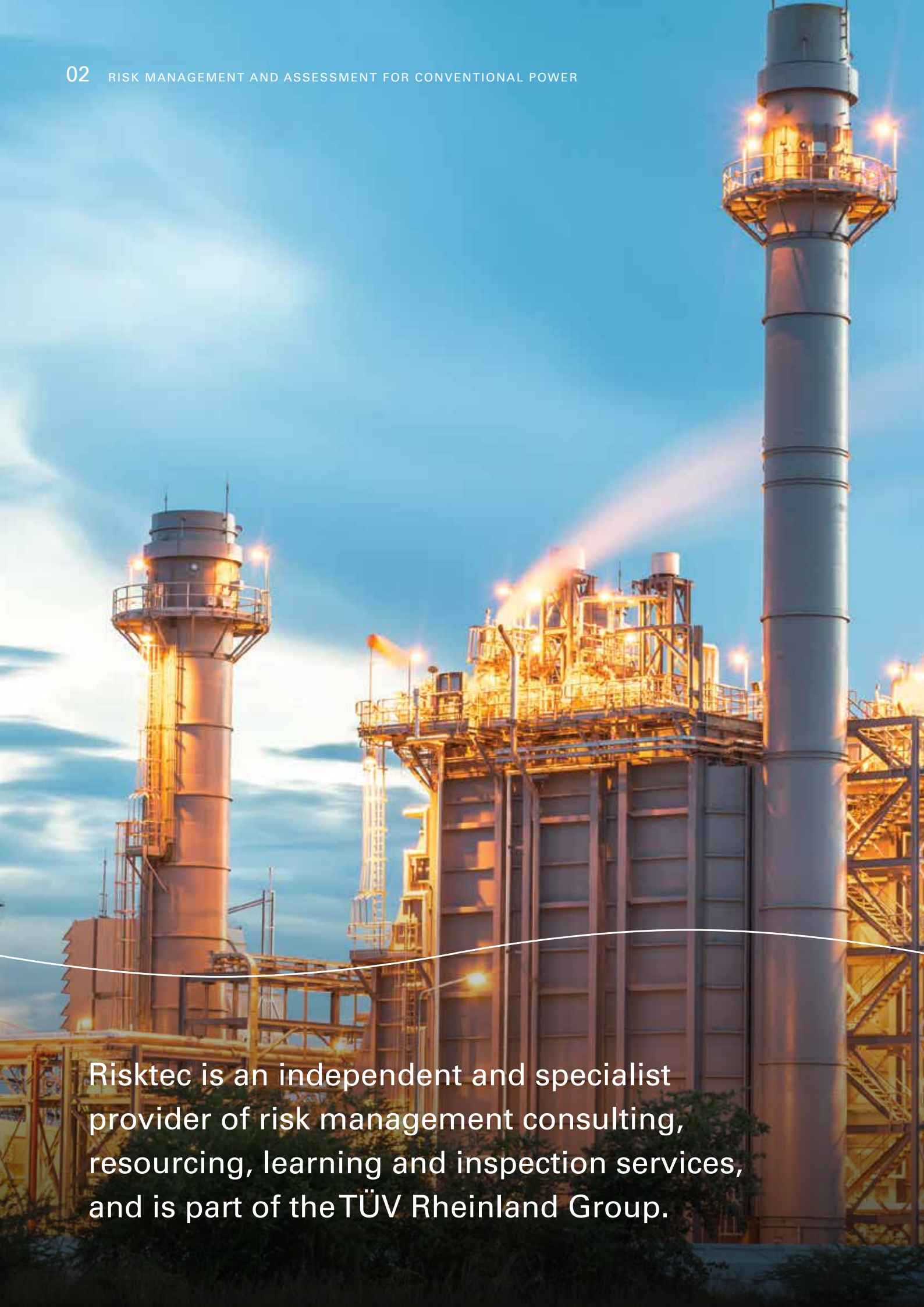


Risk Management and Assessment for the Conventional Power Industry

Helping clients to manage health,
safety, security, environmental and
business risks.



Risktec is an independent and specialist provider of risk management consulting, resourcing, learning and inspection services, and is part of the TÜV Rheinland Group.

About Risktec

Risktec was formed with the specific aim of helping clients to manage health, safety, security, environment (HSSE) and business risk, and has been part of the TÜV Rheinland Group since 2014.

We strongly believe the following key factors differentiate us in the marketplace:

OUR VALUES & CULTURE

The key values underpinning our culture are Teamwork, Integrity, Empowerment and Solutions. We work collaboratively, both within Risktec and when working with clients. We act with honesty, integrity and consistently high ethical standards. We empower everyone to deliver all aspects of a project to the best of their ability in a supportive, open and trusting environment. We are responsive and flexible to our clients' needs, delivering complete and pragmatic solutions.

OUR INDEPENDENCE

Our independence is achieved through our selected range of services, our company values and our legal structure. Our services are independent from design, construction and operations, and as such we offer truly impartial advice. Our company values include integrity, which means we are open about difficult issues. Finally, TÜV Rheinland has no shareholders with conflicting corporate goals to satisfy, enabling us to take a long-term view in everything we do.

OUR APPROACH

We are committed to providing clients with solutions, built on a sound understanding of the client's business and the issues they face. Throughout a project we work with our clients to ensure ownership of the solution. We believe this philosophy leads to mutually trusting relationships with our clients. We highlight the positives, but also do not shy away from identifying weaknesses. In this way we help clients to objectively understand their risks and the quality of their systems for managing them.

CLIENT SATISFACTION

Ultimately it is our clients who decide how well we are doing and we place great emphasis on their feedback. Consequently twice a year we survey the clients of all our active projects and we are delighted to receive consistently high levels of customer satisfaction (see page 10). This feedback drives continuous improvement across the business.



Our Experience

Risktec has a strong track record of providing risk and safety management services across the conventional power and industrial steam sectors. We have extensive experience of a wide range of power and steam generating plant. In working with us, clients can be assured of responsive, high quality technical support delivered by experienced consultants and technicians, tailored to meet their specific circumstances.

FACILITIES

- Coal fired power stations
- Combined cycle gas turbine power plant
- Biomass power stations
- Energy from waste facilities
- Industrial boilers and steam generators
- Manufacturing sites



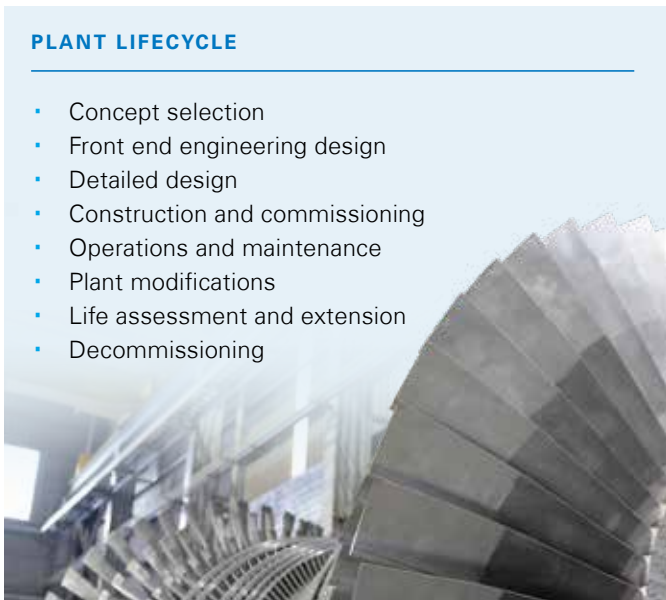
CLIENTS

- Plant owners
- Operations and maintenance companies
- Mechanical services contractors
- EPC contractors
- Design companies
- Equipment suppliers
- Industry bodies and regulators



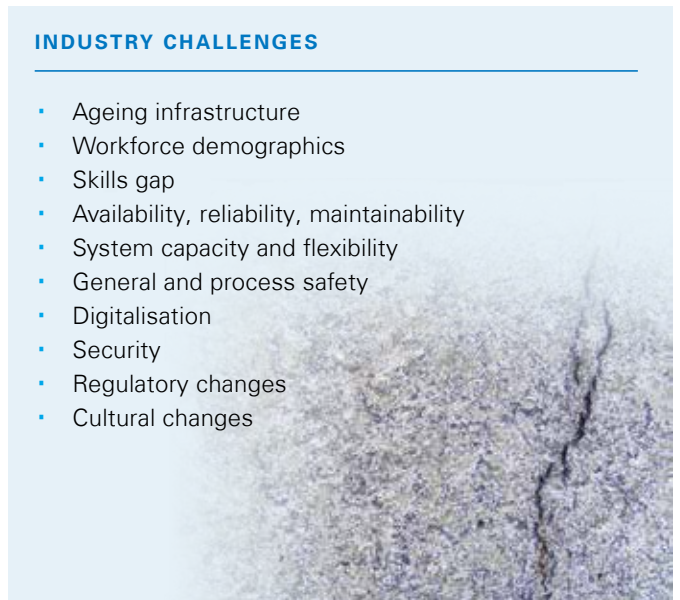
PLANT LIFECYCLE

- Concept selection
- Front end engineering design
- Detailed design
- Construction and commissioning
- Operations and maintenance
- Plant modifications
- Life assessment and extension
- Decommissioning



INDUSTRY CHALLENGES

- Ageing infrastructure
- Workforce demographics
- Skills gap
- Availability, reliability, maintainability
- System capacity and flexibility
- General and process safety
- Digitalisation
- Security
- Regulatory changes
- Cultural changes





Risktec's expertise is in high hazard industries and other sectors where the impact of loss is high.

Our Services...

RISK ENGINEERING

Identifying, analysing, evaluating and treating the risks associated with facilities, operations and equipment to acceptable levels.

HAZARD IDENTIFICATION

- HAZID / ENVID studies
- Major accident hazard identification
- HAZOP / PHA studies
- FMEA / FMECA
- Plant walkdowns and surveys
- Hazard registers

PHYSICAL EFFECTS CONSEQUENCE MODELLING

- Jet, pool and flash fire thermal radiation
- Explosion overpressure and drag load
- Flammable, toxic gas and smoke dispersion
- BLEVE and escalation effects
- Atmospheric dispersion modelling
- Computational Fluid Dynamics (CFD) assessment of explosion, dispersion and fire
- Design accident loads
- Flare and vent studies (dispersion and thermal radiation)
- Structural integrity assessment

QUALITATIVE & QUANTITATIVE RISK ANALYSIS

- Bowtie risk management
- Quantitative risk assessment
- Environmental risk assessment
- Health risk assessment
- Security risk assessment
- Business risk assessment

TECHNICAL SAFETY STUDIES

- Escape, evacuation and rescue assessment
- Essential systems survivability assessment
- Building risk assessment
- Facility siting study
- SIMOPs assessment
- Dropped objects
- Occupational risk

RISK REDUCTION & ALARP

- ALARP assessment
- Risk reduction workshop
- Cost benefit analysis
- Sensitivity and uncertainty analysis
- Support with stakeholder consultation

FUNCTIONAL SAFETY

- Functional Safety Assessment (FSA)
- Fault and event tree analysis
- Layer of Protection Analysis (LOPA)
- SIL assessment (assignment, verification and validation)
- System specification
- Safety requirements specification



FIRE PROTECTION

- Fire risk assessment / Fire safety assessment
- Passive and active fire protection system assessments
- Risk based scenario evaluation of cost effective incident mitigation strategies
- Fire response planning including philosophies, strategies and tactics

HUMAN FACTORS ENGINEERING (HFE)

- HFE screening and Human Factors Integration (HFI) planning and management
- Valve Criticality Analysis (VCA)
- Safety Critical Task Assessment (SCTA)
- Ergonomic assessment of skid packages and workplaces
- Control room ergonomic studies
- 3D CAD model reviews
- Human Machine Interface (HMI) assessment
- Alarm management
- Workload analysis and manning studies
- Human error identification, quantification and reduction
- HFE planning for construction and commissioning

RELIABILITY, AVAILABILITY & MAINTAINABILITY

- Reliability, Availability Maintainability (RAM) assessment
- Reliability Block Diagram (RBD) assessment
- Monte-Carlo simulation
- Maintenance, inspection and testing optimisation

FIRE & GAS DETECTION

- Fire and gas detection philosophy
- 3D fire detector mapping
- 3D flammable and toxic gas detector mapping
- CFD detector mapping

HSSE / SAFETY CASE

- HSSE / safety case development or updates
- Pre-submission readiness review
- Regulatory compliance review
- Independent thorough review / Periodic review
- Safety case roll-out training and communication materials
- Electronic / living HSSE / safety cases

PERFORMANCE STANDARDS & VERIFICATION SCHEMES

- Safety and environmental critical elements identification
- Performance standard development
- Verification scheme development

VENDOR INSPECTION & ASSESSMENT

- Third party inspection and expediting
- Pre-shipment inspection
- Loading / unloading inspection
- Factory acceptance tests
- Quality assurance / quality control
- Vendor capability assessments

RISK MANAGEMENT

Managing HSSE and business risk.

HSSE MANAGEMENT SYSTEMS

- Integrated HSSE Management Systems
- HSSE requirements
- Change management systems
- Document management systems
- Independent third-party audits and reviews
- Pragmatic and cost-effective, risk-based improvement strategies and programmes

PROCESS SAFETY MANAGEMENT

- Process Safety Management (PSM) systems
- Monitoring, auditing and management review
- Gap analysis against standards and good practice
- Management of change systems
- Facility siting analysis
- Incident investigations and root cause analysis (RCA)
- Compliance audits and training

ASSET INTEGRITY MANAGEMENT

- Asset Integrity Management (AIM) systems
- Monitoring, auditing and management review
- Integrity assessment including fitness for service, corrosion control, failure analysis and lifetime extension
- Risk and reliability management including risk-based inspection (RBI), reliability-centred maintenance (RCM), reliability, availability and maintainability (RAM) modelling and safety integrity level (SIL) assessment
- Data analysis of maintenance, inspection and testing results and performance improvement

BUSINESS CONTINUITY MANAGEMENT

- Threat identification
- Business impact assessment and risk analysis
- Business continuity strategies
- Business continuity plans

- Business continuity management systems
- Business continuity plan testing and auditing

EMERGENCY PLANNING & CRISIS MANAGEMENT

- Identifying potential emergency and crisis scenarios
- Emergency and crisis management strategies, plans and procedures
- Emergency control centre reviews and optimisation
- Facilitating desktop and field drills and exercises
- Assessing and auditing adequacy of emergency arrangements

SECURITY RISK MANAGEMENT

- Security risk awareness
- Security vulnerability assessment
- Cyber security assessment
- Security management strategies and response plans
- Security awareness and training programmes
- Security audits and reviews
- Investigation of security incidents



CULTURE & BEHAVIOUR

Accelerating cultural and behavioural improvement, and ensuring a solid foundation for building sustainable improvements in risk control.

CULTURE & BEHAVIOURAL SAFETY

- Safety culture/climate assessment and cultural change support
- Safety leadership workshops
- Behavioural safety strategy and programme development and associated support
- Behavioural safety measurement
- Incident investigation and root cause analysis

COMPETENCE MANAGEMENT

- Analysis of current arrangements against best practice competency standards
- Capture of competency requirements - organisational, team and personal
- Role and task analysis
- Competency assessment and training needs analysis (TNA)
- Competency management system development
- HR system integration, personnel planning and optimisation

- Developing and verifying competence assurance systems

WORKPLACE SAFETY

- Worksite risk assessment method development, linked to contractor management and safe systems of work
- User friendly procedures and working instructions
- Permit to work systems
- Health and industrial hygiene assessment

LEARNING & RESOURCING

Training in Risk and Safety Management leading to formal qualifications or tailored to meet your specific requirements.

Providing specialist risk, HSSE and engineering associates to work at client offices, project locations or industrial sites anywhere in the world.



LEARNING WITH RISKTEC

- Postgraduate Certificate, Diploma or Master's Degree (MSc) in Risk and Safety Management
- Degree Apprenticeship in Risk and Safety Management
- Continuous Professional Development (CPD) qualifications in Risk and Safety Management
- Training courses from single modules to multi-year programmes for corporate clients
- Game based learning
- Delivery via face-to-face, distance or blended learning
- Accredited by professional engineering institutions and industry bodies

RESOURCING

- Delivered by our professional resource solutions business, ASTEC, which has access to a huge pool of professional associates
- Short-term or long-term assignments

Client Satisfaction

Twice a year we survey the clients of all our active projects. The response rate is high for such surveys and we very much appreciate the time and effort spent by our clients in providing feedback to us. This feedback greatly helps us strive to continuously improve our service.

The survey asks questions encompassing all aspects of our service, from responsiveness and flexibility, through technical quality, to commercial issues. We are delighted to receive consistently high levels of customer satisfaction across all questions. This means we are able to build long-term sustainable relationships with all our clients, with over 85% of our revenue coming from existing clients. However, we also continuously seek new clients and each year over 30% of our clients are new.

Example high levels of client satisfaction:*

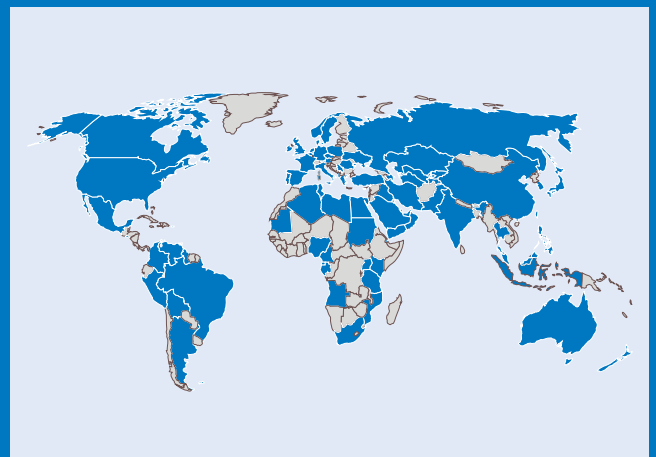
- **97%** of clients rate the technical knowledge of our personnel as very good or good (we view 'fair' as not good enough).
- **97%** of clients view us as easy to do business with.
- **98%** of clients believe they have received good value from Risktec compared to other consultants.
- **99.6%** of clients would recommend us.

*Cumulative survey results to date. The current scores are displayed on our website risktec.tuv.com

Global Experience with Risktec

Risktec has its principal office in Warrington in the UK, with other offices in key locations in Europe, Middle East, South East Asia and North America. Our activities are supported by a comprehensive network of TÜV Rheinland offices and local representatives in other regions around the world. Our intention is to be close to our clients.

We have delivered projects in over 75 countries worldwide.





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Houston

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