

# MANUFACTURE REQUIREMENTS

BUYERS GUIDE







# ENGINEERING MOMENTUM



Probe has been a trusted supply chain partner for engineering projects for over four decades. In this time, we have worked closely with our clients, building lasting relationships, to enable them to optimise asset productivity and performance.

Manufacturing oilfield equipment is at the core of the Probe offering. We are acutely aware of the demands and deadlines placed on our clients; so we are reliably responsive to their requests to ensure projects are delivered quickly but without compromising quality and safety.

Our promise to you is always to find a solution to your engineering requirements, whilst delivering momentum to your project. The content of this buyer's guide explains how we can provide unrivalled results to your design, procurement, manufacture and quality assurance challenges.

We have built a strong reputation for providing best-in-class solutions for service and supply companies across the oilfield industry. The Probe portfolio is continuously expanding as we also branch out to service other energy markets too. Our team of expert engineers are on hand to answer any questions or bespoke challenges you may have.

This is a very exciting time for Probe and we look forward to offering an innovative solution to your next engineering challenge very soon.

**David Brennan** Managing Director





# WHAT IS YOUR CHALLENGE?

Whatever your challenge may be, we are confident that we can offer an unrivalled solution.

Our respected team is founded on engineering excellence and expertise in problem solving, devising innovative solutions and reducing complexity for design, procurement, manufacturing, and quality assurance (QA) challenges.



## What is your design challenge?

### Our in-house design capability

Probe have a dedicated in-house design team with many years of combined experience. Using the latest industry design software, we can work closely with our clients and manufacturing partners to ensure client owned intellectual property (IP) or our own designs meet with both needs, while delivering the work to industry standards.

### No challenge too difficult

A big challenge in design is making something which is manufacturable, and at the same time fits our customers' requirements. Along with 40+ years of experience, our in-house design team can draw from a library of drawings which also go back four decades to reference back to and help drive a qualified solution. If a requirement is outside our area of understanding, we can also draw on the expertise of our sister companies within the Acteon Group where required from across the globe to extend capability.

### Meeting industry safety codes and standards

Good Probe design and manufacturing processes are essential to ensure we meet technical and legal requirements. By definition, good design will also lead to safe design and this is something we pride ourselves on. While meeting our legal obligations is the minimum required, Probe always go that bit further and take best practice on board throughout the design process.

Whether it's using our clients IP or developing our own design work, this will also be sent to third party accreditors and verification organisations to seek approval against standards. If customers' requests and IP do not meet the standards required, we will advise on the most suitable course of action.



## What is your procurement and manufacturing challenge?

### Reducing costs and achieving savings for your project

Our key priority in achieving strategic cost reductions, is targeting resources where they can earn the best return. We find the correct approach to each job, to guarantee the most productive route through our machine shop. In a nutshell, it's finding ways to reduce costs through any means possible which in turn, importantly, saves money for our clients.

### Providing a holistic approach to a project

At Probe we focus on the 'entire' manufacturing process, bringing together both technology and human systems to identify and reduce production variability. Throughout any given project, it's increasingly important that our staff are trained to have a complete view of the processes, from the beginning to the end. This holistic philosophy has provided results that means guaranteed process improvements for our organisation that yields substantial cost savings for our clients.

### A supplier that can consistently deliver a quality product

Competitive quality, cost, service, and delivery have always been key requirements for our clients. It is a fundamental premise of Probe's manufacturing strategy that high-quality end products cannot be built cost effectively from low-quality components.

Probe have invested in a considerable stock of quality raw material. We stock AISI 4130 alloy steel, heat treated and tested to exceed the requirements of API 6A. Our stock of round bar ranges from 70mm to 1,200mm diameter, and square bar from 9" to 18" square. The stock held is generally more than 1,000 tonnes and therefore can meet urgent delivery times from this holding. All materials are also subject to receiving full inspections and we have state of the art in-house facilities to perform a variety of non-destructive testing.

### Determining the risk mitigation of projects

For senior responsible owners and buyers, it is important to engage with the marketplace in terms of identifying the desired outcomes, risks and issues of any project requirement. As part of project scope, Probe will provide feedback on how the outcomes to a requirement might be achieved, the risks and issues as we see them, along with feedback on timescales, feasibility and affordability. Effective management of risk helps Probe manage innovation and improve performance by contributing to increased certainty and fewer surprises for our clients along the way.



## What is your QA challenge?

### Health and safety procedures

Probe are utterly committed to undertaking our business in such a way as to minimise the risks of injury or ill-health to our people and damage to property. As part of our commitment to safety excellence, we have attained OHSAS 18001 certification.

### Quality assurance management systems

Ultimately, quality is about attention to detail and good communication - two things our clients regularly tell us we excel at.

Our philosophy of a responsive, practical service is at the heart of our approach to quality management. This is evident in the form of fast response and clear communication of clients' objectives and requirements and complemented by products of appropriate high quality, reliability, safety and cost effectiveness.

We have also implemented a formal Integrated Management System (IMS), and have gained certification to ISO 9001 - 2015.

### The manufacturing cycle

Controlling quality by utilising product inspections throughout the production cycle reduces risks and cost. At Probe, we carry out 'First Off' inspection procedures and 'In Process' quality control. We also schedule third party witness testing and verification checks if our clients request it and provide 100% dimensional inspection reports.

### Our commitment to the environment

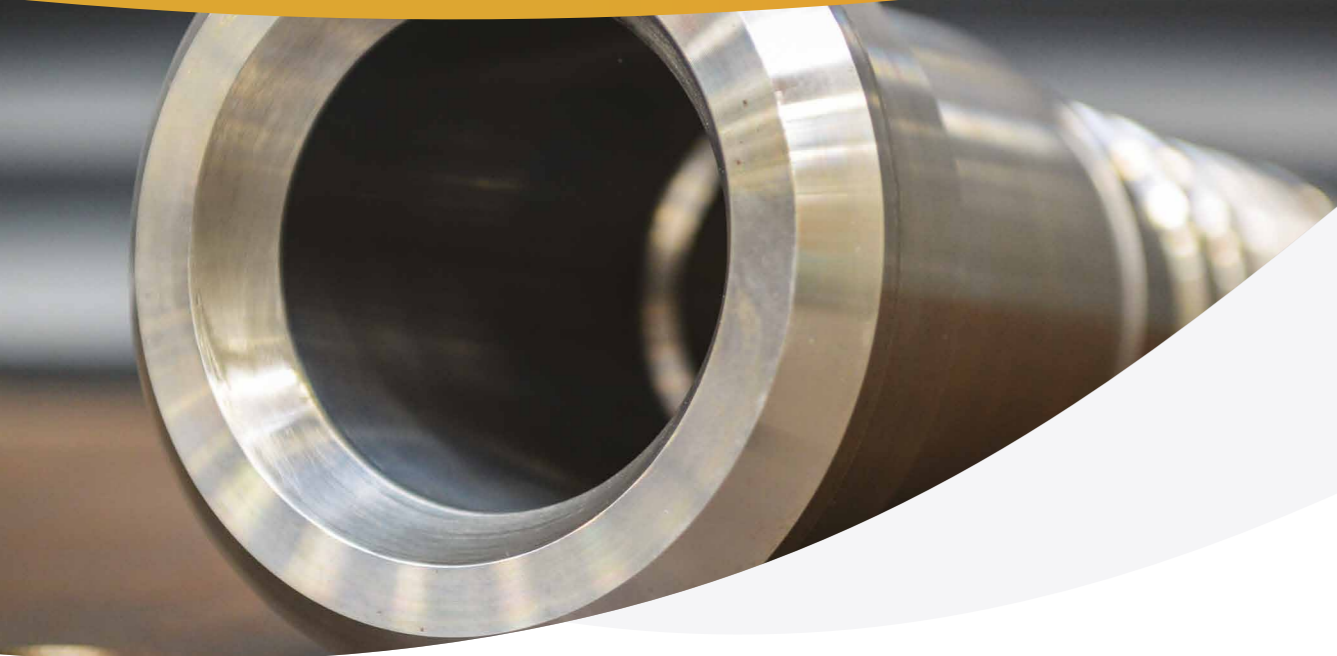
Here at Probe, we are committed to protecting the environment from avoidable harm. Within the Probe management system, we have incorporated the requirements of ISO 14001 and gained full certification. We believe our current business activities, and status of business development, constitute a limited environmental impact.

### Materials tested to meet specified requirements and standards

Probe's product testing has multiple applications, from determining if the specifications are being met to troubleshooting various issues that may arise. Using applicable industry related standards to measure the product's properties and performance, provides assurance of quality throughout the production process. For Probe, this provides a proactive strategy, that can avoid costly delays and rework down the line.

We are also licensed by the American Petroleum Institute (API) to manufacture and monogram products conforming to API Specification 6A. We also hold the prestigious API Q1 Certificate of Registration to verify that our quality system has been audited by the API.

Our Quality Management System is registered with DNV GL and we are registered with Bureau Veritas with a Certificate of Quality System Approval for the European Pressure Equipment Directive.



## Adaptor spools

Probe manufactures a complete range of bespoke adaptor spools and crossovers to connect all sizes of API flanged and hubbed items. We manufacture from the smallest API 6A flanges and hubs (1<sup>3</sup>/<sub>16</sub>" 10,000) up to the largest currently in use (18<sup>3</sup>/<sub>4</sub>" 15,000).

## API 16A Hubs and clamps

Our API hubs and clamps offer an alternative dynamic method of joining wellhead parts. Probe can provide the full range of API sizes to suit the client's exact requirements. We can even manufacture slimline clamps if space is at a premium.

## API Flanges

Probe manufactures high pressure and swivel flanges to API standards. Our products are customisable through means of size and pressure ratings and by the materials and claddings used to manufacture the product. We can supply the flanges with corrosion resistant properties.

## Casing and tubing hangers

Probe's tubing and casing hangers are vital wellhead system components. Our in-house machining and design capabilities allow total flexibility when manufacturing these products. Casing and tubing hangers are available to fit a variety of well environments and we can manufacture to the client's own designs and specification, or alternatively, we can use our own in-house design function. Probe also manufacture casing and tubing heads as well as spools and bonnets in all the standard API 6A sizes and pressure ratings.

## Choke and kill manifold

Probe's choke and kill manifold is a necessary device for managing well pressure fluctuations encountered during drilling by diverting flow through a series of chokes and valves. Our choke and kill manifolds exceed the requirements of onshore and offshore operations and are manufactured to meet client's specific needs.

## Double studded adaptor flanges

Probe's double studded adaptor (DSA) flanges offer a method of connecting two flanged pieces of equipment of different sizes, pressure ratings, and configurations. They have the capacity to connect spools, flowlines and pressure control equipment with any combination of flange sizes and pressure ratings. Our DSA flanges are supplied complete with tap-end studs and nuts. A major benefit of this product is that it is much shorter than a spool, therefore, useful where space is at a premium.

## Drilling spool

Drilling spools are similar to riser spools but have the added feature of side outlets which allow flowlines to be attached and extended to choke and kill manifolds. Probe's drilling spools are manufactured to connect to a range of flange sizes to accommodate all types of drill-through applications. Studded, flanged and hubbed ends are all available as options.

## Lubricators and risers

Probe's lubricator and riser sections are designed to act as chambers for deploying wireline tools into the well whilst under pressure. We can manufacture in-house a wide variety of lubricators and risers to client's specifications and pressure ratings including threaded and integral.

## Oil country tubular goods

Probe specialises in the complex threading of oil country tubular goods (OCTG). We provide API and premium threading of OCTG, in a variety of diameter sizes. We can manufacture any combination of rotary, casing and tubing connections to fit flange or hub connectors. We also have the capability to produce bespoke OCTG.

## Quick unions

Our quick union connections are used to assemble lubricators and related equipment and are designed to assist rig up for well intervention operations. Probe can manufacture in-house a wide variety of quick unions to customers specifications and pressure ratings. Our quick unions can also be supplied with industry standard integral, standard or flanged connections.

## Riser handling subs

Probe specialises in the design and manufacture of riser handling tools to make lifting operations safer and more efficient. Our riser handling subs can be offered as part of a package to include casing, tubing or rotary connection installed in the upper sub. We have the flexibility to accommodate the most stringent specifications.

## Wellhead desander and riser parts and spools

Probe can provide spools in every size and pressure rating for wellhead desanders and risers. Our riser spools are suitable for both drilling and marine risers and are manufactured and clad to withstand the harshest corrosive environments. We offer an extensive cladding service, which can protect assets and save on potential repair costs. Our riser/spacer spools are manufactured with a variety of end and outlet configurations. They are also designed to be used below or between drill-through equipment to adjust height of the stack, assemblies and flowline components.





# CASE STUDY

## Fully clad components for HP filter system

### The problem

Probe's client is an international energy services provider that manufactures and distributes products which enable the extraction of oil and gas for the world's leading companies. When they were asked to build a high-pressure filter system for an operator in the North Sea, they approached Probe to supply them with a range of filter vessel components. The manufactured items would be used to protect downstream components from contamination levels beyond the recommended cleanliness target.

The project required Inconel 625 corrosion resistant cladding being applied to the internal parts of the components, which would be exposed to a sour environment.

Sour environments are defined as fluids containing water as a liquid and hydrogen sulfide exceeding the limits as defined; these environments may cause sulfide stress cracking (SSC) of susceptible materials. Probe were called to manufacture and supply 7 1/16" 10,000 flanged and butt weld elbows, studded manifold blocks, long filter body sections and bottom subs along with closure plugs and acme collars to support this challenge.

This was the first time our client had been challenged with producing a fully clad filter system. They were aware of Probe's ability, having purchased several sets of components in the past, and long-standing reputation of producing fully clad components, so embarked on a close collaboration with Probe to achieve the desired result for the end client.

### The solution

Probe manufactured in-house, all the required parts for the system, with the exception of the valves and skid. All parts were manufactured to meet API 6A (20th Edition), PSL-3 and the client's own specification; with all internal parts of the system requiring additional corrosion resistant alloy (CRA) cladding. Our solution was as specified to apply Inconel 625 to all internal surfaces and over the fabrication welds.

Due to the length of the bodies, Probe developed innovative extra-long arms for the cladding heads, whilst a camera was also required to monitor the weld beads during this process.

Fully cladding many of the components with Inconel 625, as opposed to producing them all in solid alloy, reduced project costs considerably. The long bores of the vessels did not require re-machining after cladding, as the method used, produced a good surface finish.

During the project, the end client also decided that the test ports in several of the flanges could not be clad in the small bores. Probe responded to the request by replacing the components with Duplex stainless steel to ensure that the materials used on the whetted parts were completely corrosion resistant.

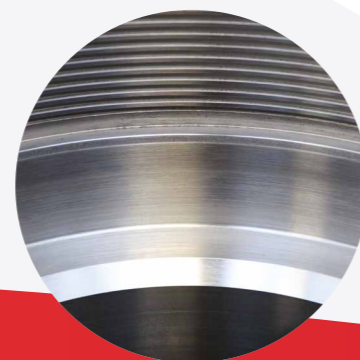
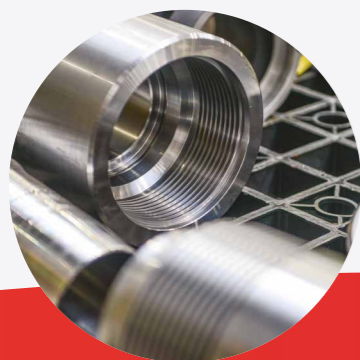
Throughout the project quality was assured by Probe. An ultrasonic examination of the raw material, magnetic particle examination of pre-clad surfaces and a dye penetrant examination was carried out. Final examinations and surface hardness surveys ensured that all products produced by Probe were fully compliant with the requirements of the specification.

Dave Good, Technical Sales Manager, Probe, said "We worked very closely with our client on this project, responding to developments throughout the process. We are delighted to have been a main supplier of components for this pioneering piece of work, which by being fully clad, has set a standard for future equipment for operators in the North Sea."

### The result

A successful solution to the client's requirements had been created. Probe supplied the equipment in a timely manner, allowing our client to complete the build of the high-pressure filter system which was then delivered to the operator in the North Sea.

**“As this was our first time producing a fully clad filter system it was key that we used a supply chain partner who had a long-standing reputation in this area. Probe were able to deliver a foolproof solution which was fully compliant to the quality standards we required.”**



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