

# 多工艺焊接系统的进步 带来好处多多

## Advances in multi-process welding systems deliver increasing benefits

《石油天然气》就新型单焊炬焊接系统M400采访了CRC Evans公司销售总监Henk de Graaf。M400具有轻量、多工艺和多电源的特点

Oil and Gas Technology spoke to Henk de Graaf, sales director onshore east at CRC Evans about the new M400, lightweight multi-process, multi-power-source, single-torch welding system



M400系统是个“多面手”，可以应用于多种工艺  
The M400 system an all-rounder that is able to perform under multiple processes

《石油天然气》：什么是M400系统在石油和天然气行业发展的驱动力？

Henk de Graaf: M400系统的设计理念是覆盖传统的手工焊接工艺和高效自动焊接系统之间的真空带。

Oil & gas Technology: What were the drivers behind the development of the M400 system in the Oil & Gas sector?

Henk de Graaf: The M400 system is designed to cover the gap between the conventional manual welding processes and

M400系统旨在用于多种焊接工艺  
The M400 system is designed to  
match several welding processes



the high productive automatic welding systems.

As the M400 can perform on several kinds of welding processes and is not limited in terms of power sources it is able to cover a wider range of applications. Not only the smaller diameters and shorter tracks are suitable, but also tie-in welding, pre-fabrication and all kind of workshop applications can be covered.

An additional feature is the way the welding torch can be set at several angle and degrees that makes it suitable to run on fillet welds.

由于M400系统可以应用于多种焊接工艺，并且不受电源限制，它能够应用于更广泛的领域。这套系统不仅适用于直径较小并且比较短的管道，同时可以用于连头焊接、预制件及车间的各种应用。

这套系统的另外一个特点是焊枪可以设置在几个不同倾角与度数，使得它适用于角焊缝。

#### 《石油天然气》：是什么推动了机械化焊接需求的增加？

**HDG:** 对于管道承包商来说，随着生产水平的提高，缩短施工时间可以节省大量成本。CRC-Evans先进的自动化焊接系统能够把缩短施工时间与针对焊接参数的全面的质量控制相结合，这表明CRC-Evans可提供优异的性能，这一点可通过经过验证的结果证明。

#### 《石油天然气》：您能介绍一下与以前的系统相比，M400系统有哪些技术进步吗？

**HDG:** 在我们目前的设备系列中，M400是最智能化的系统之一，新软件的应用使它能够与模拟和全数字化焊接电源稳定、安全地对接。与当前市场上的同类商品相比，正是这一点独特功能使得M400可以在操作上具有许多应用选择，成为独一无二的焊接系统。

#### 《石油天然气》：M400系统是为哪种应用所设计的？

**HDG:** 作为一个多功能的系统，M400有着广泛的应用领域。

#### OGT: What has driven increased demand for mechanised welding?

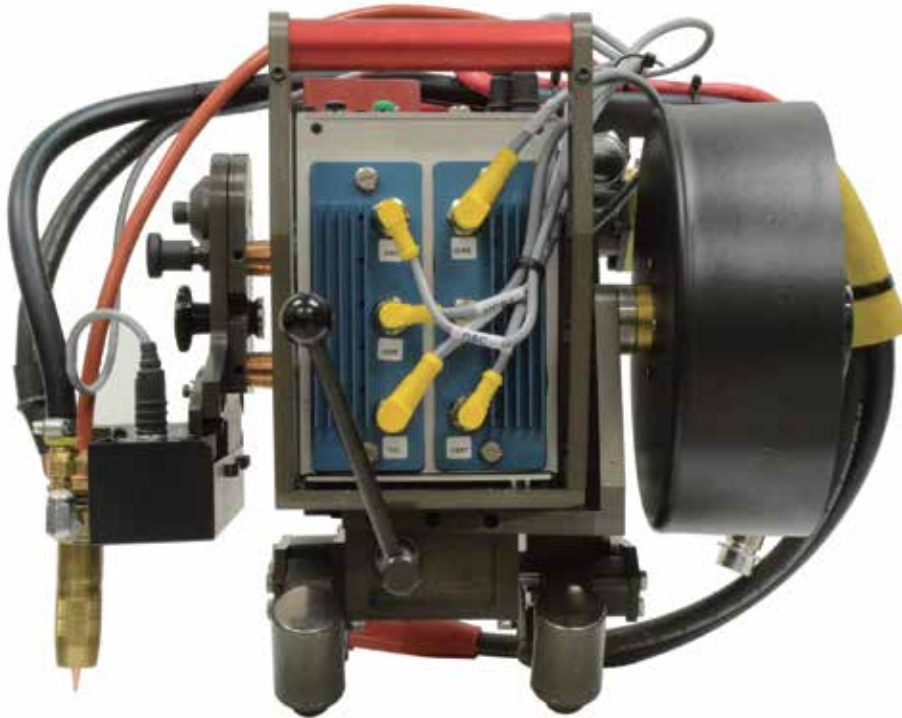
**HDG:** The increased levels of production result in shorter construction times which is a tremendous cost saving factor for pipeline contractors. When this is combined with the full support on quality control in respect to the registration of welding parameters it means that the CRC-Evans high advanced automatic welding systems are delivering excellent high performance which are backed up by proven results.

#### OGT: Can you describe the technology advances in the M400 over previous systems?

**HDG:** The M400 is one of the smartest systems in our current equipment fleet. New software makes it possible to have a stable, secured interface with both analogue and full digital welding power sources. This is one of the unique features that allows operations various application options, which makes the M400 one of a kind when compared to what is available on the market.

#### OGT: What type of applications is the M400 system designed for?

**HDG:** As a multi-functional system there is a wide range of



M400系统M400可以与焊芯工艺组合，用在填料层和盖层上  
The M400 can be used in combination with a flux cored process for the fillers and cap layer

就管道建设工作而言，CRC-Evans专注于那些高度自动化的焊接系统不适用的领域，举例而言，M400系统在直径较小或较短的管道上可以发挥巨大的作用。

M400系统也为根焊区的手动工艺留下了空间。在这些情况下，M400可以与药芯焊丝工艺组合，用在填充层和盖面层上。对于那些正在寻求现代技术以实现根焊的客户，M400系统可以与STT模块配合来进行第一层焊接。

《石油天然气》：这能够给操作员带来哪些优势？

HDG：新技术的应用形成了一种简单、可行的系统，这种系统带来多方位视觉与对电弧的精确控制。坚实的轻型自动电焊机头和升级后的遥控板使得操作这种系统变得轻松和愉快。焊接参数可以通过配件在现场遥控板上调整，或者单独编写，可以上传或下载参数。

《石油天然气》：您能描述一下使用这套系统的典型焊接工艺吗？

HDG：总的来说，M400系统是个“多面手”，可应用于多种工艺。该系统旨在应用于多种焊接工艺：采用像STT这样的冷根焊工艺做有间隙或甚至无间隙的根焊焊接；气体保护药芯焊丝工艺；自保护药芯焊丝工艺等

《石油天然气》：有间隙根焊有哪些优势？

HDG：主要优点是可用于标准的API工厂坡口，以避免所有的管子

all kinds of applications possible.

In respect of pipeline construction work, CRC-Evans has focussed on all applications where the highly productive systems could be less feasible. For example on the smaller diameters or shorter tracks the M400 system would be very helpful.

Also the M400 still leaves room for manual processes for the root area. In these cases the M400 can be used in combination with a flux cored process for the fillers and cap layer. For clients who are looking for modern technologies for the root bead the M400 can be connected to an STT module to weld the first pass.

OGT: What advantages does it offer operators?

HDG: New technology has resulted in an easy and workable system with full vision and control of the welding arc. A lightweight but solid welding bug and the upgraded pendant are making operating the system easy and enjoyable. The welding parameters can be adjusted on the spot by the pendant or separately written to be up or down loaded.

OGT: Can you describe the typical welding process using the system?

HDG: The M400 system is in principle an all-rounder that is able to perform under multiple processes. The system is designed to match with several welding processes: root pass welding with open or even closed root by using a cold root process, like STT; gas shielded flux cored process; and self-shielded flux cored process.

OGT: What are the advantages of open root welding?

HDG: The main advantage is working with the standard API factory bevel, to avoid re-bevelling all the pipes. In particular in remote areas, smaller diameters and with shorter length it could be more feasible to use the standard API factory bevel.

The M400 in combination with the STT process is providing excellent results on open root welding. With the combination of

重复加工坡口。特别是在偏远地区，针对具有较小的直径并且长度较短的管道，可使用标准的API工厂坡口。

M400与STT工艺组合在有间隙根焊方面使用效果优异。结合采用药芯焊丝焊接其余焊层，整个接头可以使用相同的自动焊接系统进行焊接。相比传统的手工艺，它能大幅提升效率。

**《石油天然气》：展望未来，你认为管道焊接还有什么其他的发展趋势？**

**HDG：**总的趋势是，管道业主要确保他们正在使用的管道是安全有保障的。因此，参数记录将成为全球范围内日益增长的要求。

当谈到需要基体材料满足机械性能时，传统的焊接工艺越来越不适用于更高钢级、更现代化的管材。基于以上原因，同时为了增加效率，我们可以在施工过程中使用自动焊接系统，这可以带来很多好处和成本节约。

自动焊接具有多种优势，可以涵盖各个方面的应用，但管道项目的最终成功还需要由CRC-Evans等专业公司支持的熟练操作。

the flux cored on the remaining passes, the whole joint can be welded with the same automatic welding system. It will result in a major efficiency improvement when it's compared to the conventional manual processes.

**OGT: Looking to the future do you see any other trends in pipeline welding?**

**HDG:** The general trend is that pipeline owners want to be sure that the pipeline they are running are safe and secured. Therefore parameter registration will be one of the demands that will increase on global scale.

Also higher, more modern pipe grades are less favourable to conventional welding processes when it comes to meeting the mechanical properties of the base material. The reasons above in combination with the efficiency improvement that can be achieved by using automatic welding systems during construction can result in major benefits and cost saving.

Automatic welding is providing several advantages and covering all these aspects, nevertheless skilled operates supported by a professional company such as CRC-Evans are contributing to the final success of the pipeline project. ■



M400系统可以与STT模块配合来进行第一轮焊接  
The M400 can be connected to an STT module to weld the first pass