

Challenges

A major global manufacturing subcontractor of innovative braking systems for the automotive industry was looking to improve machine performance, reduce overall cost and reduce waste of machining fluids used in the manufacturing of master cylinders, anti-lock brakes and the electronic stability program, brake calipers and brake forks in two plants in France.

To address these needs, Quaker recommended the facility change to 2PAQ technology – in this case, a combination of QUAKERCOOL® W ALCA FF and QUAKERCOOL® OIL HR. Quaker wanted to show that while the solution was more expensive per gallon than some competitive products, it would provide overall cost savings by reducing waste/waste treatment costs as well as reducing downtime due to foaming issues. In addition, by using 2PAQ technology the facility would reduce the overall number of machining and grinding fluids used in both plants.

Product Description

QUAKERCOOL® OIL HR is the water soluble “oil phase” of the 2PAQ technology. Developed to contain lubricants which will perform a wide range of machining and grinding operations on Cast Iron, Steel and Aluminum, the QUAKERCOOL® OIL HR phase is used in combination with QUAKERCOOL® W ALCA FF water soluble “alkaline phase.” Concentrations of the different phases depend on the difficulty of operation, material types and severity of the working area. Concentrations can be adjusted accordingly to allow for replacement of synthetic, semi-synthetic, or micro emulsions. Thus the product needs for a wide variety of operations at one location can be addressed by using different ratios of the 2PAQ alkaline and oil phase components.

When added alone to water, the alkaline phase alone can be used for grinding of Cast Iron and Steel Alloys. The versatility of the alkaline phase also allows it to be used as a process cleaner. When the process cleaner fluid solution has reached its useful life, it can be added to the coolant tank to aid with volume control and waste reduction instead of being dumped.

As REACH regulations continue to be mandated across Europe, customers are seeking boric acid-free products. QUAKERCOOL® W ALCA BFF is a boron-free, water soluble “alkaline phase” that is used in the same manner as the QUAKERCOOL® W ALCA FF.

Providing Solutions

As a first step, the manufacturer introduced the combination of QUAKERCOOL® W ALCA FF and QUAKERCOOL® OIL HR for master cylinder production, involving one 20 m³ aluminum central system in one plant. During a period of two years with 2PAQ technology, no biocides were added to the central system – not only did this save money, but also increased worker safety.

Next, the facility introduced the same combination in the machining ABS and ESP department, involving one 100 m³ aluminum central system. The 2PAQ solution enhanced machine performance in the system by improving foaming properties, biostability and lubrication performance as well as offered more robust concentrates. In addition, QUAKERCOOL® W ALCA FF was used at a low concentration for high pressure deburring operations. This eliminated the need for a separate deburring product, and further increased cost savings related to waste treatment (the waste generated by the deburring process was absorbed into the system).

The changes in the 100 m³ central system fluids resulted in the following annual cost savings for the manufacturer:

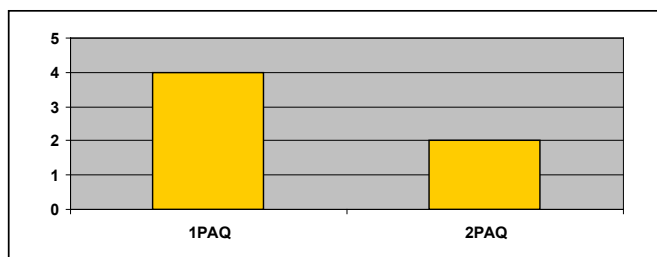
Area of Savings	Annual Cost Savings
Waste Treatment	€35,000 to €38,000
Biocide Additions	€1,000
Top-Ups	€18,000

In total, the facility’s cost savings were equivalent to 70% of the amount of its annual coolant spend.

Due to these positive results, the manufacturer recently introduced Quaker’s 2PAQ combination in their second facility in their brake calipers department, involving one 10 m³ aluminum central system, and in their brake forks department, involving one 80m³ cast iron central system.

By changing to 2PAQ technology in both plants, the manufacturer was able to reduce the number of M&G products used in their facilities by 50%.

Number of M&G products required in both plants combined.



Product & Process Expertise

Metalworking lubricants represent a very minor part of the costs in a metalworking process, typically less than 1%. This case illustrates the importance of correct fluid selection. The impact of the fluid can be a multiple of its costs, making the price of a metalworking fluid insignificant. That is why Quaker focuses on developing fluids with the highest performance without compromise, fluids that sharpen your competitive edge.

Process & Equipment

Part:	Master Cylinders
System Size:	20 m ³ , 45 m ³ /h
Water Hardness:	5 to 10° Dh – 80 to 140 ppm CaCO ₃
Concentration:	3.5% & 7%
Application Pressure:	45 m ³ /h (41,5 m ³ /h at 5 bars – 3,5 m ³ /h at 80 bars)
Filtration System:	Paper filter 100 µm type polypropylene 70 gr/m ²
Specific Operation:	Machining (drilling, tapping, milling reaming)

Part:	ABS and ESP
System Size:	100 m ³ , 510 m ³ /h
Water Hardness:	5 to 10° Dh – 80 to 140 ppm CaCO ₃
Concentration:	4% & 10%, top up 0.5% & 2.0%
Application Pressure:	510 m ³ /h (460 m ³ /h at 5 bars – 80 m ³ /h at 80 bars)
Filtration System:	Paper filter 100 µm type polypropylene 70 gr/m ²
Specific Operation:	Machining (drilling, tapping, milling reaming)

Part:	Brake Calipers
System Size:	10 m ³ , 45m ³ /h
Water Hardness:	10° Dh – 160 ppm CaCO ₃
Concentration:	4% & 8%, top up 1.5% & 3.0%
Application Pressure:	45 m ³ /h (36 m ³ /h at 5 bars – 9 m ³ /h at 70 bars)
Filtration System:	Media permanent
Specific Operation:	Machining (reaming, milling, drilling tapping)

Part:	Brake Forks
System Size:	80 m ³ , 400 m ³ /h
Water Hardness:	10° Dh – 160 ppm CaCO ₃
Concentration:	4% & 3%, top up 1.2% & 1.2%
Application Pressure:	400 m ³ /h at 5 bars
Filtration System:	Media permanent
Specific Operation:	Machining (milling, broaching, surfacing, drilling, reaming, tapping)