

INFINEUM WORLDWIDE WINTER DIESEL FUEL QUALITY SURVEY 2000

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INTRODUCTION

The Infineum World-Wide Winter Diesel Fuel Quality Survey aims to provide the petroleum refining and distribution industry with an overview of the quality of diesel in the marketplace, allowing international trends to be followed. To achieve its purpose, the Survey needs to cover as much of the globe as possible. For the Winter 2000 survey, some 293 samples were collected in 30 countries around the world. The majority of samples were collected during January and February, deep winter months in the northern hemisphere. In southern hemisphere countries, sampling was delayed until later in the year when true winter grade samples could be obtained.

Samples need to be representative of the diesel purchased by the average consumer, so they are purchased from service stations by Infineum colleagues at local area offices. As a general principle, Infineum tries to get one sample that represents the production from each refinery or region in a given country. To minimise the possibility of taking multiple samples from a single refinery, knowledge of local exchanges agreements and the distribution system is used to select where each sample is collected. For the larger diesel consuming countries, this procedure results in samples that represent a reasonable average of the overall quality. However, for smaller countries or specific producers, spot sampling over a short period of time will effectively only provide a snapshot of production quality, with data derived from only one or two samples. This can make it more difficult to evaluate trends with any accuracy.

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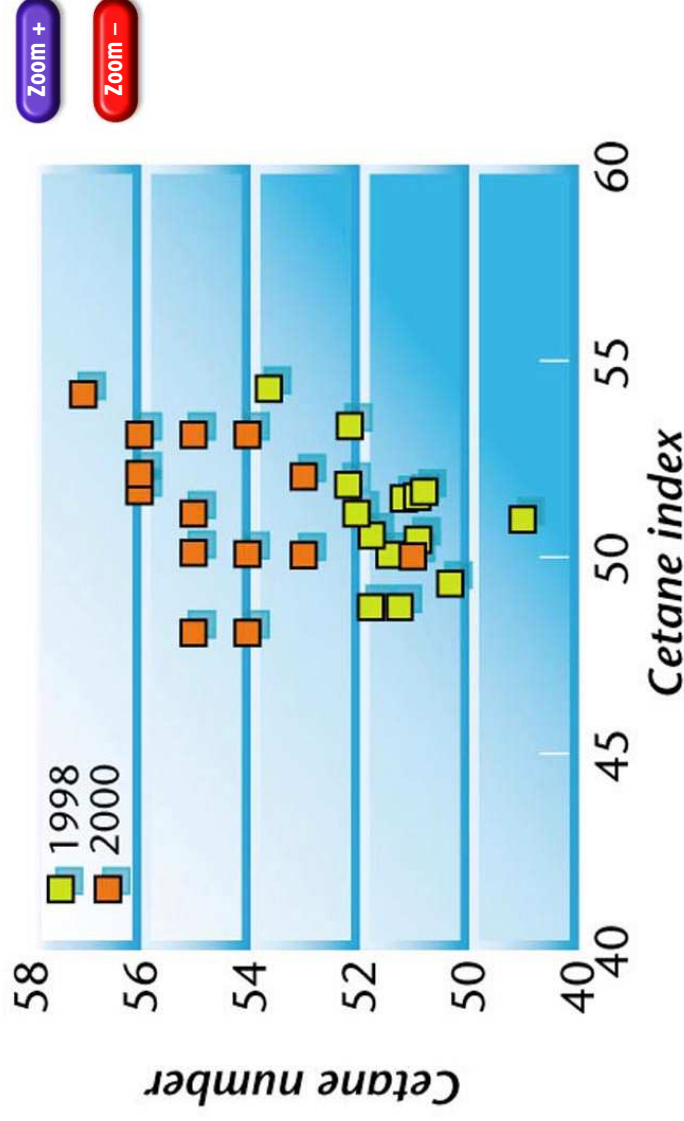
THE TRENDS

Environmental legislation in the form of increasingly tighter specifications, and OEM requirements for higher quality fuels, remain the main drivers for refiners. This year has seen the introduction of the European Years 2000 automotive diesel fuel specification, EN590:2000, that decreases the permitted sulphur level and increases the minimum level for cetane number in fuels sold Europe-wide. And in the US, forthcoming environmental legislation is beginning to have a significant impact.

Cetane number

Changing the EN590 minimum limit from 49 to 51 has resulted in a significant increase in cetane number across Europe, with the average up to 54.6, a rise of 4 over that found in the last survey in 1998. A substantial difference was found between cetane number and cetane index, indicating increased use of cetane improver in countries where diesel is produced to the EN590 specification

In the rest of the world, cetane number has remained fairly constant since the 1998 survey. Levels in Asia Pacific countries are generally high, although a small decrease has been noted in Japanese Grade 3 and Special Grade 3 samples. In South Africa, levels have been steadily increasing and now comparable with those in European countries following EN590. In the US, levels are not significantly different to previous years, with the West Coast levels remaining notably higher than those in other areas samples. This is not unexpected due to California Air Resources Board formulary requirements for diesel.



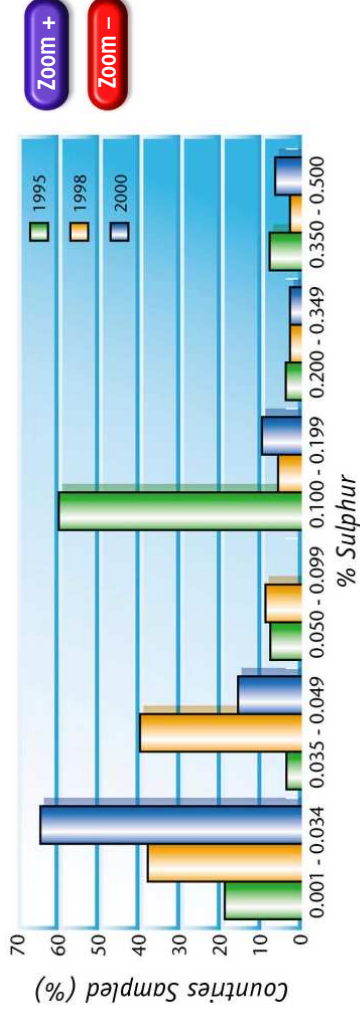
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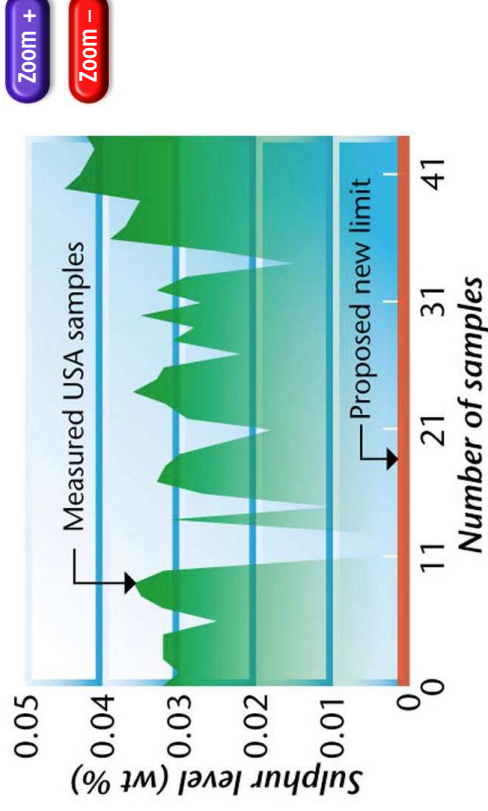
THE TRENDS

Sulphur content

Sulphur levels have been reduced worldwide, with almost two-thirds of countries surveyed now having a sulphur content in the range 0.001 - 0.034% by weight. Less than one-fifth of countries surveyed have a sulphur level above 0.05%, down from nearly one-third in 1998. Survey data indicated that the new EN590 limits of 0.035% is being achieved by all but one of the countries producing to EN590 specification.



In the US, the most prominent issue is the US Environmental Protection agency proposal to cap the sulphur content of diesel fuel sold for use in on-highway vehicles to a level of 15 parts per million (ppm), beginning 1 June 2006. This dramatic reduction will necessitate major changes in refining plants and processes and, coupled with increasing demand for product and tight refining capacity, will pose a significant challenge to US refineries. The proposed rule is already beginning to have an impact on fuel sulphur levels in the US, with some major refineries declaring their intention to reduce sulphur to 15 ppm well ahead of the 2006 deadline. The Canadian Minister of the Environment has declared that Canada will also adopt the US sulphur limits.

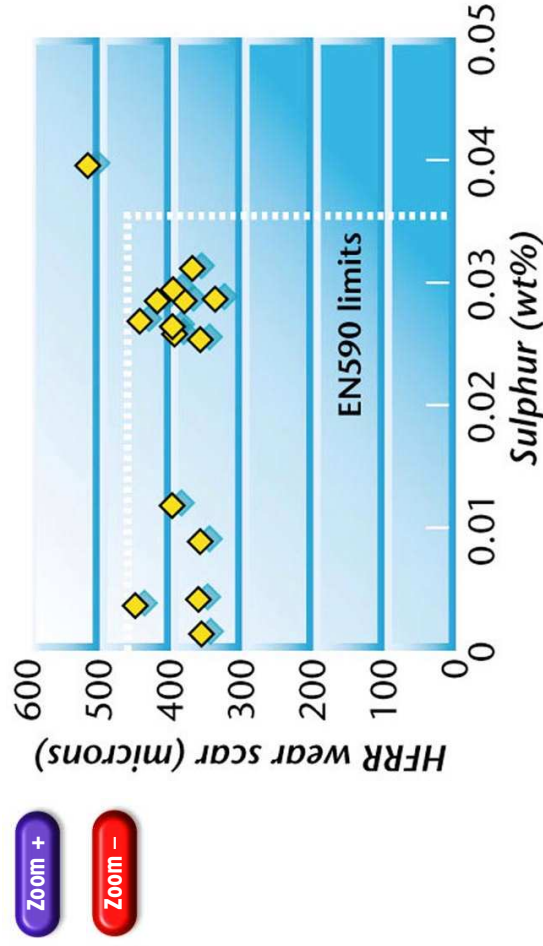


THE TRENDS

A sharp fall in sulphur levels has been seen in Korea and Singapore, following the move to low-sulphur diesel. Similar trends are expected throughout the Asia Pacific region, as more countries adopt the low-sulphur fuel.

Lubricity

Since 1998, high frequency reciprocating rig (HFRR) wear scars have improved substantially across countries producing to EN590 specification, with only one country above the maximum limit of 460 μm . The mean value of 386 μm for these countries is also better than that of 410 μm for other European countries.



Zoom +

Zoom -

Worldwide, data indicate the widespread use of lubricity additive, as the performance level of the new low-sulphur fuels remains at above that found in the 1998 survey for fuels with higher sulphur contents.

Density, distillation and cold flow

The tighter specifications for countries producing to EN590 are being met. Changes have also been seen in Asia Pacific countries, where specification are tightening in an effort to reduce smoke production, particularly in China, Malaysia and India. Despite these new density/distillation limits, cold flow performance remain essentially unchanged across all regions.

Keeping you in the picture

This is a very dynamic period in the diesel fuel industry. Significant changes in diesel fuel quality in response to regulatory, social and industry forces are underway around the globe. The Worldwide Winter Diesel Fuel Survey 2000 provides a snapshot of the properties of diesel fuels being marketed today. These changes will surely be even more evident in Infineum's next survey, targeted for 2002.



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