

Risk assessment of the Kraftfahrt-Bundesamt (KBA, Federal Motor Transport Authority) concerning the use of refrigerant R1234yf in vehicle air conditioning systems (MAC)

Flensburg, 8 August 2013. As a national product safety authority, the KBA is obliged to follow up information regarding products which may not be safe. The KBA has met with this obligation in the context of the use of the refrigerant R1234yf in vehicle air conditioning systems. Enquiries with the responsible vehicle manufacturers resulted in a very uneven picture regarding their risk assessment. Because of this, a neutral risk assessment by the KBA was impossible.

For this reason the KBA initiated and coordinated tests in order to come to its own risk assessment. For the actual test, the four best selling models of vehicle in terms of registration were chosen which use the new refrigerant R1234yf according to its type-approval. The tests were carried out by TÜV Rheinland under the stewardship and on behalf of the KBA in cooperation with the Federal Highway Research Institute (BASt), the Federal Institute for Materials Research and Testing (BAM) and the Federal Environment Agency (UBA), pursuant to the jointly developed test parameters. During the course of the investigation, vehicles were subject to a crash test comparable to UN Regulation 94. The damage patterns for the selected crash vehicles were analysed, especially with regard to the components of the refrigerant circuit. Outflow tests were completed on the refrigerant in the crashed vehicle with a hot engine with the intention of providing further knowledge on the evaluation of the risk.

As a result of these tests, no adequate proof of a serious hazard in terms of the Product Safety Law (ProdSG) occurred for the vehicle types tested here and now available on the market. Accordingly, pursuant to the ProdSG, no specific measures are to be initiated by the KBA.

To ensure that the observed range of testing was not too narrow, for the purpose of verifying the results beyond the empirically proven damage pattern for subsequent tests, the KBA decided to ascertain whether cases of hazard were to be expected under tightened test conditions. During these tests, in two cases, hydrogen fluoride (HF) exposures were determined, and in one case, reproducible flammabilities were additionally determined, which point to risks with the use of the refrigerant R1234yf. Comparative tests with the 'old' refrigerant R134a did not lead to any hazard scenarios, however.

With the participation of the Bundesministeriums für Verkehr, Bau und Stadtentwicklung (BMVBS, Federal Ministry of Transport, Building and Urban Development), the KBA has sent an interim report to the EU Commission. The final report will be finished in the autumn of this year. In a letter to the EU Commission, the KBA emphatically recommends carrying out further tests to be able to better evaluate the potential risks of the use of refrigerant R1234yf in vehicle air conditioning systems.

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