



WP1.F1 / EXPERIENCES FROM THE INSTALLATION AND THE OPERATION OF THE NEW SYSTEM GENERATION:

SOLAR SYSTEM CONCEPT WITH WATER FILLED COLLECTOR LOOP

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CONTENTS

SUMMARY

RETROFIT COMPATIBILITY AND MARKET SUCCESS

ELIMINATION OF GLYCOL DETERIORATION

AUTO DIAGNOSTICS, PROBLEM CORRECTION AND SYSTEM AVAILABILITY

REFERENCES

ACKNOWLEDGEMENTS

SUMMARY

Two of the promising solar thermal energy system concepts (/Vog06-1/), are the concepts with water filled collector loop. They were evaluated theoretically, which is reported in /Vog06-2/, /Abr06-1/, /Abr06-2/. The system concepts were implemented through the development of a variety of products. These solar water heaters and combisystems (for space heating and domestic hot water preparation) are marketed under the designation AquaSystem. Adapted components are sold as packages to serve specifically as new heating systems or as solar retrofit packages (a set of components to complement an existing heating system for solar energy utilization). The products were successfully introduced into the market during the NEGST project. Even though there was no on-site evaluation carried out on a scientific level, conclusions can be derived from the installation and operation of the large number of systems. The most important experiences are: the marketing advantage due to retrofit compatibility; the elimination of glycol and the problems with its deterioration and the enhanced system availability through auto-diagnostics and stringent problem correction. These experiences are described below.

Retrofit compatibility and market success

The AquaSystem is very successful on the market. Already, it widely replaces other system concepts among products offered by the company Paradigma, which produces and markets the AquaSystem. Approximately 90% of all solar systems sold by Paradigma are of the AquaSystem type. Traditional solar systems, utilizing antifreeze fluid (a mixture of glycol and water) in the collector loop, are still offered, but make up for as little as 10% of the companies total system sales. The success of the new system concept is widely based on the fact, that, in many cases, it complements the existing heating system without the necessity to replace an existing water heater store. However, the near-thorough replacement of the traditional system concepts indicates that the AquaSystem is a viable solution for newly built heating systems too. There are several additional advantages associated with the concept. Until November 2006 15'000 systems employing the new concept have been installed.

Elimination of glycol deterioration

Among other advantages, mentioned above and outlined in more detail in /Abr06-1/, /Abr06-02/ and /Vog06-2/, the problem of glycol deterioration caused by high temperatures in the collector loop is eliminated with the AquaSystem. This inherent advantage of the system concept reduces the effort necessary for maintenance and eliminates the risk of damage caused by glycol decomposition and subsequent corrosion or freezing.

Auto diagnostics, problem correction and system availability

One essential requirement of the AquaSystem is that the collector loop has to be operational for freeze protection. Therefore, auto-checking of the system availability by the system controller is required. As a by-product, the extensive auto-checking functions implemented in the controller of the AquaSystem detects malfunction or defects throughout the year. In case a malfunction is detected, the user is warned (by means of an audible signal) to have the problem solved. Thus system availability is increased. In the winter period of 2005/2006 freezing occurred in 0.5% of the systems installed. Because there are other passive measures to reduce the consequences of freezing, the system is not normally damaged or only suffers marginal damage if freezing occurs. The 0.5% figure suggests that about 99.5% are operating well. This is true not only for the season in which freezing may occur, but throughout the year. 99.5% is a remarkably high number. (There is no statistic figure on the availability of solar heating systems in general. However, it must be assumed that the average system availability is significantly lower.)

References

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- /Abr06-2/ Abrecht S., H. Drück, E. Streicher (2006): WP1.E2 / THEORETICAL EVALUATION OF PROMISING SYSTEM: solar combisystem concept with water filled collector loop. (/NEGST/).
- /NEGST/ New generation of solar systems. Project description and public deliverables: <http://www.swt-technologie.de/html/negst.html>

Further information is available on the project website:

<http://www.swt-technologie.de/html/negst.html>

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