



# Euro vision

The design of the sound, video and control systems for a Swedish venue relied on the early involvement of acoustic consultants

**Above: The 1,700-seat concert hall is the largest in Sweden**

**Opposite: The large concert hall with all its absorptive curtains lowered into place**

**L**augurated in 2015, Malmö Live is a building complex consisting of a concert house, a congress center and a hotel. Danish architect Schmidt Hammer Lassen designed the 56,000m<sup>2</sup> building as a cluster of rectangular blocks. The congress block contains a 1,500-seat congress hall and several meeting rooms. The 17,000m<sup>2</sup> concert block contains two concert halls, rehearsal rooms and administration facilities. The large hall is essentially a shoebox with two balconies and, with its 1,700 seats, is the biggest concert hall in Sweden. The small hall is a flexible black box with around 300 seats. Both halls have motorized absorptive roller curtains for easily variable acoustics. In the small hall the reverberation time can be varied between 1.2 and 1.6 seconds, and in the large hall between 1.5 and 2.2 seconds in

the mid-frequency range – these variations lead to a significant difference in the sound produced.

## Healthy competition

In 2011, Swedish acoustic and AV consultancy company Artifon was tasked with the design of the sound, video and control systems for the concert block. Systems were designed for sound reinforcement, sound and video recording, calling, stage listening, show control, video projection, video distribution, wireless intercom and digital signage.

“We had the privilege of being involved early in the planning process,” explains Alf Berntson, chief consultant at Artifon. “This is important since the AV equipment has a high impact on the building and a successful result depends on placement possibilities and room acoustic





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conditions.” It was decided to divide the systems into seven contracts to increase competition and attract the most qualified contractors.

There are two loudspeaker systems in the large hall – a main sound reinforcement system and a surround system. Extensive calculations of the main system were performed in CATT Acoustics to optimize the coverage and achieve high definition from the loudspeakers. “Through careful design we were able to achieve calculated mean values of the speech transmission index (STI) of 0.64 without curtains and over 0.70 with curtains, which is a very good result,” says Berntson. The requirements set out in the original specification documents were a little lower, but with clearly defined conditions and percentage of coverage that were easy to verify with measurements. The maximum sound pressure level was set to  $Leq \geq 113\text{dB}$  with a

maximum standard deviation of 1dB, as this level was deemed sufficient for most performances. The main loudspeaker system supplied by d&b consists of three FOH line arrays (L/C/R) for the parterre and the first balcony, a vertical sub-array of cardioid subwoofers, five front fills, three array fills for the rear part of the second balcony, eight fills for the second balcony sides, and 13 hidden fills for the first balcony around the stage. The surround system around the walls and in the ceiling consists of 53 loudspeakers from EM Acoustics, all with individual amplifiers.

The high sound quality was praised by the audience following the first test concert, which featured some of the most famous artists in Sweden, including the winner of the 2015 Eurovision Song Contest, Måns Zelmerlöw. ■

[www.artifon.se](http://www.artifon.se)

# When Sound Becomes Art

“Artifon’s contribution has been absolutely invaluable to the great results we see at the opera today.”

NICOLAI NISHINO-EKEBERG, head of the sound and video department, Oslo Opera

“We are extremely pleased with Artifon’s work. It has simply been brilliant!”

BERTIL KLEVNER, technical director, Folkteatern, Gothenburg

“Artifon has been able to put numbers on how we experience singing in the room. They have really contributed to that music and technology have been able to meet in this project.”

CHRISTINA HÖRNELL, Chorus Master, Royal Opera, Stockholm



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Consultants in acoustics,  
A/V-systems and Show Control  
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