

Product Analysis.

According to Mr. Tamborini the ACS product has a lot of advantages.

As understood by us, a few of them. The question is do you agree with the advantages and can you tell me why?

More animals per square meter in the laboratory.

Could be. We didn't check it.

No use of electrical power.

Correct and very important

No engine vibrations or noise, less stress for the animals.

Correct and very important

Better and not forced air flow.

Correct and very important

Firm reduction of bad smell in the laboratory.

Yes, because the exhaust pipes of the system are connected directly to the exhaust system of the room. Of course, this means that the animal facility must have a good functioning HVAC system.

Less pollution of the rack, so less cleaning.

Yes because of the extra filter at the back side of the cage.

Our animal technicians noticed that the cages became less dirty in the motor free ventilated cages than in the forced air ones. A possible explanation is that in the forced air ventilated systems the pheromones, which are produced by the animals, are quickly removed from the cage due to the high air flow (60-70 ACH) so the animals have to produce more faeces and urines in order "define" their territory in the cage. This seems to be a minor issue for motor free ventilated cages as the ACH are approximately 25.

Better growth because animals use the whole cage.

Based on a recent study we have performed and published in the 3rd East Mediterranean Regional ICLAS Symposium the growth of animals seems to be better in motor free ventilated cages than in forced air, while no differences was noticed on food consumption. This difference could be related to disturbance of the animals created by the high airflow within the cage.

Much better access to food.

Could be as the food hopper is located closer to the animals

More water in the bottle.

Could be

In case of a leaking watering system the water can escape and prevents the animals from drowning.

Could be we didn't check it because we do not have auto watering, we use bottles.

Easy installation of the system.

Correct

Better visibility at the animals for the animal technicians.

Could be. However, in our case, we didn't notice any great difference comparing to forced air systems.

Cage is self enriching.

Correct

Better purchase price compared to competitors? If yes, much?

Yes, as you don't have to pay extra for ventilation units. This means a gain of approximately 6.000 to 7.000 euro's plus the maintenance cost of the units.

**So far we have discussed positive points only, are there also negative points noticed during the time that you have been using cages from ACS?
Please your comment.**

The main point is that as the exhaust of the motor free ventilated system is connected directly to central HVAC system, this Central system should be good. As the motor free system is using the air from the room, this air should be of very good quality, filtered by central HEPA filters etc. This mean that the initial cost for the construction of the Central HVAC system would be probably increased. On the other hand forced air systems have there own ventilation unit where the air from the room is filtered passing from the HEPA filters of the unit.

I have to clarify that in our case we didn't face any problem because the Central HVAC system of our Institution is really very good.

There are also some discussions concerning the concentration of NH₃ and CO₂ levels in the cages. In the motor free ventilated system we have approximately about 25 ACH while in forced air ventilated system we have 60 or 70 ACH, so the concentration of NH₃ and CO₂ should be higher in the first case than in the second. We are working on that and the only comment I can make for the moment is that we didn't see serious differences between the two systems at least for the first five days of keeping cages with the same bedding. In our case we are using corncob as bedding material.

A hesitation we had was the overall design of the Optimice System (carousel).

However after using the system we became familiar and we didn't face any problem. The quality of plastic material of the cages and the bottles is good and we didn't notice any problems mainly due to frequent autoclaving.

Another issue is that comparing to the forced air systems, (at least as far as I know) the user can't regulate the motor free system to run under positive pressure. It functions only under negative pressure. We can't also change the range of ACH. Of course this is a matter of specifications and couldn't be considered as negative point.

In conclusion, we didn't face any negative points during the time we are using the system.

Personally, I believe that this kind of system must be available on the market for two main reasons a) economy for the users (low purchase and maintenance cost) and b) good housing conditions for the animals.

Kind regards,

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Thank you for your email. I am pleased to provide a reference for the carousel system of rodent caging. I provide the following answers to the questions you sent to me:

How is the service? Are you satisfied with it?

The design and manufacture of the carousel system is such that it requires no ongoing maintenance. It does not require an electricity supply and is therefore self-sufficient, working on negative pressure by connection to the animal room ventilation extract system. The service from the company which manufactures the systems, Animal Care Systems based in Colorado is excellent, as is the service from my local UK distributor. I have also performed audit inspection visits to the manufacturing facilities in Colorado on two occasions. The facilities where the carousel systems are made are excellent, with full business continuity arrangements and fiscal and spare part guarantees into the far future.

How long are you using this system?

I have been using the system for 5 years with no problems or issues identified at any time. I am very happy with the equipment and it has been a great success within my facility.

How do you like working with the carousel housing system?

The carousel system is an excellent system and very easy to use by all members of my staff – both small and large people! It is ergonomically excellent, and has rack number- and letter indicators to ensure that cages can be found quickly.

If most of the cages are filled with animals is it still possible for one person to transport the carousel?

Yes, one person easily moves the complete rack containing 100 cages from room to room, or within the animal room.

Do you take the entire carousel with you when you're changing the cages, or do you change the cages in the same room as the carousel is? If you take the carousel to another room for changing, do you find this easy to do?

The carousel is occasionally moved from room to room, but most of the time it is moved within the animal room. It is very easy to move and can be done with one person. It is very stable when moved with no problems identified at any time.

In general, do you find it more/less time consuming compared with the system you were using before, what type did you use before the carousel, so we can compare.

It is difficult to compare, as it is a completely different caging system from anything I have used before. We previously used Individual Ventilated Cage (IVC) systems before using the carousel system and they worked well. However, the carousel system is easier to use, is easy to clean, and as it requires no electrical supply, it does not have ongoing maintenance costs or ultrasound vibration which may be detrimental to animals. In general, we have found the carousel system to be less time consuming.

Is it easy to replace the water bottles? Or does it take a lot of time with opening closing all the cages?

I like the fact that you need to open the cage top to access the water bottle as it enables the technician to have a clear view of the animals on a daily basis. It's very easy to open and close the cages, and to replace the water bottles. I know that also cages with the bottle on the outside are offered. Do not forget that animals drink less in those cages compared with forced ventilation, so how many times do you need to replace the bottles? They contain 400 ml of water....

If you're using the automatic system, do you have any problems with leaking water?

I have never used the automatic watering system so unable to provide comment on this.

Is it possible to autoclave the entire cage?

Yes, we routinely autoclave the cages and associated equipment without any problems.

Is it possible to leave the carousel in the room when you fumigate the room?

Yes, this is the method we use and is successful.

Does it cost a lot of extra time compared to regular housing to check the animals every day, since it's a carousel and you have to turn it?

No. Once your staff are correctly and competently trained in the use of the carousel system it actually takes less time to service a rack than a conventional type caging.

Is it easy to see the animals in the cages?

Yes, it's very easy to view the animals as we have the light coloured base plates in all of our carousel systems.

Is it easy and quick to disconnect the system from the ventilation in the ceiling and the watering system, what are your experiences?

Yes, it takes less than a minute to disconnect the exhaust tube from the ventilation system, and the same time to reconnect. We do not disconnect on a regular basis as we have made the ventilation pipes (plastic) of a sufficient length to enable the carousel rack with cages to be moved very easily short distances within the animal room.

If you could do it over, would you buy this system again, or would you have chosen some other type of housing method?

Yes, most certainly. It is the best type of animal caging I have ever used. It does exactly what the manufacturer says it does, at minimal cost and very little ongoing costs. It is excellent for staff, and excellent for animal welfare, as we have housed both normal and immunocompromised rats and mice without any problems.

Do you have any idea how long the cages will last before they need to be?

I expect the cages to last a minimum of at least 10-12 years.

We have cages in use for five years with no signs of wear or damage.

They are very robust.

Do they quickly damage by washing/autoclaving them?

No. I have not observed any damage to the cages we use each day. Even if the cages are accidently dropped onto a hard surface, they are very durable.

Are there any other things you think is good to know when you work with these types of housing, either good or bad?

I have yet to find any negative points in regard to this caging system – they are excellent on all counts. I have purchased a total of 30 racks over the past five years and I am very happy with them. Additional Points for Consideration by use of the carousel system, you have the ability to house double the number of cages on the same floor footprint. I was able to double my animal room capacity overnight by use of this carousel system. It is quiet and emits no noise as there are no electrical fans or electricity supply. It eliminated allergens and smells from the animal room as it works on negative pressure from the room extract system, therefore no additional or ongoing costs. It also contributes to enhanced animal health as a result of the negative pressure arrangement. Filters are inexpensive and easy to change, and the filters used on the cages required changing once every 12 months minimum. Newer filters are now available which require no maintenance and are guaranteed for the life of the cages. There are also different cage equipment configurations depending on the customers requirements and animal studies conducted.

Please be aware that I have no affiliation of any kind to the manufacturers or suppliers of the above equipment. The opinions expressed are entirely my own.

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Testimonials from The Netherlands

My comment about your EVC cages is that we like it.

What is different comparing working in a conventional way with the open cages that we had before is that I had to get used cleaning and handling the cages. Different is even so checking animals behind plastic. Animals do show more in an open cage, animals kept in EVC cages you have to watch with more attention if you want to see details.

But to come straight, the materials do look very solid to me. In the beginning I was concerned about the auto water valves but they also look very solid. Only once in the years behind us we had a small inundation in one cage due to one obstructed watering valve but the solution was very easy and not even one single animal has drowned because the water has flown away trough the front filter.

I heard from my colleagues that a few clips have broken but only of the lids that were custom made for us by you but also no issue because they were replaced very adequate.

In general I can say, so far now, that working with your system is really satisfying.

Best regards,

**Anonymous
The Netherlands.**

What I really like about Animal Care Systems EVC cages?

- The huge number of cages per square metre compared to our old situation with open cages we now have 5 times as much animals in the same space
- The allergen free aspect is so important.
- Cross contamination absolutely impossible while using those cages in combination with changing stations.
- Safety for the animals and the animal technicians because it really is allergen free.
- While working with the ACS EVC cages you really smell nothing.
- If you follow the right procedures it is absolutely impossible that the animals smell each other. No cross contamination.
- The costs.
- In the old situation we had 6 rooms to house the animals now we only needed two rooms.
- First I had the idea that I had to get used to working with those carousels but it was much easier to get used to it than I thought.
- Now I think that it is a better way of working.
- While working with those cages you can easily hang up the bottles and the food hopper on the outside of the cages, which is very easy.
- The animals are in a well protected IVC area and they really drink less compared with a forced IVC area.
- The bottle is big and we now change it only once per week but we are thinking about changing it even less.
- Cleaning of bedding material is also reduced because of a lower NH3 level in the cages.
- It does not need any maintenance at all, only changing filters once per two or three years which is an easy job.
- For us animal technicians it is good to work in an allergen free environment and you really can not smell the animals.
- The system does not produce any noise.
- We were able to increase our capacity because of the high density and we now have more space left in our laboratory.
- We monitor the air speed easily with the rack monitoring system and it is always okay. Anonymous,

Best regards,

Anonymous
The Netherlands.