

## Suggestions for Better Use of Stainless Steel Tubes

**Let's go green...** Get out of sausage casing to reusable and environment-friendly stainless steel tube for consistency.



(The following dialogue was created based on my communications with the industry personnel who first tried this stainless steel tube. With my answers, you can find a logical reason to use this environment-friendly and convenient stainless steel tubes.)

Accepted points:

1. Stainless steel tube test result was close to casing film test result  
JP- I am glad to hear that the test results are the same between two methods.

Not accepted points;

1. Not easy to take out the test surimi sausage (sticking inside tube)

JP- Pam oil spray (see the photo, right) must be applied or veggie oil can be applied inside tubes using sponge brush (right). That will prevent the sticking and help remove gels easily.

2. When takeout sausage, easy to break (became not accurate test data)

JP- This is probably the result of gels stuck to the tube. Gels were damaged when they were removed from the tube. With oil spray, gel should be removed easily using a finger. You may use a plunger to push it.

3. Not easy to clean (cooked surimi was hard to cleaning)

JP- Extremely easy to clean if you use a soapy sponge brush (above). Your problem was caused by the fact that no oil was sprayed inside the cooking tube.

For cleaning cap threads, a small test tube brush is ideal to remove cooked surimi easily from cap threads.

4. If we get this, we will need more cleaning time (if we have 5 surimi samples, we need 30 tubes and 60 caps need to clean)

JP- Cleaning time should be a few seconds for one tube if oil spray was used before stuffing the paste. This 12-inch tube will give you 10-12 testing samples. Therefore one tube is enough for one treatment indicating 5-10 tubes for 5 surimi samples. Uh?

5. Not easy to fill in surimi (not clear tube: we can't see inside)



JP- I am sorry again. I did not provide a right stuffing nose. I assume you would ask your maintenance to make a long stuffing nozzle like on the photo (right).

6. Little long

JP- It is designed to cover two sausage casings. It is 12 inches long.

7. Heavy

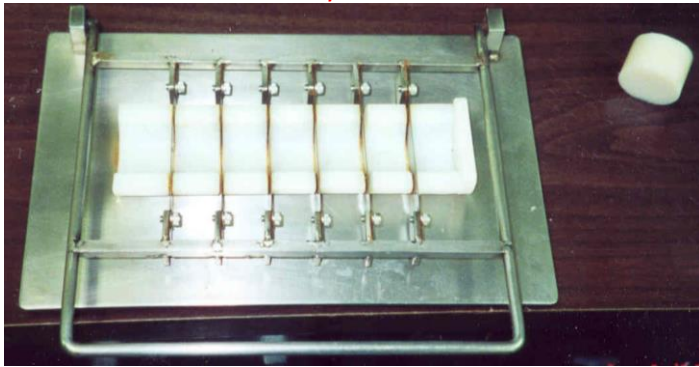
JP – It is definitely heavier than a plastic casing. But...

8. Tube diameter was different (stainless steel tube was small)

JP- If you find the diameter was different, it is the problem of your sausage casing. Your sausage casing is supposed to give 48 mm long (when it is folded flat) and 30 mm diameter. The stainless steel tube was specially designed to have 30 mm inside diameter (and thickness in 2 mm). When you find plastic casing with defects (not thermally stable), this plastic is expanded while surimi is cooked. Therefore gels cooked in a plastic casing can be expanded due to the pressure built at cooking. Therefore gels might be larger (1-3 mm larger diameter). However, a good quality plastic casing does not have this extension problem. If a poor quality plastic casing is used, you may end up with a larger gel which is likely to give wrong values of surimi. One of the advantages in this metal tube is that you will always have 30 mm diameter sausage gels.

7. Difficult to accurate cut to the test piece

JP- You will need to talk to your maintenance to make a new gel cutting device.



8. We can't kept for the comparison surimi color (no film)

JP- I understand your point. Do you mean you cannot see the surimi gel while being cooked in the metal tube? Oh well. Do we really need to see the color of gels while being cooked? We measure the gel color after cooking. Right?

At our laboratory we compared gels prepared using sausage casings and stainless steel tubes. After two batches, we can confirm the gel data from two methods are not statistically different.

|  |                        | Diameter (mm)* | Breaking force (g) | Penetration distance (mm) |
|--|------------------------|----------------|--------------------|---------------------------|
| Batch 1  | plastic sausage casing | 32.7           | 212.26±22.45       | 8.62±0.99                 |
|  | stainless steel tube   | 29.9           | 229.48±18.65       | 9.96±0.70                 |
| Batch 2  | plastic sausage casing | 32.5           | 256.57±13.58       | 9.61±0.48                 |
|  | stainless steel tube   | 29.6           | 238.67±19.14       | 9.67±0.68                 |
| *Diameter – the diameter of gels measured after cooking. |                        |                |                    |                           |

Please note that plastic casing expands during cooking with approximately 10% volume change. In fact, gels cooked in sausage casing gives actually enlarged. Gels with larger diameter, which will conduct the heat slowly, will be exposed to more proteolytic enzyme degradation, resulting in lower gel values and further underestimating the value of surimi.

### **Contact Information**

I have created this reusable stainless steel tube to move our industry more toward environment-friendly and convenient mode using a local machine shop ([www.warrenjunes.com](http://www.warrenjunes.com)). I have no interest related to this company. Make a direct contact to Warren Junes Machine Shop for your purchase while technical questions can be given to me.

Prof. Jae Park  
OSU Surimi School  
[surimiman1@yahoo.com](mailto:surimiman1@yahoo.com)  
503-325-4531 X3