Problems of web handling.

It is worth bearing in mind the following comment by one of the winding gurus ‘good winding system cannot improve a bad roll of polymer film in any way but a poor winding system can ruin a good roll of film’.

Modern winding systems will usually consistently wind a good roll of film without damaging it in any way. Thus if there is a winding problem it is only rarely that it is a problem of the winding system but in much more likely to be due to a problem of the incoming roll of material. The rolls of film can have high spots in the web profile that are from the original extrusion process or raised edges from poor slitting quality. Both of these will cause tension problems as the high spot or edge will take more of the tension than the rest of the film and this may be seen as a source of wrinkles. Often this type of problem is hidden because of the film being wound in air it allow air entrainment and the layer of air separating each layer of polymer film can mask the differences in profile or raised edges.

This highlights the major difference between winding film at atmospheric pressure and winding film in vacuum. In vacuum there is no air to act as a lubricant between the polymer and the rolls, the polymer and the deposition drum or during rewinding the successive polymer layers. The air can allow the polymer to more easily slip against other surfaces. Thus in vacuum the coefficient of friction is likely to be greater. Hence around the deposition drum as the polymer film is initially cooled and then rapidly heated the polymer may not easily slip against the drum and so if the temperature rise is too great the polymer may expand to the point where it buckles off the surface and this becomes the start of the so called ‘tramlines’ or ‘railroad tracks’.

This can be made worse because of any surface treatment. The surface treatment is designed to clean the surface of contaminants and is indiscriminate and so it will also clean the surface of additives some of which may be there to reduce the coefficient of friction. Thus well-cleaned films may be harder to wind in subsequent downstream processes because the coefficient of friction will have been increased.