Turbocharger hoses fabrication
What is a turbocharger hose?

In compressed air circuit from turbocharger to engine flexible rubber hoses dampen vibrations transmission to the intercooler fixed to the chassis.

In circuit **hot side** high temperature, vibration and pressure require hoses to be made with high performance elastomers and strong textile reinforcement.
Why use silicone and fluorosilicone rubber?

When hot side circuit temperature is around 200°C, Silicone Rubber is the material of choice. However, as some engine oil, from turbocharger shaft lubrication, is present in the air stream, an internal fluorinated liner is necessary as a barrier to avoid hose wall swelling and subsequent possible rupture.

Thanks to its excellent oil resistance Fluorosilicone Rubber is a preferred option for the liner. Also, its flexibility is important to the fabrication methods (extrusion or calendering) and to final hose mechanical performance.
Multilayer TCH co-extrusion line lay-out

1. Extruder 1 – Mid layer
2. Extruder 2 – Liner
3. Co-extrusion head
4. Cooling
5. Knitting/braiding unit – Textile
6. Caterpillar
7. Extruder 3 – Outer layer
8. Extrusion «T» head
9. Cooling unit
10. Cutting device
Extrusion w/o mandrel support

Uncured hose air support is key to avoid it to collapse under textile reinforcement pressure.
Silicone rubber screw design

- Flight width and pitch should progressively decrease towards the extruder head (here left) to help compression necessary to pull air backwards

- Minimum recommended screw L/D ratio 12:1
Extruded turbocharger hose lay-out

- HCR outer layer
- HCR middle layer
- Textile reinforcement
- FSR liner (for oil resistance)
Calendering silicone + textile for wrapping method

- Plastic liner feed roll
- Rubber stock
- Textile feed roll
Special compounds for TCH fabrication

- Thanks to a patented adhesion technology, specific but not limited to Turbocharger Hoses extrusion process, Dow has developed special FSR and HCR compounds adhering to each other when cured at same time.

- Two preferred grades are:
  - Fluorosilicone compound: SILASTIC™ FCE 50-4948 SA RED
  - Silicone compound: SILASTIC™ HCE 70-4770 SA BLACK

- Adhesion can only be obtained by coupling these special Dow compounds together.
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