



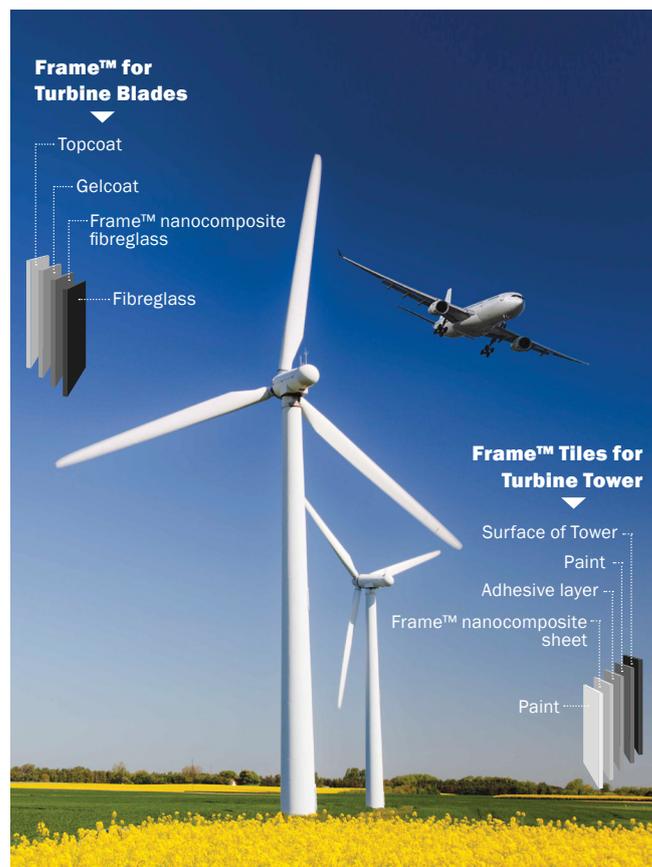
# Full radar mitigation solutions

## Frame™

Wind turbines can cause radar interference, showing up on radar operator's screens as clutter, obscuring the display and resulting in lost aircraft tracking. In many instances, these wind farms are refused planning permission resulting in costly delays.

As part of its ongoing commitment to supporting the renewable energy sector, Trelleborg have developed Frame™ an innovative radar absorbing material that mitigates wind turbine radar interference problems, unlocking gigawatts of new potential wind farm sites.

Frame™, is the new radar absorbing material for the wind industry. Frame™ has been designed to offer a full mitigation solution for tower, nacelle and blades.



## Benefits:

### Outstanding multi-band radar absorption

Recognizing that many wind farms are situated near multiple radar stations, we have developed unique multi-band absorbers, allowing a single, simple solution for a complex problem.

### Available from 1-12 GHz

The frequency of absorption can be tuned between 1-12 GHz, with an absorption bandwidth (below -20 dB) of 0.2 GHz, providing solutions for all radar types from L to X-band.

### Innovative integrated blade technology

The Frame™ range has been developed to functionalize blade resins and fiberglass systems to enable integrated radar absorption to make a truly robust stealth wind blade.

### Lightweight nano-composite polymer solution

Due to the unique fillers used in Frame™, the product has been designed to keep the turbine weight to a minimum, providing maximum efficiency to the operator.

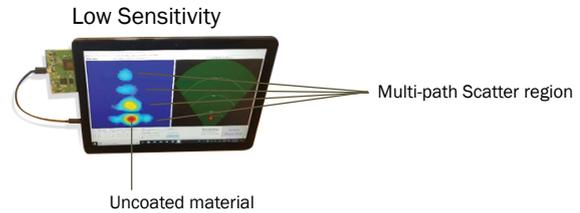
### Cost-effective radar interference mitigation

By using an easy to install ‘fit-and-forget’ material solution rather than radar hardware or software workarounds, the cost to developer is kept to a minimum.

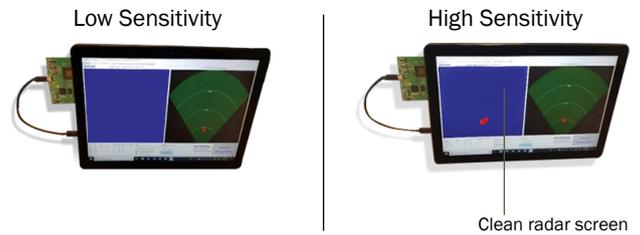
## Applications:

- Wind turbine tower
- Wind turbine nacelle
- Wind turbine blades

### Uncoated Material



### Coated with Frame™



Application	Center Frequency Reflection Loss (dB)	Bandwidth	Thickness Range	Average Density	Appearance
L Band Radar Absorption(1-2 GHz)	>20 dB	0.2 GHz	13-15 mm	1.2 g/cm <sup>3</sup>	Laminate Tile*
S Band Radar Absorption(2-4 GHz)	>20 dB	0.2 GHz	7-9 mm	1.2 g/cm <sup>3</sup>	Laminate Tile*
C Band Radar Absorption(4-8 GHz)	>20 dB	0.4 GHz	6 mm	1.2 g/cm <sup>3</sup>	Laminate Tile*
X Band Radar Absorption(8-12 GHz)	>20 dB	0.8 GHz	3-4 mm	1.2 g/cm <sup>3</sup>	Laminate Tile*

Table showing typical properties for Frame™ products across the frequency range from 1-12 GHz

\*Can have any color coating finish

## Contact Us

Trelleborg's Applied Technologies division is an industry expert in delivering innovative and reliable solutions that maximize performance for our customers. Our vast range of specialized, customizable materials ensure peace of mind at every stage of your project. With reliable and efficient project management and manufacturing we endeavor to take performance to new levels by achieving your goals safely, on time and within scope.

📍 United Kingdom: +44 (0) 1777 712500

✉ Email: [appliedtechnologies@trelleborg.com](mailto:appliedtechnologies@trelleborg.com)



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