resoltech 3350 ECO (WHITE)

Hardener 3358T ECO (BLACK) & 3357T ECO

Biobased structural epoxy adhesive

- **49% biobased on 3358T ECO hardener part***
- **Rubber toughened high strength epoxy**
- **High shear and peeling resistances**
- **Excellent applicability (universal grease-like consistency)**
- **All weather applicability even in high humidity conditions**
- **Vertical sagging limit up to 10 mm**
- **Available in cans or cartridge - 2:1 ratio for machine dispensing**

*ratio of the number of biobased carbon atoms / the number of total carbon atoms

INTRODUCTION

RESOLTECH **3350 ECO/3358T ECO & 3357T ECO** high performance unfilled adhesive offers high tenacity and toughness. Its good elongation ratio enables to bond most materials, even if they have a large CTE difference.

The system rheology is close to a universal grease, making the mixing and application very easy with a spatula or even with a brush. 3350 ECO / 3358T ECO vertical sagging limit is 10 mm on vertical applications at 23°C and 7 mm for 3350 ECO / 3357T ECO.

Particularly resistant to the propagation of micro-cracking, this system is well adapted to bondings subject to important cycles of fatigue. The areas of application of the 3350 ECO are very varied : structural composite and metallic bonding, adhesion promotion layer on secondary lamination specially on cured prepregs...

3350 ECO / 3358T ECO adhesive could be applied at low temperatures (<10°C) and is not affected by high humidity environment during application or hardening.

With a part of biobased carbons atoms in the resin part and in the hardener part, the use of 3350 ECO will reduce the carbon footprint of assemblies making no concessions on thermo-mechanical performances.

This system is sell on standard coloured version : **3350 ECO WHITE / 3358T ECO BLACK**.

Other versions available :
- **3350L ECO** : low viscosity for brush application for secondary lamination as adhesion promotion layer.
- **3350XT** : Extra thixotropic for very large application.
- **3350 HP** : 0,7 density light version.

MIXING RATIO

The mixing ratio must be accurately followed. It is not possible to change the ratio, it would result in lower mechanical properties. The mixture should be thoroughly stirred to ensure full homogeneity.

System	3350 ECO / 3357T ECO	3350 ECO / 3358T ECO
Mixing ratio by weight	100/42	
Mixing ratio by volume	2/1	

APPLICATION

- The surface should be clean, dust-free and degreased. Prepare all surfaces by abrading with medium grit paper or other suitable abrasive, remove dust then wipe with acetone, MEK or similar solvents. Metals such as aluminum & stainless steel usually require a chemical pre-treatment & mechanical abrasion to create the best bond.
- Ensure that polyester or vinylester laminates are fully cured before bonding, then prepare as above.
- When bonding epoxy laminates, the use of a suitable peel ply as the last stage in their manufacture is recommended, otherwise prepare as above. Trials may be required to test peel ply suitability.

- The adhesive can be applied with a notched trowel, spatula, putty knife or self mixing/dispensing machine in various thicknesses up to 10mm without sagging on vertical surfaces. It is recommended to use notched spreaders in order to apply even thicknesses of adhesive on the surface to be bonded.

1. Assemble and maintain parts in contact during hardening with clamps, vacuum or masking tape.
2. Cleaning of the materials should be done before polymerization with acetone, methylethylcetone (MEK) or equivalent.
3. Brush application is possible thanks to the low viscosity but high thixotropy of the system.

BIOBASED CARBON CONTENT

References	3350 ECO	3357T ECO	3358T ECO
Biobased carbon mass content*	21%	11%	49%
Biobased carbon mass content on mix*	-	18%	29%

*ratio of the number of biobased carbon atoms / the number of total carbon atoms

PHYSICAL CHARACTERISTICS

1 Visual aspect

3350 ECO (WHITE) :
Neutral or white opalescent gel

3358T ECO (BLACK) :
Reddish or black gel

3357T ECO :
Yellow gel

Mix :
Colored opalescent gel

2 Density

References	3350 ECO	3357T ECO	3358T ECO
Density at 23°C	1.14	0.96	1.03
Mix density at 23°C	-	1.08	1.11

ISO 1675, ± 0.05 tolerance

3 Vertical sagging limit

Systèmes	3350 ECO / 3357T ECO	3350 ECO / 3358T ECO
Vertical sagging limit at 23°C	7 mm	10 mm

On vertical panel at 90°

REACTIVITIES

System	3350 ECO / 3357T ECO	3350 ECO / 3358T ECO
Gel time on 70mL at 23°C* (4cm high)	1h25min	32min
Time at exothermic peak on 70mL at 23°C	1h31min	34min
Temperature at exothermic peak on 70mL at 23°C	77°C	137°C
Gel time on film 1 mm thick at 23°C**	4h53min	2h56min
Clamp time à 23°C	12h	6h

* Gel time measurements realized with Rheotech®
** Gel time measured on rheometer, shear rate $1s^{-1}$

RETICULATION & POST-CURING

In order to obtain the maximum thermo-mechanical properties, it is necessary to respect the recommended curing cycle. The table below shows the glass transition temperatures (DSC) according to different curing cycles.

Systems		3350 ECO / 3357T ECO	3350 ECO / 3358T ECO
14d at 23°C	T_g	33°C	45°C
	Shore D hardness	-	-
6h at 60°C	T_g	38°C	45°C
	Shore D hardness	-	80
8h at 60°C	T_g	41°C	46°C
	Shore D hardness	84	-
T_g max		60°C	67°C

T_G measured by DSC, 10°C/min, inflexion point
Shore D hardness measured at 23°C according to ISO 868

Post-curing cycles previously presented were chosen in order to reach the maximum potential of each systems. Depending on parts size, oven performance and hardener used, shorter post-curing cycles could lead to fully cured parts.

Please contact our laboratory service for any help on post-curing cycles.

MECHANICAL PROPERTIES

Systems		3350 ECO / 3357T ECO	3350 ECO / 3358T ECO
14d at 23°C	FLEXION Modulus Maximum strength Elongation at max strength Elongation at break	To be measured	To be measured
6h at 60°C	FLEXION Modulus Maximum strength Elongation at max strength Elongation at break	-	1.58 GPa 42.5 MPa 5.2 % 13.5 %
8h at 60°C	FLEXION Modulus Maximum strength Elongation at max strength Elongation at break	1.97 GPa 52.4 MPa 4.5 % 10.6 %	-

Flexion properties on pure resin according to ISO 178

Systems	3350 ECO / 3357T ECO	3350 ECO / 3358T ECO
Shear resistance on sandblasted steel (MPa)*		
24h at 23°C	-	13.2 (A)
7d at 23°C	19.1 (A)	20.7 (CR)
6h at 60°C	-	24.8 (CR)
8h at 60°C	-	-
Shear resistance on sanded composite (MPa)*		
24h at 23°C	-	-
7d at 23°C	18.4 (A)	-
6h at 60°C	-	16.3 (CS)
8h at 60°C	-	-
Shear resistance on wood	Wood delaminating	Wood delaminating
Pull-off resistance on sandblasted steel (MPa)**	-	23 ± 2

* ISO 4587, A = Adhesive failure ; CR = Cohesive failure on resin, CS = Cohesive failure on support, composite epoxy/glass
** ISO 4624

HEALTH & SAFETY

Resoltech issues full Material Safety Data Sheet for all hazardous products. Please ensure that you have the correct MSDS to hand for the materials you are using before commencing work.

The information below is valid for MSDS - 3350 ECO WHITE version 2.x, 3357T ECO version 1.x et la MSDS - 3358T ECO BLACK version 2.x.

Personal protection equipment :

1 Resin part

GHS07 GHS09

Signal word : Warning
Hazard statements :
H315 - Causes skin irritation.
H317 - May cause an allergic skin reaction.
H319 - Causes serious eye irritation.
H411 - Toxic to aquatic life with long lasting effects.

Precautionary statments :
P102 - Keep out of reach of children.
P202 - Do not handle until all safety precautions have been read and understood.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 - Store locked up.
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

EUH205 - Contains epoxy constituents. May produce an allergic reaction.

2 Hardener part 3357T ECO

GHS05 GHS07 GHS09

Signal word : Warning
Hazard statements :
H302 - Harmful if swallowed.
H314 - Causes severe skin burns and eye damage.
H317 - May cause an allergic skin reaction.
H411 - Toxic to aquatic life with long lasting effects.

Precautionary statments :
P102- Keep out of reach of children.
P202 - Do not handle until all safety precautions have been read and understood.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P273 - Avoid release to the environment.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 - Store locked up.
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

3 Hardener part 3358T ECO BLACK

GHS05 GHS07

Signal word : Warning
Hazard statements :
H314 - Causes severe skin burns and eye damage.
H317 - May cause an allergic skin reaction.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary statments :
P102- Keep out of reach of children.
P202 - Do not handle until all safety precautions have been read and understood.
P271 - Use only outdoors or in a well-ventilated area.
P273 - Avoid release to the environment.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 - Store locked up.
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

PACKAGING

3350 ECO / 3357T ECO :

- Metal bucket of 0.5kg + 0.21kg
- Metal box kit of 1kg +0.42kg
- Metal bucket of 5kg + 2.1kg
- Metal bucket of 10kg + 2 x 2.1kg
- Metal bucket of 25kg + 10.5kg

3350 ECO / 3358T ECO :

- Metal box kit of 0.5kg + 0.21kg
- Metal box kit of 1kg +0.42kg
- Metal bucket of 5kg + 2.1kg
- Metal bucket of 10kg + 2 x 2.1kg
- Metal bucket of 25kg + 10.5kg
- Metal bucket of 2x25 + 21kg
- 250 mL cartridge for universal dispensing gun + static mixer

- 400 mL cartridge + static mixer

HEALTH & SAFETY

Skin contact must be avoided by wearing protective nitrile gloves & overalls or other protective clothing.
Eye protection should be worn to avoid risk of resin, hardener, solvent or dust entering the eyes. If this occurs flush the eye with water for 15 minutes, holding the eyelid open, and seek medical attention.
Ensure adequate ventilation in work areas. Respiratory protection should be worn with ABEKP coded filters.
Resoltech issues full Material Safety Data Sheet for all hazardous products. Please ensure that you have the correct MSDS to hand for the materials you are using before commencing work.

TRANSPORT & STORAGE

Keep containers sealed and away from heat and cold preferably between 10°C and 30°C in a well ventilated area. Our products are guaranteed in their original packaging (check expiry date on the label).

! The data provided in this document is the result of tests and is believed to be accurate. We do not accept any responsibility over the mishandling of these products and our liability is limited strictly to the value of the products we manufacture and supply.

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