



Technofinechem Co., Ltd.
TFC Co., Ltd.

Introduction

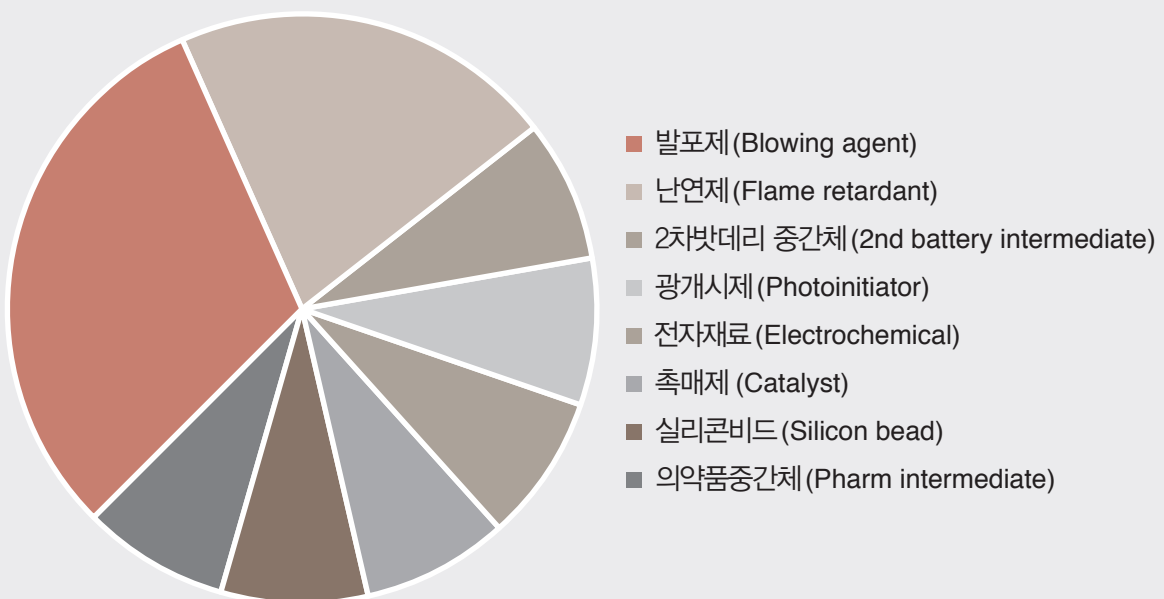
Technology develops Fine Chemical

Founded in 2003, as an outsourcing provider of engineering plastics additives, Technofinechem Co., Ltd. is a leading manufacturer of formulated chemical additive/ foaming agents with years of technical expertise. From 2009, Technofinechem Co., Ltd. began to manufacture its own customized Azodicarbonamide chemical foaming agents for local and international plastics processors suiting to customers' increasing demands and expectations. Main products include blowing agent, flame retardant, electronic chemical, and API intermediate.

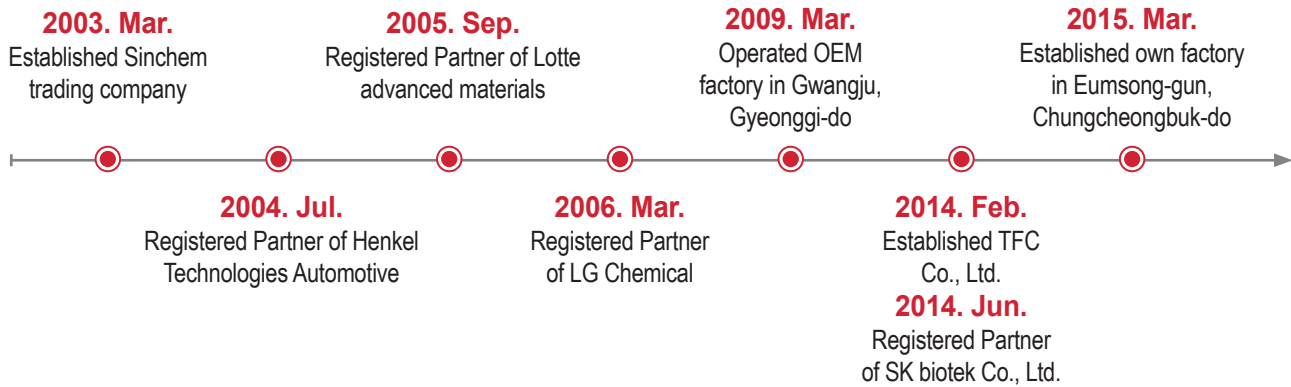
As a leading company of fast-changing chemical materials, we are devoting significant time and resources to developing new products that meet customers need and look forward to have chance to serve your new chemical materials business.

Thank you very much.

Items



History



Location

Head Office

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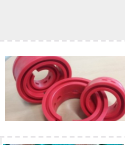
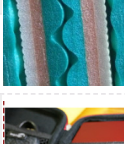


Production

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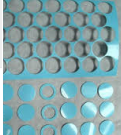


Product



Foaming Agent

| Chemical Description | Appearance | Decomposition temp.(°C) | Gas volume ml/g(STP) | Gas volume ml/g(IN AIR) | Particle Size(um) | Application | IMAGE |
|---|---------------------------|-------------------------|----------------------|-------------------------|-------------------|--|---|
| Azodicarbonamide | Orange yellow fine powder | 200-210 | 215-225 | 290-300 | 3~22 | PVC,PE,EVA, RUBBER ETC |  |
| TFC-AZP1619 | Orange yellow fine powder | 200-210 | 215-225 | 290-300 | 15~20 | PVC,PE,EVA, RUBBER ETC | |
| TFC-AZP1012 | Orange yellow fine powder | 200-210 | 215-225 | 290-300 | 10~14 | PVC,PE,EVA, RUBBER ETC |  |
| TFC-AZP0810 | Orange yellow fine powder | 200-210 | 215-225 | 290-300 | 9~11 | PVC,PE,EVA, RUBBER ETC | |
| TFC-AZP0607 | Orange yellow fine powder | 200-210 | 215-225 | 290-300 | 6~9 | PVC,PE,EVA, RUBBER ETC |  |
| TFC-AZP0305 | Orange yellow fine powder | 200-210 | 215-225 | 290-300 | 3~6 | PVC,PE,EVA, RUBBER ETC | |
| Modified Azodicarbonamide | Orange yellow fine powder | 185-200 | 210-230 | 280-290 | 18-20 | Chemical cross-linked polyethylene foams |  |
| TFC-ACPE | Orange yellow fine powder | 193-197 | 210-230 | 280-290 | 18-20 | Chemical cross-linked polyethylene foams |  |
| TFC-ACPE(H) | Orange yellow fine powder | 195-200 | 210-230 | 280-290 | 18-20 | Chemical cross-linked polyethylene foams |  |
| TFC-ACPE(HQ) | Orange yellow fine powder | 175-180 | 174-188 | 260-270 | 18-20 | Chemical cross-linked polyethylene foams |  |
| N,N'-Dinitrosopentamethylenetetraamine | Pale yellow fine powder | 167-171 | 191-200 | 210-220 | | Rubber foams |  |
| DNPT, DPT 80% | | | | | | | |
| Surface Treated Urea HHBK | Light White fine powder | 110-115(M.P) | - | - | 10~15 | Activator of DNPT(DPT) |  |
| Modified DPT AND HHBK | Light Yellow fine powder | 130-170 | 130-150 | - | 8~10 | EVA,Rubber foams |  |
| TFC-ERB200 | Light Yellow fine powder | 133-137 | 135-145 | - | 8~10 | EVA,Rubber foams | |
| TFC-ERB300 | Light Yellow fine powder | 145-150 | 135-145 | - | 8~10 | EVA,Rubber foams | |
| TFC-ME6000 | Light Yellow fine powder | 135-145 | 140-145 | 165-175 | 8~10 | EVA,Rubber foams | |
| TFC-ME6001 | Light Yellow fine powder | 150-160 | 130-145 | 165-175 | 8~10 | EVA,Rubber foams | |

Foaming Agent

| Chemical Description | Appearance | Decomposition temp.(°C) | Gas volume ml/g(STP) | Gas volume ml/g(INAIR) | Particle Size(um) | Application | IMAGE |
|---|--------------------------|-------------------------|----------------------|------------------------|-------------------|--------------------------------------|---|
| 4,4'-Oxybis(benzene sulfonyl hydrazide) | White fine powder | 158-164 | 125-140 | | 6~10 | PVC wall paper or CR Rubber etc. |  |
| OBSH | | | | | | | |
| Modified OBSH AND Azodicarbonamide | Light Yellow fine powder | 140-170 | 180-210 | | 3~5 | PVC wall paper |  |
| TFC-W1039 | Light Yellow fine powder | 140-148 | 190-198 | | 3~5 | PVC wall paper | |
| TFC-W1017 | Light Yellow fine powder | 140-146 | 190-198 | | 3~5 | PVC wall paper | |
| TFC-W1011 | Light Yellow fine powder | 150-158 | 190-195 | | 3~5 | PVC wall paper |  |
| TFC-W1015 | Light Yellow fine powder | 160-168 | 198-200 | | 3~5 | PVC wall paper | |
| TFC-W1016 | Light Yellow fine powder | 160-165 | 198-200 | | 3~5 | PVC wall paper | |
| TFC-W1013 | Light Yellow fine powder | 150-155 | 195-195 | | 3~5 | PVC wall paper |  |
| TFC-W020 | Light Yellow fine powder | 148-155 | 180-190 | | 3~5 | PVC wall paper | |
| P-Toluenesulfonyl hydrazide(TSH) | White fine powder | 100-110(M.P) | 120-130 | | - | PVC wall paper, Rubber foams |  |
| P-Toluenesulfonyl semicarbazide(PTSS) | White fine powder | 227-235 | 135-145 | | - | PVC wall paper, PVC extrusion | |
| Sodium Bicarbonate (Inorganic foaming agent) | White fine powder | 150~200 | 110-150 | | 200 mesh pass | PE(LDPE,HDPE),PP, PS(GPPS,HIPS) etc. |  |
| TFC-PY600 | White fine powder | 150~200 | 135-140 | | 200 mesh pass | PE(LDPE,HDPE),PP, PS(GPPS,HIPS) etc. | |
| TFC-PY635 | White fine powder | 150~200 | 115-120 | | 200 mesh pass | PE(LDPE,HDPE),PP, PS(GPPS,HIPS) etc. | |
| TFC-PY660N | White fine powder | 150-200 | 110-115 | | 200 mesh pass | PE(LDPE,HDPE),PP, PS(GPPS,HIPS) etc. |  |
| TFC-LMB660N (Master Batch 20%) | White Pellet | 150~200 | 60-70 | | - | PE(LDPE,HDPE),PP, PS(GPPS,HIPS) etc. |  |
| TFC-LMB330N (Master Batch 30%) | White Pellet | 150-200 | 65-75 | | - | PE(LDPE,HDPE),PP, PS(GPPS,HIPS) etc. |  |
| TFC-LMB550N (Master Batch 50%) | White Pellet | 150~200 | 80-90 | | - | PE(LDPE,HDPE),PP, PS(GPPS,HIPS) etc. | |

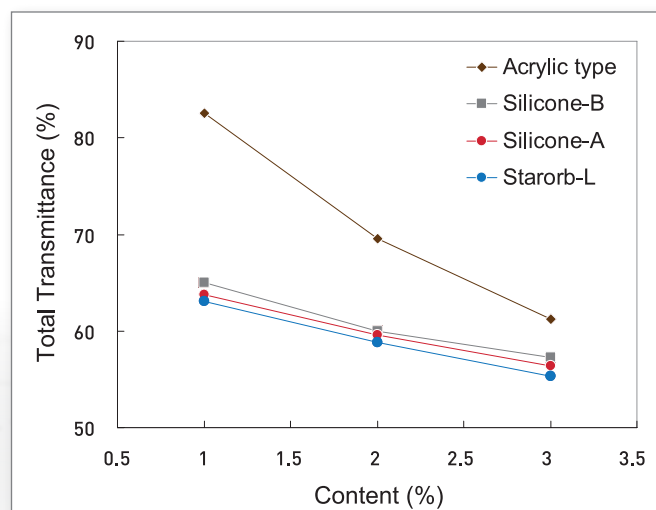
Foaming Agent

| Chemical Description | Appearance | Decomposition temp.(°C) | Gas volume ml/g(STP) | Gas volume ml/g(IN AIR) | Particle Size(um) | Application | IMAGE |
|-----------------------------------|--------------------------|-------------------------|----------------------|-------------------------|-------------------|--------------|---|
| Endothermic and Exothermic | Light Yellow fine powder | 150-200 | 150-220 | | | PS,PE,PP ETC |  |
| TFC-PY1000 | Light Yellow fine powder | 150-200 | 150-160 | | | PS,PE,PP ETC | |
| TFC-PY2000 | Light Yellow fine powder | 150-200 | 166-170 | | | PS,PE,PP ETC | |
| TFC-PY3000 | Light Yellow fine powder | 150-200 | 175-185 | | | PS,PE,PP ETC |  |
| TFC-PY4000 | Light Yellow fine powder | 150-200 | 185-190 | | | PS,PE,PP ETC | |
| TFC-PY5000 | Light Yellow fine powder | 150-200 | 190-200 | | | PS,PE,PP ETC | |

Silicon Bead_SL-200M

High performance light diffusing agent

- Low RI and small particle size
- Good thermal stability and optimum surface property



| Property | Unit | SL-200M |
|------------------|--------------------|-------------|
| Mean diameter | μm | 2 |
| C.V. | % | 15 - 20 |
| Decomp. Temp. | °C | 400↑ |
| Moisture content | % | 1↓ |
| True Density | g/ml | 1.32 |
| Bulk Density | g/ml | ~ 0.40 |
| Refractive Index | a. u. | ~1.43 |
| Oil absorption | ml/100g | 50 - 60 |
| 10% K-value | kg/mm ² | 580 |
| Angle of Repose | deg. | 40 - 45 |
| Heavy metals | ppm | N.D. |
| Surface property | | Hydrophobic |

Foaming Agent_ACPE

Feature

Specially formulated chemical blowing agent for cross-linked LDPE foam with chemical crosslinking by extrusion and continuous oven foaming process. Well dispersible in polymer compound, makes fine & uniform cell structure and smoother skin in the sponge. Uniform and fine cells, in spite of variant LDPE grades by different resin manufacturers. As decomposes at a faster rate, suitable for lower-temperature processing without any special kickers or additives compared to normal Azodicarbonamide. Odorless fine powder, a wetted type to reduce the powered dusts, with special additives.

Application

Most effective blowing agent for chemically crosslinked LDPE foams for Thermal insulation, Cushioning and Packaging material for equipment, Sports/ Leisure goods, and Floating materials.

Product Description / Specification

| Product name | TFC-ACPE(LHQ) | TFC-ACPE,ACPE(H),ACPE(T) |
|--------------------------------|---------------------------|---------------------------|
| Appearance | Orange yellow fine powder | Orange yellow fine powder |
| Decom. temp.(°C) | 179 ~ 189 | 195 ~ 200 |
| Gas volume (ml/g) | 200 ~ 220 | 225 ~ 245 |
| Average particle size (micron) | 12~ 15 | 16 ~ 22 |
| Moisture (%) | 0.3 max. | 0.3 max. |
| pH | 6.5 ~ 7.5 | 6.5 ~ 7.5 |

Formulation& Operation Conditions

| Product name | TFC-ACPE(LHQ) | TFC-ACPE,ACPE(H),ACPE(T) |
|---|---|--|
| Basic Formulation | LDPE (MI=0.8) 100 PHR, DCP 0.6 ~ 0.8 PHR, TFC-ACPE 23 PHR | LDPE (MI=0.8) 100 PHR, DCP 0.6 ~ 0.8 PHR, TFC-ACPE(LHQ) 23 PHR |
| Kneader mixing and extrusion temperature for pellet | 105~115°C | 105~115°C |
| Extrusion temperature for sheeting | 105~125°C (T-die: 125°C) | 105~125°C (T-die: 125°C) |
| Cross-linking and foaming temperature | 160~170°C and 210~220°C | 160~170°C and 210~220°C |

Figure 1.

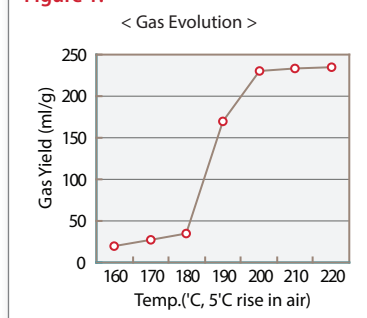
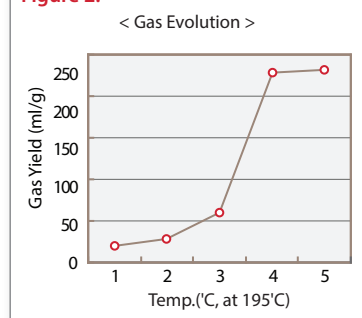


Figure 2.



Product

TFC-AZP Series

TFC-AZP Series is a chemical blowing agent which have high performance and universally used for rubbers and kind of Polyolefine plastics(PE, PP, EVA, PVC, PS, ABS etc.)

TFC-AZP Series have excellent stability in head end process of a foam through high decomposition temperature. Also it is able to control decomposition temperature freely by using decomposition accelerator, so it can be used in a wide range of manufacturing. And because the color of decomposition residue is white, it is excellent in whiteness and can get fine and uniform foam.

TFC-AZP Series is a self-extinguishing substance so there is no risk of fire. As a non-toxic, odorless and non-polluting substance, there is no degradation in physical properties while stored in dry and cool space for a long period.

| Grade | AZP0203 | AZLP0305 | AZP0608 | AZP0810 | AZP1012 | AZP1215 | AZP1619 |
|--------------------------------|---|-----------|-----------|------------|-------------|-------------|-------------|
| Appearance | Lemon yellow fine powder | | | | | | |
| Decomposition temperature (°C) | 200 ~ 210 | | | | | | |
| Gas Amount (mL/g) | STP | 215 ~ 225 | | | | | |
| | In air | 290 ~ 300 | | | | | |
| Average particle size (μm) | 2.0 ~ 3.0 | 3.0 ~ 6.0 | 6.0 ~ 9.0 | 9.0 ~ 11.0 | 10.0 ~ 14.0 | 12.0 ~ 15.0 | 15.0 ~ 20.0 |
| Moisture Content (%) | 0.3 mas. | | | | | | |
| Chemical Name | Azodicarbonamide (azobisformamide) | | | | | | |
| Molecular weight (g/mole) | 116.08 | | | | | | |
| Specific Gravity | 1.65 | | | | | | |
| Solubility | Insoluble in normal organic solvent, soluble in very small amount of DMSO and DMF | | | | | | |

TFC-ACPE & AZP Series

TFC-ACPE & ALP Series is a ADCA reforming chemical blowing agent, which has excellent performance and can be used for cross-linked PE and PP blowing agent foam.

TFC-ACPE Series is used for foaming cross-linked organic peroxides and it is excellent in stability.

So it is used for extracting uniform and bubble structured high resolution foaming foam with the balance of effective cross-linked and foaming speed.

TFC-ALP Series is a chemical blowing agent which is used for PE and PP electron beam crosslinked foam. It is excellent in thermal stability and dispersibility with resins, so it is effective in manufacturing white product.

1. Chemically crosslinked PE foam (ACPE Series)

| Grade | ACPE | ACPE(T) | ACPE(S) | ACPE(LHQ) |
|--------------------------------|--------------------------------|-----------|-----------|-----------|
| Appearance | Lemon yellow fine powder | | | |
| Decomposition Temperature (°C) | 193 ~ 197 | 195 ~ 200 | 196~200 | 179 ~ 189 |
| Gas Amount (mL/g) | STP | 210 ~ 230 | 210 ~ 230 | 200 ~ 220 |
| | In air | 280 ~ 290 | 280 ~ 290 | 275 ~ 285 |
| Average particle size (μm) | 18.0~20.0 | 18.0~20.0 | 18.0~20.0 | 12.0~15.0 |
| Moisture Content (%) | 0.3 max. | | | |
| Applying field | Chemically crosslinked PE foam | | | |

2. Electron beam crosslinked foam (AZP Series)

| Grade | AZP1400E | AZP2500P |
|--------------------------------|--------------------------|------------------|
| Appearance | Lemon yellow fine powder | |
| Decomposition Temperature (°C) | 200 ~ 204 | 204 ~ 208 |
| Gas Amount (mL/g) | STP | 220 ~ 240 |
| | In air | 280 ~ 290 |
| Average particle size (μm) | 11.0 ~ 14.0 | 24.0 ~ 26.0 |
| Moisture Content (%) | 0.3 max. | |
| Applying field | PE electron beam | PP electron beam |

TFC Chemically crosslinked PE foam Masterbatch

TFC-ACPE(MB) is a masterbatch product in chemically crosslinked PE foam and it improves shatter-resistant and dispersibility with resins.

TFC-LDDCP is a masterbatch product in crosslinked agent(DCP). It forms uniform bubble through excellent dispersibility with resin.

TFC-LDFL is a masterbatch product in charring agents. It is excellent in dispersibility with resins, so can get uniform effect in resistance to flame.

| Grade | ACPE(MB) | LDDCP | LDFL |
|----------------------------------|---------------------------|---------------------------------|----------------------|
| Appearance | Lemon yellow Pellet | Fine white Pellet | Fine white Pellet |
| Decomposition Temperature (°C) | 195 ~ 200 | - | - |
| Gas Amount (mL/g) | 90 ~ 95 | - | - |
| Melting point(°C) | - | 39 ~ 40 | - |
| Specific gravity | 1.05 ~ 1.10 | 0.80 ~ 0.90 | 1.200 ~ 1.250 |
| Apparent specific gravity (g/mL) | 0.55 ~ 0.60 | 0.45 ~ 0.50 | 0.70 ~ 0.80 |
| Moisture (%) @ 1hr./105°C | 0.035 ~ 0.040 | 0.0025 ~ 0.0035 | 0.015 ~ 0.025 |
| Content (%) | 33 | 4.7 | 45 |
| Application | Blowing agent Masterbatch | Cross linking agent Masterbatch | Charring Masterbatch |

TFC-W Series

TFC-W Series is a mixture of 2 kinds of chemical blowing agents (OBSh and ADCA) which is developed for PVC wall coverings.

TFC-W Series is a chemical agent which is excellent in dispersibility and increases whiteness of a foam.

There is no smell of Ammonia when processed in high temperature and it does not decompose rapidly, so it is excellent in stability while processing.

| Grade | W1015 | W1017 | W1018 | W1039 | W1040 | W1046 | W3000 |
|--------------------------------|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Appearance | Lemon yellow fine powder | | | | | | |
| Decomposition Temperature (°C) | 160 ~ 168 | 140 ~ 146 | 150 ~ 155 | 140 ~ 148 | 145 ~ 150 | 140 ~ 145 | 148 ~ 155 |
| Gas Amount (mL/g) @STP | 198 ~ 200 | 190 ~ 198 | 170 ~ 180 | 190 ~ 198 | 180 ~ 190 | 180 ~ 190 | 180 ~ 190 |
| Average particle size (μm) | 3.0 ~ 5.0 | 3.0 ~ 5.0 | 3.0 ~ 5.0 | 3.0 ~ 5.0 | 3.0 ~ 5.0 | 3.0 ~ 5.0 | 3.0 ~ 5.0 |
| Moisture Content (%) | 0.5 max. | | | | | | |
| Chemical Name | Reforming Azodicarbonamide | | | | | | |
| Applying field | PVC Wall coverings | | | | | | |



TFC-ME Series

TFC-ME Series is ADCA reforming chemical blowing agent which is excellent in molding under pressure and injection molding of EVA and rubber(natural, synthesis).

TFC-ME Series is a chemical blowing agent with an advantage of improving physical properties like tensile strength, dimensional stability and wear resistance.

TFC-ME Series does not decompose rapidly due to the work stability of head end process. So can gain uniform foam.

TFC-ME50MB is a masterbatch products in chemical blowing agent that is developed especially for foaming under pressure of EVA and injection. It is excellent in prevention of arsenic acid and dispersibility with resins so it has the advantage of reducing roll mixing milling time, whiteness, uniform bubble and storage stability.

1. ME Series

| Grade | | ME6000 | ME6001 | ME6002 |
|--------------------------------|--------|--------------------------|-----------|---------|
| Appearance | | Lemon yellow fine powder | | |
| Decomposition Temperature (°C) | | 135 ~ 145 | 150 ~ 160 | 152-158 |
| Gas Amount (ml/g) | STP | 130 ~ 145 | 130 ~ 145 | 130-145 |
| | In air | 165 ~ 175 | 165 ~ 175 | 170-190 |
| Average particle size (μm) | | 8.0~10.0 | 8.0~10.0 | 8-10 |
| Moisture Content (%) | | 0.3 max. | | |
| Applying field | | EVA, Rubber foams | | |

2. Blowing agent Masterbatch Type

| Grade | | ME50MB |
|--------------------------------|--------|-------------------------------|
| Appearance | | Lemon yellow fine powder |
| Decomposition Temperature (°C) | | 160 ~ 170 |
| Gas Amount (ml/g) | STP | 85 ~ 95 |
| | In air | 115 ~ 125 |
| Blowing agent content (%) | | 55 |
| EVA VA Content (%) | | 21 |
| Applying field | | EVA Press & Injection Molding |

TFC-ERB Series

TFC-ERB Series is a chemical blowing agent that can extract fine and uniform foam, which is processed ADCA with decomposition accelerator and stabilizer etc. to make it appropriate for foaming under pressure of EVA and Rubber(natural, synthesis). It improves properties like antiwear and weather proof.

TFC-ERB Series is appropriate for processing low density white foam because it is fast in thermal decomposition and has low amount of gas quantity.

| Grade | ERB200 | ERB300 |
|--------------------------------|---|------------|
| Appearance | Lemon yellow fine powder | |
| Decomposition Temperature (°C) | 133 ~ 137 | 145 ~ 150 |
| Gas Amount (ml/g) @STP | 135 ~ 145 | 135 ~ 145 |
| Average particle size (μm) | 8.0 ~ 10.0 | 8.0 ~ 10.0 |
| Moisture Content (%) | 0.5 max. | |
| Applying field | EVA, EVA/PE Blending, PE & Rubber Press Molding | |



TFC-OBSH

TFC-OBSH has a good compatibility with rubber(natural, synthesis) and thermoplastic resin. After decomposition, residue is composed of polymeric materials, so it forms fine bubble and is excellent in whiteness. Especially it is excellent in electrical isolation so it is effective in manufacturing kind of wire clothings.

TFC-OBSH has no toxicity, contamination and intoxication. Also it is a white, eco-friendly and high grade chemical blowing agent, which doesn't affect the color of final foam.

| Grade | OBSH |
|--------------------------------|--|
| Appearance | Fine white powder |
| Decomposition Temperature (°C) | 158 ~ 164 |
| Gas Amount (ml/g) @STP | 125 ~ 140 |
| Average particle size (μm) | 6.0 ~ 10.0 |
| Moisture Content (%) | 0.5 max. |
| Chemical Name | p,p'-Oxybis(benzenesulfonylhydrazide) |
| Molecular weight (g/mole) | 358.39 |
| Specific gravity | 1.55 |
| Solubility | Generally insoluble in organic solvent, dissolve in DMSO |

TFC-TSH

TFC-TSH is a low temperature chemical blowing agent, which is appropriate for rubber chemical blowing agent that requires uniform and fine bubble structure. And can manufacture excellent foam without promoting decomposition in foaming under normal pressure

TFC-TSH is low in contraction when exposed to light and heat, so it is applied to thermosetting polyesters and PVE sealants etc.

| Grade | TSH |
|--------------------------------|-------------------------------------|
| Appearance | Fine white powder |
| Decomposition Temperature (°C) | 143 ~ 148 (Melting point : 100~110) |
| Gas Amount (ml/g) @STP | 120 ~ 130 |
| Average particle size (μm) | - |
| Moisture Content (%) | 0.5 max. |
| Chemical Name | P-Toluenesulfonylhydrazide |
| Molecular weight (g/mole) | 186.2 |
| Specific gravity | 1.42 |
| Solubility | Dissolve in alcohol, DMF etc. |

TFC-DPT

TFC-DPT produces a lot of gas per unit mass, so it is economically feasible chemical blowing agent. And it is used for natural rubber and foaming under pressure of synthetic rubber.

TFC-DPT is used with accelerator of ureameter decomposition to make it fit for the condition of vulcanization of rubber. Process ability and storage stability is improved by mixing it with mineral fill packing because it is sensitive to acid and heat

| Grade | DPT |
|--------------------------------|--|
| Appearance | Light yellow fine powder |
| Decomposition Temperature (°C) | 173 ~ 180 |
| Gas Amount (mL/g) @STP | 210 ~ 220 |
| Average particle size (μm) | - |
| Moisture Content (%) | 0.5 max. |
| Chemical Name | N,N'-Dinitrosopentamethylene tetramine |
| Molecular weight (g/mole) | 186.17 |
| Specific gravity | 1.45 |
| Solubility | Insoluble in most organic solvent and there is a danger of explosion by strong acid, strong alkali and other oxidizing agent |

TFC-PTSS

TFC-PTSS is high temperature white chemical blowing agent, so it is applied for foaming Resins which has high processing temperature like ABS, HIPS, HDPE, Polyamide and rigid PVC.

TFC-PTSS improves the surface of a foam in pressing out and injection processing.

| Grade | PTSS |
|--------------------------------|---------------------------------------|
| Appearance | Fine white powder |
| Decomposition Temperature (°C) | 227 ~ 235 |
| Gas Amount (mL/g) @STP | 135 ~ 145 |
| Average particle size (μm) | - |
| Moisture Content (%) | 0.5 max. |
| Chemical Name | P-Toluenesulfonylsemicarbazide |
| Molecular weight (g/mole) | 229.25 |
| Specific gravity | 1.44 |
| Solubility | Soluble in alcohol. Insoluble in DMSO |



TFC-PY Series

TFC-PY Series is a inorganic chemical blowing agent that has surface treatment for the prevention of moisture absorption.

TFC-PY Series is applicable for chemical blowing agent and nucleating agent. Unlike other organic blowing agent, it can manufacture uniform bubbles, because it is processed through decomposition of heat absorption, so there is no expansion, contraction and destruction of bubble due to the heat. Also It is harmless to the body so it is widely used for foaming of packing materials of food.

| Grade | PY600 | PY635 | PY660N | PY1000 | PY2000 | PY3000 | PY4000 | PY5000 |
|--------------------------------|--|---------|-----------|------------------------------|-----------|-----------|-----------|-----------|
| Appearance | Fine white powder | | | Lemon yellow fine powder | | | | |
| Decomposition Temperature (°C) | 155-165 | 150-200 | 150 ~ 200 | 150 ~ 200 | 150 ~ 200 | 150 ~ 200 | 150 ~ 200 | 150 ~ 200 |
| Gas Amount (mL/g) @STP | 140-160 | 110-130 | 110-130 | 150 ~ 160 | 166 ~ 170 | 175 ~ 185 | 185 ~ 190 | 190 ~ 200 |
| Average particle size (μm) | 200mesh pass | | | 200mesh pass | | | | |
| Chemical Name | Specially coated sodium bicarbonate | | | Reforming sodium bicarbonate | | | | |
| Applying field | PE,(LDPE, HDPE), PP, PS(HIPS, GPPS) etc. | | | PS, PE, PP etc. | | | | |

TFC-LMB Series

TFC-LMB Series is a masterbatch product in Pellet of inorganic chemical blowing agents.

TFC-LMB Series has the advantage of uniform bubble of a foam and improves dimensional stability of a final foam through improving dispersibility with resins.

TFC-LMB Series is a masterbatch product in foaming agents for extrusion, which prevent arsenic acid, has time reduction in roll mixing milling and excellent in storage stability through fine dispersibility.

| Grade | LMB660N | LMB330N | LMB550N |
|--------------------------------|---|-----------|-----------|
| Appearance | White Pellet | | |
| Decomposition Temperature (°C) | 150 ~ 200 | 150 ~ 200 | 150 ~ 200 |
| Gas Amount (mL/g) @STP | 60 ~ 70 | 65 ~ 75 | 80 ~ 90 |
| Chemical Name | Masterbatch products in inorganic chemical blowing agent. | | |
| Blowing agent content(%) | 20 | 30 | 50 |
| Applying field | PE,(LDPE, HDPE), PP, PS(HIPS, GPPS) etc. | | |

TFC-HHBK/BM/TM(Foaming accelerator)

TFC-HHBK is a ureameter foaming accelerator which is applied for adjusting the temperature that is suitable for the conditions of processing ADCA and DNPT. Especially it improves stability of DNPT when mixed with DNPT. Also it eliminates the odor and contamination of a foam by eliminating formaldehyde which is generated while decomposition of DNPT.

TFC-BMK/TMK is a foaming accelerator of ADCA which is really high in vitality. It has an advantage of improving production speed, prevent decline in physical properties and discoloration caused by furious flames.

| Grade | HHBK | BM | TM |
|----------------------------|--------------------------|-------------------------|-------------------------|
| Appearance | Fine white powder | | |
| Melting point (°C) | 110 ~ 115 | 218 ~ 228 | 255 ~ 265 |
| Average particle size (μm) | 4.0 ~ 5.0 | 3.0 ~ 5.0 | 3.0 ~ 5.0 |
| Moisture Content (%) | 0.3 max. | 4.0 max. | 4.0 max. |
| Chemical Name | surfaced urea derivative | Zinc-dibenzenesulfinate | Zinc-ditoluenesulfinate |
| Applying blowing agent | DNPT, ADCA | ADCA | ADCA |

TFC-DU & WU Series(Microcapsule)

TFC-DU & WU series expands by heat and it forms a heat expandable capsule blowing agent. It is consisted of thermoplastic polymer cell and the core of volatile physical foam.

TFC-DU & WU series is a eco-friendly chemical blowing agent with excellence in expandability(40~100 times) and thermal stability. It is effective in weight lightening of foams, insulating property, soundproofing and buffer. So it can be applicable for various categories like fill packing for light weight, under body coating agent of vehicle, tire joint, elastic sealant, adhesive debonding and soundproof filler etc.

1. DU Series (Dry Type)

| Grade | DU140 | DU175-M | DU608 | DU180 | DU608S-M | DU608S-L | DU220 | DU2610S-3L |
|----------------------------|---------|---------|---------|---------|----------|----------|---------|------------|
| Average particle size (μm) | 15~25 | 15~25 | 24~45 | 25~35 | 15~25 | 25~35 | 25~35 | 8~15 |
| T start(°C) | 95~105 | 125~135 | 120~145 | 135~145 | 145~155 | 130~140 | 180~200 | 200~220 |
| T max(°C) | 148~158 | 190~200 | 190~200 | 185~195 | 195~205 | 195~205 | 220~230 | 255~265 |
| Density (kg/m³) | <15 | <15 | <15 | <15 | <15 | <15 | <20 | <20 |
| Applying field | 1,2 | 2 | 3, 4 | 3, 4 | 5 | 5 | 6 | 7 |

2. WU Series (Wet Type)

| Grade | WU120-M | WU3003-S |
|----------------------------|---------|----------|
| Average particle size (μm) | 15~25 | 15~25 |
| T start(°C) | 80~90 | 95~105 |
| T max(°C) | 125~135 | 148~158 |
| Density(kg/m³) | <15 | <15 |
| Applying field | 1 | 1 |

Applying field

1. Acryl binder for fiber 2. PVC wall coverings, floorings 3. PVC,TPR,EVA shoes-sole 4. PU coating 5. Underbody coating for vehicle 6. Reinforced material of PP/GF for vehicle 7. PA,PC,PET/PBT,PPS injection

TFC-DE & WE Series(Microsphere)

TFC-DE & WE series is a foamed microsphere which is processed by thermal expansion of TFC-DU and WU.

TFC-DE & WE Series is really low in density, excellent in elasticity and have good resistance to solvent. So it is used as light weight fill packing.

The applying field of TFC-DE & WE series is toy clay, natural leather support agent, insulating paint, repair agent of vehicle exterior, wire filler and a sensitizer of an emulsion explosive.

1. DE Series (Dry Type)

| Grade | DE140S-M | DE140S-L | DE140S-XL |
|------------------------------|----------|----------|-----------|
| Average particle size (μm) | 40~60 | 60~80 | 80~120 |
| Density (kg/m ³) | 35±5 | 25±5 | 20±5 |

2. WE Series (Wet Type)

| Grade | WE140S-M | WE140S-L | WE140S-XL | WE152-B |
|------------------------------|----------|----------|-----------|---------|
| Average particle size (μm) | 40~60 | 60~80 | 80~120 | 55~65 |
| Density (kg/m ³) | 35±5 | 25±5 | 20±5 | 35±5 |

TFC-MB Series(Microcapsule Masterbatch)

TFC- MB series is a masterbatch product in pelletized microcapsule for improvement in dispersibility of TFC-DU

TFC-MB series is mainly suitable for high temperature processing.

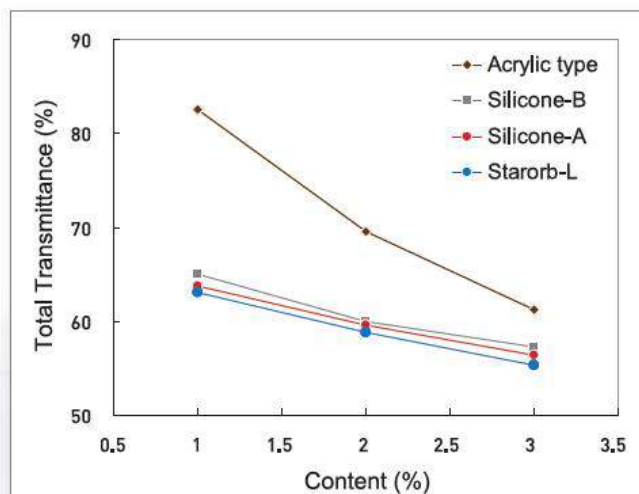
| Grade | MB180 | MB608S | MB1901M-2LG | MB1901L-2LG | MB2601S-3L |
|----------------|-----------|-----------|-------------|-------------|------------|
| T start (°C) | 135 ~ 145 | 145 ~ 155 | 145 ~ 155 | 130 ~ 140 | 200 ~ 220 |
| T max (°C) | 185 ~ 195 | 195 ~ 205 | 195 ~ 205 | 195 ~ 205 | 255 ~ 265 |
| Applying resin | EVA | EVA | EVA | EVA | EVA |
| Content (%) | 50 | 50 | 50 | 50 | 50 |

TFC-SL200M(Silicon Bead)

TFC- SL200M is a high performance light diffuser, which has low refractive index with silicon bead of small particle form








TFC-200M has fine thermal stability and optimal surface characteristics.

| Property | Unit | SL200M |
|------------------|-------------------------|----------------|
| Mean diameter | μm | 2 |
| C.V | % | 15 ~ 20 |
| Decomp. Temp. | $^{\circ}\text{C}$ | 400 \uparrow |
| Moisture content | % | 1 \downarrow |
| True Density | g/ml | 1.32 |
| Bulk Density | g/ml | ~ 0.40 |
| Refractive Index | a. u. | ~ 1.43 |
| Oil absorption | $\text{ml}/100\text{g}$ | 50 ~ 60 |
| 10% K-value | kg/mm^2 | 580 |
| Angle of Repose | deg. | 40 ~ 45 |
| Heavy metals | ppm | N.D |
| Surface property | - | Hydrophobic |



| Property | Unit | SL-200M |
|------------------|-------------------------|----------------|
| Mean diameter | μm | 2 |
| C.V. | % | 15 - 20 |
| Decomp. Temp. | $^{\circ}\text{C}$ | 400 \uparrow |
| Moisture content | % | 1 \downarrow |
| True Density | g/ml | 1.32 |
| Bulk Density | g/ml | ~ 0.40 |
| Refractive Index | a. u. | ~1.43 |
| Oil absorption | $\text{ml}/100\text{g}$ | 50 - 60 |
| 10% K-value | kg/mm^2 | 580 |
| Angle of Repose | deg. | 40 - 45 |
| Heavy metals | ppm | N.D. |
| Surface property | | Hydrophobic |


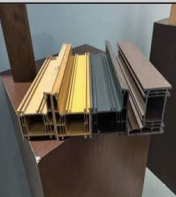

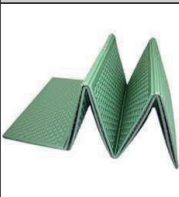



PVC Applications

| Casting | | | Calendering | Injection Molding | Calendering | Extrusion |
|---|---|---|--|---|---|---|
| Wallpaper | Flooring | Artificial leather | Artificial leather | Sandal | Flooring | Profile & Pipe |
|  |  |  |  |  |  |  |
| TFC-AZP Series TFC-W Series TFC-OBSH | TFC-AZP Series | TFC-AZP Series | TFC-AZP Series | TFC-AZP Series | TFC-AZP Series | TFC-AZP Series TFC-PY Series TFC-LMB Series TFC-PTSS |





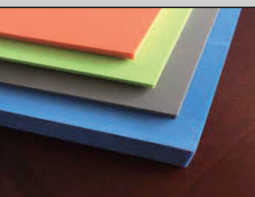
EVA Applications

| Press Molding | | | | | Injection Molding | |
|---|---|---|---|--|---|---|
| Shoes sole | Inter-Floor Noise material | Sandal | Baby toys | Mat | Shoes sole | Fishing trap |
|  |  |  |  |  |  |  |
| TFC-AZP Series TFC-ME Series | TFC-AZP Series TFC-ME Series TFC-ERB Series | TFC-AZP Series TFC-ME Series TFC-ERB Series | TFC-AZP Series TFC-ME Series TFC-ERB Series | TFC-AZP Series TFC-OBSH | TFC-AZP Series TFC-ME series | TFC-AZP Series |





PE & PP Applications

| Chemical crosslinked foam | | Electron beam crosslinked foam | Press Molding | | Injection | Extrusion |
|---|---|---|---|--|---|---|
| Pipe insulation | Building materials | Car door panel | Mat | Packaging filler | Cap seal | Profile & Pipe |
|  |  |  |  |  |  |  |
| TFC-ACPE Series TFC-ACPE(MB) TFC-LDDCP TFC-LDFL | TFC-ACPE Series TFC-ACPE(MB) TFC-LDDCP TFC-LDFL | TFC-ALP Series | TFC-AZP Series TFC-ERB Series | TFC-AZP Series | TFC-AZP Series TFC-PY Series TFC-LMB Series TFC-PTSS | TFC-AZP Series TFC-PY Series TFC-OBSh TFC-PTSS |

Rubber Applications

| Extrusion | | Press Molding | | |
|---|---|---|--|---|
| Weather strip | Insulation Tube | Wet suit | Pad | Foaming Sheet |
|  |  |  |  |  |
| TFC-AZP Series TFC-OBSh | TFC-AZP Series TFC-OBSh | TFC-AZP Series TFC-OBSh | TFC-AZP Series TFC-OBSh TFC-DPT+TFC-HHBK TFC-ERB Series TFC-TSH | TFC-AZP Series TFC-OBSh TFC-DPT+TFC-HHBK TFC-ERB Series TFC-TSH |

Other(PS, ABS etc.) Applications

| Injection | | Extrusion | | |
|---|---|---|--|---|
| Disposable container | Bottle cap | Door & Window frame | Picture frame | Sheet profile & Pipe |
|  | |  |  |  |
| TFC-PY Series TFC-LMB Series | TFC-AZP Series TFC-PY Series TFC-LMB Series TFC-PTSS | TFC-AZP Series TFC-PY Series TFC-LMB Series TFC-PTSS | TFC-AZP Series TFC-PY Series TFC-LMB Series TFC-PTSS | TFC-AZP Series TFC-PY Series TFC-LMB Series TFC-PTSS |



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