

GP SERIES · SURFACE-COATED

PFAS-Free Greaseproof,

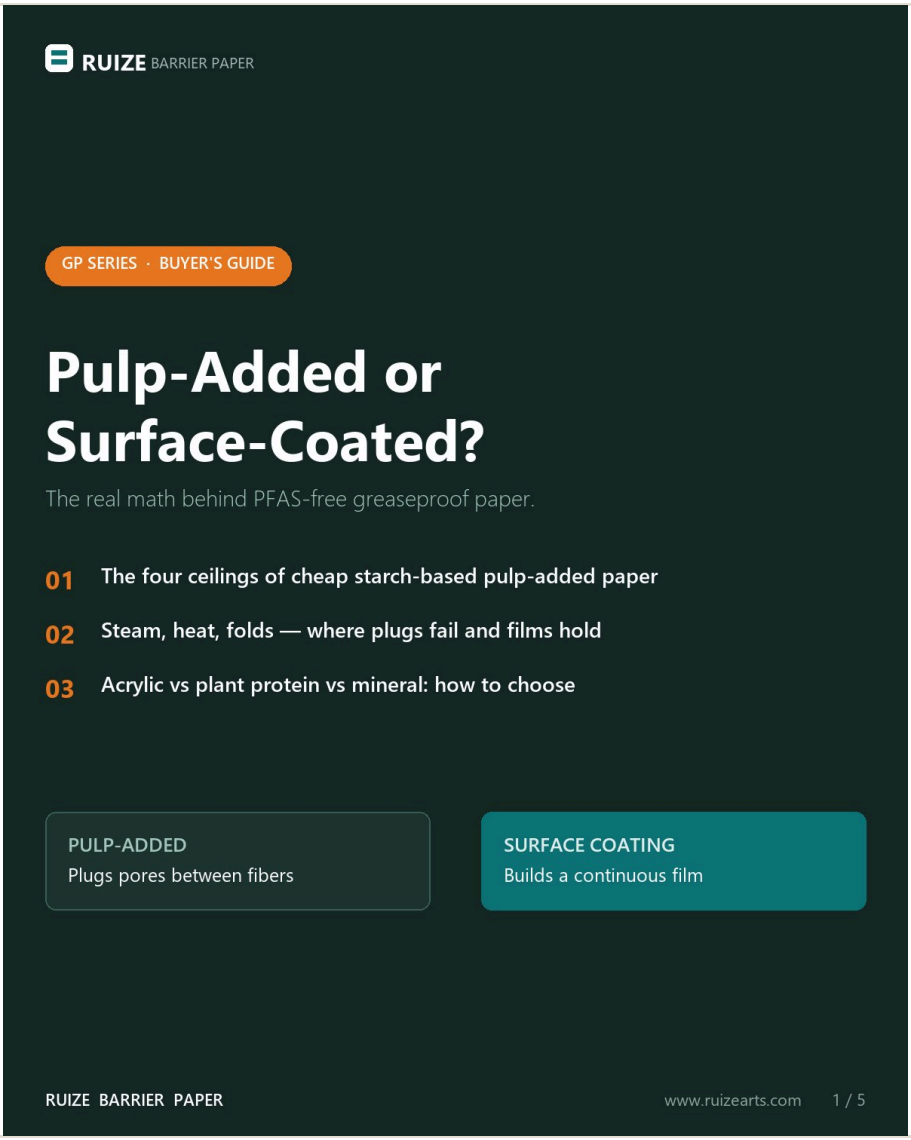
GP SERIES · SURFACE-COATED

PFAS-Free Greaseproof Paper: Pulp-Added or Surface-Coated?

Removing fluorine was never the hard part. Putting the barrier back was.

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— Ruize GP greaseproof paper technical team



The two routes, in one picture: one plugs the pores, the other builds a film.

As PFAS restrictions and plastic bans tighten across Europe, North America and an increasing number of Asian markets, the incumbent answers are leaving the shelf. Fluorochemical greaseproof paper carries PFAS and PFOA — health and persistence problems that no longer fit any retailer's list. PE-coated board is difficult to recycle in the paper stream. Silicone paper is expensive and repulps badly.

"PFAS-free, no plastic layer, recyclable and repulpable" has stopped being a selling point. It is now the entry ticket.

Somewhere along that transition, the industry split into two routes: **pulp addition and surface sizing at the paper machine** — mostly starch-based chemistry — and **functional surface coating at the converting end**.

Which leads to the question we get asked more than any other:

THE QUESTION

"Starch-based, pulp-added greaseproof paper costs dramatically less. Why does anyone bother with surface coating?"

No slogans today. We are going to work through the materials logic and the real service conditions, and settle both accounts — the technical one and the economic one.

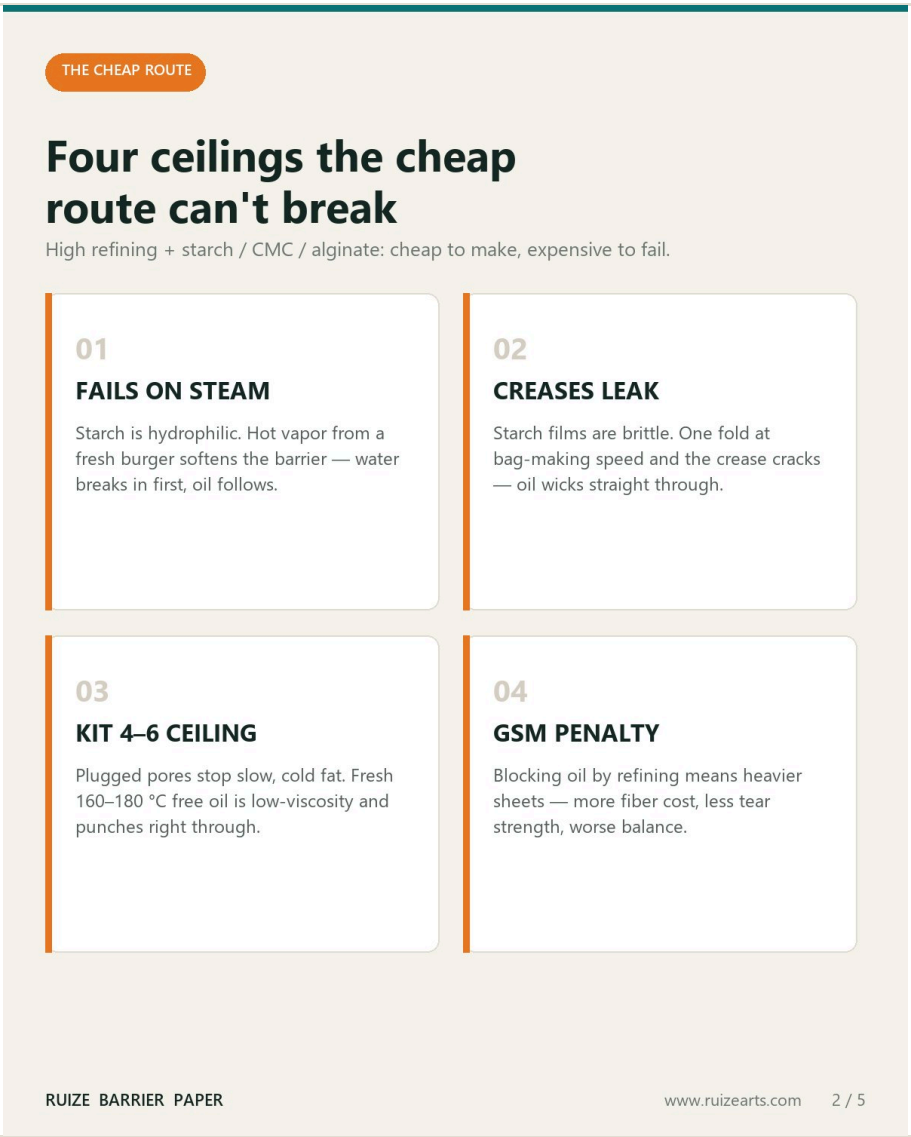
01 The four ceilings of the cheap route

02 Why you end up needing a coating anyway

03 How to choose between the three coating systems

01 / THE PROBLEM

Where cheap starch-based pulp-added paper actually breaks down



The four failure modes we see in the field, not the lab.

In the fluorochemical era, fluoride went into the pulp or onto the size press. It lowered the surface energy of the fibre so that an oil drop simply could not wet it. Elegant, effective — and gone.

Take fluorine away and the cheapest substitute a mill can reach for is **high refining plus a starch-based (or CMC, or sodium alginate) grease-resistant agent**. The mechanism is entirely different: instead of repelling oil, you **plug the capillaries between the fibres** so oil has nowhere to go.

It is genuinely cheap at commodity scale. In service, it has four built-in problems that you cannot refine your way out of:

> **1 — It fails in the presence of water and steam.**
>
> Starch is a hydrophilic polymer. Wrap a burger straight off the grill or a basket of hot fried chicken and the steam softens and disrupts the starch film within minutes. Grease resistance drops off a cliff and oil strikes through.

> **2 — The sheet turns brittle, and creases leak.**
>
> A dried starch film has poor flexibility and high rigidity. On high-speed bag making, or even in a hand wrap, the starch layer develops micro-cracks exactly along the fold — and oil takes the path of least resistance. The pack looks ruined before it reaches the customer.

> **3 — There is a ceiling on the grease rating.**
>
> Pulp-added and starch-based systems typically land at Kit 4–6, good enough for ambient, dry fats at room temperature. Fresh frying oil at 160–180 °C is low-viscosity, low-surface-tension and extremely aggressive. It finds the pores the starch did not close, and goes through.

> **4 — You pay for oil resistance in grammage.**
>
> If the only tool you have is closing pores, you either raise the basis weight or you over-refine. Either way you are buying kilograms instead of performance, and losing the balance between tear strength and porosity on the way.

02 / WHY COATING

Three plain questions that settle it



Ask your supplier these three. The answer is always the same.

Those four problems reduce to three questions. Take them to any supplier and you will know what you should be buying.

Question 1 — Do you need water resistance, moisture resistance, or sauce contact? Then you need coating.

Starch is hydrophilic by nature. Think about thickening a sauce at home: the moment the slurry hits hot water it swells and gets tacky.

A starch-based grease barrier behaves the same way. Steam from a hot bun attacks it first; once water is in, oil follows straight behind.

Coating is precisely the answer to that weakness. Water-based acrylic forms a strongly hydrophobic cross-linked structure; chemically modified and cross-linked plant proteins, and properly formulated mineral coatings, are water-resistant once dried. Keep the water out and the grease barrier stays where you put it.

Question 2 — Are you packing something straight out of the fryer? Then you need coating.

Pulp addition and starch sizing work by physical plugging. There is no dense polymer network behind it. At room temperature oil is viscous and slow, so a plugged sheet can cope — just about. Fresh fried chicken or fries arrive as free oil at 160–180 °C: almost no viscosity, very low surface tension, enormous penetrating power. It goes through the remaining micro-pores immediately.

Surface coating lays a continuous, pore-free polymer shield on top of the sheet. Plant protein coatings are particularly strong here, because protein tolerates high temperature extremely well. Whatever the oil temperature or how fluid it is, there is simply no pore left to enter — which is the real reason these systems reach Kit 12 consistently.

Question 3 — Does it get folded, bagged, or wrapped more than once? Then you need coating.

Starch is brittle once dry. Fold the sheet and the crease cracks; once it cracks, it leaks. Coating formulations carry film-forming aids and flexible polymer chains — most visibly in the acrylic and protein systems. Twist a burger wrap, fold a fried-chicken bag down hard, and the coating stays intact. No leak at the crease.

> Pulp addition plugs. Coating films. A plug never seals completely. A film does.

03 / ADVANTAGE

Where surface coating wins outright

If plugging has a ceiling, surface coating simply changes the approach: build a dense, continuous, flexible barrier **on top of** the base paper. The Ruize GP greaseproof series is developed together with a national key laboratory, using bio-based extraction and water-based coating technology. Three advantages come out of that route:

01 — Extreme lightweighting, and a lower total cost than you would expect.

Coating does not need basis weight to do its job. The GP range runs in a 23–48 gsm window, inside the Class 1 coated paper definition (≤ 60 gsm) used in European specifications. Lower grammage means more square metres out of every tonne of base paper — which offsets the coating step and still nets out cheaper per thousand wraps.

02 — High-order grease resistance, with real physical strength.

Grease resistance holds at Kit 8–12 and can be specified to the application. Bursting strength ≥ 160 kPa, air permeability ≤ 20 s/100 ml. Oil is stopped at the surface while the film stays flexible enough to fold without leaking.

03 — No plastic layer, nothing to carry downstream.

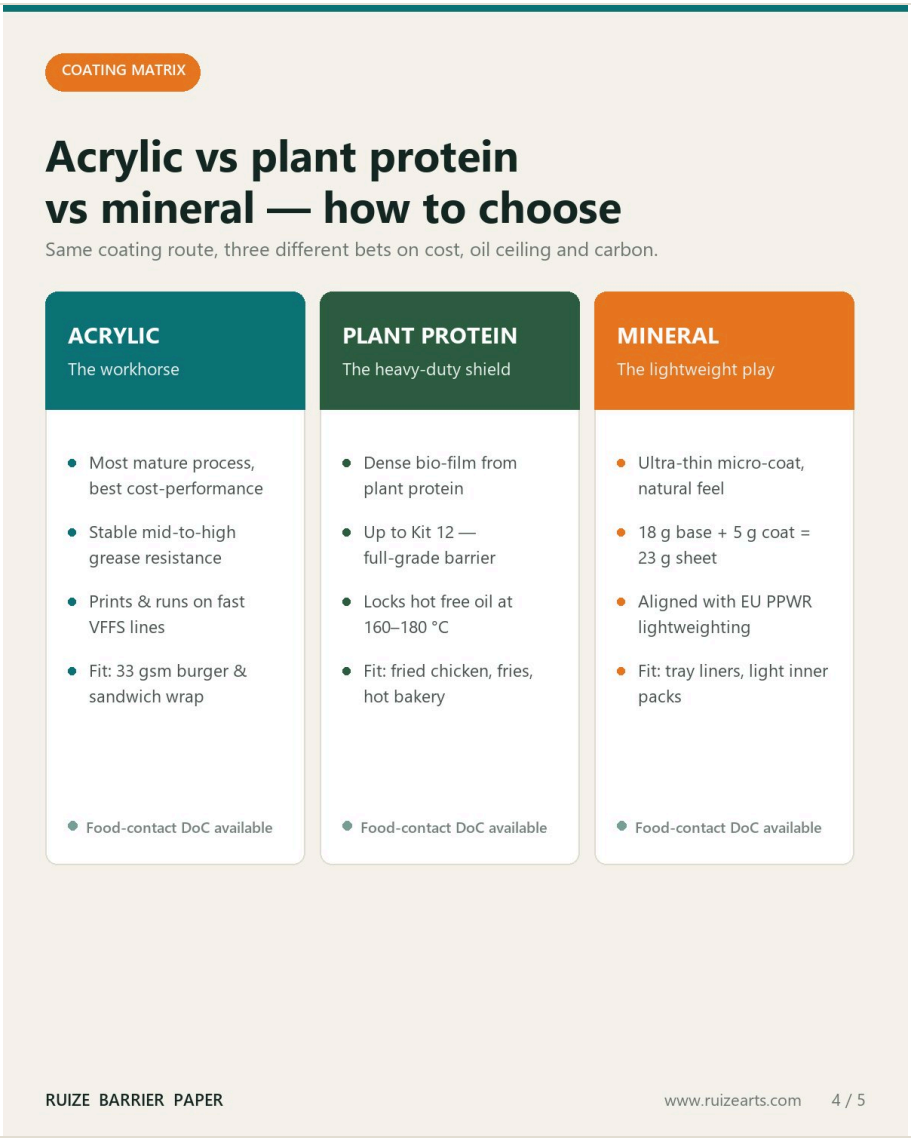
No PFAS and no PFOA added; purely water-based, vegan formulation; no intentional microplastic content; designed to enter the waste paper stream and repulp. Food contact declarations are available by grade per application: FDA, EU 10/2011, German BfR, and China GB 4806.8 / GB 9685.

23–48 gsm finished grammage	**Kit 8–12** grease resistance (customisable)
≥ 160 kPa bursting strength	**≤ 20 s/100 ml** air permeability

Source: third-party test reports; values are grade-specific and confirmed per grade's certificate.

04 / THE MATRIX

Acrylic vs plant protein vs mineral



Same route, three different bets — cost, oil ceiling, carbon.

Even within coating, customers want different things: some chase unit cost, some chase the oil ceiling, some chase paper feel and a carbon number. So the GP range runs three technologies side by side.

01 / ACRYLIC — water-based acrylic: the economical, stable choice

Mature process, strong cost-performance, stable film formation, good temperature and humidity behaviour, resistant to crease cracking. Mid-to-high grease resistance held consistently, with excellent printability and machine runnability at high speed.
Typical use: Western QSR and light meals — the reference here is the 33 gsm water-based burger wrap used by international chains, plus sandwich wraps.

02 / PLANT PROTEIN — bio-based plant protein: the natural high-performance answer

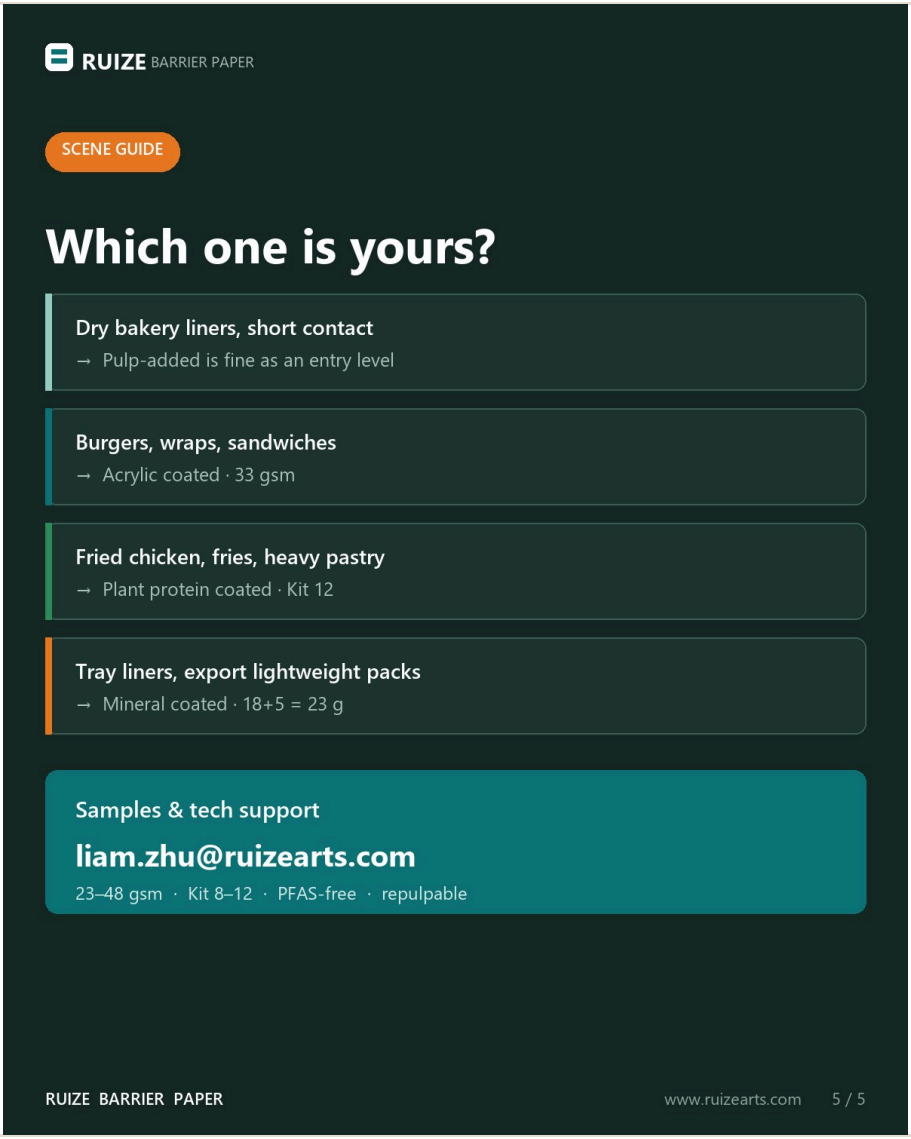
Extracted from plant protein. Forms a very dense film with a pleasant, skin-friendly hand feel and exceptional grease blocking. Reaches Kit 12 — the top of the scale — and holds against hot free fat from deep-frying.
Typical use: heavy-oil, high-temperature fried snacks — the reference here is the 38 gsm burger wrap used by international coffee chains, for high-fat bakery, fried chicken bags, popcorn chicken and fry bags.

03 / MINERAL — mineral pigmented: the extreme lightweight challenger

Keeps the touch of real paper. Ultra-thin micro-coating, aligned with the strongest decarbonisation reading of the EU "Class 1 coated paper" category.
Typical use: 18 gsm base + 5 g micro-coat = 23 gsm finished sheet. Tray liners, bakery tray papers, lightweight inner liners — maximum reduction with minimum material.

05 / HOW TO CHOOSE

Match your scene to your first section



Four scenes, four answers. Samples available for all of them.

So: cheap pulp-added starch, or surface coating? It depends entirely on what happens to the pack after it leaves your line. Start with this three-look rule:

1. **Look 1 — Any steam or sauce?** Hot water vapour, tomato ketchup, salad dressing? Choose coating. Starch fails wet-first.
2. **Look 2 — Anything straight out of the fryer?** Fresh fried chicken, fries, hot bakery? Choose coating. Hot free oil penetrates aggressively; only a dense coating holds it.

3. **Look 3 — Any folding or bag making?** Machine folding, or hand wrapping and twisting? Choose coating. A flexible film survives the crease.

Only when contact is ambient, dry, brief, and barely folded does cheap pulp-added or starch-based greaseproof paper deserve a place on the shortlist. Scene by scene:

1 — Ambient, dry, short contact bakery items

Plain bread liners, room-temperature cookie separators. If crease leaking is not critical and there is no heat or moisture, pulp-added and starch-based papers remain a valid entry-level option.

2 — Western QSR and chain deli

Burgers, wraps, sandwiches. Fresh product carries heavy steam plus sauce and fat, and gets wrapped fast by hand or machine. *Water-based acrylic coating* is required — the 33 gsm burger wrap — because it resists both moisture and creasing.

3 — Hot, high-fat fried food

Fried chicken, fries, heavy-oil pastry. Hot oil at this temperature defeats starch almost instantly. *Plant protein coating* is required, at Kit 12, to put a natural protein barrier in front of it.

4 — High-volume dine-in liners, tray papers, export lightweight packs

Squeezed between PPWR-driven material reduction and cost-down targets, *mineral coating* — 18 gsm + 5 g = 23 gsm — buys the oil resistance you need with the least material and the most paper-like feel.

∞ / THE END

From protecting health at the source, to letting packaging return to nature.

The evolution of PFAS-free greaseproof paper was never about deleting fluorine. It is about finding a new balance — food safety, maximum grease resistance, and commercial reality — using better materials science instead.

Sample / Tech Support

Samples and technical support: liam.zhu@ruizearts.com

[Insert service hotline / WeChat QR code]

#GreaseproofPaper #PFASfree #PaperPackaging #BarrierPackaging #FoodPackaging #SustainablePackaging #PPWR #PackagingEngineering #QSR #MaterialsScience

We are the Ruize GP greaseproof paper team — focused on PFAS-free, plastic-free, recyclable paper-based barrier materials.
Ruize · GP Greaseproof Series — Paper that takes the fold, takes the heat, and takes the audit.