

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO. LTD.,
SAMSUNG ELECTRONICS AMERICA, INC.,
SAMSUNG SEMICONDUCTOR, INC., and
SAMSUNG AUSTIN SEMICONDUCTOR, LLC,

Petitioners

v.

CHIEN-MIN SUNG,

Patent Owner

IPR2024-00535
U.S. Patent No. 9,724,802

**PATENT OWNER'S REQUEST FOR DIRECTOR REVIEW
OF FINAL WRITTEN DECISION**

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Patent Trial and Appeal Board
U.S. Patent and Trademark Office
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Submitted Electronically via PTACTS

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Patent Owner respectfully requests Director review and reversal of the Final Written Decision, paper 41 (the “FWD”), issued in this *inter partes* review proceeding, which found that claims 1-9 and 12-21 of U.S. Patent No. 9,724,802 (the “’802 Patent”) are unpatentable. *See* 37 CFR § 42.75.

I. INTRODUCTION

Director review is warranted because the Board reached its “designated profile” finding by oscillating between conflicting theories it treated as interchangeable, and by disregarding the patent’s controlling lexicography. At institution, the Board rejected Petitioners’ “tip-to-tip” theory, holding that the benchmark must be the designated profile, not some other tip. In the FWD, the Board revived the very “tip-to-tip” theory it had rejected at institution—treating a sketch across Fig. 2(e) of Tsai (Ex. 1004) as the alleged “designated profile”—while also embracing a different “average-height” theory drawn from Tsai’s Fig. 6. Those are mutually exclusive narratives: one assumes a profile chosen in advance for alignment; the other is merely a number calculated afterward from measured data. By toggling between them, the Board never identified a single, coherent disclosure in Tsai; it filled evidentiary gaps with inconsistent inferences. And once the ’802 patent’s lexicographic definition is applied—that when “referring to the designated profile,” “the term ‘tip’ is intended to include the highest protruding point, which the FWD admitted that it did not apply—both theories fail. Neither

the Fig. 2(e) sketch nor the Fig. 6 average is a predetermined contour anchored at the highest tip, as the claims and specification require. The FWD thus credits contradictory expert theories the Board had previously rejected, ignores controlling definitions that would defeat those theories, and rests on post-hoc assignments rather than what Tsai actually discloses. The Board's finding is thus erroneous.

The Board's priority ruling compounds these errors. It converted an extrinsic litigation declaration submitted by Dr. Sung into a blanket forfeiture of earlier priority for claim 1—without any deposition of, or testimony from, Dr. Sung in this IPR and without performing the required limitation-by-limitation §120 analysis. It then treated the '802 patent's grandparent (Sung '146) as anticipatory prior art, a position logically at odds with denying priority for lack of support within the same family. These intertwined mistakes drove the outcome. Director review is thus necessary to correct the Board's reliance on conflicting theories, its disregard of controlling lexicography and unrebutted testimony, and its legally flawed priority analysis.

II. ARGUMENT

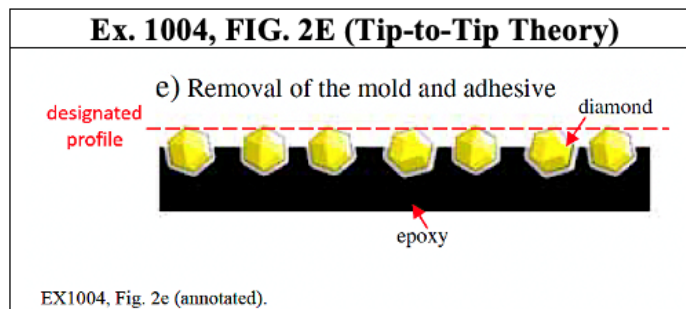
A. The Board Erred by Adopting Petitioners' Two Mutually Inconsistent "Designated Profile" Theories—After Having Rejected One Of Them at Institution

In the FWD, the Board credited two incompatible theories advanced by Petitioner and its expert, Dr. Shanfield, for what in Tsai (Ex. 1004) allegedly

constitutes the claimed “designated profile.” Reliance on these conflicting theories led the Board to clearly err in finding that Tsai discloses this claim element.

First, the Board adopted Petitioners’ “flat-profile” theory (which Petitioners and Dr. Shanfield also called the “tip-to-tip” theory) tied to Tsai’s Fig. 2(e).

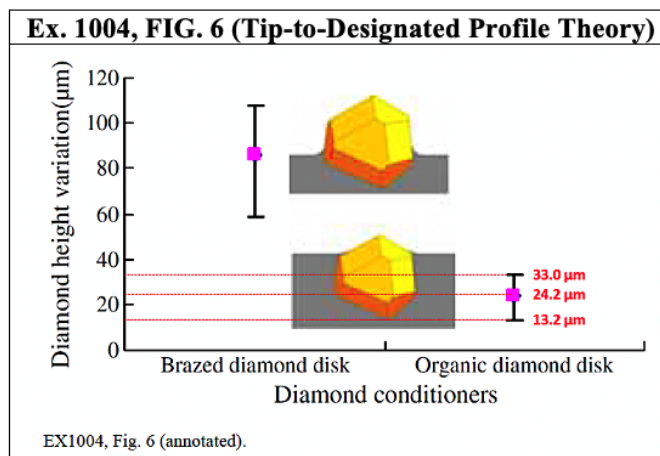
Petitioners’ expert drew a red, flat line across Tsai Fig. 2(e) and labeled it the “designated profile,” asserting a flat contour “to which each of the tips . . . should align,” which is reproduced below:



(Ex. 1002, ¶131; Ex. 1004, Fig. 2(e); Paper 41 at 71, 79.) That approach is the very “tip-to-tip” framing the Board rejected at institution, where it “agree[d] with Patent Owner’s argument that the claim term ‘tip variation’ must refer to Petitioner’s “tip-to-designated profile” claim construction, not Petitioner’s “tip-to-tip” claim construction” and held that “the claim language sets the benchmark for the ‘variation’ of a given tip to be the designated profile, not some other tip.” (Paper 14 at 63; *see also* Paper 41 at 83 (acknowledging the institution ruling).) Yet, in the FWD, the Board leaned on this tip-to-tip theory to conclude that Tsai discloses the claimed designated profile because Dr. Shanfield’s red dotted line

purportedly shows a “flat profile.” (Paper 41 at 77, 79.)

At the same time, the Board also adopted Petitioners’ “average protrusion height” (which Petitioners and Dr. Shanfield also called the “tip-to-designated profile” theory) tied to Tsai’s Fig. 6. Petitioner annotated Tsai’s Fig. 6 with three horizontal lines (min/avg/max) and urged that the average (24.2 μm) be treated as the “designated profile” (Ex. 1002 at ¶133 (“*[u]sing the average protrusion height (i.e., 24.2 microns) as the designated profile*”))), which is reproduced below:



(See Ex. 1004, Fig. 6; Paper 41 at 79, 82.) The Board agreed, stating the “breadth of claim 1 . . . allows Petitioner and Dr. Shanfield to assign the desired flat contour of leveled tips at the average diamond grit tip height.” (*Id.* at 79.)

These two theories, however, are irreconcilable—and their conflict is dispositive. The “flat-profile” or tip-to-tip theory posits a predetermined geometric plane fixed *ex ante* “to which each tip is intended to align.” By contrast, the “average protrusion height” or tip-to-designated profile theory selects a *post-hoc*

statistical average computed from measured tip heights and retroactively calls that average the claimed designated profile. A single claim element cannot simultaneously be (i) a predetermined contour used at design/fabrication to control protrusion alignment and (ii) a measurement artifact derived after fabrication. This clash confirms what the record shows: Tsai contains no single, coherent disclosure of the claimed “designated profile.”

Nor can “claim breadth” cure that gap. Anticipation requires that Tsai discloses the claim element in a single embodiment. Toggling between a flat plane (Fig. 2(e)) and a post-process average (Fig. 6) cannot supply one disclosure and underscores that Tsai does not disclose the claimed designated profile.

The specification’s lexicography underscores the Board’s significant error in finding that Tsai discloses the claimed “designated profile”: “profile” means a “predetermined contour . . . to which a plurality of superabrasive particles . . . are intended to align,” and when “referring to the designated profile,” *“the term ‘tip’ is intended to include the highest protruding point* of a superabrasive particle, whether that point be an apex, an edge, or a face.” (Ex. 1001 at 11:42–45.)

The Board admitted this error—it did not apply the specification’s lexicographic definition that “the term ‘tip’ is intended to include the highest protruding [tip]” “when referring to the designated profile” based on waiver grounds. (See Paper 41 n.15.) But waiver cannot authorize an incorrect

construction or permit the Board to ignore controlling lexicography, particularly where the Board heavily relied on the definition of “profile” (Paper 41 at 77) in concluding that Tsai discloses the claimed “designated profile.”

In any event, there was no waiver because the Board was on notice of this definition throughout the case: Patent Owner identified this important definition in the POPR, POR, and Sur-Reply; and Dr. Tsai also offered *unrebutted testimony* that, in this context, “designated profile” is anchored at the highest tip; and the FWD itself notes that testimony. (Paper 10 at 13 (“the term ‘tip’ is intended to include the highest protruding point”); Paper 17 at 17 (same); Paper 25 at 5 (same); Ex. 1055 at 116:8–12 (“Q. . . . Let’s go back to defining the designated profile as the highest protruding tip. A. Yes.”); Paper 41 at 74.)

1. The Board’s “Flat-Profile” and “Average-Height” Theories Are Irreconcilable, Contrary to the Intrinsic Record, and Unsupported by Substantial Evidence

With respect to Petitioners’ flat-profile/tip-to-tip theory, the Board treated Dr. Shanfield’s computer-drawn red dotted line across Tsai’s Fig. 2(e) as the claimed a designated profile, concluding Tsai intended tips “leveled to the same height,” and agreeing the line is a “flat profile . . . to which each of the tips . . . should align,” even while noting “some tips may protrude above or below” it. (Paper 41 at 77; Ex. 1002 at ¶¶131–132.) First, that red line is not a predetermined contour “to which . . . particles are intended to align,” nor is it anchored at the

highest protruding point, as the specification requires when referring to the designated profile. (Ex. 1001 at 6:21–25; 11:42–45.) Crediting a line inferred from observed tips departs from the lexicography and from the Institution Decision, which rejected the tip-to-tip theory and held the benchmark for “variation” must be the designated profile, “not some other tip.” (Paper 14 at 63.)

Also, the Board’s reliance on the statement that “some tips may protrude above or below . . . the designated profile” underscores the problem rather than curing it. *That phrasing is not Tsai’s disclosure*; it is Petitioners’ expert’s characterization. (See Ex. 1002 at ¶132.) And expert characterization cannot substitute for an actual disclosure in Tsai in the context of anticipation.

Further, the Board’s analysis is internally inconsistent: the FWD embraces a single “flat profile . . . to which each [tip] should align” while simultaneously accepting departures “above or below” that very line, and elsewhere it relies on a different “average-height” construct from Fig. 6. (Paper 41 at 79, 82.) A claim element cannot be both a predetermined geometric line and a statistic average computed after measurement. The toggling confirms Tsai does not disclose the claimed designated profile, and the finding lacks substantial evidence.

The Board’s reliance on Petitioners’ second “average-protrusion-height” theory fares no better. The Board acknowledged it was “persuaded by Dr. Tsai’s testimony that Tsai does not reflect any significance to the average . . . as defining

a designated profile”; yet, it concluded the “breadth of claim 1 ... allows Petitioner and Dr. Shanfield to assign” the flat contour at the average diamond-tip height. (Paper 41 at 79.) That is legal error. As alluded to above, anticipation requires Tsai to disclose the claimed designated profile; claim breadth cannot supply this missing element by permitting an expert to designate a profile *post hoc*.

Substantively, an “average” is a measurement statistic, not a predetermined geometric contour “to which a plurality of superabrasive particles . . . are intended to align.” (Ex. 1001 at 6:21–25.) An “average” has no lateral geometry (planar, sloped, curved, or domed), cannot be selected *ex ante* to direct alignment of each tip, and Tsai nowhere identifies that “average protrusion height” for tip alignment or along which tips align. (See Ex. 1004, 8:19–26 (Fig. 6 reports “[h]eight variation in tips”).) Re-drawing Fig. 6 with min/avg/max lines merely visualizes outputs; it does not create the “predesignated contour” the claims require.

This second theory also collides with the lexicography that the “tip,” in this context, “is intended to include the highest protruding point.” Substituting a statistical average for a highest-tip-anchored, predetermined contour *reads “designated” out of “designated profile”* and contradicts claim 1’s requirement that “a tip of each” particle aligns along that contour including the highest tip.

Having credited a *post-hoc* average untethered to the highest protruding tip and to any preselected contour, the Board’s finding is contrary to the intrinsic

record and lacks substantial evidence.

2. The Board Abused Its Discretion By Discounting Dr. Tsai's *Unrebutted* Testimony Explaining That ODD Uses A Substrate Baseline And Not A Designated Profile Anchored At The Highest Protruding Tip

Both the Board and Petitioner acknowledged that Dr. Tsai, the author of Tsai, testified that a “designated profile” was not a design consideration for ODD:

Q. Was the designated profile a design consideration for ODD at the time of publishing this paper? . . .

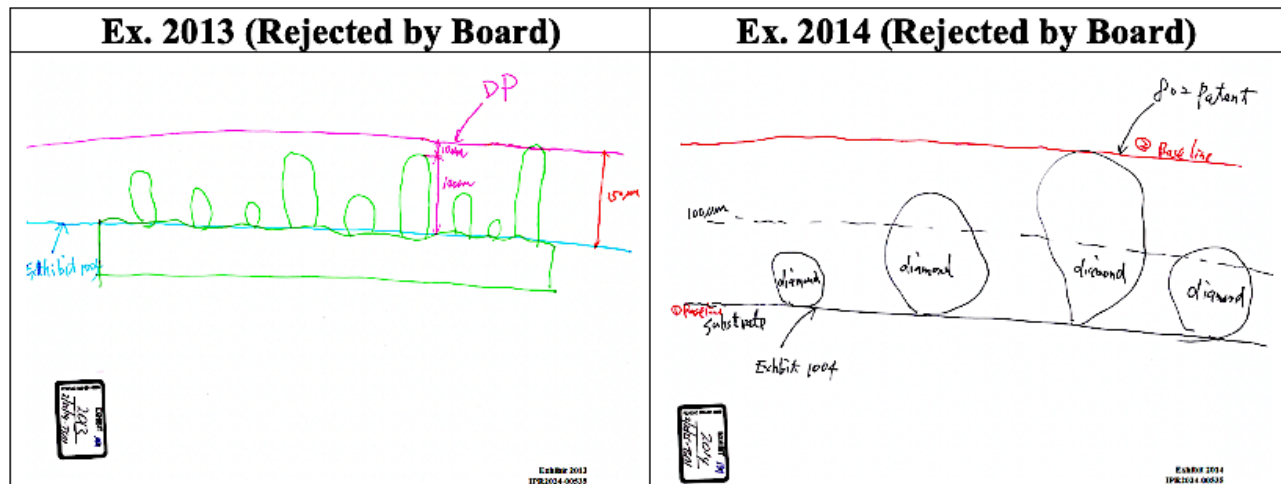
THE WITNESS: We did not consider about it.

BY MR. CHAN: Q. Why not?

A. Because we hoped to reach the equal heights, and we utilized the reverse casting method and we were able to achieve a very flat plate. Therefore, that we could use that as the baseline to measure the diamonds.

(Ex. 1055 at 158:15-25; Paper 41, at 75.)

Dr. Tsai explained and diagrammed that the ODD design measures tip height protrusion from the substrate (labeled as “Exhibit 1004” (in blue) in Ex. 2013 and “baseline 1” in Ex. 2014) whereas the claimed “designated profile” measures alignment and variation along the highest protruding tip (labeled as “DP” (in pink) in Ex. 2013 and “baseline 2” in Ex. 2014):

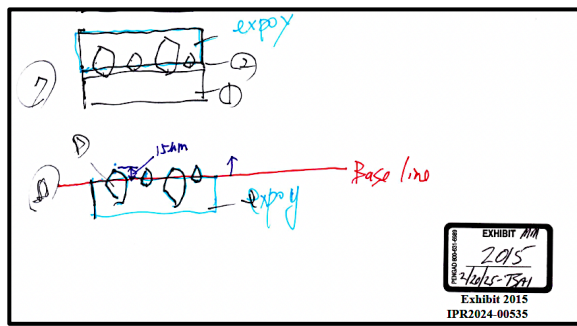


(See Exs. 2013–2014; Ex. 1055 at 152:12–19, 153:13–21.) That testimony goes to what Tsai actually discloses and how a POSA would understand it. Yet, the Board did not even address why Dr. Tsai is wrong or why the Tsai reference does not disclose what Dr. Tsai has demonstrated in Exs. 2013 and 2014.

Rather than engage that substance, the Board simply discounted Dr. Tsai’s evidence and testimony, and accused Patent Owner of “mis-appl[ying]” the ’802 patent’s lexicographic definition of “profile.” (Paper 41 at 80.) That response conflates two different inquiries. There is no dispute about the ’802 patent’s lexicographic definitions. The question instead is what Tsai itself discloses, and Dr. Tsai’s direct testimony goes to the heart of this question: **ODD has no designated profile** (Ex. 1055 at 158:15-25 (testifying that a designated profile was not a design consideration when designing the ODD), it does **not** designate a predetermined contour at the highest protruding tip (*Id.* at 164:5-12 (testifying to the use of “substrate as a baseline”))), and it does not align its tips to such a contour

(*id.* at 202:22-23 (testifying to using the substrate for tip alignment)).

According to Dr. Tsai, ODD has no designated profile because ODD “uses reverse technology” where “you reverse it, then the surface will become very flat, and therefore, you can use that leveled line as the baseline.” (Ex. 1055 at 153:22-25.) Dr. Sung demonstrated how the ODD disclosed in Tsai “uses reverse technology” to avoid the need for a designated profile in Ex. 2015:



(See Ex. 1055 at 159:18-161:8 (explaining how reverse casting used by ODD does not require a designated profile or a predetermined contour for tip alignment).)

Dr. Tsai’s factual description of his methods and measurements in the Tsai reference is the very kind of technical evidence the Board should have weighed (but did not do so) when determining what the Tsai reference discloses. Labeling it a “mis-application” of lexicography sidesteps the substance and fails to engage the material evidence.

The Board’s error is compounded because *no rebuttal expert testimony contradicted Dr. Tsai’s account of ODD’s baseline measurement framework or his illustrations shown in Exs. 2013 and 2014. Dr. Shanfield simply accepted*

Dr. Tsai’s testimony and did not rebut it. Where the only technical evidence is un rebutted, the Board had to give a reasoned basis to discount it; it could not silently replace it with a lay inference. Yet, rather than identify any disclosure in Tsai showing the designation of a highest-tip-anchored contour, the Board assigned an “average” to Fig. 6 and inferred another one from the hand-drawn line over Fig. 2(e)—post hoc and unsupported. Dr. Tsai’s testimony explains why those moves fail: because ODD looks to the substrate as the “baseline,” the Fig. 2(e) line is not a predetermined contour tied to the highest protruding tip, and the Fig. 6 “average” is merely a statistical summary, not a design target “to which . . . particles are intended to align.” By disregarding this un rebutted evidence and substituting its own inference, the Board’s designated-profile finding is legally erroneous and lacks substantial evidence.

3. The Board Abused Its Discretion By Disregarding Dr. Tsai’s Un rebutted Testimony and Substituting Lay Inference

The record contains detailed, un rebutted expert testimony from Dr. Tsai explaining—conceptually, mathematically, and with diagrams—that Tsai measures tip heights to the substrate and does not disclose a predesignated contour anchored at the highest protruding tip as claim 1 requires. (*See, e.g.*, Paper 25 at 1.) Petitioner offered no expert rebuttal identifying where Tsai designates such a contour or instructs alignment to it. Faced with that silence, the Board filled the

gap with its own lay reading of figures—treating a hand-drawn “flat” line across Fig. 2(e) and a post-hoc “average” line in Fig. 6 as if either were the claimed designated profile. Neither is identified in Tsai as the plane “to which . . . tips are intended to align,” and neither is tied to the highest protruding tip. Anticipation must rest on what the reference discloses, not on what the Board can retroactively assign to it.

The Board’s approach also misallocates the burden—it cannot substitute its technical inference for *unrebutted* expert evidence, especially without citing any disclosure in Tsai that designates a highest-tip-anchored profile. In doing so, the Board also effectively shifts the burden, requiring Patent Owner to disprove a limitation Petitioner did not establish with expert testimony.

The Board’s own acknowledgments further highlight the problem: it concedes Tsai does not treat the average as a designated profile, yet invokes “claim breadth” to adopt one anyway; and it accepts that tips may lie “above or below” the Fig. 2(e) line while simultaneously calling that line the profile “to which each tip should align.” Those internal contradictions confirm Petitioners’ evidentiary gap and the Board’s effort to fill it with non-expert evidence.

Because the Board’s finding rests on *post-hoc* assignments and contradictory, non-expert inferences instead of substantial evidence demonstrating that Tsai allegedly discloses a predesignated contour anchored at the highest

protruding tip, its designated-profile determination cannot stand.

B. Sung '146 Cannot Be Used As Prior Art Unless The Board Performed A Limitation-by-Limitation Analysis, Which It Did Not Do

Petitioners asserted, and the Board agreed, that Sung '146 (Ex. 1029)—the published application that issued as the '270 patent—is prior art to the '802 patent. But the '802 patent *claims priority* to, and is a grandchild of, the '270 patent; absent a forfeiture, a grandparent patent cannot be prior art to its grandchild. (Paper 17 at 54.) The FWD nevertheless adopted Petitioners' position by treating Dr. Sung's district-court declaration as a blanket disclaimer of earlier priority and, on that basis alone, held that Sung '146 (and Sung '026) are prior art. (Paper 41 at 22–27.) That is error for three independent reasons.

First, the Board misused the Sung declaration. The statement on which the FWD relies refers to “new subject matter . . . claimed in the '802 patent,” not to claim 1 (or all claims). (Ex. 1011 ¶18.) In a CIP, “new subject matter” can coexist with matter fully supported by earlier filings; it does not, by itself, extinguish §120 entitlement for claim 1's limitations that the family already discloses. The district court never adjudicated priority (Paper 17 at 32), and Petitioners chose not to depose Dr. Sung to clarify scope. The Board then supplied its own reading (which is beyond the Board's jurisdictional authority) of that extrinsic statement and used it to override the intrinsic record. That is backward. Priority must be decided from

the four corners of Sung '146, not by importing a litigation posture to override the intrinsic record.

Second, the Board did not perform the required element-by-element written-description analysis. Entitlement to an earlier date is limitation-specific, especially in a CIP. Yet, and despite the Board's recognition that "Patent Owner satisfied his burden of production" (Paper 41 at 21), the FWD issued a blanket conclusion that "the '802 patent claims are not entitled to a priority filing date that precedes [Tsai, Sung '026, and Sung '146]" without mapping the elements of claim 1 to Sung '146's disclosure. (*Id.* at 22–27.) Even at institution, the Board noted Petitioner only "indirectly" addressed entitlement with respect to another (provisional) application and otherwise provided no Sung '026 analysis. (Paper 14 at 30.) The FWD nevertheless "adopted" Petitioners' position without conducting the necessary four-corners comparison. That is not substantial-evidence review.

Third, the FWD is internally inconsistent. It denies priority for lack of written description in Sung '146 while simultaneously treating Sung '146 as anticipatory prior art to the '802 challenged claims. Those positions cannot both be true: if Sung '146 discloses every limitation of claim 1 (anticipation), that disclosure clearly demonstrates possession sufficient to support claim priority under §120; if it does not, then Sung '146 cannot anticipate and cannot be prior art. The Board never reconciles this conflict with limitation-specific findings.

III. CONCLUSION

For the foregoing reasons, Patent Owner requests Director review and reversal of the Board's findings that the claims of the '802 Patent are invalid on Grounds 1, 2, and 3.

Dated: October 17, 2025

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), the undersigned certifies that on October 17, 2025, the foregoing document is being served via electronic mail upon the following counsel of record for Petitioner:

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