



I do,
I do not

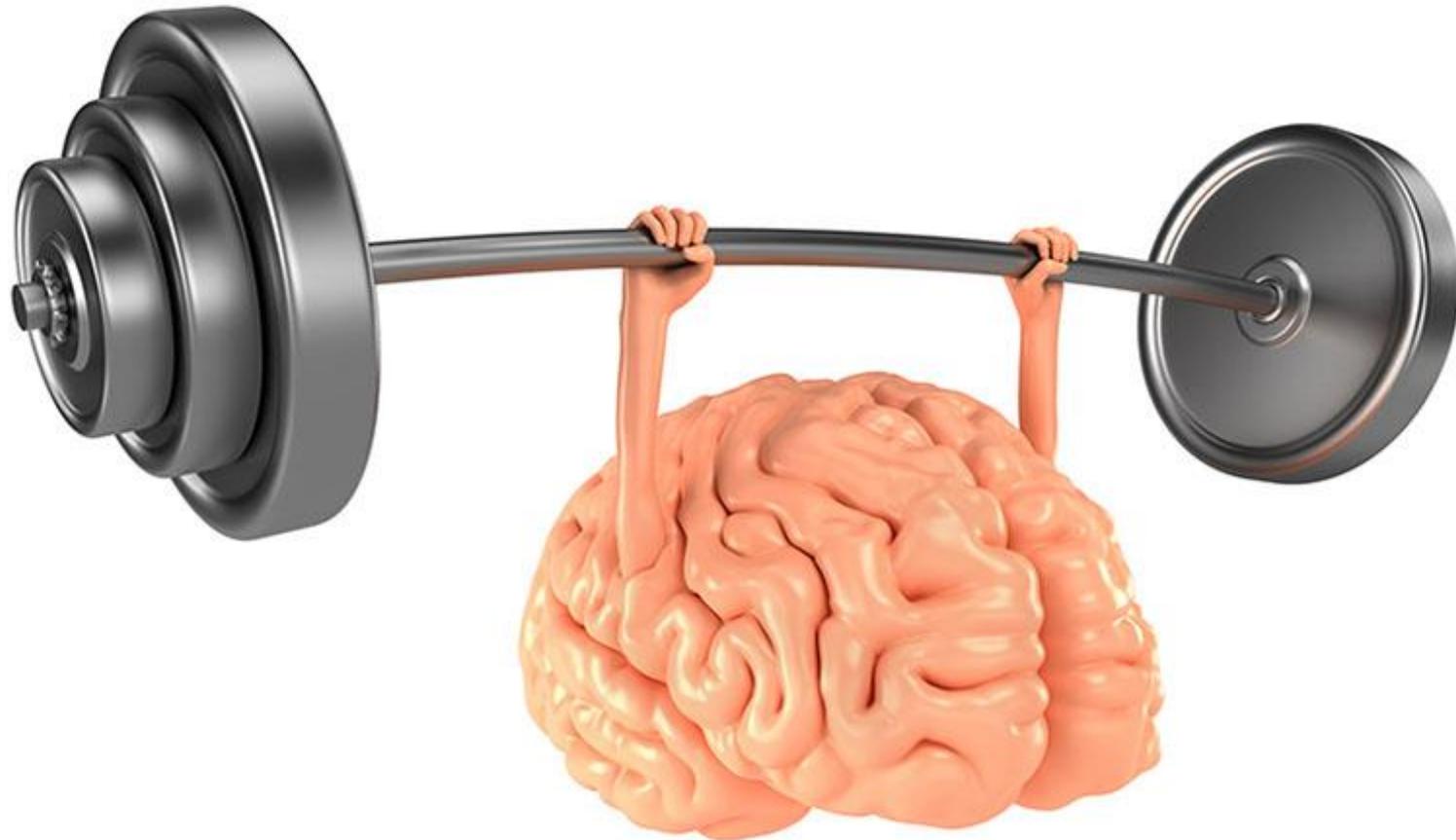


Who uses *LIQUID*
(laundry) detergent
at home?

Liquid Detergents:

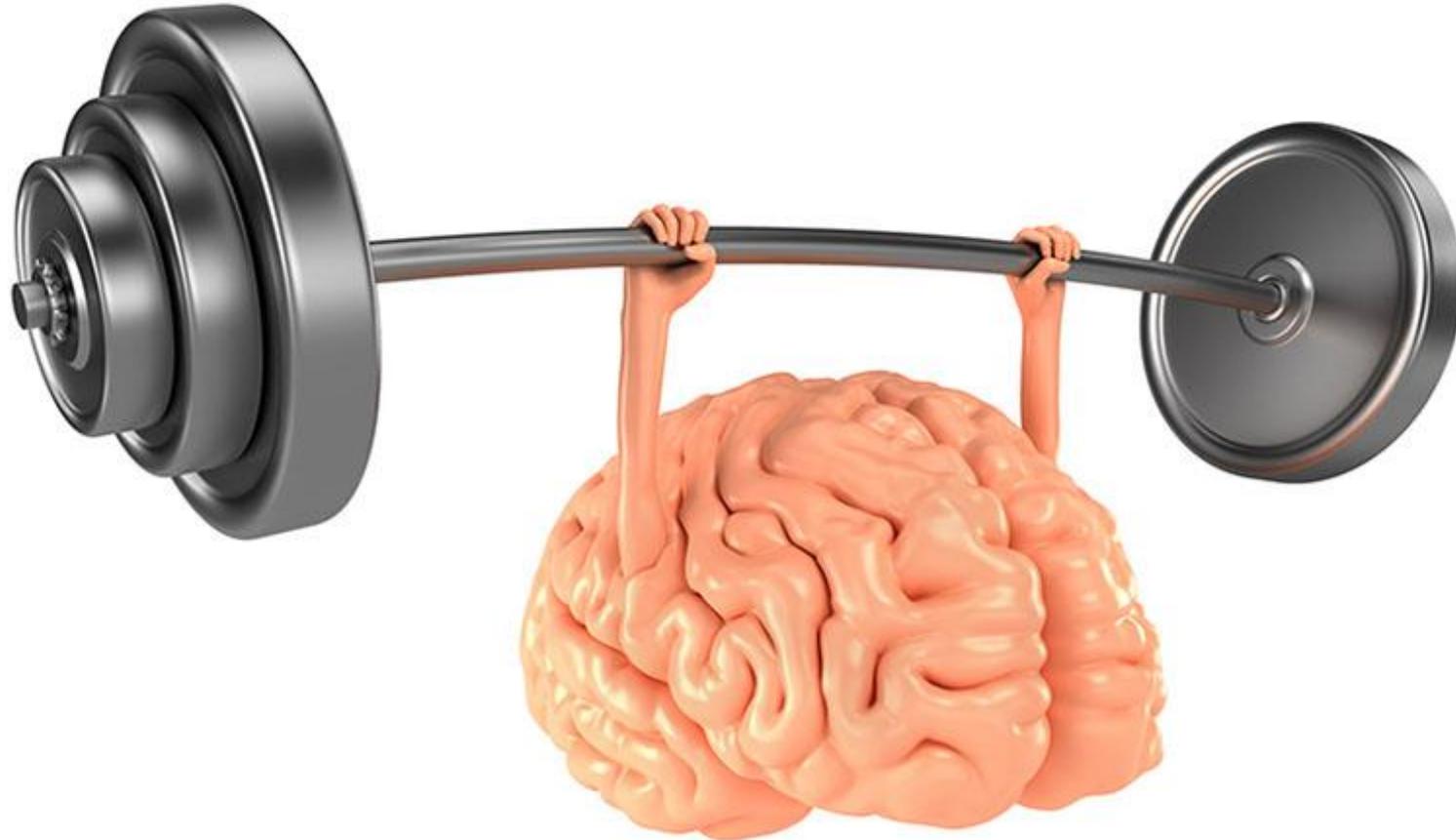


Brain Training – Fact Check



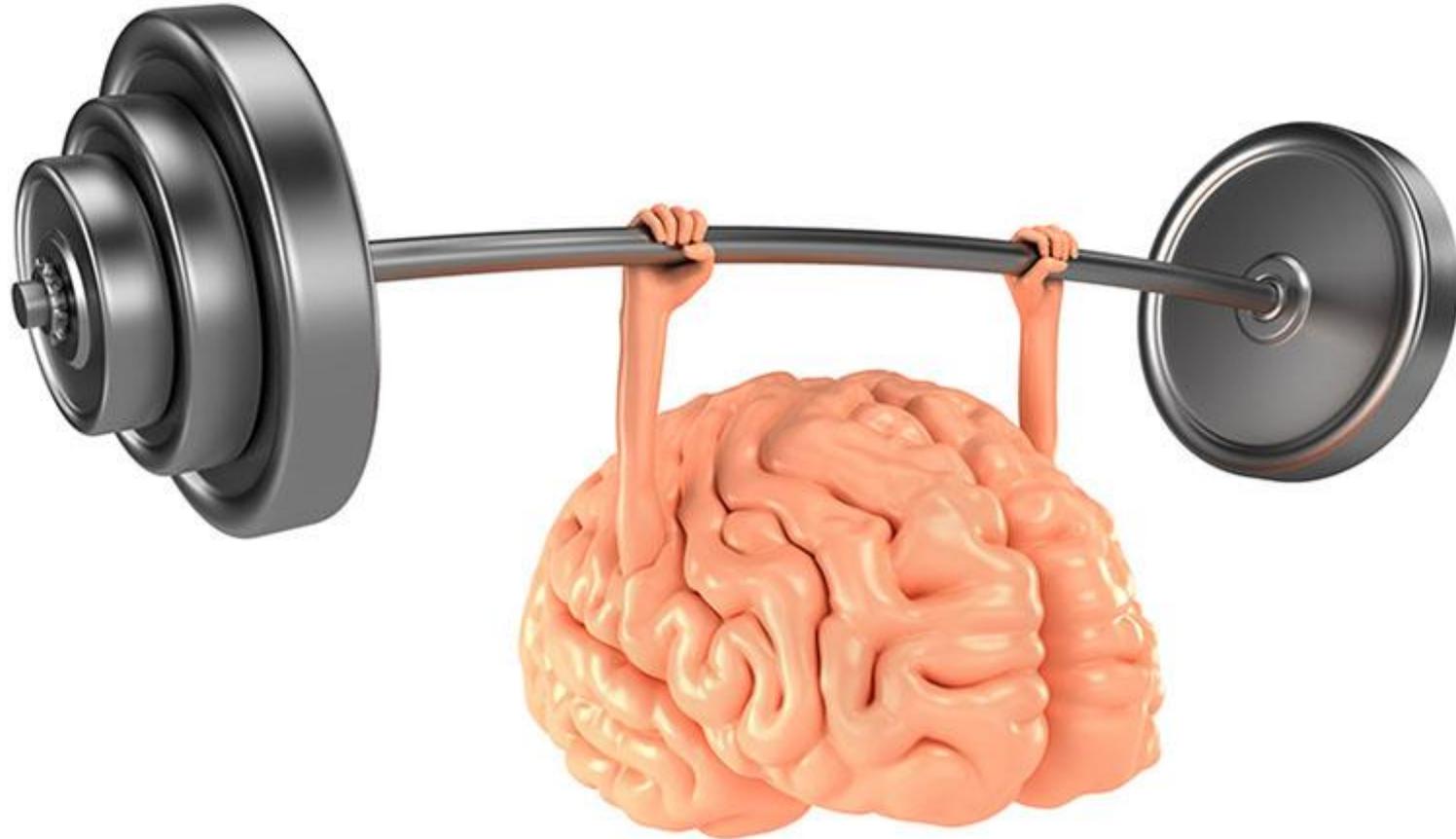
What is the US annual consumption (bottles) of liquid laundry detergents?

- A) 300M**
- B) 700M**
- C) 1B**



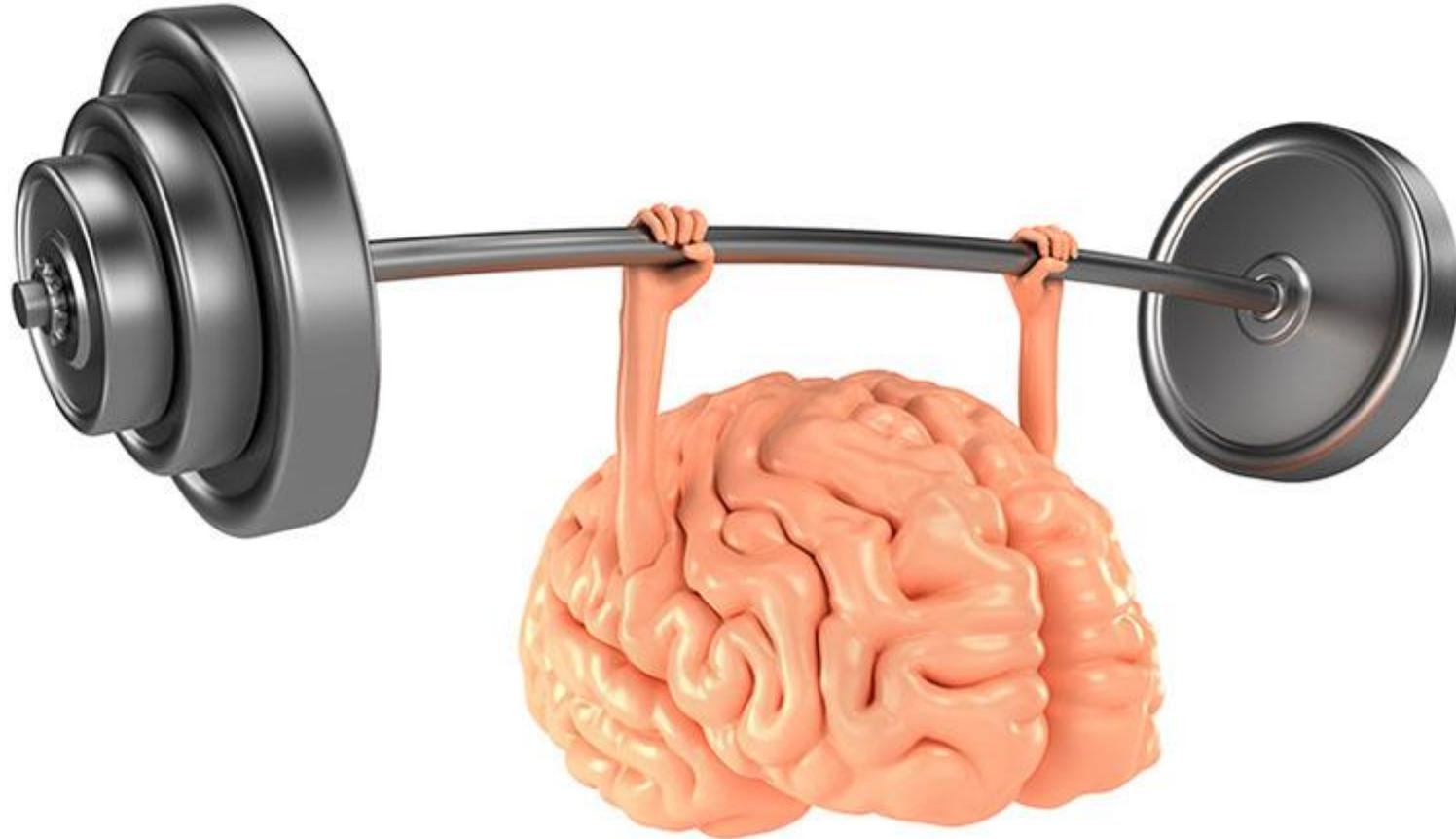
700 MILLION bottles of Laundry detergent shipped in US ALONE. [sappi](#)

- A) 300M
- B) 700M**
- C) 1B



How many containerloads is that, assuming 2880 bottles/container? **sappi**

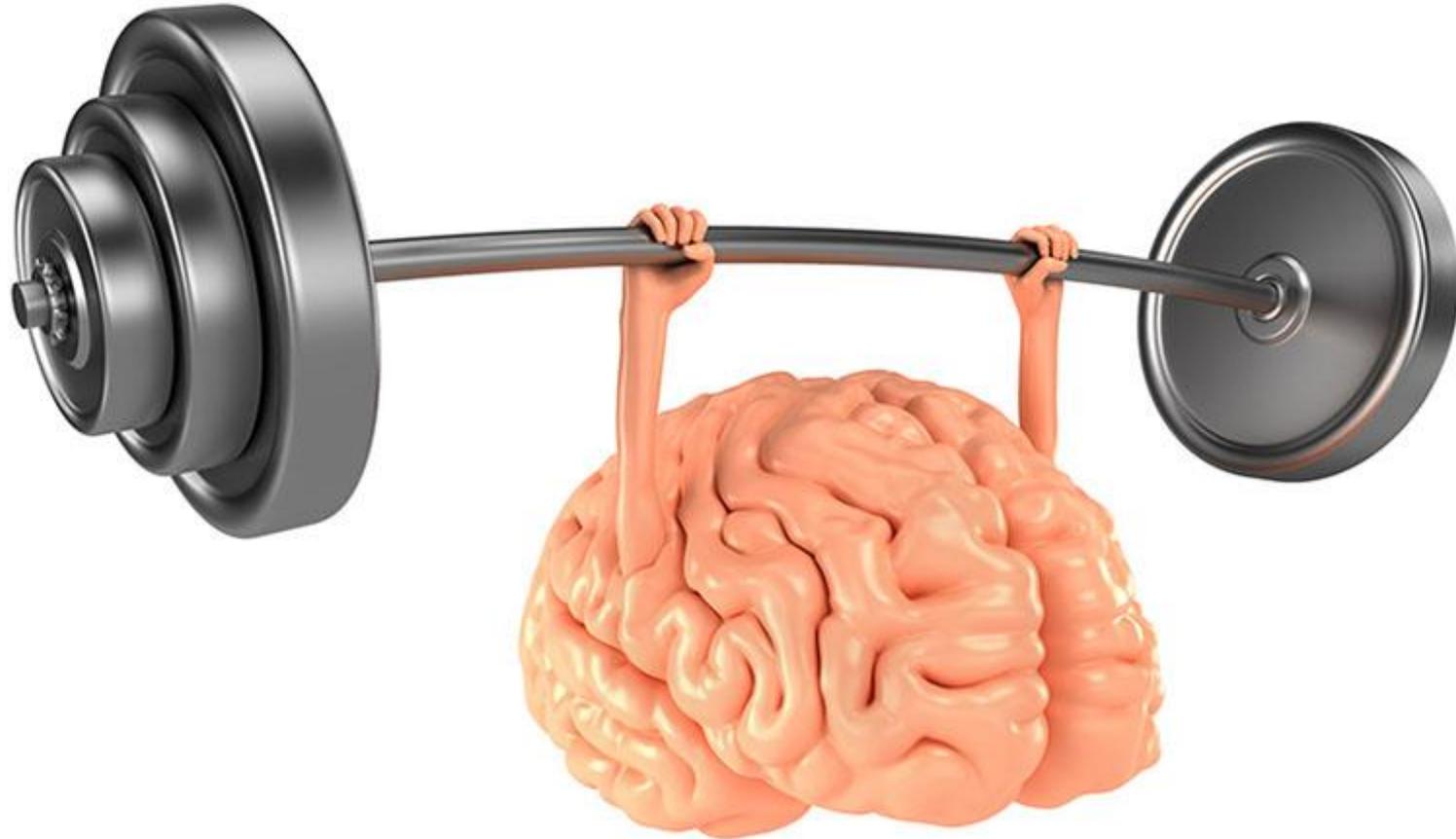
- A) 100k
- B) 250k
- C) 500k



~250,000 containerloads of laundry detergent per year in US alone.

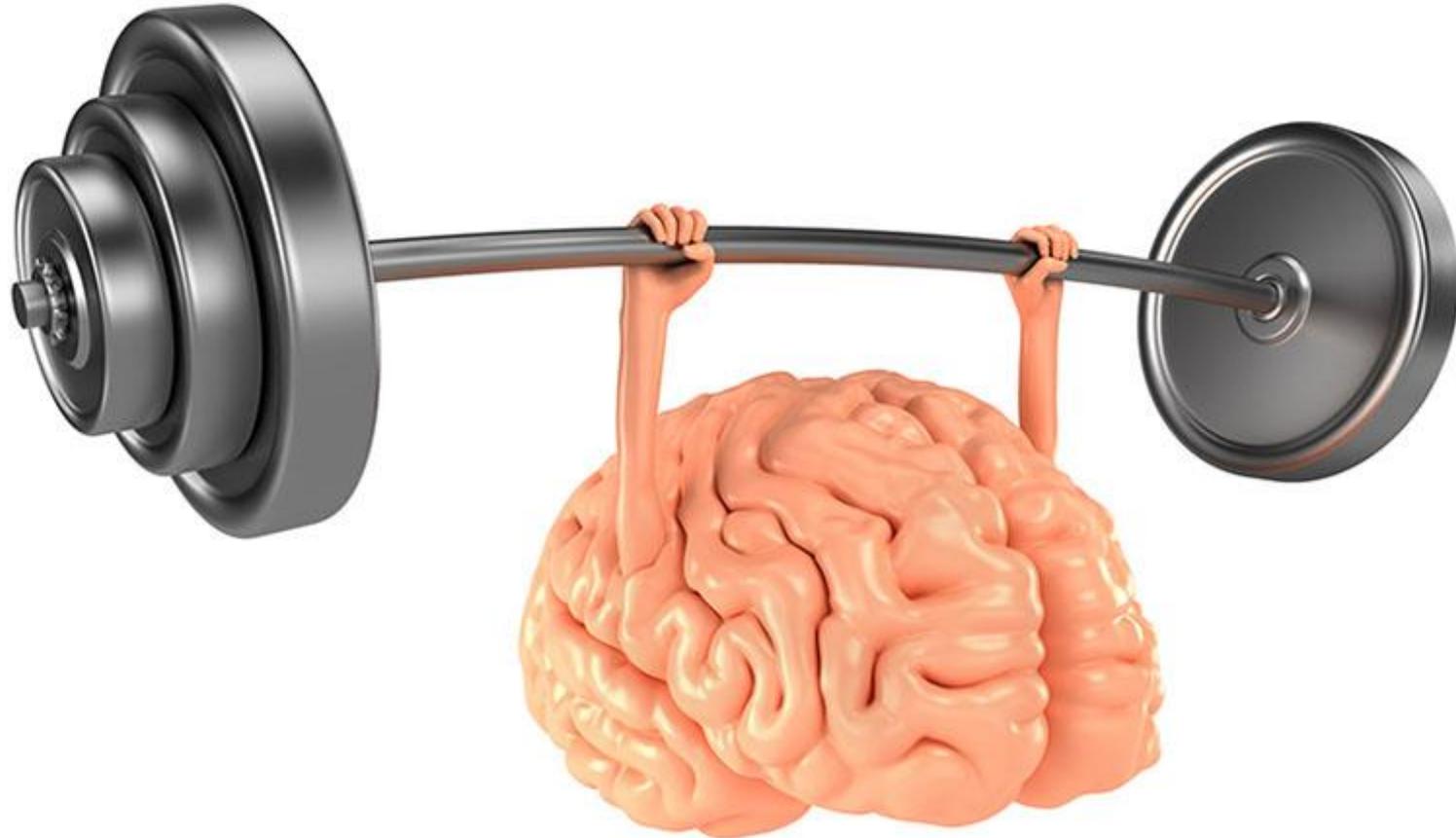
sappi

- A) 100k
- B) 250k**
- C) 500k



Utopia: How many containerloads are needed when considering solid detergent sheets with equal performance?

- A) 20k
- B) 30k
- C) 40k



~16k containers of solid detergents can replace
~250k containers of liquids.

A) 20k

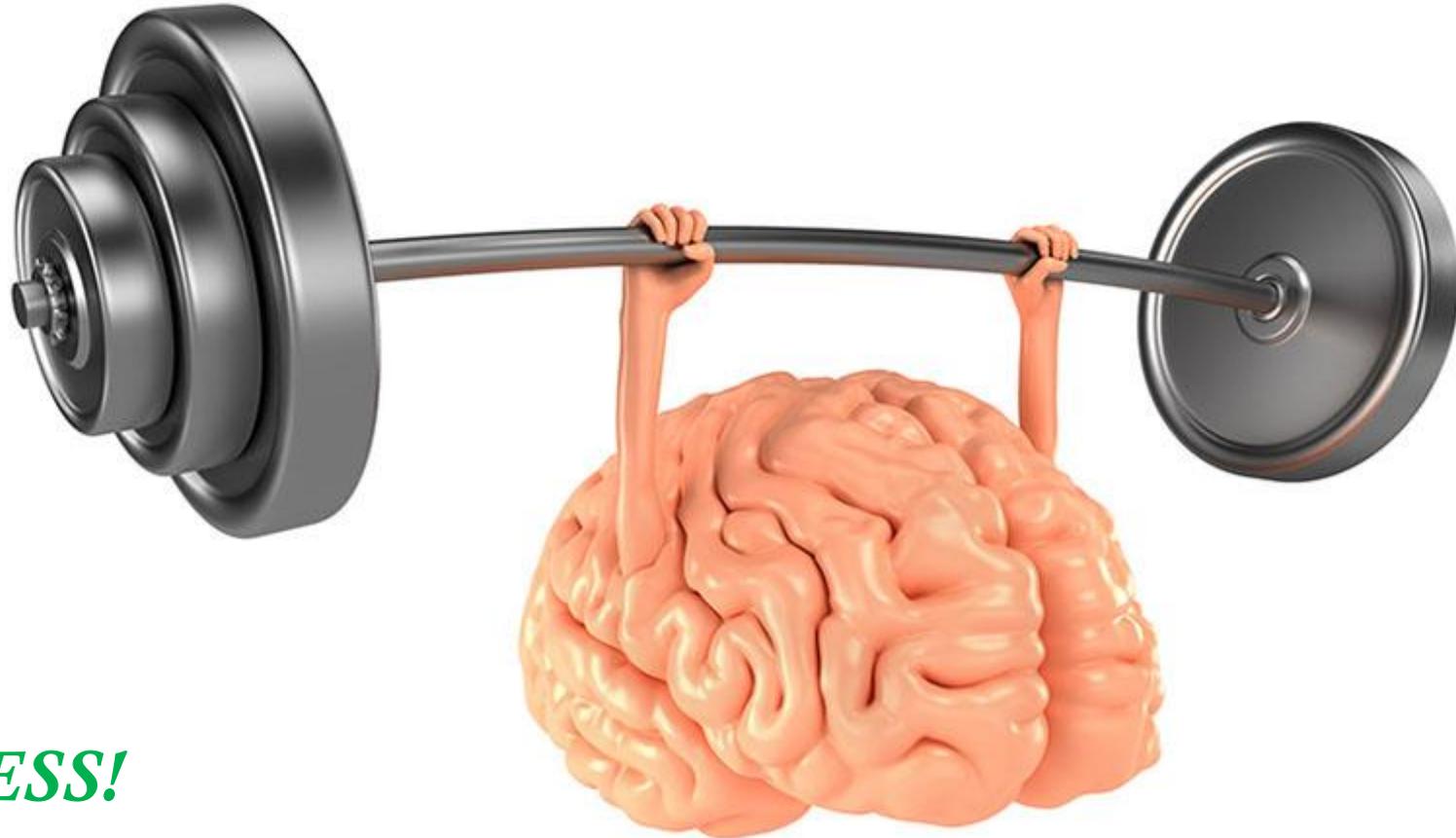
B) 30k

C) 40k

Compared to
liquid,

That's

~15 TIMES LESS!



OPINION: *why* are we *still* producing liquids?



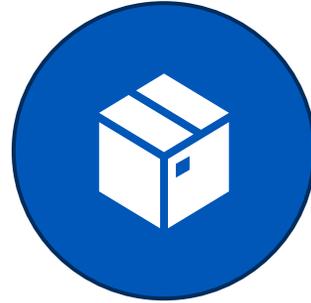
Consumer

**The great
Decider**



Equipment

**The great
Inhibitor**



Packaging

**The great
Promise**



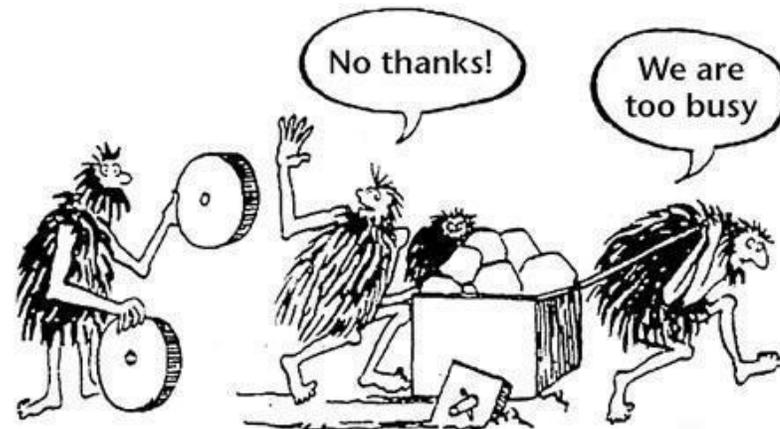
Compatibility

**The great
Limiter**



Performance

**The great
Separator**



Why not make solid detergents?



*PVOH, the standard binder in
solids, is under heavy scrutiny...*

The uncertainty of PVOH...

petition on behalf of BlueLand and Plastic Pollution Coalition

January 26, 2023

Petition submitted via e-mail and UPS

PETITION TO REQUEST HEALTH AND ENVIRONMENTAL TESTING AND REGULATION ON POLYVINYL ALCOHOL UNDER THE TOXIC SUBSTANCES CONTROL ACT AND AN UPDATE TO THE CHEMICAL SAFETY STATUS OF POLYVINYL ALCOHOL ON THE EPA'S SAFER CHEMICAL INGREDIENTS LISTS

It is necessary to explain the science of biodegradation testing and also the interpretation of the results and data as it can be very misleading if misunderstood. One such atypical case of misunderstanding of the test data and its misinterpretation was used to petition the United States Environmental Protection Agency (US-EPA) about potential toxicity coming from high levels of un-degraded water-soluble films based on PVOH. The EPA's response, in the form of a published statement endorsing the current biodegradation screening tests and also the lack of toxicity of PVOH, serves to underline the necessity to develop better understanding of the tests than focus on developing new test protocols (15). EPA's response showed how the petition had misinterpreted literature-based OECD 301 data on PVOH and correlated the results to bioaccumulation and toxicity based on assuming the exact same conditions used in the screening test also exist in WWTP and hence incorrectly concluding that high amounts of PVOH remain and are discharged un-degraded to the environment. The EPA's scientifically substantiated argument conclusively endorsed the use of OECD test guidelines that have been the basis of decades of EPA studies on eco-toxicity and end-of-life scrutiny for degradable chemistries. This example serves to amplify the need for simple and understandable interpretations of test data vs any need to reinvent or develop new biodegradation test protocols.

YASH PARULEKAR
MonoSol, A Kuraray Division, Indiana, USA

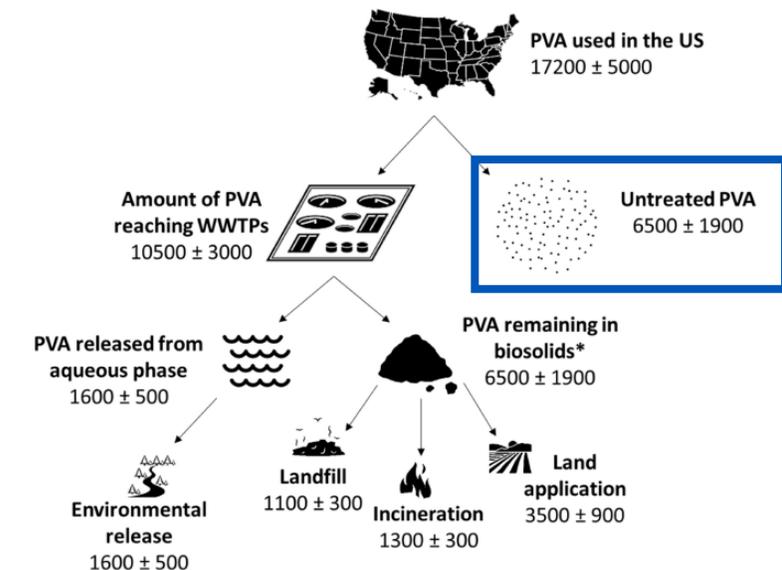
Communication

Degradation of Polyvinyl Alcohol in US Wastewater Treatment Plants and Subsequent Nationwide Emission Estimate

Charles Rolsky^{1,2,*} and Varun Kelkar^{1,3}

Our data suggest that, on average, only $\sim 10,500 \pm 3000$ mtu/yr (See Figure 4) of PVA enters treatment infrastructure, and only a fraction of this is biodegraded due to the specificity of conditions required to facilitate complete degradation. Based on the assumed WWTP scenario, 15.76% remains in the aqueous phase ($\sim 1600 \pm 500$ mtu/yr) and 61.2% (6500 ± 1900 mtu/yr) remains in the biosolids exiting the anaerobic digester. Thus, a total of 8100 ± 2400 mtu/yr of PVA is estimated to remain untreated by WWTPs annually in the United States. Of that, 6500 ± 1900 mtu/yr of PVA remains untreated due to lack of treatment capacity or inaccessibility to a functioning WWTP in certain remote communities.

Metric tons (mtu/yr) of PVA used and degraded in US wastewater



*520 ± 100 biosolids travel to sources defined as "other"

*The Future of PVOH
in an Increasingly
Environmentally Conscious World
is Unclear at Best*

Why not make
Futureproof,
PVOH-FREE
solid detergents?





sappi

*Fibrillated Cellulose in
Solid Detergents:*

a

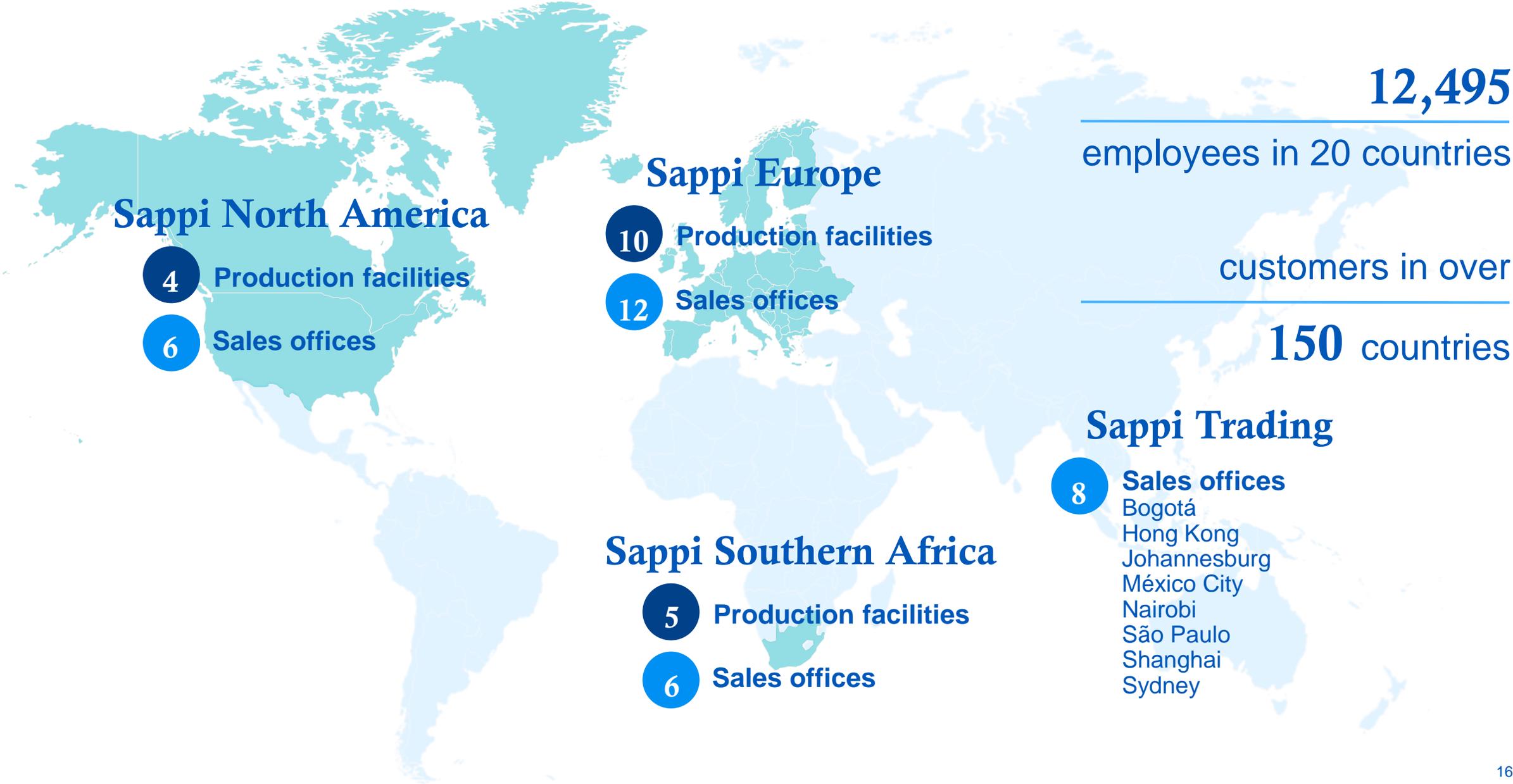
Natural,

*Performance
boosting*

Alternative to PVOH

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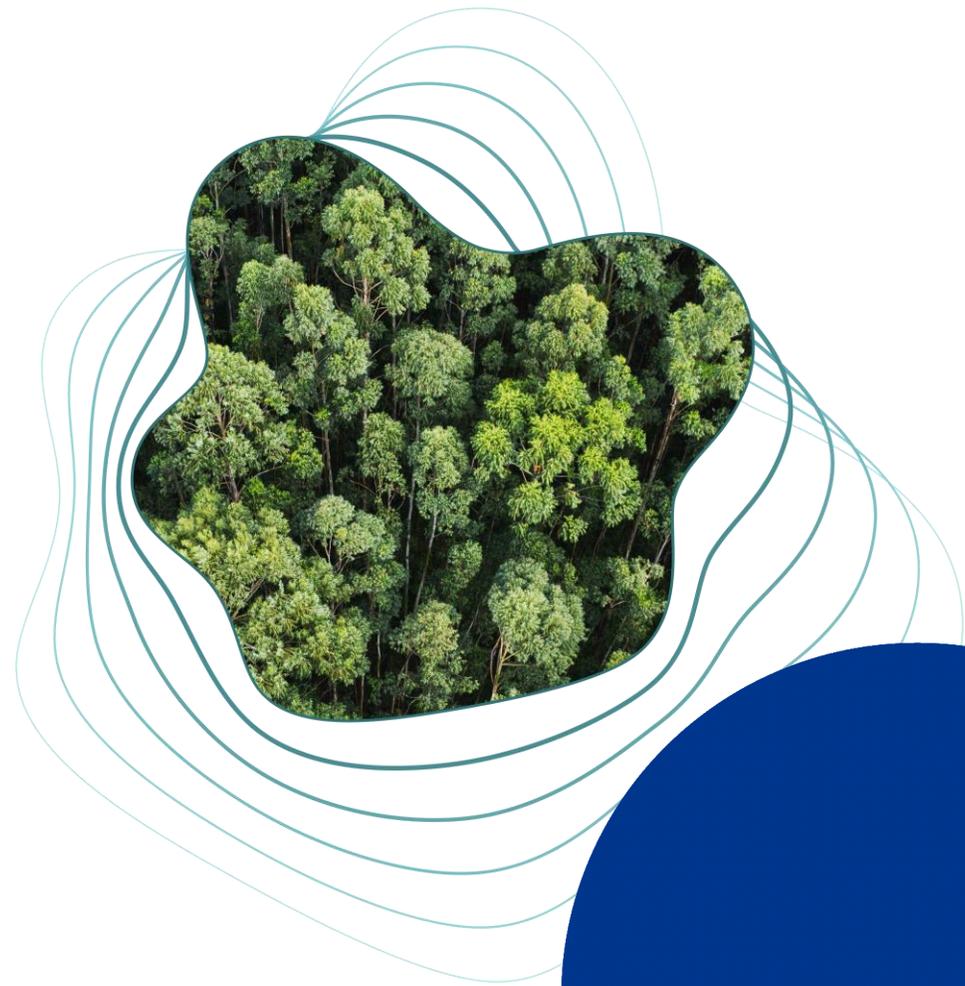
At a glance Sappi group



We grow woodfibre responsibly

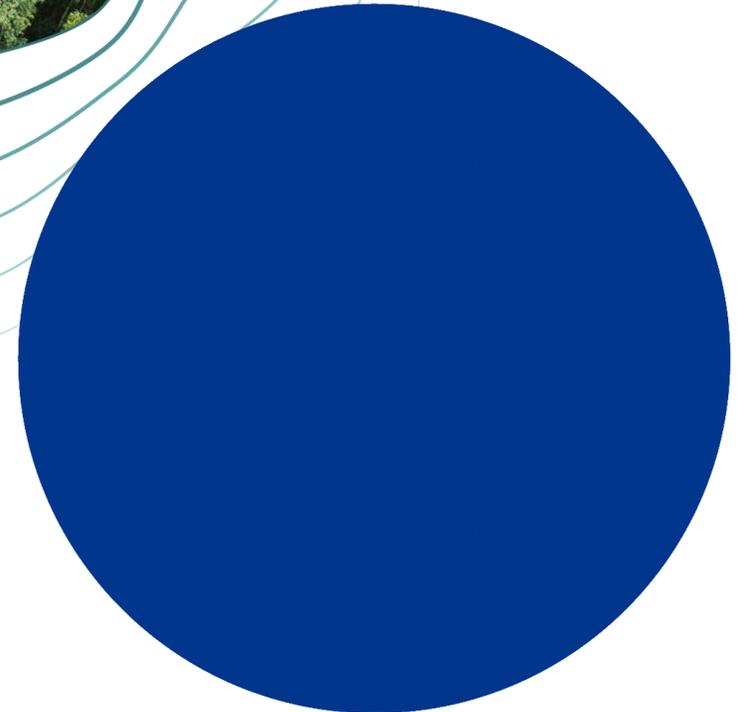
We are here to prove that commercial forestry and forest conservation are not mutually exclusive.

Our policies and practices ensure that forests and plantations are expertly tended, harvested and most importantly, regenerated for healthy regrowth.



87%

Woodfibre used at Sappi Europe's mills was FSC™ or PEFC certified (2022)





Dissolving Wood pulp - Textiles

Packaging Papers



Graphic Papers



Biomaterials



Specialty papers



Responsibly sourced Woodfibres

for

Sustainable & Scalable

Alternatives

to

non-renewables.

sappi



Biomaterials



Valida - Fibrillated Cellulose

Applications:

- Cosmetics
- Barriers
- Fibre composites
- **Homecare products**
- Seed coating
- Adhesives
- Paints and coatings
- Concrete admixtures
- Pigments and inks
- Frost protection

Fibrillated Cellulose

is

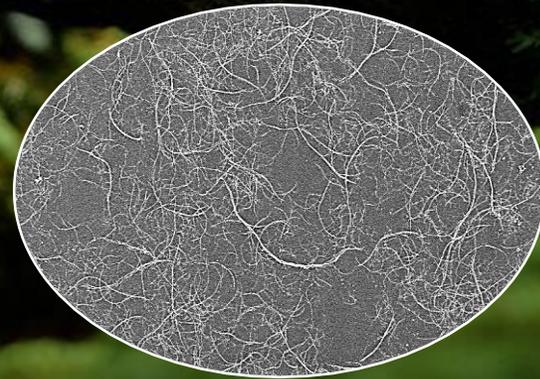
Natural cellulose

that is

*mechanically
Processed to*

its smallest
component,

cellulose fibrils.



*Valida
Fibrillated cellulose*

Valida is a sustainably sourced, natural & biodegradable material



*Purely
mechanical
Process!*

*Valida is
natural and
readily biodegradable.*

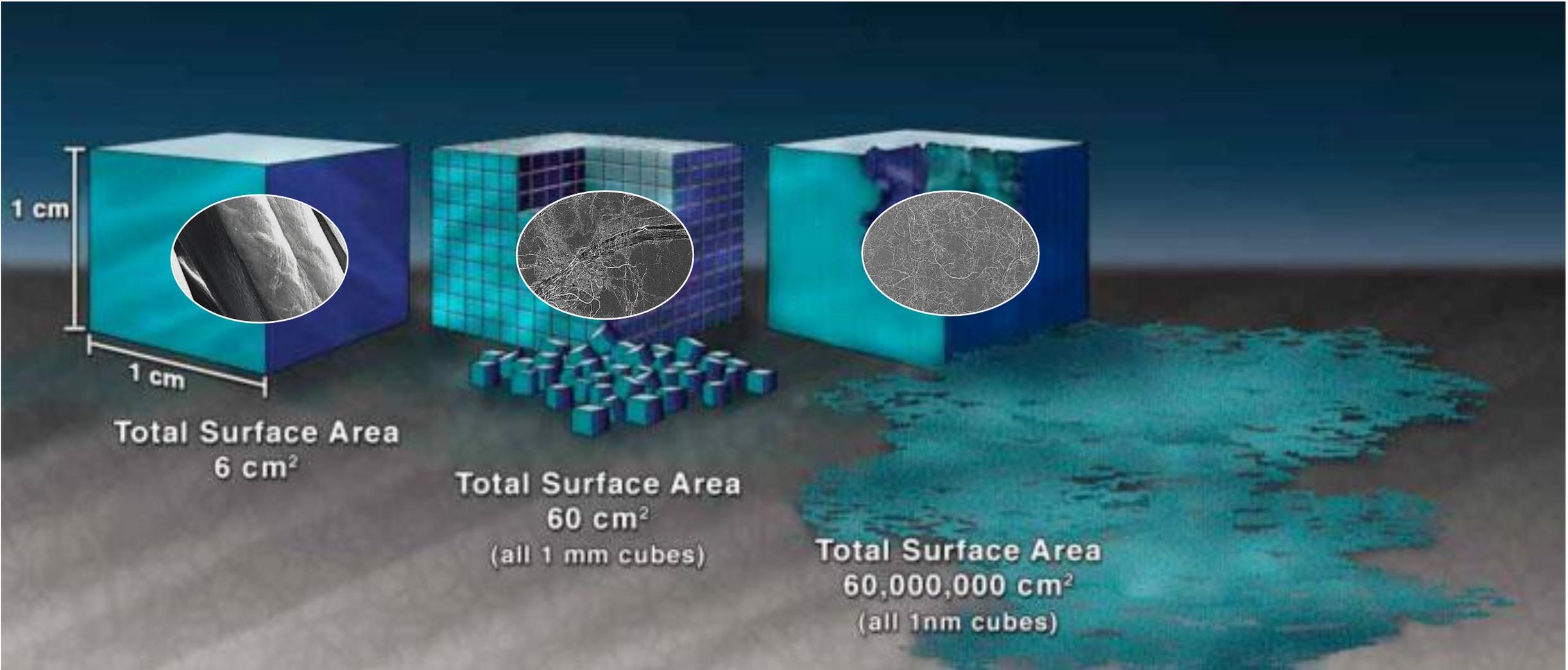


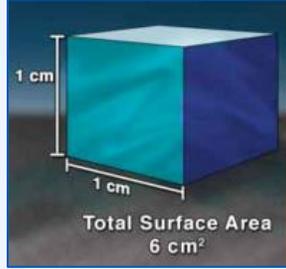
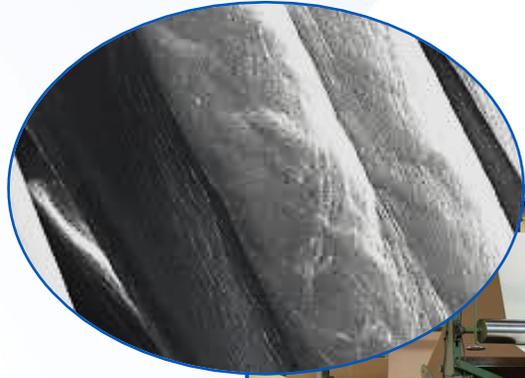
100%

Woodfibre used for Valida
was PEFC certified (2022)

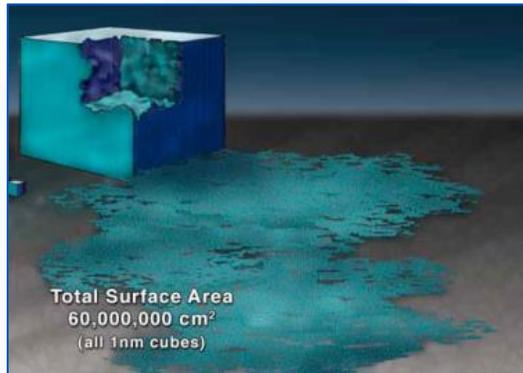
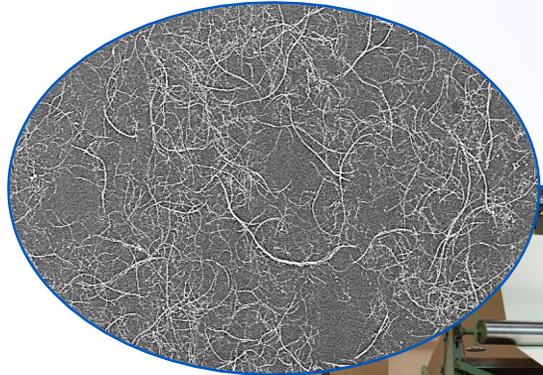


Size matters!





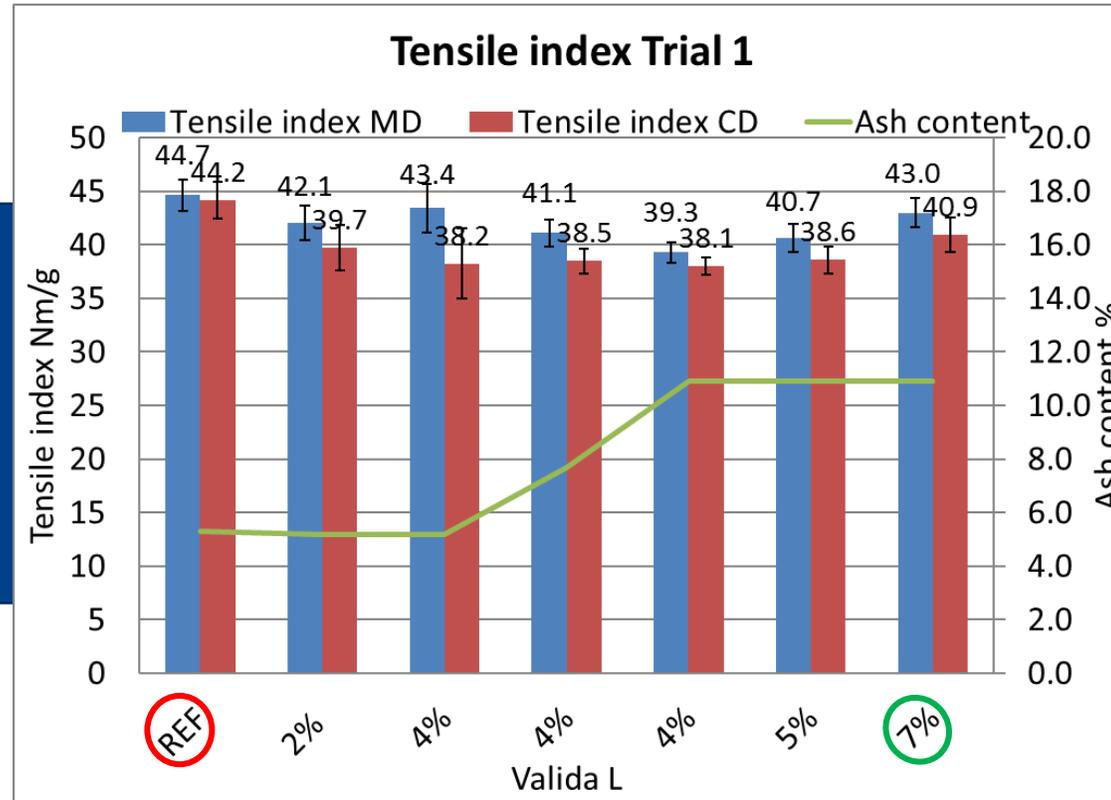
Fibrillated Cellulose is an excellent *BINDER*



Valida is a binder of actives

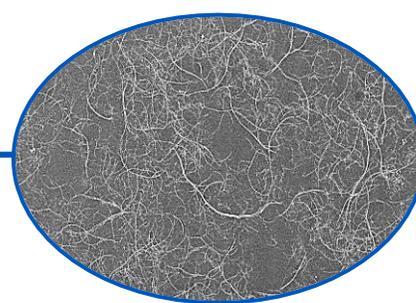
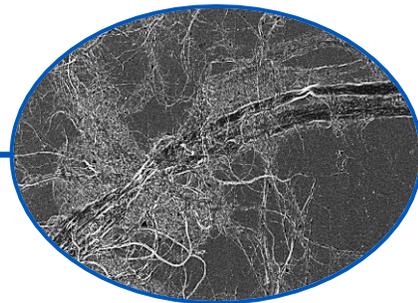
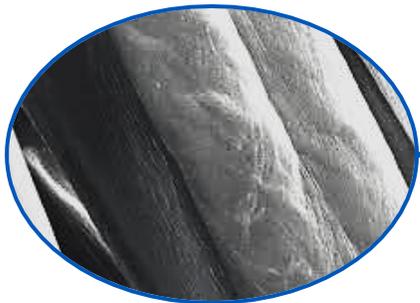
Adding Valida

maintains strength



At DOUBLED

Ingredient loading



significantly better binding than standard cellulose!

MORE active ingredients per # of binder

equals

LESS 'Dead load' in the end-product!

Ingredient Compatibility



pH (Bleach)

Enzymes

Surfactants

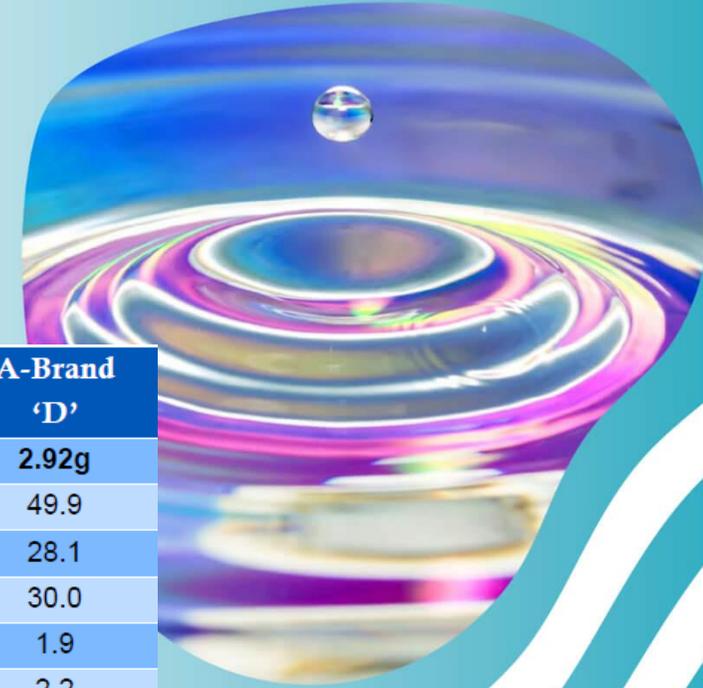


Case Study – Valida detergent sheet

Valida replaced Poly Vinyl Alcohol in a customer project on solid detergent sheets.

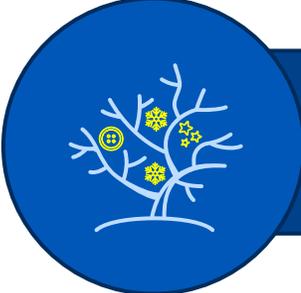
The resulting sheet was compared to 4 detergent strip market leaders.

Valida outperformed *all of them*.

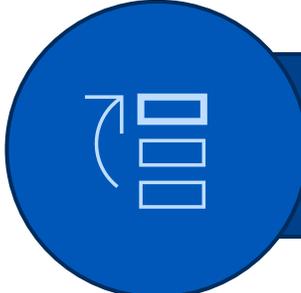


Soils on Cotton	Valida Sheet 1	Valida Sheet 2	Valida Sheet 3	Valida Sheet 4	A-brand 'A'	A-brand 'B'	A-brand 'C'	A-Brand 'D'
Sheet weight	1.26g	1.56g	1.47g	1.58g	4.32g	1.68g	1.73g	2.92g
Clay	56.4	56.5	53.7	49.9	52.7	54.2	53.6	49.9
Coffee	32.4	33.2	31.8	30.9	26.9	28.9	27.0	28.1
Dust Sebum	38.4	43.6	36.6	37.4	35.2	33.4	30.5	30.0
EMPA 112	2.5	1.9	1.6	1.4	0.6	2.0	1.8	1.9
EMPA 116	2.2	2.2	2.3	2.1	2.4	2.1	1.9	2.2
Grass	10.0	10.4	8.7	6.7	4.3	5.8	6.3	3.5
Makeup	27.9	25.4	26.3	24.5	28.1	23.5	26.4	22.7
Mud	84.8	82.6	79.8	79.7	74.7	73.0	72.2	69.4
Red Wine	27.4	27.1	27.4	26.5	25.4	25.7	27.1	24.9
Spaghetti	62.7	60.9	60.7	61.9	62.1	62.9	62.3	61.9
Overall Soil Removal Totals	344.7	343.8	328.9	321.0	312.4	311.5	309.1	294.5
% Of Best	Best	99.7%	95.4%	93.1%	90.6%	90.4%	89.7%	85.4%

The values



Binder of actives



Reduced 'Dead load' while improving performance



Ingredient compatibility

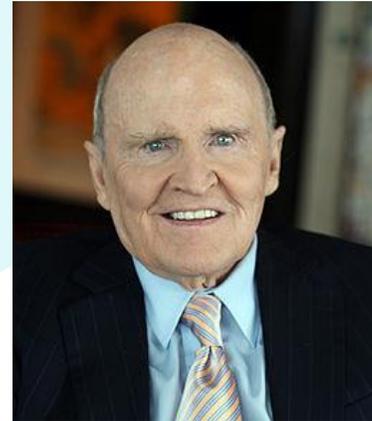
Naturally enhanced cleaning efficiency



Now is the time to innovate

sappi

“Change before you
have to.”



**Jack Welch,
Former CEO General Electric**