



PERNIAGAAN WIRA OON SDN BHD

PWO INDUSTRIES SDN BHD

Building a Better Tomorrow with Today's Waste

**The day when an idea becomes a reality with the
incorporation of Perniagaan Wira Oon Sdn Bhd.**

September 10th, 2002

**Begins its journey in making a better tomorrow
starting with diverting the ever-increasing waste
from landfill through recycling**





“the closure of the government-owned rubbish dump, despite the increasing amount of waste generated each day.”

.....





“the rubbish dump is usually easily forgotten, but it is not only affecting the immediate environment but also one of the factors affecting our Earth’s climate change.”

.....



HISTORY



2002

.....
PERNIAGAAN WIRA OON
SDN BHD
FOUNDED IN MALAYSIA



2007

.....
PWO INDUSTRIES SDN BHD
FOUNDED IN MALAYSIA



2014

.....
EXPANSION - PWO 2



2018

.....
EXPANSION - PWO 3





PERNIAGAAN WIRA OON SDN BHD

.....

Building a Better Tomorrow with Today's Waste

WHEN METAL MEETS MACHINE



THE COMPACTOR

.....





SORTED AND BUNDLED PLASTIC



SORTED AND BUNDLED CARDBOARD

.....



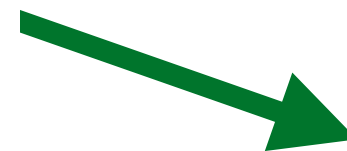
**ALL THE
BUNDLED
PRODUCTS WILL
BE SUPPLIED TO
DIFFERENT
INDUSTRIES FOR
FURTHER
RECYCLING**



**PAPER
RECYCLING
PLANT**



**PLASTIC
RECYCLING
PLANT**



**METAL
MELTING
PLANT**





PWO INDUSTRIES SDN BHD

Building a Better Tomorrow with Today's Waste

“with the increasing of waste going around everyday, I can see that textile cut waste has hidden potentials”





“with the use of various colors, I can mix and match to create other recycled products”



“especially those in Europe and America have heightened awareness, they can better accept environmentally-friendly products”





Control Union Certifications B.V.
Meeuwenlaan 4-6, 8011 BZ, Zwolle, Netherlands
+31 38 4260100
www.controlunion.com

CERTIFICATE OF COMPLIANCE

(Scope Certificate)

Certificate No: CU1001997RCS-2019-00002347
Registration No: 1001997

Control Union Certifications declares that

PWO Industries SDN.BHD.
No. 21, Jalan Wawasan Utama, Sri Gading Industrial Estate
83300 Batu Pahat, Johor
Malaysia

has been inspected and assessed in accordance with the
Recycled Claim Standard (RCS) 2.0

and that products of the categories as mentioned below (and further specified in the annex) comply with this standard:

Yarns

Processing steps / activities carried out under responsibility of the above-mentioned company (by the operations as detailed in the annex) for certified products

Importing, Recycling, Exporting, Trading, Spinning

This certificate is valid until:
2020-01-23

Place and date of issue:



2019-02-22, Zwolle

Name of authorised person:

On behalf of the Managing Director
Ya Gao | Certifier

Stamp of the issuing body



Standard's Logo



This certificate cannot be used as a transaction certificate. The issuing body can withdraw this certificate before it expires if the declared compliance is no longer guaranteed. Accredited by: Sri Lanka Accreditation Board (SLAB), Accreditation No: CP 004-01



This electronically issued document is the valid original version.

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RECYCLED CLAIM STANDARD (RCS) 2.0



“with the certificate,
I think there is a high
chance of tapping into
the potential market”



Our Machinery



TEARING



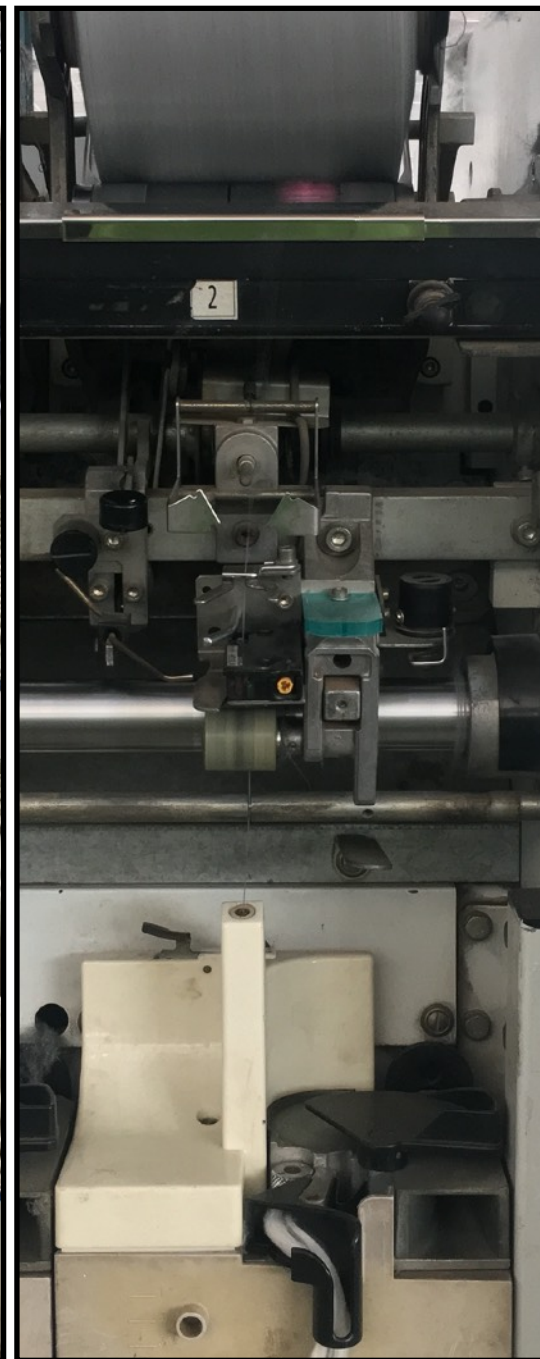
PLUCKER



CARDING



DRAW FRAME



OPEN END



Our Products



YARN



FABRIC



GARMENT



SHOELACES



SHOES



Research

Scenario 1 (S1)*

CH₄ emissions = 120 kg CH₄/1 t of textile disposed of at landfill (based on the assumption that all potential CH₄ is released in the year the waste is disposed of)

Scenario 2 (S2)*

Greenhouse gas emissions by life cycle stages with the concept of producing oil sorbent mats for a case study.

Type	Raw material acquisition	Product manufacturing	Waste management	Transports	Total
CO ₂ (kg/1 t)	-	163	917	10.5	1,091
CH ₄ (kg/1 t)	-	0.5890	0.0113	0.00060	0.6009
N ₂ O (kg/1 t)	-	0.0150	0.0021	0.0009	0.0180
CO ₂ eqv (kg/1 t)	-	180	918	10.8	1,109

Conversion: 1kg of CH₄ = 25 kg of CO₂e, whereas 1kg of N₂O = 298 kg of CO₂e



Research

Scenario 3 (S3)*

Calculation procedure and results (per functional unit) of greenhouse gas emission reduction potential (emission savings) of textile waste recycling.

$$\text{Equation} = B - A + C + D$$

A = Emissions from recycled product life cycle

B = Emissions from virgin product life cycle

C = Emissions savings, when the waste (=raw material of the recycled product) entering the product system is recovered, not disposed of at landfill or combusted to produce energy

D = Emissions from energy recovery during waste management life cycle stage.

Case II : Textile	kg CO2 eqv. / 1 t				
	B -	A +	C +	D	Total*
Disposal of waste textile at landfill is prevented of at landfill and recycled textile oil absorbent mat is combusted.	5,511	1,109	2,646	2,189	9,237
* Total may not agree because of rounding					



Conclusion

These figures below are an estimation of greenhouse gas emission reduction potential of textile waste...

Type	Landfill (S1)	Life Cycle Stage (S2)	Per Function Unit (S3)	Total
CO ₂ eqv (kg/1 ton)	3,000	1,109	9,237	13,346

... after conversion, an estimate of **13.346 kg CO₂e*** will be prevented from **1 kg** of waste not being dispose of at the landfill



Conclusion

Every **month** an estimate of **400,000 kgs** of cut waste flow into PWO. After applying the results **13.346 kg CO₂e**, which will give an answer of **5338.5 ton CO₂e / 1 ton***.

In other words, it is equivalent to:

- **12,360 barrels*** of oil consumed
- **218,232 propane cylinders*** used for home barbeques
- **1,133 passenger vehicles*** driven for one year
- **88, 272 tree seedlings*** grown for 10 years



Future Plans - Energy Saved

In the next 5 years, PWO INDUSTRIES SDN BHD has a series of plans to upgrade its machinery

Year	Carding	SB-D 50	RSB-D 50	OE R36	Energy Saved per Day (kwh)
Power Reduced (kw)*	66	3.05	7.61	14.13	
	Number of Machines**				
2020	0	2	2	1	850.80
2021	2	0	0	1	3,507.12
2022	2	1	1	1	3,762.96
2023	2	1	1	1	3,762.96
2024	0	2	2	1	850.80
	Total Reduced Power Consumption (kwh) and Bill Reduced				12,734.64

In other words, it is equivalent to **20.8 barrels*** of oil consumed

*EPA 2018, *Greenhouse Gas Equivalencies Calculator*, EPA, viewed 17 October 2019, <<https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>>

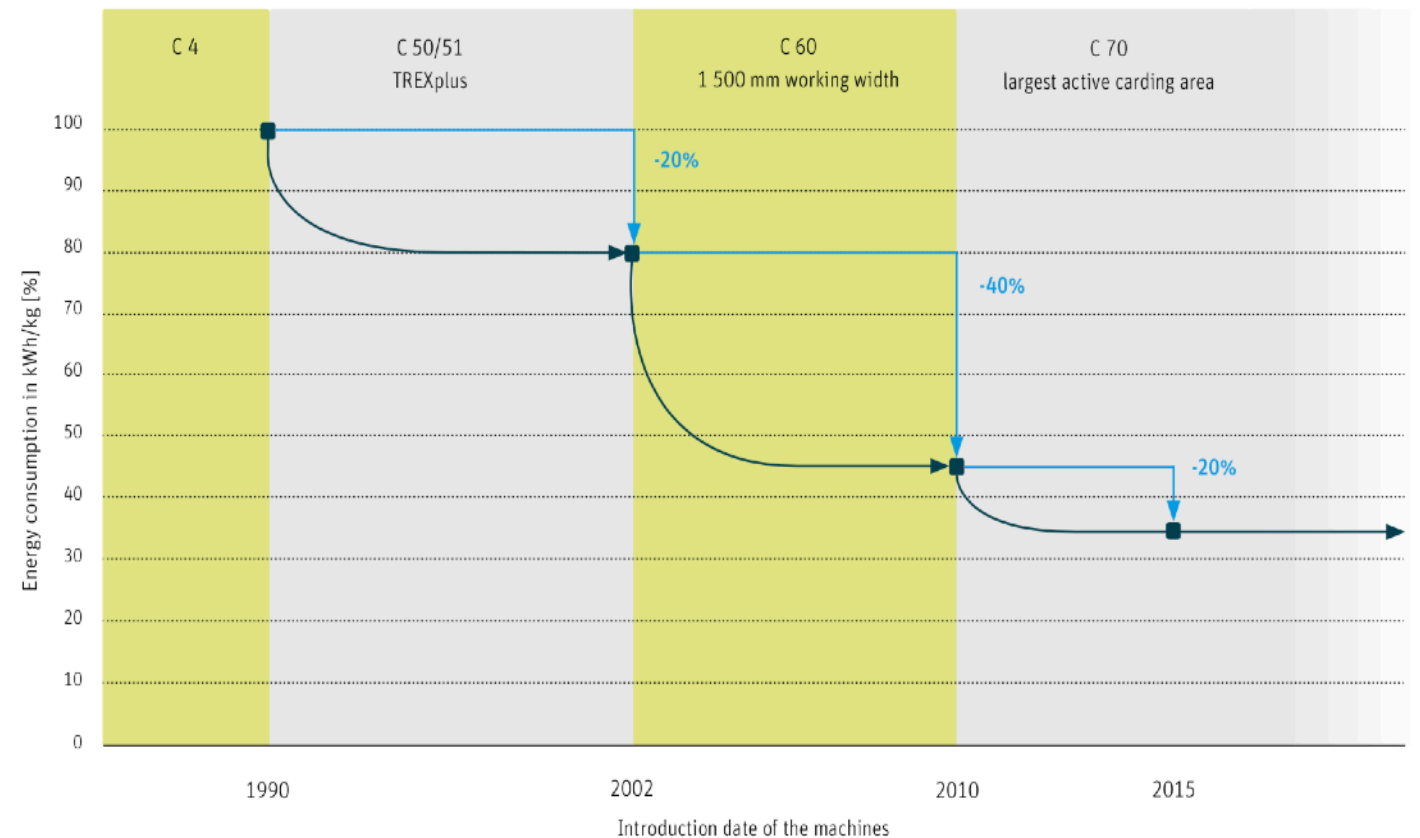
**Rieter, *Products*, Rieter, viewed 17 October 2019, <<https://www.rieter.com>>



Rieter - Carding C75



Energy consumption strongly reduced since 1992



*C75 and C70 has very similar energy consumption in kWh/kg

With every C75 upgraded, PWO will be able to decrease energy consumption by 80%



Rieter - Breaker Draw Frame SB-D 50



Comparison

TYPE	SB 951	SB-D 50*
Main Motor (kw)	7.5	5.00
Intake Motor (kw)	-	-
Suction motor (kw)	1.95	1.50
Machine Control (kw)	0.26	0.26
Coiler motor (kw)	1.6	1.50
Can Changer (kw)	0.25	0.25
Total Power Consumption	11.56	8.51

* SB-D 50 has 25% less belts and drive elements reduce friction and thus the energy costs up to 1000 Euro per RSB and year



Rieter - Breaker Draw Frame RSB-D 50



Comparison

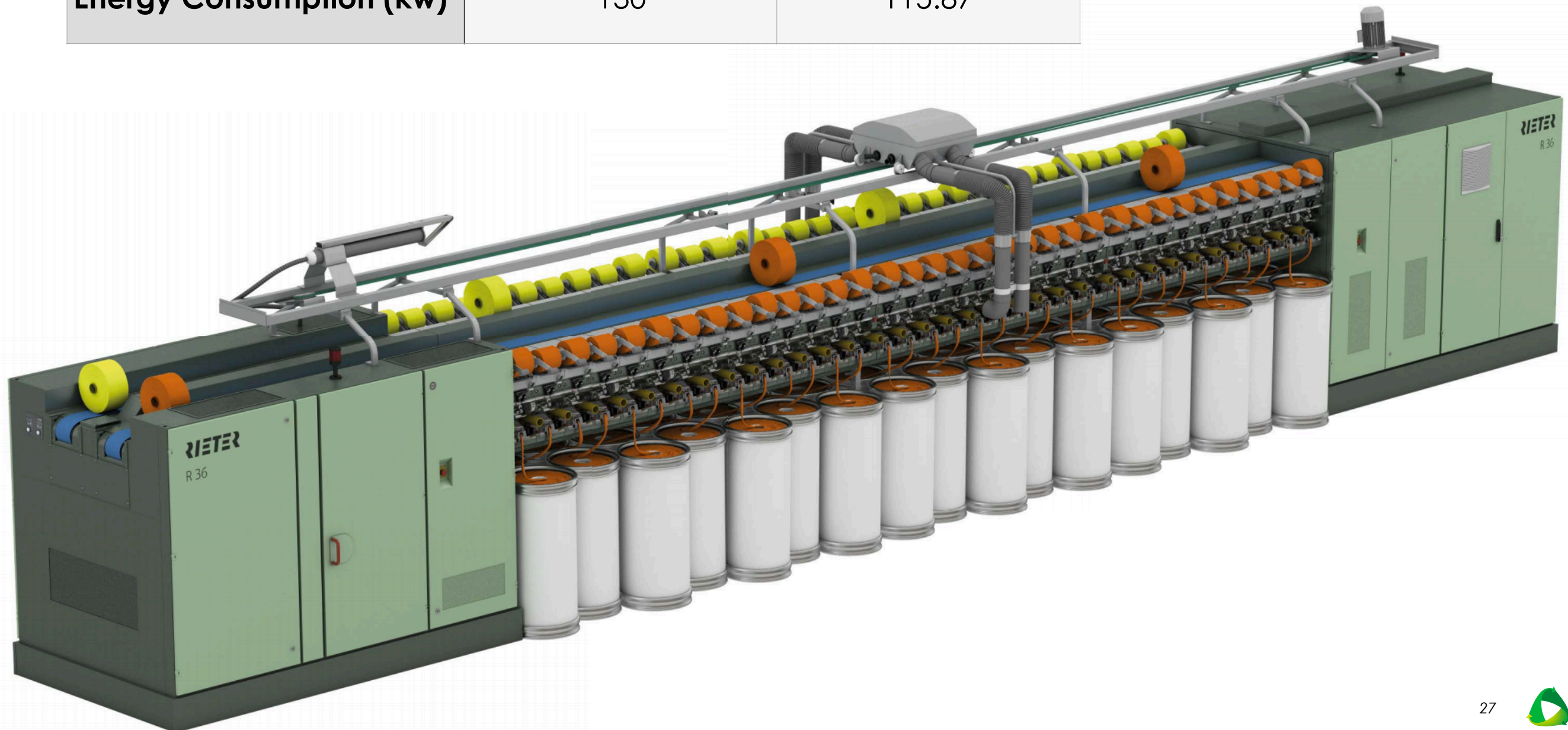
TYPE	RSB 851	RSB-D 50
Main Motor (kw)	7.5	3.90
Intake Motor (kw)	7.5	3.90
Suction motor (kw)	1.95	1.50
Machine Control (kw)	0.26	0.50
Coiler motor (kw)	1.30	1.10
Can Changer (kw)	0.25	0.25
Total Power Consumption	18.76	11.15



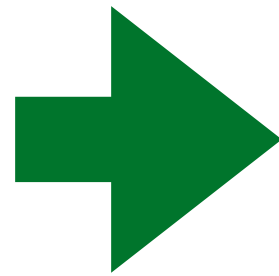
Rieter- Rotor Spinning R36/280

Comparison

TYPE	BD320/288	R36/280
No. of Spindles	288	280
Energy Consumption (kw)	130	115.87



**RECYCLED CLAIM
STANDARD
(RCS) 2.0**



**GLOBAL RECYCLED
STANDARD
(GRS) 4.0**

PWO is preparing for GRS application to further certify its products, which the company will be ready to take another step ahead in fighting for pollution and tackle sustainability.

COMING SOON IN 2020

