



UNI-SYSTEMS DIFFUSERS

JUNE 2014

DIFFUSER





SOME OF OUR ACCOMPLISHMENTS

DIFFUSER



Customer	Galo Bravo	
Country	Brazil	
Year	1983	
Units	1	
Capacity	TCD	4,000
Extraction	%	98.0



Usina Galo Bravo, S.A., Brazil

DIFFUSER



Customer	Cruz Alta	
Country	Brazil	
Year	1985	
Units	1	
Capacity	TCD	8,000
Extraction	%	98.0



Usina Cruz Alta de Olimpia, S.A., Brazil

DIFFUSER



Customer	Vale do Rosario	
Country	Brazil	
Year	1996	
Units	1	
Capacity	TCD	10,000
Extraction	%	97.8



Cia. Energetica Vale do Rosario, S.A., Brazil

DIFFUSER



Customer	Providencia	
Country	Argentina	
Year	1997	
Units	1	
Capacity	TCD	10,000
Extraction	%	97.4

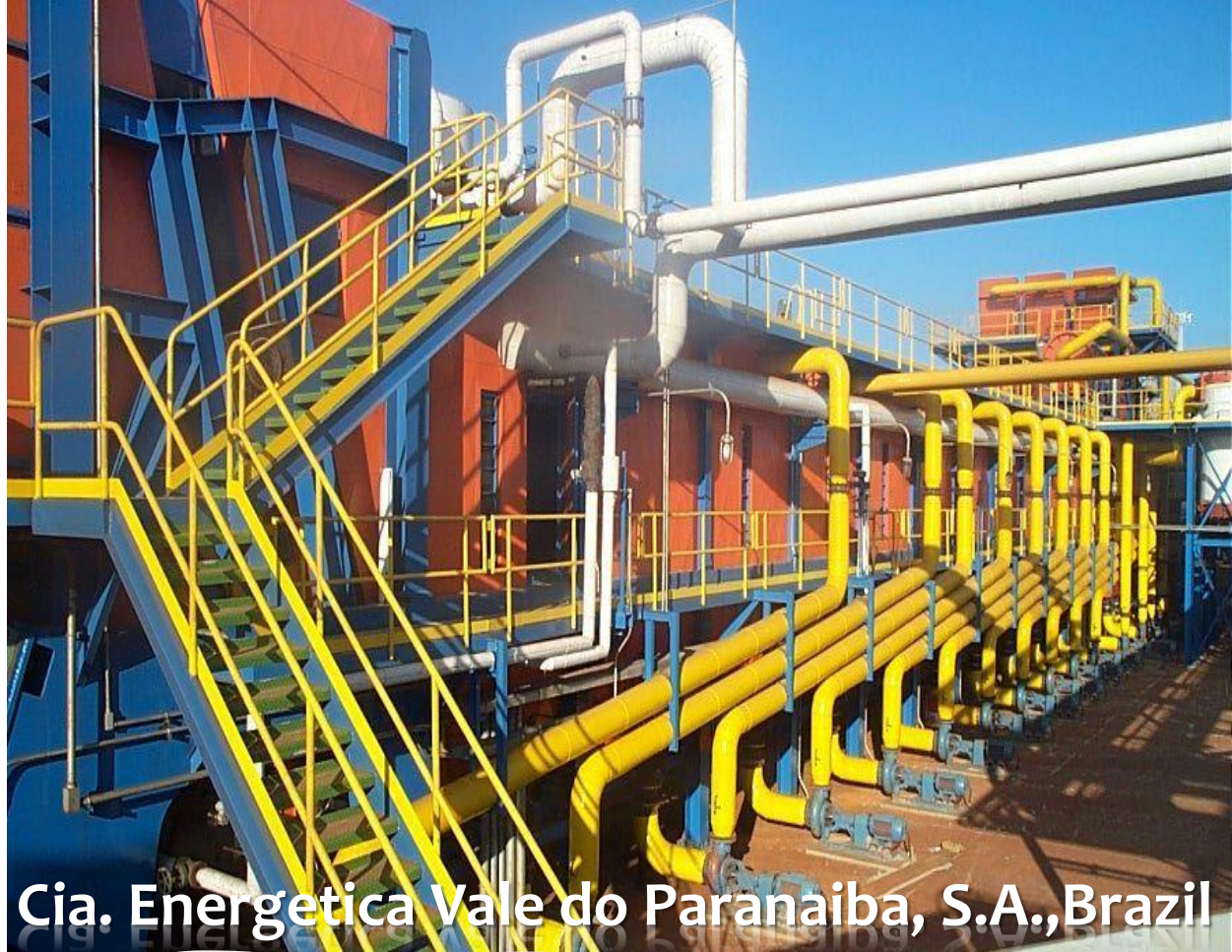


ARCOR - Ingenio Providencia, S.A., Argentina

DIFFUSER



Customer	Vale do Paranaíba	
Country	Brazil	
Year	2003	
Units	1	
Capacity	TCD	6,000
Extraction	%	98.3



Cia. Energetica Vale do Paranaíba, S.A., Brazil

DIFFUSER



Customer	Lacassine	
Country	USA	
Year	2004	
Units	1	
Capacity	TCD	10,000
Extraction	%	97.4



Louisiana Agricult. Financial Authority, USA

DIFFUSER



Customer	Frutal	
Country	Brazil	
Year	2005	
Units	1	
Capacity	TCD	10,000
Extraction	%	97.8



Usina Frutal, S.A., Brazil

DIFFUSER



Customer	Vertente	
Country	Brazil	
Year	2006	
Units	1	
Capacity	TCD	7,000
Extraction	%	98.0



Usina Vertente, S.A., Brazil

DIFFUSER



Customer	Oroeste	
Country	Brazil	
Year	2007	
Units	1	
Capacity	TCD	10,000
Extraction	%	97.8



Usina Oroeste, S.A., Brazil

DIFFUSER



Customer	Guariroba	
Country	Brazil	
Year	2007	
Units	1	
Capacity	TCD	8,000
Extraction	%	97.8



Usina Guariroba, S.A., Brazil

DIFFUSER



Customer	San Francisco	
Country	Brazil	
Year	2007	
Units	1	
Capacity	TCD	10,000
Extraction	%	97.8



USJ Group, Brazil

DIFFUSER



Customer	Agricola del Chira	
Country	Peru	
Year	2009	
Units	1	
Capacity	TCD	4,000
Extraction	%	97.9



Romero - Agricola del Chira, S.A., Peru

DIFFUSER



Customer	Aroeira	
Country	Brazil	
Year	2010	
Units	1	
Capacity	TCD	4,000
Extraction	%	97.9



DIFFUSER



Customer	Pedro Alfonso	
Country	Brazil	
Year	2010	
Units	1	
Capacity	TCD	12,000
Extraction	%	97.7



BUNGE - Usina Pedro Alfonso, S.A., Brazil

DIFFUSER



Customer	Valdez	
Country	Ecuador	
Year	2010	
Units	1	
Capacity	TCD	14,000
Extraction	%	97.6



Cia. Azucarera Valdez, S.A., Ecuador

DIFFUSER





WORKING PRINCIPLE

DIFUSOR

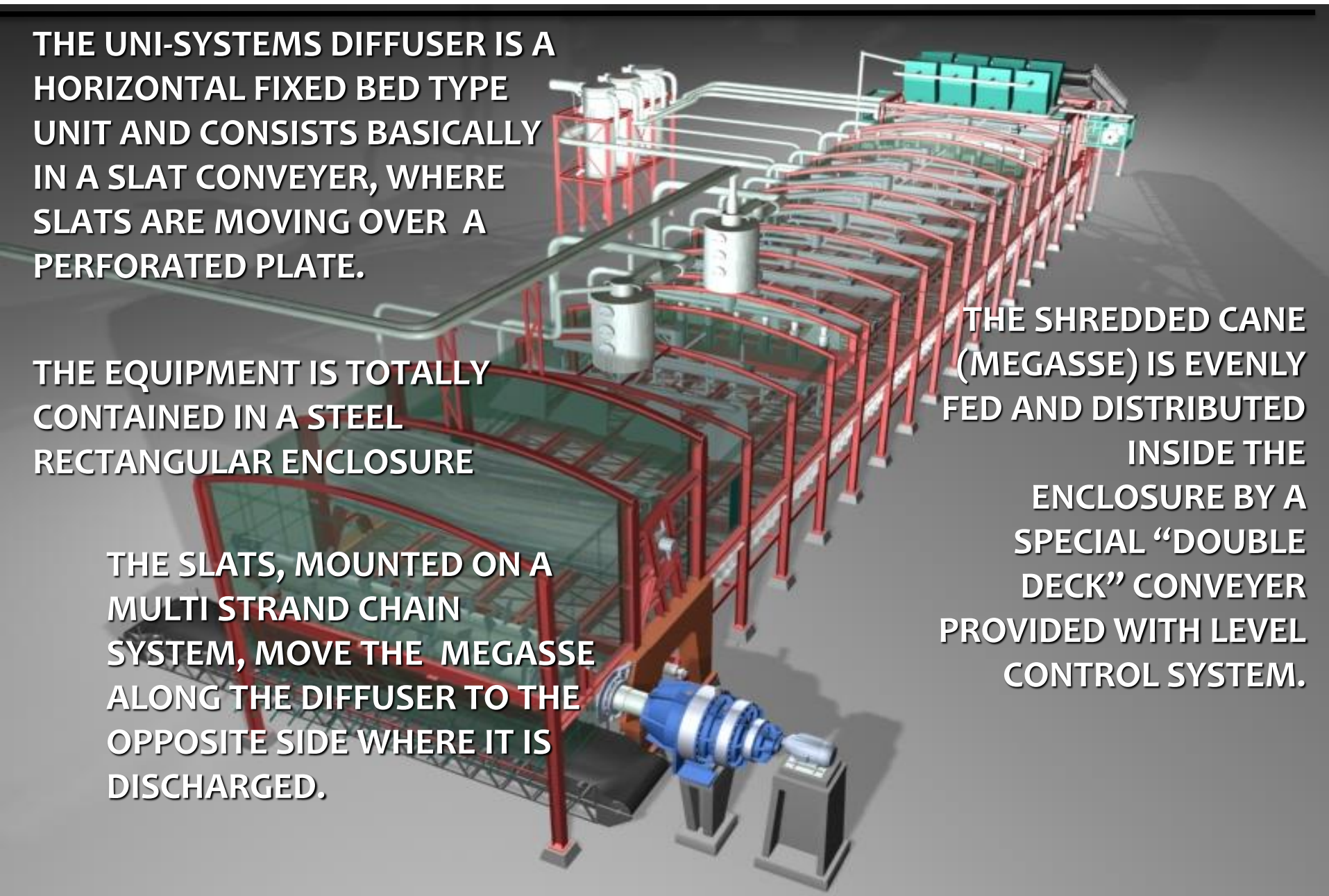


THE UNI-SYSTEMS DIFFUSER IS A HORIZONTAL FIXED BED TYPE UNIT AND CONSISTS BASICALLY IN A SLAT CONVEYER, WHERE SLATS ARE MOVING OVER A PERFORATED PLATE.

THE EQUIPMENT IS TOTALLY CONTAINED IN A STEEL RECTANGULAR ENCLOSURE

THE SLATS, MOUNTED ON A MULTI STRAND CHAIN SYSTEM, MOVE THE MEGASSE ALONG THE DIFFUSER TO THE OPPOSITE SIDE WHERE IT IS DISCHARGED.

THE SHREDDED CANE (MEGASSE) IS EVENLY FED AND DISTRIBUTED INSIDE THE ENCLOSURE BY A SPECIAL “DOUBLE DECK” CONVEYER PROVIDED WITH LEVEL CONTROL SYSTEM.

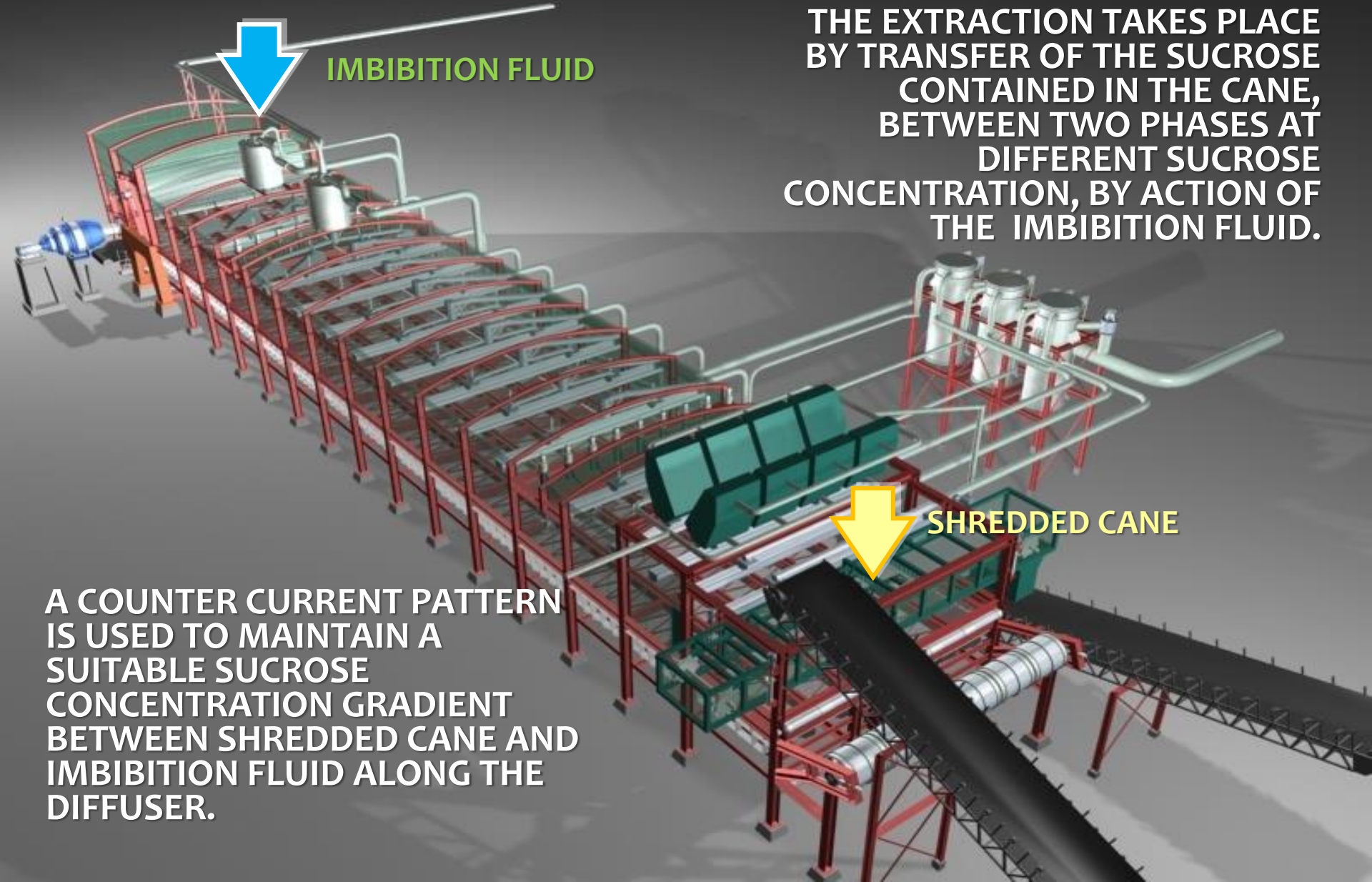


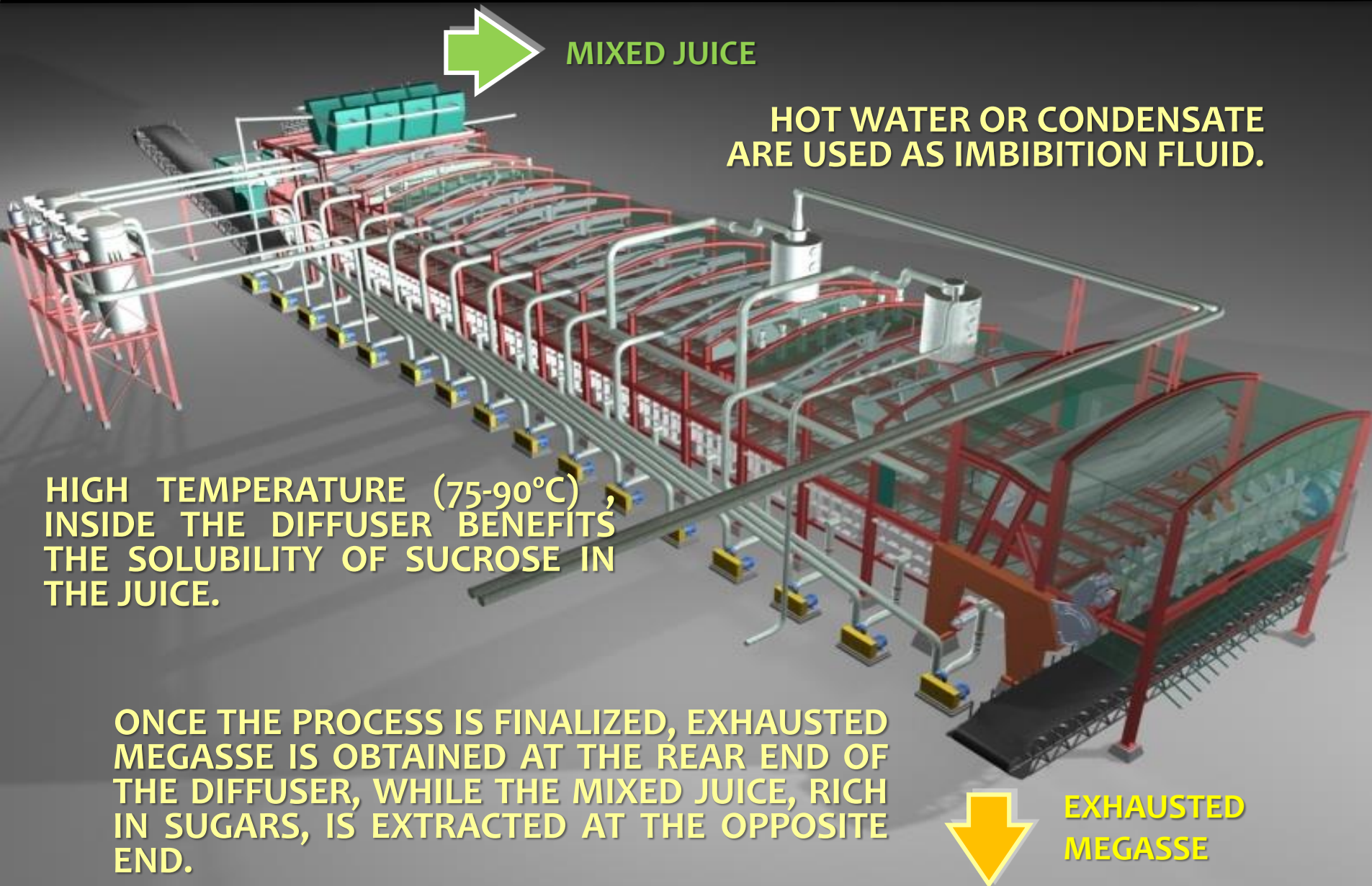
THE EXTRACTION TAKES PLACE BY TRANSFER OF THE SUCROSE CONTAINED IN THE CANE, BETWEEN TWO PHASES AT DIFFERENT SUCROSE CONCENTRATION, BY ACTION OF THE IMBIBITION FLUID.

IMBIBITION FLUID

SHREDDED CANE

A COUNTER CURRENT PATTERN IS USED TO MAINTAIN A SUITABLE SUCROSE CONCENTRATION GRADIENT BETWEEN SHREDDED CANE AND IMBIBITION FLUID ALONG THE DIFFUSER.





MIXED JUICE

HOT WATER OR CONDENSATE
ARE USED AS IMBIBITION FLUID.

HIGH TEMPERATURE (75-90°C) ,
INSIDE THE DIFFUSER BENEFITS
THE SOLUBILITY OF SUCROSE IN
THE JUICE.

ONCE THE PROCESS IS FINALIZED, EXHAUSTED
MEGASSE IS OBTAINED AT THE REAR END OF
THE DIFFUSER, WHILE THE MIXED JUICE, RICH
IN SUGARS, IS EXTRACTED AT THE OPPOSITE
END.

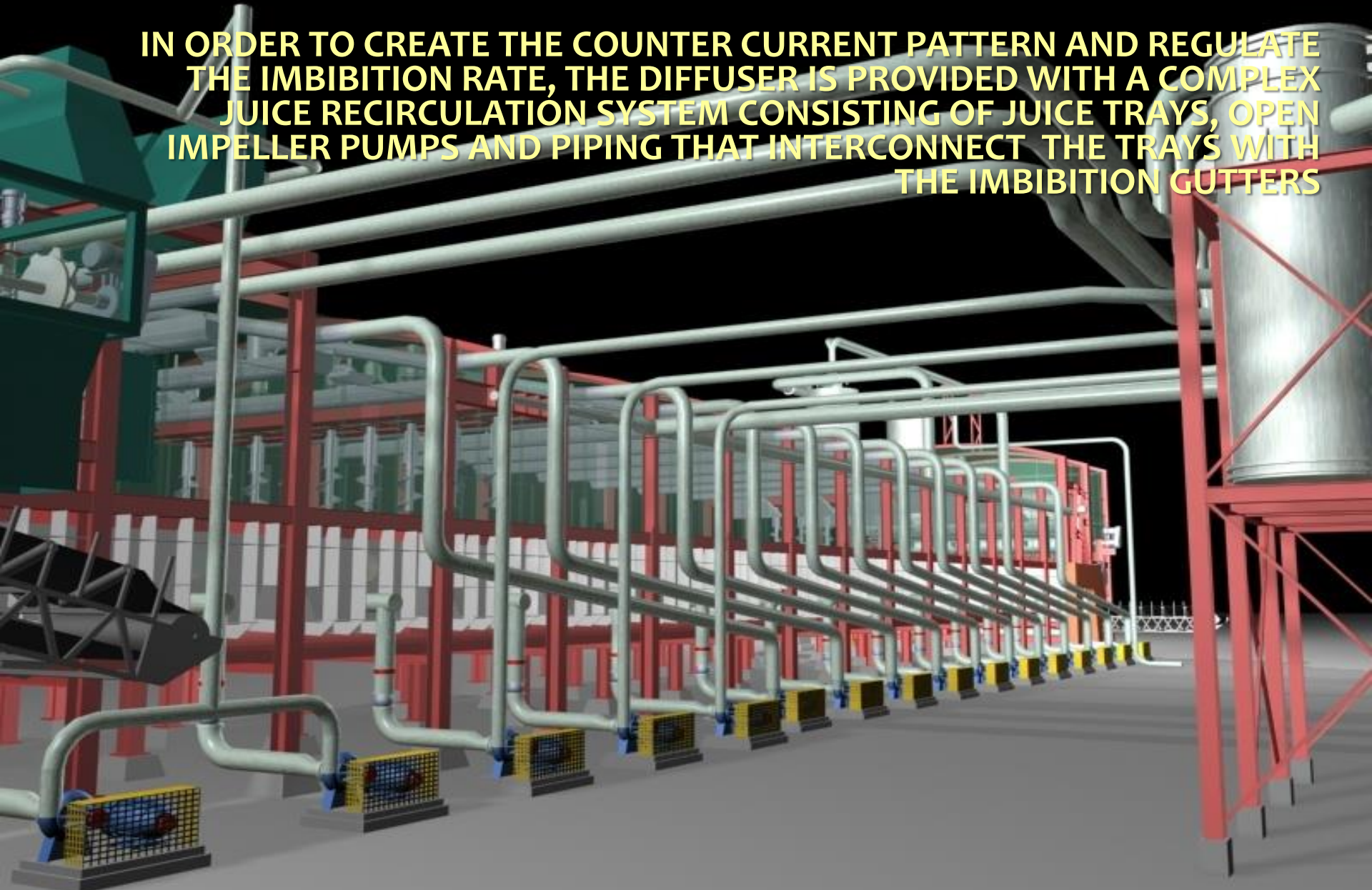
EXHAUSTED
MEGASSE

THE MEGASSE MAT WASHING IS ACCOMPLISHED BY MEANS OF SEVERAL IMBIBITION TRAYS SUITABLY INSTALLED AT REGULAR INTERVALS ABOVE THE MAT.



SEVERAL BATTERIES OF LIFTING SCREWS, PROPERLY SPACED OUT ALONGSIDE THE DIFFUSER PREVENT THE COMPACTATION OF THE MEGASSE MAT AND MAINTAIN A GOOD PERCOLATION RATE

IN ORDER TO CREATE THE COUNTER CURRENT PATTERN AND REGULATE THE IMBIBITION RATE, THE DIFFUSER IS PROVIDED WITH A COMPLEX JUICE RECIRCULATION SYSTEM CONSISTING OF JUICE TRAYS, OPEN IMPELLER PUMPS AND PIPING THAT INTERCONNECT THE TRAYS WITH THE IMBIBITION GUTTERS



A SPECIAL FLOATING ROLL PROVIDES THE HYDRAULIC SEAL INSIDE THE DUFFUSER, THUS PREVENTING JUICE OUTFLOW AND REDUCING THE MEGASSE MOISTURE, LEAVING THE DIFFUSER, TO LESS THAN 80%.



THE MEGASSE DISPLACEMENT SYSTEM INCLUDES SEVERAL STRANDS OF CHAINS AND SLATS MOUNTED ACROSS CONTIGUOUS CHAINS.



THE DIFFUSER BOTTOM IS MADE OF PUNCHED PLATES WITH HOLES OF SPECIAL PROFILE TO PROMOTE HIGH PERCOLATION EVEN WITH HIGH DIRT CONTENT. THE JUICE FLOWING OUT THE HOLES IS COLLECTED IN JUICE TRAYS MOUNTED UNDER THE PLATES.



A REVOLVING KICKER INSTALLED AFTER THE FLOATING ROLL BREAKS APART THE MEGASSE MAT AND TRANSFER THE MEGASSE INTO THE DISCHARGE CONVEYER.

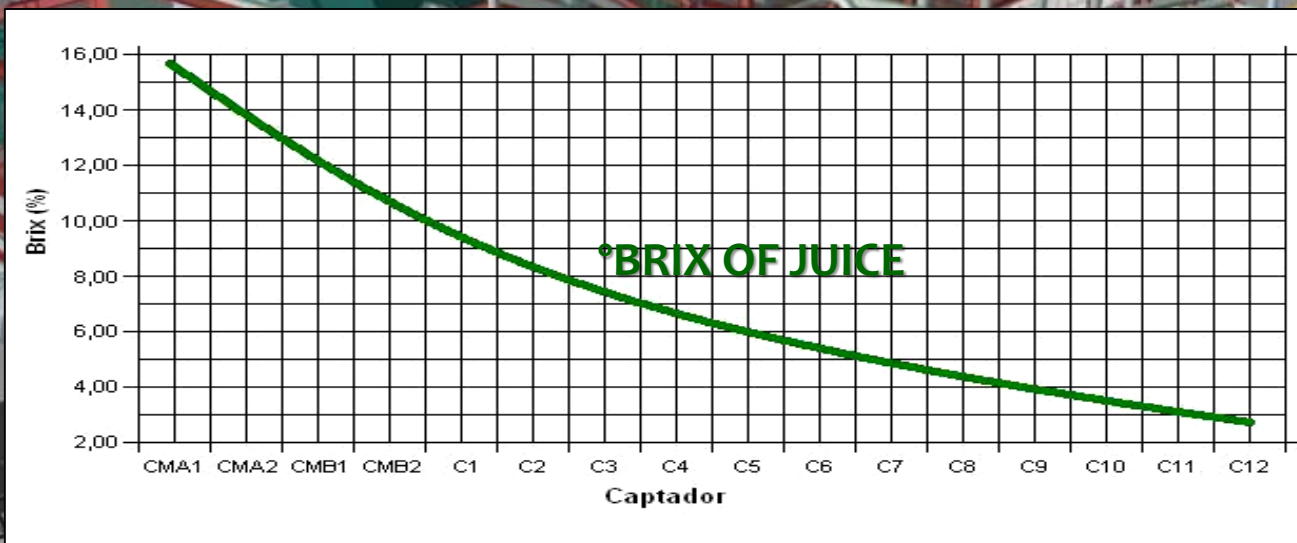


THE MOVING MECHANISM CONSISTS OF A MAIN SHAFT FITTED WITH SPROCKETS, A PLANETARY GEARBOX AND ELECTRIC DRIVE. TO ALLOW A SUITABLE SPEED CONTROL FOR ANY GIVEN OPERATING CONDITION, THE MOTOR IS PROVIDED WITH A VARIABLE FREQUENCY DRIVE.

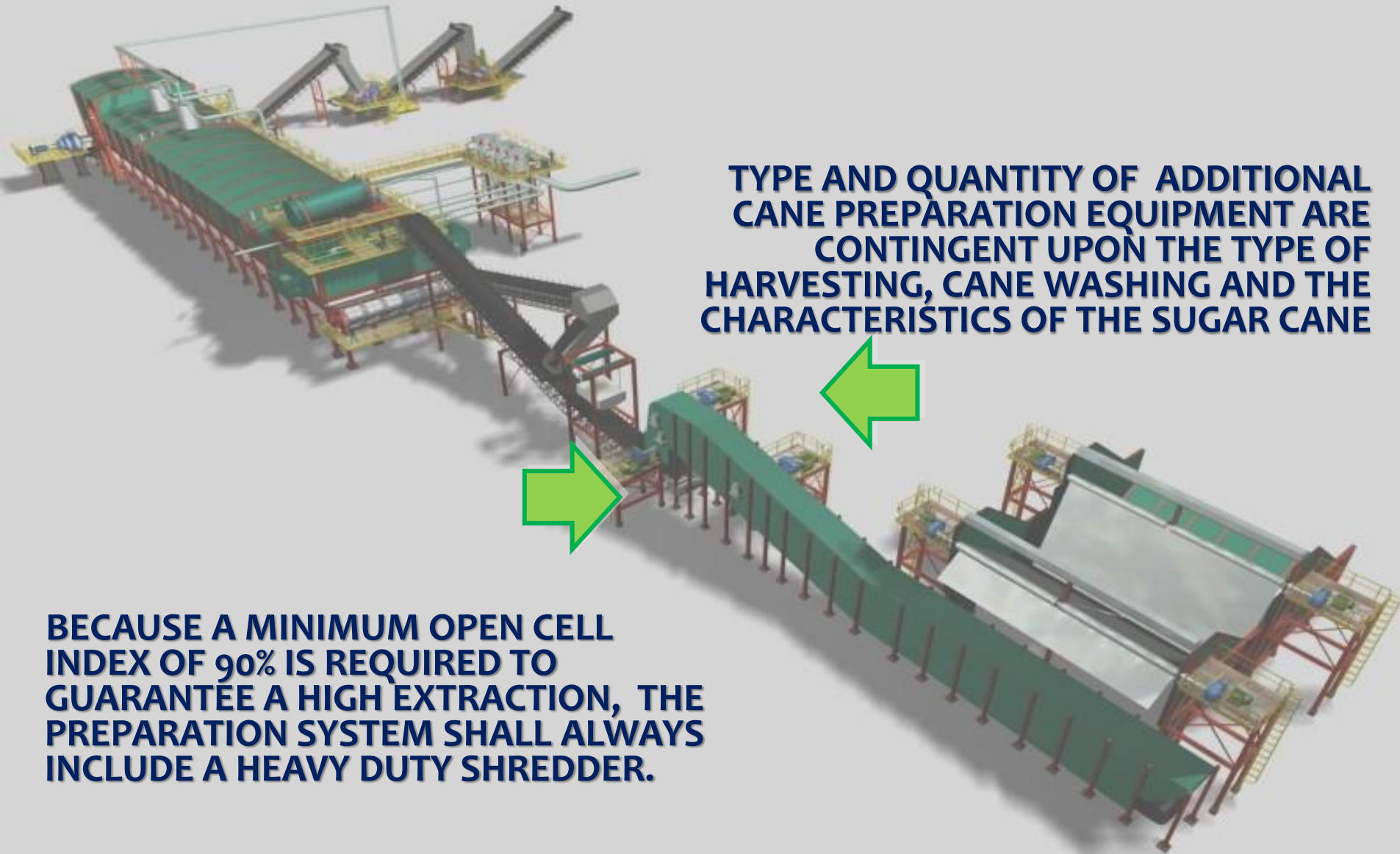
ALONG THE DIFFUSER, THE JUICE CONCENTRATION (°BRIX) INCREASES TO REACH THE MAXIMUM IN THE SECTION WHERE SHREDDED CANE IS FED INTO THE EQUIPMENT.

SIMULTANEOUSLY, THE MEGASSE SUGAR CONTENT IS CONSTANTLY REDUCED, UNTIL REACHING THE DISCHARGING SECTION.

SUGAR CONCENTRATION IN JUICE TRAYS



TYPICAL SOLIDS CONCENTRATION CURVE ALONG THE DIFFUSER



THE MEGASSE LEAVING THE DIFFUSER WITH 78-80% MOISTURE IS DRIED UP TO A MOISTURE NOT EXCEEDING 50-51%

THE DRYING SYSTEM INCLUDES A TWO-ROLL DEWATERING DEVICE THAT REDUCES MOSTURE TO 70%



AND A FINAL DRYING MILL DESIGNED TO GUARANTEE THE FINAL BAGASSE MOISTURE.





ADVANTAGES OF THE DIFFUSER OVER A MILL TANDEM

DIFFUSER





- HIGHER SUGAR EXTRACTION
- LOWER POWER CONSUMPTION
- LOWER MAINTENANCE COSTS
- LOWER OPERATING COSTS
- HIGHER OPERATING FLEXIBILITY
- HIGHER OPERATING RELIABILITY
- LOWER INVESTMENT COSTS
- LOWER INSTALLATION COSTS
- CLEANER AND SAFER OPERATION
- LOWER RISK OF INFECTIONS

DIFFUSER



PRACTICAL RESULTS SHOW THAT THE POL% IN BAGASSE OBTAINABLE WITH A DIFFUSER IS AS LOW AS 0.6%, IN MOST CASES LOWER THAN 1%, WHILE COMPARABLE LOW VALUES ATTAINABLE WITH A MILL TANDEM ARE 1.6-2.0%, NORMALLY 2.5-3%

THE REDUCTION OF 1% OF POL% BAGASSE REPRESENTS AN INCREASE OF GROSS PROFITS OF ABOUT 1,100 US\$ PER THOUSAND TONS OF PROCESSED CANE PER SEASON. (VALUE BASED ON AN AVERAGE SUGAR PRICE OF 400 US\$/TON).

LOWER POWER CONSUMPTION

THE DIFFUSER USES A SMALL PORTION OF THE MECHANICAL POWER TYPICALLY REQUIRED IN A CONVENTIONAL MILL TANDEM.



A COMPARISON BETWEEN A SIX FOUR-ROLL MILL TANDEM TOTALLY ELECTRIFIED AND A DIFFUSER SHOWS A POWER SAVING OF ABOUT 65% WITH THE DIFFUSER.

LOWER MAINTENANCE COSTS

DIFFUSER PARTS DO NOT ENDURE SAME WEAR AS MILL COMPONENTS. THE ONLY ELEMENTS THAT REQUIRE PERIODICAL MAINTENANCE ARE THE MAIN CHAINS (PINS AND BUSHES), PUMP INTERNALS AND CONVEYER MOVING PARTS

THERE IS NO NEED TO DISMOUNT THE WHOLE INSTALLATION AT THE END OF THE CRUSHING SEASON

PRACTICAL EXPERIENCE SHOWS THAT MAINTENANCE COSTS FOR A DIFFUSER INSTALLATION (WITH ONLY ONE DRYING MILL) IS ABOUT 35-40% OF COSTS WITH A MILL TANDEM.

LOWER OPERATING COSTS

ONLY ONE OPERATOR PER SHIFT CONTROLS THE DIFFUSER BY MEANS OF A COMPUTER INTERFACE. THE ONLY ELEMENT REQUIRING DIRECT ATTENTION IS THE DRYING MILL.

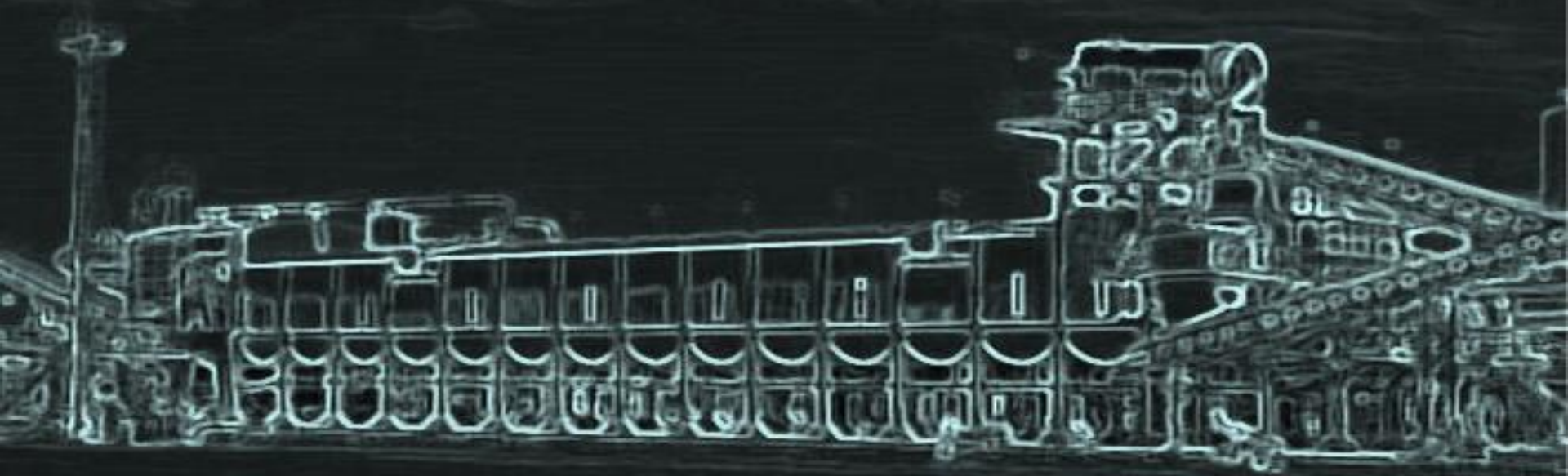
THE COSTS OF LUBRICATION AND WELDING ARE BASICALLY NARROWED DOWN TO 20%, MAINLY IN THE DRYING MILL AREA.

THE COSTS OF CHEMICALS FOR JUICE CLARIFICATION AND FILTRATION DROP TO ABOUT 50%

ALL INCLUDED, THE OPERATING COSTS DROP TO 25-30%.

HIGH OPERATING FLEXIBILITY

THE DIFFUSER MAINTAINS A CONSTANT PERFORMANCE IN A WIDE RANGE OF CAPACIDAD (50 - 120%), EVEN WITH UNEVEN CANE SUPPLY OR VARIABLE FIBER CONTENT.



THE DIFFUSER CAN OUTPERFORM A MILL TANDEM IN TERMS OF EXTRACTION, EVEN WHEN HEAVILY OVERLOADED.

ALL MOVING PARTS ARE SUBJECTED TO LOW MECHANICAL STRESSES, THUS REDUCING CHANCES OF MECHANICAL FAILURES. ALL CRITICAL ELEMENTS (SUCH AS CHAINS) ARE DESIGNED FOR A 15 YEARS LIFE SPAN.

THE PERFORMANCE IS NOT AFFECTED BY PROGRESSIVE WEAR OF MOVING PARTS, THEREFORE NO DOWNTIME FOR REPLACEMENT OF THESE PARTS IS EXPECTED.

VERY HIGH OPERATIONAL RELIABILITY, WITH OVERALL DOWNTIME LESS THAN 2% ARE COMMON WITH UNI-SYSTEMS DIFFUSER

LOWER INVESTMENT COSTS

**THE ACTUAL CAPEX FOR A DIFFUSER IS ESTIMATED
IN 80-85% OF THE COST OF A SIX FOUR-ROLL MILL
TANDEM**

**ONLY 50% OF CLARIFICATION/FILTRATION CAPACITY
IS REQUIRED**

**BEING PARTIALLY FABRICATED AT SITE, FREIGHT
COSTS ARE GENERALLY REDUCED.**

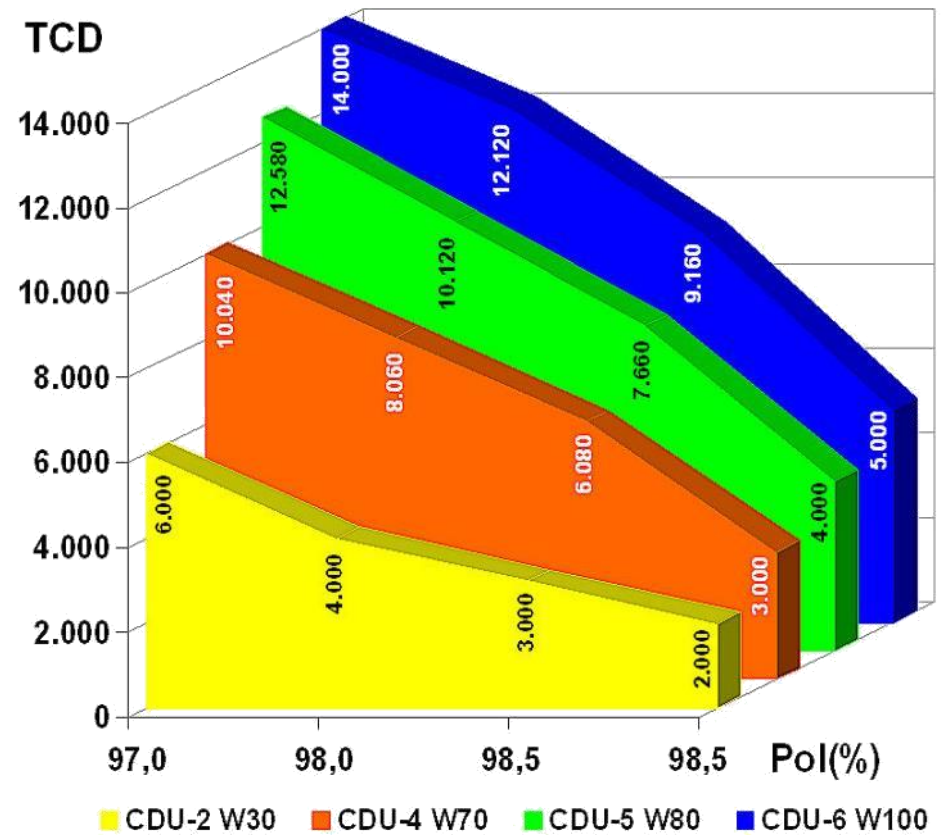
**THE DIFFUSER IS INSTALLED OUTDOOR, NO
BUILDING OR SHELTERS NOR GANTRY CRANES ARE
REQUIRED.**

LOWER INSTALLATION COSTS

THE DIFFUSER DOES NOT REQUIRE THE MASSIVE CONCRETE FOUNDATIONS TYPICAL OF MILLS AND HEAVY MECHANICAL GEARING. THIS COST ALSO APPLIES TO CLARIFICATION/FILTRATION MODULE

ALL DRIVES REQUIRE LOW POWER, RESULTING IN SAVINGS WITH TRANSFORMERS, STARTERS, MCC'S, CABLES AND OTHER BULK MATERIALS AND RELATED INSTALLATION COSTS

A DIFFUSER INSTALLATION IS MUCH LESS INTENSIVE IN COSTS FOR CRANES AND LIFTING EQUIPMENT



PERFORMANCE RANGE OF UNI-SYSTEMS DIFFUSERS



REFERENCE LIST

JUNE 2011

DIFUSOR



UNI-SYSTEMS DIFFUSERS REFERENCE LIST



#	YEAR	END USER, COUNTRY	DESCRIPTION	STATUS	CAP.TY, TCD
1	1985	GALO BRAVO, BRAZIL	DIFFUSER	IN OPERATION	4,000
2	1996	CRUZ ALTA, BRAZIL	DIFFUSER	IN OPERATION	8,000
3	1996	CIA. AÇUCAREIRA VALE DO ROSÁRIO, BRAZIL	DIFFUSER	IN OPERATION	10,000
4	1998	PROVIDÊNCIA, ARGENTINA	DIFFUSER	IN OPERATION	10,000
5	1999	CEVASA I (CARGIL), BRAZIL	TURNKEY SUGAR AND ETHANOL PLANT	IN OPERATION	4,000
6	2001	VALE DO PARANAÍBA, BRAZIL	DIFFUSER	IN OPERATION	6,000
7	2002	VERTENTE S.A., BRAZIL	TURNKEY SUGAR AND ETHANOL PLANT	IN OPERATION	8,000
8	2004	DRACENA S.A., BRAZIL	TURNKEY SUGAR AND ETHANOL PLANT	IN OPERATION	4,000
9	2005	SÃO FRANCISCO I, BRAZIL	DIFFUSER	IN OPERATION	12,000
10	2005	LOUISIANA AGRIC. FIN. AUTHORITY, USA	TURNKEY SYRUP PLANT	IN OPERATION	10,000
11	2006	ARCOR - PROVIDENCIA, ARGENTINA	DIFFUSER	IN OPERATION	10,000
12	2006	SÃO JOÃO DE ARARAS, BRAZIL	DIFFUSER	IN OPERATION	10,000
13	2007	FRUTAL, BRAZIL	TURNKEY SUGAR AND ETHANOL PLANT	IN OPERATION	10,000
14	2007	GUARIROBA, BRAZIL	TURNKEY SUGAR AND ETHANOL PLANT	IN OPERATION	8,000
15	2007	SÃO FRANCISCO II	DIFFUSER	IN OPERATION	12,000
16	2008	VALE DO PARANÁ, BRAZIL	DIFFUSER	IN OPERATION	10,000
17	2008	USINA CACHOEIRA DOURADA, BRAZIL	DIFFUSER	IN OPERATION	12,000
18	2008	SÃO JOÃO DE ARARAS, BRAZIL	DIFFUSER	IN OPERATION	10,000
19	2008	BP - USINA TROPICAL (I), BRAZIL	DIFFUSER	IN OPERATION	10,000
20	2008	BP - ITUIUTABA BIOENERGIA, BRAZIL	TURNKEY SUGAR AND ETHANOL PLANT	IN OPERATION	10,000
21	2008	USINA OUROESTE, BRAZIL	TURNKEY SUGAR AND ETHANOL PLANT	IN OPERATION	8,000
22	2008	COSAN (GASA), BRAZIL	DIFFUSER	IN OPERATION	15,000
23	2008	AGRICOLA DEL CHIRA, PERU	TURNKEY SUGAR AND ETHANOL PLANT	IN OPERATION	4,000
24	2008	BP - ITUMBIARA DE BIOENERGIA, BRAZIL	TURNKEY SUGAR AND ETHANOL PLANT	IN OPERATION	10,000
25	2009	BUNGE - USINA PEDRO ALFONSO, BRAZIL	DIFFUSER	IN OPERATION	12,000
26	2009	BIO ENERGÉTICA AROEIRA, BRAZIL	TURNKEY SUGAR AND ETHANOL PLANT	IN OPERATION	5,000
27	2009	USINA CEVASA II (CARGIL), BRAZIL	DIFFUSER	IN OPERATION	8,500
28	2010	CIA. AZUCARERA VALDEZ, ECUADOR	DIFFUSER	IN OPERATION	15,000
29	2010	MAPLE ENERGY , PERU	DIFFUSER	CONSTRUCTION	6,000
30	2010	PARACATU, BRAZIL	DIFFUSER	IN OPERATION	10,000
31	2012	SOUTHEAST RENEWABLE FUELS, USA	TURNKEY ETHANOL PLANT	CONTRACT	4,000
32	2013	BP - USINA TROPICAL (II), BRAZIL	DIFFUSER	IN OPERATION	10,000

THANK YOU

UNI-SYSTEMS DO BRASIL, LTDA. UNI-SYSTEMS, INC.

m.scipioni 2007



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