



Cristal Sustainability Update 2017

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Cover Photo: A participant at the Junior Safety Agent Campaign for Community Support at Cristal's pigment plant in Bahia, Brazil

General Note: This document provides a 2017 update to the 2013 Cristal Sustainability Report presented on our website, where a full overview of our reporting against GRI G4 guidelines is provided. The reporting methodology is in accordance with the GRI G4 "Core" guidelines.

The reporting period for this report is calendar year 2017. This is the latest data available at the time of the preparation of this document. Only sections with updated data for the above-mentioned year are included in this report. Other sections are referred to in the initial report.

Thank you for your interest in our sustainability performance.

Please send questions or comments to sustainability@cristal.com.



WELCOME BY OUR EVP

Dear Readers,

Welcome to Cristal's annual Sustainability Update for the year 2017. Throughout the year, we continued our journey to improve our sustainability performance. Progress and action were made on all of our sustainability indicators.

We continued to improve our sustainability scoring, evaluated through third party assessment, and we have also successfully completed the first Together for Sustainability (TfS) Audit for our pigment plant in Ashtabula, Ohio. We received excellent feedback from the third party conducting the audit, giving us a high score recognizing the environmental, social and economic sustainability performance of Cristal. In 2018, we are conducting another TfS audit for our plant in Stallingborough, UK to further demonstrate our commitment to sustainability to our stakeholders with third party verification of our performance.

In 2018, we are focusing on decreasing our carbon footprint. For that purpose, we set more challenging energy targets for our plants. These targets are monitored on a monthly basis to ensure they are achieved at the end of the year. We are confident that our efforts will result in improved CO_2 emissions at the end of the year.

During the first quarter of 2018, we implemented a third party monitoring program (EcoVadis) for our key suppliers to help us ensure that they are fully compliant with our own sustainability objectives.

We are continuing discussions with our stakeholders, especially our customers and our suppliers, to continue our journey to improve our sustainability performance. In addition to that, we continue to be actively engaged with the local communities in the areas we operate to ensure we are positively contributing to these communities not only from the economic perspective but also through social and environmental programs.

We look forward to sharing with you our 2017 update and to further demonstrate our sustainability commitments.

Christian Günther Executive Vice President Cristal (Titanium Strategic Business Unit) TASNEE

1 ORGANIZATION

Cristal continues to be one of the largest producers of titanium dioxide and a leading producer of titanium chemicals. We are the largest merchant titanium chemicals producer and the world's leading supplier of ultrafine titanium dioxide products. We are also a producer of mineral sands.

The table below shows the distribution of our full-time employees by age structure.

	2017	2016	2015
Employees (FTE)	3,134	3,277	3,549
Training hours	178,795	206,353	158,812
Age structure (%)			
<30	406 (13.0%)	496 (15.1%)	636 (17.9%)
30 – 50	1,721 (54.9%)	1,778 (54.3%)	1,900 (53.5%)
>50	1,007 (32.1%)	1,003 (30.6%)	1,013 (28.5%)

In 2015, a transformation occurred with the transition of National Industrialization Company (Tasnee), Cristal's majority shareholder, from a holding entity to an operational entity. Tasnee assumed the management and leadership of Cristal and moved its entities to sustainable businesses capable of withstanding typical downward cycles in the business. A huge part of that process included reorganization and streamlining the organizational structure.

The table below shows the distribution of our full-time employees by gender.

Employee Category	Gender	Full-Time Employees	Percentage
Management			
	Female	41	12.85%
	Male	278	87.15%
Employees (Non- managerial level)			
	Female	275	24.30%
	Male	858	75.70%
Worker			
	Female	27	1.60%
	Male	1,655	98.40%
Total		3,134	100

2 THIS REPORT

The reporting period for this document is calendar year 2017. The first report was issued in 2015 for the calendar year 2013 according to Global Reporting Initiative (GRI) standard's "Core" option. Cristal plans to update the sustainability report on a yearly basis.

This report includes only updated information for the year 2017. Detailed content on sustainability is provided in the initial report, which can be accessed through our web site through the following link:

http://www.cristal.com/news-room/Documents/ Sustainability_Report_Interactive.pdf

The contact person for questions regarding this report, or feedback and suggestions for our sustainability program, is Chris Wiernicki, General Manager - Health, Safety and Environment for Cristal, who can be reached at sustainability@cristal.com.

3 ECONOMIC PERFORMANCE

Economic impact of our operations includes direct payroll and benefits; supplier spend, which is more than twice our direct payroll, and its impact on those companies; capital projects and construction employment; the indirect multiplier effect of these expenditures upon the communities where we operate; tax payments and direct charitable donations to communities, and the economic benefit realized by our customers through their use of our products. Our net sales in 2017 were approximately \$1.6 billion.

Economic performance is one of the pillars of sustainability. While our economic performance has a positive effect in the communities where we operate, our continued commitment to exemplary environmental, health, safety and sustainable performance is what allows our continued operation.

4 MARKET PRESENCE

The market presence comprises both a local presence within communities where we have operations and an industry presence in the international marketplace. It is managed as a growth objective at both levels, with development plans proposed, reviewed and implemented through formal company funding processes. Success of initiatives is monitored at both local and company levels through financial performance metrics, and adjustments are made as needed. In 2017, Cristal continued to be one of the largest producers of titanium dioxide products globally.

The table below shows amount and distribution of our raw material spend:

	2017	2016
Asia/Pacific		
% of spend within region suppliers	99%	100%
Total number of suppliers to the region	1,218	1,259
Number of local suppliers from within the region	1,198	1,236
Europe		
% of spend within region suppliers	75%	70%
Total number of suppliers to the region	1,420	1,394
Number of local suppliers from within the region	1,395	1,366
Middle East		
% of spend within region suppliers	47%	48%
Total number of suppliers to the region	595	598
Number of local suppliers from within the region	494	422
North America		
% of spend within region suppliers	50%	46%
Total number of suppliers to the region	730	748
Number of local suppliers from within the region	709	723
South America		
% of spend within region suppliers	94%	87%
Total number of suppliers to the region	57	52
Number of local suppliers from within the region	50	50
China		
% of spend within region suppliers	92%	92%
Total number of suppliers to the region	459	392
Number of local suppliers from within the region	453	389

5 MATERIALS

The following table provides information on the fiveyear period from 2013-2017 in absolute numbers (in millions of tons) and per ton of product. This report incorporates data from all our pigment and mineral separation plants across the world. In 2017, we continued to optimize our operation, which, together with increased production rates, resulted in a significant reduction in the use of our raw materials (around 22% reduction in ton per ton of product).

Year	2017	2016	2015	2014	2013
Raw Material used (M tons)	3.55	3.10	1.95	2.18	2.27
Raw Material used (t/t All products)	1.80	2.31	2.90	2.83	2.88



Indicator of raw material consumption per unit of product shows a significant reduction in 2017

6 ENERGY

The following table provides information on the fiveyear period from 2013-2017 in absolute numbers (million GJ) and per ton of product. It also includes the energy generated from renewable sources in millions of GJ. This report incorporates data from all our pigment plants, mines and mineral separation plants across the world. The reduction in the energy intensity in 2017 is driven by energy efficiency programs at our manufacturing sites and increased production rates compared to 2016. It was also driven by increased production volume against energy consumption at our mining sites. It is important to note that the billing quantities for natural gas consumption one of our pigment plants were adjusted after review with the energy supplier. Data for previous years were adjusted to reflect these changes.

The average energy intensity for our pigment plants are well within the range indicated in the European Commission reference document on best available techniques for the TiO_2 sector. This applies for both sulfate and chloride processes.

	2017	2016	2015	2014	2013
Absolute in M GJ	16.38	15.64	12.37	13.74	13.01
Energy Intensity (GJ/t All Products)	8.29	11.62	18.35	17.25	16.50
Energy from Renewable Sources (M GJ)	0.09	0.14	0.15	0.14	0.14



Indicator of energy intensity shows a significant reduction in 2017

7

7 WATER CONSUMPTION

The following table provides information on the fiveyear period from 2013-2017 in absolute numbers (million cubic meters) and per ton of product. Year 2016 reporting incorporates data from all our pigment and mineral separation plants across the world. The reduction in the water consumption per ton of product in 2017 is driven by water efficiency programs at our manufacturing sites and increased production rates compared to 2016.

	2017	2016	2015	2014	2013
Water Used (M m ³)	51.40	38.93	20.92	23.76	23.07
Water Used (m ³ /t All products)	26.02	28.97	31.06	30.88	29.26



Indicator of water consumption per unit product shows continued reduction in 2017

8 BIODIVERSITY

In 2017, we had over 300 hectares in rehabilitation in our Brazilian and Australian mining sites. Much of this area will require several more years of continued management to fully achieve the agreed end uses. Much of this is in the process of recovery, but is not yet fully rehabilitated. At our mines in Brazil, the surface area of disturbed land was reduced by 24% compared to 2016. It is important to note that the closing balance in 2016 was updated in this report based on approved regulatory figures for our mines in Australia.

Cristal continues to be a leader in rehabilitation activities as recognized by local authorities in Australia and Brazil. Our SHE policy was updated to ensure we maintain at least this level of leadership consistently.

All Sites	2017	2016	2015	2014
Total land disturbed and not yet rehabilitated in Ha (A: Opening Balance)	1,936	1,801	1,859	1,769
Total amount of new land disturbed within reported period (B)	436	288	187	213
Total amount of land newly rehabilitated within the reporting period to the agreed end use (C)	306	153	245	123
Total land disturbed and not yet rehabilitated in Ha (D= A+B-C)	2,065	1,936	1,801	1,859

9 EMISSIONS

The table below provides information on the fiveyear period from 2013-2017 in absolute numbers (in million tons). This report incorporates data from all our pigment and mineral separation plants across the world for Scope 1 and 2 emissions.

The graph below shows the carbon footprint reductions achieved by Cristal across the company from the baseline year of 2006 through 2017 expressed as the average kg of CO_2 emitted per kg of TiO_2 produced. The basis of the calculation is Scope 1, 2 and 3 emissions from "Cradle to Gate" to provide a more in-depth assessment from the emissions associated with the entire manufacturing process. Year 2017 incorporates data for all TiO_2 pigment production sites. The carbon footprint calculation methodology is developed by the Titanium Dioxide Manufacturing Association (TDMA) according to the EU PEF Method.

CO_2 emissions in M tons	2017	2016	2015	2014	2013
Direct emissions (scope 1)	0.64	0.58	0.54	0.62	0.56
Indirect emissions (scope 2)	1.23	1.03	0.91	0.86	0.82

Cristal is committed to decreasing the carbon footprint of our business through improved manufacturing efficiency, waste reduction, improved emissions controls, alternative energy and other methods that support all of the areas of sustainability. In 2017, Cristal has successfully decreased Scope 1 and Scope 2 emissions from all its sources. However, there was an increase in the Scope 3 emissions, which is mainly due to increased transportation emissions of raw materials; and increased energy consumption at two of our pigment plants. This has resulted in nearly the same rate of CO₂ emissions in 2017 compared to 2016. It is important to note that the billing quantities for natural gas consumption one of our pigment plants were adjusted after review with the energy supplier. Data for previous years were adjusted to reflect these changes.



Indicator of Carbon Footprint shows similar emission rate in 2017 compared to 2016

10 EFFLUENT

The following table provides information on the fiveyear period from 2013-2017 in absolute numbers (in million cubic meters) and per metric ton of product. This report incorporates data from all our pigment and mineral separation plants across the world. The reduction in the water discharge per ton of product in 2017 is driven by increased production rates compared to 2016 and water efficiency programs by our manufacturing sites. It was also driven by increased production rate at our mining sites.

	2017	2016	2015	2014	2013
Water Discharge (M m³)	25.96	23.82	20.80	21.84	21.90
Water Discharge (m³/t All products)	13.14	17.73	30.87	28.38	27.77



Indicator of water discharge per unit product shows continued reduction in $2017\,$

11 WASTE

The table below provides information on the fiveyear period from 2013-2017 in absolute numbers (in thousand metric tons). The increase in 2017 total numbers is attributed to increased production volume from our operations. The improvement in waste per ton ratio in 2017 is attributed to optimization programs at our sites and to increased production compared to 2016. In addition, there was a high quantity of special waste disposed in 2016, while in 2017 waste was generated from normal operations. The sites have also successfully implemented programs to minimize generation of hazardous waste and increased recycling.

The majority of non-hazardous waste is the mineral residue from the manufacturing process. Some of the manufacturing locations have the ability to beneficially reuse this material, while others dispose it of in a dedicated landfill.

	2017	2016	2015	2014	2013
Waste (kilo tons)	1,411	1,122	664	676	737
Waste (t/t all products)	0.71	0.93	0.99	0.88	0.93

Waste (t/t all Products)



Indicator of waste generated per unit product shows continued reduction in $2017\,$

The table below provides a breakdown of waste in terms of hazard classification and final disposal option.

Quantity of Waste (kilo tons)	2017	2016	2015	2014
Hazardous waste	39	146	99	140
Recycling	19.36	0.46	0.22	0.40
Treatment	18	144	98	140
Landfill	0.01	0.02	0.00	0.00
Non-hazardous waste	1,372	1,152	666	677
Recycling	5.00	5.17	0.34	0.18
Treatment	0.83	1.06	0.00	0.00
Landfill	1,356	1,145	665	676

12 ENVIRONMENTAL COMPLIANCE

Our manufacturing locations are subject to environmental permits, regulations and standards. Compliance is monitored by internal and external groups. Any non-compliances are investigated and corrective action plans are defined, implemented, tracked and validated as effective. The following table shows the number of non-compliance incidents in 2017.

	Non Compliance Incidents (#)	Fines (in USD)	
Europe	0	0	
Latin America	0	0	
Middle East	1	0	
North America	0	0	
Asia/Pacific	2	0	
Worldwide	3	0	

No significant fines or sanctions for non-compliance with environmental laws and regulations occurred in 2017.

13 EMPLOYMENT

Our workforce is the key to our success in all areas. Cristal is an effective and growing business – a leader in our field. What sets us apart, however, is our culture. We think of our people as family members and we treat them as such; taking a warm and caring approach to everything from employee safety to career development.

We respect our people and we hold ourselves accountable for our actions and our performances. In this way, we own all our successes and build valued relationships throughout our business and beyond. Both direct employees and contractors are valued and are included in workflow processes and monitored through our human resources and contractor management processes. Any employment or contractor issues that arise are reviewed at the management level for the group involved – plant management for locally controlled issues or corporate level for broader issues.

Approximately 3,100 persons were employed across Cristal operations worldwide by the end of 2017.

14 LABOR/MANAGEMENT RELATIONS

The application of our policies and implementation of our mission and vision occurs at the worker level and the relationship between the worker and their management is fundamental to our business. This applies whether workers are represented by a collective bargaining agreement or not. At most of our locations, workers are represented. Agreements with unions include conditions of employment covering: normal wages, premium pay, vacations, holidays, benefit plans including insurance and retirement plans, and other aspects of labor/management relations. There have been no strikes at Cristal locations since 1998.

In 2016, the company revised its "equal opportunity" policy to renew our continuing commitment to recruit, hire, promote, re-assign, compensate and train persons in all job classifications without regard to race, color, religion, sex, age, national origin, disability, sexual orientation or any other legally protected classification. This policy is supported by a group of policies and procedures that includes code of conduct and business ethics and a policy on preventing workplace discrimination, harassment, bullying and violence.

15 OCCUPATIONAL HEALTH AND SAFETY

Our safety vision is to prevent all workplace injuries, illnesses and environmental impact through our Journey to Zero program focusing on achieving an excellent safety culture across the organization. Operating safely is an integral part of our business philosophy: "An unsafe ton is an unwanted ton," a value repeatedly set forth by the Cristal leadership.

The Total Recordable Incidence Rate (TRIR) measures the rate of recordable workplace injuries and illnesses, as defined by the US Occupational Health and Safety Administration (OSHA), normalized per 100 workers per year. Recordable injuries and illnesses include all work-related deaths, illnesses, and injuries that result in a loss of consciousness, restriction of work or motion, permanent transfer to another job within the company, or that require some type of medical treatment other than first-aid treatment. The TRIR is calculated by multiplying the number of recordable injuries in a calendar year by 200,000 (which represents 100 employees working 2,000 hours per year) then dividing this value by the total man-hours actually worked in the year. Our TRIR for 2017 increased compared to 2016. However, our TRIR level remains at the lower tier compared to similar industries. We initiated a number of initiatives to decrease the injury rate and further enhance the organization safety culture.



• Cristal TRIR

- US ACC Responsible Care Members
- US Chemical Manufacturing

Indicator of Employees Total Recordable Injury Rate (TRIR) shows an increase in 2017

16 TRAINING AND EDUCATION

Company-wide, an average of 57 hours of training per employee was provided in 2017, representing an increase of nearly 19% compared to 2016. This includes training on safety, environmental and health protection topics, plus workplace and personal development training. The development training is discretionary time spent on skills development, as opposed to training that is mandated by a legal requirement. Approximately one training hour in every two is now spent on development activity compared to one hour in every six in 2013. Actual development hours per employee rose from seven hours in 2013 to 29 hours in 2017. This is higher than development hours in 2016 by around 61%.

A sustained focus on employee development is fast becoming part of the fabric of Cristal. All employees at supervisor level and above in the organization receive a documented annual performance and career development review. The majority of those also receive a mid-year review, which focuses predominately on future-forward action and development. For 2017, the spend per employee on training was US\$420, which is 3% higher than spending in 2016. The table below shows the breakdown of employee training and development by region.

	Training hours / Employee	Development hrs./ Employee	Training cost / Employee (\$US)
APAC	45	6	514
US	59	40	115
Europe	56	9	377
Middle East	37	45	517
Brazil	108	32	591
Average All Areas	57	29	420

17 COMMUNITY SUPPORT

In each location where we operate, we actively interact with the local communities, neighboring industries and local schools, colleges and universities. Given the large number of programs and individual locations, it is not practical to share all of our community support activities around the world. In this section, we share examples of Cristal's community support activities from different locations in 2017.

G.O. Community Development Corporation (G.O. Ministries) has been part of the Ashtabula, Ohio community for 20 years and is committed to helping families with food, clothing and shoes in a fun and safe place to gather. On September 16, 2017 at the Station Avenue location, the Cristal Ashtabula Plant 1 Community Project helped G.O. Ministries continue their philosophy of providing training, opportunities and support for those in need.

There were over 50 Cristal employees and family members working hard throughout the day and numerous projects were accomplished. Many hands made for quick work as the team installed much needed lights, exhaust fans in the meal prep area, a new water fountain, fixed a broken dishwasher and focused on the newly designated shoe room by painting and assembling shoe racks. Building new tables for board members to conduct their meetings was another project. The volunteers painted hallways, cleaned the kitchen, washed walls and tables, sorted and prepared numerous items of clothing for donation, found some additional outside yard work, and all was done with a smile and sense of camaraderie.

Chris Morrison, Chair of the Community Project Committee, said, "I would like to thank the many Cristal employees that participated in this year's community day event through clothing and shoe donations and those that volunteered their time on Saturday. This project would not have been the success it was without the crews. There is no kinder act then helping someone less fortunate then yourself and even though we may never meet the people that will benefit from what we accomplished today, I am certain our support will help G.O. Ministries continue to provide this much needed service to our community."

The consensus around the building for those involved had one common theme—the youth of this community are our future and we need to continue investing in them. Cristal's support of G.O. Community Development Corporation is a positive step in this direction.



Ashtabula Pigment Plant 1 employees volunteer at the G.O. Community Development Corporation

COMMUNITY SUPPORT continued

Ashtabula Plant 2's Community Project occurred at the One Step Center in Conneaut, Ohio. The One Step Center gives children ages 12-17 a place to go after school to receive assistance with academics, study together in the study room, hang out in the lounge, or play various recreational sports in the gymnasium. Most importantly, these children are given a free hot meal, which is eaten altogether in the cafeteria, giving the children and volunteers an opportunity to sit and talk together—an experience many of these children do not receive at home.

The work at the One Step Center occurred in two phases. The first phase included installing LED light fixtures throughout the entire first floor of the building. We were able to replace fixtures in the kitchen, dining room, gymnasium, stage, main hallway, and in two classrooms. This first phase was made possible with the help of approximately 20 maintenance and I&E (instrumentation and electrical) folks who volunteered their time after work. Installing these new LEDs dramatically decreased the electric bill for the facility, allowing more money to be spent on making a difference for these children.

The second phase included installing doors and shelves in the dining room pantry and painting the north entrance, the main hallway walls and ceiling, the dining room, the kitchen ceiling, the gymnasium, and the stage floor. This second phase was made possible with the help of approximately 50 of Cristal's Ashtabula employees who volunteered their time on a Saturday morning. The new paint achieved its desired effect of making the One Step Center feel brighter and more welcoming.



Ashtabula Pigment Plant 2 employees hold Community Day at the One Step Center

COMMUNITY SUPPORT continued

In 2017, Cristal supported 14 local organizations at Thann, France. The representatives of the local organizations, accompanied by employees from the site who had put forward their names, recieved 700 Euros as part of Cristal's "InTouch" program. The objective of this program is to reinforce relationships between the employees, local business, families and the surrounding communities. The InTouch committee, made up of around 20 members of the site personnel, chose 14 of them from various different areas including culture, sport, humanitarian aid and education. These 14 employees named a group of organizations in which they are personally investing their time, to be nominated for the donation. The effort was recognized by the local press in Thann and a special article was published by *Thur et Doller* newspaper on March 12, 2017. The newspaper also recognized other community support efforts such as the purchase of training material for the volunteer Bitschwiller fire brigade and high-visibility vests for the Thann athletics group to be able to run safely.



Representatives from 14 local associations attend reward event together with In Touch committee leader and Cristal's Thann Pigment Plant Manager

18 ANTI-CORRUPTION

Our global locations are assessed for various risks, including risks related to corruption, on an ongoing basis. Cristal's anti-corruption policies and procedures are communicated to governance board members and employees. Cristal has a system in place for the training of board members and employees regarding its anti-corruption policies and procedures. Such training is accomplished, depending upon the intended audience, either in-person or via online training. There have been no recorded incidents of corruption during the reporting period of 2017.

19 COMPLIANCE

We are committed to comply with all relevant regulations in countries where we operate. This commitment is documented as part of the company's core values. To support compliance, the company issued a documented "non-retaliation policy" in 2016 to empower employees to report non-compliances if observed; to maintain an "open door policy" at all levels of management to encourage employees to report problems or concerns; and to enforce disciplinary action against retaliation acts in response to reporting.

In order to ensure that our suppliers are compliant with all relevant regulations our risk group implemented a third party monitoring program "Navex" during 2017.

No non-compliances with laws and regulations relating to provision and use of products or services were identified during 2017.

June 2018 reflecting data from calendar year of 2017

http://www.cristal.com/safety-health-and-environment/Pages/sustainability-reports.aspx



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