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G.E.M. Consultants B.V.

16384



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KORDIN GRAIN TERMINAL MALTA
UNIDO PROJECT DP/MAT/83/003
PROGRESS REPORT NO. 4

Prepared for:

United Nations Industrial
Development Organization (UNIDO)
Vienna - Austria

8606

May, 1987.

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ABBREVIATIONS

G.R.M. Government of Republic of Malta
M.E.D. Ministry of Economic Development
D.O.W. Department of Works / Marine Section
B.M. Bühler Miag
M.S.C.L. Malta Shipbuilding Co. Ltd.
P.L. Panta Lesco Malta
M.D.D. Malta Dry Docks
M.G.G. MediGrain
P.W. Public Works
M.S. Molenschot Breda Holland

1. INTRODUCTION

In March 1986, Unido awarded G.E.M. Consultants the contract for providing the services of its specialist, Mr. J. van Geel, in his capacity as an advisor to the management of the Kordin Grain Terminal in Malta.

Mr. J. van Geel commenced his services with the Kordin Grain Terminal on 7th April, 1986.

Mr. J. van Geel is advising the management on all matters related to the operations of the grain terminal.

Mr. J. van Geel has continued his services to the Kordin Grain Terminal until 21st April, 1987.

This progress report contains a summary of the services during the last period in Malta i.e. January, February, March and April 1987.

2. REPORT ON DAY-TO-DAY OPERATIONS

Calenderweek 52 (repeated from Progress Report No. 3)

Checked the firepump room, as part of routine safety check.

No irregularities found.

Called Mr. Vissers about received telex from headoffice.

We are still waiting for reply from headoffice about specifications from Diverside insecticide. However, headoffice has not received reply from Diverside itself. We will try direct contact.

Calenderweek 1, 1987

Mr. Briffa wrote a letter to Mr. Mizzi, Director of Public Works, regarding the water leak of the silo roof and cracks in the silo wall (see Annex I). The necessary actions are insisted to be undertaken urgently and professionally to assure the management committee the save usage of the silo.

The two nos. Bobcats, type Clark 743, as being ordered in calenderweek 46, 1987 arrived on site. These skidloaders will be used for cleaning up operations in ship's hold.

An automatic drain for the air system of the loader was received.

Calenderweek 2, 1987

Mr. Janke of B.M. called and asked for assistance by customs clearance of the tools from Schultz. There are problems regarding the payment of import taxes. Nobody is willing to pay.

Mr. Briffa asked for go-ahead with insecticide, make Diverside. Advised Mr. Briffa to wait. We are still lacking a certificate of health from the Government of Italy, Ministry of Health.

Problems again with the lift. It cannot take the maximum weight of 1,800 kgs in spite of the contractor's statement that he already tested the lift with test-weight.

Calenderweek 3, 1987

The following items ordered from The Netherlands, have been received:

- flexible cable, 24 cord, total length 100 m
- explosion free inspection lights (make Philips)
- walky-talkies (portofoon).

Tested the walky-talkies in the reclaim tunnels. Reception is very poor due to the output of 1.5 Watt.

As we ordered for an output of 5 Watt, the headoffice was informed.

The silo was visited by 350 local people.

Calenderweek 4, 1987

Started to install the base station for the walky-talkies in the control room.

Sent telex to Vanandel, Rotterdam, The Netherlands asking for an instruction book for the base station. Received telephone call from the headoffice about the walky-talkies. The 5 Watt modules will be sent to Malta.

Started testing the silo lift with local test weight i.e. 1,800 kgs concrete.

Testrun with the unloader has been carried out for one hour period.

Noticed that the new humidity meter is not functioning properly. It was sent back to Panta Lesco.

Calenderweek 5, 1987

Have sent telex to the headoffice asking for documentation and prices for portable gas and oxygen detectors.

Telex reply from headoffice received regarding the spare bulbs for the explosion free inspection lights and the oxygen detector.

At GEM Rotterdam terminals the Riken detector model OX-62 B.H.V. is used to measure oxygen in ship's hold.

Received service manual (instruction book) from Vanandel, The Netherlands, for the base station of walky-talkies.

Problems arised with the lift. The basement is full of water. Also, when the lift is moving, all doors can be opened.

Mr. Briffa is fully informed.

Calenderweek 6, 1987

After being informed by telex the Schultz's erection team arrived in Malta. The customs clearance procedures for their tools have been finalized. Inspection of the belt conveyors was started.

On belt conveyor B2 twenty small cracks were observed. Repair works started with the vulcanizing of belt B2. Also a new joint in belt B1 was made.

Observed that the guide ring of the S.W.F. winch from the unloader was damaged. A spare ring was available at the terminal and installed.

Calenderweek 7, 1987

Ordered through GEM's Purchasing Department a new portable oxygen detector, make Riken, model OX-62B, including one oxygen cell, 5 m hose and nozzle and in additional 10 m hose.

Received health certificate from Italian Ministry of Health about Diverside insectspray (see Annex IV).

Observed that the tension of the belt conveyor B2 is too high. After one hundred running hours the belt B2 has become 5 meters longer, while at some locations this belt is now 3 centimeters smaller in width.

Sent telex to Mr. Janke, B.M. regarding the above and asked for their clarification and details about the counterweight of the belt conveyor.

Later this week, on 14th February, Mr. Janke arrived in Malta.

The International Standards indicate that for belts of more than 500 mm wide, a decrease in the width of 1 percent is acceptable. For open belt the maximum acceptable elongation is 2 percent.

From belt conveyor B9 the coverlayer was removed and renewed up to 10 mtr. length.

Calenderweek 8, 1987

In hospital for medical observation and treatment.

Calenderweek 9, 1987

Engineers of Schultz have completed the necessary repair works to all the belt conveyors.

Mr. Ratcliffe from the Royal International Insurance Ltd. visited the terminal for an inspection of the fire fighting equipment. There were no complaints. All relevant equipment is in good working condition.

Informed Mr. Briffa that the terminal needs repainting and extra mechanical maintenance. There was no action noticed yet.

Calenderweek 10, 1987

Inspected the buckets elevators. Lots of loose buckets were found. Due to lack of proper tools (only hand tools available) it took three days to do complete check on one bucket elevator. Informed Mr. Briffa, whereafter he ordered air-driven tools.

During the testrun with elevator E1, there was a lot of noise in elevator boot. Observed a dust cake on bootpulley. Cleaned the elevator's boot thoroughly.

All the compressor units were thoroughly inspected and tested.

Calenderweek 11, 1987

Received two drums containing Diverside insecticide spray 209 litres each. Repaired weighing scale 30. Feedgates were not working properly.

Kordin Grain Terminal paid the invoice no. 1624/01.87 for pre-paid expenses by G.E.M. Consultants.

It appears that over-payment of Dfl. 1,289.70 was made.

Calenderweek 12, 1987

Started spraying the silo bins with Diverside insecticide spray.

Received quotation from Medairco for an airconditioning system in the control room.

The total of 3 nos. of split-type cooling and heating units are priced for L.M. 1,730.--, excluding the power supply connection and drain pipes.

Calenderweek 13, 1987

Mr. Briffa ordered a total of 500 nos. lamps for decorating purposes of the silo during Independence Day.

Ordered the installation of a time switch on the halogen lights. The bulbs of the lights on landside burned out already three times.

The costs of one bulb is L.M. 3.--.

Called the headoffice about the invoice for the oxygen detector.

Calenderweek 14, 1987

A two hours test run was carried out with the unloader.

Some maintenance work done on the weighing scale of unloader.

Asked Panta Lesco to give a quotation for an airconditioning system in the control room.

Started the installation of a new telephone installation in the reclaim tunnels.

An electronic student joint the staff of the terminal. He will work at the silo for a period of 5 months.

All members of the staff now, three in total, are electricians. Mechanics are still contracted on job to job basis.

3. BACK-UP SERVICES

Following back-up services have been provided by the headoffice in Rotterdam:

- Equipment

Assistance to sort out about missing parts from spares despatched to Medigrain (Annex II).

Provided documentation of portable gas and oxygen detectors and advise for the purchase (Annex III).

- Belt conveyor

Assistance and advise about observations of belt related to belt length, belt width, cracks in topcover, counterweight.

- ANNEX I Letter from Mr. Briffa to Mr. Mizzi,
director of public works, dated 30 December, 1986.
- ANNEX II Telexes from Mr. Briffa.
Telex sent by headoffice to Mr. Briffa.
- ANNEX III Telex from Mr. van Geel.
Documentation of oxygen detector.
- ANNEX IV Decree of the Italian Ministry of Health
about insecticide Diverside Super.
- ANNEX V International Standards on beltconveyors
1121 - Conveyor belts - List of characteristics which may be
required according to use.
283 - Full thickness tensile strength and elongation of
conveyor belts - Specifications and method of test
505 - Conveyor belts - Tear propagation resistance of the
carcass - Method of test
583 - Conveyor belts - Tolerances on total thickness and
thickness of covers
251 - Conveyor belts - widths and lengths.

Mr. Briffa wrote the following letter to Mr. Mizzi director of public works.

Mr. Mizzi.
Director of Works,
Bujumbura.

30 dec. 1988

DATE	10.2.87
NR.	306
NO	DETAILS
YU UR	
FILE	

Dear Mr. Mizzi.

Project; Kordin silo.

I am writing to inform you that once again, following last few days rainfall, a large volume of water has entered the bins and finished on belt no B7 in the tunnels beneath the bins. Strangely enough, this time the liquid was a mixture of water and what appears to be "bitumen".

The latter even forming a deposit on the belt, a sample of this mixture is still at the silo. Although there were several attempts to repair the roof, it appears that to date, the job was not professionally done since water continued to find its way inside the bins causing consequential damage.

As you know, wet bins cannot be used to store grain unless they are properly dried. Following a recent inspection we have encountered another great problem.

Between the rock and silo walls (culvery) we have found a large quantity of maize lying on the ground from investigations we conducted, it resulted that this maize was coming out of cracks in the silowall.

You understand that if this damage is not immediately taken care of a dangerous situation may result.

Given the circumstances, the management committee had to stop negotiations regarding work for the silo, since it cannot guarantee the quality of the product following storage.

The management committee, together with the G.E.M Consultants cannot be held responsible for repercussions following storage of grain in the silo under these conditions, and therefore insist that ~~all necessary~~ ~~action~~ ~~must~~ ~~be~~ ~~undertaken~~ urgently and professionally, so that we would not be forced to hand over the silo back to the works department, until the management committee is assured that the silo can again be used without unnecessary risk.

Regard, A. Briffa K.G.T.

Copy to Mr. Sant eng. C. Cassar marine section,
Mr. J. V. Geal, Gem. Consultants.

nnnn*
23435 gemhg n1

09.44 *
23435 gemhg n1
from : kordin grain terminal - malta

to : gem b.v. - rotterdam

re : spares despatched to medigrain

please be informed that all spares received in good order except
6 (six) natrium lamps sont 400w e40 which were missing.

please advice whether these lamps were sent seperate.

regards

a. briffa
kordin grain terminal*
23435 gemhg n1
1908 kgt mw

IN 140187	
NR. 032	
TO JV	INITIALS
FILE 2606	

43 96+ *
23435 gemhg n1
82+? 4061908+
1908 kgt mw

23435 gemhg n1

035/cs
14-01-1987

to : kordin grain terminal - malta
fm : g.e.m. consultants - rotterdam
attn : mr. a. briffa
re : your telex of 14-01-1987 - spares to medigrain.

1. supplier is now checking packing list / order list in factory. will inform you.
2. did the boxes in which all was packed, reach you completely closed. could items have been stolen.
3. to whom should we send the invoices for portofoons, natrium lamps and transport.

kind regards
jan vissers
+++

*
1908 kgt mw

23435 gemhg n1

IN 15-01-87	
NR. 041	
TO E JV	INITIALS y
FILE 8606	

08.52 *
23435 gemhg n1

from : kordin grain terminal - malta
to : g.e.m. consultants - rotterdam
attn : jan vissers

reference to your telex dated 14-01-87 - spares to medigrain

1. please be informed that lamps were included in the packing list.
2. the box in which all spares were packed was completely closed and was opened by us in the presence of the customs officials. so they could not have been stolen.
3. invoices should be sent to :-

kordin grain terminal
c/o medigrain limited
4 mill street
marsa
malta

thanking you.

regards

a. briffa
kordin grain terminal

*
23435 gemhg n1
1908 kgt mw

IN 26.07.87	
NR. 078	
TO JV	INITIALS
FILE	8606

09.59 *
23435 gemhg n1

from : kordin grain terminal - malta
to : g.e.m. consultants - holland
attn : mr. j. vissers

please send me some documentation and prices about portable gas
and oxygen detectors.

regards

j.v. geel

*
23435 gemhg n1
1908 kgt mw

Brochure by R.H.

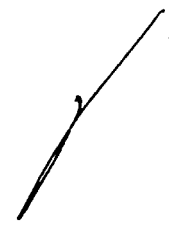
SUBJECT	PROJECT NO.	DATE 24/1/87	PAGE
	ENG.		OF

Riken zuurstof meetapparatuur

GEM Europort + Botlek gekocht type OX-62B (pc93)

- Prijs:
- detector met 12 zuurstof cel fl 1825
 - reserve cel fl 845 per stuk
 - cable (slang) 10m lengte fl 231.

- * normaal uitgerust met 5 m slang / standaard.
- * wordt geleverd met draagtas, testcertificaat en manueel.
- * vakt op normale battery.
- * wordt geleverd in temper doos, gevuld van lucht
veelt vervanging



RIKEN

OXYGEN MEASURING INSTRUMENTS

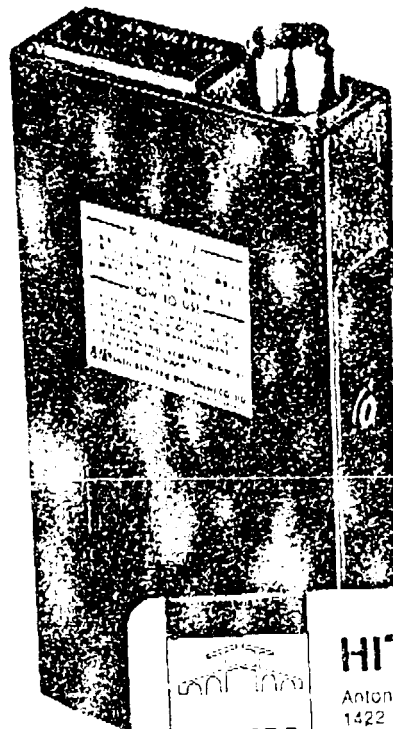
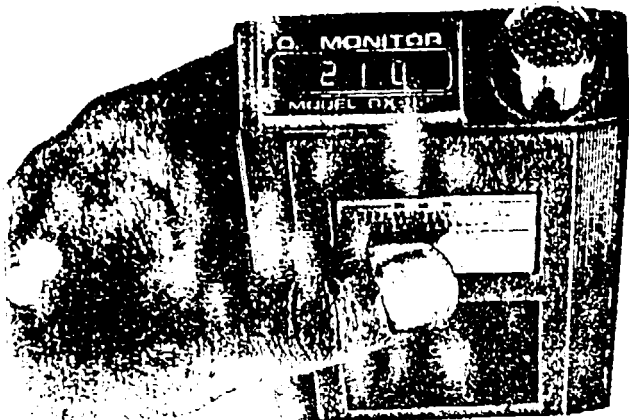
⟨PORTABLE MODELS OX-82, OX-62B, OX-1, OX-226/227⟩

⟨FIXED MODELS OX-120, OX-121⟩

ANNEX III

Page 3 of 7

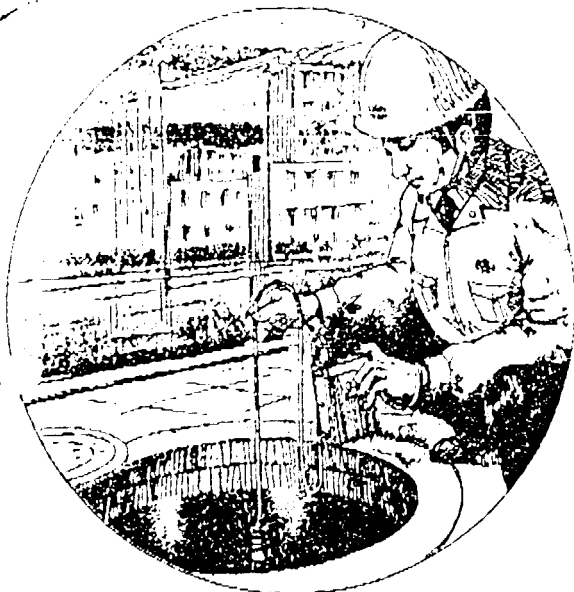
●MODEL OX-82



HITMA B.V.

Anton Philipsweg 1
1422 AL Uithoorn
Postbus 175
1420 AD Uithoorn
Telefoon: 02975 - 68011

GROEP INSTRUMENTATIE-SYSTEMEN



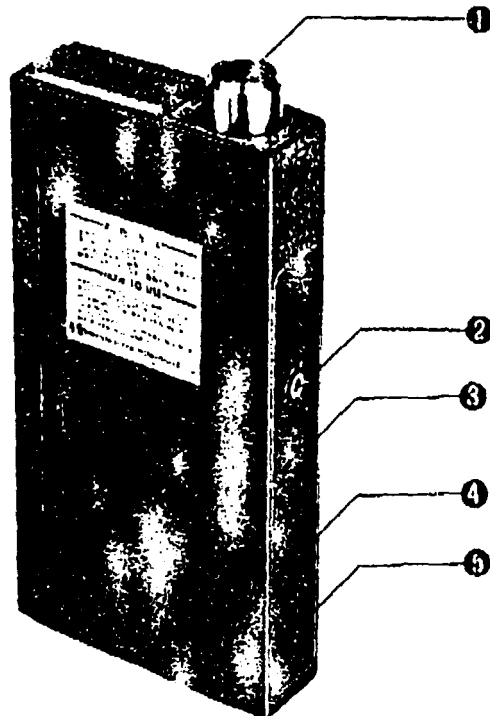
TYPICAL APPLICATIONS

- Mines & construction tunnels.
- Telephone companies and their cable vaults and manholes.
- Sewage disposal plants.
- Chemical plants & refineries.
- Gas & electrical utilities.
- Laboratories.
- Shipping industries.

RIKEN PORTABLE/POCKETABLE OXYGEN INDICATORS and OXYGEN ALARM SYSTEM provide a quick, convenient method for determination of oxygen content of any atmosphere. It is intended primarily as an indicator of oxygen deficiency, with good readability from 0~25%. However, it is adaptable for any measurements where oxygen concentration is to be detected. These models are most suitable and recommended for testing tanks, manholes, vessels and other spaces to determine safety from the standpoints of oxygen deficiency before entering and while work is in progress.



RIKEN KEIKI FINE INSTRUMENT CO., LTD.



- ① Oxygen sensor
- ② Span adjuster
- ③ Zero adjuster
- ④ Power switch
- ⑤ External alarm receptacle

The Model OX-82 Personal Oxygen Indicator and alarm is a pocket-sized, lightweight instrument designed for uninterrupted monitoring of oxygen levels. Carried in a pocket, the OX-82 provides hands-free continuous diffusion sampling, a digital readout of oxygen level and an alarm whenever oxygen level falls below a preset point. A side-mounted jack accepts a plug that connects to an optional alarm buzzer to alert the wearer even in environments with a high background (ambient) noise level.

An alarm for low battery condition warns the user when power is low. The top-mounted oxygen sensor is easily detached for mounting on an optional extension cable to provide remote sampling in tanks or manholes prior to entering these or other potentially hazardous areas.

FEATURES

- Pocket-size (78x142x26mm)
- Lightweight (300grs)
- Hands-free monitor
- Percent oxygen digital readout
- Audible and visual alarm
- Remote alarm capability
- Remote monitoring capability
- Low battery alarm
- Intrinsically safe design
- Automatic self-illumination display in a dark place.

SPECIFICATIONS

Principle	Electrochemical cell
Sampling method	Diffusion sampling Built-in and/or remote sensor type
Range	0--25% oxygen content
Accuracy	±0.3% by volume at constant temp.
Readout	Digital display readable to nearest 0.1% oxygen (3 digit)
Alarm	1) Intermittent audible tone and flashing alarm light, activated when oxygen content falls below alarm level (preset at 18%). 2) Continuous audible tone for low battery alarm 3) External alarm buzzer receptacle
Operating temp.	-10°C -- +40°C
Power source	Dry cells (Standard), 2 pcs
Battery life	100 hrs continuous operation minimum in case of no alarm/illumination, using dry cells
Dimensions	78(W) x 142(H) x 26(D)mm
Weight	Approx 300 grs (Inc. carrying case)
Life expectancy of the sensor	Above 10 months
Warranty	1 year material & workmanship (8 months on oxygen cell)

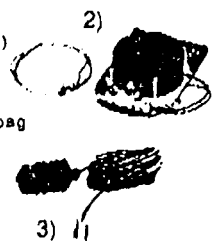
Specifications subject to change without notice.

STANDARD ACCESSORIES

- 1) Dry cell (R6 or AA size) 2 pcs
- 2) Carrying case (with hand strap) 1 pc

OPTIONAL ACCESSORIES

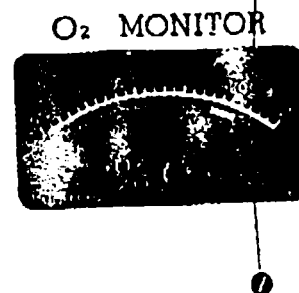
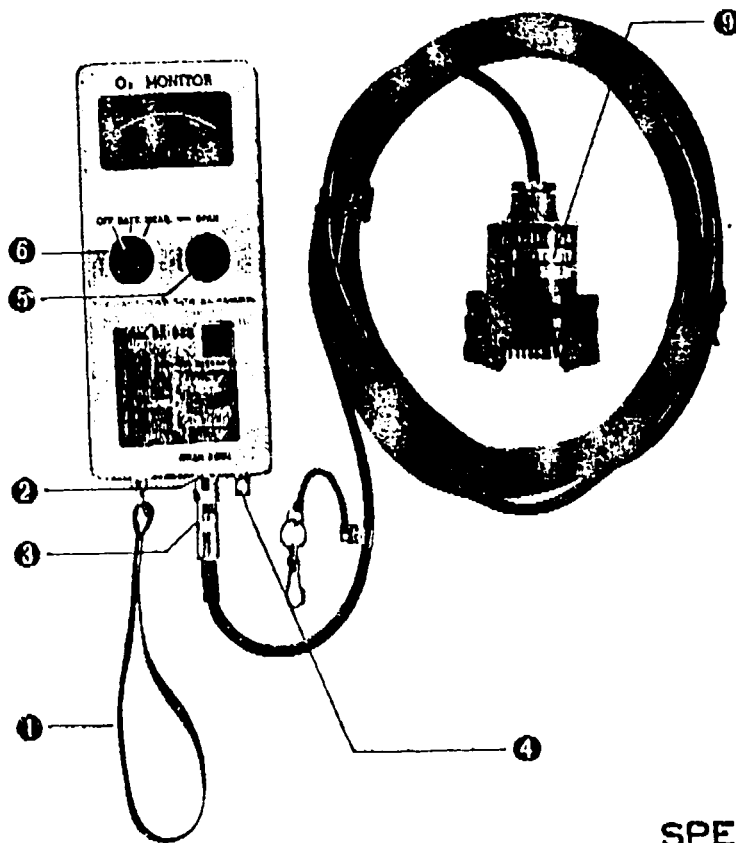
- 1) Ni-Cd battery and charger (AC 100V or AC 220V)
- 2) External alarm buzzer (with clip)
- 3) Extension cable (5m, 10m, 20m or 30m)
- 4) Calibration kit for pressurized air (Gas sampling bag and adaptor)
- 5) Carrying bag
- 6) Weather-proof rubber cover (for marine use)



PORTABLE MODEL OX-62B (Remote sampling type)

ANNEX III

Page 5 of 7



- ① Carrying/wrist strap
- ② Recoptacle
- ③ Connector
- ④ Chain stopper
- ⑤ Span adj. knob
- ⑥ Control switch
- ⑦ BATT zone
- ⑧ ◆ (span) mark
- ⑨ Remote sensor (GD-F5A) with protective cover

Intrinsically safe Model OX-62B, remote sensor type, provides the meter scale graduated 0~25%. The sample gas is diffused into the remote sensor by static diffusion. Optional length of remote sensor cable assures high accurate measurement at high depth of vessels and/or manholes without approaching hazardous zone. The OX-62B is convenient model for determination of oxygen deficiency at any hazardous area.

FEATURES

- Intrinsically safe 3A G4 (No.33362) & drip proof in Japan
- Approved by NK (NK register of shipping in Japan) and HK (Ship equipment inspection society of Japan)
- Remote sensor is protected against the shock with protective sensor cover.
- Light weight, simple to use
- Continuous operation for approx. 70 days (1680 hrs) with alkaline battery

SPECIFICATIONS

Principle	Electrochemical cell
Sampling method	Diffusion sampling Remote sensor type
Range	0 - 25% oxygen content
Accuracy	Better than $\pm 0.7\%$ by volume (complies with JIS T-8201)
Operating temp	-10°C ~ +40°C
Power source	Dry cell (std.) x 2 pcs or Ni-Cd battery (option) x 2 pcs (this separate recharge is made by the charger for this exclusive use)
Battery life	Manganese dry cell: 40 days minimum, Alkaline battery: 70 days minimum, Ni-Cd: 20 days maximum
Dimensions	Indicator: 83(W) x 177(H) x 40(D) mm
Weight	0.9 kg (Incl. sensor & cord)
Explosion proof	Intrinsically safe 3A G4 (No.33362) & drip proof in Japan
Life expectancy of the sensor	Above 15 months
Warranty	1 year material & workmanship

Specifications subject to change without notice.

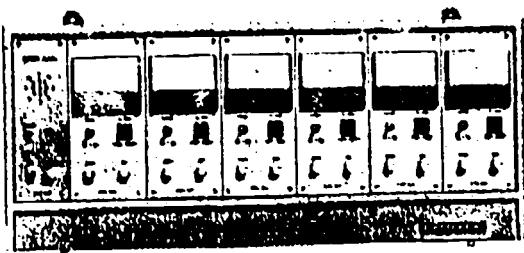
STANDARD ACCESSORIES

- 1) Carrying case 1 pc.
- 2) Carrying/wrist strap 1 pc.
- 3) Spare sensor model OS-B8 1 pc.
- 4) Dry cell (RB or AA size) 2 pcs.
- 5) Instruction manual 1 copy.
- 6) Test certificate 1 copy.

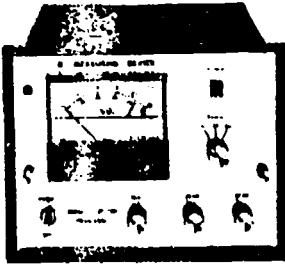
OPTIONAL ACCESSORIES

- 1) Extension cable (5m or 10m)
- 2) Carrying bag
- 3) Ni-Cd battery and charger AC 100V or AC 220V

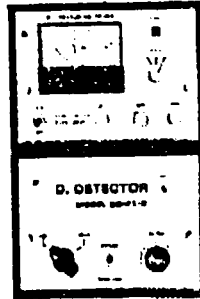
ALARM SYSTEMS MODELS OX-120·OX-121 (Continuous monitoring)



OX-121, 6-channel



OX-120



OX-120 with detector head

DETECTOR HEADS



GD-F3A



GD-F4A



GD-F1

These systems are designed to measure/monitor the presence of oxygen with low alarm or high alarm. The model OX-120 is a single channel panel mounting type and available for desk-top type by use of detector head GD-F1A,B or C. As the model OX-120-F1C is provided with syringe for extracted sample oxygen from food storage etc. On the other hand, model OX-121 is multi-channel wall mounting system from single to 6-channel and assures highly reliable and stable remote operation by combination of each detector head specified below.

FEATURES

- Significantly quick response time.
- Various combination available.
- Dual range.
- Alarm level can be set at any range.
- Available to select either Low (oxygen deficiency) alarm or High (excess oxygen) alarm (model OX-121)
- Either Low alarm or high alarm must be specified when ordering (model OX-120)
- Intrinsically safe (i3nQ5 in Japan) system available by adding zener barrier box.

SPECIFICATIONS

Indicator/alarm unit

Model	OX-120	OX-121
Mounting	Panel mounting	Wall mounting
Range	a) 0~25/0~5% b) 0~25/0~10% c) 0~25/0~50% d) 0~25/0~100%	Please specify one of them (dual expanded scale) when ordering.
Alarm accuracy	Within ±1% of full scale	
Alarm method	Motor-relay type (adjustable at any level)	
Alarm	High or Low (Specify either when ordering)	High or Low (Selectable)
	Red light (latching)	Red light (latching, with reset button) Audible tone in power unit
Relay contact	One common (C contact), rated 3A at 220 VAC (Resistance load)	
Operating temp	-10°C ~ +40°C	
Recorder output	0 ~ 10mV DC	
Power source	AO 220V (100V, 115V, or 240V) 50/60Hz	
Distance between indicator unit and detector head	Max. 600m	
Applicable cable	2 core cable with shield	

Specifications subject to change without notice.

Detector head

Model	GD-F1	GD-F3A	GD-F4A	GD-F43
Sampling method	Sample drawing by internal pump	Diffusion sampling	Flow-thru type	Diffusion sampling
Response time	Better than 20 sec to get 90% response			
Operating temp	-10°C ~ +40°C			
Applicable sensor	OS-B3 (std.)	OS-B11 (std.) OS-B11TF (For solvent gas resistance)		OS-11VR
Power source for pump	AO 100V ±10V, 50/60Hz			
Sample flow rate	0.8 ~ 2.0 l/min		0.8 ~ 1.5 l/min	
Sample gas inlet/outlet position	Inlet: Outlet: a) F1A: Rear Rear b) F1B: Front Rear c) F1C: Front Rear			
Explosion proof		Intrinsically safe design (i3nQ5) is available by addition of separate optional zener barrier		Flame proof (J2G4)

COMBINATIONS

Type	Remote detection		Combined type
	OX-120	OX-121	
Indicator/control unit			OX-120
Combination detector head		GD-F3A	GD-F1A
		GD-F4A	GD-F1B
		GD-F43	GD-F1C



RIKEN HEIKI FINE INSTRUMENT CO., LTD.

2-7-6, Azusawa, Jiyohashi-ku, Tokyo, 174 Japan

Cable Address RIKENFINE TOKYO

TELEX: 272 2638 RKNFINE

TEL: TOKYO (946) 1111

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to : kordin grain terminal - malta
 from : g.e.m. consultants - rotterdam
 attn : mr. j. van geel
 re : 8606 - bulbs and oxygen detector

1. bulbs
 spare bulbs were not included in parcel. supplier will send 6 bulbs free of charge, delivered malta terminal.
2. oxygen detector
 at present g.e.m. uses riken detector - type Ox-62b hv sent you brochure today.
 price of detector is:

- detector incl. 1 oxygen cell and 5 m hose and nozzle	df1. 1.825
- spare cell per piece	df1. 845
- extra long 10 m hose	df1. 231

detector will be delivered incl. bag, test certificate and manual.
 delivery time abt 6 wks.
 above prices do not include transport.

we advise you to buy detector with 2 spare cells and 10 m hose,
 total df1. 3746 excl. vat.

regards
 jan vissers
 +++

*
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MINISTRY OF HEALTH

THE MINISTER

Given the decree dated 19.7.1968 with which was registered under all effects of law N. 5203 the medical surgical guard named DIVERSIDE SUPER of the firm DIVERSEY S.p.A. - Cod. fisc. n. 00102760196 situated in BAGNOLO CREMASCO (CR), S.S. Lodi Crema 235 prepared in the office of same firm situated in BAGNOLO CREMASCO (CREMONA);

Given the request presented on 11.10.1979 by the same firm to obtain authorisation to modify the composition of the above mentioned defence;

⁰
Considering that the new composition is according to the pre-requisites; following the advice of the 'Superior Consulate of Health' dated 18.7.1979 regarding the substitution of 'Piretina' with 'Piretroidi';

Ascertaining that the firm under question has proceeded with the payment of the due government tax;

Given article 189 of the T.U. approved with R.D. 27.7.1934 N. 1265 modified by the Law 1.5.1941, N. 422;

Given article 2 of the Rule approved with R.D. 6.12.1928, N. 3112;

DE C R E E

The medical surgical guard DIVERSIDE SUPER of the firm DIVERSEY S.p.A. - Bagnolo Cremasco (CR) - cod. fisc. 00102760196, prepared in the office of the same firm, the capability of which (firm) is ascertained, modified in composition, remains registered with all effects of Law N. 5203, and registered under the name of the same firm.

The affixed label and illustration, with which the product must be put on the market, are approved and form an integral part of the present decree. The present decree will be informed through administrative means to the firm concerned. The present decree will be published in the Official Gazette at the expense of the same firm.

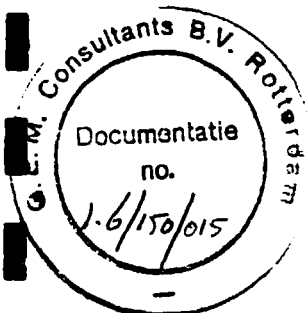
THE MINISTER

INTERNATIONAL STANDARD



1121

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION · МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ · ORGANISATION INTERNATIONALE DE NORMALISATION



Conveyor belts — List of characteristics which may be required according to use

Courroies transporteuses — Répertoire des caractéristiques pouvant être exigées en fonction de l'utilisation

First edition — 1976-06-15

UDC 621.867.2

Ref. No. ISO 1121-1976 (E)

Descriptors : conveyor belts, mechanical properties, electrical properties, tests, utilization, standards lists.

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 1121 was drawn up by Technical Committee ISO/TC 41, *Pulleys and belts (including vee-belts)*. It was submitted directly to the ISO Council, in accordance with clause 6.12.1 of the Directives for the technical work of ISO.

This International Standard cancels and replaces ISO Recommendation R 1121-1969, which had been approved by the Member Bodies of the following countries :

Australia	Germany	Portugal
Austria	Greece	South Africa, Rep. of
Belgium	India	Spain
Czechoslovakia	Israel	Sweden
Denmark	Italy	Switzerland
Egypt, Arab Rep. of	Korea, Rep. of	Thailand
Finland	Netherlands	Turkey
France	Norway	U.S.S.R.

The Member Bodies of the following countries had expressed disapproval of the document on technical grounds :

United Kingdom
U.S.A.

Conveyor belts – List of characteristics which may be required according to use

1 SCOPE AND FIELD OF APPLICATION

This International Standard establishes a list of the various characteristics which may be required of conveyor belts, according to their use.

This document, which should be taken only by way of a guide for the use of specifications writers, is intended to prevent a profusion of unnecessary or irrelevant requirements arising from the number of existing or future International Standards specifying conveyor belt characteristics and methods of test.

2 REFERENCES

ISO 252, *Conveyor belts – Minimum requirements for ply adhesion and method of test.*

ISO 282, *Conveyor belts – Sampling.*

ISO/R 283, *Full thickness tensile strength and elongation of conveyor belts – Specifications and method of test.*

ISO 284, *Conveyor belts – Electrical conductivity – Specification and method of test.*

ISO 505, *Conveyor belts – Tear propagation resistance of the carcass – Method of test.*

ISO 703, *Conveyor belts – Troughability – Characteristic and method of test.*

ISO 1120, *Conveyor belts – Determination of strength of mechanical fastenings – Static test method.*

3 TABLE OF CHARACTERISTICS

Characteristics	Methods of test	Normal use	Mining and iron works	Elevator
In full thickness :				
– Breaking strength (longitudinal direction)	ISO/R 283	X	X	X
– Elongation under reference load ¹⁾	ISO/R 283	X	X	X
– Breaking elongation	ISO/R 283		X	
– Strength of mechanical fastenings	ISO 1120	2)	2)	
– Troughability	ISO 703	3)	3)	
– Electrical conductivity	ISO 284		4)	
Of the carcass :				
– Adhesion between plies	ISO 252	X	X	X
– Tear resistance (longitudinal direction)	ISO 505		X	
Of covers :				
– Adhesion covers plies	ISO 252	X	X	X

1) The elongation in the longitudinal direction can also be measured under the load suitable to the rate of work when this is specified in the order.

2) If the belt must be joined by mechanical fastening.

3) Except if the belt must be used flat (this test is unnecessary when the belt is manifestly flexible).

4) Only if the belt must be conductive to static electricity.

ISO 1121-1976 (E)

4 REMARKS ON THE TABLE

4.1 Only ISO approved tests have been listed. Additions will be made to the table as further International Standards are published.

4.2 Belts which do not fall into one of the categories of the table are to be considered special cases. The type of test

to be carried out in these cases shall be arranged between manufacturer and user and be specified on the order.

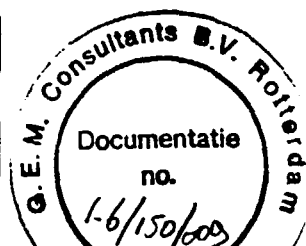
4.3 It should be pointed out that ISO 282 lays down the number of samples to be taken in conveyor belt acceptance tests, depending on the length ordered by the same user (for the same characteristics).

International Standard



283

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION



Full thickness tensile strength and elongation of conveyor belts — Specifications and method of test

Résistance et allongement par traction des courroies transporteuses en pleine épaisseur — Spécifications et méthode d'essai

First edition — 1980-08-15

UDC 621.852

Ref. No. ISO 283-1980 (E)

Descriptors : conveyor belts, specifications, tests, test specimens, test specimen conditioning, test results, tensile strength, thickness.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 283 was developed by Technical Committee ISO/TC 41, *Pulleys and belts (including veebelts)*.

It results from the combination into one single document of ISO Recommendation R 283-1962 and its Amendment 1-1972, which it cancels and replaces, and was submitted directly to ISO Council for acceptance, in accordance with clause 5.10.1 of part 1 of the Directives for the technical work of ISO.

Australia	Germany, F. R.	Romania
Austria	Greece	South Africa, Rep. of
Belgium	India	Spain
Brazil	Iran	Sweden
Canada	Israel	Switzerland
Chile	Italy	Thailand
Colombia	Korea, Rep. of	Turkey
Czechoslovakia	Mexico	United Kingdom
Denmark	New Zealand	USA
Finland	Norway	USSR
France	Portugal	Yugoslavia

No member body expressed disapproval of the document.

Full thickness tensile strength and elongation of conveyor belts — Specifications and method of test

0 Introduction

The studies which led to the first edition of ISO/R 283 showed that the highest strength values were obtained from test pieces of a rectangular shape. However, this shape was not adopted because it leads to frequent breakages at the edges of the test piece or in the grips.

It was shown that breakages in the grips were avoided by using a waisted test piece. It was also apparent that the highest values were obtained when the test piece had the greatest possible radius of curvature (for a rectangular test piece the radius of curvature is infinite). The type of test piece which was recommended (hereafter called "type A"), with its 1 000 mm radius of curvature, resulted from these observations.

The same observations are valid in the case of high strength belts, but the gripping force permitted by the 35 mm ends of the type A test piece is generally inadequate to prevent slipping in the grips.

The best shape of test piece is one which :

- provides a large gripping area (test piece with a wide end);
- allows a high ratio of gripping force to tensile strength;
- has the largest possible radius of curvature.

The test pieces described herein for belts having a strength greater than 1 000 N/mm have been agreed as a compromise to meet the above requirements.

1 Scope and field of application

This International Standard lays down the conditions for full thickness tensile strength testing of conveyor belts, and also the corresponding specifications (breaking strength and elongation, elongation under reference load).

It applies to both "surface" and "underground" belts.

2 Specifications

2.1 Breaking strength

The minimum values of full thickness breaking strength in the longitudinal (warp) and the transverse (weft) directions are

1) "Reference load" signifies the tensile stress equal to 10 % of the minimum strength specified in the table in 2.1 (longitudinal direction)

given in the table below in force units and referred to the unit of the width of the test piece.

Minimum values	
longitudinal direction ¹⁾	transverse direction
N/mm	N/mm
160	63
200	80
250	100
315	125
400	160
500	free
630	free
800	free

1) The value of the breaking strength of a belt in the longitudinal direction is included in the standard designation for that belt.

NOTES

1 The values shown in the table above belong to the R10 series of preferred numbers, in accordance with ISO 3, *Preferred numbers — Series of preferred numbers*.

2 The table of values for strength in the longitudinal directions may be extended in both directions by using preferred numbers from the R10 series downward or upward :

125, 100, etc.

1 000, 1 250, etc.

3 The table of values for strength in the transverse direction may be extended downward by using preferred numbers of the R10 series in that direction :

50, 40, etc.

On the other hand, transverse strength remains open for belting of 800 N/mm and over (in the longitudinal direction).

2.2 Elongations in the longitudinal direction

The values shown below are given unless otherwise specified (this may occur in particular for single ply belts, metal belts and certain belts of very great length) :

Elongation under reference load¹⁾ 4 % max.

Breaking elongation 10 % min.

ISO 283-1980 (E)

3 Method of test

3.1 Principle

A test piece cut from the full thickness of the belt is tensile tested until it breaks.

3.2 Apparatus

The apparatus consists of the following :

3.2.1 **Dynamometer**, the dynamometer load should be suitable for the strength of the test piece.

3.2.2 **Grips**, the form of the grips should ensure perfect fixing of the test piece and eliminate any possibility of slip during the tensile test. The use of grips with transverse serrations in accordance with figure 1 is recommended. For very thick belts, the use of double compartment grips of the type shown in figure 2 is permitted.

3.3 Test pieces

3.3.1 Shape and dimensions

The shape and dimensions of the test piece shall be in accordance with either figures 3, 4 or 5 which are alternatives and chosen by the supplier.

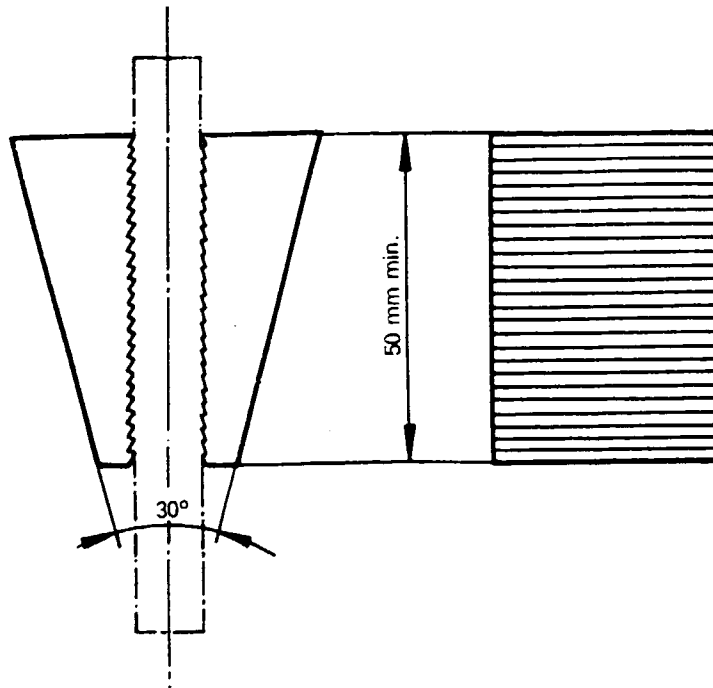


Figure 1

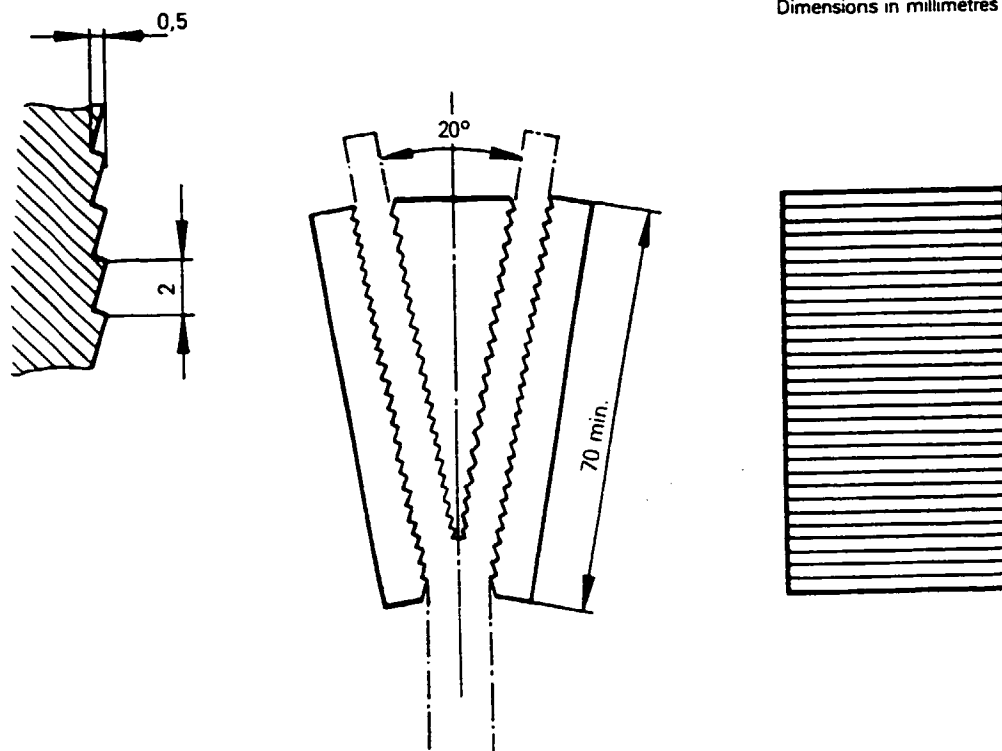


Figure 2

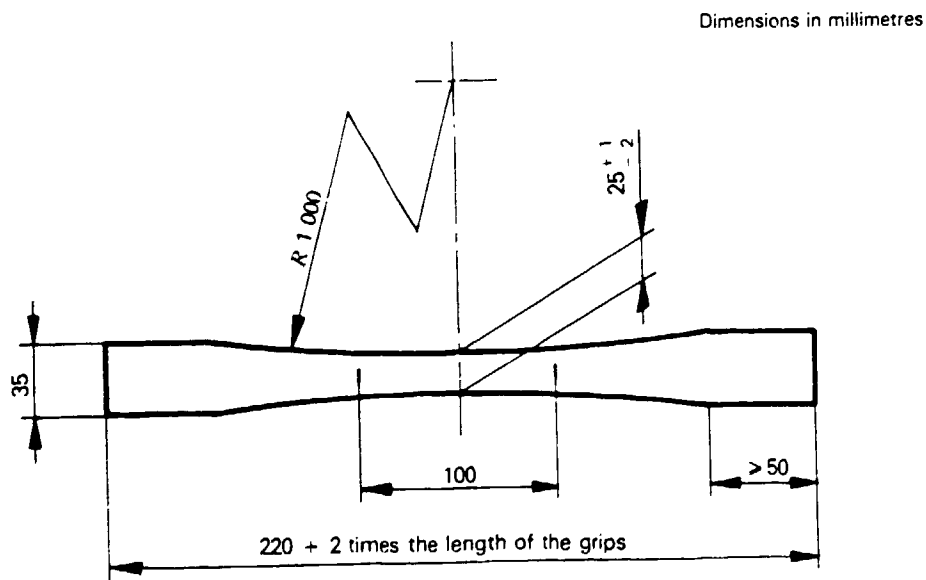


Figure 3 – Type A test piece

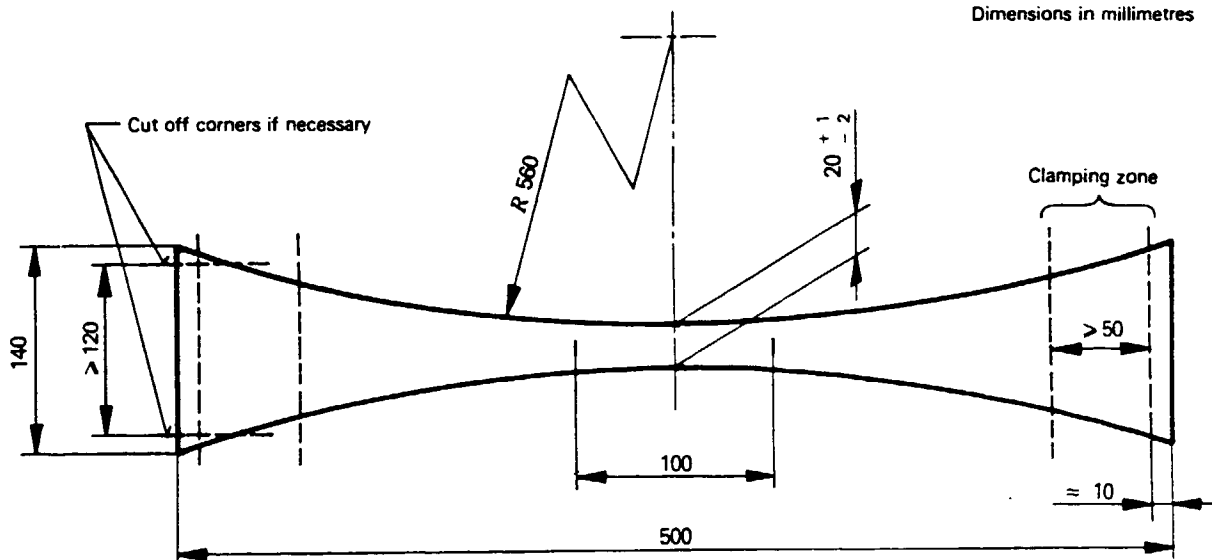


Figure 4 – Type B test piece

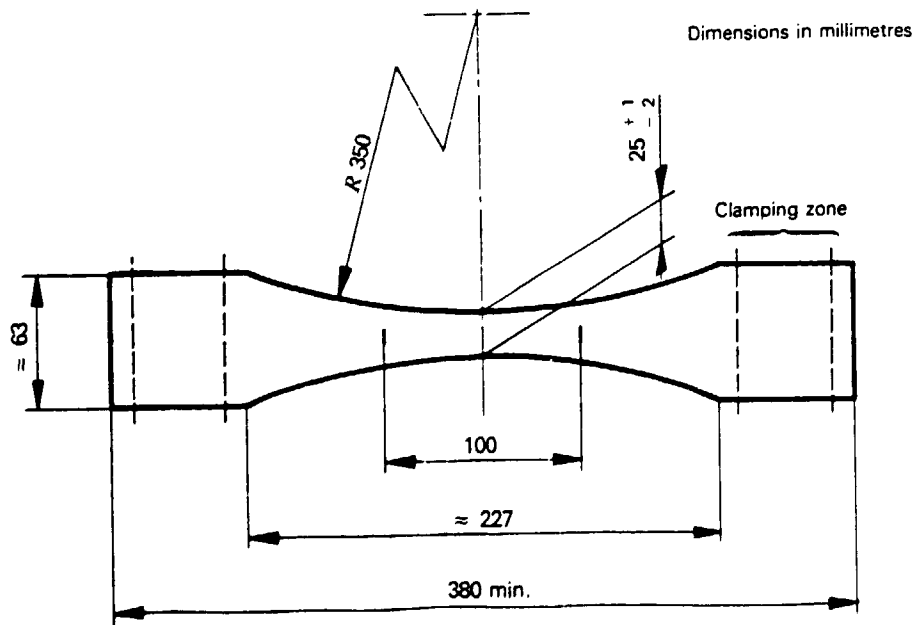


Figure 5 – Type C test piece

3.3.2 Number

- Three longitudinal test pieces.
- Three transverse test pieces.

3.3.3 Method of sampling

Sampling should be done parallel or at right angles to the axis of the belt and at least 50 mm from its edge. It should be done at least 5 days after manufacture.

The die should be moistened before cutting. The cutter angle should be at most 18° (see figure 6).

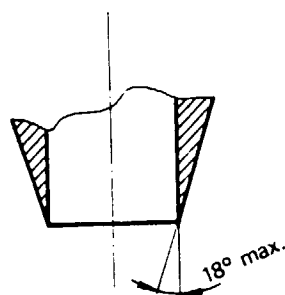


Figure 6

3.3.4 Preparation

On the axis of the test piece draw two datum marks equidistant from the centre and 100 mm apart.

If the covers of the belt are very thick or of very different thicknesses, the test may be performed without covers, in order to avoid slip of the test piece in the grips.

Measure exactly the width of the middle part of the test piece.

NOTE — For certain types of construction, the proposed shapes produce abnormal distribution of stresses in the different threads and systematic slip in the grips, giving misleading results. The test should then be made on test pieces of a different shape.

3.4 Conditioning of test pieces

The test should be performed on test pieces taken at least 5 days after manufacture.

The test pieces should be conditioned for 3 days at a temperature of 20 ± 2 °C and a relative humidity of (65 ± 5) %.

In the event of dispute, the conditioning period should be increased to at least 14 days (with the same temperature and humidity conditions). The exact value of this period may be specified by agreement between the manufacturer and the user.

3.5 Procedure

The distance between the grips should be fixed at

200 ± 10 mm when a type A test piece is used, or the external edges of the grips should be placed at approximately 10 mm from the extremities of a type B or type C test piece.

Exert a continuous (uninterrupted) tensile stress on the test pieces, at the rate of 100 ± 10 mm/min.

For lengthways test pieces, note the gauge length when the tensile stress reaches 10 % of the nominal strength, this being regarded as the reference load.

Continue to read the gauge length until the first sign of destruction of the fabric. Read the breaking load on the chart or on the dynamometer indicator.

Breakage should occur between the two datum marks on the test piece. (Any test pieces which break outside this central portion or which slip in the grips should not be taken into account when calculating the mean, and the test should be repeated on new test pieces).

3.6 Reporting of results

3.6.1 Breaking strength

Strength should be shown in force units and referred to the unit of the width of the test piece.

Calculate separately the mean of the values obtained for the longitudinal direction and the transverse direction. For each of these two cases, the result should be taken as the nearest whole number to the mean value so found.

3.6.2 Elongations

Elongations should be shown as a percentage of the initial gauge length.

For elongation at break, calculate the mean of the values found (in the longitudinal direction). The result should be taken as the nearest whole number to the mean value so found.

For elongation under reference load, calculate the mean of the values found (in the longitudinal direction). The result should be taken as the number rounded to the first decimal place.

3.7 Test report

The test report should mention, in addition to the results found, the following items :

- the mean values;
- the type of test piece used;
- the width of the middle part of the test piece;
- the number of individual values that were used for preparing these means;
- the conditioning period;
- the temperature and relative humidity during the test.

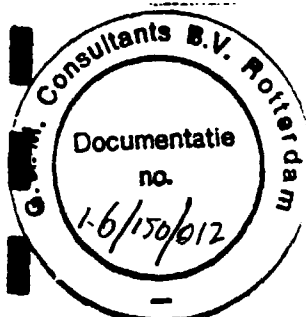
The test report should indicate if the test has been made with or without cover.

INTERNATIONAL STANDARD



505

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION



**Conveyor belts — Tear propagation resistance of the carcass —
Method of test**

Courroies transporteuses — Résistance à la propagation d'une déchirure dans la carcasse — Méthode d'essai

First edition — 1975-05-01

UDC 621.867.212.3/5 : 620.172.25

Ref. No. ISO 505-1975 (E)

Descriptors: belts, conveyor belts, tests, mechanical tests, tear tests, crack propagation.

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 41 has reviewed ISO Recommendation R 505 and found it technically suitable for transformation. International Standard ISO 505 therefore replaces ISO Recommendation R 505-1966 to which it is technically identical.

ISO Recommendation R 505 was approved by the Member Bodies of the following countries :

Australia	Greece	South Africa, Rep. of
Austria	India	Spain
Belgium	Israel	Sweden
Chile	Italy	Switzerland
Czechoslovakia	Japan	Turkey
Denmark	Korea, Rep. of	United Kingdom
Egypt, Arab Rep. of	Netherlands	U.S.A.
Finland	New Zealand	U.S.S.R.
France	Pakistan	Yugoslavia
Germany	Portugal	

No Member Body expressed disapproval of the Recommendation.

No Member Body disapproved the transformation of ISO/R 505 into an International Standard.

Conveyor belts — Tear propagation resistance of the carcass — Method of test

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method of test for the measurement of the propagation resistance of an initial tear in the carcass of conveyor belts.

This test is intended for application to belts used in mines and in installations where there is a risk of longitudinal tearing.

2 PRINCIPLE

The test consists in measuring, by means of tensile testing at a given speed, the force necessary to propagate an initial tear made in a test piece from which the covers have been removed.

3 APPARATUS

The apparatus consists of a **dynamometric tensile testing machine** with the following essential characteristics :

- the machine shall be chosen so that the forces to be measured come within the upper 90 % range of its full rated capacity;
- the speed of separation of the jaws shall be capable of being adjusted to 50 ± 10 mm (2 \pm 0.4 in) per minute;
- the free distance between the jaws shall be capable of being adjusted to at least 300 mm (12 in).

The machine shall be provided with a **device for the graphical recording** of the force necessary to continue tearing the test piece.

4 TEST PIECES

4.1 Shape and dimensions

- Shape : rectangular.
- Length : 300 mm (12 in).
- Width : 100 ± 1 mm (4 \pm 0.04 in).
- Thickness : belt thickness, without covers.

4.2 Number

Two test pieces shall be used : one in sense A and one in sense B. (See figure 4.)

4.3 Method of sampling

Test pieces shall be taken from the sample in the longitudinal direction of the belt and at a minimum distance of 10 mm (0.4 in) from edges of the belt.

4.4 Preparation

The covers of the test pieces shall be removed by stripping or by buffing.

If there is a breaker ply, strip the corresponding covers without cutting the breaker ply over a width of 20 mm (0.8 in) only, i.e. 10 mm (0.4 in) on each side of the longitudinal axis of the test piece with the exception of the zone held in the jaws of the machine (see figure 1).

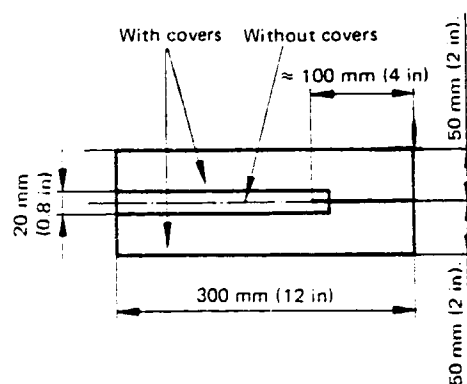


FIGURE 1 — Test piece with breaker

Cut the test pieces from the middle of one of their ends over a length of about 100 mm (4 in) parallel to the length (see figure 2).

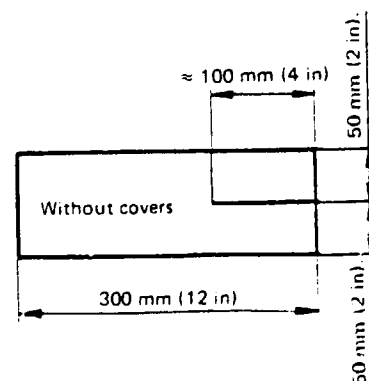


FIGURE 2 — Test piece without breaker

ISO 505-1975 (E)

If necessary, the width of the test piece (cut edge) may be adjusted to the gripping width of the jaws by tapering the edges symmetrically on a length at most the same as that of the cut, as indicated in figure 3, with the width at the end of the cut part as great as the width of the jaws permits.

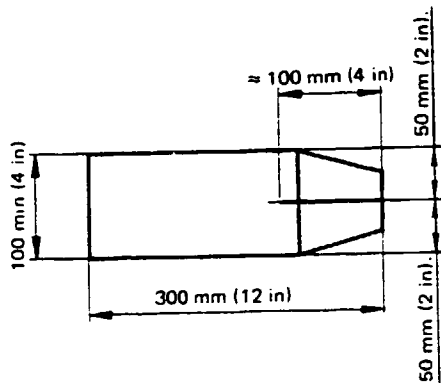


FIGURE 3 - Tapered test piece

5 METHOD OF TEST

5.1 Conditioning of test pieces

The test shall be performed on test pieces taken at least 5 days after manufacture.

The test pieces shall be conditioned for 3 days at a temperature of $20 \pm 2^\circ\text{C}$ and a relative humidity of $65 \pm 5\%$.

In the event of dispute, the conditioning period shall be increased to at least 14 days (with the same temperature and humidity conditions). The exact value of this period may be specified by agreement between the interested parties.

5.2 Test conditions

Tests shall be carried out in a place having a temperature of $20 \pm 2^\circ\text{C}$ and a relative humidity of $65 \pm 5\%$.

5.3 Procedure

Mount the two cut ends of the test piece in the jaws of the tensile testing machine either in sense A or in sense B as indicated in figure 4, so that the inner edges of the cut are situated at the centre of each jaw.

Fix the speed of separation of the jaws at 50 ± 10 mm (2 ± 0.4 in) per minute and continue testing until the tear has extended for at least 100 mm (4 in).

Note the mean tearing force by means of the graphical recording device over the length of the curve corresponding to at least a 75 mm (3 in) tear.

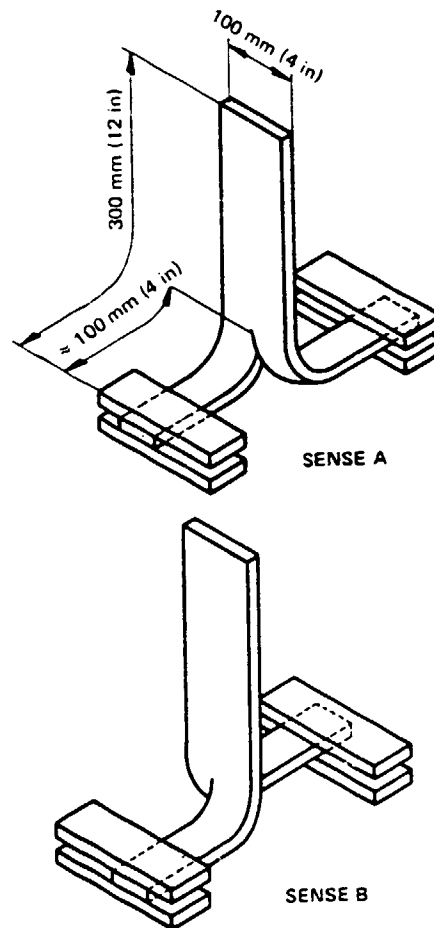


FIGURE 4

6 EXPRESSION OF RESULTS

The tear resistance of a test piece is expressed as the mean tearing force recorded during the test.

Indicate the resistance of each test piece separately and then indicate the mean value of the resistance of the two test pieces.

7 TEST REPORT

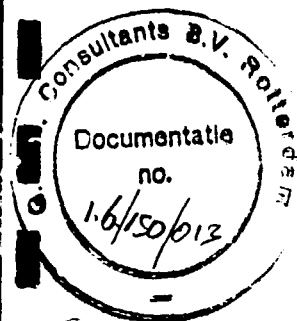
In addition to the results obtained note the way in which tearing occurred. (If weft threads have been pulled out without any characteristic tear, this is considered a tear.)

INTERNATIONAL STANDARD



583

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION - МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ - ORGANISATION INTERNATIONALE DE NORMALISATION



Conveyor belts — Tolerances on total thickness and thickness of covers

Courroies transporteuses — Tolérances sur l'épaisseur totale et l'épaisseur des revêtements

First edition — 1975-05-01

UDC 621.867.212.3/5-181

Ref. No. ISO 583-1975 (E)

Descriptors: belts, conveyor belts, coatings, dimensions, thickness, dimensional tolerances.

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 41 has reviewed ISO Recommendation R 583 and found it technically suitable for transformation. International Standard ISO 583 therefore replaces ISO Recommendation R 583-1967 to which it is technically identical.

ISO Recommendation R 583 was approved by the Member Bodies of the following countries :

Australia	France	Portugal
Austria	Germany	South Africa, Rep. of
Belgium	India	Spain
Brazil	Ireland	Sweden
Chile	Israel	Switzerland
Czechoslovakia	Italy	U.S.S.R.
Denmark	Japan	Yugoslavia
Egypt, Arab Rep. of	Netherlands	
Finland	New Zealand	

The Member Body of the following country expressed disapproval of the Recommendation on technical grounds :

United Kingdom

The Member Bodies of the following countries disapproved the transformation of ISO/R 583 into an International Standard :

Sweden
United Kingdom

Conveyor belts — Tolerances on total thickness and thickness of covers

1 SCOPE AND FIELD OF APPLICATION

This International Standard lays down

- a) the maximum difference between the total thickness measured in any two points of the area of a conveyor belt and the appropriate method of measurement;
- b) the permissible deviations on the thickness of each cover and the appropriate method of measurement. The latter applies only to belts with covers at least 1 mm (0.04 in) thick and which can be completely removed.

However, neither the total thickness of the belt nor the thicknesses of the covers are standardized. They should be fixed by agreement between purchaser and vendor. The deviations mentioned in b) apply to the thickness of the covers specified in this way.

This International Standard does not apply to belts with a metal carcass.

2 REQUIRED CHARACTERISTICS

Designation	Required characteristics	Method of measurement
Maximum difference between the values of the total thickness measured in any two points of the area of the belt	1 mm (0.04 in) if the mean of two measurements does not exceed 10 mm (0.4 in) 10 % of the mean if this exceeds 10 mm (0.4 in)	Sub-clause 3.1
Maximum permissible deviation on the specified thickness of each cover	plus : no limit minus { 0,2 mm (0.008 in) if the specified thickness is equal to or less than 4 mm (0.16 in) 5 % of the specified thickness if this is greater than 4 mm (0.16 in)	Sub-clause 3.2

3 METHODS OF MEASUREMENT

3.1 Total thickness

Apply to the two points chosen a measuring instrument with anvils and graduated in divisions of 0,1 mm (0.004 in).

3.2 Thicknesses of covers

3.2.1 Test piece

Rectangular test piece, taken from the total thickness of the belt including the covers :

width : 50 mm (2 in) approximately

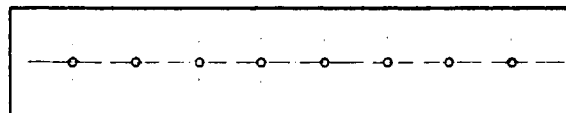
length : equal to the total width of the belt.

3.2.2 Apparatus

Hand micrometer gauge, each arm of which ends in a plate, graduated in divisions of 0,1 mm (0.004 in).

3.2.3 Procedure

Carry out the measurements at eight points distributed evenly along the long axis of the test piece (see figure).



Measure the total thickness h of the test piece at each of these eight points.

Remove one cover completely, then measure the thickness h_1 of the test piece at the same points.

Remove the other cover completely, then measure the thickness h_2 of the test piece at the same points.

NOTE — Any protective fabric (embedded in the covers) which does not participate in the tension exerted on the belt, shall be considered as forming part of the covers and shall therefore be removed with them.

3.2.4 Expression of results

The calculated thicknesses of the covers e_1 and e_2 at each of the eight points are given by the following formulae :

$$e_1 = h - h_1$$

$$e_2 = h_1 - h_2$$

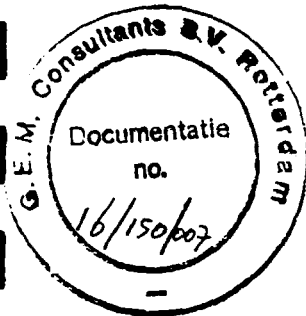
The calculated thicknesses of each cover are taken as equal to the mean of eight values for e_1 and the mean of eight values for e_2 respectively.

INTERNATIONAL STANDARD



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Conveyor belts — Widths and lengths

Courroies transporteuses — Largeurs et longueurs

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 251 was drawn up by Technical Committee ISO/TC 41, *Pulleys and belts (including vee-belts)*. It was submitted directly to the ISO Council, in accordance with clause 6.12.1 of the Directives for the technical work of ISO.

This International Standard cancels and replaces ISO Recommendation R 251-1970, which had been approved by the Member Bodies of the following countries :

Australia	Greece	Spain
Austria	India	Sweden
Belgium	Israel	Switzerland
Brazil	Italy	Thailand
Czechoslovakia	Japan	Turkey
Denmark	Netherlands	United Kingdom
Egypt, Arab Rep. of	New Zealand	U.S.S.R.
Finland	Norway	
France	South Africa, Rep. of	

No Member Body had expressed disapproval of the document.

Conveyor belts – Widths and lengths

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the widths of conveyor belts and the corresponding tolerances, and also tolerances on lengths.

2 WIDTHS AND TOLERANCES

2.1 The widths of conveyor belts are fixed as shown in the table below.

TABLE – Widths of conveyor belts

mm	in
300	12
400	16
500	20
600	24
650	26
800	32
1 000	40
1 200	48
1 400	56
1 600	64
1 800	72
2 000	80

2.2 The permissible tolerances on the widths are fixed as follows :

- a) for the widths of 300 to 500 mm (12 to 20 in) : ± 5 mm ($\pm 3/16$ in)
- b) for the widths of over 500 mm (20 in) : ± 1 % of the value in millimetres

3 LENGTHS AND TOLERANCES

3.1 The lengths of conveyor belts are not standardized.

3.2 The permissible tolerances on the lengths of conveyor belts, measured in loose condition, are fixed as follows :

- a) for belts delivered in the endless state and mounted in that way : $\pm 0,5$ %
- b) for open belts : maximum difference between the delivered length and the ordered length : $\begin{matrix} +2 \\ -0,5 \end{matrix}$ %

NOTES

- 1 This specification is not applicable to underground belts.
- 2 Special cases may be the subject of agreement between the parties concerned.