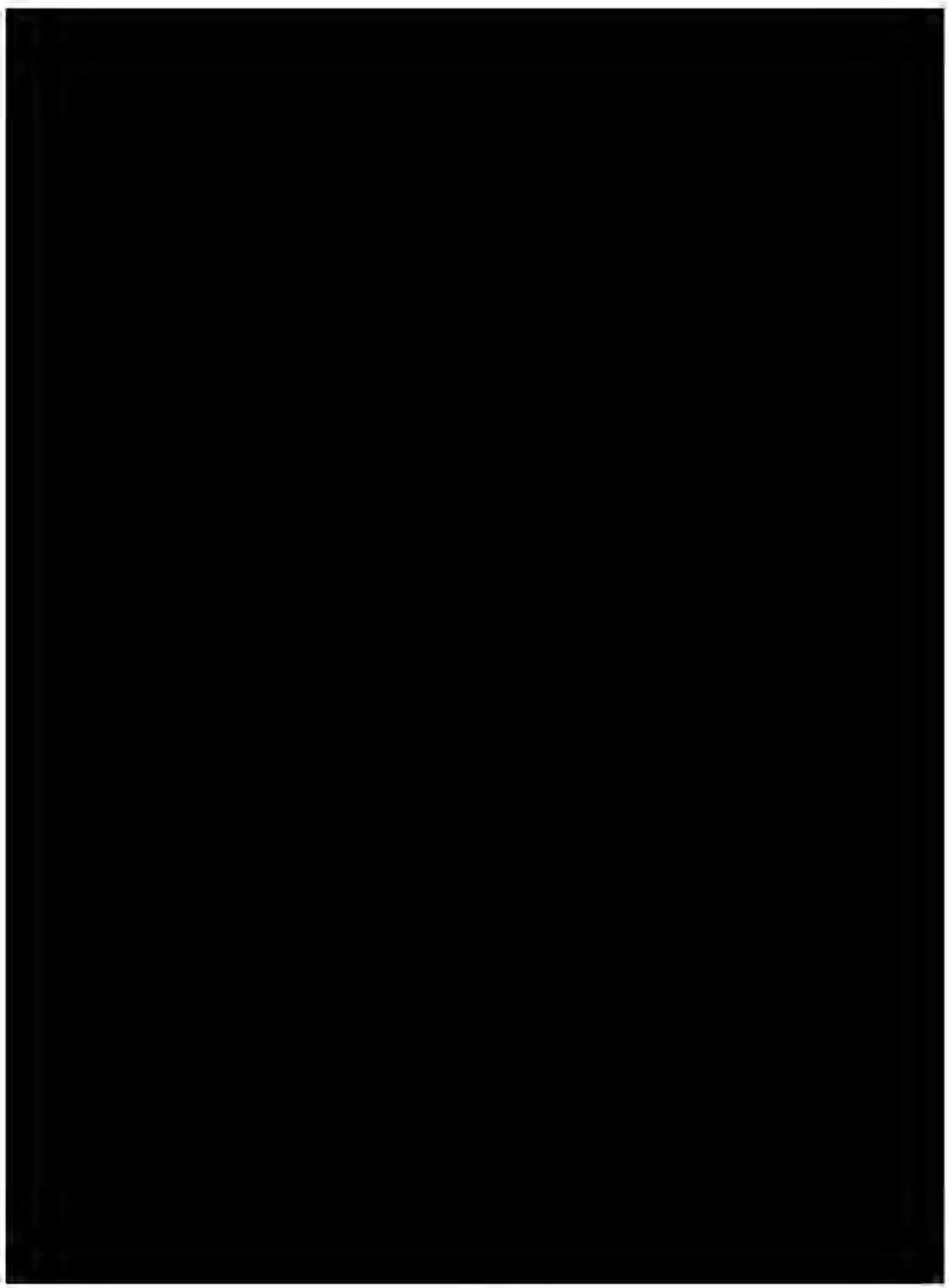
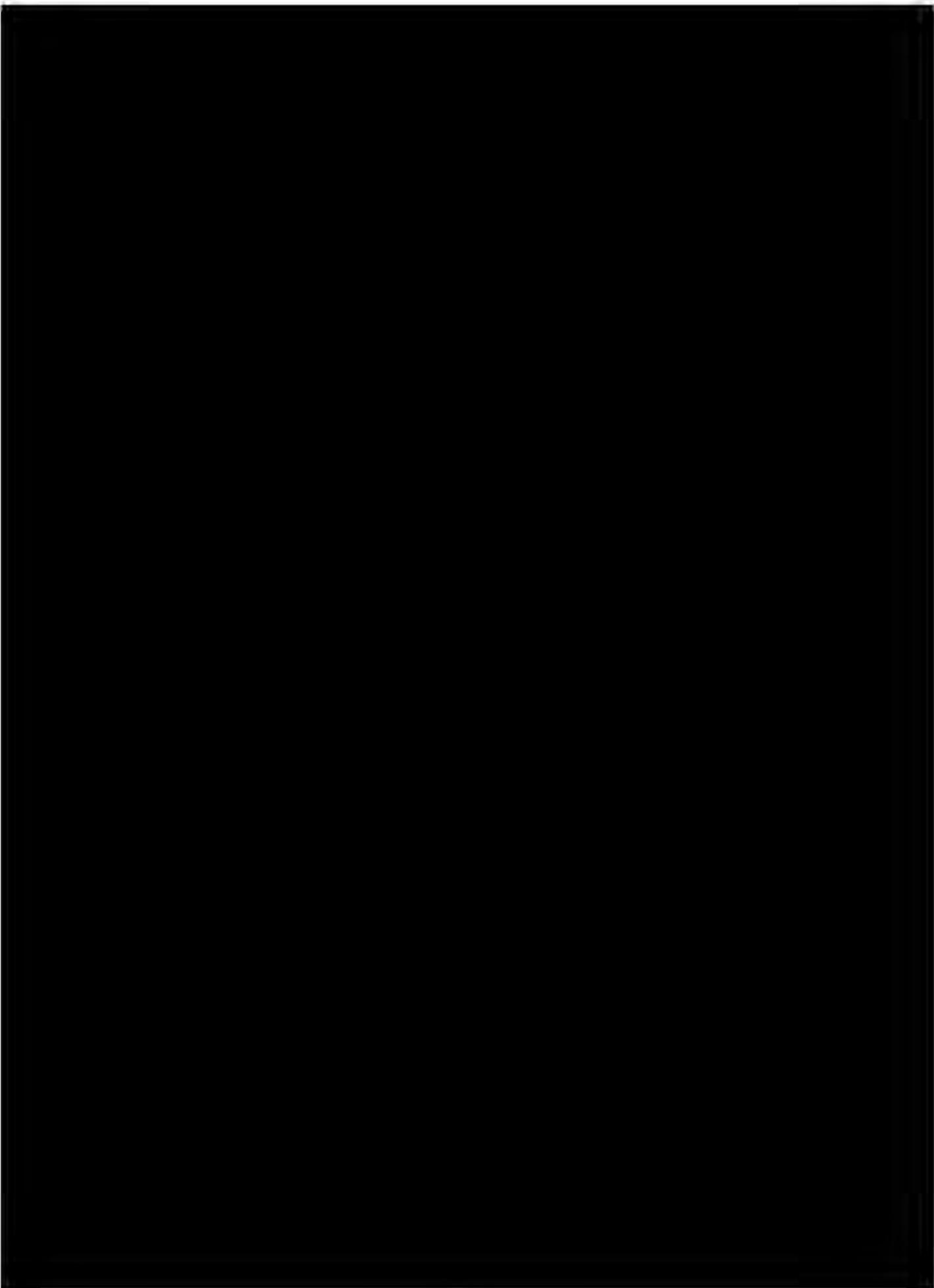


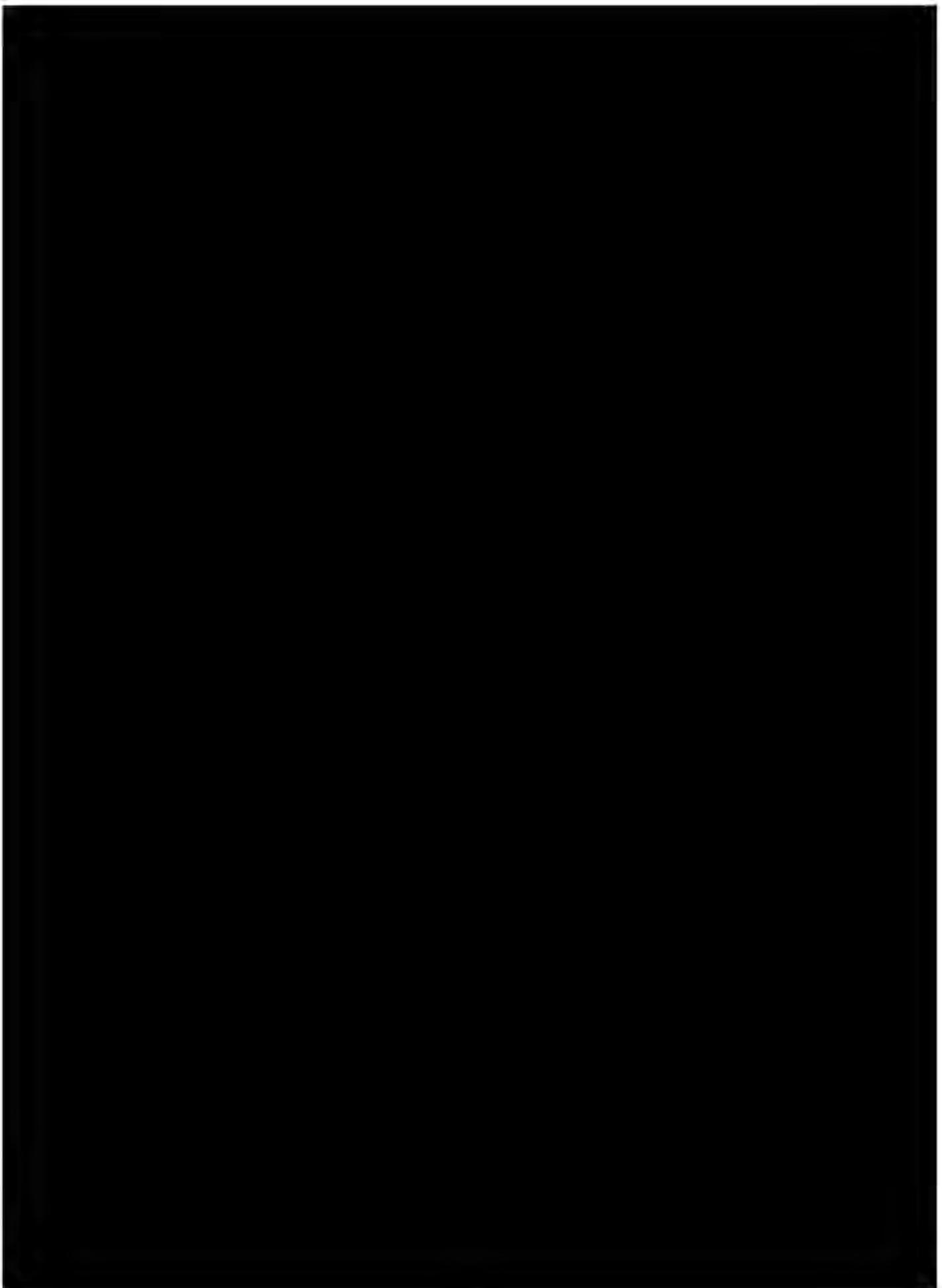
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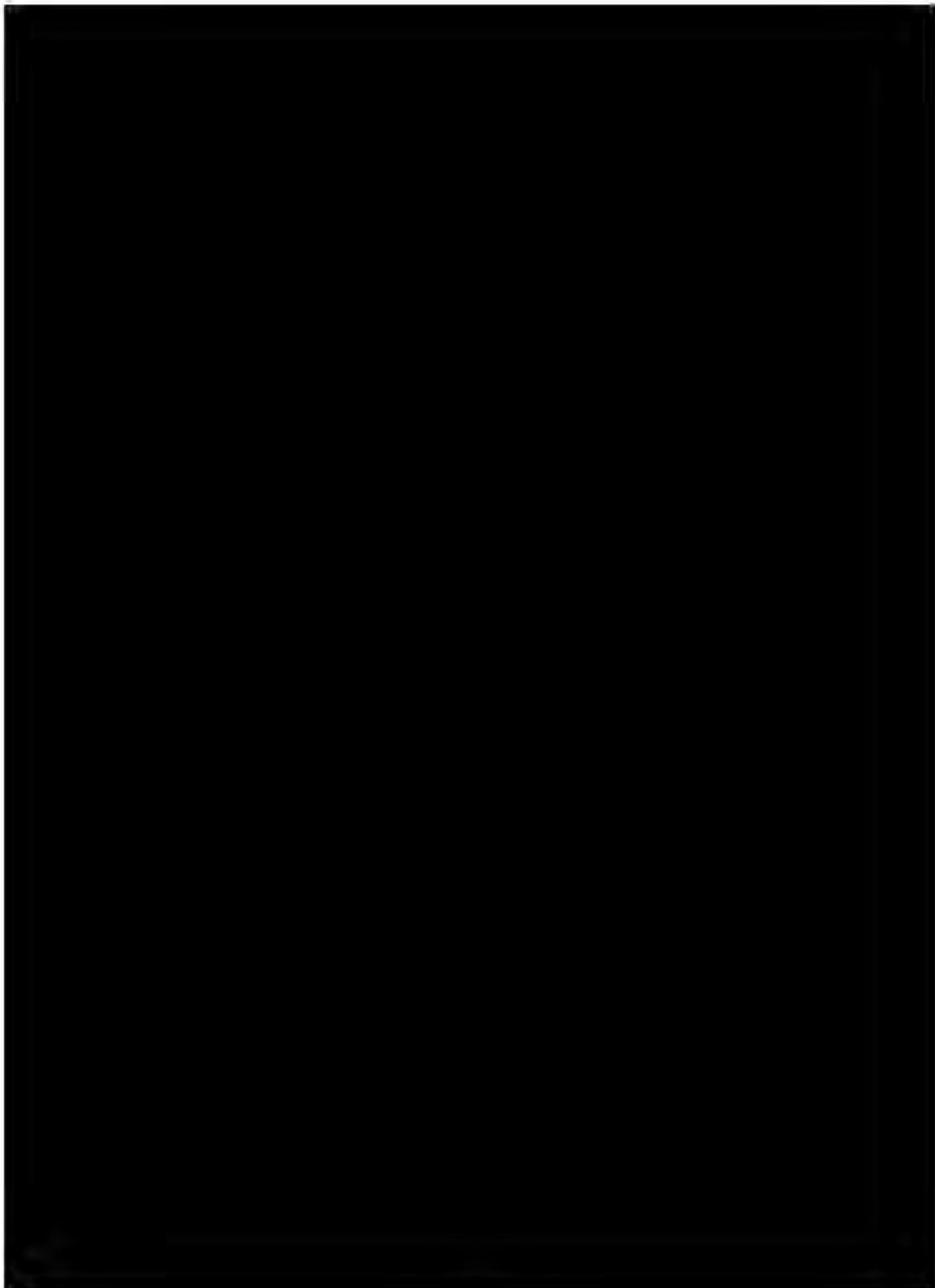
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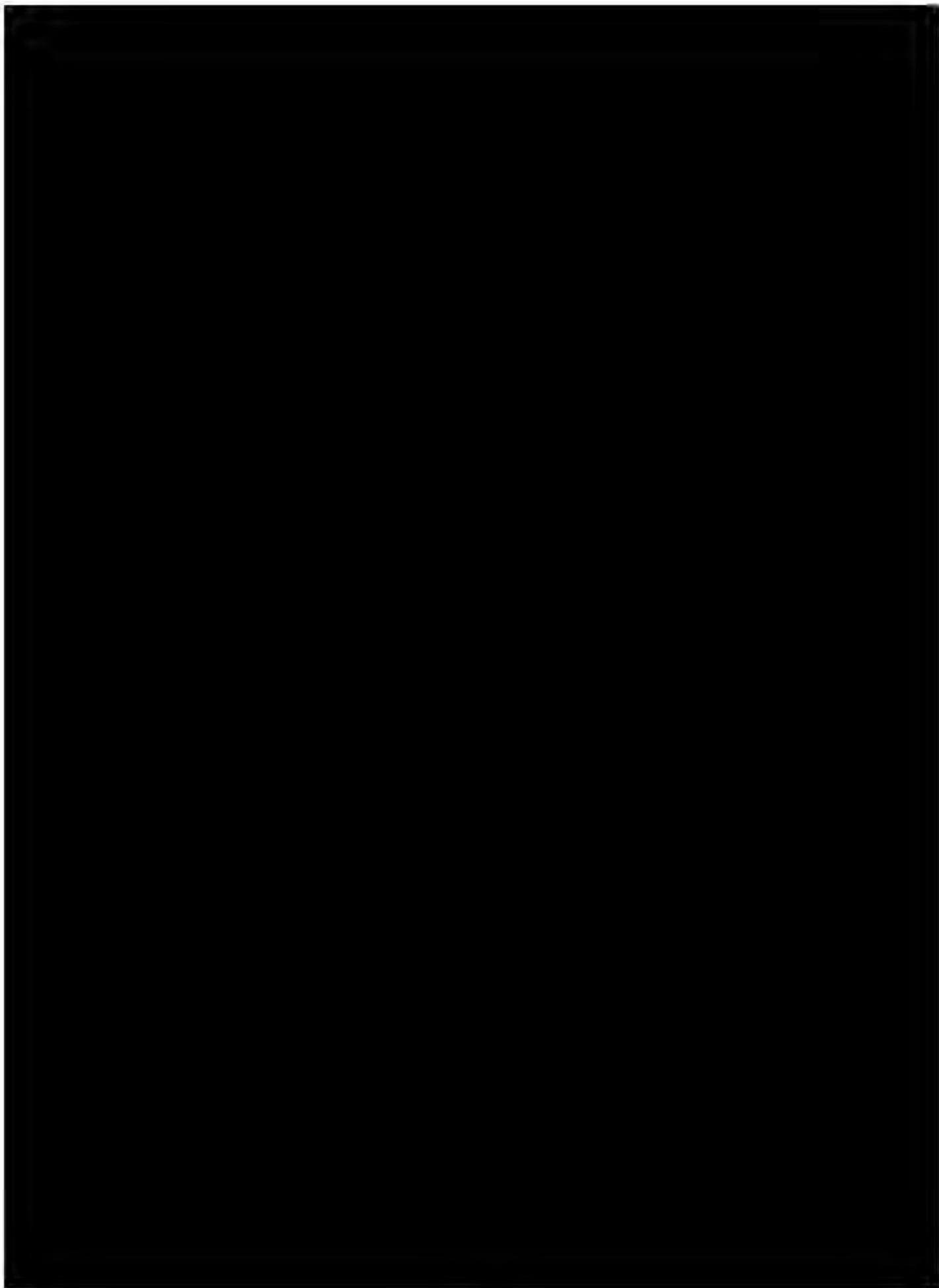
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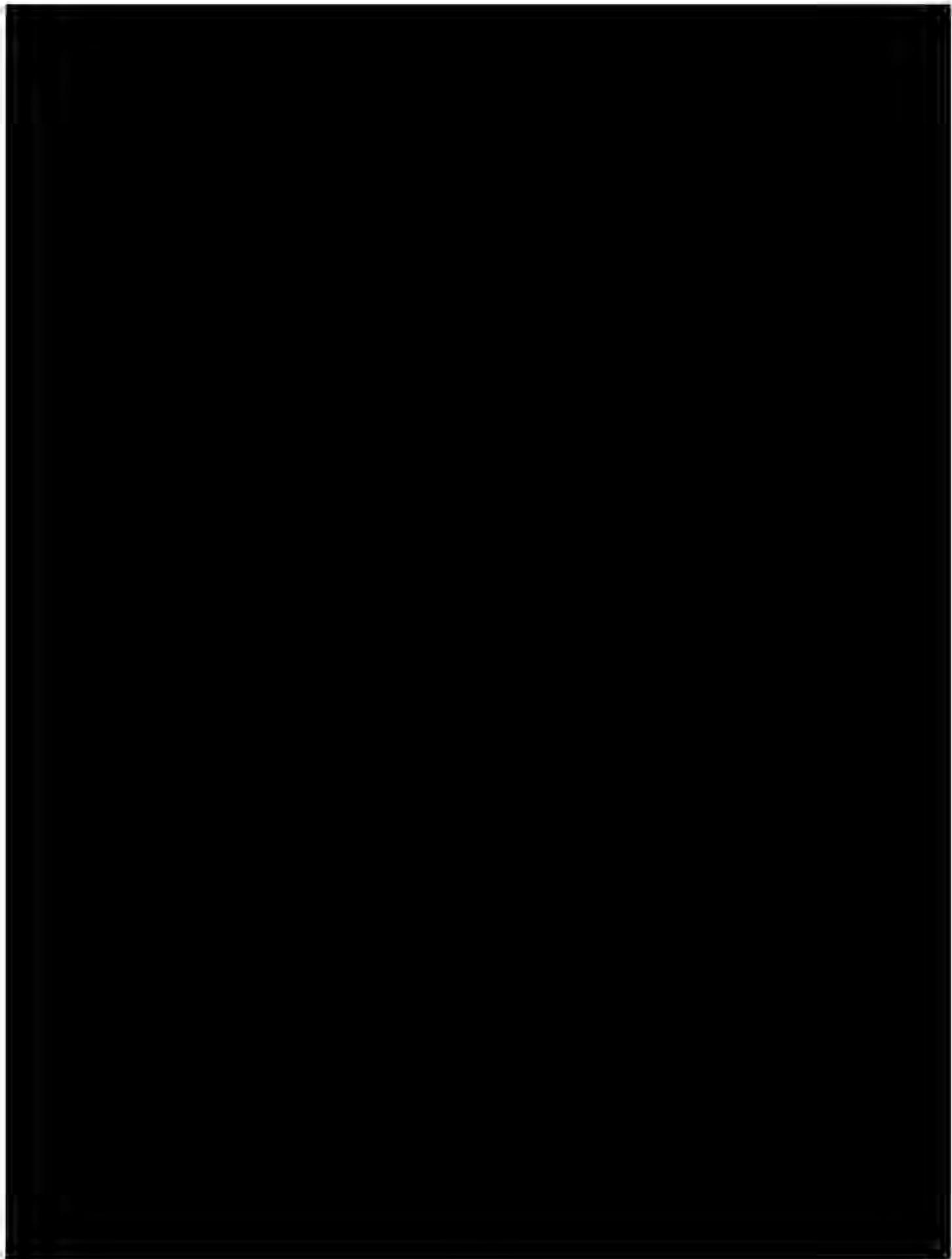
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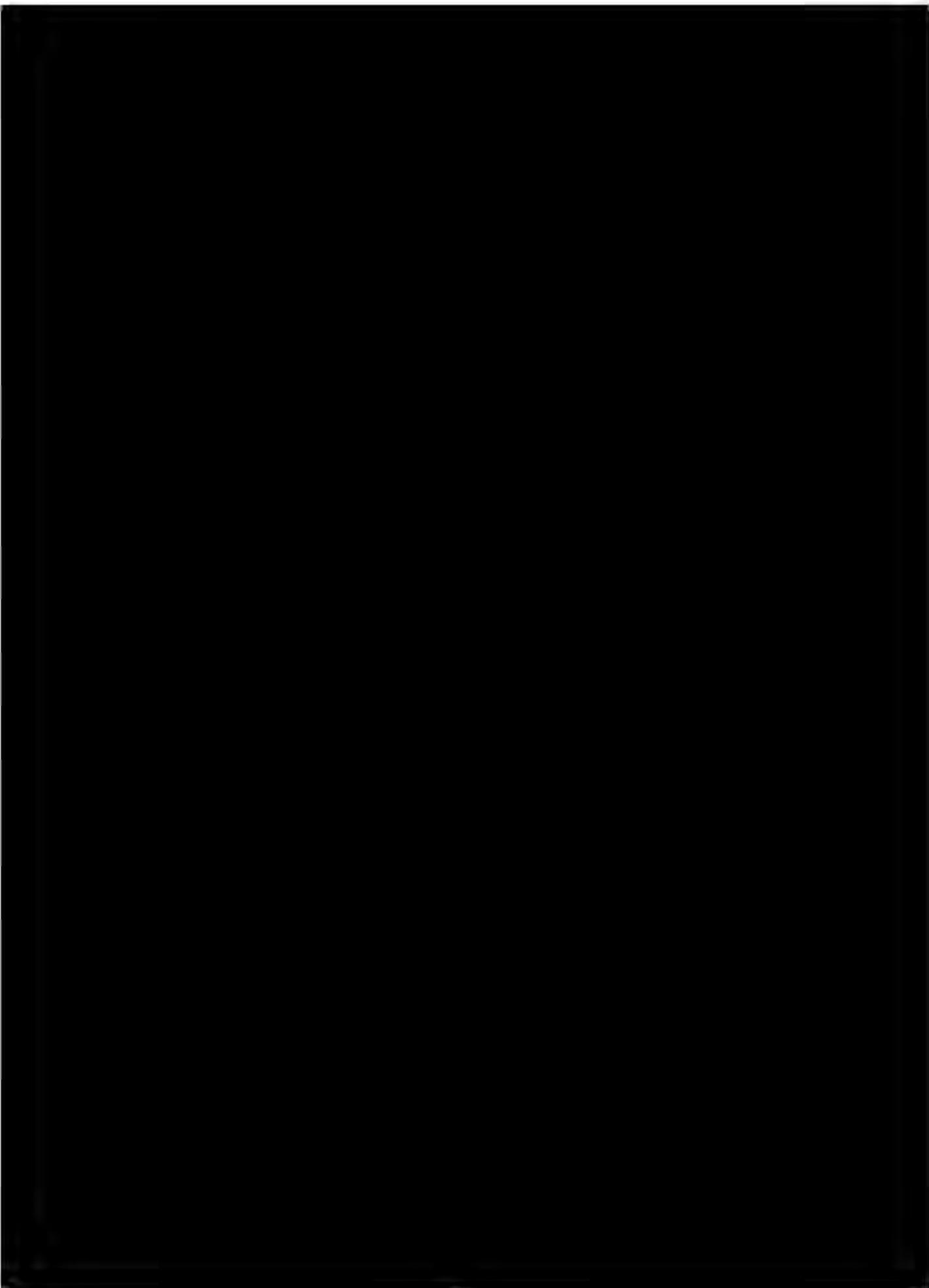
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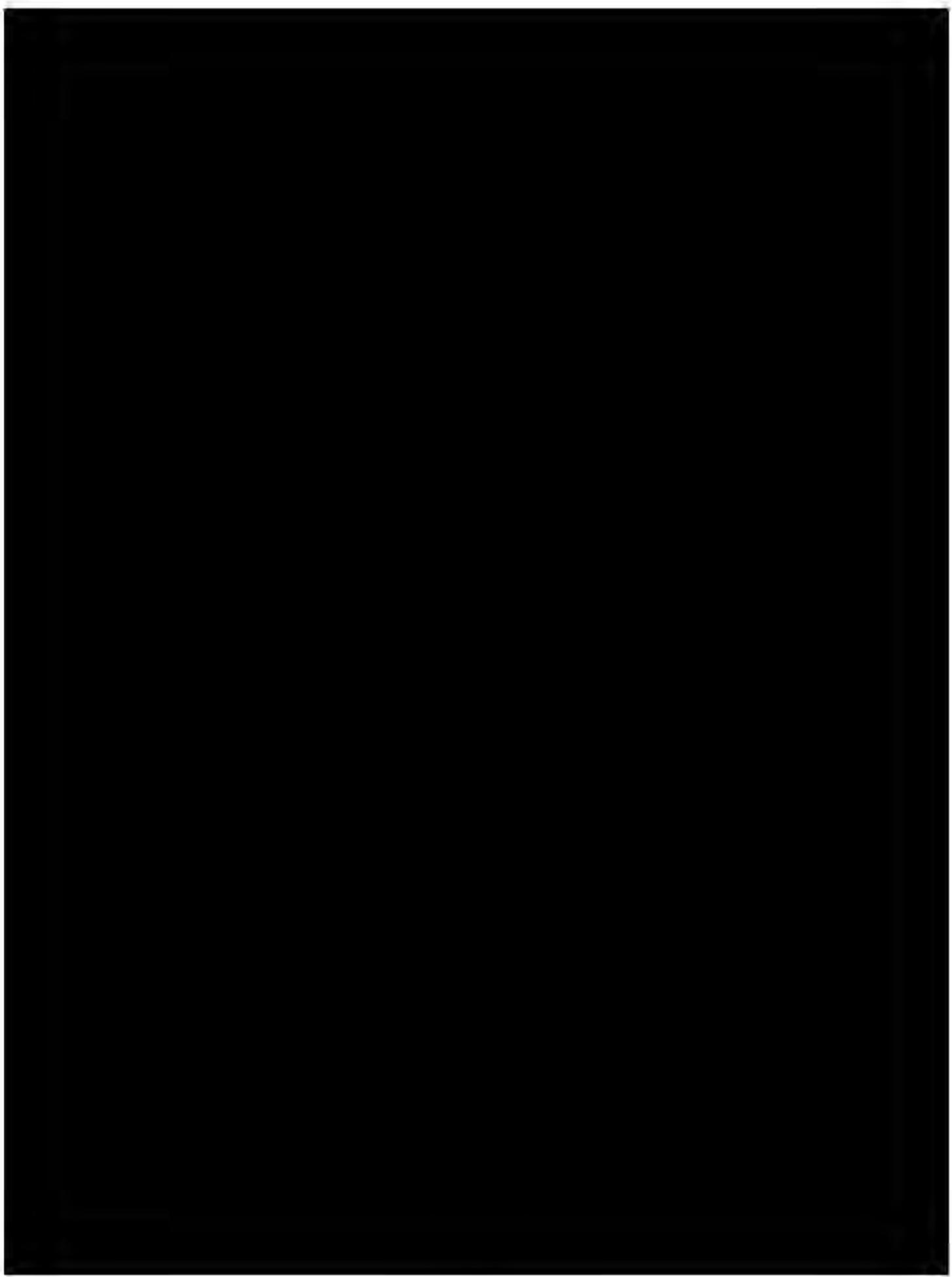
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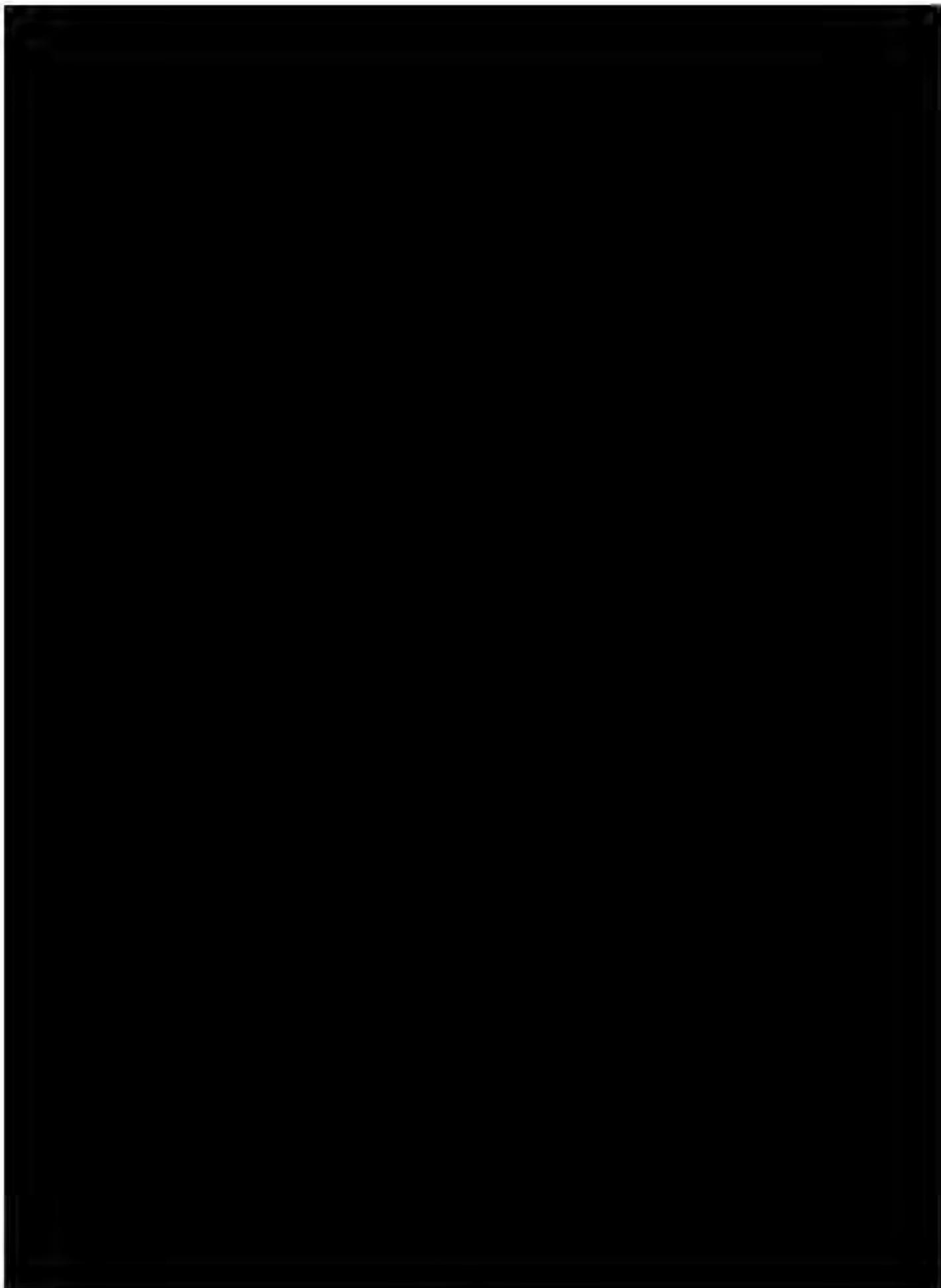
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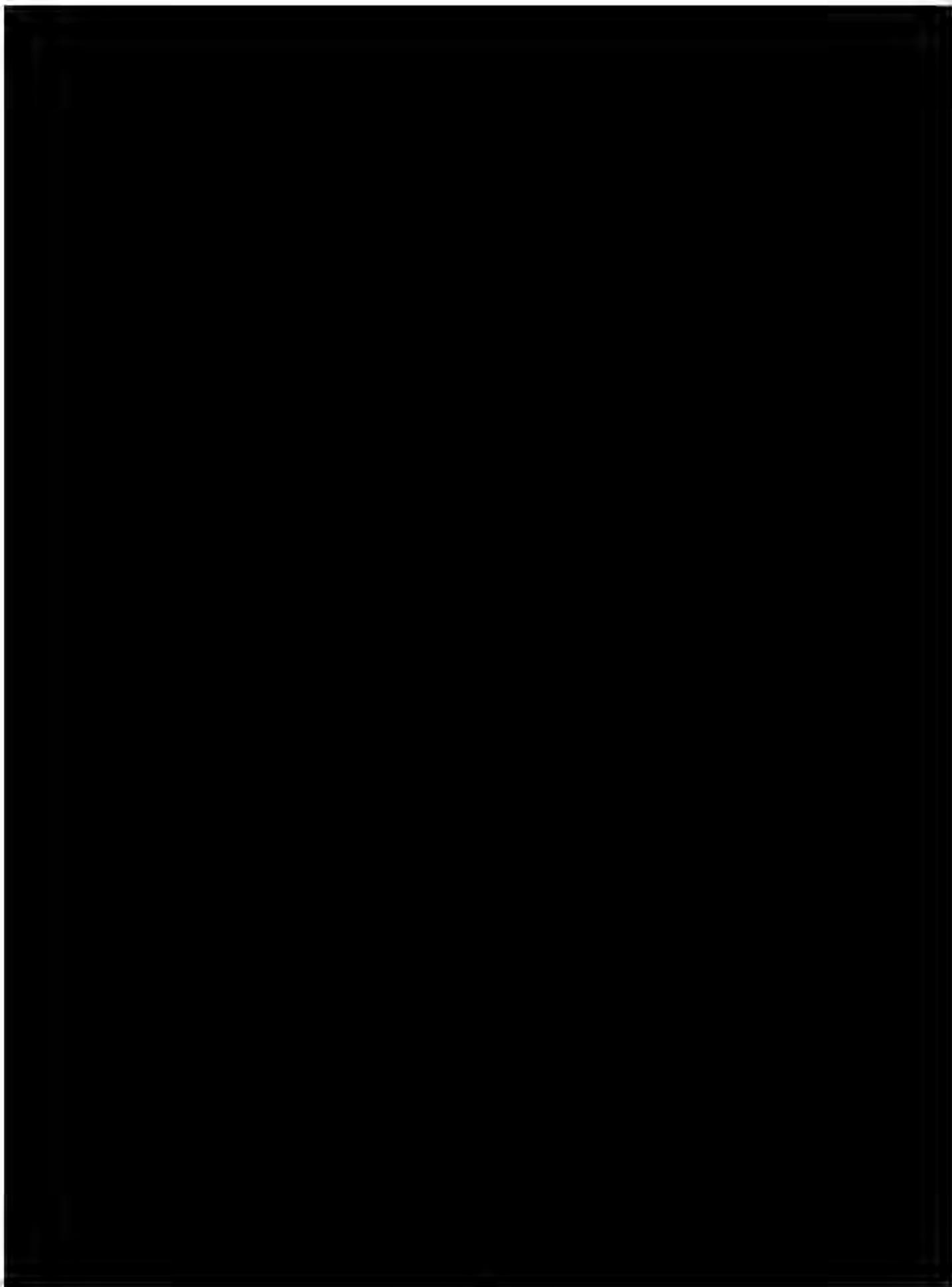
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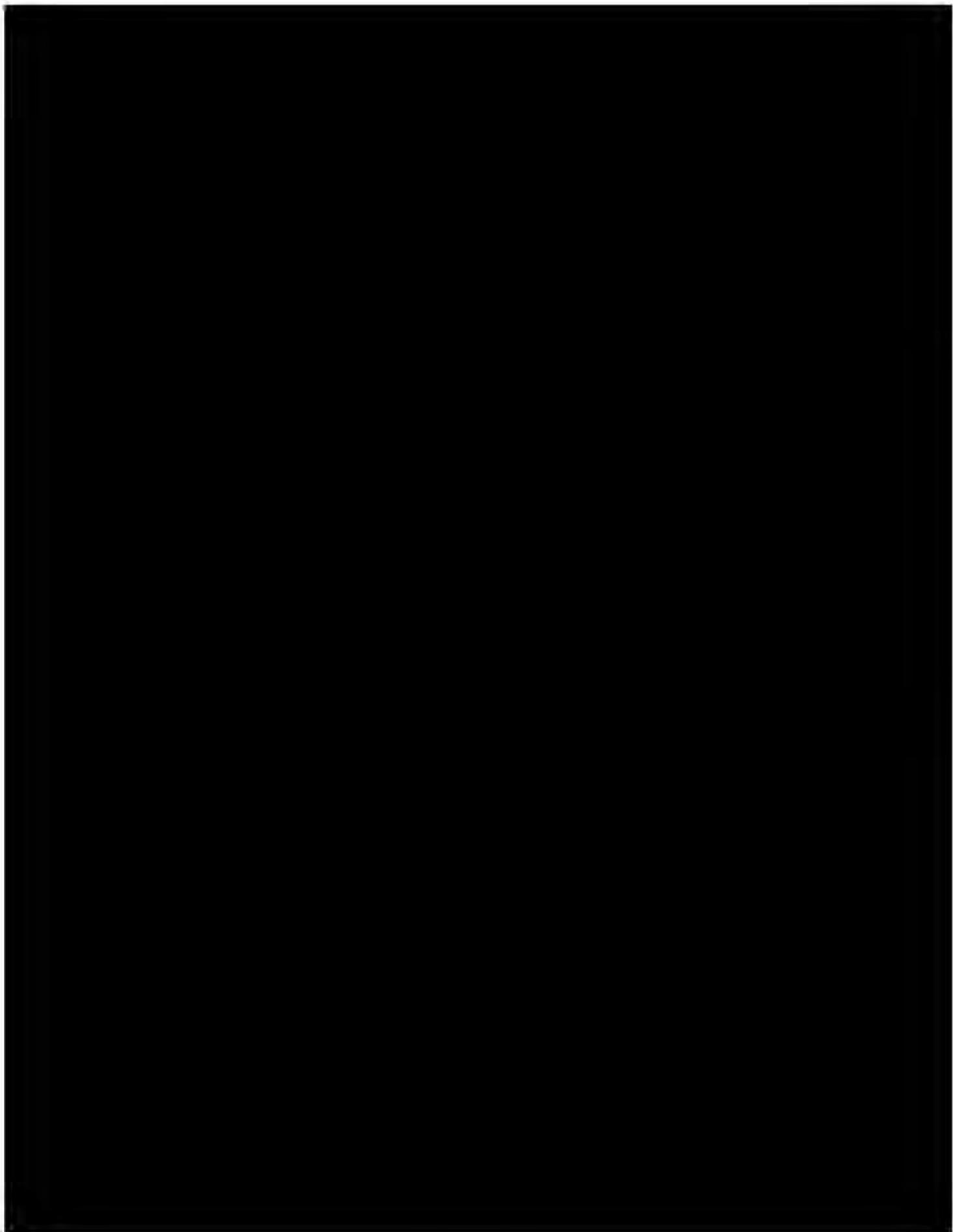
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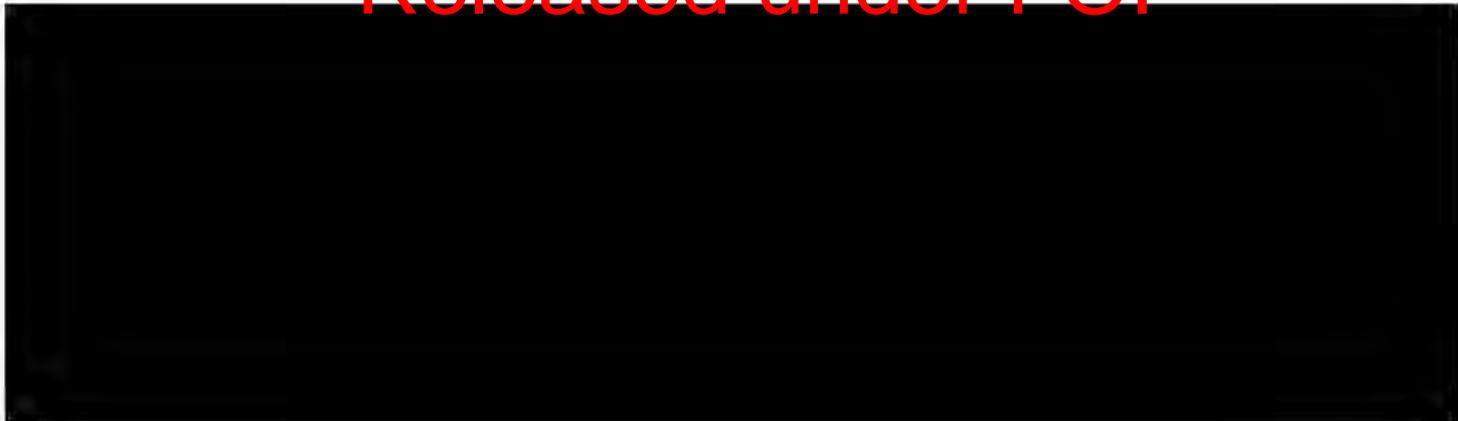
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Date: 01/11/2022

Mandy Ford

Assistant Director - Consumer Product Safety Division

Australian Competition and Consumer Commission

23 Marcus Clarke Street

Canberra, ACT 2601

Australia

Email: mandy.ford@accc.gov.au

Dear Mandy,

Reference: Data Request Submitted to QISU's Website. Reference # 1824

Request Title: Injury and/or fatality data involving the use of products containing lithium-ion batteries

Submission Date: 24/08/2022

Please find below summary of data analysis by QISU.

Summary of your request:

The ACCC is seeking data relating to injuries and/or fatalities associated with consumer use of lithium-ion batteries or products containing lithium-ion batteries for the period between 1 January 2017 and 19 August 2022. We would like to request data as described below:

Products

Some of the consumer products containing lithium-ion batteries we are particularly interested in include:

- mobile phones and tablets
- computers and accessories
- household appliances such as rechargeable vacuum cleaners and electric mops
- e-bikes and e-scooters
- wearable smart devices
- electric cigarettes
- power tools
- camping equipment

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- digital cameras
- residential solar storage systems

Search terms

- Lithium-ion battery
- Lithium-ion batteries
- Lithium

When mentioned with the search terms above, the following terms:

- Thermal runaway
- Overcharging
- Overheating
- Fire

Data fields

If possible, details of:

- number of injuries caused by lithium-ion batteries or products containing lithium-ion batteries
- type and severity of injury
- age of victim
- primary cause of injury
- activity at time of injury
- place of injury
- year of injury
- Burns
- Explosion

Purpose:

Scoping product safety issues and identifying potential hazard prevention strategies relating to lithium-ion batteries is an ACCC Product Safety Priority for 2022-23. This is due to the increasing number of reports of incidents associated with lithium-ion batteries resulting in injuries, fatalities and property damage.

The ACCC is conducting a study focusing on lithium-ion batteries in consumer product and their associated risks associated with these batteries (including thermal runaway), and identifying potential options for mitigating these risks. In the last 5 years, the ACCC has received close to 200 product safety reports relating to lithium-ion batteries, with mobile phones and tablets being the most reported product category (noting our data is not fulsome). Approximately 25% of these reports involved an alleged injury.

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QISU Report on Lithium-ion Batteries (Data Request Number: 1824)

This material is provided on the condition that full acknowledgement for the provision of data and analysis is given to the **Queensland Injury Surveillance Unit (QISU)**.

Please let us know whether any action has been taken as a result of your use of the data, and whether or not a publication (in print or through the electronic media) has been produced.

Background of QISU Data:

QISU collects injury data from emergency departments (ED) at participating hospitals across Queensland. The data is estimated to represent roughly one quarter to one fifth of all ED injury presentations in the state depending on the age group and injury type studied. The QISU database contains injury data collected since 1999. Not all hospitals have participated in data collection during this period. Data is collected in the following Hospital and Health Service areas: Darling Downs HHS, Cairns and Hinterland HHS, Central QLD HHS, Children's Health QLD HHS, Mackay HHS, Metro North HSS, Metro South HHS, North West HHS, Townsville HHS and Wide Bay HSS. Data is coded for Injury Surveillance by using the National Data Standards for Injury Surveillance (NDSIS v.2c).

QISU data is collected at the point of triage; when the triage nurse ticks yes to an injury this triggers an injury module to open for completion by the triage nurses. The injury module fields are not mandatory, allowing the triage nurses to skip part of or all the injury fields depending on clinical flow priorities. Consequently, the data may have missing codes in the injury data fields. QISU coders can supplement coded fields based on information in the injury description field (triage text in EDIS and the Injury Surveillance field in FirstNet).

Each record is validated and coded in accordance with the National Data Standards – Injury Surveillance (NDS-IS) (National Injury Surveillance Unit 1998). This process lags several months behind data intake. In some situations, machine validation can be used to include more recent data.

There are several important notes to be considered when analysing and interpreting QISU data:

- Not all cases identified in the QISU database have been admitted to hospital as the majority of patients are discharged from the emergency department following treatment.
- QISU data will miss cases that present at other non-participating EDs.
- QISU data will also miss cases that may be severe and/or transferred directly to intensive care or other inpatient units at QISU participating hospitals, without being registered in the ED based injury surveillance system.
- QISU data will not capture fatalities that occur at the scene of an injury or after admission to hospital.
- The number of injury cases captured by QISU is influenced by a range of factors, including the number of collecting hospitals and the injury surveillance data completion rate in individual hospitals which varies annually. In general, QISU data is not suitable for trend or incidence calculation.

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Methods:

We analysed QISU data for the five year period from 01/07/2017 to 30/06/2022. A brief summary of the search criteria and methodology is described.

Search Criteria:

Year: 01/07/2017 – 30/06/2022 AND

Injury Description keywords (including misspellings)

lithium, battery, batteries, remote, phone, mobile, iphone, i phone, ipad, i pad, samsung, computer, laptop, lap top, drone, power pack, smart watch, torch, power tool, charg, electric bike, electric bicycle, ebike, e bicycle, electric scooter, e scooter, mobility scooter, vape, e cigarette, camera, camcorder, video, power supply, solar, VR, Wii AND

Injury Description keywords: explos, explode, caught fire, over charg, over heat, melt OR

External code: 14 - fire, OR 16 – exposure to hot object or solid substance

N = 114

The “Injury Description” consists of a brief free text field entered by the Triage Nurse when a person initially presents to the ED with an injury. This free text is examined in order to elicit additional non coded information in relation to the injury event. This analysis is limited by the fact that the entry in this field can vary depending upon triaging style and clinical circumstances at the time when the nurse is attending to the injured person.

A proportion of cases were extracted from QISU coder’s validated data (only up to 31/12/2020) and combined with QISU machine classified preliminary database (data from 01/01/2021 to 30/06/2022).

The same search criteria was used for these two datasets and were then merged. Each case was subsequently manually reviewed for the specific purpose of the data request. This was to ensure that relevant cases were included or excluded. The reviewer checked the following categories for relevance; product type, mechanism of injury, and excluded cases based on product involvement/injury circumstances. Of the 114 cases identified in the initial search criteria, 35 cases across the requested dates were included and 79 cases were excluded as a manual review indicated that they were not relevant to the requested information.

Within the 35 cases, 30 were identified as lithium-ion battery related injuries, and five were identified as potential lithium-ion battery related injuries based on the products involved in the injury. Both as have been included in the report below.

The search strategy does not capture foreign body or caustic injuries related to lithium button batteries.

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Results:

Cases have been grouped into either lithium-ion or potential lithium-ion depending on the specificity in the text narrative. Lithium-ion has been assigned if it states the battery as lithium or if it is highly likely to be lithium-ion related based on the description, size and product type involved in the injury. Potential lithium-ion has been assigned if it is unclear but is still likely to be lithium-ion related based on the product type and description. There were five cases identified as potential lithium-ion related.

1. Demographics

Table 1.1: Distribution of ages and gender (n = 35).

Age range	Male			Female*	Total
	Total	Lithium-ion	Potential Lithium-ion		
0 - 4	2	1	1	0	2
5 - 9	2	1	1	0	2
10 -14	0	0	0	1	1
15 - 24	4	4	0	4	8
25 - 44	17	14	3	1	18
45 - 64	4	4	0	0	4
Total	29	24	5	6	35

*All cases were lithium-ion related.

Table 1.2: Place of injury occurrence (n = 35).

Place of Occurrence	Lithium-ion	Potential Lithium-ion	Total
Unspecified	19	0	19
Home	7	2	9
Trade or service area	2	2	4
Hospital or other health service	2	0	2
Car	0	1	1
Total	30	5	35

Table 1.3: Activity at time of injury (n = 35).

Activity	Lithium-ion	Potential Lithium-ion	Total
Unspecified activity	21	2	23
Working for income	6	3	9
Resting, sleeping, eating, other personal activity	3	0	3
Total	30	5	35

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2. Mechanism of injury

Table 2.1: Type of product by the mechanism of injury (n = 35).

Product	Explosion		Burn		Fire	Unspecified	'Overcharging'*	Total
	Lithium-ion	Potential Lithium-ion	Lithium-ion	Potential Lithium-ion				
Powerpack or energy storage	12	2	1	0	1	2	1	19
Electric mobility device	0	0	1	2	1	0	0	4
Unspecified	1	1	0	0	1	0	0	3
Mobile phone	2**	0	0	0	0	0	0	2
Power tool	2	0	0	0	0	0	0	2
Watch	0	0	2	0	0	0	0	2
Battery charger	1	0	0	0	0	0	0	1
Electric cigarette or vape	1	0	0	0	0	0	0	1
Laptop or tablet	1	0	0	0	0	0	0	1
Total	20	3	4	2	3	2	1***	35

*'Overcharging' without causing fire or burn.

**One case specified an Apple product.

***This case involves an inhalation injury. Please see Table 3.2 below for more details.

Table 2.2: Cases where a product has caused a fire or a smoke inhalation injury (n = 6).

Product	Smoke Inhalation	House Fire	Total
Powerpack or energy storage	3	1	4
Electric mobility device	1	0	1
Unspecified	1	0	1
Total	5	1	6

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3. Nature of injury & body region injured

Table 3.1: Nature of injury by body region injured (n = 35).

Body Regions	Burn		Inhalation or exposure to toxic substance	Multiple Injuries		Unspecified		Wound	Total
	Lithium- ion	Potential Lithium- ion		Lithium- ion	Potential Lithium- ion	Lithium-ion	Potential Lithium-ion		
Unspecified	1	1	8	0	0	0	1	0	11
Upper Limb	9	0	0	0	0	0	0	1	10
Hand	4	0	0	0	0	0	0	0	4
Forearm	2	0	0	0	0	0	0	0	2
Wrist	1	0	0	0	0	0	0	1	2
Elbow	1	0	0	0	0	0	0	0	1
Multiple Body Regions	1	0	0	0	0	0	0	0	1
Head and Neck	2	1	1	0	1	3	0	0	8
Face	1	1	1	0	1	1	0	0	5
Eye	1	0	0	0	0	2	0	0	3
Multiple Body Regions	4	0	0	0	0	0	0	0	4
Lower Limb	1	1	0	0	0	0	0	0	2
Knee	0	1	0	0	0	0	0	0	1
Thigh	1	0	0	0	0	0	0	0	1
Total	17	3	9*	0	1	3	1	1	35

*These were all identified as lithium batteries.

Table 3.2: Mechanism of injury by nature of injury (n = 35).

Mechanism of Injury	Burn		Inhalation or exposure to toxic substance	Unspecified		Multiple Injuries		Wound	Total
	Lithium- ion	Potential Lithium- ion		Lithium- ion	Potential Lithium- ion	Lithium- ion	Potential Lithium- ion		
Explosion	13	1	4	3	1	0	1	0	23
Burn	3	2	0	0	0	0	0	1	6
Fire	1	0	2	0	0	0	0	0	3
Unspecified	0	0	2	0	0	0	0	0	2
'Overcharging'	0	0	1	0	0	0	0	0	1
Total	17	3	9	3	1	0	1	1	35

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Table 3.3: Type of product by nature of injury (n = 35).

Product	Burn or corrosion		Inhalation or exposure to toxic substance	Unspecified		Multiple Injuries		Wound	Total
	Lithium-ion	Potential Lithium-ion		Lithium-ion	Potential Lithium-ion	Lithium-ion	Potential Lithium-ion		
Powerpack or energy storage	8	0	8	1	1	0	1	0	19
Electric mobility device	1	2	1	0	0	0	0	0	4
Unspecified	2	1	0	0	0	0	0	0	3
Mobile phone	1	0	0	1	0	0	0	0	2
Power tool	1	0	0	1	0	0	0	0	2
Watch	1	0	0	0	0	0	0	1	2
Battery charger	1	0	0	0	0	0	0	0	1
Electric cigarette or vape	1	0	0	0	0	0	0	0	1
Laptop or tablet	1	0	0	0	0	0	0	0	1
Total	17	3	9	3	1	0	1	1	35

4. Injury Severity

Table 4.1: Type of product by the urgency at presentation (n = 35).

Product	Resuscitation (immediate)	Emergency (10 minutes)	Urgent (30 minutes)	Semi urgent (60 minutes)	Non urgent (120 minutes)	Total
Powerpack or energy storage	2	5	5	7	0	19
Electric mobility device	0	1	2	0	1	4
Unspecified	1	1	1	0	0	3
Mobile phone	0	1	0	0	1	2
Power tool	0	0	1	1	0	2
Watch	0	0	0	2	0	2
Battery charger	0	1	0	0	0	1
Electric cigarette or vape	0	1	0	0	0	1
Laptop or tablet	0	0	1	0	0	1
Total	3	10	10	10	2	35

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5. Trends Over Time

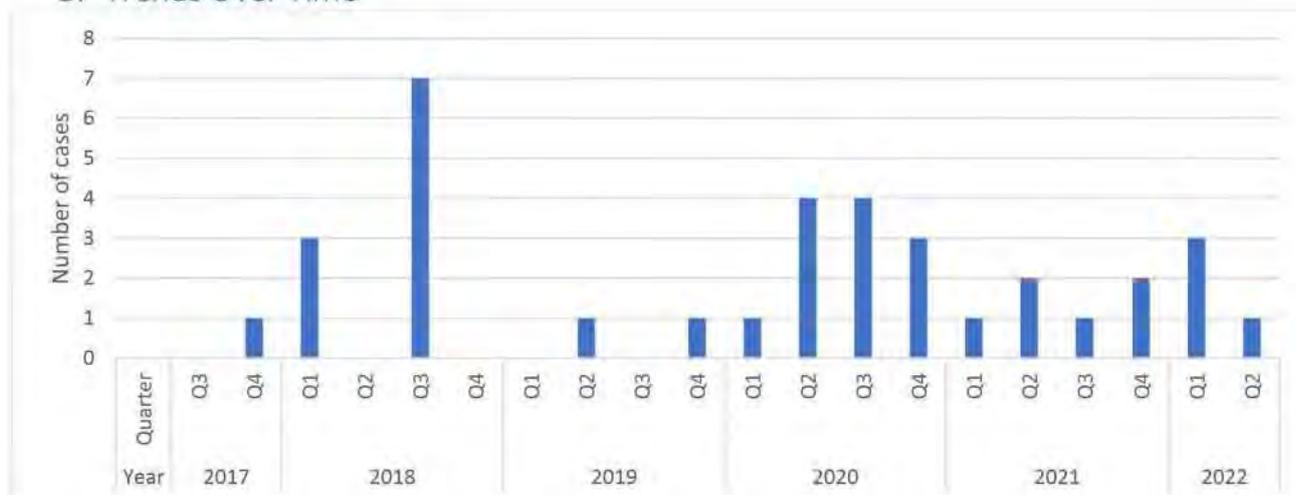


Figure 1

Distribution of cases between July 2017 and June 2022 (n = 35).

Table 5.1: Distribution of cases by year (FY) (n = 35).

Financial Year	Total
2017 - 18	4
2018 - 19	8
2019 - 20	6
2020 - 21	10
2021 - 22	7
Total	35

Table 6: Breakdown of all Lithium-ion Battery cases (n = 35).

Product Type	Description	Mechanism	Place of Occurrence	Urgency	Battery Type
Powerpack or energy storage	1015 INHALED DRY POWDER FROM EXTINGUISHER. LYPO BATTERY EXPLOSION. FIGHTING HOUSE FIRE.	Explosion	Unspecified	Emergency (10 minutes)	Lithium-ion
	POSSIBLE SMOKE INHALATION FROM LITHIUM ION BATTERIES, BATTERIES SELF COMBUSTED WHILE ON CHARGE, WAS EXPOSED TO VERY SMALL MOUNT OF FUMES, MOTHER CALLED THE FIRE DEPT	Overcharging or overcharged	Home	Semi urgent (60 minutes)	Lithium-ion

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EXPOSED TO FUMES OF SELF IGNITING BATTERIES LITHIUM ION, PATIENT CALLED FIRE DEPT. TO DEAL WITH ISSUE	Fire	Home	Urgent (30 minutes)	Lithium-ion
EXPLOSION AT TURPENTINE FACTORY. ? BATTERY EXPLODED EXPOSED EYE. SKULL EXPOSED. RHS SIGNIFICANT FACIAL BURNS, DEEP LACS TO RIGHT SIDE OF FACE.	Explosion	Trade or service area	Resuscitation (immediate)	Potential lithium-ion
LEFT UPPER LEG BURN. LOOKS UNCOMFORTABLE BANDAGE INSITU. MOI LITHIUM BATTERY EXPLODED IN POCKET .	Explosion	Home	Emergency (10 minutes)	Lithium-ion
BURN TO LEFT INDEX FINGER FROM BATTERY HEAT BURN, NOT CHEMICAL	Burn	Unspecified	Semi urgent (60 minutes)	Lithium-ion
EXPOSURE TO GAS EMITTED BY MELTING BATTERY NOW EXPERIENCING NAUSEA, HEADACHE, COLD SWEATS WORKERS COMP	Unspecified	Hospital or other health service	Urgent (30 minutes)	Lithium-ion
EXPOSED TO GAS EMITTED BY MELTING BATTERY STATES IS NOW NAUSEOUS, HEADACHE AND COLD SWEATS WORKERS COMP FORM	Unspecified	Hospital or other health service	Urgent (30 minutes)	Lithium-ion
SMOKE INHILLATION AND SUPERFICIAL BURNS TO HAND RECHARGABLE BATTERY EXPLOSION	Explosion	Unspecified	Emergency (10 minutes)	Lithium-ion
LITHIUM BATTERY EXPLOSION BURNS TO FACE	Explosion	Unspecified	Emergency (10 minutes)	Lithium-ion
EXPOSURE TO UNKNOWN SUBSTANCE POST SMALL ROUND BATTERY EXPLODING NEAR FACE AT 1540. NIL OBVIOUS INJURIES HAS WASHED FACE.	Explosion	Home	Urgent (30 minutes)	Lithium-ion
PAIN TO RIGHT FOREARM, NAUSEA, POST SMALL LITHIUM BATTERY EXPLOSION, RINSED ON SCENE	Explosion	Unspecified	Semi urgent (60 minutes)	Lithium-ion
RIGHT HAND PAIN POST EXPOSURE TO LITHIUM, POST LITHIUM BATTERY EXPOSURE, VOMITED X3 POST,	Explosion	Unspecified	Semi urgent (60 minutes)	Lithium-ion
N AND V + HEADACHE POST ?INHALATION INJURY AT WORK. LITHIUM BATTERY EXPLODED CAUSING FUMES.	Explosion	Trade or service area	Semi urgent (60 minutes)	Lithium-ion
LITHIUM BATTERY EXPLODED IN FACE NO VISION RIGHT EYE	Explosion	Unspecified	Emergency (10 minutes)	Lithium-ion
LITHIUM BATTERY 'EXPLODED'// ?INHALED FUMES, NOW HEADACHE, DROWSY, DIZZINESS	Explosion	Unspecified	Semi urgent (60 minutes)	Lithium-ion
ELECTRICAL BURNS TO FACE AND BILAT ARMS FROM ?BATTERY EXPLOSION	Explosion	Unspecified	Urgent (30 minutes)	Lithium-ion
C SPINE + LUMBAR PAIN. MOI SITTING ON BATTERY IN ARMY CAR WHEN	Explosion	Car	Resuscitation (immediate)	Potential Lithium-ion

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	EXPLODED AND THROWN AGAINST WALL OF CAR.				
	EARS RINGING, SINGED HAIRS TO ARMS, CLOSE TO LARGE FUEL/BATTERY EXPLOSION TONIGHT. FRIEND SEVERELY INJURED POST.	Explosion	Home	Semi urgent (60 minutes)	Lithium-ion
Electric mobility device	SMOKE INHALATION, DIZZY, SORE THROAT, SHORTNESS OF BREATH, MOI ELECTRIC SCOOTER FIRE IN ENCLOSED SPACE.	Fire	Unspecified	Urgent (30 minutes)	Lithium-ion
	BURN FROM OWN ELECTRIC SCOOTER LEFT HAND APPROX 1800HRS PATIENT STATES HAS HAD HAND UNDER COLD RUNNING WATER FOR OVER 1/24HR HAS HAD 2 X RUM CANS POST INJURY	Burn	Unspecified	Urgent (30 minutes)	Lithium-ion
	BURNT ON 18/5, HOT METAL SCALD FROM BIKE. MOI DIDN'T REALISE BURN INITIALLY. HOT PART OF ELECTRIC BIKE.	Burn	Home	Non urgent (120 minutes)	Potential lithium-ion
	INJURY BURN / SCALD FRICTION BURN UNDER RIGHT KNEE FROM ELECTRIC SCOOTER	Burn	Home	Emergency (10 minutes)	Potential lithium-ion
Unspecified	FORKLIFT BATTERY EXPLODED NEAR FACE, SUPERFICIAL BURNS TO FACE, HAEMATOMA LEFT FOREDEAD, LEFT EARING	Explosion	Industrial or construction area	Urgent (30 minutes)	Potential lithium-ion
	BURNS TO LEFT HAND AND ?SMOKE INHALATION SOOT TO BACK OF THROAT. MOI COMPUTER CAUGHT FIRE.	Fire	Unspecified	Emergency (10 minutes)	Lithium-ion
	BURNS TO LIPS/ FACE/ NECK/ ARMS. MOI BATTERY/ PETROL EXPLOSION 1/24 AGO. 20/60 COOL RUNNING WATER.	Explosion	Unspecified	Resuscitation (immediate)	Lithium-ion
Mobile phone	PRESENTS W/ SMALL BURN TO LEFT ELBOW AFTER I PHONE EXPLODED NEAR SAME. HAS RUN COLD WATER OVER SAME AT 15 MINUTES. SMALL BLISTER INTACT.	Explosion	Home	Non urgent (120 minutes)	Lithium-ion
	LEFT EYE INJURY, PATIENT THROWN HIS MOBILE PHONE INTO FIRE LAST NIGHT, WHICH EXPLODED AND HIT HIS EYE, EYE IS CLOSED, BLURRY VISION, SAND LIKE FEELING	Explosion	Unspecified	Emergency (10 minutes)	Lithium-ion
Power tool	PAIN 6/10 LEFT EAR, CHARGE ON NAILGUN HAS EXPLODED, PATIENT NOTES BLOOD FROM EAR AT TIME, NOW HAS PAIN, HEARING LOSS AND RINGING IN HIS EAR.	Explosion	Unspecified	Semi urgent (60 minutes)	Lithium-ion
	POWER TOOL BLEW UP TO RIGHT HAND AND FOREARM. REDNESS AND BLISTERING TO AREA. PIECES OF MELTED TOOL ON SKIN. NORMAL CAP	Explosion	Trade or service area	Urgent (30 minutes)	Lithium-ion

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	REFIL TO SKIN. 6/10 PAIN. ON AND OFF UNDER RUNNING WATER.				
Watch	WOUND TO RIGHT MEDIAL WRIST, MOI ? BATTERY FROM FITNESS TRACKER, ONSET APPROX 1/7 AGO, SURROUNDING REDNESS TO WOUND	Burn	Unspecified	Semi urgent (60 minutes)	Lithium-ion
	BURN TO LEFT WRIST FROM SMART WATCH	Burn	Home	Semi urgent (60 minutes)	Lithium-ion
Battery charger	BURN TO RIGHT INDEX FINGER AND UPPER THIGH > PORTABLE CHARGER EXPLODED IN POCKET 25 MINS COOLING. BLISTER TO RIGHT 2ND FINGER AND BURN RIGHT THIGH 6/10 PAIN. PORTABLE CHARGER EXPLODED	Explosion	Unspecified	Emergency (10 minutes)	Lithium-ion
Electric cigarette or vape	E CIGARETTE EXPLODED BURNS TO ABDOMEN AND RIGHT HAND. NO AIRWAY CONCERNS.	Explosion	Unspecified	Emergency (10 minutes)	Lithium-ion
Laptop or tablet	FLASH BURNS TO EYE WHEN LAPTOP EXPLODED AT 1430 COMPLAINING OF 6/10 PAIN, DIFFICULT TO OPEN EYES, WEEPING FROM BOTH EYES.	Explosion	Unspecified	Urgent (30 minutes)	Lithium-ion

We hope this summary report is useful to you. If you require any further assistance in this matter, please do not hesitate to contact the Queensland Injury Surveillance Unit.

Document prepared by:



Metro North Hospital and Health Services
Herston Qld 4029

